

# TAHOE WATER SUPPLIERS ASSOCIATION PROTECT THE SOURCE



## 2024 Watershed Control Program Annual Report

# **2024 Watershed Control Program Annual Report**

**Prepared for Board Members of the Tahoe Water Suppliers Association (TWSA)**

**Published October 2024**

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\*For electronic appendices, contact [DrinkTahoeTap@ivgid.org](mailto:DrinkTahoeTap@ivgid.org)\*



## INTRODUCTION

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- The purpose of this document is to review and report on the progress of the Tahoe Water Suppliers Association Members' Watershed Control Program (WCP) between July 1, 2023 and June 30, 2024.
- This report contains extensive reference and documentation to significant Tahoe Basin watershed activities, threats, and controls relative to overall water quality for the reporting year.

### Annual Report Objectives and Goals

Eight areas have been identified as the focus of the WCP including: education, monitoring, data management, regulatory, mapping, administration, water conservation, and water rights.

### Annual Report Purpose and Structure

All TWSA members successfully met goals established during the reporting year and remained within Federal and State water quality standards during the reporting year.

- Tahoe's tap water remains some of the purest in the world.
- The water systems have met all drinking water standards for the past 15+ years.
- Based on the quality of the water source and protection programs in place, the TWSA members anticipate the ability to continue to meet the drinking water standards in the future.

This report reflects EPA requirements of an effective Watershed Control Program and includes: an action plan, action plan highlights, description of the water supply, potential sources of pollution, controls, monitoring and data management.

Information specific to the individual purveyors is highlighted in the Agency Annual Data chapter.

The TWSA Watershed Control Program Action Plan and Timeline (in the next section) is updated annually to address TWSA objectives and goals.

### Who We Are

The Tahoe Water Suppliers Association (TWSA) consists of public water suppliers in the Lake Tahoe Basin whose source of drinking water is Lake Tahoe. The purpose of the TWSA is to protect the quality of the purveyors' drinking water from waterborne contaminants that are potentially harmful to human health. Source water protection is an effective tool in a multi-barrier approach to protecting drinking water. In accordance with federal and state guidelines, members of the association have established a Watershed Control Program (WCP) and report annually on their progress.

### Mission Statement

The TWSA mission statement as adopted in June 2008:

*"The mission of the Tahoe Water Suppliers Association is to develop, implement, and maintain an effective watershed control program in order to satisfy recommendations in watershed sanitary surveys, advocate for the protection of Lake Tahoe as a viable source of drinking water, and to satisfy additional state and federal requirements."*

## **TWSA Membership**

### Nevada members

Douglas County (representing three systems)  
Cave Rock Water System  
Skyland Water Company  
Zephyr Water Utility  
Edgewood Water Company  
Glenbrook Water Cooperative  
Incline Village General Improvement District  
Kingsbury General Improvement District  
Round Hill General Improvement District

### California members

Lakeside Park Association.  
North Tahoe Public Utility District  
Tahoe City Public Utility District  
South Tahoe Public Utility District (associate member, non-voting)

## **What is a Watershed Control Program (WCP) Annual Report?**

The 1976 Safe Drinking Water Act regulates drinking water in the United States. Under the Act, the Environmental Protection Agency (EPA) has the authority to set standards for drinking water quality and oversee states, localities, and water suppliers. The 1986 Amendments to the Safe Drinking Water Act included the Surface Water Treatment Rule (SWTR) affecting surface water systems and set specific and measurable treatment standards for surface water purveyors.

Federal and state regulations infer that protecting sources of drinking water by implementing watershed control programs can be an effective barrier in a multi-barrier potable water treatment process.

Surface water systems operating under an exemption to filtration (a.k.a. a non-filtration permit) must complete a Sanitary Survey and Watershed Control Plan every 5 years with annual updates. The purpose of a WCP is to prevent contaminants potentially harmful to human health from entering sources of drinking water. The EPA considers an effective WCP to include, at a minimum, the following components:

- a. Description of the watershed;
- b. Identification and mechanisms to control potential contaminating sources; monitoring program to track existing and new detrimental activities;
- c. Program to gain ownership or control of the watershed;
- d. Annual reports (EPA 2003); and,
- e. Consideration of cryptosporidium in control requirements: Interim Enhanced Surface Water Treatment Rule, Long Term Enhanced Surface Water Treatment Rule, Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule or LT2ESWTR).

The State of Nevada adopted the Safe Drinking Water Act and subsequent updates in NAC 445A. The regulating authority is Nevada Division of Environmental Protection Bureau of Safe Drinking Water. The previous sanitary surveys and Watershed Control Programs fulfilled the requirements of an effective watershed control program, and included: education and outreach, data management, water quality monitoring, mapping, and regional planning and regulation.

Recent requirements for compliance with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule) have been addressed by all TWSA members. Details are provided in later chapters of this report.

## History of TWSA

In 2024, TWSA celebrated its 22nd year as an Association. The 20 Year History of TWSA is posted at: [https://www.yourtahoepace.com/uploads/pdf-public-works/20\\_year\\_history\\_of\\_TWSA\\_5\\_24\\_2022.pdf](https://www.yourtahoepace.com/uploads/pdf-public-works/20_year_history_of_TWSA_5_24_2022.pdf)

Nevada members of TWSA first started working together during the state adoption of the 1986 amendments to the Safe Drinking Water Act (SDWA) and the creation of the Surface Water Treatment Rule (SWTR). Together, the Nevada purveyors were successful in including the following language in the Nevada state code:

“NAC445A.525 Filtration: Avoidance of requirements. (NRS445A.860): 1. A supplier of water may apply to the Division to operate without installing a system for filtration.” “For the Division to determine the adequacy of a watershed control program for a system located at Lake Tahoe, the supplier of water must demonstrate that a level of protection which minimizes the potential for contamination by *Giardia lamblia* cysts, viruses and *Cryptosporidium* is provided by the location of the intake structure and a watershed control program.”

The partnership adopted the essential elements of an integrated water management approach for high-quality source water not requiring filtration including, frequent monitoring, watershed controls, demonstrated history devoid of waterborne disease outbreaks, adequate storage in the event of higher turbidity excursions, and flexibility and redundancy in disinfection process (AWWA). The purveyors also completed the first of three sanitary surveys and control programs (1992) and pilot studies to determine trihalomethane formation potential and ozone disinfection design criteria. As a result, the Nevada State Board of Health granted five suppliers “filtration exemptions,” while one supplier (Round Hill) implemented filtration.

The 1992 plan, and subsequent updates, identified potential risks to source water quality including, sanitary sewer overflows, urban run-off, development, and hygiene practices of summer boaters and visitors. The idea of forming an agency to deal with source water protection issues was presented in 1992; but was not implemented until completion of the 2002 ten-year update plan.

In 2002, with encouragement from State Health officials, five purveyors from the original partnership, Edgewood Water Company, Incline Village GID, Kingsbury GID, Round Hill GID, and Zephyr Water Utility formed an association under a multi-party agreement to address federal and state source water protection regulations and fulfill recommendations of previous sanitary surveys. Appointed staff members from each agency from the TWSA board. The largest partner, IVGID, offers its Resource Conservationist as the association’s Executive Director. In 2002, the Nevada Tahoe Water Suppliers Association (NTWSA) was formed. In 2003 the Association added Glenbrook Water Cooperative. The NTWSA changed its name to the Tahoe Water Suppliers Association (TWSA) in December 2005 with the addition of the first California water purveyor, North Tahoe PUD. This was followed quickly by the Cave Rock Water System, Skyland Water Company, and Tahoe City PUD, all in 2007, and Lakeside Park Association, and South Tahoe PUD in 2008.

The agreement stipulates cost sharing of expenses incurred by IVGID on behalf of the association. Members pay an annual fee, in part proportional to the size of their service areas, and in part in equal amounts representing common administrative costs. The TWSA budget averages \$150,000-\$175,000 annually, for staff and operating costs. Current TWSA source water protection programs include extensive consumer awareness campaigns on source water protection and appreciation of our amazing drinking water source, a multitude of regional pollution prevention partnership projects, and representation at regional working groups regarding aquatic invasive species, sustainable recreation, emerging contaminants, mutual aid support, and other watershed topics.

## I. TWSA ACTION PLAN

TWSA members use the following Action Plan to accomplish the goals of the Watershed Control Program.

PROGRAM	ACTION	RESPONSIBLE PARTY AND PARTNERS	TIMELINE
<b>Education</b>			
<b>1.0</b>	Continue to improve the TWSA education program by redefining the theme and message	TWSA, TRPA, NTCD, HOAs, USFS	2006-ongoing
<b>1.1</b>	Provide current information, education materials, and reports on TWSA websites ( <a href="http://TahoeH2O.org">TahoeH2O.org</a> and <a href="http://DrinkTahoeTap.org">DrinkTahoeTap.org</a> )	TWSA	Updated quarterly 2004-ongoing
<b>1.2</b>	Create and distribute posters, flyers, brochures, inserts, web media, reminder stickers, booth materials, and print and radio media	TWSA, NTEEC, NTCD, HOAs, USFS, Local and State agencies, officials, and PIO's	2005-ongoing
<b>1.3</b>	Include source water protection information in current customer information mailings, CCRs, new customer mailings, BMP/Water Auditing	TWSA, member agencies	2005-ongoing
<b>1.4</b>	Distribute information at community events	TWSA, HOA's, community partners and environmental groups	2006-ongoing
<b>1.5</b>	Participate in industry level source water protection efforts (AWWA, WEFTEC, others). Provide local professional development opportunities for TWSA members.	TWSA	2006-ongoing
<b>1.6</b>	Track customer responses, outreach efforts, web visits, and summarize activities.	TWSA	2005-ongoing
<b>1.7</b>	Incorporate Aquatic Invasive Species information in TWSA outreach.	TWSA, TRCD, TRPA	2008-ongoing
<b>Monitoring</b>			
<b>2.0</b>	Improve current surface water monitoring programs by improving the sampling programs, refining analyses, and reporting success.	TWSA, UNR, LTEEC, NTCD, TRPA, NDEP, TCS	2005-ongoing
<b>2.1</b>	Incorporate potential parameters of concern into surface water monitoring programs in the Lake Tahoe Basin. The newest example is microplastics.	TWSA, UNR, NTEEC, NTCD, TRPA, NDEP, LRWQCB	2005-ongoing
<b>2.2</b>	Prepare a project proposal to study climatic effects on source water quality and potential sources of pollution.	TWSA, UNR, DRI, TSC, TERC	Microplastics grant 2019-22; Other research being conducted (DRI, TSC, TERC, UNR)
<b>2.3</b>	Research potential grant funding for monitoring programs.	TWSA, UNR, USACE	Ongoing
<b>2.4</b>	Define the elements of a surface water risk assessment. Provide information to local planning agencies.	TWSA, TERC, AWWA Source Water Protection, Black and Veatch	Phase 2 completed June 2014 with funding from NDEP and TWSA. Phase 1 was completed Oct. 2008.



<b>Data Management</b>			
<b>3.0</b>	Improve reporting process for intake samples; annual submission of Watershed Control Plan.	TWSA board and staff	2003-ongoing
<b>3.1</b>	Gather, track, and report regularly on TWSA partners' operations, management, project planning, or other changes that may affect water quality.	Planning agencies, local water districts, environmental education programs, recreation facilities	2003-ongoing
<b>Regulatory</b>			
<b>4.0</b>	Participate in regional planning efforts, including general and technical committees, the TRPA Shorezone Ordinance Amendment process, and the Lahontan Regional Water Quality Control Board Amendment Process.	TWSA board and staff, partners, regulating authorities	2004-ongoing
<b>4.1</b>	Promote TWSA objectives and goals by attending stakeholder meetings and offering presentations or testimony.	Planning agencies, local water districts, environmental education programs, recreation facilities	2006-ongoing
<b>4.2</b>	Set the trigger for water supplier notification during a plan review that includes activities that may affect drinking water quality.	TRPA, TWSA, NDEP, LRWQCB	2007-ongoing
<b>4.4</b>	Public comment and working group involvement in Aquatic Invasive Species management plans and projects.	Planning agencies, TWSA, other local water districts, TKPOA, HOAs, environmental education programs	2006-ongoing
<b>Mapping</b>			
<b>5.0</b>	Mapping of potential contaminating sources.	TRPA, Counties, TWSA staff	2004-ongoing
<b>Administration</b>			
<b>6.0</b>	Develop a plan to incorporate new members into TWSA. The Bylaws revision was finalized in March 2017.	TWSA	2005-ongoing
<b>6.1</b>	Review other agencies to improve the annual reporting process.	TWSA	2006-ongoing
<b>6.2</b>	Submit Annual Report to NDEP –BSDW, CA DDW, TWSA members, and other regulators. Post on website.	TWSA	Annual December
<b>6.3</b>	Review TWSA goals.	TWSA	Annually reviewed 2009-ongoing

<b>Water Conservation</b>			
<b>7.0</b>	Incorporate water conservation and source water protection information into packets and education programs.	TWSA, NTCD, TRCD	2005-ongoing
<b>7.1</b>	Research current water use and water conservation programs in the Lake Tahoe Basin.	TWSA	2005-ongoing
<b>7.2</b>	Develop a collaborative water conservation program.	TWSA, NTCD, other partners	2005-ongoing
<b>7.3</b>	Research potential grant funding.	TWSA, NTCD, other partners	2005-ongoing
<b>Water Rights</b>			
<b>8.0</b>	Review the Tahoe annual diversions report prepared by the Nevada State Engineers office.	TWSA, member agencies	ongoing

#### Acronyms

AWWA: American Water Works Association  
 BMP: Best Management Practices  
 BSDW: Bureau of Safe Drinking Water (NV)  
 CCR: Consumer Confidence Report  
 DDW: Division of Drinking Water (CA)  
 DRI: Desert Research Institute  
 EPA: Environmental Protection Agency  
 HOA: Homeowners' Association  
 IWMP: Integrated Weeds Management Plan  
 LRWQCB: Lahontan Regional Water Quality Control Board (CA)  
 LT2ESWTR or LT2 Rule: Long Term 2 Enhanced Surface Water Treatment Rule  
 NRWA: Nevada Rural Water Association  
 NDEP: Nevada Department of Environmental Protection  
 NTEEC: North Tahoe Environmental Education Coalition  
 NTCD: Nevada Tahoe Conservation District  
 PIO: Public Information Officer  
 TERC: Tahoe Environmental Research Center (UC Davis)  
 TKPOA: Tahoe Keys Property Owners Association  
 TRPA: Tahoe Regional Planning Agency  
 TRCD: Tahoe Resource Conservation District  
 TCS: Tahoe Science Consortium  
 TWSA: Tahoe Water Suppliers Association  
 UNR: University of Nevada, Reno  
 USEPA or EPA: United States Environmental Protection Agency  
 USFS: United States Forest Service  
 USACE: US Army Corps of Engineers

## II. TWSA ACTION PLAN HIGHLIGHT

### Executive Summary of TWSA Action Plan Accomplishments

The Tahoe Water Suppliers Association (TWSA) Annual Report compiles water quality data and water utility activities for 11 members (with Tahoe intakes) of the Association. It also provides an annual summary of regional watershed-relevant activities such as research and pollution control programs. It has been continuously published since 2003 and can be referenced at:

<https://www.yourtahoeplace.com/public-works/water/source-water-protection/documents-links>

This executive summary provides key information on TWSA programs and partner projects. TWSA has provided a unified voice for source water protection and watershed protection, developed strong relationships with local research and regulatory agencies, and offered professional development opportunities for member staff since 2002.

Below is a sample of recent accomplishments:



**OUR TAP WATER IS EXTRAORDINARY**

The Tahoe Water Suppliers Association (TWSA), which includes California and Nevada public water agencies, provides outstanding, pure drinking water that is exceptional from the source. Its members possess six of the total 60 "filtration avoidance" permits awarded among the 160,000 public water systems across the U.S.

The City supports TWSA's Drink Tahoe Tap campaign, which encourages consumption of our extraordinarily tasty tap water instead of water from plastic bottles.

**WE ARE ALL STEWARDS OF THE LAKE**

Discarded plastics are particularly damaging to our water quality because they break down into smaller pieces and persist in our environment.

To encourage the reuse of personal water bottles over the single use of plastic bottles, the City is installing more public water refill stations.

**SALE OF SINGLE-USE PLASTIC WATER BOTTLES IS BANNED**

On April 24, 2024, the ordinance will prohibit retail sale or distribution of any single-use plastic bottled water under one gallon. Bottled water is any product that contains water as the sole ingredient, without added flavors, electrolytes, vitamins, etc. While non-plastic alternatives do not violate the ordinance, the City encourages refilling with Tahoe Tap instead of promoting single-use alternatives.

For more information, and to view the ordinance, visit [cityofslt.us/plasticwaste](https://cityofslt.us/plasticwaste) or scan the QR code.

CITYOFSLT.US • (530) 542-6000 • @CITYOFSLT

 CITY OF SOUTH LAKE TAHOE

The City of SLT Water Bottle Commercial Restrictions began in April 2024. On April 22, 2024, the City of South Lake Tahoe (CA) implemented a ban on the distribution and sale of single-use plastic water bottles (under 1 gallon). TWSA's robust "Drink Tahoe Tap" campaign is a centerpiece of this leadership action. Post-implementation, the action has been effective, with 82% of businesses reporting compliance.

<https://www.tahodailytribune.com/news/water-bottle-ban-auditors-pleased-with-business-compliance-rate/>

<https://www.youtube.com/watch?v=JzsPOhJ8t6o>

[https://www.mtdemocrat.com/news/south-lake-tahoe-plastic-bottle-ban-in-effect/article\\_e644f7ca-fe6e-11ee-a28c-8b7553741204.html](https://www.mtdemocrat.com/news/south-lake-tahoe-plastic-bottle-ban-in-effect/article_e644f7ca-fe6e-11ee-a28c-8b7553741204.html)

<https://southlakenow.com/story/10/04/2022/city-council-finalizes-south-lake-tahoe-plastic-water-bottle-ban-and-updates-polyst>

<https://www.tahoedailytribune.com/news/south-lake-tahoe-bans-single-use-plastic-water-bottles/>

SOUTH LAKE TAHOE, Calif. - South Lake Tahoe City Council finalized adoption of a single-use plastic water bottle ban for city facilities and permitted, temporary activities and special events. The ban went into effect citywide on April 22, 2024. The ban prohibits the sale of single-use plastic water bottles of less than one gallon, with an exception for emergency situations, designated by City Manager Joe Irvin. Single-use plastics are a significant source of waste and pollution due to the sheer volume of these products produced and used by consumers and the long amount of time they exist in the environment after their short, useful life ends, the city said in a press release. Discarded plastics are particularly damaging to water quality as they do not break down or decompose. Instead, they eventually break apart into microplastics that end up washing downstream into water bodies.

Through the course of an ongoing study, the University of California Davis's Tahoe Environmental Resource Center (TERC) recently found plastic in almost every sample taken from beaches around the Lake. Because no wastewater is discharged to Lake Tahoe, most of the microplastic waste appears to be coming from plastic litter, especially plastic bottles and bags. Visitors and businesses can contribute to the stewardship of Lake Tahoe by drinking local tap water or purchasing more sustainable single-use options. The Tahoe Water Suppliers Association, a consortium of local municipal water agencies, and TERC developed the 'Drink Tahoe Tap' campaign to encourage people to embrace the award-winning tap water and ditch single-use plastic water bottles. Even Raley's, one of the area supermarkets, has been a committed partner by displaying 'Drink Tahoe Tap' water bottles in the front of their stores.

"We aim to find ways to support an already robust 'Drink Tahoe Tap' marketing campaign and look forward to working with our business community to help them embrace this opportunity to participate in the stewardship of Lake Tahoe," said Sara Letton, the city's sustainability coordinator. "The community really stepped up to overwhelmingly support this at the first City Council presentation, but we also heard loud and clear from our business community that they are looking for some support as the ban is implemented."

In response, the city plans to install water bottle refill stations at strategic locations throughout the community over the next couple of years and will work with local partners on outreach and education to drive behavior change toward refilling with tap water.



## **TWSA Program Milestones 2002-2024 – Celebrating 22 Years of Partnerships in Stewardship**

TWSA has completed 2 decades of ‘partnership in stewardship’ in the Tahoe Basin. With modest beginnings, the TWSA has grown to be a force in the Basin that is accomplishing great things in support of source water protection. Lake Tahoe is an exceptional surface and groundwater source, recognized as one of the purest water sources in the world. The TWSA Board and staff are passionate about water; specifically, Tahoe’s outstanding drinking water; which you all know under our trademark slogan, Drink Tahoe Tap®. These member agencies are the driving force behind the success of the TWSA; having invested more than \$2 million dollars (over time) to support our collaborative source water protection outreach and education programs. Protecting our drinking water is a community effort. The TWSA has become an active partner in source water protection projects involving multiple Tahoe Basin Partners; including NDEP, the Tahoe Fund, UC Davis-TERC, SWEP, TRCD, TRPA, the League to Save Lake Tahoe, and Raley’s Supermarkets, as well as educators, scientists, policymakers, students, and others. The power of collaboration cannot be overstated. Our work supports numerous projects in the Basin, ranging from staff attending regulatory working groups on AIS management and shoreline project proposals; to providing outreach programs on water quality and potential contaminants such as dog waste, tourism impacts, and emerging microplastics issues. Our work within the Basin is successful because we strive to achieve the same goal as so many other active partners, to protect Lake Tahoe for future generations.

### **Tahoe Water Suppliers Association (TWSA) Milestones and Awards**

#### 2002-2005

- TWSA is formed within the existing structure of IVGID’s Public Works Division’s Waste Not programs (2002).
- Association organizational structure is established, and staff-led Watershed Control Program Annual Report process begins (2003).
- IVGID Waste Not receives the “Golden Pinecone Award”; Nevada Greenup (2004)



#### 2006-2010

- TWSA wins the “National American Water Works Association (AWWA) Exemplary Source Water Protection Award” medium systems (2006).
- TWSA is awarded the “NDEP Wendell McCurry Excellence in Water Quality Award” (2006).
- TWSA receives the “US EPA/AWWA Region 9 – Exemplary Source Water Protection Award” medium systems (2009).
- TWSA Executive Director (Madonna Dunbar) receives the “Living Green Award” from the Parasol Community Collaboration (2009).
- TWSA Executive Director (Madonna Dunbar) receives the “Positive Environmental Impact Award”; North Lake Tahoe Chamber of Commerce (2009).
- TWSA Staff (Rebecca Williams) receives the “Exemplary Employee Service Award” from the North Lake Tahoe Chamber of Commerce (2009).
- TWSA has been awarded the “CA/NV AWWA Exemplary Source Water Protection Award” for its long-term commitment to protecting drinking water (2009).

## 2011-2020

- IVGID receives the “Best Tasting Water in Nevada” award as the winner in a blind taste test conducted at the annual Nevada Rural Water Association Conference (2011, 2012, 2016).
- KGID receives the “Best Tasting Water in Nevada” award as the winner in a blind taste test conducted at the annual Nevada Rural Water Association Conference (2015).
- TWSA Executive Director (Madonna Dunbar) is awarded the “Tahoe Regional Planning Agency (TRPA) Lake Spirit Award” in the North Shore Exemplary Agency/Environmental Scientist representative category (2014).
- KGID wins the “Gold Medal for Best Tasting Water in America” at the National Rural Water Rally (2016).
- TWSA Executive Director (Madonna Dunbar) receives the California Water Environment Association (CWEA) “Community Outreach and Engagement Award” (2018).
- IVGID receives the “Golden Pinecone Award,” Government Agency Award (Diamond Peak/Public Works); GREENevada (2019).
- TWSA receives the “National Exemplary Source Water Protection Program Award” from the American Water Works Association (2020).
- TWSA receives the “Spirit of TRPA Award” 50th Anniversary - Tahoe Regional Planning Agency, Wastewater Partnerships (2020).

## 2021-present

- TWSA Staff Technician (Sarah Vidra) receives the California Water Environment Association (CWEA) “Community Outreach and Engagement Award” (2023).
- Lakeside Park Association wins “Best Tasting Water”; California Rural Water Association’s Water Expo (2024).
- TWSA Executive Director (Madonna Dunbar) receives the “Golden Pinecone Lifetime Achievement Award”; Nevada GreenUp (2024).

There are 12 water system members in the Association, each providing water as a municipal or community utility. Each full member has one vote in Association (total 11 voting members) with business through its designated representative at quarterly meetings: March, June, September, and December. TWSA updated its bylaws in 2017 and 2022, revising its organizational structure and purpose.

### **TWSA 2024 Membership:**

- |  |  |
|--|--|
| • Cave Rock Water System                       | • Round Hill General Improvement District          |
| • Edgewood Water Company                       | • Skyland Water Company                            |
| • Glenbrook Water Cooperative                  | • Tahoe City Public Utility District               |
| • Incline Village General Improvement District | • Zephyr Water Utility                             |
| • Kingsbury General Improvement District       | • <i>Associate membership (non-voting): (2022)</i> |
| • Lakeside Park Association                    | • South Tahoe Public Utility District              |
| • North Tahoe Public Utility District          |  |

**“The Mission of the Tahoe Water Suppliers Association is to develop, implement, and maintain an effective watershed control program in order to satisfy recommendations in watershed sanitary surveys, advocate for the protection of Lake Tahoe as a viable source of drinking water, and to satisfy additional state and federal requirements.”**

Since 2002, TWSA has provided a unified voice for source water protection. Our regional involvement includes public comment supporting watershed protection, developing strong relationships with local research and regulatory agencies, offering extensive programs to provide community education, and providing technical services in watershed protection and water conservation areas.

TWSA's organizational website = [www.Tahoe H2O.org](http://www.Tahoe H2O.org)

Drink Tahoe Tap / Take Care Storyboard site = [www.DrinkTahoeTap.org](http://www.DrinkTahoeTap.org)

Water Bottle Filling Station Map: <https://takecaretahoe.org/water-stations>

Facebook = <https://www.facebook.com/DRINK-TAHOE-TAP-160029390585>

### **Community Education and Professional Development**

Continue to improve the TWSA education programs, theme, and message.

Provide local professional development opportunities for TWSA members.

TWSA staff members maintain professional water industry certifications; all hold AWWA Water Efficiency Practitioner level 1 certification. Regional training opportunities by AWWA, NvRWA, WEF, and state agencies are shared with all members. TWSA staff are trained as 'Eyes on the Lake' team members to identify aquatic invasive species (AIS). Staff members also attend ongoing trainings, such as Project WET and Project WILD curriculum training classes. In addition, staff self-learn constantly on emerging topics through independent research.

### **Provide educational materials**

TWSA's long-running outreach program focuses on educational messaging on watershed protection, water quality, sustainability choices, and the exceptional quality and value of local tap waters. New topics (such as microplastics) are integrated as they emerge. TWSA staff promotes multiple messages, including trademarked slogans, through wide-ranging events and presentation schedules. TWSA also employs other communication methods such as video, web, and print media.

### **Educational and Action Based Partner Projects**

TWSA staff and organization are active partners with the following efforts:

#### **Focus Topic: TOURISM: Litter and Trash Impacts in the Watershed**

Litter and trash issues at Lake Tahoe have received increased regional and even national attention due to the high visitation influx, which is creating extreme pressure on limited public lands and community resources. The League to Save Lake Tahoe, Tahoe Environmental Research Center, Desert Research Institute, and other partners are maintaining databases on trash impacts in the watershed. Lake Tahoe is the most visited national forest in California. Regional agencies in Tahoe estimate as many as 15 million people visit every year. In 2020, the region saw a shift in the focus of tourism promotional efforts towards a sustainable recreation model. Various agencies are now shifting to address recreation, land use, and the impacts of land use on water quality, as well as promoting stewardship messaging.

#### **TWSA was a sponsor for the 2024 Tahoe Trash Summit**

[https://www.2news.com/news/second-annual-lake-tahoe-litter-summit-offers-possible-solutions-for-cleaning-up-lake-tahoe/article\\_7eb7ff8a-132c-11ef-accf-935ca98b2262.html](https://www.2news.com/news/second-annual-lake-tahoe-litter-summit-offers-possible-solutions-for-cleaning-up-lake-tahoe/article_7eb7ff8a-132c-11ef-accf-935ca98b2262.html)



Clean Up the Lake hosted the second annual Lake Tahoe Litter Summit in May 2024. During the summit they came away with three possible solutions. The first is developing a preventative action committee, where they can take ideas and put them into action. The second is finding ways to build better infrastructure. "At times we don't have the trash cans, the dumpsters, and the infrastructure that's needed," said Colin West, CEO of Clean Up the Lake. "So how do we keep Tahoe pristine and beautiful and wild like we love it while also having the support that we need to manage litter, to manage waste and everything in the basin?" The third solution involved how to prevent another huge trash load on July 5. You may remember last year the massive amount of trash that was left behind from Independence Day celebrations, and how long it took to clean it all up. Organizers say with how high the lake is right now, there's less room for beaches this year. Their goal is to now start doing activism in June by talking with businesses and parks to spread awareness. They are also getting together another committee, the data unification committee. This committee would compile all the data of the litter from around the lake. That way, they get a better understanding of where they're at in their efforts. During the summit, they had a psychologist come in and explain the effects of constantly seeing trash and litter and how that may influence people to continue what they are doing. "At times when people see cleanups, when people see littering as a common thing that occurs, they might continue to do that," West said. "So, with the stewardship plan, with the summit and all the press and things we put out, we want to try and reinforce the good work that's happening."

**California Responsible Travel Code, courtesy of Visit California. Adventure and Explore Responsibly.**

<https://visitolaketahoe.com/travel/sustainable-travel/>

Pristine beaches, immaculate trails, and spotlessly snowy ski runs are what draw thousands of people to South Lake Tahoe every year. To ensure you and others have that same experience today or next year, embrace the idea of being a good visitor. It can be as simple as taking your trash with you, drinking tap water while here, or exploring the outdoors safely and responsibly. Preserving and protecting Lake Tahoe's irreplaceable scenic beauty is something everyone can get behind.

**LAKE TAHOE DESTINATION STEWARDSHIP PLAN - Taking Care of Tahoe** <https://stewardshiptahoe.org>

The multi-jurisdictional development of the Lake Tahoe Destination Stewardship Plan and efforts to educate visitors about how to help take care of Tahoe has drawn the attention of national media outlets, including CNN Travel and Comstock's in 2023.

<https://www.northtahoecommunityalliance.com/community-vitality/to-take-care-of-tahoe-everyone-has-a-role-to-play-opinion/>



**Shared Vision: Tahoe is a cherished place, welcoming to all, where people, communities, and nature benefit from a thriving tourism and outdoor recreating economy.** Alignment around a Shared Vision  
The region created a shared vision to address critical challenges and improve the Tahoe experience – for all – through a comprehensive, collaborative approach. This Shared Vision was shaped over the past year by extensive public engagement, research tools and approaches, and a thorough analysis of how Tahoe’s famed tourism and outdoor recreation experience impacts the region. This vision represents the desired outcome of the Lake Tahoe Destination Stewardship Plan.

**Strategic Pillars and Action:** The Shared Vision for Tahoe is built upon four Strategic Pillars. By acting on all four Strategic Pillars, the Shared Vision can be achieved. Within the plan, each of these Strategic Pillars encompasses a major goal along with objectives and priority action steps to achieve it.

- *Foster A Tourism Economy That Gives Back*
- *Turn A Shared Vision Into Shared Action*
- *Shape The Tahoe Experience For All*
- *Advance A Culture Of Caring For Tahoe*

The plan includes 32 actions organized by strategic pillar that will help implement the shared vision. The newly formed Lake Tahoe Destination Stewardship Council, hit the ground running by acting on initial priorities and rallying both new and existing members to contribute financial and human resources.

Demonstrating Tahoe’s characteristic resilience, dedication, and strong penchant for collaboration, commitments to new funding were secured, existing programs were reinforced, and new initiatives were developed with an eye toward the shared vision for Tahoe. This is a work plan to keep teams on track and moving forward toward the shared goals of fostering a tourism economy that gives back, advancing a culture of caring, and improving the Tahoe experience for all.

**Take Care Tahoe** [www.takecaretahoe.org](http://www.takecaretahoe.org)

A workgroup of more than 60 participating agencies, this group coordinates custom environmental stewardship messaging for the Tahoe region. Many of the TWSA main outreach messages are top topics in this pool of outreach resources.



## Ways to Take Care of Tahoe



**Drink Tahoe Tap** = Refill with the world’s best water.



**Be #1 at Picking Up #2 = Don't forget a bag!**

### **Lake Tahoe Sustainable Recreation Working Group**

<https://www.trpa.gov/programs/sustainable-recreation/>

The Lake Tahoe Sustainable Recreation Working Group (formed in 2017) is a multi-sector working group of conservation and recreation professionals, private and nonprofit partners, and recreation stakeholders. The primary goal, and ultimate desired outcome, is to provide high-quality outdoor recreation experiences, while preserving and restoring the outstanding natural and cultural resources of the Lake Tahoe Basin.

### **Sustainable Recreation Pledge** <https://www.gotahoenorth.com/sustainable-travel-pledge>

**Become A Steward of Lake Tahoe:** Commit to exploring the Lake Tahoe region responsibly and help preserve our treasured spaces by leaving them better than you found them. Adhere to instructions and signage, rules are in place for your safety and the wellbeing of our environment. Lend a hand during one of our community clean-up days and volunteer through North Lake Tahoe's Ambassador program. Think like a local! Ride public transportation and support small businesses and events – tourism dollars help keep our communities vibrant and strong.

### **Tahoe Youth Ambassadors**



<https://www.tahoefund.org/news/new-take-care-tahoe-ambassador-programs-roll-out-across-the-tahoe-region>

<https://sierranevadaalliance.org/laketahoeambassadors/>

The **Lake Tahoe Ambassador Program** is a youth stewardship training program for ages 14-18, with beginning college-level crew leads who also receive introductory leadership and team building experience. Participants interact face-to-face with the public, sharing information about Lake Tahoe's natural environment and ways to protect Tahoe. During the summer, Ambassadors are stationed at various popular beaches, trailheads, and visitor centers around Lake Tahoe during peak times. In addition, Ambassadors receive training in basic environmental research skills and complete a summer-long research project with a professional mentor, utilizing the data collected on the job. New programs were designed to create opportunities to educate visitors, encourage environmental stewardship and promote responsible recreation. Since 2021, every weekend throughout summer up to 50 ambassadors

are positioned at popular recreation sites to provide information to Tahoe-Truckee area visitors about the importance of proper trash disposal, trail and wildlife etiquette, wildfire safety and other Leave No Trace principles. While each of the programs are independently managed, ambassadors from each program will wear the same Take Care Tahoe branded uniform to demonstrate a united, consistent approach to the education effort. This summer, six organizations are launching ambassador programs in locations around the Lake Tahoe Region to directly address and reduce tourism-related environmental impacts the region regularly experiences.

### **Tahoe Blue Crews – More Volunteer Teams to Tackle Trash**

<https://www.keeptahoeblue.org/join-us/tahoe-blue-crew/>

In response to increased trash concerns, IVGID Waste Not's conservation team, who support TWSA efforts, increased clean-up activities by partnering with the League to Save Lake Tahoe's Tahoe Blue Crew program (volunteers who commit to ongoing cleanups) and offering multiple cleanup events for casual volunteers. Participants engaged on several levels: at in-person events, cleanup remotely or both, clean up any day, any time. Participants are also encouraged to report what you find while cleaning up using the Litter and Trash Report on the Citizen Science App (free to download at [citizensciencetahoe.org](https://citizensciencetahoe.org)) or by using a data card (provided in the cleanup kits or [downloading it here](#)) and either drop it off to the location you borrowed cleanup supplies from. Also, we encourage the use of the hashtags #TahoeBlueGooder #litterfreetahoe. These multi-day events are hosted by [Clean Tahoe](#), [Incline Village Waste Not](#), [Jamie Anderson Foundation](#) and the [League to Save Lake Tahoe](#). See also:



<https://www.keeptahoeblue.org/news/events/tahoe-trash-pickup-challenge-2020>

### **Clean Tahoe North Shore Program for trash and litter mitigation**

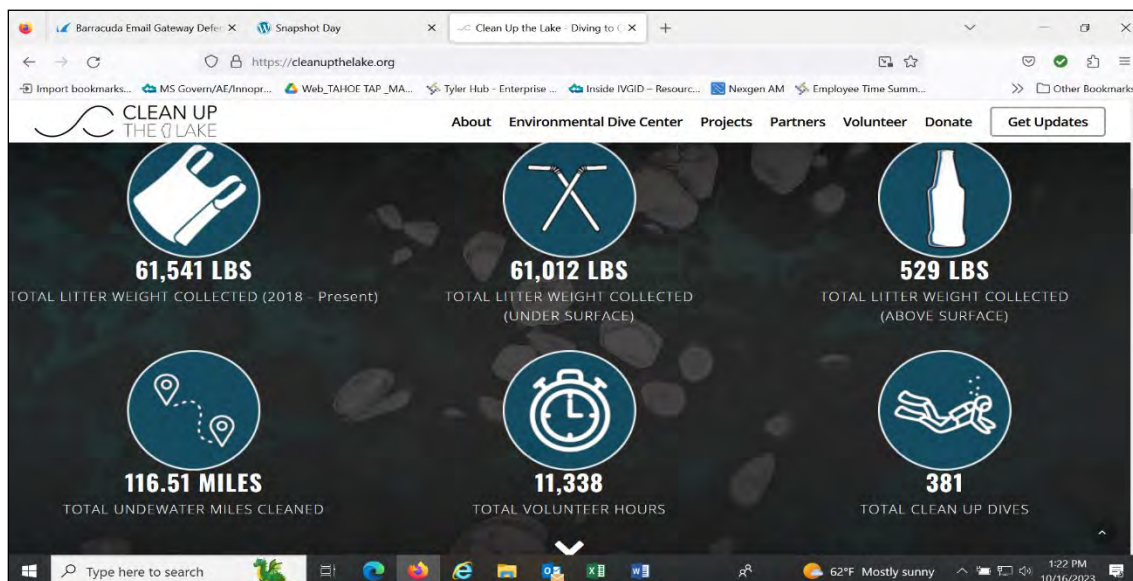
In 2021, Clean Tahoe launched a north shore litter mitigation service; to parallel their long-established south shore operations. Clean Tahoe is a nonprofit corporation, whose mission includes fostering public-private partnerships and resources for supporting litter and garbage management services in the Lake Tahoe Basin and surrounding areas. Funding partners wished to enhance litter and garbage abatement and reduce the negative effects of such litter and garbage in their respective communities; and recognized the advantage of a joint and coordinated effort to address litter and garbage abatement and recognized Clean Tahoe's success in providing these services in the South Lake Tahoe area. Each Funding Partner has a separate Agreement with Clean Tahoe for litter abatement and garbage services, each with specific services, terms, conditions, and compensation schedule. Seven agencies joined together to support the Clean Tahoe Multi-Jurisdictional Program.





## **Clean Up the Lake's (CUTL) 72 mile underwater cleanup of Lake Tahoe** <https://cleanupthelake.org>

CUTL has discovered pollution issues within the community and under the surface of numerous lakes in the Tahoe Basin including Lake Tahoe. Through data collection, collaborating with environmental scientists, extensive research dives and outreach in the community –CUTL utilizes a small staff and many volunteers to tackle these issues. CUTL performs scuba cleanups and implements litter mitigation strategies. TWSA offered in-kind support to the 2020 NDEP funded 6-mile underwater cleanup of Tahoe East Shore locations by collaborating with the Clean Up the Lake non-profit, Tahoe Environmental Research Center (TERC) and Desert Research Institute (DRI) on trash sort operations. Support includes use of a utility trailer for debris collected storage, use of IVGID Public Works site for sorting and inventory operations, disposal costs for collected materials after inventory.

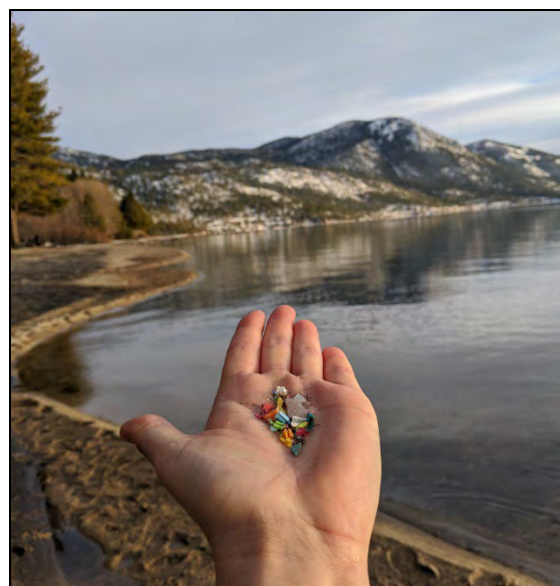


## **Research Support/Projects with Partners - Microplastics as an Emerging Contaminant**

<https://www.epa.gov/newsreleases/us-epa-awards-nearly-100000-address-microplastic-pollution-lake-tahoe>

Plastic waste, and the resulting micro-plastic plastic fragments created from outdoor exposure, have emerged as a concerning contaminant in the ocean and freshwater environments. In California, the State Water Board has begun the regulatory process to define, monitor and potentially regulate a standard for drinking water systems. Due to the land and airborne loading nature of micro-plastics, drinking water systems reliant on surface water sources have the most potential to be impacted, rather than groundwater systems.

In 2019, The U.S. Environmental Protection Agency (EPA) awarded \$97,000 in grants for projects to address microplastic pollution in Lake Tahoe. The projects include a study led by the UC Davis Tahoe Environmental Research Center (TERC) to gather more data on the movement and types of plastics in Lake Tahoe as well as a public education-focused, source-reduction pilot project led by the Incline Village General Improvement District, in partnership with the



Tahoe Water Suppliers Association and others. Both projects are managed by the Nevada Division of Environmental Protection (NDEP) with the aim of reducing sources of plastic pollution. Today's announcement coincides with the 24th Annual Lake Tahoe Summit, which will include participation from EPA Region 9 experts. "Lake Tahoe is an important natural resource for communities in California and Nevada," said EPA Pacific Southwest Regional Administrator John Busterud. "EPA is pleased to support forward-looking projects which can reduce harmful microplastics in waters, thus protecting human health and the environment." "The Nevada Division of Environmental Protection, together with our partners, looks forward to carrying out these novel projects to address the emerging issue of microplastics in Lake Tahoe," said Greg Lovato, Administrator of the Nevada Division of Environmental Protection. "A better understanding of microplastic sources, impacts, and controls is critical to keeping Lake Tahoe clean and ensuring it remains a healthy and vibrant ecosystem. Efforts like this shine as a prime example of the benefits of collaboration in conservation."

Microplastics are small plastic debris that can escape into the environment. They have been detected in drinking water in multiple locations worldwide and can be ingested by wildlife. Unlike plastic waste in the ocean, microplastics do not enter Lake Tahoe through wastewater or from commercial shipping operations. Rather, improperly disposed of litter found on Lake Tahoe's beaches is believed to be the lake's primary source of plastic pollution; followed potentially by road/tire debris and airborne particulates.

**Lake Tahoe has high concentration of microplastics, 2023 global research shows. Research published in Nature reveals concentrations of microplastics in 38 lakes with plastic debris from textiles frequently identified. July 12, 2023 <https://www.unr.edu/nevada-today/news/2023/lake-tahoe-microplastic>**

Microplastics, small fragments of fibers from clothing, packaging, and other plastic residue have invaded freshwater lakes and watersheds globally and in alarming quantities, according to new research published in the scientific journal *Nature* under the title 'Plastic debris in lakes and reservoirs.' Lake Tahoe, known for its purity and high level of legal protection had the third highest concentration of plastic of 38 lakes tested around the world and higher than in the surface water at the ocean's gyres where the floating islands of debris emblematic of the world's plastic pollution crisis collect.

"One of the highest priorities at Lake Tahoe is to keep the water quality clear and pristine," Sudeep Chandra, Professor of Limnology and Director of the Global Water Center at the University of Nevada, Reno, said. "Clarity is the signature of Lake Tahoe and the mantra Keep Tahoe Blue is not taken lightly. With this study, we now know that plastics exist in high concentrations in Lake Tahoe and could be having an impact on the ecosystem and the animals living in the lake. This shows us that there are always emerging issues that need to be addressed so we can try to preserve the lake into the future."

Lake Tahoe has a record of science-driven conservation policies and programs to address human impacts. Not only has wastewater been transported out of the basin for decades, [\\$660 million in water quality improvements have been invested through the Lake Tahoe Environmental Improvement Program](#). In June of this year, the region also began managing the impacts of outdoor recreation and tourism more holistically. The new Lake Tahoe Destination Stewardship Plan is tackling environmental issues facing the Lake Tahoe Basin, prioritizing litter enforcement and environmental sustainability and stewardship.

TWSA staff are active participants in the emerging science of this field. In 2023-2024, staff participated in microplastic subcommittee for the following organizations - Tahoe Science Advisory Council and CA Water Quality Monitoring Council.

In 2023, Tahoe Specific Microplastics Research provided an initial snapshot of intake sampling. (Drinking Water Intake Study) [https://www.yourtahoeplace.com/uploads/pdf-public-works/July\\_2023\\_Microplastics\\_in\\_Lake\\_Tahoe\\_\(longer\\_press\\_release\).pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/July_2023_Microplastics_in_Lake_Tahoe_(longer_press_release).pdf)



**MICROPLASTICS IN LAKE TAHOE; THE DRINKING WATER PERSPECTIVE TAHOE TAP REMAINS SAFE AND HEALTHY** <https://sierranevadaalliance.org/to-sink-or-swim-microplastics-laketahoe/>

Recent research published in Nature.com, included Lake Tahoe among a global list of 38 freshwater lakes with high concentration of microplastics detected. As part of ongoing watershed protection programs, the Tahoe Water Suppliers Association (TWSA) has worked in partnership with the Tahoe Environmental Research Center (TERC/UC Davis) and the Nevada Division of Environmental Protection (NDEP) to pro-actively study the presence of microplastics in the surface waters of Lake Tahoe.

**RESEARCH: A Snapshot Study on the Fate and Type of Plastics in Lake Tahoe, EPA Grant \$35,000. *To Sink or Swim: A Snapshot Evaluation of the Fate and Types of Microplastics in Lake Tahoe*; for NDEP: published in 2023, by UC Davis Tahoe Environmental Research Center researcher, Katie Senft, and associates, examined Lake Tahoe water sampled at six different depths from top to bottom.** [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report\\_Final\\_20230302.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report_Final_20230302.pdf)

Part of the sampling included a drinking water intake specific study. This study consisted of eight sampling events of two municipal drinking water sources in Lake Tahoe from summer 2021 to winter 2022. Samples were taken from the North Shore of Lake Tahoe at the Incline Village Improvement District and the South Shore at Edgewood Water Company. **This information yielded an average microplastic abundance of 0.044 particles/L, which points to minimal exposure to microplastics at Tahoe drinking water sources.** The association members continue to be keenly aware of and closely following the science of microplastics and the monitoring protocols. They have been actively engaged in removing plastics and preventing more plastics from entering the watershed through public education and awareness efforts. They have determined this to be the best tool to alleviate accumulation of microplastics in the environment. The municipal water samples collected consisted of two particles of polypropylene and one particle of polyester in 68.44 liters (L) of water.

- **What this means for Tahoe Tap drinkers: 1 microplastic particle detected per appx. 23 liters of water (0.044 particles/L) = Possible ingestion of 1 microplastic particle every 7 days (based on average consumption).** To compare, a low average single-use plastic water bottle particle count referenced, when averaged across all lots and all brands = 325 particles/L found within the bottled water tested. (Mason <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6141690/>)



Staff developed a summary on Microplastics in Drinking Water (PowerPoint) for use as an invited panelist on the **2023 Science in Action; Working Together to Build Resiliency at Lake Tahoe- Microplastics In Freshwater Systems session**, held October 11-13, 2023 at Lake Tahoe Community College. The partnership between Tahoe scientists and resource managers is the subject of a three-day conference hosted by the Tahoe Science Advisory Council. The gathering brings together academic scientists, agency staff, and community members for a thoughtful, interactive dialogue about science as the foundation for environmental protection policy – past, present, and future.



#### **OUTREACH: Pilot Project to Reduce Source Water Plastic Pollution at Lake Tahoe, EPA Grant \$62,000.**

This 2 year, multi-agency collaborative project includes: education and public outreach to achieve a behavior change in the region, with the ambitious goals of 1) raising awareness of plastic pollution, 2) increasing public understanding of the different types of plastics and 3) the impacts of their consumer choices, 4) reducing the use of single-use plastic, and thereby 5) reducing the presence of plastic in Lake Tahoe's waters and beaches.

**TWSA's "Drink Tahoe Tap" Partnership with Take Care, Tahoe Environmental Research Center, and Sierra Watershed Education Partnership has just completed 2 years of work on this 'emerging contaminant' education project.** This project focusses on education and public outreach to promote behavioral changes towards proper disposal of trash at Lake Tahoe. It promotes the reduction of the use of single-use plastic through research, local business partnerships, student engagement, public education, and awareness of drinking water and watershed protection.

**Project highlights** included:

**Development of a complete suite of DRINK TAHOE TAP® TAKE CARE outreach materials** was commissioned and published regionally, in both web and print format. Messaging specifically focuses on reducing microplastics by reducing purchase of single use water bottles, and refilling instead.

<https://takecaretahoe.org/take-action/tahoe-tap>

**A new website** was created as part of the Take Care Tahoe campaign along with a new page within the main Take Care Tahoe campaign and an update to an existing page: <http://www.drinktahoetap.org> (redirects to <https://takecaretahoe.org/drink-tahoe-tap/>) and <https://takecaretahoe.org/take-action/tahoe-tap>

The website features an interactive web storyboard, visually linking in a cartoon illustration style, eco-system impacts from single-use plastic waste, and litter in general.





### HAWS WATER BOTTLE REFILL STATIONS

An industry discount is being offered. Through the Tahoe Fund - HAWS Corporation will be offering a 30% discount to purchasers of water bottle fillers for use in the region. The parties are in development of a flyer and possible special graphics for the station. Details to follow.

### WATER BOTTLE REFILL STATIONS GRANT PROGRAM

To make refilling easier for residents and visitors alike, the Tahoe Fund and Tahoe Water Suppliers Association have launched the Drink Tahoe Tap Water Refill Network, as an interactive map feature on the Take Care Tahoe website. **The WATER BOTTLE FILLING STATION web map is located at:** <https://takecaretahoe.org/water-stations>. It provides quick reference to locations for visitors and residents to fill up their refillable water bottles with award winning Tahoe Tap water.

Truckee locations are being integrated under a Drink Truckee Tap type campaign; calling out their unique high quality water sources, currently being developed.



### An Official DRINK TAHOE TAP Bottle & Partnership with Raley's Supermarket – 2024 reprinted bottles

Continuing through 2025, DRINK TAHOE TAP® / TAKE CARE custom design bottles are on sale at Raley's



GROVEY stores in the Tahoe Basin region. Raley's produced 11,000 custom bottles in 2021. At its height, displays were created for 116 Raley's stores (outside the basin) throughout northern CA and NV.

**LAKE TAHOE VISITOR AUTHORITY (LTVA) Supports South Lake Tahoe's Single-Use Water Bottle Ban with massive refillable bottle distribution**

<https://ltva.org/ltva-bulletin-april-3/>

With the SLT single-use plastic water bottle ban going into effect on Earth Day, April 22, 2024, the Lake Tahoe Visitors Authority purchased 35,000 highly durable, aluminum, USA-made reusable water bottles for distribute to special events and SLT lodging properties. These were a tremendous success. The program is linked to a "Fill it Forward" environmental program fundraiser.



<https://tahoechamber.org/rules-to-lake-by/>

Lake Tahoe Visitors Authority is stepping up to encourage responsible recreation in the basin and to combat the reputation that's developed in recent years about litter and traffic congestion and [our region being "over-touristed."](#) Recent activations include:

- **[Rules to Lake By](#)** | Rules to Lake By is a campaign developed as a gentle reminder that our fragile environment is at the heart of both our visitors' and residents' love for this place. Rules to Lake By messages have launched parallel to the LTVA's "always on" visitor campaign running in targeted markets ranging from Chicago to Seattle. The initiative aligns with LTVA's goal of being a leading destination marketing organization in sustainability.
- **4th of July Litter Mitigation Strategy** | Pictures are worth a thousand words and last year's pictures of beaches blanketed with litter were damaging to Lake Tahoe's reputation as a pristine destination to visit. Working with the basin-wide Destination Stewardship Council to Take Care of Tahoe by reaching visitors at every touch point. The 3rd Rule to Lake By, "Let's Leave Less," will be front and center during this busy time of the summer.
- **[Destination Stewardship Council](#)** | With representation in all committees, LTVA is a highly active member organization, with a collective goal of turning values into action and ensuring that the Destination Stewardship Plan is as fast-moving and responsive as possible. As a fiscal sponsor for the ambassador program, which places high school and college students at high-traffic recreation sites to educate visitors about caring for Tahoe, LTVA is in lock-step with this collaborative group of public and private way in pushing for positive cultural change, which in turn, will encourage visitation by improving the experience of visitors and residents alike.
- **Awe 'and then' Some Tourism Forum** | Held on June 12, the forum emphasized stewardship, not only as vital to preserving our region's delicate environment but also vital to attracting higher-spend visitors who increasingly consider destination sustainability as a deciding factor in where to go. The travel market is driving change.
- **Fill it Forward water bottles** | In partnership with Drink Tahoe Tap, LTVA purchased 35,000 USA-made, highly durable refillable water bottles from [Fill it Forward](#) to distribute to guests, volunteers, and residents at a wide range of locations and events, in support of the City of South Lake Tahoe's recent single-use plastic water bottle ban. Recipients are encouraged to scan the QR code which pays it forward to one of four local environmental non-profits at five cents per scan: [TAMBA](#), [Sugarpine Foundation](#), [Clean Up The Lake](#), and the [Tahoe Rim Trail Association](#).



In its primary role as the destination marketing organization, the LTVA is focused on emerging and continuing trends, including the demand for outdoor recreation, authentic experiences, spending levels

and preferences, and sustainable destination practices. The organization's data collection platforms help to inform its marketing decisions as this visitor landscape continues to evolve rapidly towards these trends and work with its partners to navigate the sensitive balance between tourism, environment and community.

### **Tahoe Environmental Research Center and Sand Harbor Visitor Center – Microplastics Exhibits**

The Tahoe Science Center developed microplastics exhibit and nonpoint source and plastic pollution educational materials, informed by research. The exhibit was installed at the Tahoe Science Center in Incline Village in summer 2021. A new water fill station is included in the exhibit area, featuring DRINK TAHOE TAP custom messaging and graphics. This interactive exhibit was replicated in 2022 at the Sand Harbor Visitor Center and in edited form in 2023 at the North Lake Visitor Authority Center in Tahoe City.



This exhibit and lesson topics include: 'Sources of Plastic at Lake Tahoe, From Macro to Micro: How Plastics Break Down, Quantifying Microplastics, and 'Where Do Microplastics End Up Around the Lake?' Tahoe's Plastic Problem: A Day at the Beach (includes "Plastic Sorting" and "Resin Identification Code" details) Breaking up with Plastic; Microplastics in Lake Tahoe (includes "Zoom in on Microplastics"); It's Time for Solutions.

This project also produced similar traveling exhibits for use at events around the lake and locations including visitor centers, trailheads, and public beaches. The grant team is also collaborating with other regional partners to promote their plastics outreach efforts, such as California State Parks' 'Below the Blue' artwork displays made from underwater trash retrieved at their park locations.

### **Sierra Watershed Education Partnership TREC / Student Microplastics Education**

As part of the grant, TERC and Sierra Watershed Education Partnership (SWEP) created a variety of online video lessons on plastic pollution and watershed impacts. In-person curriculum delivery was on hold through 2021 due to COVID-19. In the past year as part of this grant, SWEP created the "Beach Detectives" <https://www.4swep.org/post/beach-detective> virtual field program and associated [Microplastics-Beach Detective Data Sheet](#). UC Davis created this [video](#) lesson to help guide student investigations.

New micro-plastics snippets created and web posted, see <https://www.4swep.org/swep-snippets> for all the sessions. These are plastic specific: <https://www.4swep.org/post/what-is-plastic> <https://www.4swep.org/post/beach-detective> <https://www.4swep.org/post/how-long-until-gone> <https://www.4swep.org/post/upcycled-milk-jugs> <https://www.4swep.org/post/zero-waste-lunch> <https://www.4swep.org/post/litter-scavenger-hunt> <https://www.4swep.org/post/upcycled-t-shirt-bags>





Another student program component was to create partnerships between Eco-Action Teams and local businesses, which play a key role in products available to the community. The TERC staff and SWEPP staff engaged Tahoe-Truckee students in the past year in a variety of ways. This program component was impacted by the Covid-19 restrictions; there was an inability to conduct in person interviews with customers. Instead, the students helped develop the on-line survey on water purchase / use habits; provided feedback on the water bottle and Take Care designs and copy; and created several on-line educational videos. For 2020-21 school year, the Tahoe-Truckee High School's combined Envirolution Club (facilitated by SWEPP staff advisors) has created an on-line, community participation portal via Instagram. <https://www.youtube.com/watch?v=nwFeMZfvPE0>.

### **Student Partnership with Raley's Supermarket**

<https://www.tahoedailytribune.com/news/tahoe-students-address-plastic-problem-inspire-change-in-raleys>

In 2021, the students also had direct access to work with Raley's management on their sustainability measures, providing a youth feedback perspective. The group participated in several collaborations with the Raley's team facilitated by TERC and SWEPP, and developed a four-part action plan for Raley's executive team to consider how they could reduce plastic waste locally.

When the initiative began, students from North Tahoe, Truckee, Incline, and South Tahoe high schools learned about the prolific microplastics problem impacting Lake Tahoe from UC Davis Tahoe Environmental Research Center AmeriCorps member Elise Matera and staff members at Sierra Watershed Education Partnerships and the Tahoe Water Suppliers Association.

They learned that when plastic items are not properly disposed of, from single-use water bottles, sleds and other items, they break down into tiny toxic pieces that contaminate Lake Tahoe's pristine waters and beaches. The students were quickly brought up to speed on the microplastics crisis, the types of plastic, problems with recycling effectiveness, and sorting plastics into macroplastics, microplastics and nanoplastics.

The North Tahoe and Truckee Envirolution Club members were inspired to make a difference and formed a plastics sub-committee to assess which of these problems could be solved. With coaching by members of the plastic reduction collaboration (funded by a Nevada Division of Environmental Protection grant), the students surveyed their local Raley's stores to come up with a list of all the ways plastic waste could be reduced. The students presented their findings to the Raley's executive team and highlighted three areas for improvement: plastic water bottles, plastic grocery bags and plastic sleds and other toys that break apart easily. Other suggestions the team made included moving away from distribution of straws, plastic to-go ware, and plastic souvenirs.

### **Media Coverage of Trash and Plastics Issue - The microplastics project has received extensive media coverage. A sampling:**

<https://www.kolotv.com/2020/07/02/raleys-working-with-tahoe-organizations-and-uc-davis-to-reduce-plastic-waste/>

<https://www.sierrasun.com/news/environment/microplastic-cleanup-research-continues-at-lake-tahoe/tahoe/?fbclid=IwAR0ZrNliqsQD21ULLd0GsJrFmsEffgh3r2lg8wG7EQQS01oMkzxNnuQQaTk>

<https://www.sierrasun.com/opinion/columns/darcie-goodman-collins-tina-dvon-gallier-save-lake-tahoe-from-single-use-plastics/>

<https://www.sierrasun.com/news/the-fate-of-plastics-in-lake-tahoe/>

<https://www.sierrasun.com/news/environment/clean-up-the-lake-pulls-more-than-8200-pounds-of-trash-from-tahoe-donner/>

<https://www.sierrasun.com/news/pack-it-in-pack-it-out-locals-protest-surge-of-litter-left-in-truckee-tahoe-area/>

<https://www.sierrasun.com/news/power-of-the-people-how-truckee-tahoe-locals-are-taking-to-beaches-to-clean-up-litter-left-by-visitors/>

<https://www.sierrasun.com/news/mitigating-microplastics-what-types-of-plastics-are-getting-into-lake-tahoe-and-landing-on-beaches/>

### **TWSA Long Term Education Projects**

TWSA has a long history of projects related to community education and outreach on the focus topics of source water protection and an appreciation of municipal tap water. The following offers summary of some of these long-term programs and partnerships.

#### **Drink Tahoe Tap® Stickers and Refillable Water Bottles**

TWSA completed the trademark registration process for Drink Tahoe Tap® and I Drink Tahoe Tap!®; first executed in 2015, and renewed in 2021. This trademark was implemented in a license agreement for the recent Raley's collaboration. Tahoe Tap is well recognized regionally and supported by both locals and tourists alike. In 2020, an official brand and bottle were developed. More than 120,000 Drink Tahoe Tap® stickers have been distributed since the campaign launched in 2008. Regional partners work with Drink Tahoe Tap on other water bottle projects as well.



#### **Drink Tahoe Tap® Taste Test**

TWSA staff provides a blind taste test at our outreach booth at local events. Staff provides the waters in 3 unmarked, dispensers using a 2 oz. recyclable aluminum cup. Each participant votes and the votes are recorded. The taste tests results are consistent; tap water is selected over bottled waters.

#### **Recent TWSA Peer Agency Awards**

- TWSA Staff Technician (Sarah Vidra); California Water Environment Association (CWEA) “Community Outreach and Engagement Award” (2023).
- Lakeside Park Association wins “Best Tasting Water”; California Rural Water Association’s Water Expo (2024).
- TWSA Executive Director (Madonna Dunbar) “Golden Pinecone Lifetime Achievement Award”; Nevada GreenUp (2024).

In 2020, the American Water Works Association (AWWA) recognized the Tahoe Water Suppliers Association (TWSA) with the coveted **2020 Exemplary Source Water Protection Award**. TWSA demonstrated the highest level of protection and preservation of the Lake Tahoe watershed, the region’s primary water source. <https://www.awwa.org/Membership-Volunteering/Awards/Exemplary-Source-Water-Protection-Award>

#### **Tahoe Regional Planning Agency Spirit of TRPA Award**

The Tahoe Water Suppliers Association was selected by TRPA staff and board members as one of the **2020 Lake Spirit award recipients** to represent the group of Public Utility Districts and General Improvement Districts who work so hard to protect our lake and provide services to our communities. All recipients were acknowledged at the virtual TRPA Governing Board meeting on November 18, part of TRPA’s 50-year celebration. [www.trpa.org](http://www.trpa.org)

### **2024 Golden PineCone Sustainability Award**

Madonna Dunbar, TWSA Executive Director, received the LIFETIME ACHIEVEMENT AWARD given by GreenUp Nevada. This is the first time the award category was presented and recognized her 17+ years of service in environmental protection in the Tahoe region.



### **Tahoe Tap Best Tasting Water Awards**

In 2024, Lakeside Park Association won the CA Rural Water Association Taste Test. Every year in April, the California Rural Water Association's Water Expo holds an annual event where a formal taste-testing panel of judges compares water samples submitted from all over California for clarity, bouquet, and taste. The judges in 2024 all agreed that Lakeside Park Association's water was the very best! This journey continues as LPA looks forward to their invitation to enter into the National Great American Water Taste Test in Washington, D.C. in February 2025! LPA is a long-time member of the Tahoe Water Suppliers Association which advocates for the protection of Lake Tahoe as a community drinking water source. "Drink Tahoe Tap ®" is a prominent regional slogan as the communities adopt a 'refill culture". In 2017, Cave Rock/Skyland won "Best Tasting Water in Nevada" at the Nevada Rural Water Conference. In January 2016, Kingsbury GID took home the "Gold Medal for Best Tasting Water" at the national Rural Water Rally, in Washington D.C., after receiving "Best Tasting Water in Nevada" in at the 2015 annual Nevada Rural Water Association Conference. IVGID received the "Best Tasting Water in Nevada" at the Water Association Conference; also in 2012 and 2011.

### **Distribution of Refillable Water Bottles**

Prior to having retail bottle sales with Raley's, an average of 5,000 customized, refillable containers were distributed annually at various events. Since 2010, approximately 75,000 (glass or metal) bottles have been distributed.

### **Promoting Greater Access to Tahoe Tap Water for Visitors and Residents - Drink Tahoe Tap ® Water Bottle Refill Station Grant Program**

Since 2019, TWSA and the Tahoe Fund have initiated the Tahoe Tap Water Bottle Refill Station Grant Program. Rebates are available to Tahoe Basin businesses and non-profits who install a bottle filler/upgraded water fountain. 34 stations have been installed, both indoor and outdoor, in the region



from current \$50,000 investment. An additional \$30,000 funding pool was allocated by the TWSA Board for future 2024-25 installations.

**DRINK TAHOE TAP - FIND A REFILL MAP:** The “Drink Tahoe Tap Refill Network” has 80+ Tahoe/Truckee locations registered via the Take Care Website, <https://takecaretahoe.org/water-stations>



**Drink Tahoe Tap®**

**Join Us in a Refreshing Partnership!**

Can people refill reusable water bottles at your business?  
If so, would you like to become an official water refill station?

**Why Partner with Us?**

**Community recognition:** Show your commitment to the environment.

**Partner with Take Care Tahoe:** Receive recognition on the Take care website as a “Drink Tahoe Tap®” partner and appear as a location on the water refill map.

**Reduce plastic waste:** Contribute to the reduction of plastic waste and support the plastic water bottle ban coming to South Lake Tahoe in April 2024.

**Scan the QR code to become a Drink Tahoe Tap® refill station!**

Contact us:  
info@takecaretahoe.org  
Website: takecaretahoe.org  
Grant Link: <https://tinyurl.com/mv2svv5n>

**Take care.** **Tahoe Water Suppliers Association**  
Protect the Source

### Free Tap Water Distribution at Public Events

Our Mobile Water Station Program is robust; being used at 35+ events annually with an estimated reach of 200,000+. 15 stations are available for regional use at various events. These stations connect to standard outdoor faucets served by approved water sources, have tap dispenser heads and a carbon filter system. The water fill station construction designs are available online, at no cost: [www.TahoeH2O.org](http://www.TahoeH2O.org).

They have proven to be extremely popular and have provided water at multiple large-scale community events. Since 2014, this program has been instrumental in reducing the use of bottled water at area events; serving fresh water to crowds up to 5000 people.





### Watershed Education Events

Staff conducts outreach with the TWSA “Drink Tahoe Tap ®” education booth at more than 25 community events annually. TWSA’s outreach booth offers source water protection, water conservation and tap water awareness information. Some of the annual events include the North and South Lake Tahoe Earth Day Festivals, Snapshot Day, Rock Tahoe half-marathon, Harbor Shakespeare Festival, SnowFest Science Expo, 4th of July events, the Tahoe Summit, regional music festivals, chamber mixers, ski area special events, and other events.



### Volunteer Driven Litter Cleanups

Recent years have included a push to increase volunteer participation and develop Tahoe’s community stewardship culture. We collaborate extensively on North Shore cleanup efforts coordinated by the League to Save Lake Tahoe and Keep Tahoe Clean for South Lake Tahoe.

<https://www.keeptahoeblue.org/join-us/tahoe-blue-crew>

Annually, hundreds of volunteers collect tons of trash from Tahoe’s beaches, streams and lakeside trails. An example of the need for management change came to a head in 2023. To support volunteers, IVGID Waste Not / TWSA in coordination with the League to Save Lake Tahoe, support Tahoe Blue Crews with the loan of collection equipment, waste disposal, logistics and donation of water bottles.

<https://www.yourtahoeplace.com/events/community-cleanups>



### On July 5, 2024 – improved management helps reduce holiday litter impacts

<https://southtahoenow.com/story/07/05/2024/trash-left-lake-tahoe-beaches-significantly-less-4th-july>

Trash left on Lake Tahoe beaches significantly less this 4th of July 2024; Volunteer forces break records. After the large amount of trash left behind by the 4th of July revelers on Zephyr Shoals in 2023, all eyes were on the post-holiday beach cleanups around Lake Tahoe on July 5. At seven beach cleanup sites coordinated by the League to Save Lake Tahoe (Keep Tahoe Blue), the total trash removed weighed in at 1,866 pounds. At Zephyr Shoals last year alone, the trash left behind on the scenic 3/4-mile beach totaled over 8,000 pounds. The astounding volunteer turnout for this year’s event set a new record, surpassing the previous high by more than 200 individuals and showing the public’s commitment to take care of Tahoe. Yet, the 774 volunteers, a beach-cleaning robot from ECO-CLEAN Solutions, and divers from Clean Up The Lake together found only a touch more than the average litter collected during past July 5th cleanups. In total, participants removed 1,866 pounds of trash, not even a quarter of what volunteers removed on July 5, 2023.

The beach improvements at Zephyr were implemented by Aramark Destinations as part of the new Tahoe Blue Beaches program – a collective effort by the League to Save Lake Tahoe and USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU) to “raise the bar for beach management” in Tahoe.

Based on the small amount of litter at Zephyr Cove and Shoals in 2024, the program showed it can be successful.

The League to Save Lake Tahoe is aligned with and taking action to implement the Lake Tahoe Destination Stewardship Plan in collaboration with over 20 regional organizations. The award-winning plan, developed with the participation of over 3,000 residents, visitors, and businesses, establishes a shared vision for the region's outdoor recreation and tourism and encourages everyone to help take care of Tahoe's cherished communities and environment. Visit [www.stewardshiptahoe.org](http://www.stewardshiptahoe.org) to learn more and read the plan.

### **TWSA Regional Events Sponsorships**

TWSA supports a variety of conferences, online events and educational programs in the form of fiscal donations, water station use, or water bottle donations. TWSA provides in kind and small fee support for the production of the State of the Lake Report, Tahoe In Depth publications, Music on the Beach, Concerts at Commons Beach, Sierra Nevada Alliance, League to Save Lake Tahoe, Nevada Rural Water events, Eyes on the Lake trainings, the Tahoe Summit, North and South Lake Tahoe Earth Day events, other conferences and events.

### **School Programs**

In addition to the micro-plastics project, TWSA staff provides presentations on Tahoe Tap and source water protection, including water quality sampling lessons and streamside ecology activities in area schools. Since 2011, TWSA and TWSA members (TCPUD, NTPUD, IVGID) have partnered with the Sierra Watershed Education Partnership (SWEP) to offer water quality assemblies annually, to almost 2,000 North Tahoe elementary, middle and high school students. These assemblies feature a presentation by the Truckee High School Envirolution Club's Trashion Show, themed on appreciation of tap water, water conservation and watershed protection. At these shows, students receive custom refillable metal water bottles and other water conservation collateral. <https://www.4swep.org/>



### **Annual Tahoe-Truckee-Reno Snapshot Day**

<http://tahoetruckeesnapshotday.org>

This event is a collaboration between multiple water quality focused agencies. This is one of the longest running watershed citizen monitoring events on the U.S. west coast. Annually, TWSA staff leads Snapshot Day, a large-scale volunteer water quality monitoring event for the Tahoe region from Lake Tahoe to Pyramid Lake. At "Snapshot Day" (annually in May) 300+ volunteers spend the morning at 50+ locations within the watershed, collecting samples of turbidity, nutrients, dissolved oxygen and photographic documentation. Many sites have been repeated now for 15+ years, providing long-term watershed condition data.

### **Incline Village Beach Water Quality Sampling**

TWSA staff collects and analyzes raw water samples on a regular schedule from 6 Incline Village beach and stream zone locations. AIS inspections of shoreline conditions were added in 2015. Data has been maintained in a centralized database since 2004.

### **Watershed Protection Outreach Campaigns**

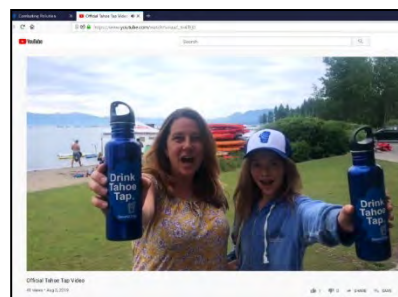
TWSA water conservation and water quality protection print publications are updated annually. Outreach materials include a leak detection information card with dye tabs, AWWA 'value of water' and water conservation brochures, TWSA source water protection information, a custom dog waste bag holder and bag refills, 'Drink Tahoe Tap ®' stickers and information on the issues of bottled water versus tap water.

### **TWSA General Advertising & Social Media**

#### **Love Your Water - Tahoe Tap's Music Video - The "Drink Tahoe Tap Song"**

[https://www.youtube.com/watch?v=uaZ\\_tn4fRj0](https://www.youtube.com/watch?v=uaZ_tn4fRj0).

Local musician, Joaquin Fioresi, wrote and produced this original song and music video, featuring regional music talent. It was featured on regional broadcasts off the summer music series "Virtual Music on the Beach" and "Best of Commons Beach".



TWSA is found on social media (Facebook/Instagram) as Drink Tahoe Tap (#where2fill and #drinktahoetap). TWSA partnered with the regional Take Care Tahoe campaign, to develop Drink Tahoe Tap ® messaging to encourage the use of refillable water containers. Informational articles and advertisements on source water protection, water quality and water conservation are published regularly in visitor magazines such as Tahoe In Depth, Tahoe Visitor Guide and Tahoe.com Summer/Winter editions. Each publication reaches an estimated audience of 60,000+ persons each summer and winter season. Issues are provided in the rooms of area hotels and are also distributed at shopping centers, visitor centers and local businesses. Water bottles and "Drink Tahoe Tap" ® stickers also serve as a major portion of the advertising campaign. TWSA staff regularly tapes radio and television public service announcements. Tahoe Tap is featured on Lake Tahoe Television on multiple segments and TWSA runs Drink Tahoe Tap"® ads. <https://m.youtube.com/watch?v=633vLUjWM8A&feature=youtu.be>

### **Tahoe Cigarette Disposal Bin Program**

<https://www.keeptahoeblue.org/our-work/combating-pollution/cigdisposal>

The aim of the Tahoe Cigarette Disposal Program is to reduce toxic chemicals from littered cigarette butts from leaching into the environment, to protect wildlife, and to reduce litter on Lake Tahoe's shoreline and vicinity, while also providing educational information. The bins were obtained through a Keep America Beautiful grant program (value, \$20,000). As of October 1, 2020, the League to Save Lake Tahoe and TWSA have installed 100+ canisters throughout the Lake Tahoe Basin, for free. The Tahoe Cigarette Disposal program is branded to fit in with the Take Care Tahoe campaign, and each canister is designed to be highly visible and include education on how cigarette butts have harmful impacts to the environment and wildlife.





## Dog Waste Awareness

### **“Be #1 at Picking Up# 2” / “They Drop It, You Drink It” / Dog Waste Pickup Station Sponsorship**

Dog waste collection is an ongoing campaign. Bag dispensing stations, custom signage and collection receptacles are placed in high impact areas and monitored by volunteer or partner agency staff. Approximately 50,000 dog bags are provided by TWSA with an estimated 100,000 more bags being provided by our partners, annually. The graphics style Take Care Tahoe messaging on dog waste collection was incorporated into TWSA outreach materials in 2015. 100 stations are in use around Lake Tahoe, including the new Sand Harbor-Incline bike path, the Johnson Meadows property, Van Sickle State Park, Bijou Park, Burke Creek/Kahle Drive, Lake Tahoe Nevada State Park, Brockway Lookout, Tahoe City and Tahoe Vista Dog Parks, Incline Village community lands, and various Tahoe neighborhoods. Individual leash bag dispensers are also offered at events.



## Participate in source water protection efforts

### **Aquatic Invasive Species (AIS) Public Outreach and Engagement; Control Method Workgroups**

2020-24 were milestone years in aquatic invasive species projects at Lake Tahoe. TWSA staff was heavily engaged in environmental review documentation and research, and our involvement is anticipated over through the next decade, as this is one of Tahoe’s top environmental concerns from its potential, eco-system-wide impacts.

**In summer 2023, a previously non-detected invasive species was verified to be in Lake Tahoe, the New Zealand Mudsnail.** <https://wildlife.ca.gov/News/Archive/invasive-new-zealand-mudsnails-discovered-in-lake-tahoe#gsc.tab=0>

The California Department of Fish and Wildlife (CDFW) was informed by the Tahoe Regional Planning Agency (TRPA) that divers monitoring for aquatic invasive species in Lake Tahoe detected invasive New Zealand mudsnails (*Potamopyrgus antipodarum*) in areas off the South Shore of Lake Tahoe. New Zealand mudsnail samples were subsequently positively identified by experts within CDFW and an outside genetics lab. This is the first time the species has been detected in Lake Tahoe.

[New Zealand mudsnails \(NZMS\)](#) are tiny, aquatic snails that reach, on average, up to 4-6 millimeters long. Despite their small size, NZMS are a highly problematic aquatic species. Dense populations can displace and outcompete native species, sometimes by consuming up to half the food resources in the waterway. The snails have been linked to reduced populations of aquatic insects, including mayflies, caddisflies, stoneflies, and other insects upon which trout and salmon populations depend.

“This is a significant detection and one we’re treating with the utmost seriousness and urgency to determine the extent of the infestation and prevent any further spread within the Lake Tahoe watershed,” said Colin Purdy, Environmental Program Manager for CDFW’s North Central Region, which encompasses the California portion of Lake Tahoe and the surrounding areas of Placer and El Dorado counties. “We greatly appreciate the communication, collaboration and rapid response coordinated so far by TRPA and the Tahoe Resource Conservation District. It will take a coordinated commitment by all the entities that serve the Tahoe Basin as well as the public to prevent the further spread of these invasives in a lake and a watershed that’s cherished around the world.”

TWSA continues to support AIS prevention efforts by other regional agencies including Tahoe Regional Planning Agency (TRPA) and Tahoe Resource Conservation District (TRCD) as a member of the Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG). TWSA staff and utility members are active participants in the LTAISWG, regularly attending meetings and participating in work plan development. TWSA's increased participation has helped resolve past problems related to a lack of communication during the clam removal pilot program with the applicable water agencies.

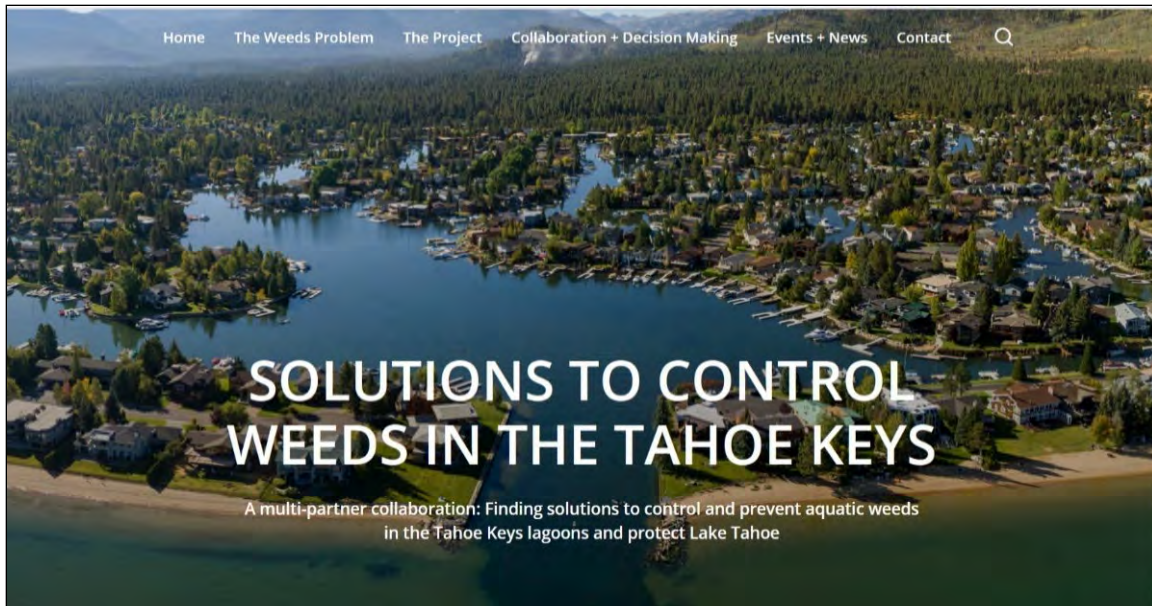
### **Sierra Club Tahoe Area Group and California Sportfishing Protection Alliance Announce Lake Tahoe Lawsuit Victory (Tahoe Keys CMT)**

**In January 2022, a pilot project was authorized approving multiple test methods of aquatic weed control in the Tahoe Keys: Tahoe Keys Lagoons Aquatic Weed Control Methods Test Application / CEQA Process. This permit was vacated by court in 2024:** <https://www.sierraclub.org/press-releases/2024/04/sierra-club-tahoe-area-group-and-california-sportfishing-protection-alliance>

**South Lake Tahoe, CA** – The Sierra Club Tahoe Area Group and the California Sportfishing Protection Alliance (CSPA) are thrilled to announce victory in their lawsuit against herbicide discharges into the Tahoe Keys lagoons connected to Lake Tahoe. In January 2022, the Lahontan Regional Water Quality Control Board issued a permit allowing the first ever discharge of herbicides into Lake Tahoe's waters. The Sierra Club and CSPA filed suit in El Dorado County Superior Court in June 2022 asking the Court to rule against the dangerous precedent set by the Board's permit. The judge agreed with the Sierra Club and CSPA and [vacated the permit](#) to use herbicides in the Tahoe Keys. Jason Flanders and Kenya Rothstein of the Aqua Terra Aemis Law Group represented the Sierra Club and CSPA in this matter. From the beginning of the Control Methods Test project and throughout the project's environmental analysis and final permit processes, the Sierra Club Tahoe Area Group and CSPA commented that allowing the discharge of herbicides before non-chemical methods were fully analyzed and demonstrated not to work would violate the Board's own regulations in their Basin Plan.

This [court ruling](#) released April 25, 2024 confirms that the Lahontan Board "abused its discretion in granting the exemption," and ordered the Board to "vacate and set aside its approval of the project and any and all approvals" during project implementation. The Court also ordered the Board to withdraw its certification of the Final Environmental Impact Report (EIR), which the Court found deficient for not analyzing the reasonable possibility of repeated future applications of herbicides. The Tahoe Keys Property Owners Association originally asked for multiple years of herbicide applications and is already beginning discussions about future herbicide applications. This ruling sends an important message to the Board and the Tahoe Keys Property Owners Association regarding future applications for herbicide treatments. Non-chemical methods must be tested very thoroughly and proven ineffective before any herbicide treatments can be approved.

The Tahoe Keys Property Owners Association (TKPOA) submitted the Tahoe Keys Lagoons Aquatic Weed Control Methods Test Application. Because the applicant's preferred project includes limited use of selected herbicides (with mitigation) this triggered the need for an [Environmental Impact Report](#) (EIR) required by the [California Environmental Quality Act](#) (CEQA) and Lahontan Regional Water Quality Control Board (Lahontan Water Board), and an Environmental Impact Statement (EIS) required by the Tahoe Regional Planning Agency (TRPA). <https://tahoekeysweds.org>



The Control Methods Test application proposes the use of targeted herbicides as one weed control method to test (alongside and in combination with) other methods to reduce and control the abundant growth of invasive and nuisance aquatic weeds that are compromising water quality and degrading beneficial uses of the Tahoe Keys lagoons.

The environmental analysis will determine if the use of U.S. Environmental Protection Agency (EPA) and the Department of Pesticide Regulation (DPR) approved herbicides can meet the strict environmental standards of Lake Tahoe’s classification as a [Tier Three, Outstanding National Resource Water](#). TWSA staff, and our consultant Water Quality Treatment and Solutions, each prepared comments.

TWSA is highly involved in providing public comment AIS Management Plans. This issue has become a major component of our work. **TWSA support the implementation of non-chemical, water quality enhancing, control methods.** The emerging technologies of Ultraviolet Light (UVC) and Laminar Flow aeration, are showing promising results. Diver assisted removal is slow, but effective.

TRPA, one of the lead agencies on this project, convened a core committee of stakeholders to select neutral facilitation services and an independent environmental consulting firm for the environmental analysis process. The selection team is composed of representatives from Lahontan Water Board, TKPOA, TRPA, Tahoe Water Suppliers Association, and The League to Save Lake Tahoe. The core team unanimously selected Zephyr Collaboration to provide facilitation services for the project, and TRC Solutions, Inc. to provide environmental consulting services.

Since its inception, TWSA staff has participated in regional government, regulatory and scientific research working groups, to keep the dialog about source water protection inclusive of drinking water services. We regularly partner with local non-profits and environmental group on programs, trainings and educational activities. TWSA staff and the water purveyor managers have been active partners in the Asian Clam removal projects and ongoing AIS removal/monitoring projects by the Tahoe RCD, TRPA and UC Davis. TWSA staff provided on-site water quality monitoring support on the Asian Clam Removal Projects occurring summer 2011 in the Marla Bay, Lakeside and Emerald Bay areas.

**Final project and environmental document review links:**

[https://www.waterboards.ca.gov/lahtontan/water\\_issues/programs/tahoe\\_keys\\_weed\\_control](https://www.waterboards.ca.gov/lahtontan/water_issues/programs/tahoe_keys_weed_control)  
<https://tahoekeysweds.org>, <https://www.keyswedsmanagement.org>

TWSA Comment Letter: [https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA\\_FINAL\\_comments\\_on\\_Lahontan\\_Permit\\_\(submitted\\_10\\_28\\_2021\).pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA_FINAL_comments_on_Lahontan_Permit_(submitted_10_28_2021).pdf)

TWSA Project Staff summary: [https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA\\_CMT\\_TWSA\\_Staff\\_Summary\\_Antideg\\_10152021.pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA_CMT_TWSA_Staff_Summary_Antideg_10152021.pdf)

**TWSA/Tahoe Fund AIS Bottom Barrier Challenge**

In 2014, TWSA committed funding to Tahoe RCD, for the replacement of 20 rubber mats (\$5000) used by the AIS management team (bottom barrier, non-chemical treatment program) to smother weeds and asian clams. In 2018, The TWSA partnered with the Tahoe Fund to purchase additional bottom barriers with a 1:1 grant match project. <http://www.tahoe fund.org/our-projects/active-projects/aquatic-invasive-bottom-barrier-challenge/>

Aquatic invasive plants affect water quality around the shoreline of Lake Tahoe. Through a well-coordinated program, the Tahoe Resource Conservation District has been able to remove aquatic invasive weeds with the use of bottom barriers and diver-assisted hand pulling. The inventory of bottom barriers was 1.6 acres short of the maximum 5 acres of coverage permitted for Tahoe.

In 2018, the TWSA issued a successful matching challenge to raise a total of \$52,000 to purchase the remaining 175 barriers that would bring the inventory to the full 5 acres. With the full inventory of mats, more aquatic invasive weeds are removed from the lake and water quality is improved. Media coverage of the successful funding challenge is posted at:

<http://www.kolotv.com/content/news/Keeping-Lake-Tahoe-clean-with-bottom-barriers-490967561.html>

<http://www.ktvn.com/clip/14565568/tahoe-barriers-invasive-species>

<http://www.ktvn.com/story/38894280/crews-tackle-invasive-aquatic-plant-issue-at-lake-tahoe>

Several TWSA members have been working with Tahoe RCD on AIS controls using non-chemical methods on their properties. Lakeside Park Association has hosted both UV light and bottom barrier installation sites. North Tahoe PUD used bottom barriers at one site, to evaluate different non-herbicide controls. Crystal Shores HOA in Incline Village NV used bottom barriers to treat a milfoil growth site in their marina.

**Aquatic Invasive Species (AIS) Education**

TWSA outreach efforts include educating the public about Aquatic Invasive Species, covering the transportation risks, ecological implications and preventive measures. AIS information has been incorporated into the TWSA outreach program since the issue emerged at the lake in 2007. Concerns about the introduction of Quagga and Zebra mussels, and their potential effect on drinking water infrastructure and water quality are presented through customer signs installed at area boat ramps, and via website and brochures.

TWSA staff members maintain training as Tahoe Keepers, Eyes on the Lake volunteers and AWWA Water Efficiency Practitioners (Level 1).



**Track customer responses / summarize activities**

Through direct outreach and media contacts, staff estimates 200,000-400,000 people receive TWSA/IVGID Waste Not information annually. TWSA maintains the websites: [www.TahoeH2O.org](http://www.TahoeH2O.org) (and) [www.DrinkTahoeTap.org](http://www.DrinkTahoeTap.org). Source water protection, water conservation, TWSA annual reports and sanitary surveys are available for public review on this website.

**Define the elements of a Surface Water Risk Assessment (SWRA)****Provide information to local planning agencies.**

In June 2012, the TWSA/USACE Lake Tahoe Source Water Risk Assessment (LTSWRA) was used to evaluate potential impacts to drinking water quality from proposed new beach access areas associated with the Edgewood Lodge Project. The project engineer (RO Anderson) provided extensive case study comparisons and conducted multiple runs of the risk model to assuage concerns voiced by NDEP and TWSA water providers to the Tahoe Regional Planning Agency during the project public comment period.

**2014 Lake Tahoe Flow Modeling, Potential Pathogen Transport and Risk Modeling Report**

S. Geoffrey Schladow, Andrea Hoyer, Francisco Rueda and Michael Anderson / June 2014

In spring 2013, NDEP initiated discussion with TWSA to fund Phase 2 of the Lake Tahoe Risk Assessment Model developed in 2008 (Black & Veatch, B&V Project No. 41717). Phase 2 was funded by NDEP and TWSA for \$95,000 in 2013-14. There had been significant improvement in the data available on lake currents since 2008, so the upgrades provided better modeling with more refined area grids based on this new data. This project re-analyzed lake water current patterns in the southeastern corner of Lake Tahoe, in the area of the Edgewood and Kingsbury intakes. The analysis is related to public water systems at Lake Tahoe and the impact that local potential contaminating activities have on the source water. In addition to new data, new potential contaminating activities had been proposed near the public water system intakes.

**Flow Modeling and Pathogens (PO # S004422)****Executive Summary**

Swimming and other body-contact recreational activities have been identified by the USEPA, the Nevada Division of Environmental Protection, the California Department of Health Services and other public health professionals as a potential source of microbiological contamination of recreational waters. This study was undertaken to quantify the impacts of body contact recreation on microbial water quality at the Kingsbury General Improvement District (KGID) and Edgewood Water Company intakes on Lake Tahoe. This study builds upon the risk assessment conducted previously (Black and Veatch, 2008). The modeling results that underpinned these conclusions provide a number of additional insights to minimizing pathogen entrainment into drinking water intakes. Primarily, by using a technique developed under this project, it is now possible to determine the source area of pathogens (or any other contaminant) that arrives at a water intake. The results also provide insight into the complex interplay between the windfield, the strength of the lake's thermal stratification and the transport patterns of pathogens. Most notably, having an intake located below the maximum depth of the thermocline greatly reduces the frequency of pathogen arrival at the intake. This has other implications with respect to lake level and drought conditions.

With prolonged drought episodes (predicted to be more frequent under future climatic conditions), lake level will be lower and thereby reduce the depth of the water intakes. Under those conditions the period of time favorable for pathogen transport to the intakes is likely to increase significantly. Similarly,

the time of water withdrawal can be used to minimize risk. Nighttime and early morning withdrawals seem to pose the greatest risk, as pathogens released the previous day have had little opportunity to be de-activated by solar radiation. This highlights the linkage between drinking water quality and maintenance of high water clarity, particularly in the nearshore region. Maximizing the penetration of UV radiation from solar radiation into the water column provides “free” water treatment.

The release of a surrogate for herbicide transport from the vicinity of Tahoe Keys was simulated, and showed that herbicide could be transported to the vicinity of the nearshore regions of south-east Lake Tahoe within a 24 hour period. Within that period, material did not actually arrive at any of the water intakes, but based on other results in this report, that would occur within less than 48 hours. It must be borne in mind that these results are a first estimate of the fate of herbicides. No account has been taken of the dilution that a real plume of herbicide would be subject to, and the possible breakdown into other chemicals. Likewise, the toxicity (if any) of the herbicide for the case of consumption or body contact recreation has not been considered as it was beyond the scope of the study. However, should the use of herbicides be permitted at Lake Tahoe, there is a strong case that a more complete study of the fate of these products on public health should be undertaken.”

A TWSA sponsored workshop on this report and the current data was offered on Nov. 5 and 6, 2014, by Dr. Schladow at both north and south Tahoe locations. Media coverage of the presentations is at: <http://www.laketahoenews.net/2014/11/scientists-studying-life-below-tahoes-surface/>

**Gather, track, and report regularly on TWSA partners’ operations, management, project, planning or other changes that may affect water quality:**

TWSA members and staff continue to annually report on planning or other changes that may affect drinking water quality. Raw water data (Turbidity, Fecal Coliform and Cryptosporidium levels) is collected and tracked from each of the water purveyors’ intakes on a monthly basis. Long term data sets are maintained. This data, along with operational upgrades, capital improvement projects and Tahoe area environmental improvement projects are recorded in the TWSA Watershed Control Annual Report. The USEPA Long Term 2 Enhanced Surface Water Treatment rule (LT2) required redundancy on treatment for filtration avoidance permit facilities. All TWSA members have met this requirement. Detailed water quality data for members is included later in the report.

**Participate in regional planning efforts, including general/technical committees, TRPA working group and Board activities, agency regulatory language and amendment/ordinance process. Promote TWSA objectives/goals by attending stakeholder meetings and offering presentations /testimony.**

**Public Drinking Water Protection Advocacy**

TWSA drinking water quality advocacy is our core mission. Much of our work has focused on research on source water protection and aquatic weeds management practices. The TWSA has been actively involved in dialog and discussion regarding the proposed aquatic weeds controls in the Tahoe Keys. The TWSA supports the use of non-chemical methods, citing herbicide use’s applicability in a Tier 3 water is only as a last resort in aquatic weeds management; after all other methods are exhausted.

Tahoe Keys Integrated Weeds Management Stakeholder Circle (SC) Work Group; one of only 2 non-regulatory members. Over the past 4 years, the mediated workgroup was organized by the TRPA to bring together regulatory partners and stakeholders.

Current information is posted at: <https://tahoekeysweeds.org/>. The goal of the collaborative, multi-stakeholder process is to ensure stakeholder concerns and perspectives are addressed during the environmental analysis, resulting in a plan for testing weed control methods that is science-based, broadly supported, and effective at controlling aquatic weeds in the Tahoe Keys lagoons.

**TWSA Staff are participating in 2 regional microplastics working groups:**

- **Tahoe Science Advisory Council Microplastics Subcommittee**

**2024 Release of White Paper**  [White Paper Microplastics WG V1.5.docx](#)

**Executive Summary**

The Tahoe Science Advisory Council convened the Microplastics Workgroup to assess current state of knowledge of microplastics, highlight key data gaps, and recommend next steps. The workgroup focused on four main areas: microplastic sources, fate and transport, microplastic interactions with ecology and impacts to water quality, and regulatory/source controls to reduce microplastics entering Lake Tahoe. The workgroup recommends (1) further assessing specific microplastic sources, (2) assessing microplastic transport, (3) evaluating the impacts of microplastics to lake clarity and drinking water, and (4) continued assessment of strategies to reduce plastic litter entering the environment.

**Microplastics are a contaminant of emerging concern around the globe (World Health Organization, 2019, 2022) and at Lake Tahoe (Nava et al., 2023). In response to growing awareness about plastics in the region, the Tahoe Science Advisory Council (Council) convened a working group (group) of local and regional experts to summarize and document microplastics and plastic pollution research in the Lake Tahoe Basin. TWSA staff participate in this work.**

Using available information, the group was charged with highlighting key information and data gaps, and with making recommendations for next steps.

The group conducted its work over the course of one year and developed this memorandum to document its findings. The project was guided by the 2023 Lake Tahoe “Science to Action” conference proceedings, a targeted survey, and regular science community and stakeholder engagement. The conference provided space for science-management dialogue about microplastics and highlighted the need to summarize the state of the knowledge and prioritize future investment.

- **California Water Quality Monitoring Microplastics Subcommittee**
  - *Local and global community exchange of information and data for microplastics monitoring methods and tools*
  - Meet quarterly, details are shared through Lyris (waterboard)
  - Two groups which are very active:
    - Microplastics monitoring playbook
    - Microplastics Language for Consumer Confidence Reports – soon to be released!

TWSA also maintains staff presence on the TRPA Interagency Shorezone Coordination Group. This group meets monthly to review Shorezone project applications each month.

TWSA maintains staff presence on Nearshore Aquatic Invasive Weeds Working Group (NAIWWG), facilitated by the Tahoe Resource Conservation District (TRCD). This group meets quarterly to review and discuss lakewide AIS projects, action plans, treatment technologies, and emerging issues.

TWSA staff has been receiving notification on buoy and dock permit applications being re-issued by Nevada State Lands. TWSA staff review these notifications and then forward any applications of concern to the appropriate water agency for further review.

TWSA staff maintains ongoing participation with the TRPA, NDEP, Lahontan Water Board, The Tahoe Fund, City of Reno Sustainability Workgroup, Tahoe Environmental Research Center, Sustainable Tahoe and other working groups to maintain dialogue on source water protection.

### **Emergency Preparedness**

TWSA members are participants in the NvWARN and CalWARN emergency inter-local agreements. The WARN groups of water and wastewater utilities offer a web-driven, statewide mutual assistance program. Managed through the websites (<http://www.calwarn.org>) (<http://www.nvwarn.org>), CalWARN and NvWARN agreements provide a system for immediate assistance for member utilities during an emergency. Water and wastewater utilities can request equipment and personnel to assist during natural or man-made events that impact water and wastewater systems.

### **Tahoe Regional Mutual Aid Agreement**

In 2014, a TWSA subcommittee began the revision of a Tahoe specific mutual aid agreement, this update was completed in 2017 and revised again for 2023. In 2024, the mutual aid agreement was instrumental in effective response to water/sewer emergencies. <https://ntpud.org/carnelian-bay-sewer-spill/>

**The Caldor Fire** created major public safety and emergency response needs as it tore through the edges of the City of South Lake Tahoe (August/Sept. 2021). Emergency response protocols included assisting TWSA members with connecting with their emergency managers, to address issues such as infrastructure mapping needs, generator fuel supplies and staffing.

<https://www.sacbee.com/news/california/fires/article255173052.html>



*Tahoe In Depth* Special Caldor Fire Issue:

[https://www.trpa.gov/wp-content/uploads/CaldorFire\\_12pgs\\_No20\\_FINAL\\_web.pdf](https://www.trpa.gov/wp-content/uploads/CaldorFire_12pgs_No20_FINAL_web.pdf)

### **Fire Flow Water Supply Enhancements**

TWSA members and South Tahoe Public Utility District have been working collaboratively on federal funding requests for infrastructure upgrades and inter-tie projects in order to address the need for adequate fire flows in the event of urban wildfire. The Lake Tahoe Community Fire Protection Partnership has worked to secure federal funding which, when matched dollar-for-dollar with local agency funding, allows construction of critical water infrastructure projects with a nexus to fire protection within the Lake Tahoe Basin. More than \$32,000,000 in federal funds have been 50% matched by Partnership members. (Source: USFS Funding/Lake Tahoe Fire Prevention Partnership). The Fire Flow Partnership is formalized, with both TWSA and non-TWSA members. More information can be obtained by contacting Shelly Thomson, at South Tahoe PUD.

Intensive efforts are being focused on Tahoe “Wildfire Adapted Communities” – a multi-agency, multi-state, multi-decade effort of education and forest fuels reduction projects designed to reduce and mitigate risk of catastrophic wildfire in the Tahoe Basin. Wildfire in the Urban-Wildlands Interface of the Tahoe Basin is universally identified as a high-level risk to source water protection, holding potential

catastrophic damage to water quality, water infrastructure, water treatment and distribution. Wastewater infrastructure is also highly vulnerable and is a critical service to maintain and protect. Nineteen agencies currently form the Tahoe Basin Fuels Partnership\* working group. The membership includes a mix of community owned and private water suppliers, and the regional wastewater agencies. Eleven of the TWSA members are active in this Partnership. Each of the Partnership members operates and maintains infrastructure for water/wastewater services, serving local and visitor populations. Serving a year round population under 100,000 – infrastructure investments to protect our source water have been a major commitment of our communities. Tahoe’s unique draw as an international tourist destination is currently estimated at 15 million annual visitations. This is 3x the visitation to the top 3 US National Parks, combined.

#### **Set trigger for water supplier notification during a plan review that includes activities that may affect drinking water quality**

Regulatory language in the LRWQCB Basin Plan Amendment requires water provider notification and solicitation of comments of potential chemical use projects.

TWSA has supported drinking water source protection through discussion of the zone of protection around drinking water intakes and wells. Current TRPA language includes a 600 ft. buffer zone to trigger project review near lake source intakes. TWSA formally requested the TRPA standard change to a 1,320 ft. (1/4 mile) buffer zone of protection around drinking water intakes. The TRPA Shoreline Plan review process initiates a water provider notification triggers for any new proposed piers or permanent structures within 1,320 ft. of an intake. For buoy fields, the notification process is also triggered in the Project Review process. The planning review process now includes a check mechanism for notification to a purveyor of any project within 600 ft. of groundwater or 1320 ft. for lake intakes. TRPA maps are flagged for drinking water sources. However, intake locations are not published for security reasons.

TWSA staff receives notification and hard copies of applications of a variety of use permits (piers, buoys) and potential projects as submitted by applicants to Nevada State Lands. These are forwarded to the applicable water providers so they can include comment and mitigation requirements such as turbidity and bacterial sampling for potential impact projects.

#### **Develop a plan to incorporate new members into TWSA**

TWSA has a defined cost sharing plan and formal membership agreement. STPUD became a full member in 2017. Also in 2017, the TWSA Board completed a bylaws review process with updates. Several local purveyors have expressed interest in joining as associate members, effective in 2022.

#### **Annual Reporting**

The TWSA Watershed Control Program Annual Report is submitted to the Nevada Division of Environmental Protection Bureau of Safe Drinking Water and the California Division of Drinking Water Programs (Northern California Field Operations Branch) annually, each December. Reports are posted online at [www.TahoeH2O.org](http://www.TahoeH2O.org). Hard copies of the report are distributed to personnel of area agencies upon request. TWSA Watershed Control Program Annual Reports are published annually, since 2003.

### **TWSA Organizational Goals**

The TWSA Board conducts annual goal setting (reviewed 6/2023). The TWSA Board Goals are:

1. **“Continue and increase emphasis on extensive education and outreach on focus topics of: source water protection, Aquatic Invasive Species (AIS) threats, treatment methods used for AIS and the value of municipal tap water.”**

As detailed in Action Plan Highlights 1.0 through 1.9 – a variety of actions happen towards this goal.

2. **“Continue outreach and advocacy efforts for federal infrastructure funding, especially for fire flow capacity.”**

STPUD and IVGID conduct federal lobbying efforts on behalf of drinking water concerns for the Association. STPUD has conducted collective grant funding management for the TWSA group on fire flow enhancement infrastructure such as additional tanks, hydrants, pipe replacement and upgrades.

3. **“Continue a strong communication relationship with Tahoe Regional Planning Agency (TRPA), Nevada Department of Environmental Protection (NDEP), Lahontan Regional Water Quality Control Board (LRWQCB) and other regulatory agencies on source water protection.”**

The most significant recent development includes participation on the Stakeholder Committee of the Tahoe Keys Control Methods Test working group. This is a mediated team coordinated by TRPA for the Tahoe Keys Property Owners Association “Application for Exemption” resubmitted to the Lahontan Regional Water Quality Control Board in July 2018. Past participation has ongoing project review and mitigation suggestions provided regarding pesticide and herbicide use (land and water use) to Lahontan Regional Water Quality Control Board (LRWQCB). Agency involvement by Nevada Dept. of Environmental Protection and California Dept. of Public Health was prompted by water provider concerns. Initial public comment prompted the LRWQCB Board to direct staff to form a working group to address the water provider concerns and produce appropriate intake protection/mitigation language. This language was incorporated into the existing regulations. TWSA staff has been heavily involved in the Nearshore Aquatic Invasive Weeds Working Group (NAIWWG) in the past 5 years. Public comment is offered. Research is conducted and shared with the group.

TWSA’s Executive Director and Chairman are in regular contact with agency staff regarding drinking water provider concerns. Staff has maintained presence on TRPA led planning and workgroup committees for shore zone projects and AIS projects.

TWSA is a sponsor for, and TWSA staff submits articles to TRPA’s Tahoe in Depth publication. This magazine is Tahoe’s environmental news print (also online) platform. Print copies are distributed quarterly via US Mail to all property owners in the Basin, and are offered at visitor locations.

4. **“Maintain and improve project review / involvement process with TRPA, NV State Lands, Lahontan Water Board and other planning/regulatory agencies.**

Current active projects include:

- Aquatic Invasive Species (AIS): threats/prevention programs, treatment methods, Control Methods Test
- Groundwater Contamination at the ‘Y’ / PCE Plume Project
- Tahoe Regional Planning Agency Shoreline Plan and Project Reviews
- Nevada State Lands notifications on occupancy of lake bottom
- Truckee River Operating Agreement (TROA) Ongoing regulatory updates
- Federal and state regulatory updates
- Emerging contaminants (microplastics)

TWSA members worked with TRPA on establishing a standardized Memorandum of Understanding (MOU) for routine water utility work, reducing the need to obtain individual permits for standard small scale construction and infrastructure upgrades. As outlined above in Action Plan highlights; TWSA staff and member agencies are actively involved in the planning and review of projects, activities and regulations related to source water protection at Lake Tahoe.

**5. “Utilize regional studies/projects to determine how they protect source water quality. Continue to work with LTWIP as appropriate.”**

Review of published reports and studies is conducted on an ongoing basis by TWSA staff and member agencies. Intensive staff resources have been directed to research and develop TWSA public comment on the potential use of aquatic herbicides for aquatic weeds control, driven by planning efforts in the Tahoe Keys area. Many of the reports and studies released in the past year are referenced in this annual report. Microplastics as an emerging contaminant are a new topic.

Water Use Efficiency (Conservation) in California

California water conservation policy mandates extensive education, outreach and enforcement measures. Common conservation measures implemented include: tiered rates, irrigation restrictions, probation on water use on hardscaping, requirements for water efficient indoor fixtures, online water waste reporting forms and more. TWSA California members meet the 20% by 2020 state goal.

<https://water.ca.gov/programs/water-use-and-efficiency>

Water Efficiency (Conservation) in Nevada

Water providers enacted conservation education and voluntary water reductions.

Review Tahoe Annual Diversions Reports

TWSA members did not exceed allocated water rights in the past year. Lake Tahoe to Pyramid Lake is a complex and highly managed, bi-state, watershed. The Truckee River Operating Agreement (TROA) <http://www.troa.net/> was signed on Sept. 6, 2008. This agreement among 16 parties (including Federal, California, Nevada, Pyramid Lake Paiute Tribe, water agencies/irrigation districts and Truckee Meadows Water Authority) was designed to improve the operational flexibility of Truckee River reservoirs, and had been in negotiation for more than 18 years. It is designed to formalize, regulate and monitor water rights and water use within the Tahoe Basin, the Truckee River Watershed and the final outflow areas of Pyramid Lake and the Carson River. Under TROA, Tahoe Basin water rights for water extractions (surface and groundwater) are capped at 34,000 acre feet total, annually. Allocations are 11,000 acre feet per year (afy) for Nevada use and 23,000 (afy) for California use. Implementation began December 2014.





### III. MONITORING AND DATA MANAGEMENT

#### TWSA OPERATORS WITH FILTRATION AVOIDANCE\*

##### **Ozone plus Ultraviolet (UV) disinfection; chlorine residual for delivery:**

- Incline Village General Improvement District (IVGID)
- Glenbrook Water Cooperative (Glenbrook)
- Zephyr Water Utility District (ZWUD)
- Kingsbury General Improvement District (KGID)
- Edgewood Water Company (Edgewood)

##### **Ultraviolet (UV) disinfection and chlorine residual for delivery:**

- North Tahoe Public Utility District (NTPUD)

#### TWSA OPERATORS USING FILTRATION TREATMENT

##### **Filtration and chlorine residual for delivery:**

- Tahoe City Public Utility District (TCPUD), the McKinney Quail System
- Skyland Water Company (Skyland)
- Cave Rock Water System (Cave Rock)
- Round Hill General Improvement District (RHGID)
- Lakeside Park Association (LPA)

**Table 5.0 Filtration Avoidance Criteria**

*Treatment Requirements for Filtration Avoidance		
Water Quality Parameter	Surface Water Treatment Rule (SWTR)	SWTR + LT2ESWTR
Giardia	3-log removal/inactivation	3-log removal/inactivation
Virus	4-log removal/inactivation	4-log removal/inactivation
Cryptosporidium		2-log removal/inactivation
Turbidity	<5 Nephelometric Turbidity Unit (NTU)	<5 NTU
Total coliform	<100/100 mL	<100/100 mL
Fecal coliform	<20/100 mL	<20/100 mL

*Source: USACE Risk Assessment Report 2008*

\* Note: All TWSA water purveyors with filtration avoidance met LT2 upgrade requirements by using a combination of ozone and ultraviolet (UV) treatment or UV alone. All purveyors use chlorine residual for distribution system disinfection. System upgrades are described in Chapter V.

The EPA defines water quality monitoring as a method to identify new, potentially contaminating activities and control existing activities. Water suppliers are required to monitor raw water that may affect human health for constituents. In 2002, the Tahoe Water Suppliers Association (TWSA) established a central drinking water quality database to improve accessibility, evaluate long-term health of their water supply, distinguish water quality trends, and identify potential treatment methods. Between 2003 and 2004, TWSA staff combined existing climatic databases in the Basin for future causal studies. TWSA staff continues to monitor weather in relation to turbidity and total coliform monitoring spikes. The TWSA has also worked with the Army Corps of Engineers, the Nevada Department of Environmental Protection, the University of California-Davis, the University of California-Riverside, and Black & Veatch Consulting to complete and update a risk assessment study of the drinking water intakes. TWSA also monitors shorezone development and aquatic invasive species issues throughout the watershed. These are the initial steps in expanding the source water quality monitoring program.

## Raw Water Monitoring

Under the Surface Water Treatment Rule, TWSA water purveyors with filtration avoidance are required to complete turbidity (NTU) and total coliform or fecal coliform analyses on raw drinking water, 40 CFR §141.71(a). Samples are taken from the first pump station from the drinking water intake pipe prior to treatment. Sample frequency is dependent on the flow of raw water relative to community demand. For example, TCPUD's McKinney Quail System (included in this report from 2004-2021) helps serve an increase in the seasonal community and often does not pump or sample raw water daily during the winter months. The non-filtering water suppliers currently test raw water for total coliform or fecal coliform. The filtering water suppliers are not required to test for total coliform and E. coli coliform on raw water; turbidity monitoring is required. LPA and TCPUD also monitor for coliforms, even though they are filtration systems. All purveyor results are included in the following report section (see Chapter IV). The Tahoe City PUD McKinney Quail system is offline and did not produce water during the reporting year, and the new West Lake Tahoe Treatment Plant is scheduled to be operational in 2025.

All water suppliers are required to submit the maximum and mean of the regulated impurities to the Nevada Department of Environmental Protection Bureau of Safe Drinking Water and the California State Water Resources Control Board, Division of Drinking Water Programs, on a monthly basis. Any violations of monitoring or water quality parameter levels must be reported immediately. Depending on the violation type and duration, violations may require additional monitoring, reporting, and customer alerts, including boil orders or ongoing treatment.

To help suppliers identify potential problems and future treatment processes, TWSA developed a combined database that includes the following:

- maximum turbidity
- mean turbidity
- median turbidity
- maximum total coliform and fecal coliform
- mean total coliform and fecal coliform
- median total coliform and fecal coliform
- total coliform and fecal coliform colony counts and percentage of positive samples per year
- 90<sup>th</sup> percentile of constituent readings

The Annual Report summarizes raw water data for each purveyor for the reporting year of July 1, 2023, to June 30, 2024, and yearly data ranging between July 1, 2014, and June 30, 2024. TWSA maintains a database with many purveyors' data, archived from 1997. The graphical data analysis includes the following:

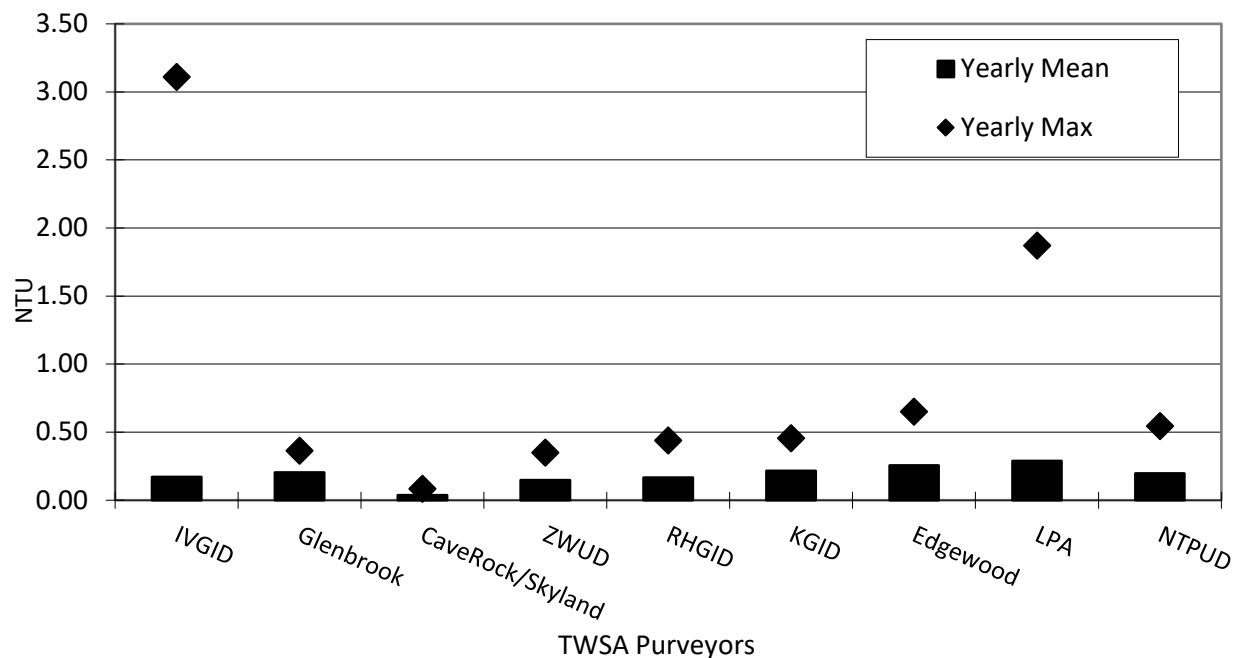
- monthly mean and maximum turbidity
- annual mean and maximum turbidity
- monthly mean and maximum total coliform
- annual mean and maximum total coliform

The analysis aims to identify trends and develop methods of maintaining and improving the supply and treatment processes. Following is a brief overview of the purveyors' combined raw water sample results during the 2023-2024 reporting year, listed as 2023 in tables and figures, and between the 10-year period of July 1, 2014 to June 30, 2024. Individual reports are located in the agency sections within Chapter IV of this document.

## Turbidity

During the reporting year, the maximum turbidity readings for the purveyors ranged between 0.09 NTU and 3.11 NTU (Table 5.1 and Figure 1.0). The purveyors' maximum turbidity readings occurred at different times of the year but tended to occur during spring runoff events and when winds were from the east (Table 5.1). The maximum turbidity reading, 3.11 NTU, occurred on March 1, 2024, at Incline Village General Improvement District (IVGID) (Table 5.2). IVGID operates with filtration avoidance, and the maximum turbidity value of 3.11 NTU is below the requirement for filtration avoidance of 5 NTU. IVGID conducted turbidity analysis on 366 raw water samples; one result was above 1 NTU, equaling 0.27% of samples for the reporting year. March 1, 2024, was the first day of a four-day blizzard event in the Lake Tahoe basin. The weather station in Incline Village reported mixed precipitation and winds from the south/southeast of 0.8-8.1 mph with gusts up to 13.0 mph. The National Oceanic and Atmospheric Administration's (NOAA) Tahoe City Area report for March 1, 2024, included 12 inches of new snow in the Tahoe City Area as the first of a four-day blizzard that brought winds up to 150 mph to the Lake Tahoe basin and 34 inches of snow accumulation<sup>1,2</sup>. The mixing effect caused by winds from the south/southeast ahead of the winter storm likely influenced the maximum turbidity reading for the reporting year.

**Figure 1.0: Comparison of Annual Mean and Maximum Turbidity Results for TWSA Purveyors for the 2023-2024 Reporting Year.**



Following historical trends, maximum turbidity readings have been correlated to wind events producing a wave mixing effect. Five of the nine TWSA water purveyors had maximum turbidity readings in the

<sup>1</sup> National Oceanic and Atmospheric Administration, National Centers for Environmental Information, National Climate Report, March 2024, West, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202403>

<sup>2</sup> National Oceanic and Atmospheric Administration, NOWData, for Tahoe City Area, daily data for a month, March 2024, <https://www.weather.gov/wrh/climate?wfo=rev>

summer: ZWUD in July 2023, LPA in August 2023, and NTPUD, KGID, and RHGID in September 2023 (Tables 5.1 and 5.2). Fall 2023 held the maximum turbidity reading for Glenbrook in November. The winter season of 2023-2024 held maximum turbidity readings at Edgewood in December 2023, Caverock/Skyland in January 2024, and IVGID in March 2024. Annual spring runoff did not influence the maximum turbidity readings during this reporting year, with no annual maximum results from April through June 2024. Following historical trends with low precipitation years, NOAA notes the water year 2023-2024 as D0-Dry at the conclusion in September 2024<sup>3</sup>.

**Table 5.1: Summary of TWSA raw water turbidity between July 1, 2023, and June 30, 2024, in relation to weather.**

2023-2024 (NTU)	IVGID	Glenbrook	Cave Rock/Skyland	ZWUD	RHGID	KGID	Edgewood	LPA	NTPUD
Mean	0.17	0.21	0.04	0.15	0.17	0.21	0.26	0.29	0.20
Maximum	3.11	0.36	0.09	0.35	0.44	0.46	0.65	1.87	0.55
Date Maximum	1-Mar	12-Nov	4-Jan	5-July	14-Sep	21-Sep	9-Dec	18-Aug	19-Sep
Sustained Wind Speed (mph) Average/Max	0.8 8.1	1.9 14.0	5.0 9.0	4.2 14.0	3.0 13.0	0.9 12.0	0.4 10.0	0.9 11.0	3.3 24.8
Wind Gust Max Speed	13.0 mph	25.0 mph	10.0 mph	15.0 mph	13.0 mph	12.0 mph	10.0 mph	11.0 mph	0.0 mph
Wind Direction	SSE	NE	ESE	ENE	ESE	NE	ENE	WNW	NE
Weather Event/Precipitation (in)	0.01 (Mixed)	0.00	0.00	0.00	0.00	0.01 (Rain)	0.26 (mix)	0.04 (Rain)	0.00
Highest Monthly Mean	0.22	0.22	0.045	0.20	0.25	0.28	0.32	0.42	0.26
Date of Highest Mean	Mar-24	Aug-23 Sep-23	Jun-24	July-23 Aug-23	Sep-23 Oct-23	July-23 Aug-23	Oct-23	Aug-23	Jul-23

Annual mean turbidity results ranged from 0.04 NTU to 0.29 NTU for the reporting year (Figure 1.0). The highest annual mean turbidity reading for the TWSA purveyors was 0.29 NTU, which was from LPA's intake, a system operated with filtration. The highest annual mean turbidity result for the purveyors with filtration avoidance is 0.26 NTU calculated for Edgewood (Tables 5.1 and 5.3). Annual mean turbidity decreased for two purveyors and increased for seven, between this reporting year and the previous (Table 5.3, Figure 1.4). The highest monthly mean turbidity calculations ranged between 0.045

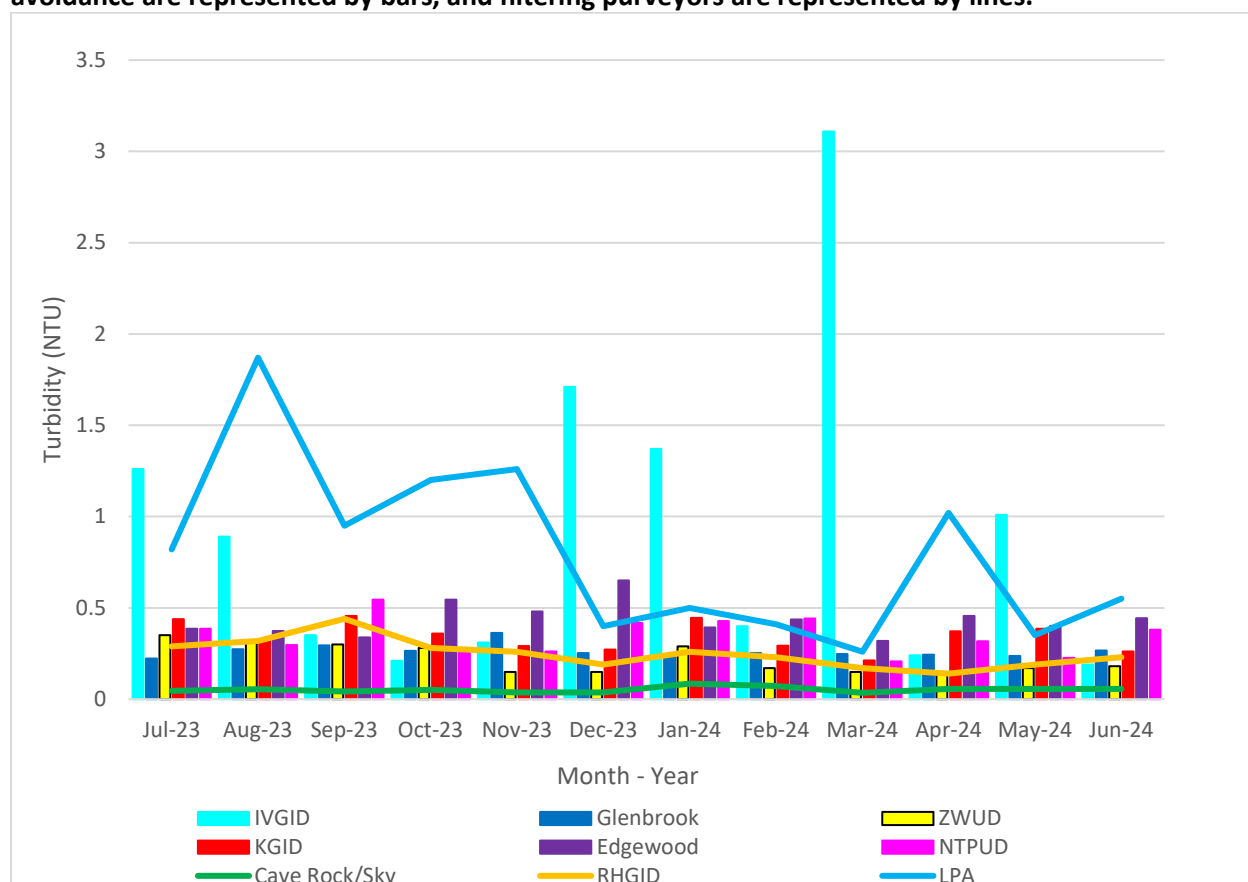
<sup>3</sup> National Integrated Drought Information System, Explore Historical Data and Conditions, <https://www.drought.gov/historical-information?dataset=0&selectedDateUSDM=20241022>.



NTU and 0.42 NTU and occurred primarily during July and August 2023, with results for seven purveyors (Table 5.1, Figure 1.2).

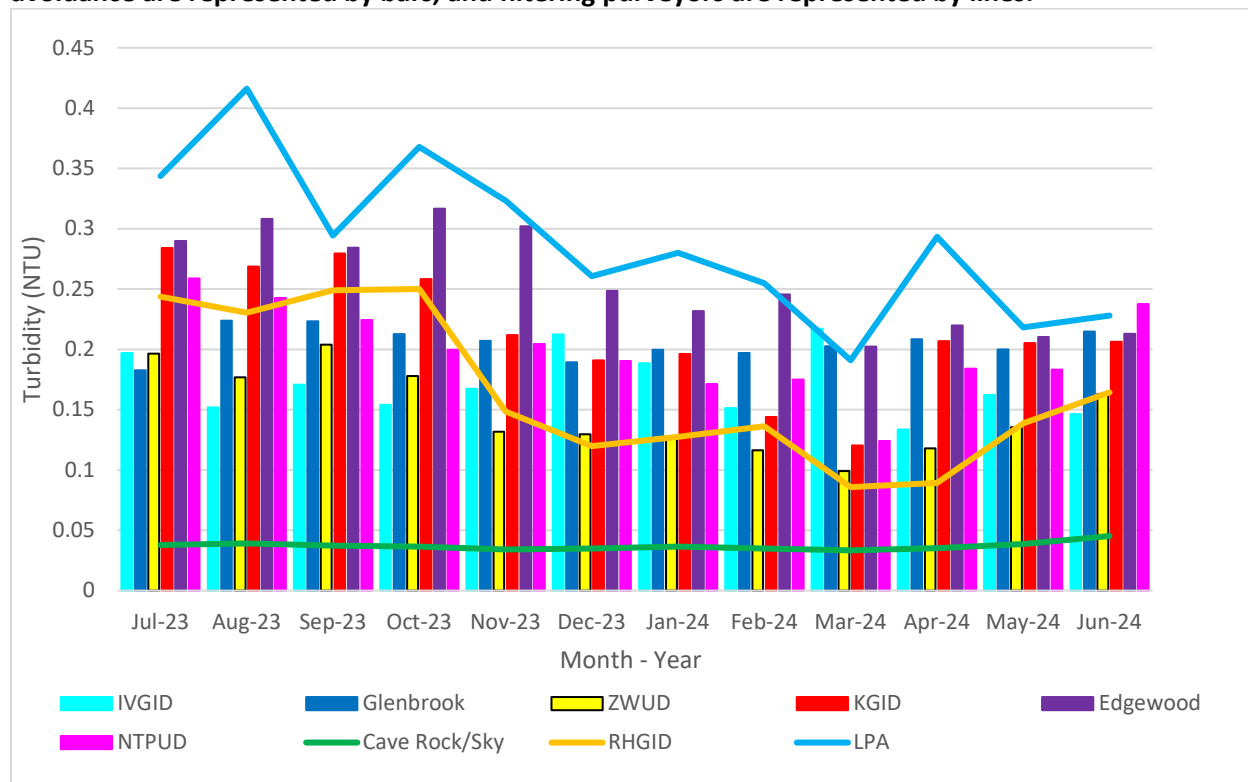
For the reporting year, monthly maximum turbidity results remain below 1.00 NTU for eight of nine purveyors. Maximum daily turbidity results were above 1.00 NTU at IVGID in July 2023, December 2023, January 2024, March 2024, and May 2024. The IVGID maximum is the only result in March above 0.50 NTU for purveyors operating with filtration avoidance (Figure 1.1). All other purveyors with filtration avoidance had monthly maximum turbidity below 1.00 NTU, with Edgewood and NTPUD reporting monthly maximums greater than 0.50 NTU in September, October, and December 2023.

**Figure 1.1: Maximum turbidity from July 1, 2023, to June 30, 2024. Purveyors operating with filtration avoidance are represented by bars, and filtering purveyors are represented by lines.**



For the reporting year, monthly mean turbidities remained below 0.50 NTU for all purveyors operating with filtration avoidance. In addition, the filtering purveyors also have a monthly mean turbidity of less than 0.50 NTU (figure 1.2). Monthly mean turbidities were the highest in the summer months of 2023, with monthly mean turbidities greater than 0.25 NTU at KGID, Edgewood, LPA, and NTPUD (Figure 1.3). Monthly mean turbidities remained above 0.25 NTU at NTPUD and LPA in October and November, then dropping with water temperatures into the winter season of 2023-2024. Monthly mean turbidity at the Cave Rock/Skyland raw water intake was consistent throughout the reporting year, with values ranging from 0.03-0.06 NTU.

**Figure 1.2: Mean turbidity by month July 2023 to June 2024. Purveyors operating with filtration avoidance are represented by bars, and filtering purveyors are represented by lines.**



The ten-year reporting period includes several notable weather events that affected turbidity in the waters of Lake Tahoe. Most recently, the winter of 2022-2023, 2022 in tables and figures, was reported as the snowiest on record, with the NOAA reporting the central and southern Sierra Nevada snow survey data from April 1, 2023, the snowpack was the deepest in the past 90 years, greater than previous benchmark years of 1952, 1969, 1983 and 2017<sup>4</sup>. The spring runoff season was visible within the Lake Tahoe basin, with monthly mean turbidity values reaching maximums for the 2022 reporting year in May and June 2023 (Table 5.2). Spring runoff was also documented by the USGS discharge measurements at Incline Creek during the same period. See the 2023 TWSA Watershed Control Program annual report for additional information.

During February 2023, the waters of Lake Tahoe experienced full vertical mixing due to extremely cold air temperatures recorded throughout the early part of winter 2022-2023<sup>5</sup>. The UC Davis State of the Lake Report noted that November and December 2022 air temperatures were well below the 112-year average temperature from 1910 to 2022<sup>6</sup>. The cold air produced reduced surface water temperatures that equaled the lake bottom temperature of 41.34°F on February 27, 2023 and lasted for seven weeks through April 2023, as recorded by the UC Davis monitoring buoy near Glenbrook. The effects of

<sup>4</sup>National Centers for Environmental Information, National Oceanic and Atmospheric Administration, March 2023, National Climate Report, Western Region, Snowpack, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202303>

<sup>5</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2023, Extreme Ice and Extreme Mixing, [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/SOTL\\_2023\\_web.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/SOTL_2023_web.pdf), page 6.16

<sup>6</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2023, Monthly Air Temperature, [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/SOTL\\_2023\\_web.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/SOTL_2023_web.pdf), page 7.4

complete vertical mixing may have been observed at Edgewood, as vertical mixing time may vary between locations and lake depths, as particulates, nutrients, and oxygen move throughout the equalized temperature in the water column.

For the 10-year reporting period of July 1, 2014, to June 30, 2024, the maximum turbidity for each purveyor has varied. For the 10-year period, the highest maximum turbidity reading was recorded at LPA, 44.56 NTU, reported in 2022, and the lowest maximum turbidity reading, 0.04 NTU, was recorded in 2020 at Cave Rock/Skyland; both purveyors operate with filtration (Table 5.2 and Figure 1.3). For purveyors with filtration avoidance, the highest annual maximum for the 10-year reporting period was 7.21 NTU recorded at Glenbrook in 2014, and the lowest annual maximum for the 10-year reporting period was 0.35 NTU at ZWUD this reporting year. Although no trends visually appear, many of the maximum turbidity values remained below 5 NTU except Glenbrook in 2014, with six results above 5 NTU (Figure 1.3). Annual maximum turbidity was the lowest in 2017 for the 10-year reporting period, with values of 0.29 NTU-1.67 NTU (Table 5.2). For this reporting year (noted as 2023 in Tables and Figures), annual maximum turbidity linear trendline data for the 10-year period shows that six purveyors have a decreasing annual maximum turbidity trend, and three show an increasing trend in annual maximum turbidity (Figure 1.3).

Historical annual mean turbidity is relatively consistent for each purveyor (Table 5.3). The annual range throughout the 10-year reporting period for all purveyors is 0.031 NTU to 1.15 NTU (Table 5.3). For purveyors with filtration avoidance, the range in annual mean over the 10-year reporting period is 0.12 NTU and 0.30 NTU. The lowest annual mean for filtration-avoidant purveyors of 0.12 was calculated twice in the 10-year period, first at IVGID in 2020 and again with ZWUD in 2022 (Figure 1.4). The highest annual mean for purveyors with filtration avoidance was 0.30 NTU, calculated in 2019 at ZWUD (Table 5.3). The annual mean turbidity values for this reporting year range from 0.04 NTU to 0.29 NTU (Figure 1.2). Although no inclusive trends visually appear, over the 10-year reporting period, linear trendline data for annual mean turbidity shows three purveyors with decreasing trends, four with increasing trends, and two with stable trends (Figure 1.4).

The turbidity values for Cave Rock/Skyland for the 2020-2021 reporting year, noted as 2020 in tables and figures) are representative of the drought conditions seen throughout the Lake Tahoe watershed. The annual minimum for 2020-2021 is 0.002 NTU, the lowest value in the TWSA Cave Rock/Skyland data set from 2002-2021. Additional analysis shows the annual minimum during the drought year of 2015 as 0.01 NTU, with the third-lowest annual maximum of 0.26 NTU. The similarities between 2015 and 2020 show a likely correlation between drought conditions and turbidity at the Cave Rock/Skyland intake due to the reduced seasonal runoff. Additionally, the following purveyors had maximum turbidity values less than or equal to the 2015 reporting year in 2020: IVGID, Glenbrook, Cave Rock/Skyland, ZWUD, RHGID, Edgewood, and NTPUD (Table 5.2). The following purveyors had annual mean values less than or equal to 2015 in 2020: IVGID, Glenbrook, Cave Rock/Skyland, and NTPUD (Table 5.3). Turbidity values in this reporting year are also similar to the drought year of 2015, with seven purveyors' maximum turbidity values less than or equal to 2015 at Glenbrook, Cave Rock/Skyland, ZWUD, KGID, Edgewood, LPA, and NTPUD (Table 5.2). Annual mean turbidity values less than or equal to 2015 in this reporting year were calculated for Glenbrook, Cave Rock/Skyland, ZQUD, LPA, and NTPUD (Table 5.3)

In addition to drought, during the 10-year reporting period, surface water conditions were also impacted by the 2021 Caldor fire. The effects of fire suppression efforts on turbidity may have influenced purveyors in the South Lake Tahoe region, including readings at KGID, Edgewood, and LPA.

**Table 5.2: Comparison of TWSA purveyors' annual maximum turbidity results for the reporting years July 1, 2014- June 30, 2024.**

(units NTU)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<b>IVGID</b>	0.78	0.63	0.79	0.76	0.80	0.79	0.49	0.42	2.35	3.11
<b>Glenbrook</b>	7.21	1.37	0.59	0.77	0.81	1.13	0.65	0.65	0.59	0.36
<b>CaveRock/Skyland</b>	1.00	0.26	0.46	0.39	0.30	0.36	0.04	0.05	0.074	0.09
<b>ZWUD</b>	0.91	0.57	0.48	0.83	0.90	0.84	0.55	0.42	0.68	0.35
<b>RHGID</b>	0.29	0.27	0.35	0.29	0.38	0.33	0.23	0.24	0.27	0.44
<b>KGID</b>	0.66	0.60	4.28	0.81	1.38	0.65	1.85	1.17	0.79	0.46
<b>Edgewood</b>	0.75	0.70	0.70	0.92	0.66	0.44	0.83	0.52	0.50	0.65
<b>LPA</b>	1.00	5.60	20.20	1.67	17.00	4.59	6.02	7.88	44.56	1.87
<b>TCPUD</b>	0.31	0.40	0.50	0.60	0.50	0.50	0.30	ND	ND	ND
<b>NTPUD</b>	0.99	0.92	1.03	0.65	0.50	0.85	0.60	0.53	0.54	0.55

Historic information is available upon request. ND is No Data for the 2021-2022, 2022-2023, and 2023-2024 reporting years.

**Table 5.3: Comparison of TWSA purveyors' annual mean turbidity results for the reporting years July 1, 2014-June 30, 2024.**

(units NTU)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<b>IVGID</b>	0.14	0.14	0.18	0.18	0.19	0.18	0.12	0.14	0.19	0.17
<b>Glenbrook</b>	0.23	0.23	0.17	0.22	0.19	0.23	0.21	0.21	0.19	0.21
<b>Cave Rock/Skyland</b>	0.22	0.17	0.21	0.23	0.16	0.17	0.03	0.03	0.031	0.04
<b>ZWUD</b>	0.17	0.16	0.16	0.24	0.26	0.30	0.17	0.20	0.12	0.15
<b>RHGID</b>	0.11	0.12	0.14	0.13	0.12	0.20	0.14	0.14	0.14	0.17
<b>KGID</b>	0.18	0.19	0.24	0.23	0.19	0.17	0.23	0.23	0.17	0.21
<b>Edgewood</b>	0.18	0.15	0.16	0.21	0.24	0.23	0.22	0.17	0.19	0.26
<b>LPA</b>	0.31	0.30	0.62	0.23	0.26	0.28	0.61	0.62	1.15	0.29
<b>TCPUD</b>	0.22	0.20	0.21	0.25	0.22	0.27	0.22	ND	ND	ND
<b>NTPUD</b>	0.24	0.26	0.23	0.27	0.21	0.22	0.15	0.17	0.17	0.20

Historic information is available upon request. ND is No Data for the 2021-2022, 2022-2023, and 2023-2024 reporting years.

**Figure 1.3: Comparison of TWSA Purveyors Maximum Turbidity Results from 2014 to 2024.**

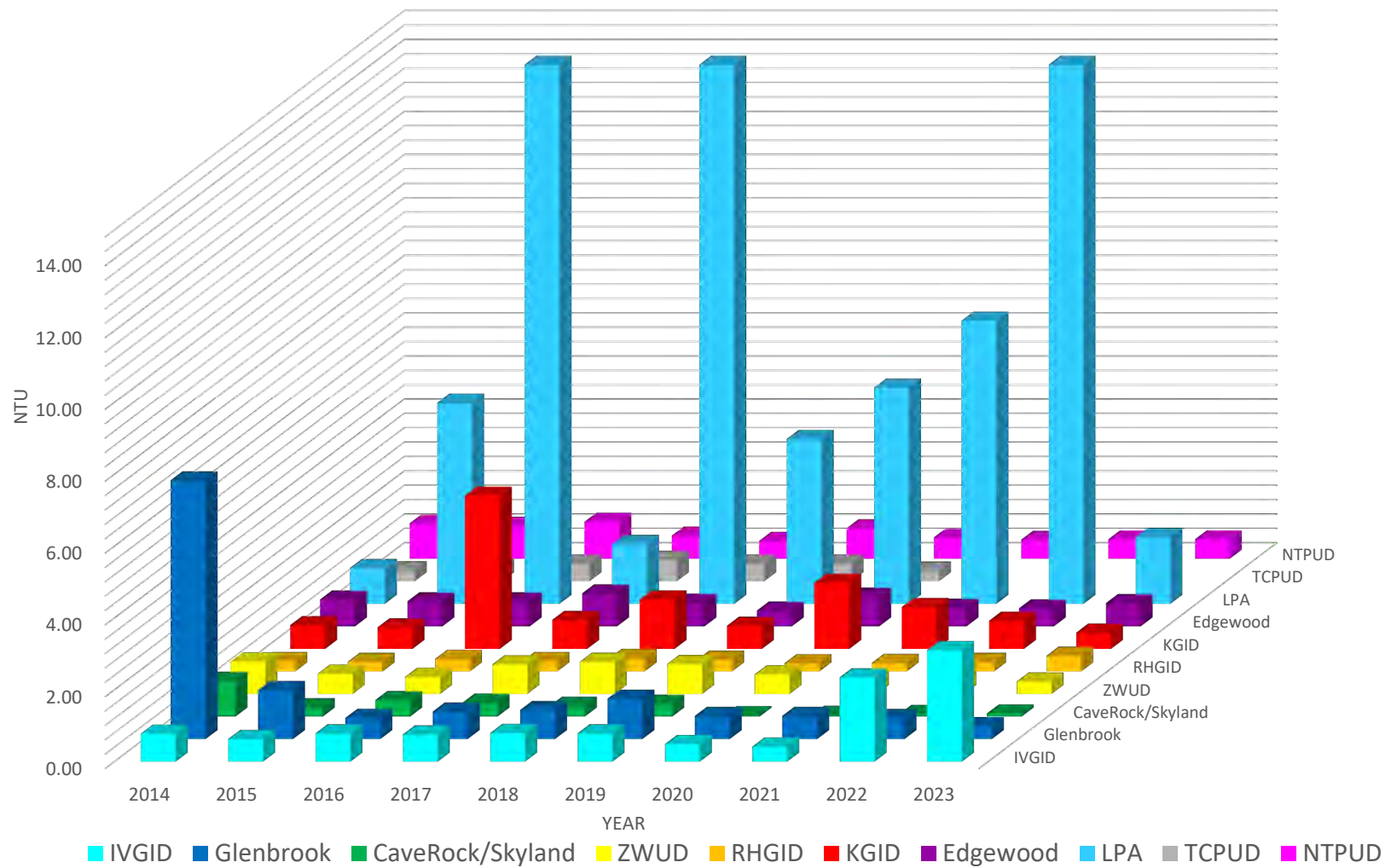
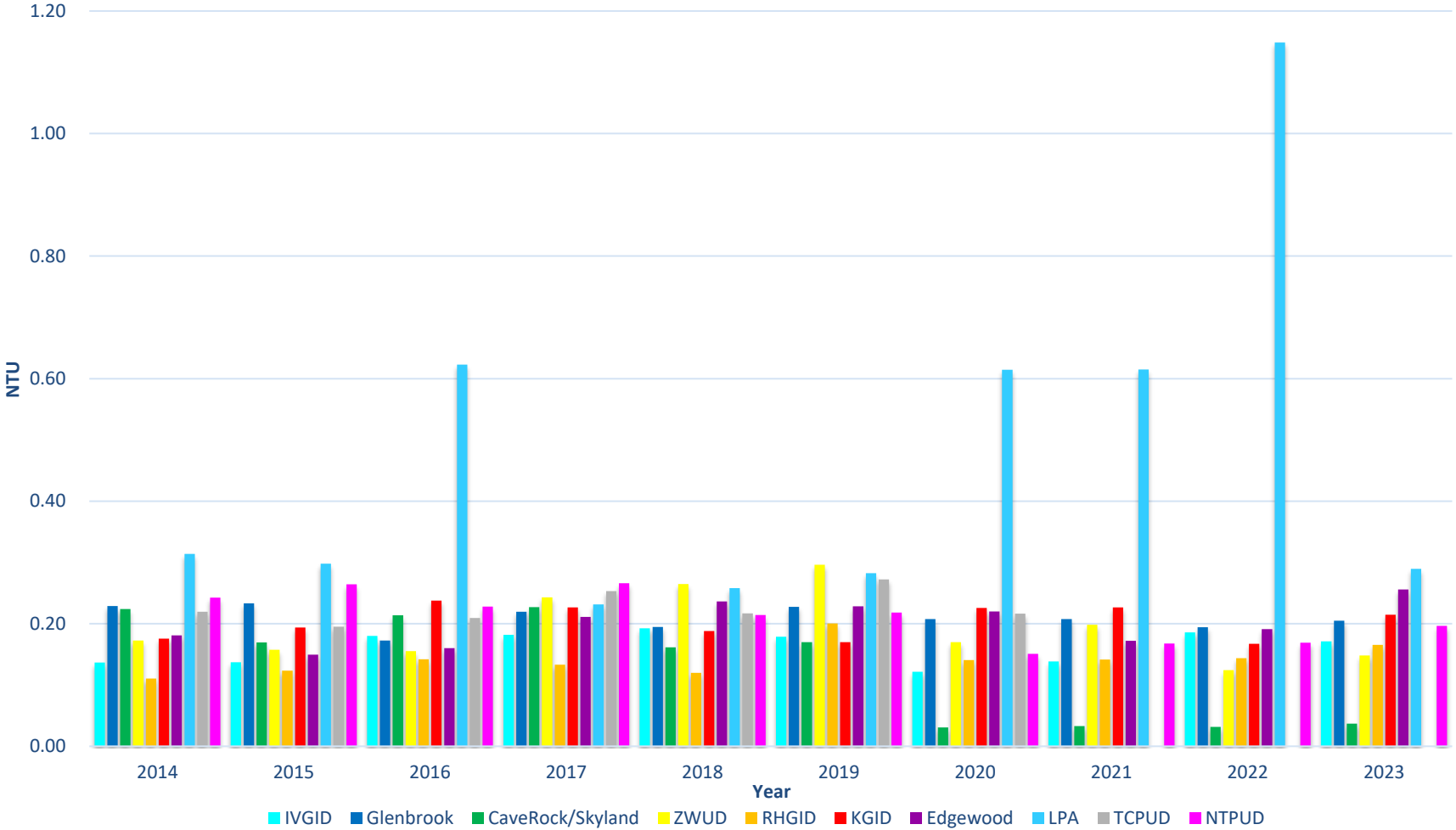




Figure 1.4: Comparison of TWSA Purveyors Annual Mean Turbidity for the 2014-2024 Reporting Years.



## Microbial Quality

Microbial quality is the measurement of bacterial colonies of fecal coliform or total coliform. TWSA water purveyors analyze raw water samples for microbial quality prior to the first point of disinfection. Maximum total coliform is the highest number of colony-forming units per 100 mL (CFU) or most probable number of colony-forming units per 100 mL (MPN) counted from a single raw water sample during a reporting month or year. The mean total coliform count is the average number of colonies counted from individual samples during the reporting month or year. This report includes measurements of total coliform for six members: Glenbrook, ZWUD, KGID, Edgewood, LPA, and NTPUD for the reporting year of July 1, 2023, through June 30, 2024. Total coliform is reported for IVGID from July 1, 2023, through October 31, 2023; for the remainder of the reporting year, fecal coliform was used for microbial quality reporting. IVGID fecal coliform results are available in the individual chapter for IVGID in this report. See Agency Annual Data page 1.

During the reporting year, the maximum total coliform readings for the purveyors were between 13.4 CFU/100 mL and >1600 MPN/100 mL (Table 5.4, Figure 1.8). The purveyors' annual mean total coliform results were between 1.07 CFU/100 mL and 30.69 CFU/100 mL (Table 5.4, Figure 1.9).

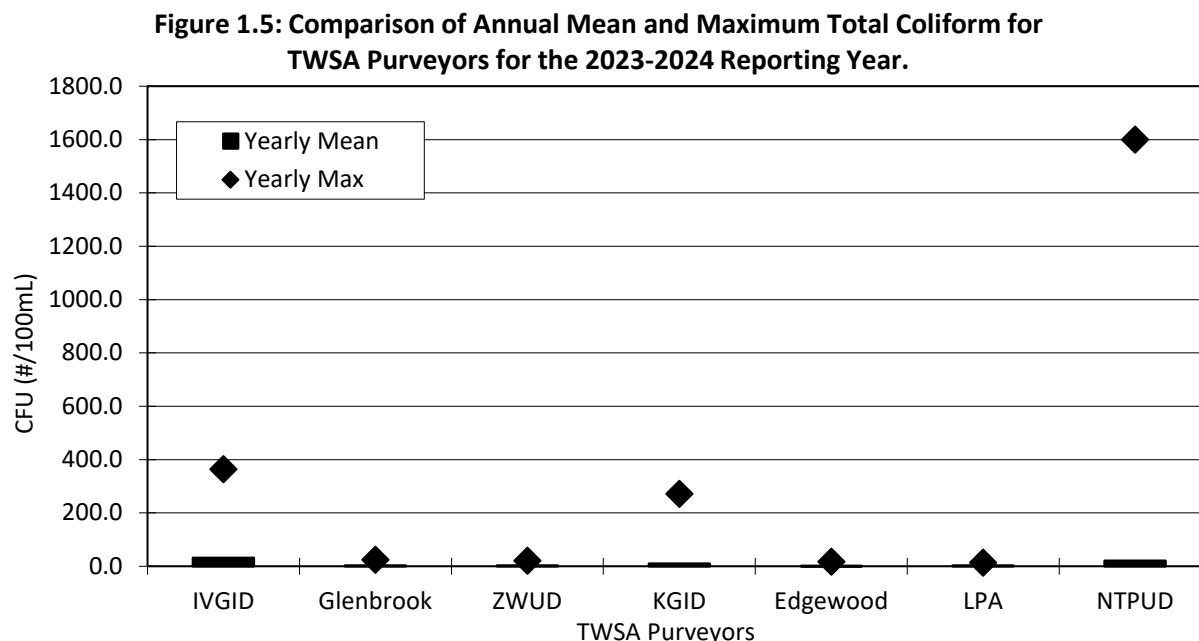
<b>Table 5.4: For the 2023-2024 reporting year, a comparison of annual maximum total coliform (CFU or MPN/100 mL) and weather data by date for TWSA water suppliers.</b>								
Annual Total Coliform CFU/MPN (#/100mL)	IVGID	Glenbrook	ZWUD		KGID	Edgewood	LPA	NTPUD
Mean	30.69	2.54	2.19		10.03	1.07	2.23	20.02
Maximum	364	23.8	20.70		271.0	16.4	13.4	> 1600.0
Date Maximum	8/10/23	8/29/23	9/5/23	9/27/23	7/17/23	9/6/23	6/25/24	08/24/23
Sustained Wind Speed (mph)	1.2	1.5	3.6	4.1	0.2	1.0	1.0	3.7
Average/Max	6.0	10.0	14.0	17.0	7.0	10.0	10.0	19.2
Wind Gust Speed (mph)	8.00	12.0	15.0	17.0	7.0	10.0	10.0	0.0
Daily Max Temp (°F)	78.3	78.0	69.6	66.9	87.3	73.6	82.4	65.8
1 Week Mean Temperature (°F)	65.8	57.7	55.8	49.5	71.5	56.7	67.7	53.5

\*NTPUD reported one result, greater than the laboratory reporting limit of > 1600 CFU/100 mL, represented as 1600 CFU/100 mL.

\*\*IVGID analyzed 52 samples from July 1, 2023, through October 31, 2023, for total coliform.

The maximum reading of >1600 MPN/100 mL was recorded at NTPUD on August 24, 2023. This result is greater than the filtration avoidance criteria of 100 MPN/100 mL. The weather on August 24, 2023, included sustained winds of 3.7-19 mph from the east-northeast, which created wave action and a mixing effect, also noted in the previous "too numerous to count" events at NTPUD recorded in June 2016 and April 2023. NTPUD took 76 measurements of total coliform between February 24, 2023, and August 24, 2023; of these measurements, three results were greater than 100 MPN/100 mL for a percentage of results ≥ 100 MPN/100 mL of 3.95% less than the 10% requirement for filtration

avoidance. The August 24, 2023, total coliform result of >1600 MPN/100 mL, meets the requirements for filtration avoidance criteria.



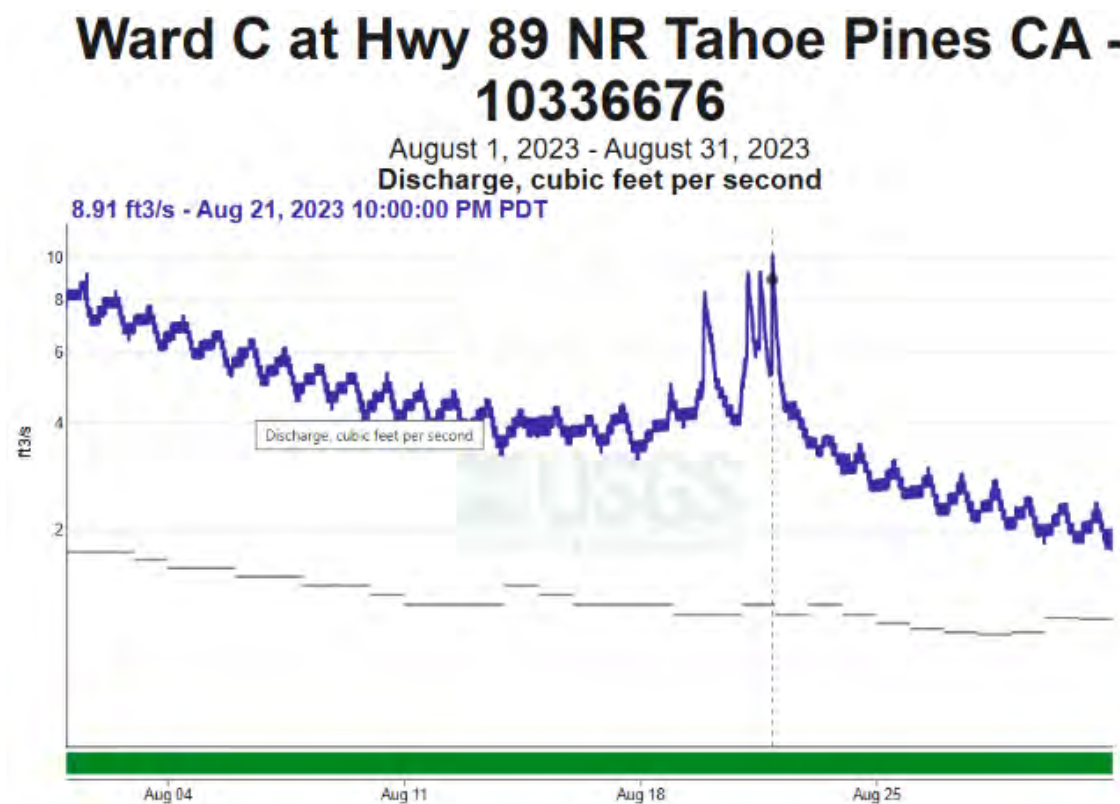
For the reporting year, three purveyors operating with filtration avoidance had total coliform results greater than 100 CFU/100 mL; these results were reported at IVGID, KGID, and NTPUD. IVGID reported four total coliform results greater than 100 CFU/100 mL. KGID and NTPUD both reported three total coliform results greater than 100 CFU/100 mL. Filtration avoidance criteria require 90% of measurements from the previous six months to be below 100 CFU/100 mL. The purveyors meet the filtration avoidance criteria with a percentage of previous six-month results greater than 100 CFU/100 mL ranging from 1.28% to 6%, less than the 10% requirement criteria (Table 5.5).

**Table 5.5: Results in exceedance of filtration avoidance criteria for total coliform, including the date and number of results in the previous six-month period, and calculated percentage of results greater than 100 CFU/100 mL in the date range.**

Entity	Result in exceedance	Result Date	Number of results in the previous 6 months	The number of results greater than the criteria	The percentage of dates greater than the criteria in the previous 6-months
IVGID	200 CFU/100 ML	7/25/2023	80	2	3%
IVGID	260 CFU/100 ML	8/8/2023	80	3	4%
IVGID	288 CFU/100 ML	8/9/2023	80	4	5%
IVGID	364 CFU/100 ML	8/10/2023	80	5	6%
NTPUD	240 MPN/100 ML	08/17/23	76	2	2.63%
NTPUD	>1600 MPN/100 ML	08/24/23	76	3	3.95%
NTPUD	130 MPN/100 ML	1/4/2024	77	3	3.90%
KGID	271 CFU/100 ML	7/17/2023	78	1	1.28%
KGID	222 CFU/100 ML	7/25/2023	78	2	2.56%
KGID	109.1 CFU/100 ML	8/23/2023	77	3	3.90%

During the reporting year, Hurricane Hilary made landfall on the west coast, becoming a tropical storm before crossing into southern California on August 20-21, 2023. Hilary was the first tropical storm to pass over California since Nora in 1997<sup>7</sup>. The storm's effects entered the Lake Tahoe Basin on August 20, 2023, with the Tahoe City Area NOAA station recording 0.58 inches of rainfall and 0.38 inches of rain the following day. The USGS creek gage on Ward Creek shows an increased discharge between August 21 and August 22, as the precipitation moved through Stream Environment Zones (SEZ) that terminate in Lake Tahoe (Figure 1.6). The UC Davis monitoring stations recorded surface water temperatures above 65°F<sup>8</sup> (Figure 1.7). The combination of warm surface water temperatures and stream environment zone flushing likely impacted the coliform readings greater than 100 CFU/100 mL recorded at KGID on August 23, 2023, and NTPUD on August 24, 2023.

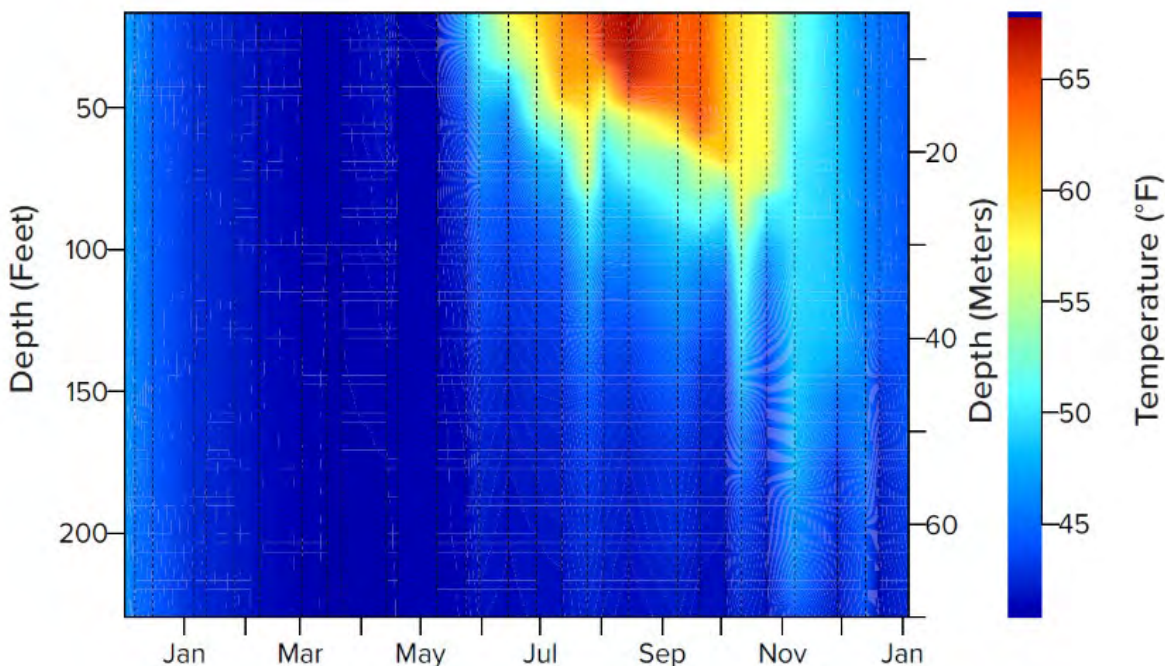
**Figure 1.6: Ward Creek discharge in cubic feet per second, August 1, 2023, through August 30, 2023.**



<sup>7</sup> National Oceanic and Atmospheric Administration, NOWData, for Tahoe City Area, daily data for a month, August 2023, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202308>.

<sup>8</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2024, Water Temperature Profile, [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL\\_Final\\_reduced\\_2.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL_Final_reduced_2.pdf), page 8.3

**Figure 1.7: Surface water temperatures of Lake Tahoe by Depth and month, from the Tahoe Environmental Research Centers 2024 State of the Lake Report.**



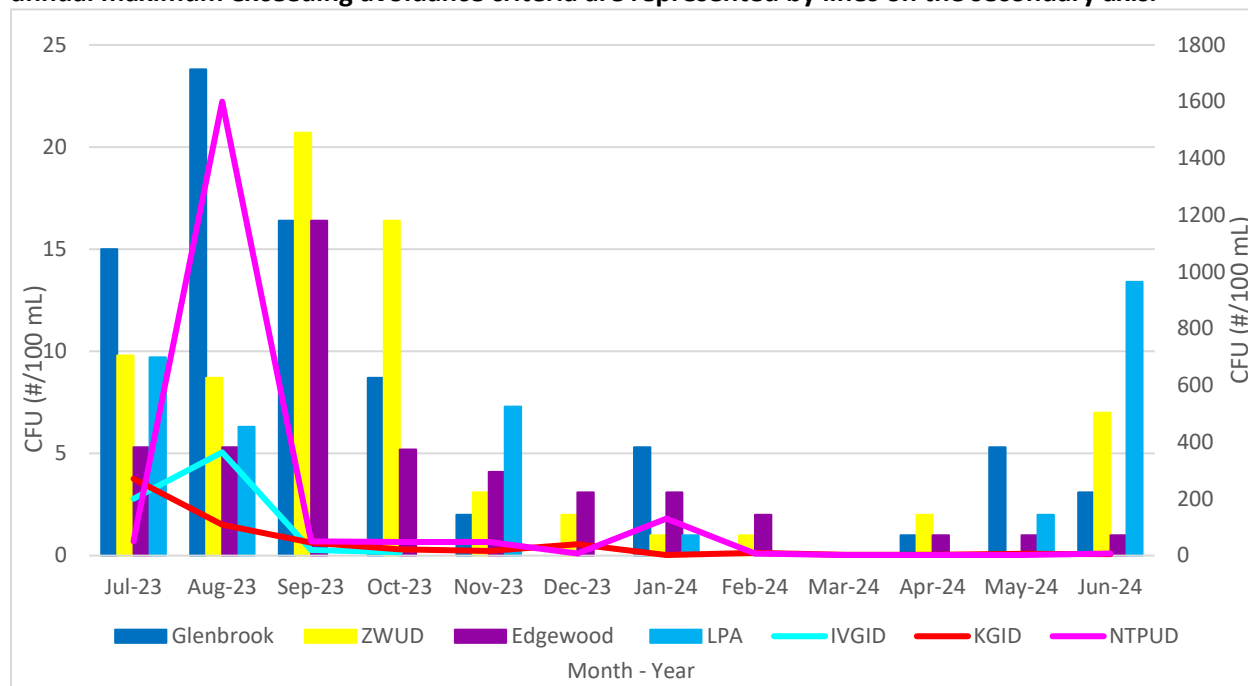
For the reporting period, total coliform followed seasonal trends with increased readings during the summer months and results tapering off into the winter, with all purveyors' maximum total coliform results reported in the summer months of June through September (Figure 1.8). Monthly maximum total coliform results fell below 40 CFU/100 mL for all purveyors between February and June 2024 as air temperatures decreased. The UC Davis State of the Lake report states that the surface water temperatures of Lake Tahoe were the greatest in August 2023; this likely influenced monthly maximum total coliform results at IVGID, Glenbrook, and NTPUD (Figure 1.7). For the 2023-2024 reporting year, three of seven purveyors had decreased annual maximum total coliform results compared to the previous year (Figure 1.10).

For the reporting year, annual mean total coliform values range from 1.07 CFU/100 mL to 30.69 CFU/100 mL. The annual mean was highest at IVGID with a result of 30.69 CFU/100 mL, a system with filtration avoidance; the annual mean for IVGID only included the 57 samples taken from July 1, 2023, to October 31, 2023. NTPUD had the highest annual mean for the entire reporting year of July 1, 2023, to June 30, 2024, of 20.02 MPN/100 mL. For the reporting year, three purveyors had decreased annual mean results compared to the previous reporting year, and four had increased annual mean results (Figure 1.11).

Monthly mean total coliform results for the reporting year were the highest in August and September 2023. Following the increases in surface water temperatures recorded by UC-Davis<sup>7</sup>, the monthly maximum total coliform was highest in August for IVGID, Glenbrook, and NTPUD and in September for ZWUD and Edgewood (Figure 1.9). Monthly mean results were the lowest in February 2024 and remained low through May 2024.



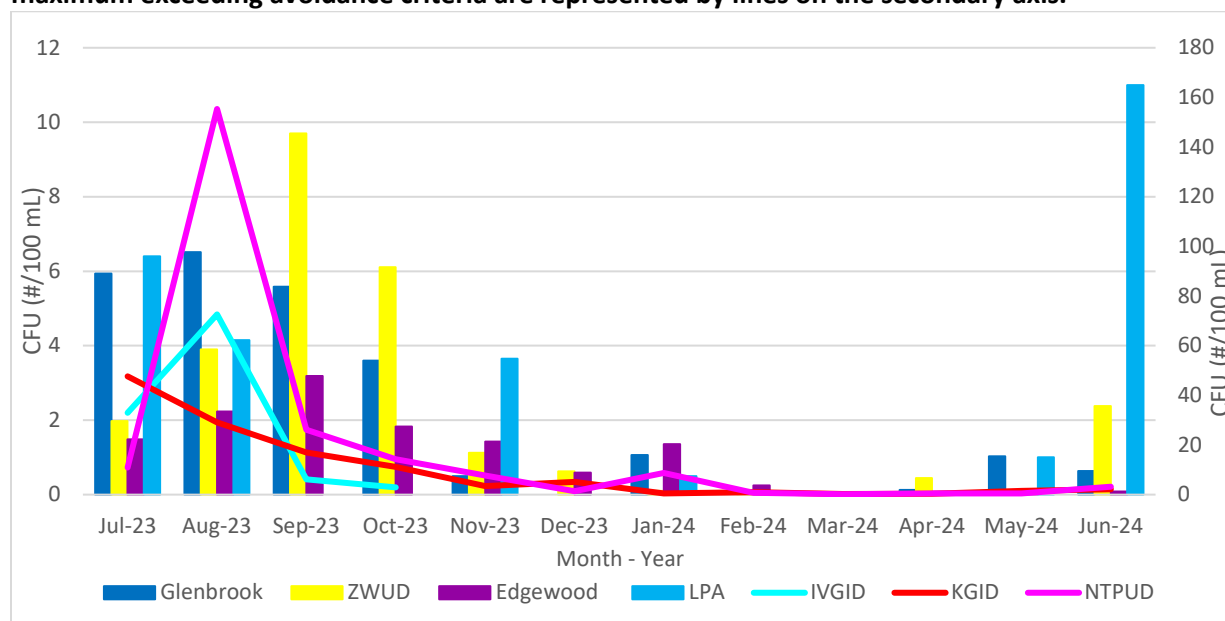
**Figure 1.8: Maximum total coliform by month July 2023 to June 2024. Purveyors with annual maximums less than avoidance criteria are represented by bars on the primary axis, purveyors with annual maximum exceeding avoidance criteria are represented by lines on the secondary axis.**



\*NTPUD reported one result greater than the laboratory reporting limit of > 1600 CFU/100 mL. On August 24, 2023, it is represented as 1600 CFU/100 mL.

\*\*IVGID analyzed 52 samples from July 1, 2023, to October 31, 2023, for total coliform.

**Figure 1.9: Mean total coliform by month July 2023 to June 2024. Purveyors with annual maximums less than avoidance criteria are represented by bars on the primary axis, purveyors with annual maximum exceeding avoidance criteria are represented by lines on the secondary axis.**



\*NTPUD reported one result greater than the laboratory reporting limit of > 1600 CFU/100 mL. On August 24, 2023, it is represented as 1600 CFU/100 mL.

\*\*IVGID analyzed 52 samples from July 1, 2023, to October 31, 2023, for total coliform.

For the 10-year reporting period, July 1, 2014, to June 30, 2024, the maximum total coliform for each purveyor has varied. Although no trends visually appear, maximum total coliform results were below 120 CFU/100 mL for all purveyors during the 2018 reporting year. The 10-year reporting period also had the highest annual maximum total coliform results in 2017. Results ranged from 28.8 CFU/100 mL to 613 CFU/100 mL. The 10-year maximum for water purveyors with filtration avoidance of >1600 CFU/100 mL was recorded at NTPUD five times during three events. The filtering purveyor's 10-year maximum of 613 CFU/100 mL was recorded at LPA in 2017 (Figure 1.10 and Table 5.6). The annual maximum reading for this reporting year of >1600 CFU/ 100 mL taken at NTPUD is equal to their maximum result for the reporting years of 2022 and 2015.

Historical annual mean total coliform results are relatively consistent for each purveyor. The annual range throughout the 10-year reporting period and purveyors is 0.01 CFU/100 mL to 69.36 CFU/100 mL (Table 5.7). Linear trendline data for the 10-year reporting period for annual mean total coliform results show increasing trends for six of the seven purveyors, likely influenced by the increase in total coliform seen in the 2017 reporting year (Figure 1.11). The winter season of 2016-2017 was the wettest on record in the Lake Tahoe basin. The Tahoe Environmental Research Center, State of the Lake Report 2018, stated that seasonal spring runoff washed more sediment into Lake Tahoe than the previous five years combined<sup>9</sup>. In addition to increased sediment from spring runoff, the waters of Lake Tahoe remained warm at raw water intake depths due to a lack of deep water mixing, which likely influenced the total coliform results for the 2017 reporting year.

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<sup>9</sup> NOAA National Centers for Environmental Information, State of the Climate: National Climate Report for February 2017, published online March 2017, retrieved on September 15, 2017 from <https://www.ncdc.noaa.gov/sotc/national/2017/02/supplemental/page-2>.

**Table 5.6: Comparison of TWSA purveyors' annual maximum total coliform results for the reporting years July 1, 2014 to June 30, 2024.**

(units CFU/ 100 mL)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
IVGID	43	37	16	76	1	1	37.00	50	108	364**
Glenbrook	40.6	62.4	16.4	28.8	28.8	200.5	83.10	120	38	23.8
ZWUD	19.2	32.4	38.4	29	22.2	30.6	65.90	550	43	20.7
KGID	200.5	83.1	200.5	144	118.4	88.5	69.70	200.5	130	271
Edgewood	16.1	60.9	20.3	35.5	36.4	45.2	17.80	43.00	9.9	16.4
LPA	12.1	7.5	10.9	613	29.5	37.3	18.90	50.4	18.5	13.4
TCPUD	13.7	3.1	5.1	67.7	55.4	32.7	42.80	ND	ND	ND
NTPUD	110	>1600*	70	500	23	30	170.00	50	>1600*	>1600*

Historic information is available upon request. ND is No Data for the 2021-2022, 2022-2023, and 2023-2024 reporting years

\*NTPUD reported results greater than the laboratory reporting limit of >1600 MPN in 2015, 2022, and 2023. The results are represented as 1600 MPN/100 mL.

\*\* IVGID analyzed 52 samples from July 1, 2023, to October 31, 2023, for total coliform; the district only analyzed raw water samples for fecal coliform to meet reporting requirements for the remainder of the reporting year.

**Table 5.7: Comparison of TWSA purveyors' annual mean total coliform results for the reporting years July 1, 2014 to June 30, 2024.**

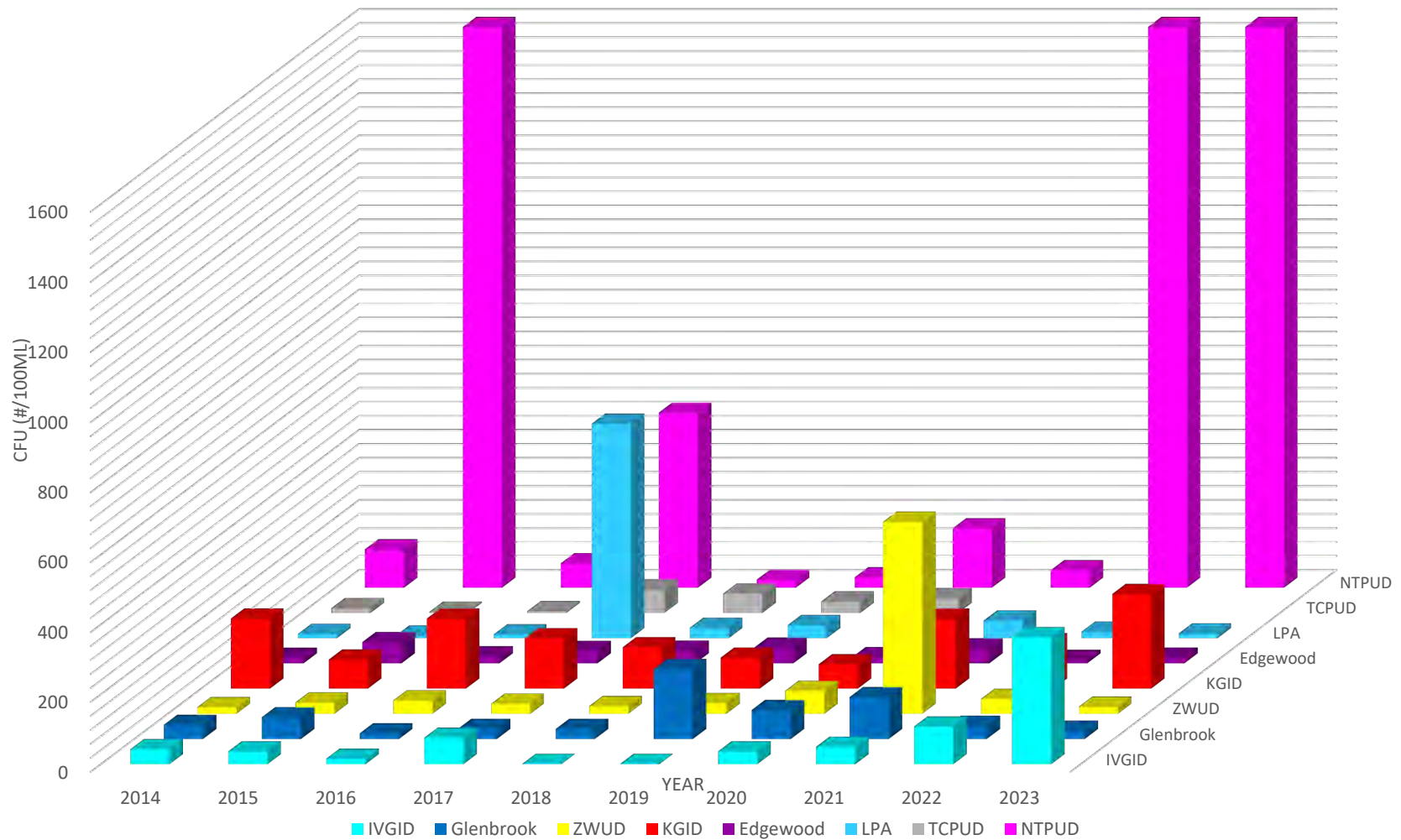
(units CFU/100 mL)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
IVGID	0.46	0.35	0.24	1.95	0.01	0.01	2.16	2.20	2.92	30.69**
Glenbrook	3.14	4.01	2.48	3.45	2.82	9.34	4.03	6.29	3.81	2.54
ZWUD	3.19	2.51	3.54	3.07	3.06	4.30	3.86	14.15	3.70	2.19
KGID	5.82	2.70	9.78	6.30	5.42	5.98	6.36	14.00	8.59	10.03
Edgewood	1.20	1.71	2.95	7.33	0.09	4.23	3.69	3.26	0.63	1.07
LPA	2.32	1.12	1.84	69.36	4.92	4.03	3.09	6.21	3.58	2.23
TCPUD	1.00	1.02	3.73	18.22	15.13	8.86	18.87	ND	ND	ND
NTPUD	4.42	33.68*	2.52	11.21	1.85	1.82	4.10	3.98	17.87*	20.02*

Historic information is available upon request. ND is No Data for the 2021-2022, 2022-2023, and 2023-2024 reporting years

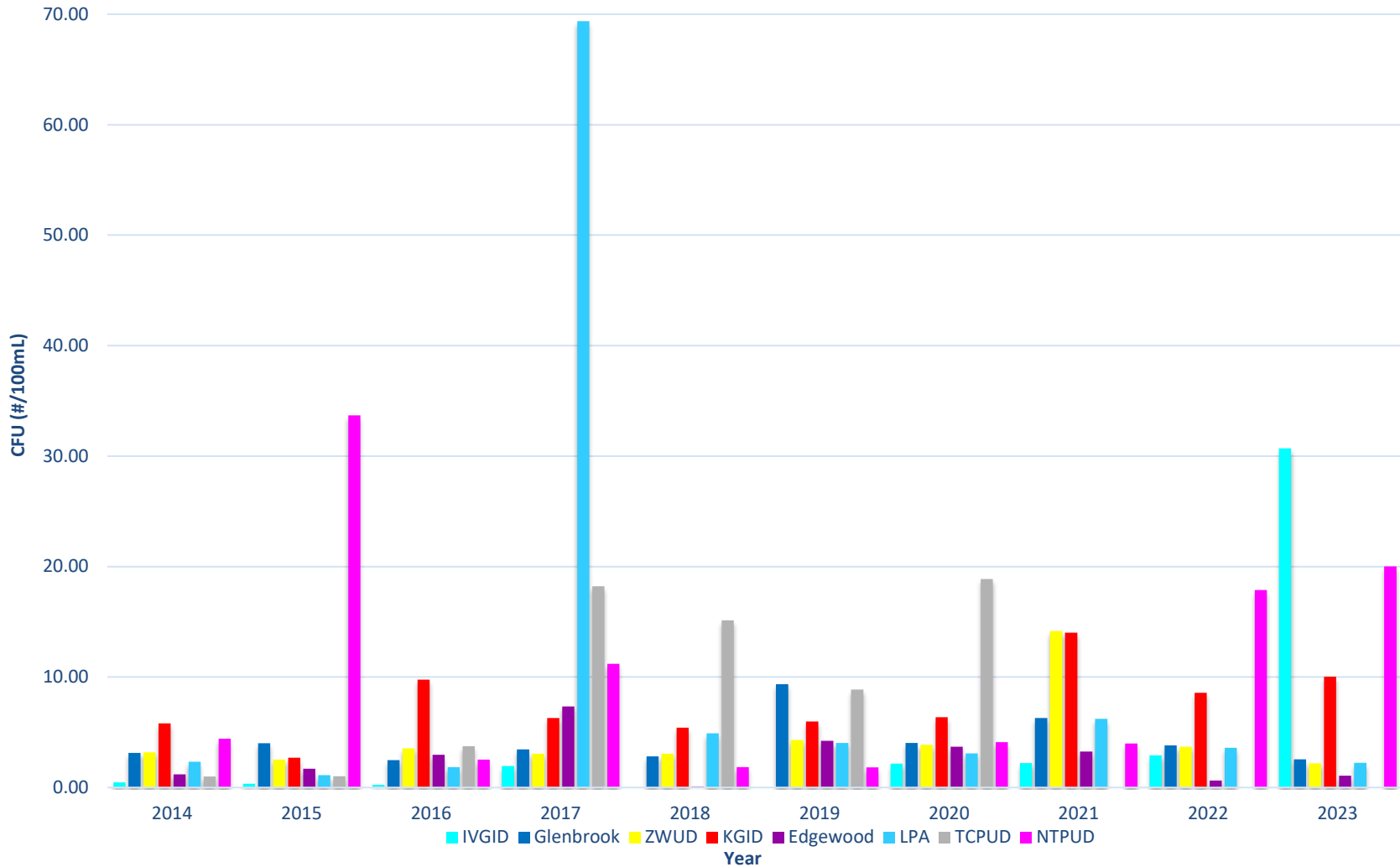
\*NTPUD reported "too numerous to count" results of >1600 MPN in 2015, 2022, and 2023. The results are reported as 1600 MPN/100 mL.

\*\* IVGID analyzed 52 samples from July 1, 2023, to October 31, 2023, for total coliform; the district only analyzed raw water samples for fecal coliform to meet reporting requirements for the remainder of the reporting year.

**Figure 1.10: Comparison of TWSA Purveyors Maximum Total Coliform for the 2014 to 2024 reporting years.**



**Figure 1.11: Comparison of TWSA Purveyors Mean Total Coliform Results for 2014 to 2024 reporting years.**





## **Surface Water Monitoring**

In the past (1999 to 2010), IVGID partnered with the NDEP to provide a volunteer surface water monitoring program on the north shore of Lake Tahoe. The Incline Village Clean Water Team was a volunteer water monitoring program in the Incline Village/Crystal Bay area, focused on surface water monitoring at eleven locations monthly or bi-monthly. Volunteers monitored dissolved oxygen, electrical conductivity, gauge height, pH, and streamflow at each site and collected two grab samples. The lab analyzed the grab samples for total coliform, fecal coliform, and turbidity. Results from surface water samples led IVGID staff to identify broken water pipes and social recreation areas (dog walking areas). This information was valuable in advising on the future location of a new dog park that would combine areas of high dog use into a managed site. Due to a lack of volunteer support, the Clean Water Team is not currently in operation.

In 2003, IVGID added a beach monitoring program. Once a week throughout the summer and biweekly in the winter, staff collects samples from four beach sites and the mouths of two streams. The samples are analyzed in the lab for turbidity, total coliform, and E. coli coliform. The results of the tests are used to determine if additional studies are needed to assess the effect of recreational activity on source water quality. Initial results indicate an increasing trend in the total coliform at beach and creek sites during the summer months. The goal is to identify and remove or reduce potential contaminating sources. IVGID staff continues to operate their stream and beach monitoring program.

The Tahoe Water Suppliers Association has been a supporting partner of the citizen science water quality monitoring program Snapshot Day. The annual volunteer water quality monitoring program started in the Lake Tahoe basin in 2000. The focus of the event is to capture a snapshot in time of water quality throughout the Lake Tahoe Basin. Volunteers are split into regions and assigned a tributary to visit and conduct visual observations, collect water quality measurements, and obtain surface water samples for laboratory analysis. Results are then combined, an annual report is compiled, and anomalies in data are reported to agencies.

## **Climatic Database**

In 2004, IVGID staff started analyzing climatic databases to provide accessible weather data for causal correlation analyses. The weather data analyzed includes wind speed (sustained and gusts), wind direction, precipitation, humidity, temperature (maximum, minimum, and weekly average), and snow depth. The web-based weather data provided from Weather Underground, [www.wunderground.com](http://www.wunderground.com), is used extensively in analysis.

## Safe Drinking Water Information System (SDWIS)

The EPA maintains the Safe Drinking Water Information System to track and inform people if a water purveyor has violated the Safe Drinking Water Act. These violations can relate to health, reporting, or monitoring requirements that were not met. TWSA purveyors had one violation at one purveyor during the reporting year, and there are three updated records from the previous reporting year (Table 5.8).

**Table 5.8: Violations by TWSA Purveyors of the Health, Reporting, or Monitoring Requirements of the Environmental Protection Agency's Safe Drinking Water Act (SDWIS 2023-2024).**

<b>Roundhill General Improvement District</b> Monitoring and Reporting and other Violations: system failed to complete all samples or sample in a timely manner or had another non-health-based violation. A significant monitoring violation means the system failed to take a large percentage of the required samples. Non-significant monitoring violations indicate that the water system failed to take some of the required samples, but did do some of the required sampling.			
<b>Type of Violation</b> Monitoring, Regular	<b>Compliance Period Begin Date</b> 1/1/2023	<b>Compliance Period End Date</b> 12/31/2023	<b>Drinking Water Rule or Contaminant</b> Nitrate Rule, Arsenic Rule, and Inorganic Chemicals
<b>Follow Up Action</b> State Public Notification requested	<b>Date of Response</b>	<b>Violation ID</b> 64413-64424	<b>Return To Compliance Date</b> 3/26/2024

The following section provides detailed water quality reports for each of the TWSA water purveyors.

## **Incline Village General Improvement District**

### **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, the Incline Village General Improvement District (IVGID) remained in compliance with Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violations of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for IVGID is provided in the Consumer Confidence Report found in Appendix B.

#### ***Turbidity***

Between July 1, 2023, and June 30, 2024, IVGID met Federal and State guidelines for turbidity by remaining within the regulatory limits. The monthly mean and maximum turbidity measurements did not exceed 5.0 NTU (Figure 2.0). The highest turbidity reading for the reporting year was 3.11 NTU, coinciding with a wind event on March 1, 2024. Sustained winds from the South-Southeast of 0.8-8.1 mph with gusts up to 13 mph likely affected the turbidity results (Table 5.1). The March 1<sup>st</sup> result is the only result greater than 1 NTU in the reporting year. Additionally, on March 1, 2024, 12 inches of new snow was reported by NOAA in the Tahoe City Area as the first of a four-day blizzard that brought winds up to 150 mph to the Lake Tahoe basin and 34 inches of snow accumulation<sup>1,2</sup>. During the reporting year, IVGID reported five turbidity readings greater than or equal to 1.00 NTU (Table 6.0). The highest monthly mean turbidity, 0.22 NTU, occurred in March 2024 (Table 6.0, Figure 2.0). The annual mean turbidity for IVGID was 0.17 NTU, and 90% of results were below 0.19 NTU.

**Table 6.0: IVGID source water turbidity data from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the IVGID intake.**

<b>Month</b>	<b>Monthly max (NTU)</b>	<b>Date monthly max</b>	<b>Monthly mean (NTU)</b>	<b>Monthly median (NTU)</b>	<b>90<sup>th</sup> percentile</b>
<b>Jul-23</b>	1.26	22	0.20	0.14	0.21
<b>Aug-23</b>	0.89	16	0.15	0.13	0.21
<b>Sep-23</b>	0.35	1	0.17	0.16	0.21
<b>Oct-23</b>	0.21	16	0.15	0.15	0.16
<b>Nov-23</b>	0.31	5	0.17	0.16	0.17
<b>Dec-23</b>	1.71	28	0.21	0.15	0.19
<b>Jan-24</b>	1.37	17	0.19	0.13	0.22
<b>Feb-24</b>	0.40	29	0.15	0.12	0.26
<b>Mar-24</b>	3.11	1	0.22	0.10	0.17
<b>Apr-24</b>	0.24	4	0.13	0.12	0.19
<b>May-24</b>	1.01	24	0.16	0.13	0.17
<b>Jun-24</b>	0.19	27	0.15	0.14	0.17

Historically, IVGID's turbidity readings did not reach or exceed 1.0 NTU from 2002 to 2022. From 1997-2002, maximum IVGID turbidity readings ranged from 1.0 to 1.9 NTU. The annual maximum for the

<sup>1</sup> National Oceanic and Atmospheric Administration, National Centers for Environmental Information, National Climate Report, March 2024, West, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202403>

<sup>2</sup> National Oceanic and Atmospheric Administration, NOWData, for Tahoe City Area, daily data for a month, March 2024, <https://www.weather.gov/wrh/climate?wfo=rev>

reporting year, 3.11 NTU, is greater than the previous reporting years' maximum of 2.35 NTU and the highest value for IVGID in the TWSA data set from 1997 to 2023. The annual mean for 2023-2024, 0.17 NTU, is less than the previous year's result of 0.19 NTU (Figure 2.1). Linear trendline data shows an increase in annual maximum and mean turbidity for the IVGID drinking water intake from July 1, 2014, to June 30, 2024 (Figure 2.1).

### **Microbial Quality**

IVGID met Federal and State guidelines for total coliform and fecal coliform for the reporting year. IVGID analyzed 52 samples from July 1, 2023, to October 31, 2023, for total coliform; the district only analyzed raw water samples for fecal coliform to meet reporting requirements for the remainder of the reporting year. The maximum total coliform reading was 364 CFU/100 mL, the mean was 30.69 CFU/100 mL, and 90% of the samples were below 41.30 CFU/100 mL (Table 6.1). Fecal coliform was analyzed throughout the entire reporting period of July 1, 2023, to June 30, 2024. The maximum fecal coliform reading was 1 CFU/100 mL, the annual mean was 0.01 CFU/100 mL, and 90% of the samples were equal to 0.00 CFU/100 mL.

**Table 6.1: IVGID annual source water total and fecal coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected from raw water at the IVGID intake.**

	<b>Total coliform (# colonies/100 mL)</b>	<b>Fecal coliform (# colonies/100 mL)</b>
<b>Mean</b>	30.69	0.01
<b>Median</b>	8.00	0.00
<b>Max</b>	364.00	1.00
<b>90th Percentile</b>	41.30	0.00
<b>Colony-Forming Samples</b>	41.00	2.00
<b>Total Number of Samples</b>	52.00	156.00

The reporting year maximum total coliform result of 364 CFU/100 mL was recorded on August 10, 2023. This result exceeds the 100 CFU/100 mL criteria for filtration avoidance. The 364 CFU/100 mL result was one of five results above the criteria in the 80 measurements taken in the previous 6-month period, equaling 6% of measurements, less than the 10% requirement for filtration avoidance, that sample results must satisfy the criteria of  $\leq 100$  CFU/100 mL in at least 90% of measurements from the previous 6 months (Table 6.2). During the period of July 1, 2023, to October 31, 2023, IVGID reported four results greater than 100 CFU/100 mL; all results were taken during the summer months of July and August. The maximum result of 364 CFU/100 mL result was likely caused by wind-wave action produced by a southwest wind event that produced sustained winds of 1.2-6.0 mph with gusts up to 8.0 mph. The temperature was likely influential, as the daily maximum temperature was 78.3°F, 12.5 degrees above the weekly average temperature of 65.8°F. A full description of weather paired with maximum total coliform readings is available (Table 5.4).

IVGID reported four results greater than 100 MPN/100 mL during July 1, 2023, to October 31, 2023. All results are within the filtration avoidance criteria of  $\leq 100$  MPN/100 mL in at least 90% of measurements from the previous six months. The dates, results, and percentages are provided in the table below (Table 6.2).

**Table 6.2: Results in exceedance of filtration avoidance criteria for total coliform, including the date and number of results in the previous six-month period, and calculated percentage of results greater than 100 CFU/100 mL.**

Criteria	Result in exceedance of 100 CFU/100 mL	Result Date	Total number of results in 6 months previous	The number of results greater than the criteria	The percentage of dates greater than the criteria in the previous 6-months
Total Coliform	200	7/25/2023	80	2	3%
Total Coliform	260	8/8/2023	80	3	4%
Total Coliform	288	8/9/2023	80	4	5%
Total Coliform	364	8/10/2023	80	5	6%

IVGID sampling protocol evolved during the reporting year, with fecal coliform replacing total coliform for regulatory reporting on November 1, 2023. For the 2023-2024 reporting year, the maximum fecal coliform reading was 1 CFU/100 mL, the annual mean result is 0.013 CFU/100 mL, and 90% of the samples were equal to 0.0 CFU/100 mL. This maximum is less than the filtration avoidance criteria of  $\leq 20$  CFU/100 mL. The maximum result of 1 CFU/100 mL was recorded twice during the reporting year on May 15, 2024, and June 13, 2024 (Figure 2.4). On both dates, the daily maximum temperature was at least 18°F greater than the weekly average temperature, likely influencing the maximum readings. Additionally, weather included winds from the south with gusts of 9-10 mph, causing mixing from wave action. Fecal coliform was detected in 1% of the 156 samples analyzed from July 1, 2023, to June 30, 2024, less than the previous reporting year detection rate of 3%.

**Table 6.3: IVGID monthly source water total and fecal coliform data result from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected from raw water at the IVGID intake.**

	Monthly maximum total coliform (# colonies/100 mL)	Monthly mean total coliform (# colonies/100 mL)	Monthly maximum fecal coliform (# colonies/100 mL)	Monthly mean fecal coliform (# colonies/100 mL)
Jul-23	200.00	32.92	0.00	0.00
Aug-23	364.00	72.60	0.00	0.00
Sep-23	20.00	6.17	0.00	0.00
Oct-23	12.00	2.92	0.00	0.00
Nov-23			0.00	0.00
Dec-23			0.00	0.00
Jan-24			0.00	0.00
Feb-24	No Data	No Data	0.00	0.00
Mar-24			0.00	0.00
Apr-24			0.00	0.00
May-24			1.00	0.07
Jun-24			1.00	0.08

In continuation of this report's long-term analysis of microbial quality, total coliform will be used for comparison for the 10-year period of July 1, 2014, to June 30, 2024. Total coliform annual mean and maximum results show an increasing trend over the 10-year reporting period from July 1, 2014, to June

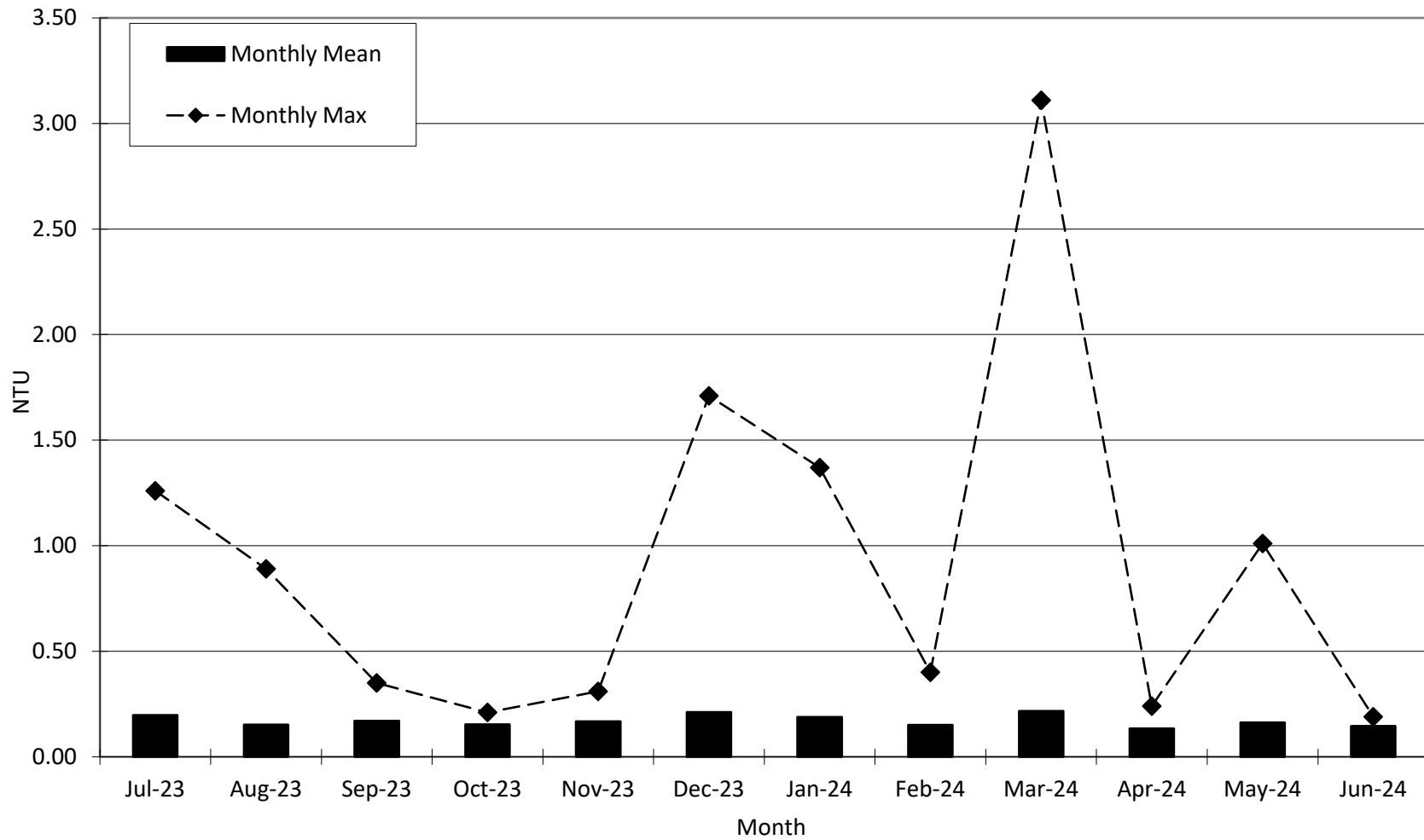


30, 2024 (Figure 2.3 and Figure 5.3). The annual maximum of 364 CFU/100 mL for the 2023-2024 reporting year is the highest in the TWSA data set of microbial quality for IVGID from 1997 to the present. The second highest result is 180 CFU/100 mL in 2022-2023. From July 2022 to October 2024, IVGID reported five results greater than 100 CFU/100 mL (Figure 2.3).

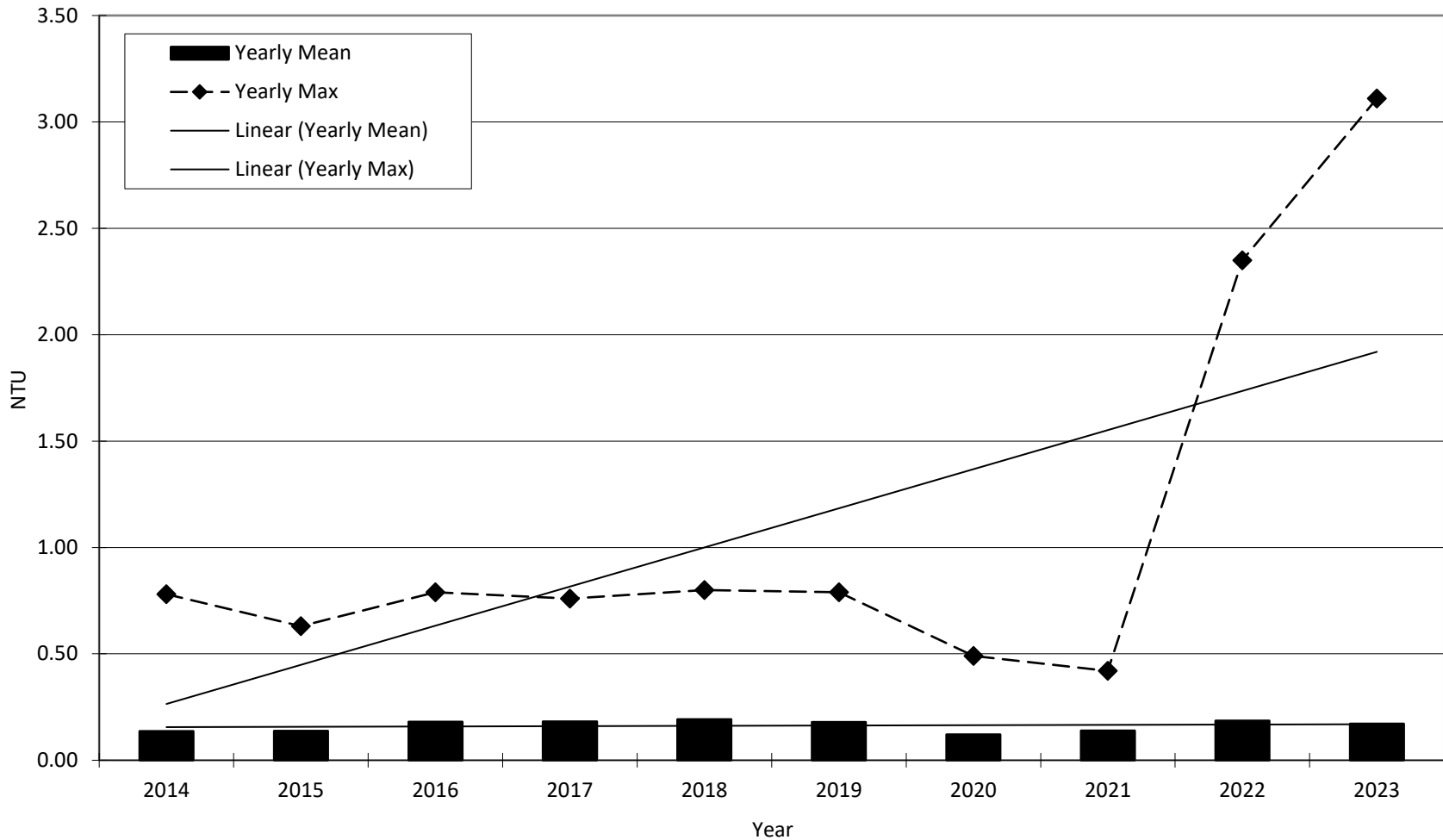
### **Turbidity and Microbial Quality**

Filtration avoidance criteria require systems to monitor for microbial quality when turbidity readings exceed 1 NTU. During the reporting year, IVGID recorded one result greater than 1 NTU (Table 6.0, Figure 2.0) On March 1, 2024, the turbidity result was 3.11 NTU. The fecal coliform result taken on March 4, 2024, was zero CFU/100 mL. The fecal coliform result taken on February 28, 2024, was also zero CFU/100 mL.

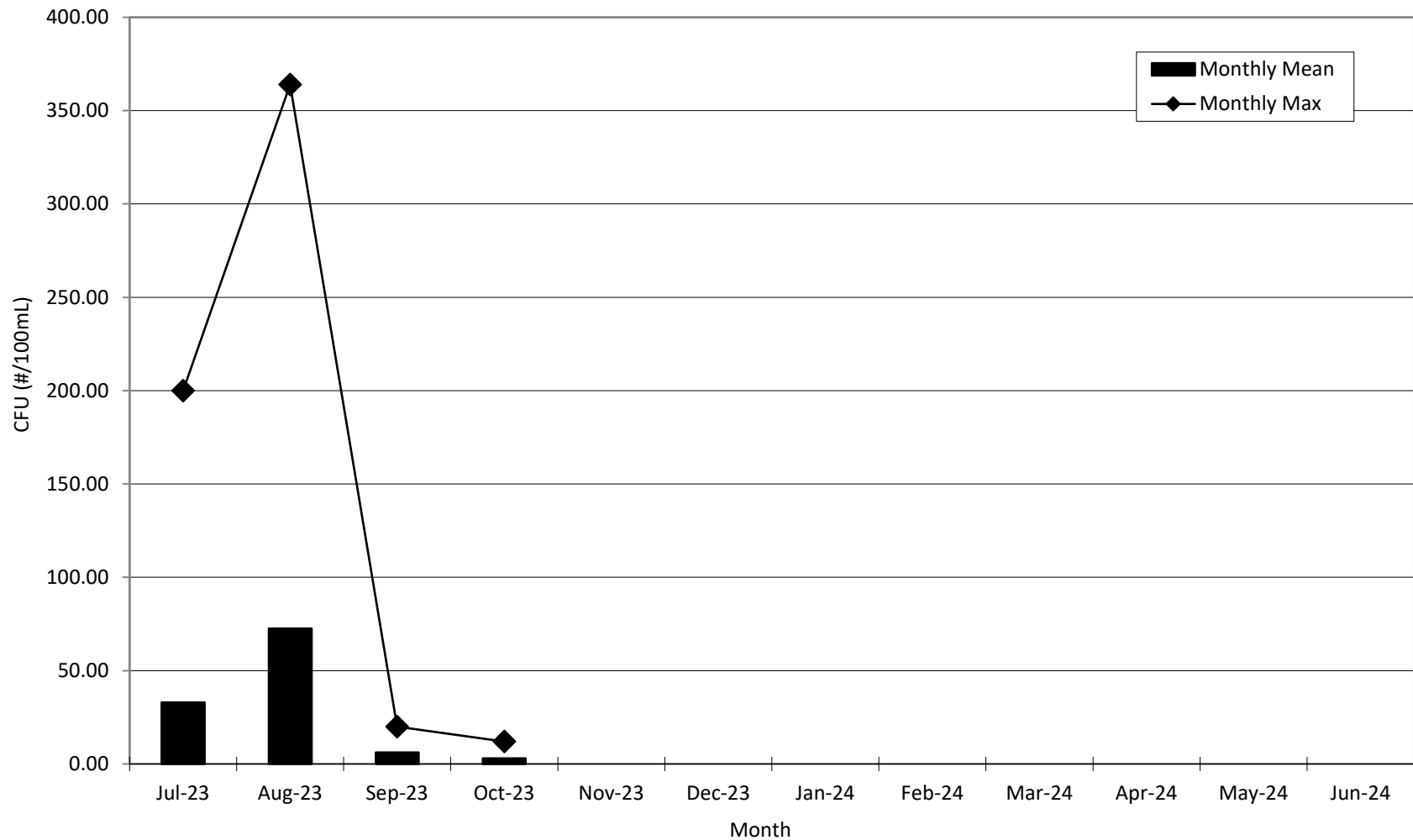
**Figure 2.0: Monthly Mean and Max Turbidity Results for Incline Village General Improvement District  
between July 1, 2023 and June 30, 2024.**



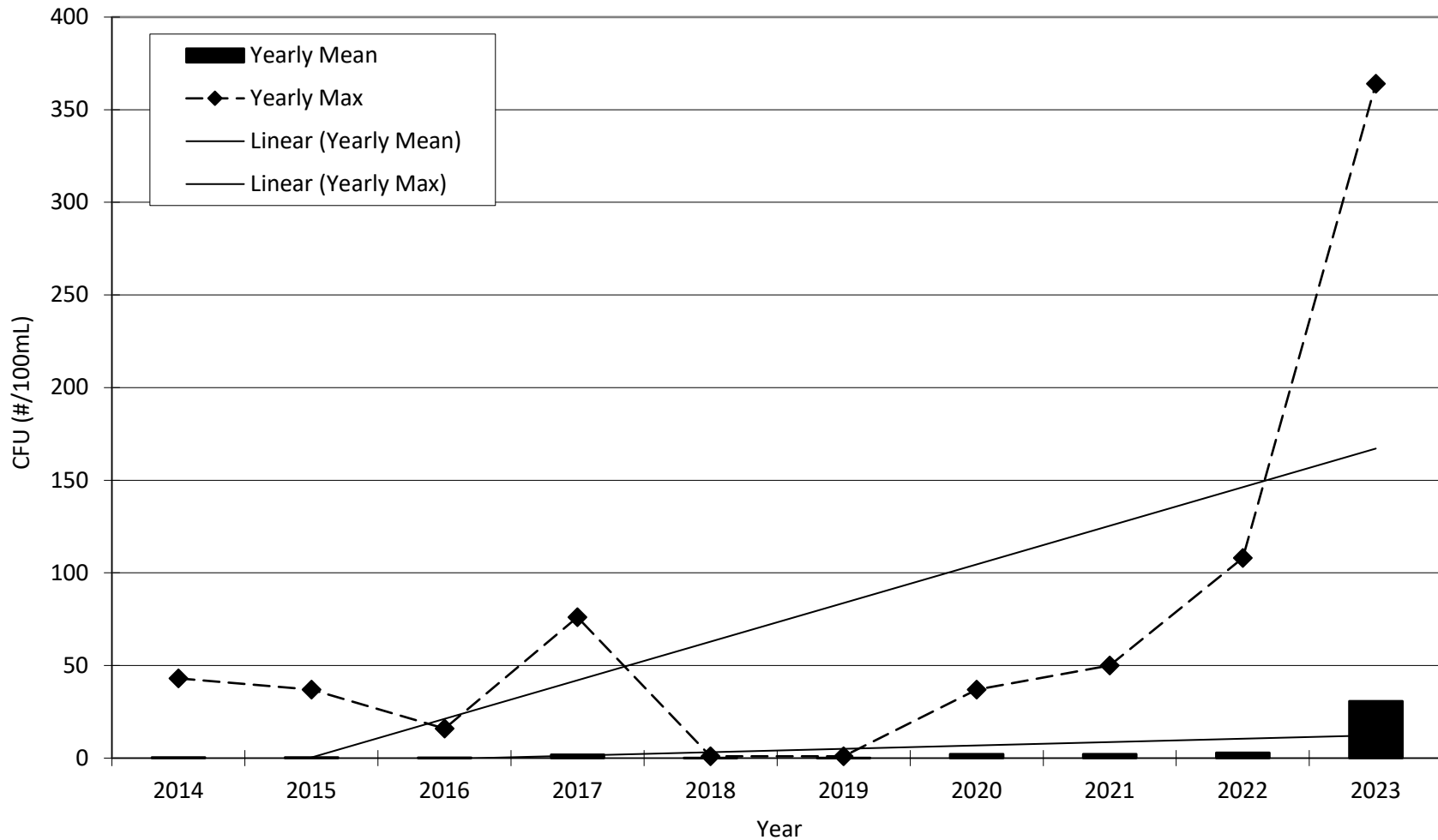
**Figure 2.1: Yearly Mean and Max Turbidity Results for Incline Village General Improvement District between July 1, 2014 and June 30, 2024.**



**Figure 2.2: Monthly Mean and Max Total Coliform Results for Incline Village General Improvement District between July 1, 2023 and October 31, 2023.**

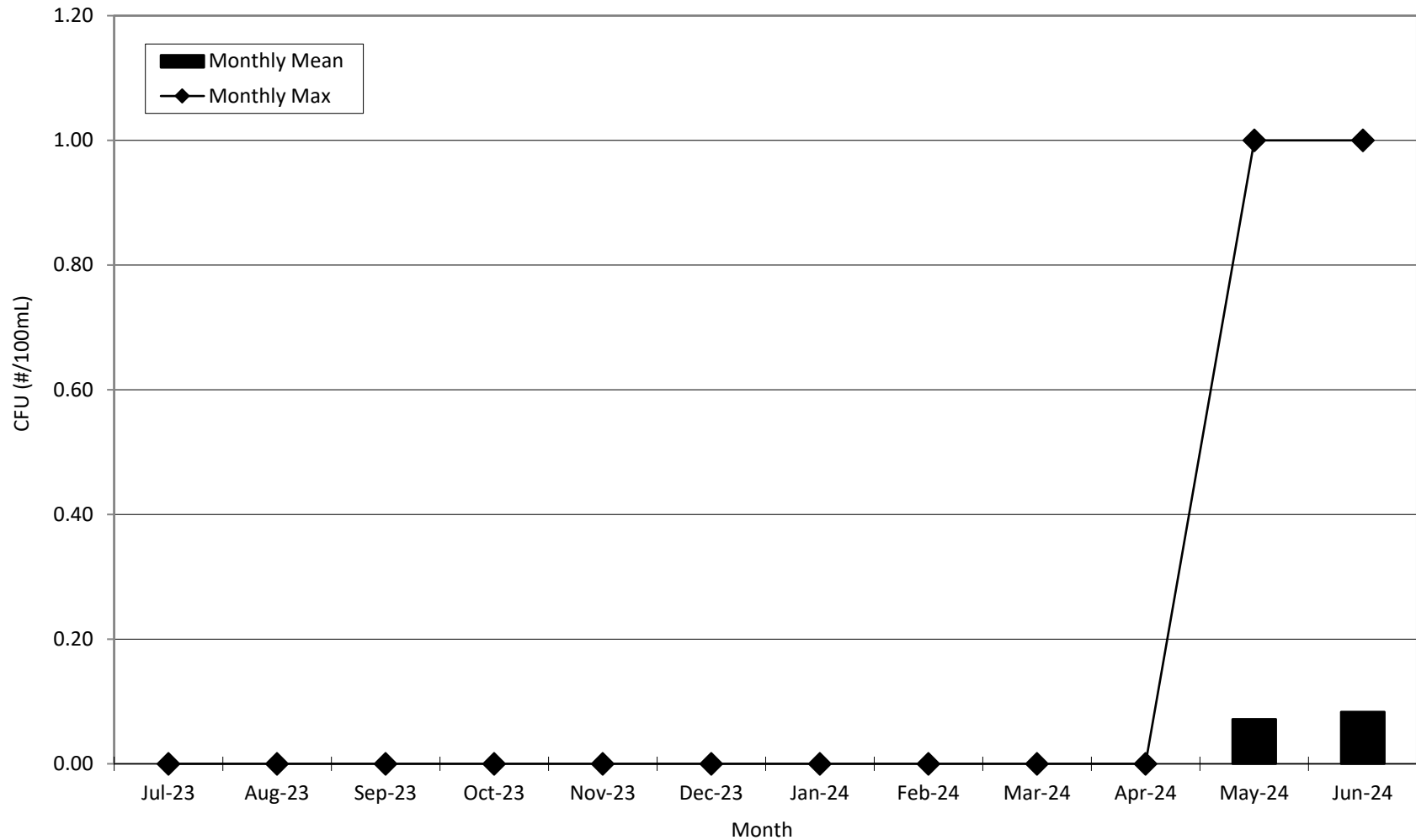


**Figure 2.3: Yearly Mean and Max Total Coliform Results for Incline Village General Improvement District between July 1, 2014 and October 31, 2024.**





**Figure 2.4: Monthly Mean and Max Fecal Coliform Results for Incline Village General Improvement District between July 1, 2023 and June 30, 2024.**



## **Glenbrook Water Cooperative** **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, Glenbrook Water Cooperative (Glenbrook) remained in compliance with Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violations of the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for Glenbrook is provided in the Consumer Confidence Report found in Appendix B.

### ***Turbidity***

Between July 1, 2023, and June 30, 2024, Glenbrook met Federal and State guidelines for turbidity by remaining within regulatory limits. The monthly mean and maximum turbidity measurements did not exceed 5.0 NTU (Figure 3.0). The highest turbidity reading for the reporting year was 0.36 NTU, less than the previous reporting year's maximum of 0.59 NTU. The maximum turbidity reading was taken on November 11, 2023. A mixing effect was likely produced by wind from the northeast of 1.9-14.0 MPH paired with gusts up to 25 mph (Table 5.1). Glenbrook had an annual mean turbidity value of 0.21 NTU for the 2023 reporting year. The largest monthly mean turbidity, 0.22 NTU, occurred in August and September 2023 (Table 7.0).

**Table 7.0: Glenbrook Water Cooperative source water turbidity data summary July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the Glenbrook intake.**

	<b>Monthly Max (NTU)</b>	<b>Date Monthly Max</b>	<b>Monthly Mean (NTU)</b>	<b>Monthly Median (NTU)</b>	<b>Monthly 90% (NTU)</b>
<b>Jul-23</b>	0.22	1	0.18	0.19	0.21
<b>Aug-23</b>	0.27	22	0.22	0.21	0.26
<b>Sep-23</b>	0.29	16	0.22	0.21	0.27
<b>Oct-23</b>	0.26	28	0.21	0.21	0.25
<b>Nov-23</b>	0.36	12	0.21	0.20	0.24
<b>Dec-23</b>	0.25	29	0.19	0.20	0.22
<b>Jan-24</b>	0.23	23	0.20	0.20	0.22
<b>Feb-24</b>	0.25	14	0.20	0.20	0.22
<b>Mar-24</b>	0.25	18	0.20	0.20	0.24
<b>Apr-24</b>	0.24	17	0.21	0.21	0.23
<b>May-24</b>	0.24	28	0.20	0.20	0.22
<b>Jun-24</b>	0.27	1	0.21	0.21	0.24

Historically, Glenbrook has maintained low turbidity measurements. The highest readings in the 10-year reporting period of July 1, 2014, to June 30, 2024, include 7.21 NTU in 2014, 1.37 NTU in 2015, and 1.13 NTU in 2019. Within the same 10-year period, turbidity values also included the lowest, 0.65 NTU in 2020 and 2021, 0.59 NTU in 2016, and 0.36 in 2023. The maximum turbidity for this reporting year of 0.36 NTU is the lowest maximum turbidity in the 10-year reporting period. Annual maximum turbidity shows a decreasing linear trend over the 10-year reporting period (Figure 3.1).

Glenbrook has historically maintained annual mean turbidity values below 0.21 NTU, including 0.21 NTU for 2023 (Table 5.3). Annual mean turbidity shows a stable linear trend over the 10-year reporting period (Figure 3.1).

### **Microbial Quality**

Glenbrook met Federal and State guidelines for total coliform and fecal coliform for the reporting year. The maximum total coliform reading was 23.8 coliform-forming units per 100 mL (CFU/100 mL), the annual mean was 2.54 CFU/100 mL, and 90% of the samples were below 7.09 CFU/100 mL. The maximum fecal coliform reading was 3.10 CFU/100 mL, the annual mean was 0.09 CFU/100 mL, and 90% of the samples were below 0.0 CFU/100 mL (Table 7.1).

**Table 7.1: Glenbrook Water Cooperative annual source water total coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected from raw water at the Glenbrook intake.**

	<b>Total coliform (# colonies/100 mL)</b>	<b>E. coli coliform (# colonies/100 mL)</b>
<b>Mean</b>	2.54	0.09
<b>Median</b>	0.00	0.00
<b>Max</b>	23.80	3.10
<b>90th Percentile</b>	7.09	0.00
<b>Colony- Forming Samples</b>	38.00	5.00
<b>Total Number of Samples</b>	78.00	78.00

The 2023 maximum total coliform count was 23.8 CFU/100 mL, a decrease from 38.0 CFU/100 mL in 2022 (Figure 3.3). The maximum total coliform result occurred on August 29, 2023. The weather included sustained winds of 1.5-10.0 mph with gusts up to 12.0 mph paired with a maximum temperature of 78.0°F, a 20.3-degree increase from the weekly mean temperature of 57.7°F (Table 5.1). The increase in temperature and mixing caused by wind may have contributed to the maximum total coliform result.

The 2023 annual mean total coliform count is 2.54 CFU/100 mL, lower than the previous reporting years' annual mean of 3.81 CFU/100 mL (Tables 7.1, Figure 3.3). The highest monthly mean total coliform result was 6.51 CFU/100 mL, recorded in August 2023 (Table 7.2). Total coliform was detected in 39% of the 78 samples analyzed, equal to the previous year. For the 2023 reporting year, the total coliform results decreased throughout the cooler months and increased during the warm summer months (Figure 3.2). Glenbrook had an increase in total coliform in January 2024, with 5.3 CFU/100 mL reported on January 3<sup>rd</sup>, likely influenced by a rain-on-snow event flushing through the Stream Environment Zones (SEZs).

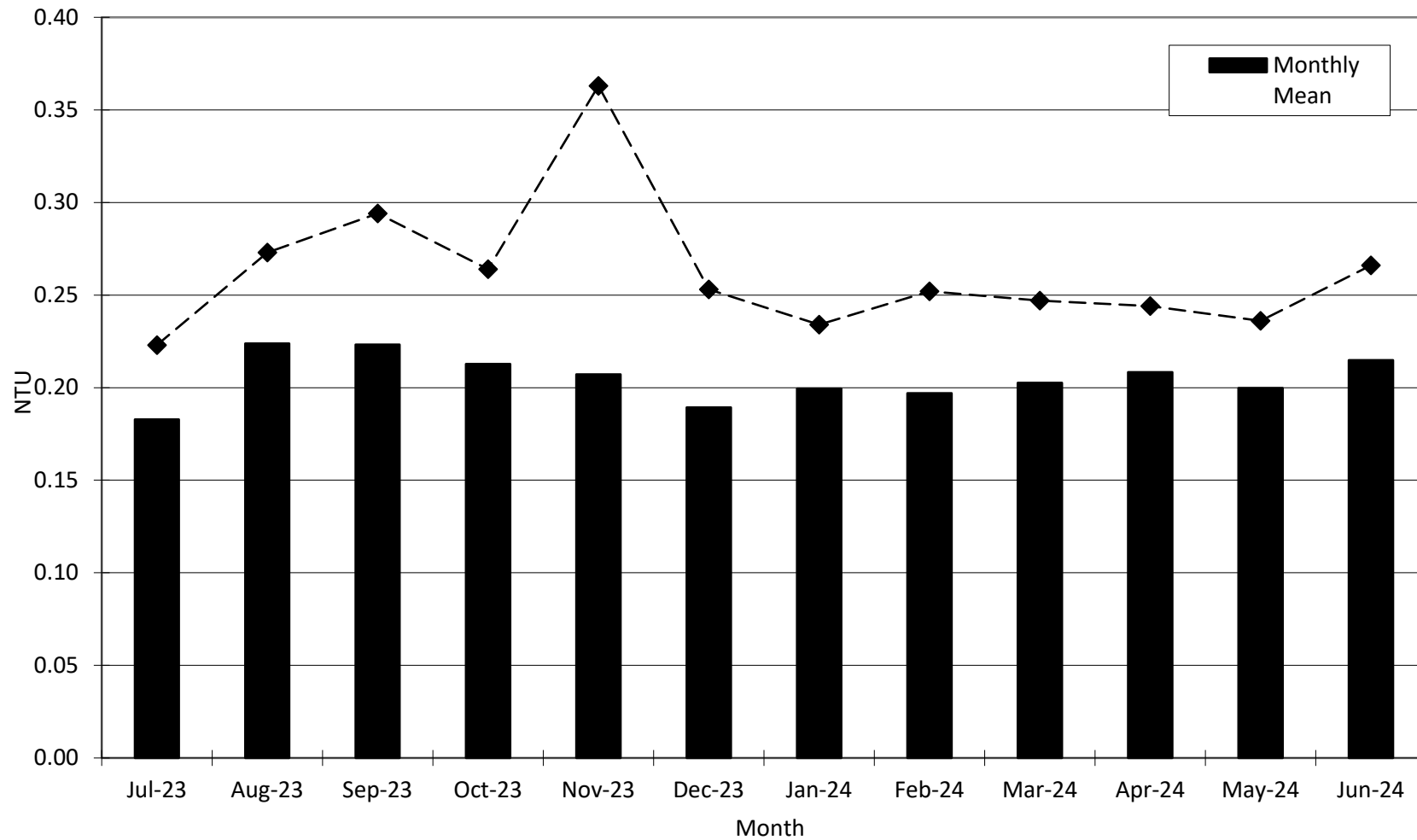
The yearly maximum and mean total coliform results show an increasing linear trend over the 10-year reporting period of July 1, 2014-June 30, 2024 (Figure 3.3). The highest annual maximum result in the 10-year reporting period was 200.5 CFU/100 mL, recorded on consecutive days, August 26-27, 2019. Weather likely impacted the maximum result with winds from the east and increased temperatures 16°F above the weekly average temperature, reaching 84.4°F. The maximum result for 2019 was above the filtration exemption criteria of 100 CFU/100 mL but less than the 10% of results requirement, with two out of 76 readings above 100 CFU/100 mL.

Glenbrook also performed tests for E. coli coliform during the reporting year. E. coli coliform was detected in five samples, representing 6.41% of the samples analyzed, a decrease from 8.33% in the previous reporting year. For the reporting year, the maximum E. coli coliform value was 3.10 CFU/100 mL, with an annual mean of 0.09 CFU/100 mL (Table 7.1 and 7.2).

**Table 7.2: Glenbrook Water Cooperative monthly source water total coliform data results from July 1, 2023, through June 30, 2024. Analyses completed on samples collected from raw water at the Glenbrook Water Company intake.**

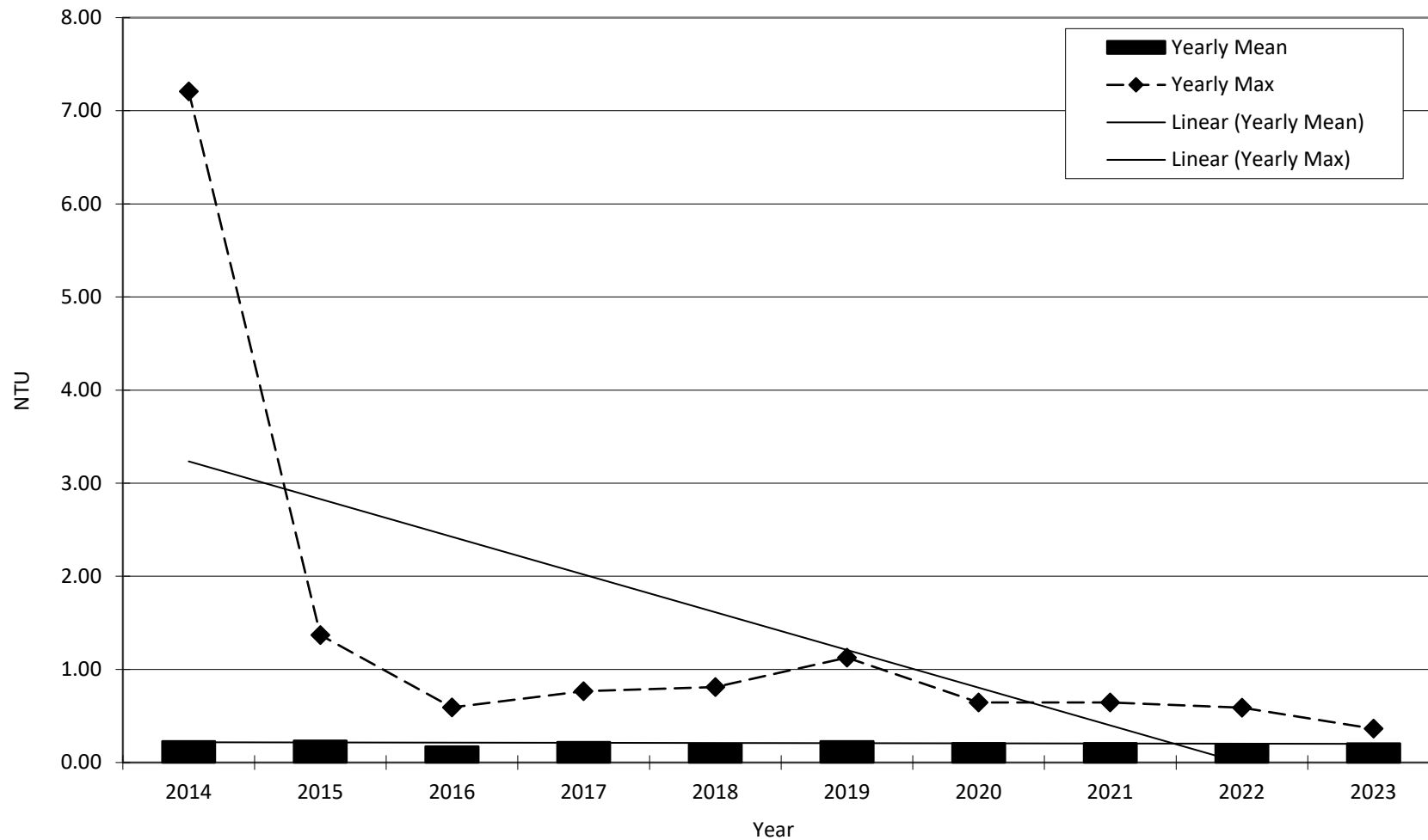
	<b>Monthly Maximum Total Coliform (# colonies/100 mL)</b>	<b>Monthly Mean Total Coliform (# colonies/100 mL)</b>	<b>Monthly Maximum E. coli (# colonies/100 mL)</b>	<b>Monthly Mean E. coli (# colonies/100 mL)</b>
<b>Jul-23</b>	15.00	5.93	0.00	0.00
<b>Aug-23</b>	23.80	6.51	1.00	0.11
<b>Sep-23</b>	16.40	5.59	0.00	0.00
<b>Oct-23</b>	8.70	3.60	3.10	0.62
<b>Nov-23</b>	2.00	0.50	0.00	0.00
<b>Dec-23</b>	0.00	0.00	0.00	0.00
<b>Jan-24</b>	5.30	1.06	1.00	0.20
<b>Feb-24</b>	0.00	0.00	0.00	0.00
<b>Mar-24</b>	0.00	0.00	0.00	0.00
<b>Apr-24</b>	1.00	0.13	1.00	0.13
<b>May-24</b>	5.30	1.03	1.00	0.10
<b>Jun-24</b>	3.10	0.64	0.00	0.00

**Figure 3.0: Monthly Mean and Max Turbidity Results for Glenbrook Water Cooperative between July 1, 2023 and June 30, 2024.**

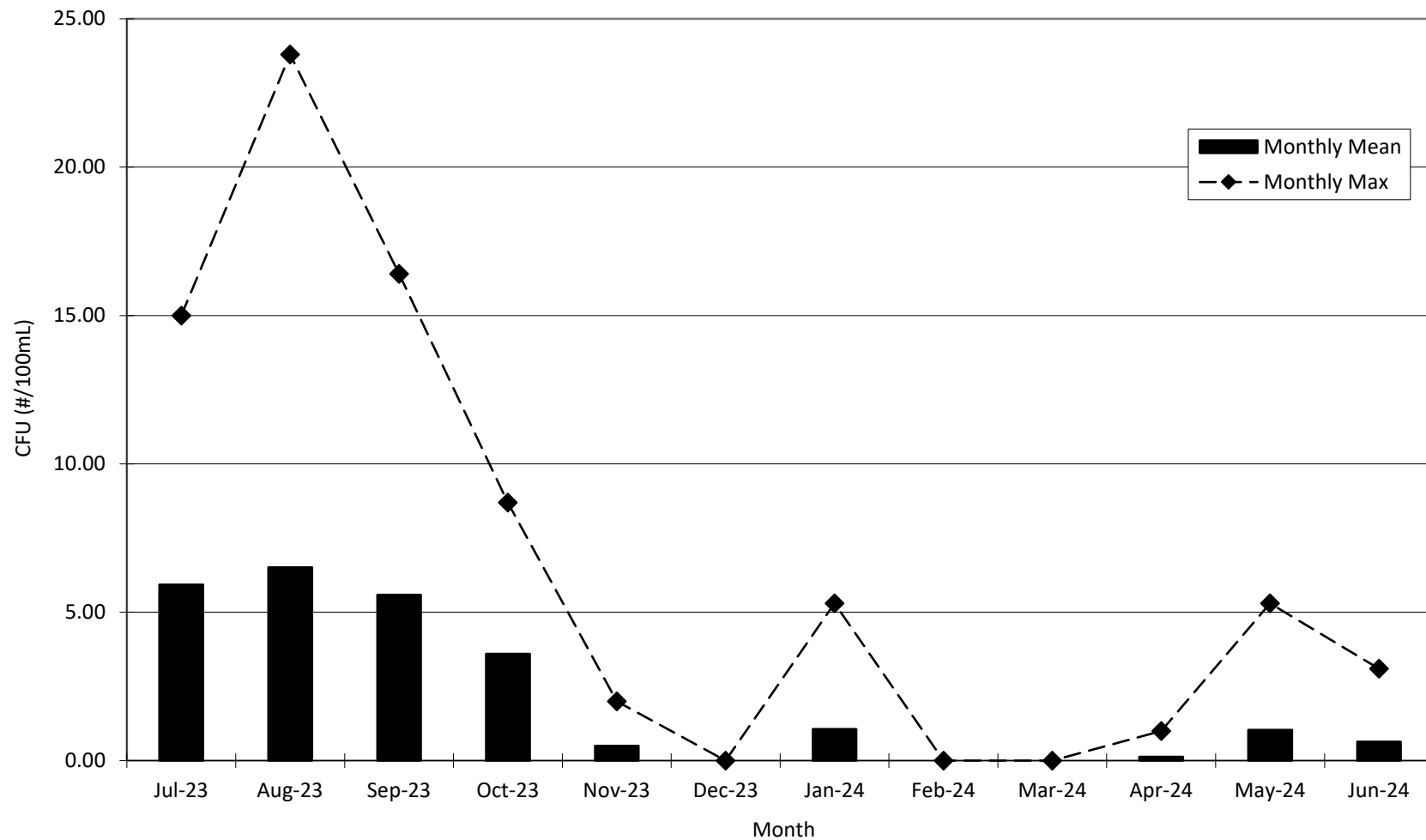




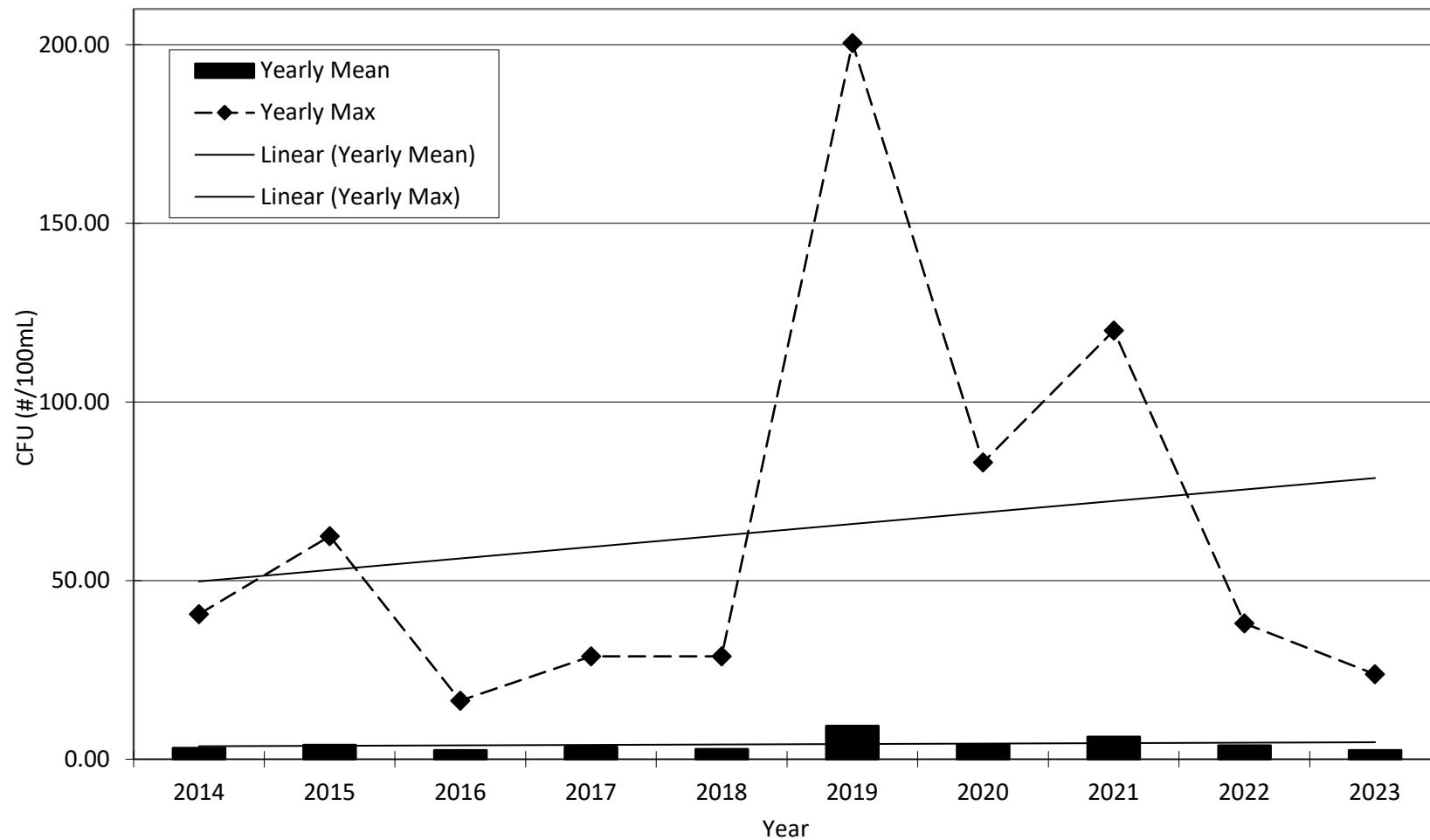
**Figure 3.1: Yearly Mean and Max Turbidity Results for Glenbrook Water Cooperative between July 1, 2014 and June 30, 2024.**



**Figure 3.2: Monthly Mean and Max Total Coliform Results for Glenbrook Water Cooperative between July 1, 2023 and June 30, 2024.**



**Figure 3.3: Yearly Mean and Max Total Coliform Results for Glenbrook Water Cooperative between July 1, 2014 and June 30, 2024.**



## **Cave Rock/Skyland Water Utility District** **Water Quality Data Summary 2023-2024**

Cave Rock/Skyland Water Utility District (Cave Rock/Skyland) is a filtration supplier and is only required to report source water turbidity. During the reporting year, Cave Rock/Skyland remained in compliance with Federal and State water quality requirements for a filtering water supplier. During the same period, the Environmental Protection Agency (EPA) notes no violation of the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for Cave Rock/Skyland is provided in the Consumer Confidence Report found in Appendix B.

### ***Turbidity***

Between July 1, 2023, and June 30, 2024, Cave Rock/Skyland met Federal and State guidelines for turbidity by remaining within regulatory limits. The monthly maximum turbidity measurements did not exceed 1.0 NTU. The maximum turbidity reading for the reporting year, 0.09 NTU, was recorded on January 4, 2024, during a wind event that produced sustained winds of 5.0-9.0 mph with gusts up to 10.0 mph from the east/southeast (Table 5.1). The annual mean turbidity for Cave Rock/Skyland was 0.04 NTU, greater than the previous reporting year's annual mean of 0.031 NTU (Figure 4.1). The highest monthly mean turbidity was 0.045 NTU, recorded in June 2024 (Table 8.0, Figure 4.0).

**Table 8.0: Cave Rock/Skyland source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the Cave Rock/Skyland intake.**

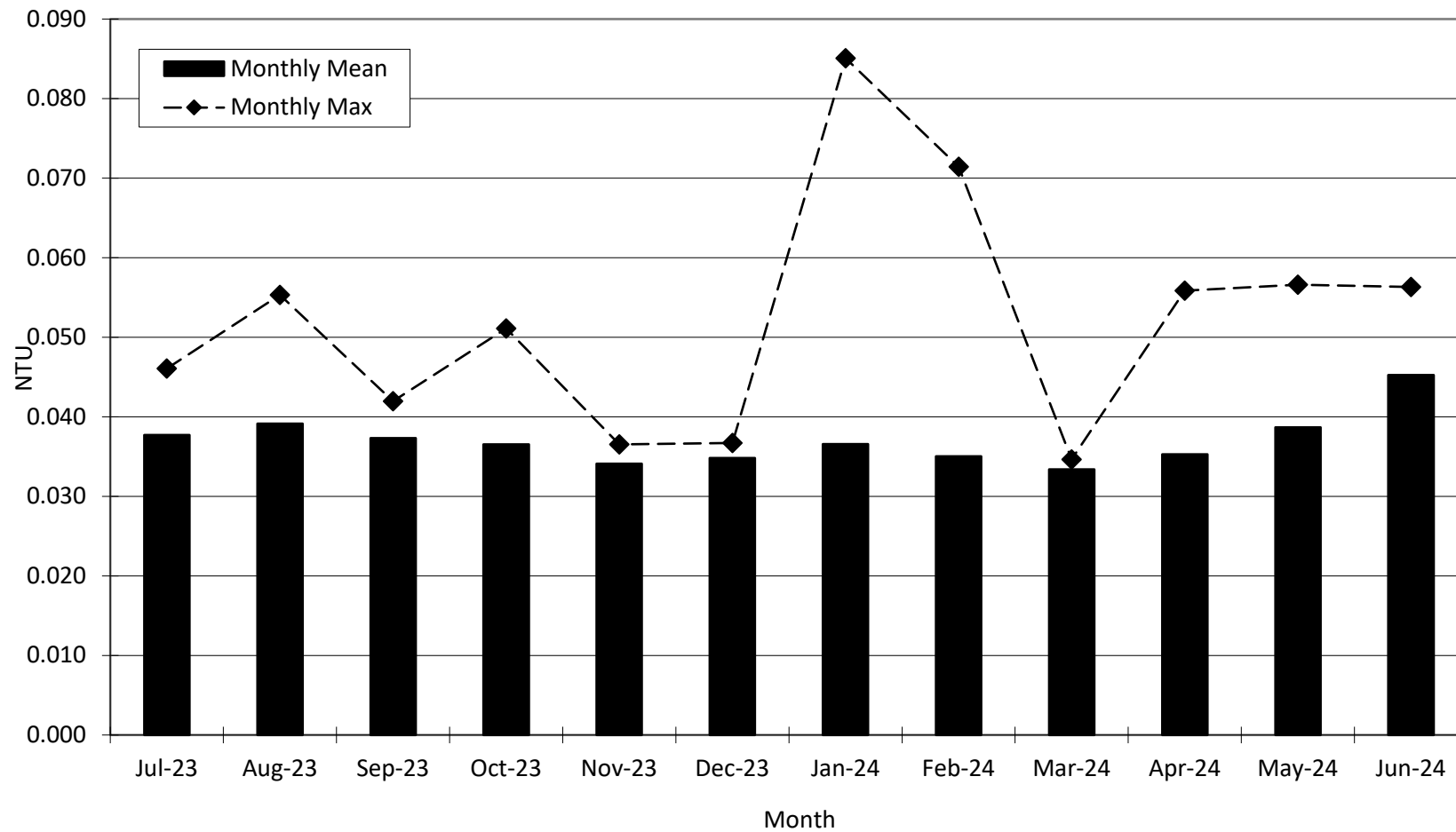
	<b>Monthly max (NTU)</b>	<b>Date monthly max</b>	<b>Monthly mean (NTU)</b>	<b>Monthly median (NTU)</b>	<b>90<sup>th</sup> Percentile</b>
<b>Jul-23</b>	0.046	18	0.038	0.038	0.039
<b>Aug-23</b>	0.055	24	0.039	0.039	0.040
<b>Sep-23</b>	0.042	11	0.037	0.037	0.039
<b>Oct-23</b>	0.051	4	0.037	0.035	0.039
<b>Nov-23</b>	0.037	30	0.034	0.034	0.035
<b>Dec-23</b>	0.037	30	0.035	0.034	0.037
<b>Jan-24</b>	0.085	4	0.037	0.034	0.037
<b>Feb-24</b>	0.071	12	0.035	0.034	0.034
<b>Mar-24</b>	0.035	11	0.033	0.034	0.034
<b>Apr-24</b>	0.056	17	0.035	0.034	0.038
<b>May-24</b>	0.057	20	0.039	0.039	0.042
<b>Jun-24</b>	0.056	24	0.045	0.043	0.051

Historically, Cave Rock/Skyland has maintained turbidity measurements below the 5.0 NTU regulatory requirement for filtration avoidance (Figure 4.1). The record maximum turbidity reading of 3.55 NTU occurred during the 2011 reporting year. The annual maximum turbidity reading of 0.09 NTU for this reporting year is the third lowest in the 10-year reporting period of July 1, 2014, to June 30, 2024. Starting in 2021, annual maximum turbidity at Cave Rock/Skyland became similar to the annual minimum of 2009 (0.04 NTU), 2011 (0.047 NTU), and 2012 (0.050 NTU). The annual minimum for 2023-2024 is 0.031 NTU, greater than the previous reporting years' annual minimum of 0.026 NTU. The

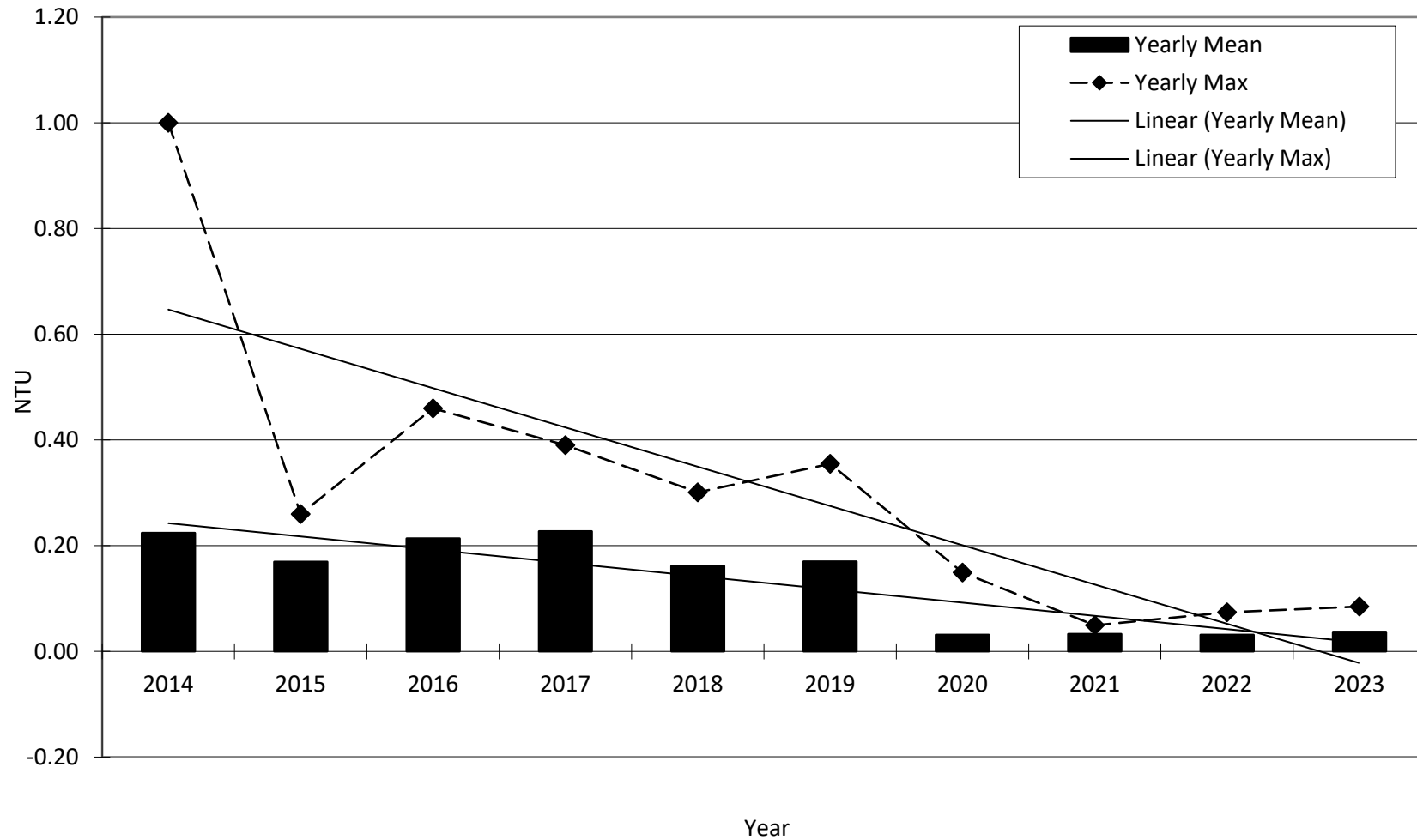
similarities between 2015, 2020, and 2021 show a likely correlation between drought conditions and turbidity at the Cave Rock Skyland intake due to the reduced seasonal runoff at the beginning of the reporting year. The Cave Rock/Skyland system did see an increase in turbidity during January and February 2023, likely influenced by mixed precipitation flushing stream environment zones. Linear trendline statistics show a decrease in annual maximum and mean turbidity from July 1, 2014, to June 30, 2024 (Figure 4.1).



**Figure 4.0: Monthly Max Turbidity Results for Cave Rock and Skyland Water Districts between July 1, 2023 and June 30, 2024.**



**Figure 4.1: Yearly Mean and Max Turbidity Results for Cave Rock and Skyland Water Districts between July 1, 2014 and June 30, 2024.**



## **Zephyr Water Utility District**

### **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, Zephyr Water Utility District (ZWUD) remained compliant with Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violation of the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for ZWUD is provided in the Consumer Confidence Report found in Appendix B.

#### ***Turbidity***

Between July 1, 2023, and June 30, 2024, ZWUD met Federal and State guidelines for turbidity by remaining within regulatory limits. The monthly maximum turbidity measurements did not exceed 1.0 NTU (Figure 5.0). The highest turbidity reading for the 2023-2024 reporting year was 0.35 NTU and occurred on July 5, 2024 (Table 9.0). Winds from the east/northeast of 4.2-14.0 mph with gusts up to 15.0 mph likely created a mixing effect (Table 5.1). The annual mean for 2023-2024 is 0.15 NTU, greater than the previous reporting years' annual mean of 0.12, the lowest annual mean in the TWSA data set for ZWUD from 1997 to the present (Figure 5.1).

**Table 9.0: Zephyr Water Utility District source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the Zephyr Water Utility District water supply intake.**

<b>Month</b>	<b>Monthly max (NTU)</b>	<b>Date monthly max</b>	<b>Monthly Mean (NTU)</b>	<b>Monthly median (NTU)</b>	<b>Monthly 90%</b>
<b>Jul-23</b>	0.35	7	0.20	0.19	0.22
<b>Aug-23</b>	0.31	29	0.18	0.17	0.19
<b>Sep-23</b>	0.30	14	0.20	0.20	0.22
<b>Oct-23</b>	0.28	3	0.18	0.18	0.22
<b>Nov-23</b>	0.15	5	0.13	0.13	0.14
<b>Dec-23</b>	0.15	6	0.13	0.13	0.14
<b>Jan-24</b>	0.29	8	0.13	0.12	0.13
<b>Feb-24</b>	0.17	29	0.12	0.11	0.12
<b>Mar-24</b>	0.15	27	0.10	0.09	0.13
<b>Apr-24</b>	0.14	30	0.12	0.12	0.13
<b>May-24</b>	0.17	1	0.14	0.14	0.15
<b>Jun-24</b>	0.18	14	0.16	0.17	0.17

Historically, ZWUD has maintained low turbidity measurements. The highest reading reported since 1997, 1.35 NTU, occurred in 1998. Annual maximum turbidity for the 10-year reporting period includes the lowest result of 0.35 NTU in this reporting year, followed by 0.42 NTU in 2021 and the highest reading of 0.91 NTU in 2014. Annual mean turbidity remained below 0.20 NTU from 2014-2016 and increased steadily from 2017-2019, with this year's result pairing with the previous year to reestablish results similar to 2014-2016. Linear trend line analysis of the 10-year reporting period from July 1, 2014, to June 30, 2024, shows a decreasing linear trend in annual maximum and mean turbidity (Figure 9.1).

## Microbial Quality

ZWUD met Federal and State guidelines for total coliform and fecal coliform for the 2023-2024 reporting year. The maximum total coliform reading was 20.70 coliform-forming units per 100 mL (CFU/100 mL), the annual mean was 2.19 CFU/100 mL, and 90% of the samples were below 6.40 CFU/100 mL. The maximum fecal coliform reading was 8.70 CFU/100 mL, the annual mean was 0.11 CFU/100 mL, and 90% of the samples were below 0.00 CFU/100 mL.

**Table 9.1: Zephyr Water Utility District annual source water total and E. coli coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected daily from raw water at the ZWUD intake.**

	total coliform (# colonies/100 mL)	E. coli coliform (# colonies/100 mL)
Mean	2.19	0.11
Median	0.00	0.00
Max	20.70	8.70
90th Percentile	6.40	0.00
Colony-Forming Samples	50	3
Total Number of Samples	105	105

The maximum total coliform count for the 2023-2024 reporting year of July 1, 2023, to June 30, 2024, was 20.70 CFU/100 mL, a decrease from the previous year's max of 43 CFU/100 mL (Table 9.1, Figure 9.3). The maximum total coliform reading of 20.70 CFU/100 mL occurred twice in the reporting year. The first reading was taken on August 5, 2023. The maximum temperature reached 69.6°F, while the weekly mean temperature was 55.8° F. The increase in temperature by 13.8 degrees paired with sustained wind of 3.6-14.0 mph with 15.0 mph gusts reported likely influenced total coliform results (Table 5.4). The second reading was taken on August 27, 2023; the maximum temperature reached 66.9°F, while the weekly mean temperature was 49.5°F; the increase in temperature of 17.4 degrees was paired with winds from 4.1-17.0, which likely influenced the maximum result.

**Table 9.2: Zephyr Water Utility District monthly source water total and E. coli coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected daily from raw water at the ZWUD intake.**

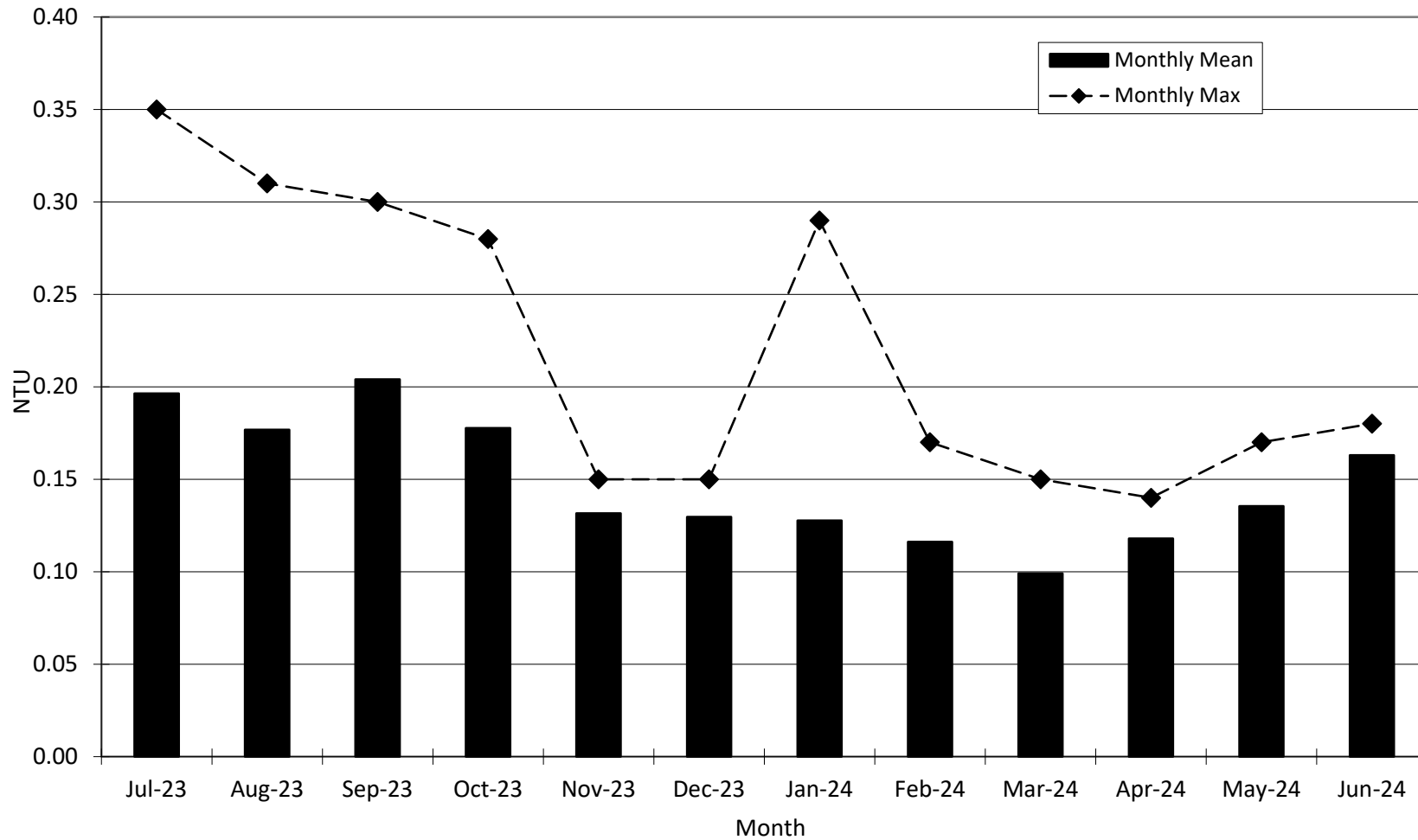
	Monthly maximum total coliform (# colonies/100 mL)	Monthly mean total coliform (# colonies/100 mL)	Monthly maximum E. coli coliform (# colonies/100 mL)	Monthly mean E. coli coliform (# colonies/20 mL)
Jul-23	9.80	1.98	8.70	1.09
Aug-23	8.70	3.90	0.00	0.00
Sep-23	20.70	9.70	2.00	0.25
Oct-23	16.40	6.11	1.00	0.11
Nov-23	3.10	1.12	0.00	0.00
Dec-23	2.00	0.63	0.00	0.00
Jan-24	1.00	0.10	0.00	0.00
Feb-24	1.00	0.13	0.00	0.00
Mar-24	0.00	0.00	0.00	0.00
Apr-24	2.00	0.44	0.00	0.00
May-24	0.00	0.00	0.00	0.00
Jun-24	7.00	2.38	0.00	0.00

Total coliform was detected in 50 of the 105 samples analyzed, equaling 48%. The annual mean total coliform count was 2.19 CFU/100 mL, a lower value than the previous reporting year's mean total coliform result of 3.70 CFU/100 mL (Table 9.1, Figure 5.3). For the reporting year, 90% of the 105 samples were below 6.40 CFU/ 100 mL, lower than the previous reporting years 13.47 CFU/100 mL. Total coliform followed seasonal trends with increased readings during the summer months, with results tapering off into the winter season (Figure 9.2).

Historically, the annual mean total coliform results have remained consistent and encircled 5 CFU/100 mL. While the maximum total coliform results show greater variability than annual mean, all results reported are well below regulatory limits for total coliform from 2014-2024. The 2021 reporting year had an annual maximum of 550 CFU/100 mL, the highest result in the TWSA data set for ZWUD from 1997 to the present. The linear trend line over the 10-year reporting period of July 1, 2014, to June 30, 2024, shows an increasing trend for annual mean and maximum results (Figure 5.3).

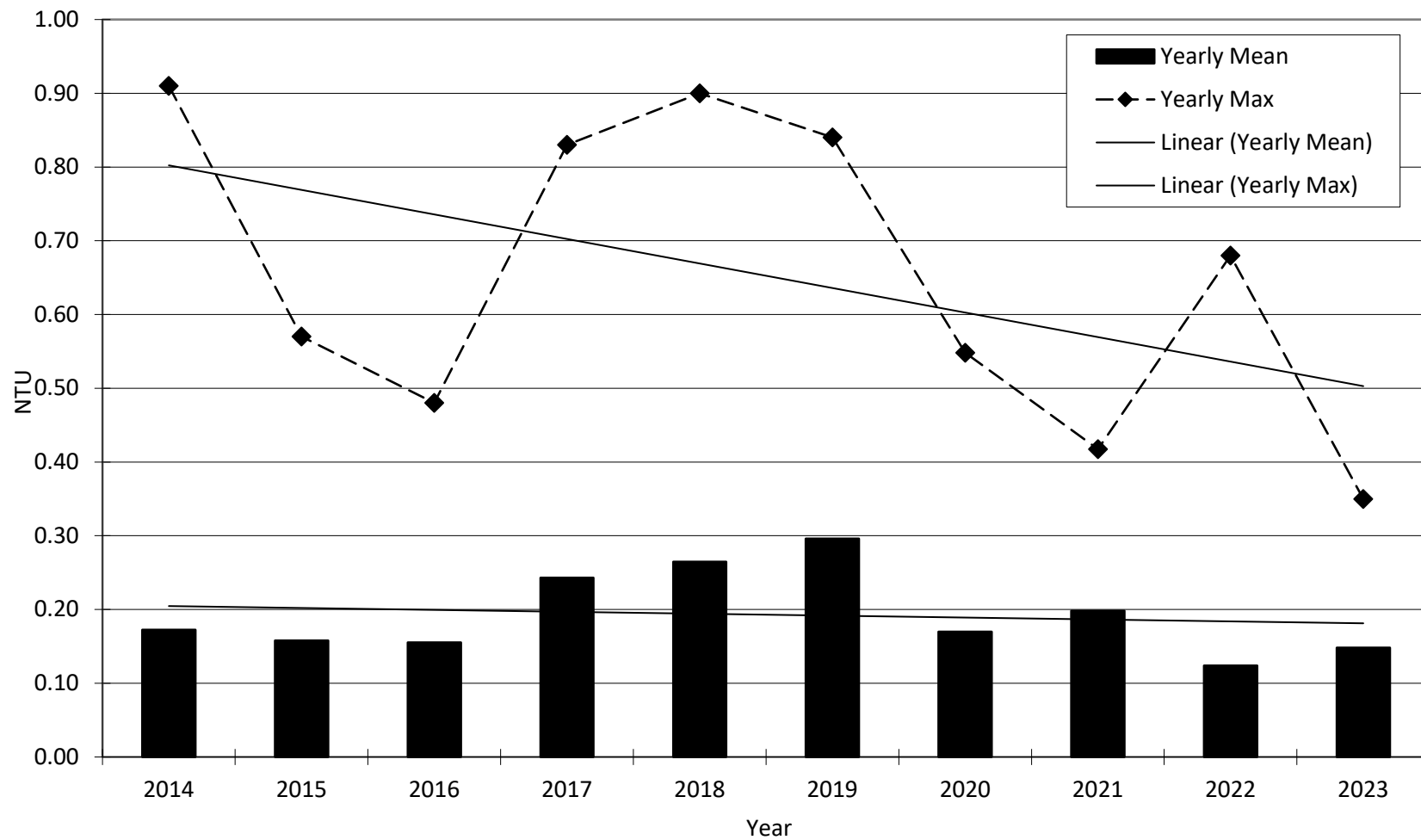
ZWUD also completed tests for E. coli coliform on all samples tested for total coliform; three detections were reported for the reporting year. The maximum E. coli coliform reading was 8.7 CFU/100 mL, reported on July 6, 2023. The annual mean E. coli coliform result was 0.11 CFU/100 mL, and 90% of the samples for the reporting year were below zero (Table 9.1).

**Figure 5.0: Monthly Mean and Max Turbidity Results for Zephyr Water Utility District between July 1, 2023 and June 30, 2024.**

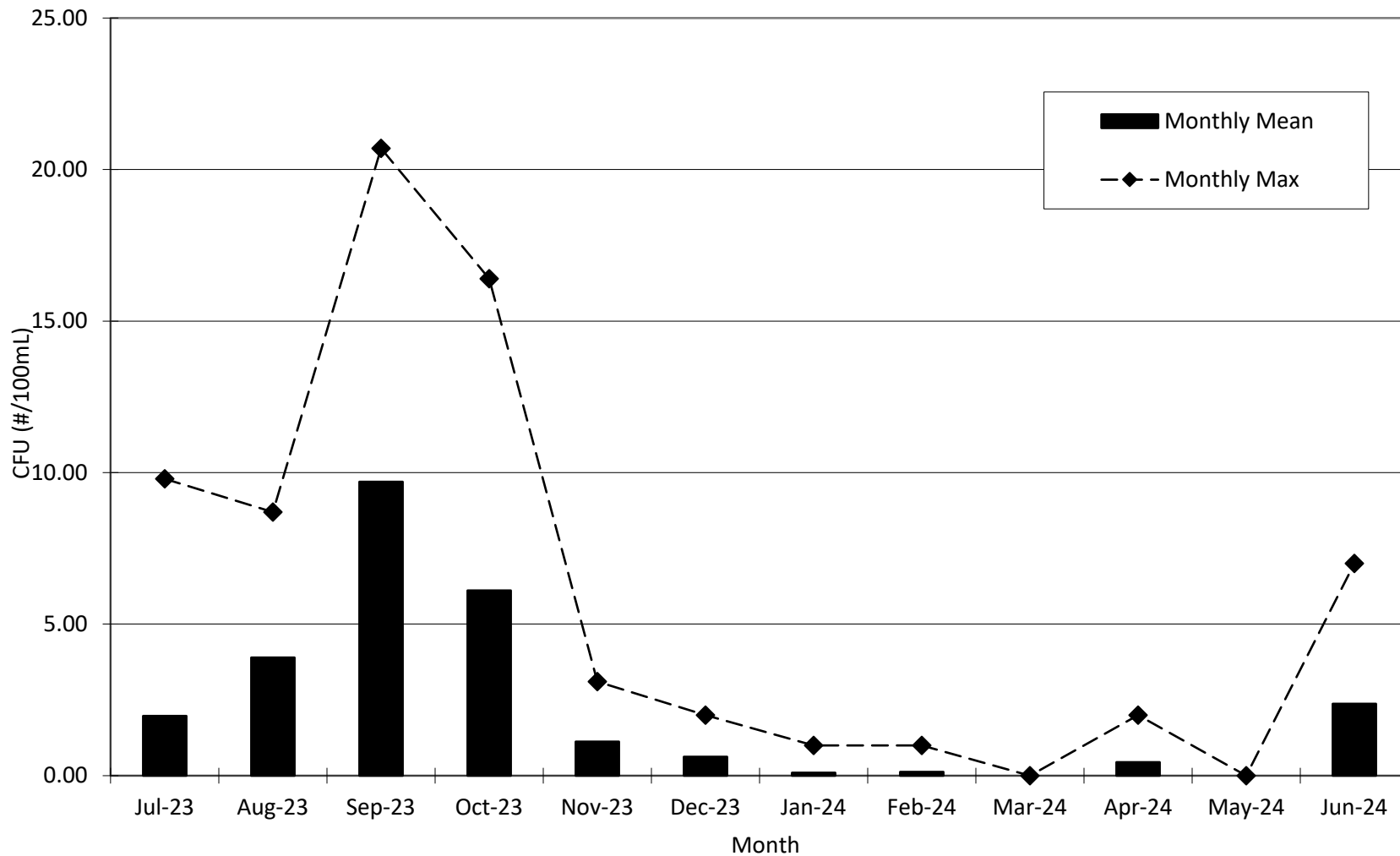




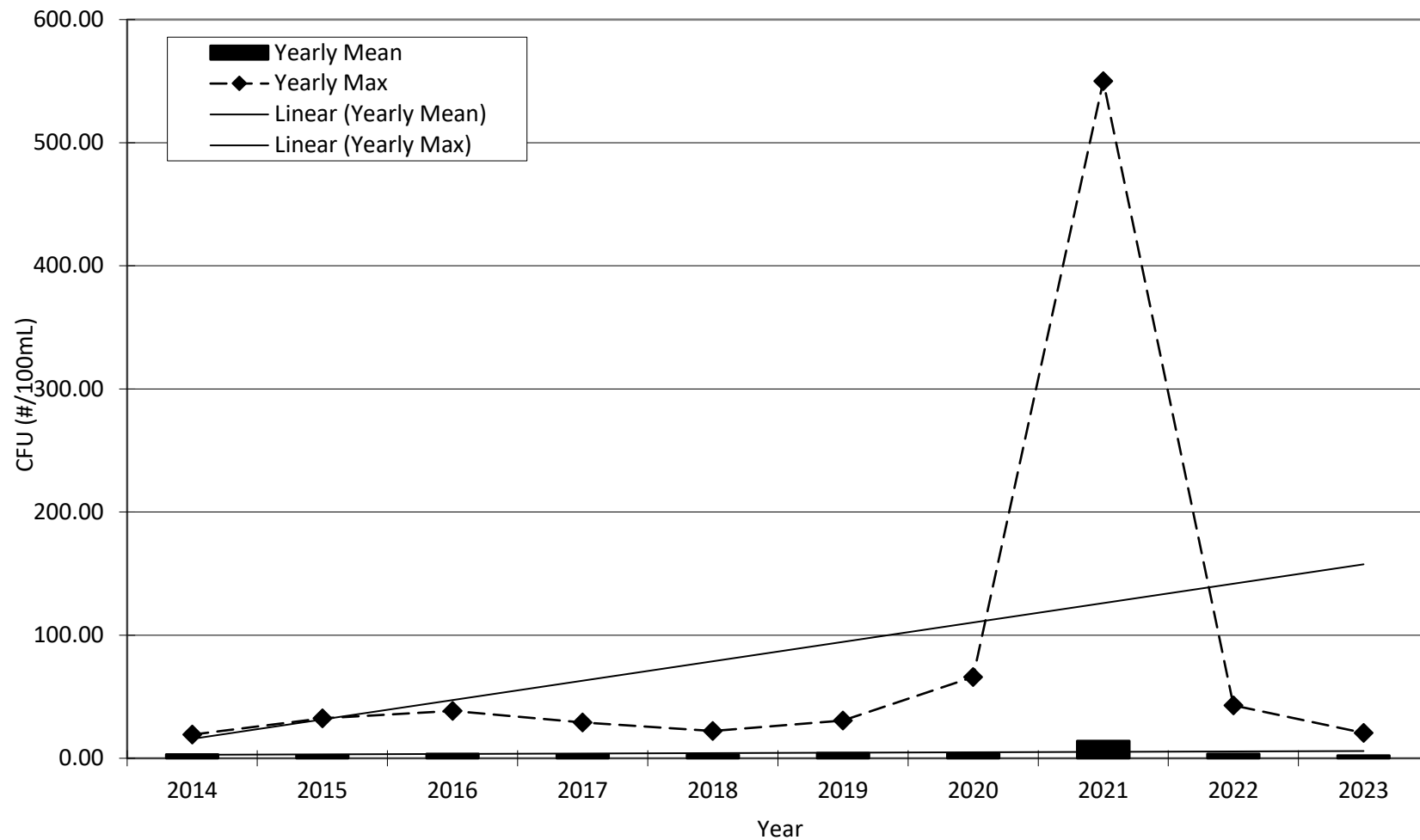
**Figure 5.1: Yearly Mean and Max Turbidity Results for Zephyr Water Utility District between July 1, 2014 and June 30, 2024.**



**Figure 5.2: Monthly Mean and Max Coliform Results for Zephyr Water Utility District between July 1, 2023 and June 30, 2024.**



**Figure 5.3: Yearly Mean and Max Coliform Results for Zephyr Water Utility District between July 1, 2014 and June 30, 2024.**



## **Round Hill General Improvement District** **Water Quality Data Summary 2023-2024**

Round Hill General Improvement District (RHGID) is a filtering water supplier that is only required to report source water turbidity. During the 2023-2024 reporting year, RHGID remained under a filtering water supplier's Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) noted one violation of the monitoring requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for RHGID is provided in the Consumer Confidence Report in Appendix B.

### ***Turbidity***

Between July 1, 2023, and June 30, 2024, RHGID met Federal and State guidelines for turbidity by remaining below regulatory limits. The monthly mean and maximum turbidity measurements for the reporting year did not exceed 0.50 NTU (Figure 6.0). The maximum turbidity reading for the reporting year was 0.44 NTU, higher than the previous reporting years' maximum of 0.27 NTU (Figure 6.1). The annual maximum was recorded on September 14, 2023. Wave action associated with east/southeast winds of 3.0-13.0 MPH likely influenced the turbidity reading by creating a mixing effect from wave action (Table 5.1). The annual mean turbidity for the reporting year was 0.17 NTU, greater than the previous two reporting years' result of 0.14 NTU (Figure 6.1). The largest monthly mean turbidity result was 0.25 NTU, reported in September and October 2023 (Table 10.0).

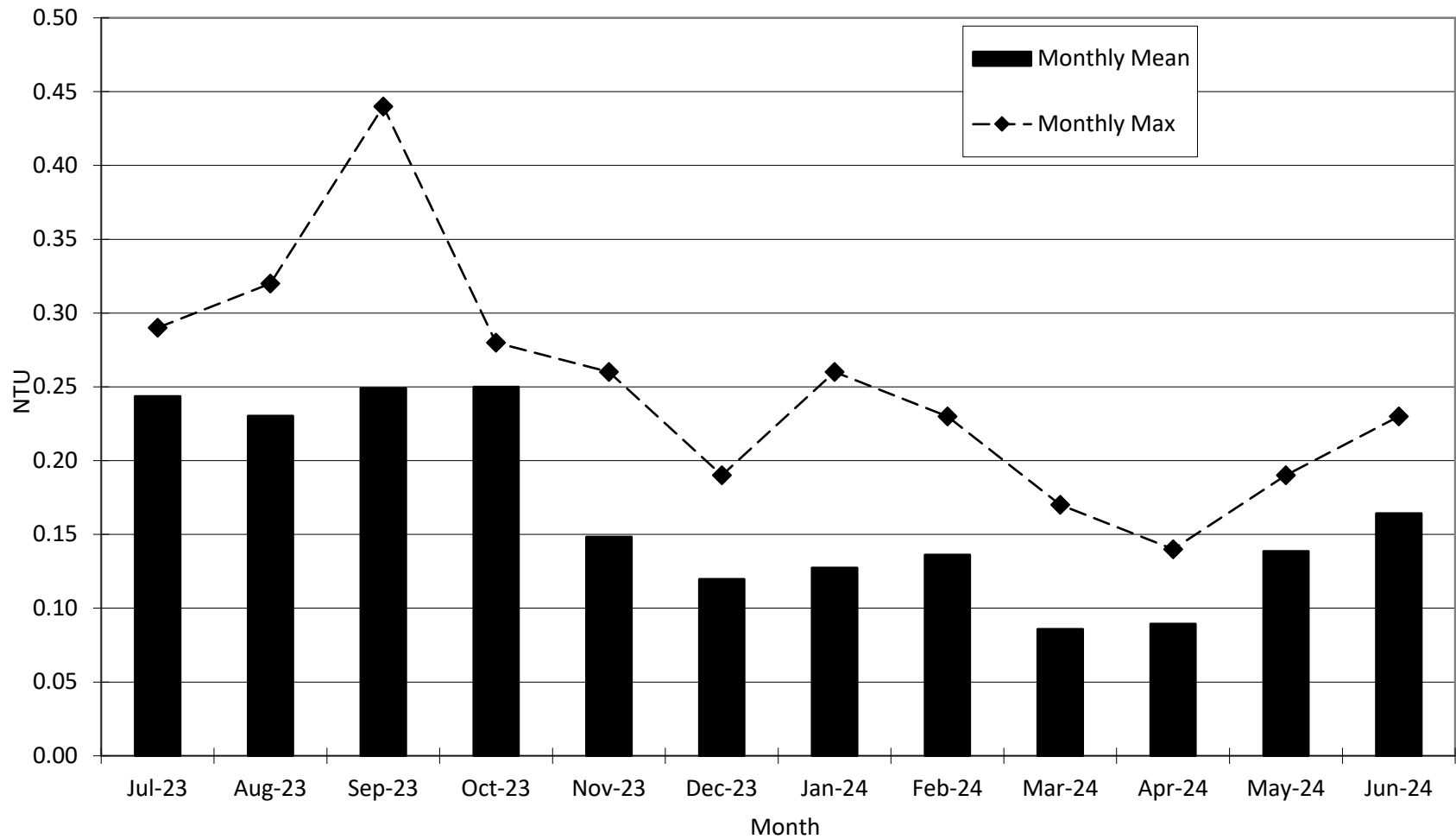
**Table 10.0: RHGID source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the RHGID intake.**

<b>Month</b>	<b>Monthly max (NTU)</b>	<b>Date monthly max</b>	<b>Monthly mean (NTU)</b>	<b>Monthly median (NTU)</b>	<b>90<sup>th</sup> percentile</b>
<b>Jul-23</b>	0.29	30	0.24	0.24	0.28
<b>Aug-23</b>	0.32	24	0.23	0.22	0.30
<b>Sep-23</b>	0.44	14	0.25	0.25	0.28
<b>Oct-23</b>	0.28	4, 8, 19, 24, 27	0.25	0.25	0.28
<b>Nov-23</b>	0.26	4	0.15	0.14	0.22
<b>Dec-23</b>	0.19	25	0.12	0.11	0.18
<b>Jan-24</b>	0.26	4	0.13	0.11	0.20
<b>Feb-24</b>	0.23	17	0.14	0.13	0.19
<b>Mar-24</b>	0.17	30	0.09	0.08	0.13
<b>Apr-24</b>	0.14	13, 25	0.09	0.08	0.13
<b>May-24</b>	0.19	27	0.14	0.14	0.17
<b>Jun-24</b>	0.23	27	0.16	0.18	0.21

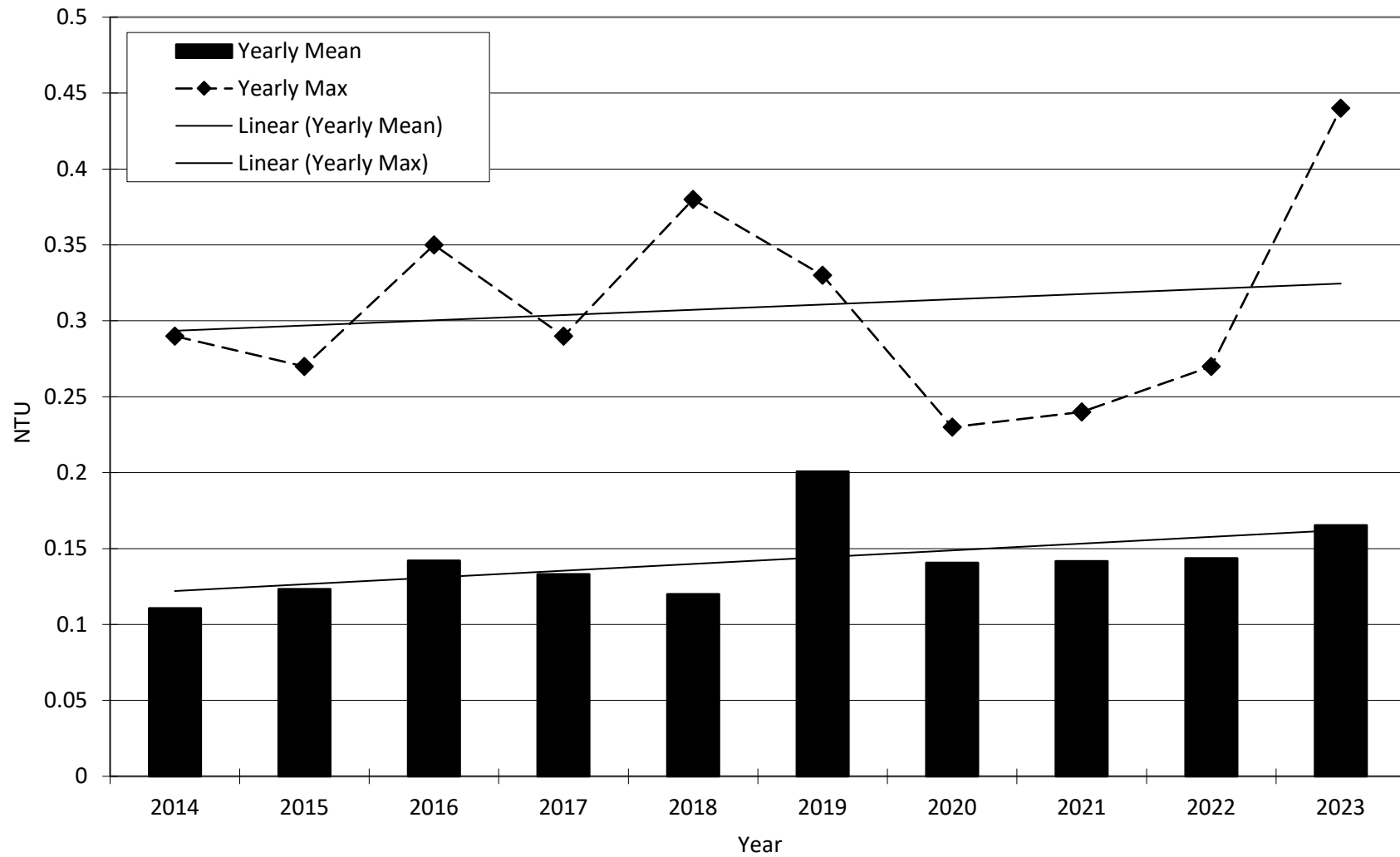
Historically, RHGID has maintained low turbidity measurements. In 2006, the turbidity reading reached 4.89 NTU during a rain and snow event. Due to this high reading, the intake was relocated and extended an additional 1,500 feet into deeper water at a total distance of 2,500 feet from shore. The next highest reading was reported in January 1997, 2.19 NTU, and occurred during a 100-year storm event. Annual maximum results are all below 0.50 NTU for the 10-year reporting period of July 1, 2014, to June 30, 2024 (Figure 6.1). The highest maximum turbidity

reading in the 10-year reporting period is this year's reading of 0.44 NTU, followed by 0.38 NTU, recorded in 2018. Annual mean turbidity has remained below 0.20 NTU for the 10-year reporting period, with eight of ten years below 0.15 NTU. Linear trend line analysis shows an increasing trend in both annual maximum and annual mean from July 1, 2014, to June 30, 2024 (Figure 6.1).

**Figure 6.0: Monthly Mean and Max Turbidity Results for Round Hill General Improvement District  
between July 1, 2023 and June 30, 2024.**



**Figure 6.1: Yearly Mean and Max Turbidity Results for Round Hill General Improvement District  
between July 1, 2014 and June 30, 2024.**





## **Kingsbury General Improvement District** **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, Kingsbury General Improvement District (KGID) remained within Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) noted no violation of the monitoring and reporting requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for KGID is provided in the Consumer Confidence Report found in Appendix B.

### ***Turbidity***

Between July 1, 2023, and June 30, 2024, KGID met Federal and State guidelines for turbidity by remaining within regulatory limits. The yearly maximum was 0.46 NTU, taken during a weather event on April 6, 2023. Winds were from the northeast at 0.4-11.0 mph, with 0.01 inches of rain recorded (Tables 5.1, 11.0). The annual mean turbidity result was 0.21 NTU, and 90% of the samples were below 0.31 NTU (Table 11.0). The largest monthly mean turbidity, 0.28 NTU, occurred in July and August 2023 (Table 11.0, Figure 7.0).

**Table 11.0: KGID source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the KGID intake.**

	Monthly max (NTU)	Date monthly max	Monthly mean (NTU)	Monthly median (NTU)	90 <sup>th</sup> percentile
<b>Jul-23</b>	0.44	25	0.28	0.28	0.34
<b>Aug-23</b>	0.32	8	0.27	0.27	0.30
<b>Sep-23</b>	0.46	21	0.28	0.27	0.32
<b>Oct-23</b>	0.36	19	0.26	0.25	0.33
<b>Nov-23</b>	0.29	7	0.21	0.20	0.26
<b>Dec-23</b>	0.27	7	0.19	0.18	0.23
<b>Jan-24</b>	0.45	15	0.20	0.17	0.27
<b>Feb-24</b>	0.29	27	0.14	0.14	0.18
<b>Mar-24</b>	0.21	28	0.12	0.11	0.15
<b>Apr-24</b>	0.37	26, 27, 30	0.21	0.17	0.37
<b>May-24</b>	0.39	4	0.21	0.16	0.38
<b>Jun-24</b>	0.26	30	0.21	0.22	0.24

Historically (1997-2003), KGID maintained annual mean source water turbidities less than 1.0 NTU. Maximum annual turbidity ranged from 2.59 NTU to 3.0 NTU between 2004 and 2006, returned to below 1.0 NTU in 2007, increased above 1.0 NTU again in 2008-2010, and dropped below 1.0 NTU in 2011 through 2015. Annual maximum turbidity reached 4 NTU during the 2016-2017 reporting year, during the large runoff season of spring 2017. From 2017- 2023, the annual maximum turbidity ranged from 0.65 NTU to 1.85 NTU. The annual maximum returned below 1.0 NTU during the 2022 reporting year, with the maximum result of 0.79 NTU (Figure 7.1). The annual maximum for this reporting year of 0.46 NTU continues the trend of maximum value below 1 NTU. Linear trendline data for the 10-year reporting period of July 1, 2014, to June 30, 2024, shows a decreasing linear trend in annual maximum (Figure 7.1).

The annual mean turbidity, 0.21 NTU, for the reporting year is greater than the previous year. Annual mean turbidity values remain below 0.25 NTU for the 10-year reporting period, and linear trendline analysis shows a stable trend (Figure 7.1).

## Microbial Quality

KGID met Federal and State guidelines for total coliform and fecal coliform for the 2023-2024 reporting year. The maximum total coliform reading was 271 CFU/100 mL, the annual mean was 10.03 CFU/100 mL, and 90% of the samples were below 23 CFU/100 mL. The maximum fecal coliform reading was 2 CFU/100 mL, the annual mean was 0.05 CFU/100 mL, and 90% of the samples were below 0.0 CFU/100 mL.

**Table 11.1: KGID annual source water total and E. coli coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected daily from raw water at the KGID intake.**

	<b>Total coliform (# colonies/100 mL)</b>	<b>E. coli coliform (# colonies/100 mL)</b>
<b>Mean</b>	10.03	0.05
<b>Median</b>	1.00	0.00
<b>Max</b>	271.00	2.00
<b>90th Percentile</b>	23.00	0.00
<b>Colony Forming Samples</b>	98.00	6.00
<b>Total Number of Samples</b>	156.00	156.00

The maximum total coliform result for the reporting year of 271 CFU/100 mL was recorded on July 17, 2023. This result exceeds the 100 CFU/100 mL criteria for filtration avoidance. The 271 CFU/100 mL result was one of three results above the criteria during the reporting year at KGID. Filtration avoidance criteria require that 90% of the measurements from the previous 6-month period must satisfy the  $\leq 100$  CFU/100 mL criteria for total coliform. KGID took 78 measurements for total coliform from January 17, 2023, to July 17, 2023; one result was greater than 100 CFU/100 mL, equaling 1.28% of the measurements taken in the previous 6-month period, less than the 10% requirement for filtration avoidance. The result was likely caused by wind-wave action produced by a west wind event that produced sustained winds of 0.2-7.0 mph. The temperature was likely influential, as the daily maximum temperature was 87.3°F, 15.8 degrees above the weekly average temperature of 71.5°F. A full description of weather paired with maximum total coliform readings is available (Table 5.4). The dates, results, and percentages for the additional two results above 100 CFU/100 mL recorded in the reporting year are provided in Table 11.2.

**Table 11.2: Results in exceedance of filtration avoidance criteria for total coliform, including the date and number of results in the previous six-month period, and calculated percentage of results greater than 100 CFU/100 mL.**

<b>Criteria</b>	<b>Result in exceedance of 100 CFU/100</b>	<b>Result Date</b>	<b>Total number of results in 6 months previous</b>	<b>The number of results greater than the criteria</b>	<b>The percentage of dates was greater than the criteria for the previous 6 months.</b>
<b>Total Coliform</b>	271	7/17/2023	78	1	1.28%
<b>Total Coliform</b>	222	7/25/2023	78	2	2.56%
<b>Total Coliform</b>	109	8/23/2023	77	3	3.90%

KGID had a second total coliform result above 100 CFU/100 mL on July 25, 2023. Filtration exemption criteria require 90% of measurements from the previous six months to be below 100 CFU/100 mL. KGID analyzed 78 samples for total coliform between January 25, 2023, and July 25, 2023; of these samples, two results were above the total coliform criteria, equaling 2.74% of measurements from the previous six-month period, less than the 10% requirement for filtration avoidance. The third result above 100 CFU/100 mL was reported on August 28, 2023. KGID analyzed 77 samples for total coliform between February 23, 2023, and August 28, 2023; of these samples, three results were above the total coliform criteria, equaling 3.90%, less than the 10% requirement for filtration avoidance.

Additionally, two days prior to the final result for KGID over 100 CFU/100 ML for total coliform, Hurricane Hilary made landfall on the west coast, becoming a tropical storm before crossing into southern California on August 20-21, 2023. Hilary was the first tropical storm to pass over California since Nora in 1997<sup>1</sup>. The storm's effects entered the Lake Tahoe Basin on August 20, 2023, with the Tahoe City Area NOAA station recording 0.58 inches of rainfall and 0.38 inches of rain the following day. The USGS creek gage on Ward Creek shows an increased discharge between August 21 and August 22, as the precipitation moved through Stream Environment Zones (SEZ) that terminate in Lake Tahoe (Figure 1.6). The UC Davis monitoring stations recorded surface water temperatures above 65°F<sup>2</sup> (Figure 1.7). The combination of warm surface water temperatures and SEZ flushing likely impacted the maximum total coliform at KGID on August 24, 2023.

**Table 11.3: KGID monthly source water total and E. coli coliform data results from July 1, 2023, through June 30, 2024. Analyses completed on samples collected daily from raw water at the KGID intake.**

Month	Monthly maximum total coliform (# colonies/100 mL)	Monthly mean total coliform (# colonies/100 mL)	Monthly maximum E. coli coliform (# colonies/100 mL)	Monthly mean E. coli coliform (# colonies/100 mL)
Jul-23	271.00	47.65	1.00	0.08
Aug-23	109.10	29.09	0.00	0.00
Sep-23	45.30	17.04	2.00	0.17
Oct-23	22.20	11.12	0.00	0.00
Nov-23	16.00	3.45	0.00	0.00
Dec-23	40.60	5.08	0.00	0.00
Jan-24	2.00	0.52	1.80	0.25
Feb-24	10.00	1.00	0.00	0.00
Mar-24	3.10	0.26	0.00	0.00
Apr-24	3.10	0.29	1.00	0.07
May-24	6.30	1.50	0.00	0.00
Jun-24	5.20	2.13	0.00	0.00

The annual mean total coliform count for KGID between July 1, 2023, and June 30, 2024, was 10.03 CFU/100 mL greater than the previous years' 8.59 CFU/100 mL. The monthly mean total coliform results ranged between 0.26 CFU/100 mL and 47.65 CFU/100 mL (Table 11.2). The

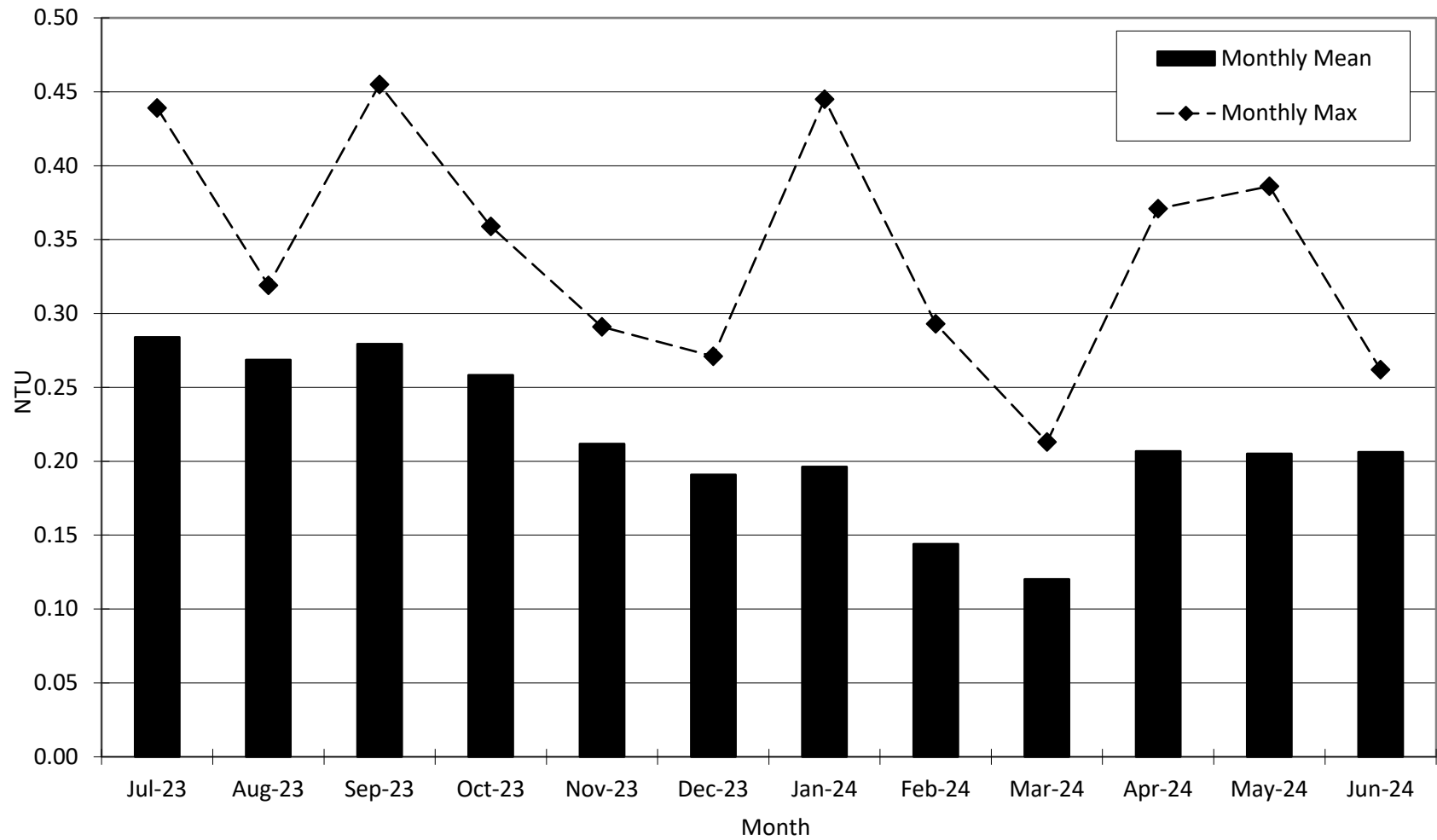
<sup>1</sup> National Oceanic and Atmospheric Administration, NOWData, for Tahoe City Area, daily data for a month, August 2023, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202308>.

<sup>2</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2024, Water Temperature Profile, [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL\\_Final\\_reduced\\_2.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL_Final_reduced_2.pdf), page 8.3

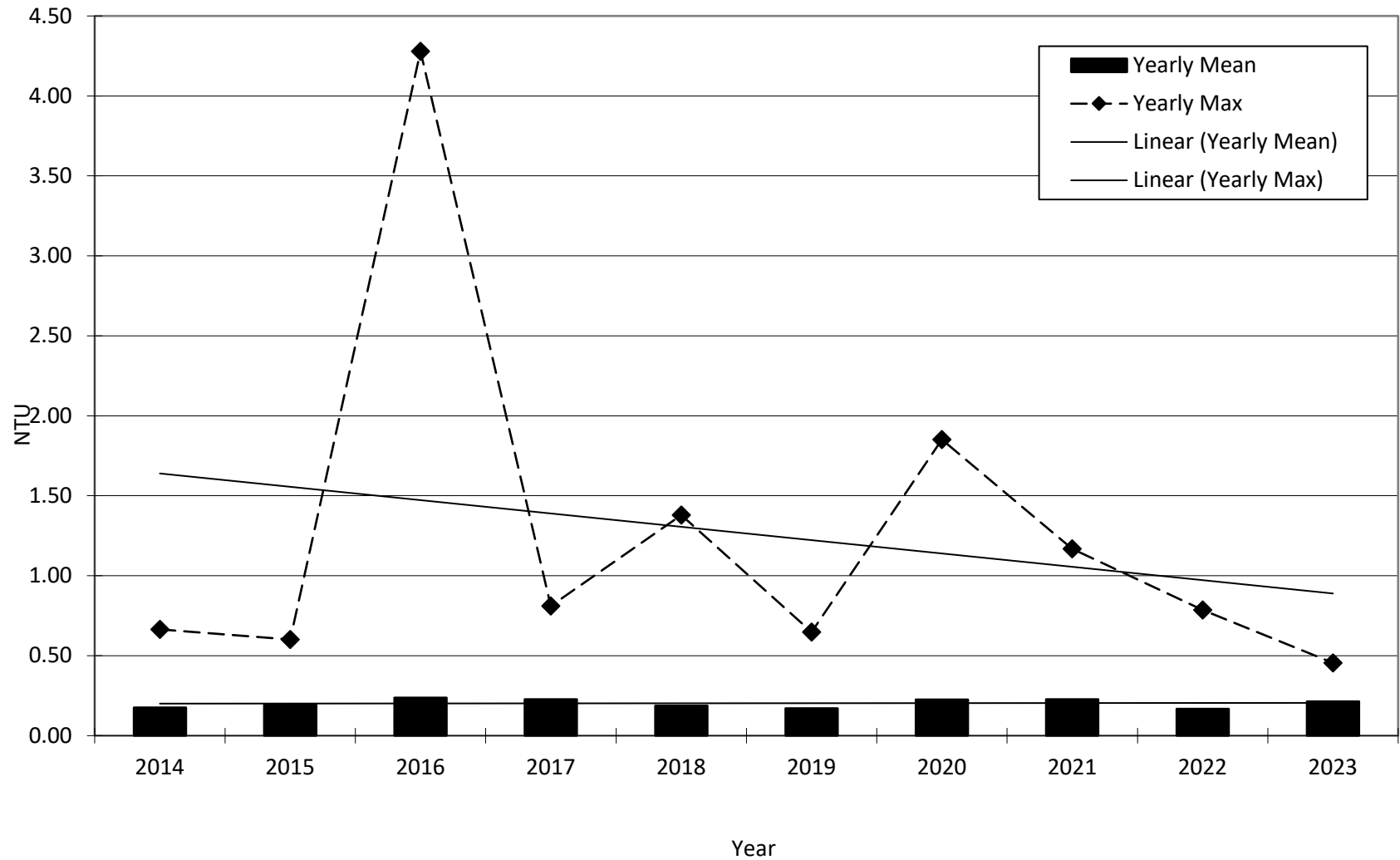
highest monthly mean total coliform result occurred in July 2023. Linear trend line data analysis shows a decreasing trend in annual maximum and an increasing trend in annual mean over the 10-year reporting period of July 1, 2014, to June 30, 2024 (Figure 7.3).

KGID also completed tests for E. coli coliform on 156 source water samples. During the reporting year, 6 samples detected E. coli coliform with a maximum reading of 2.00 CFU/100 mL, giving KGID an E. coli coliform detection rate of 3.84%. Consequently, the yearly mean for E. coli coliform was 0.05 CFU/100 mL. The annual median and 90% of E. coli coliform readings were both 0.00 CFU/100 mL (Table 11.1).

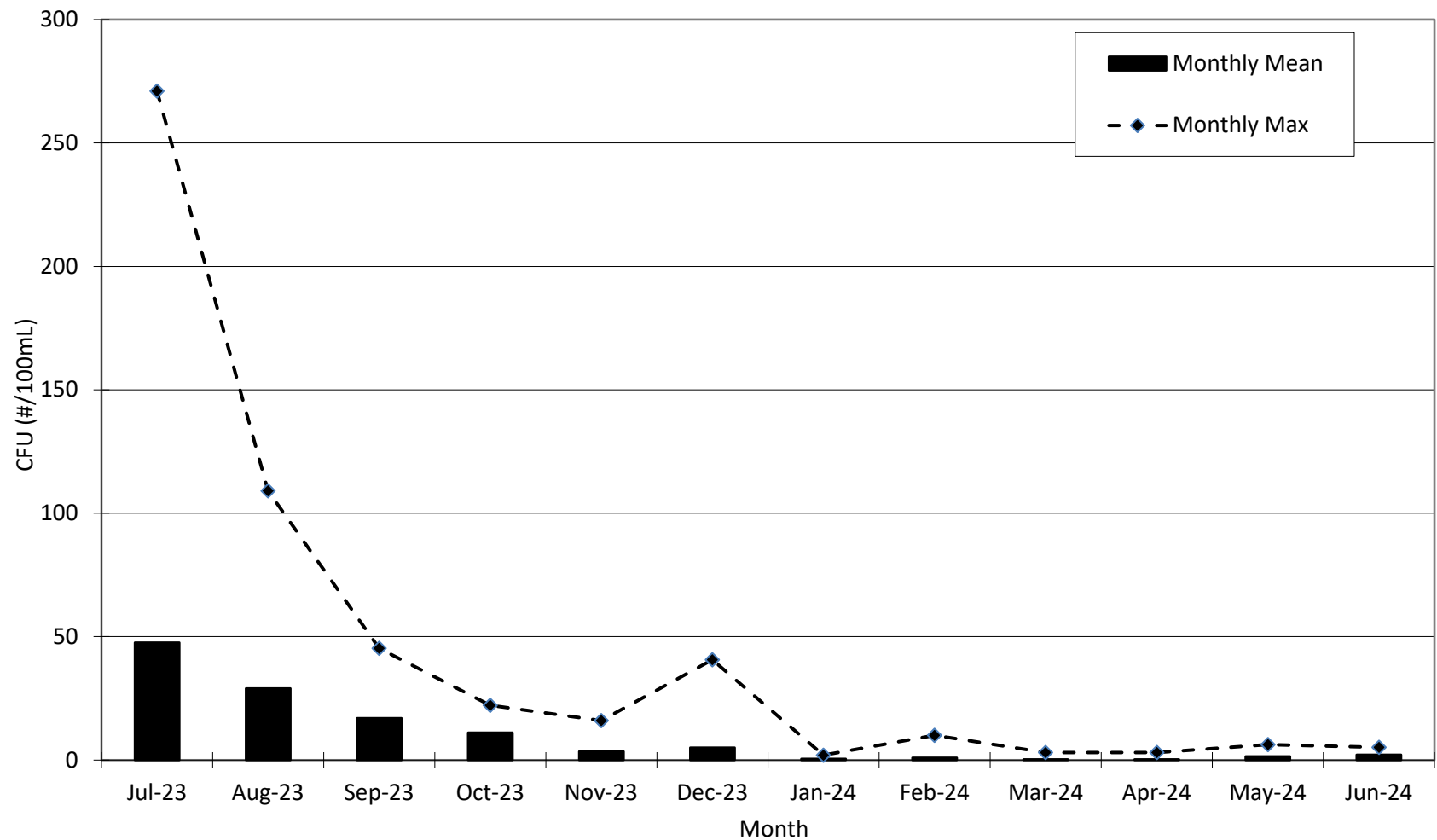
**Figure 7.0: Monthly Mean and Max Turbidity Results for Kingsbury General Improvement District  
between July 1, 2023 and June 30, 2024.**



**Figure 7.1: Yearly Mean and Max Turbidity Results for Kingsbury General Improvement District  
between July 1, 2014 and June 30, 2024.**

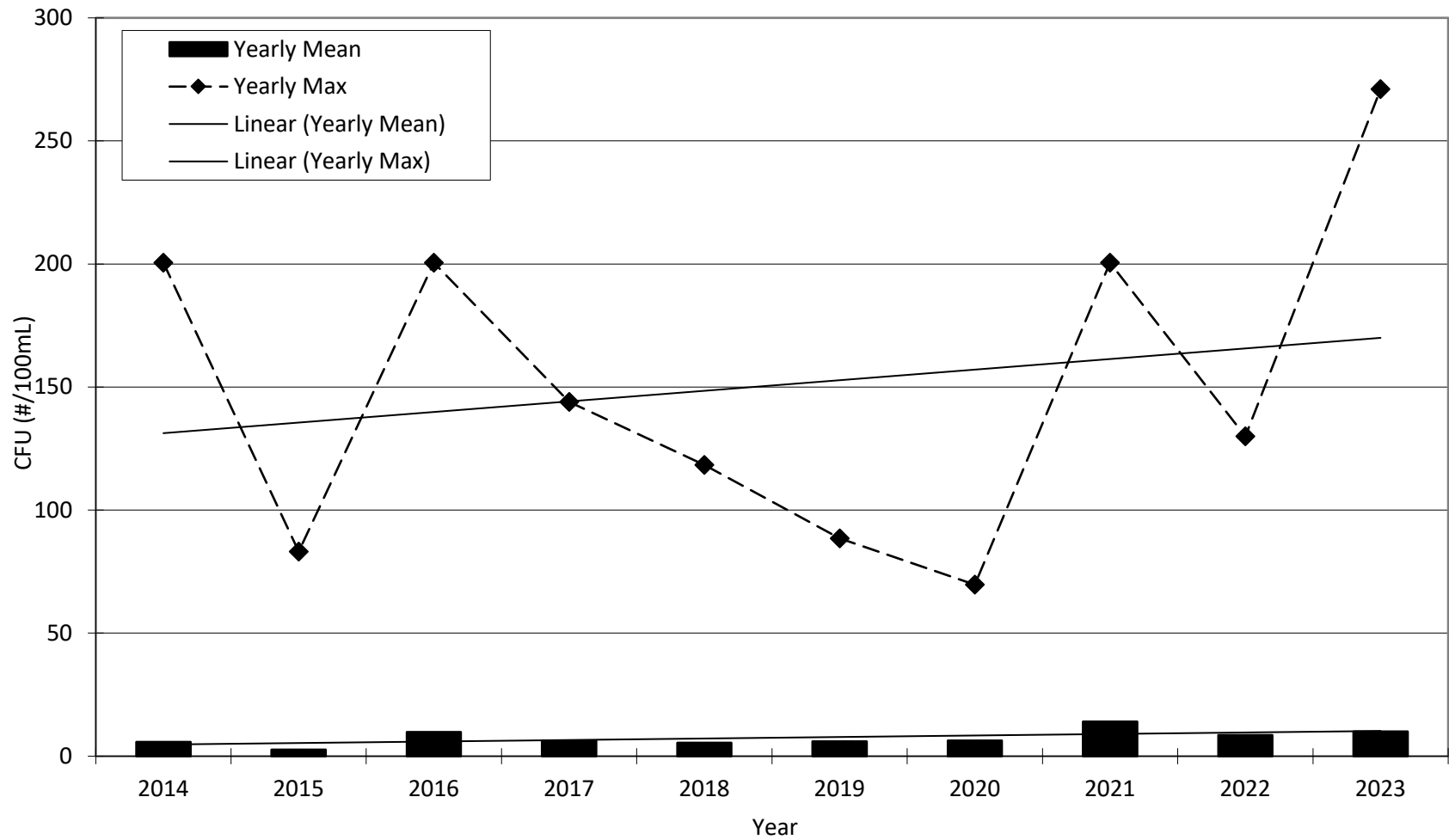


**Figure 7.2: Monthly Mean and Max Coliform Results for Kingsbury General Improvement District  
between July 1, 2023 and June 30, 2024.**





**Figure 7.3: Yearly Mean and Max Coliform Results for Kingsbury General Improvement District  
between July 1, 2014 and June 30, 2024.**



## **Edgewood Water Company**

### **Water Quality Data Summary 2023-2024**

During the reporting year, Edgewood Water Company remained within Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violation of the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8).

#### ***Turbidity***

Between July 1, 2023, and June 30, 2024, Edgewood Water Company met Federal and State guidelines for turbidity by remaining within regulatory limits. The monthly maximum and mean turbidity measurements did not exceed 1.00 NTU (Figure 8.0). The highest turbidity reading for the reporting year was 0.46 NTU, taken on December 9, 2023. Winds of 0.4-10.0 mph from the northeast created mixing, paired with 0.26 inches of mixed precipitation, which likely influenced the maximum reading (Table 5.1). The annual maximum for this reporting year was greater than the previous reporting year's maximum of 0.50 NTU. This maximum reading continues similar trends seen at Edgewood (Figure 8.1). The highest monthly mean turbidity reading, 0.32 NTU, occurred in October 2023. The highest monthly 90<sup>th</sup> percentile turbidity reading for the reporting year, 0.43 NTU, was recorded in November 2023 (Table 12.0).

**Table 12.0: Edgewood Water Company Turbidity Data Summary, July 1, 2023, through June 30, 2024. Turbidity measurements are completed on samples collected daily from raw water at the Edgewood intake.**

	Monthly max (NTU)	Date monthly max	Monthly mean (NTU)	Monthly median (NTU)	Monthly 90% (NTU)
<b>Jul-23</b>	0.39	14	0.29	0.28	0.36
<b>Aug-23</b>	0.37	14	0.31	0.28	0.36
<b>Sep-23</b>	0.34	27	0.28	0.28	0.32
<b>Oct-23</b>	0.55	6	0.32	0.30	0.41
<b>Nov-23</b>	0.48	4	0.30	0.29	0.43
<b>Dec-23</b>	0.65	9	0.25	0.24	0.31
<b>Jan-24</b>	0.39	10	0.23	0.23	0.31
<b>Feb-24</b>	0.44	3	0.25	0.24	0.36
<b>Mar-24</b>	0.32	10	0.20	0.19	0.29
<b>Apr-24</b>	0.46	27	0.22	0.19	0.35
<b>May-24</b>	0.40	14	0.21	0.19	0.30
<b>Jun-24</b>	0.44	5	0.21	0.20	0.30

Historically, Edgewood has maintained low turbidity measurements. The highest historical reading, 3.5 NTU, occurred in January 1997 during a 100-year storm event. The maximum turbidity measurement, 0.65 NTU, for the reporting year was greater than the previous years' 0.50 NTU, creating a decreasing trend of maximum turbidity results over the 10-year period of July 1, 2014, to June 30, 2024 (Figure 8.1). Annual maximum turbidity at Edgewood continues to encircle 0.70 NTU as the result for 2015 and 2016, with three results above and five below. The annual mean turbidity measurement for the reporting year was higher than the previous reporting year, 0.26 NTU and 0.19 NTU, respectively (Figure 8.1). The annual mean turbidity data from 2014-2024 shows an increasing linear trend. All results for the 10-year reporting period are below 0.30 NTU, with five results below 0.20 NTU and five above.

## Microbial Quality

Edgewood met Federal and State guidelines for total coliform and fecal coliform for the reporting year. The maximum total coliform reading was 16.40 coliform-forming units per 100 mL (CFU/100 mL), the annual mean was 1.07 CFU/100 mL, and 90% of the samples were below 3.10 CFU/100 mL. The maximum fecal coliform reading was 2.00 CFU/100 mL, the annual mean was 0.03 CFU/100 mL, and 90% of the samples were below 0.00 CFU/100 mL.

**Table 12.1: Edgewood Water Company annual source water total and E. coli coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected daily from raw water at the Edgewood Water Company intake.**

	total coliform (# colonies/100mL)	E. coli coliform (# colonies/100mL)
Mean	1.07	0.03
Median	0.00	0.00
Max	16.40	2.00
90th Percentile	3.10	0.00
Colony-Forming Samples	65.00	3.00
Total Number of Samples	156.00	156.00

The maximum total coliform count for the reporting year was 16.40 CFU/100 mL, an increase from 9.90 CFU/100 mL in 2022 (Figure 8.2). The maximum total coliform result occurred on September 6, 2023. The temperature on that day reached a high of 73.6° F, with a weekly mean temperature of 56.7° F. The increase in temperature of 16.9° F paired with winds from the west of 1.0-10.0 mph produced a mixing effect, likely attributed to the result (Table 12.1, Table 5.4). The highest monthly mean of total coliform, 3.18 CFU/100 mL, occurred in September 2023 (Table 12.2).

**Table 12.2: Edgewood Water Company monthly source water total and E. coli coliform data from July 1, 2023, through June 30, 2024. Analyses completed on samples collected from raw water at the Edgewood Water Company intake.**

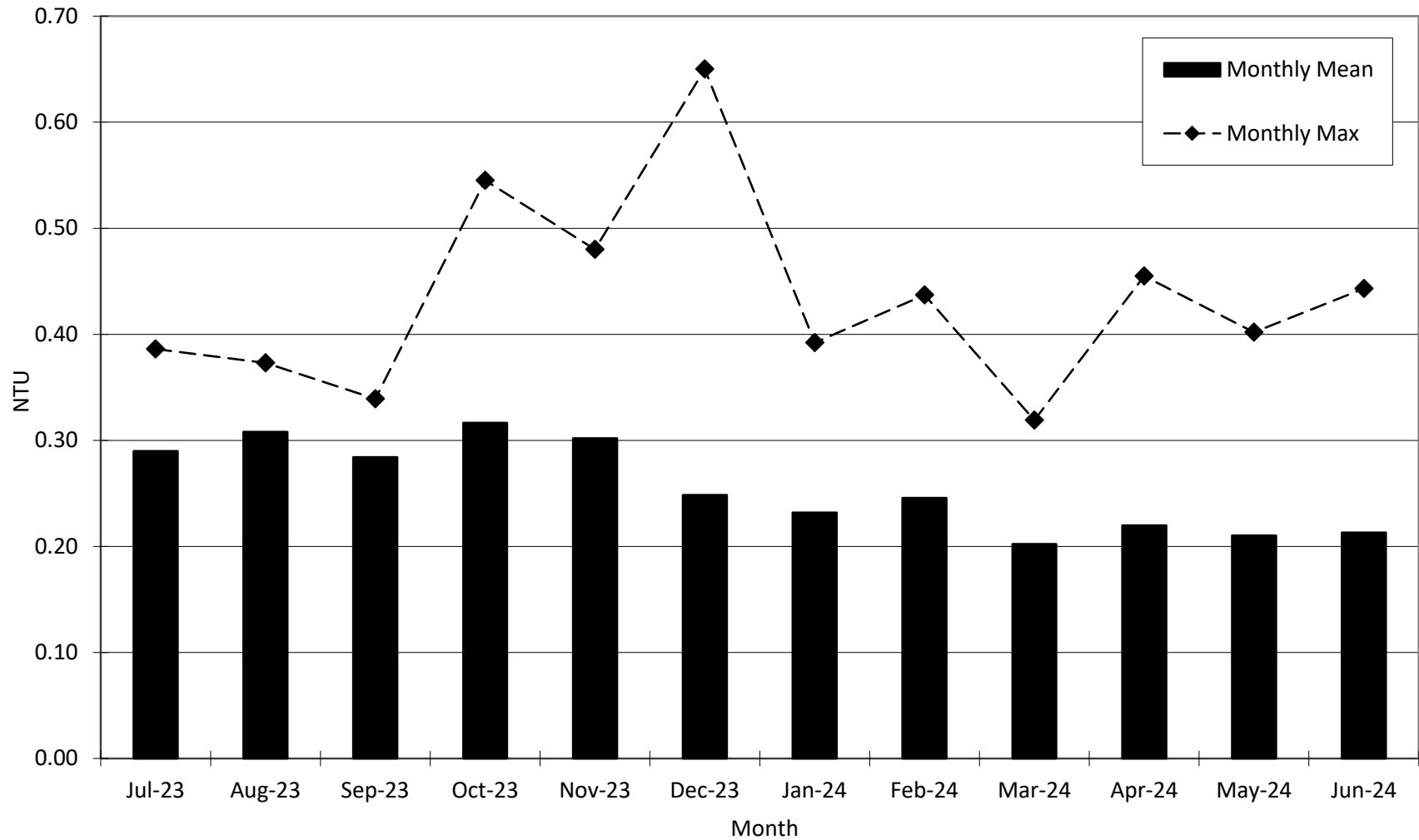
	Monthly maximum total coliform (# colonies/100 mL)	Monthly mean total coliform (# colonies/100 mL)	Monthly maximum E. coli coliform (# colonies/100 mL)	Monthly mean E. coli coliform (# colonies/100 mL)
Jul-23	5.30	1.48	0.00	0.00
Aug-23	5.30	2.23	2.00	0.21
Sep-23	16.40	3.18	0.00	0.00
Oct-23	5.20	1.83	0.00	0.00
Nov-23	4.10	1.42	0.00	0.00
Dec-23	3.10	0.59	0.00	0.00
Jan-24	3.10	1.35	1.00	0.07
Feb-24	2.00	0.25	0.00	0.00
Mar-24	0.00	0.00	0.00	0.00
Apr-24	1.00	0.07	0.00	0.00
May-24	1.00	0.08	0.00	0.00
Jun-24	1.00	0.08	0.00	0.00

Total coliform was detected in 42% of the 156 samples analyzed, greater than the previous year's 37%. The annual mean total coliform count was 1.07 CFU/100 mL, greater than the previous years' 0.63 CFU/100 mL. The annual median result is 0.00 CFU/100 mL for this reporting year, and 90% of the samples were below 3.10 CFU/100 mL (Table 12.1). Throughout the 2023-2024 reporting year, total coliform counts were greater than the previous year, with 65 and 57 colony-forming samples (Table 12.1).

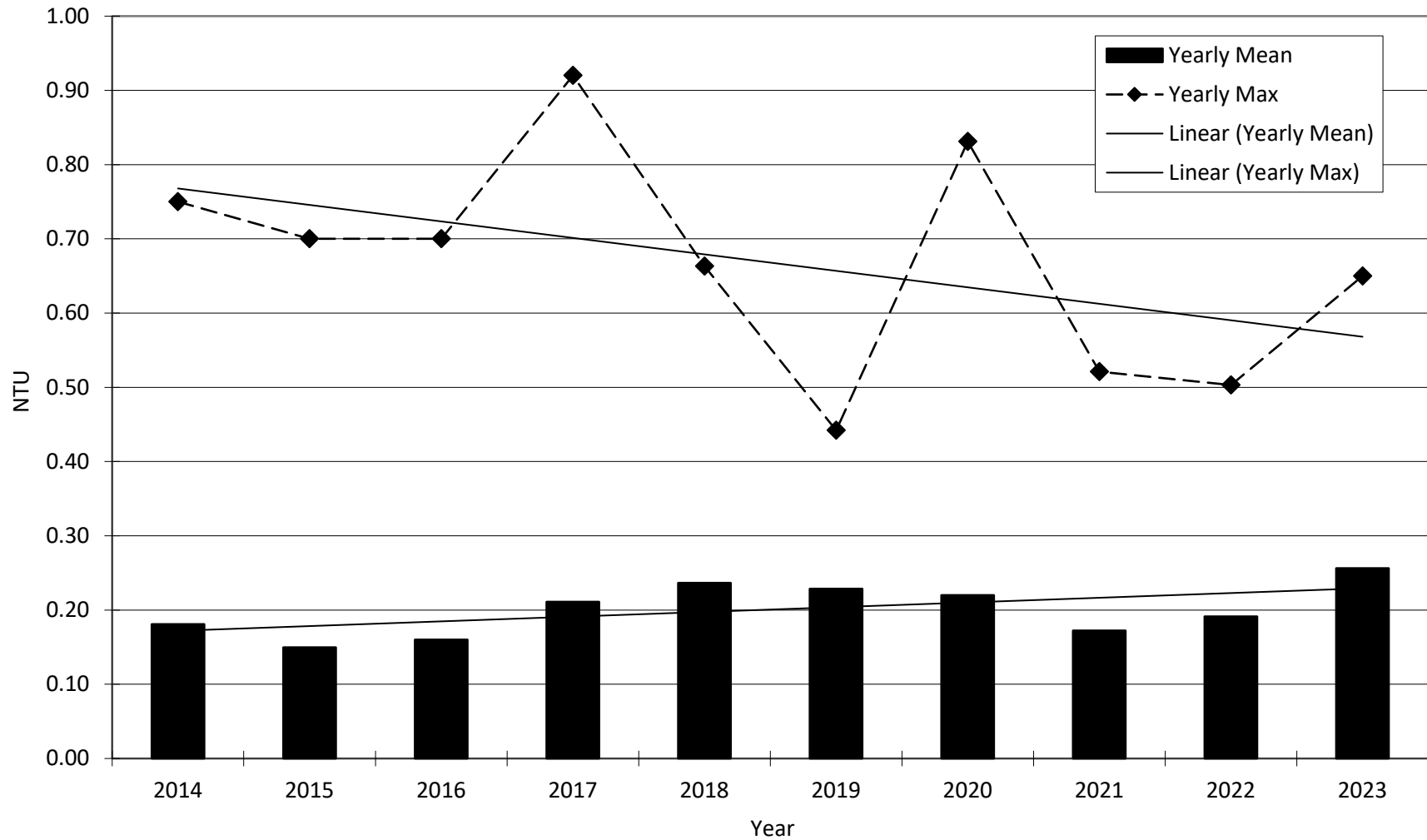
Over the 10-year reporting period, total coliform results show a decreasing linear trend in annual maximum and an increasing linear trend for annual mean (Figure 8.3). Annual maximum results for the 10-year reporting period encircle 30.0 CFU/100 mL with results split above and below. Annual mean total coliform results for the 10-year reporting period remain below 10 CFU/100 mL, with five results below 3.0 CFU/100 mL and five above (Figure 8.3).

Edgewood Water Company also completed tests for E. coli coliform on all samples tested for total coliform. E. coli coliform was detected in three samples during the 2023-2024 reporting year. The maximum E. coli coliform reading was 2.0 CFU/100 mL, taken on August 2, 2023. The annual mean E. coli coliform result was 0.03 CFU/100 mL, and 90% of the samples were below zero (Table 12.1).

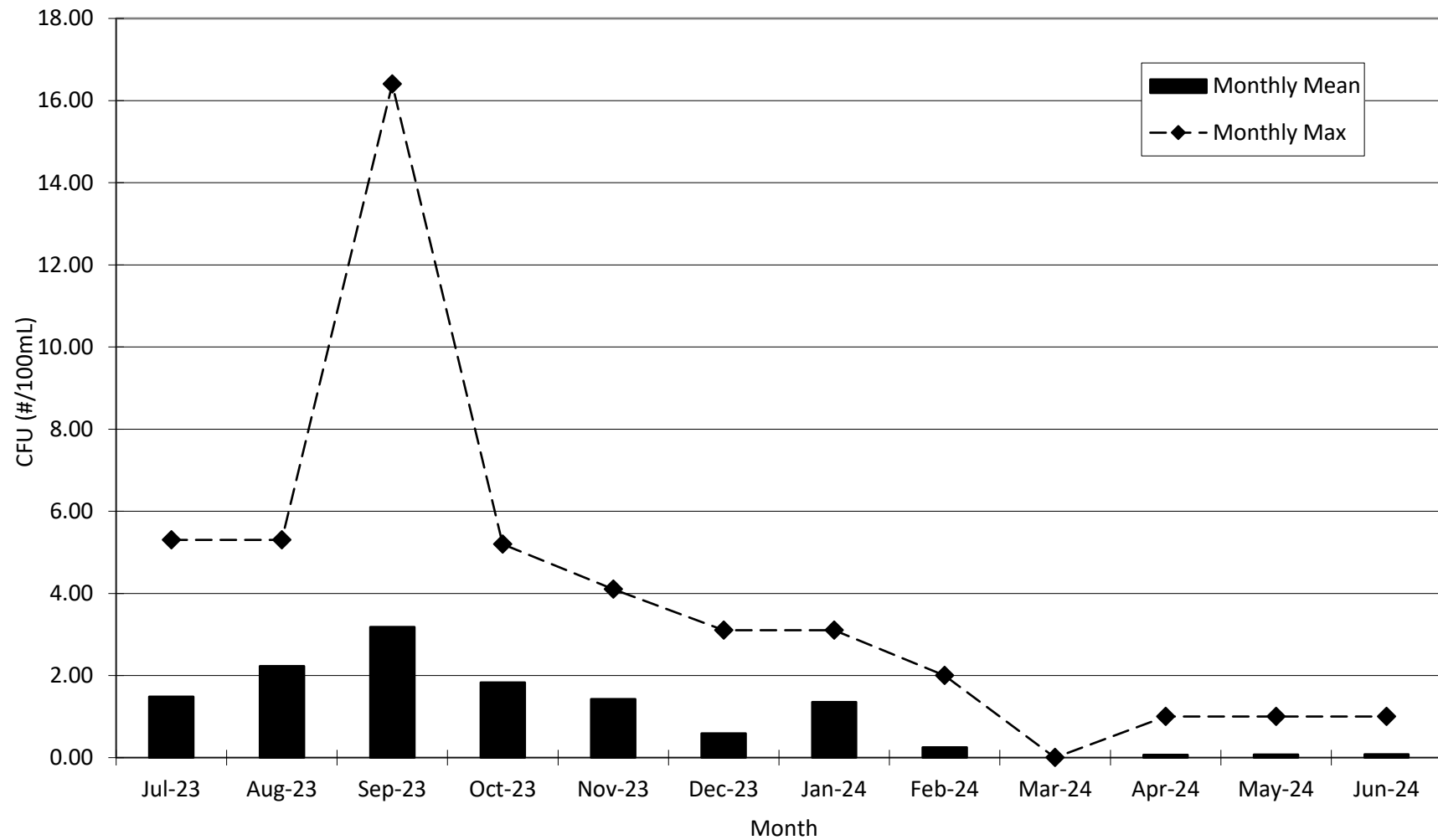
**Figure 8.0: Monthly Mean and Max Turbidity Results for Edgewood Water Company between July 1, 2023 and June 30, 2024.**



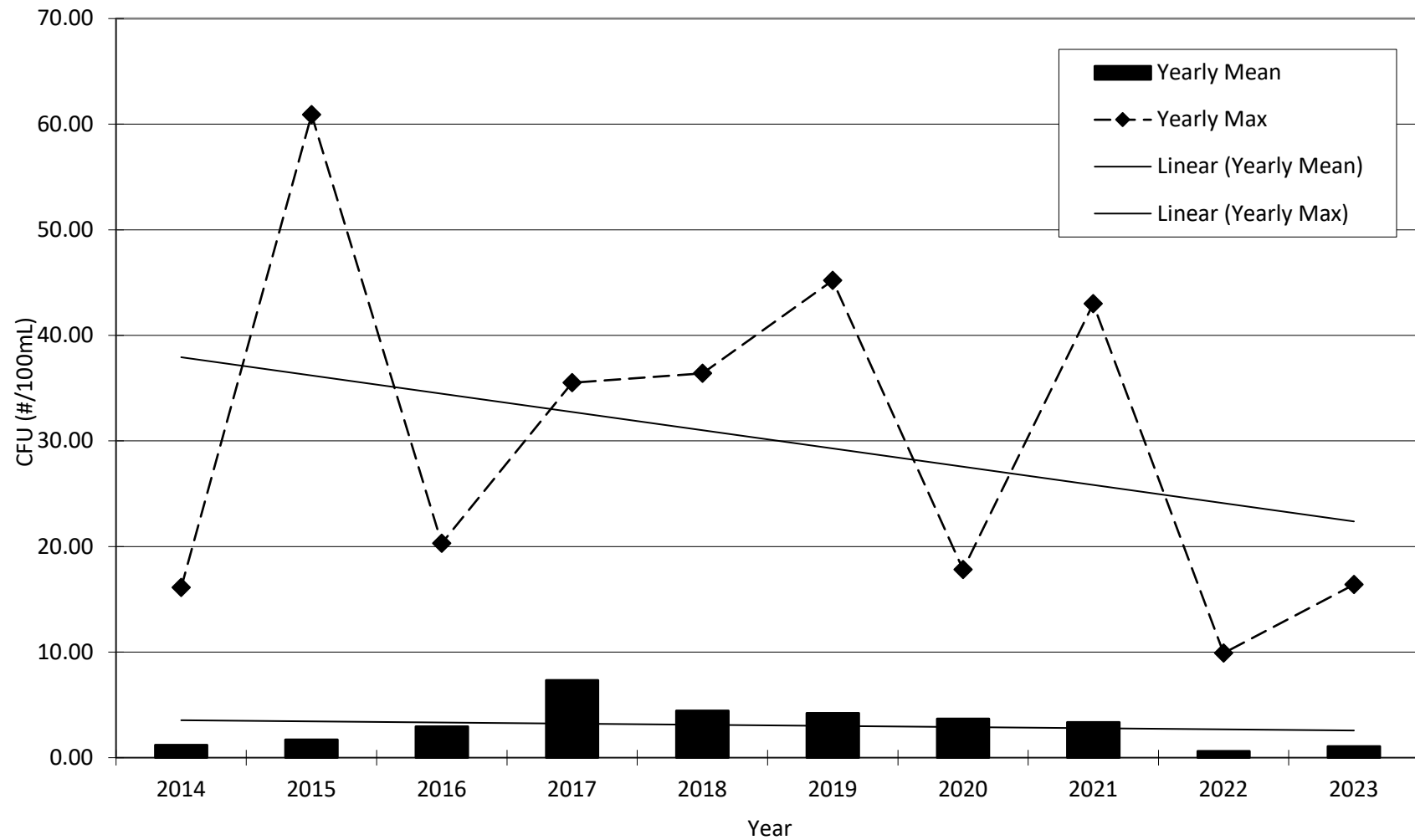
**Figure 8.1: Yearly Mean and Max Turbidity Results for Edgewood Water Company between July 1, 2014 and June 30, 2024.**



**Figure 8.2: Monthly Mean and Max Coliform Results for Edgewood Water Company between July 1, 2023 and June 30, 2024.**



**Figure 8.3: Yearly Mean and Max Coliform Results for Edgewood Water Company between July 1, 2014 and June 30, 2024.**





## **Lakeside Park Association**

### **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, Lakeside Park Association (LPA) remained in compliance with Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violation to the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8). The Lakeside Park Association operates with filtration in place. The Consumer Confidence Report in Appendix B provides additional regulatory information for LPA.

#### ***Turbidity***

Between July 1, 2023, and June 30, 2024, LPA met Federal and State guidelines for turbidity by remaining within regulatory limits for a filtering water system. The highest turbidity reading for the reporting year was 1.84 NTU and occurred on August 18, 2023. A precipitation event producing 0.04 inches of rain paired with wave action produced by a wind from the west/northwest of 0.9-11 mph may have influenced the maximum result (Table 5.1). The annual mean turbidity for LPA was 0.29 NTU (Figure 9.0). The monthly mean turbidity result was highest in August 2022 at 0.42 NTU, lower than the previous reporting year's highest monthly mean turbidity of 2.91 NTU (Table 13.0 and Figure 9.1).

**Table 13.0: LPA source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the LPA intake.**

<b>Month</b>	<b>Monthly Max (NTU)</b>	<b>Date Monthly Max</b>	<b>Monthly Mean (NTU)</b>	<b>Monthly Median (NTU)</b>	<b>90th Percentile</b>
<b>Jul-23</b>	0.82	22	0.34	0.29	0.62
<b>Aug-23</b>	1.87	18	0.42	0.26	0.94
<b>Sep-23</b>	0.95	29	0.29	0.24	0.43
<b>Oct-23</b>	1.20	15	0.37	0.31	0.51
<b>Nov-23</b>	1.26	4	0.32	0.27	0.36
<b>Dec-23</b>	0.40	8	0.26	0.25	0.34
<b>Jan-24</b>	0.50	4	0.28	0.26	0.34
<b>Feb-24</b>	0.41	10	0.25	0.25	0.34
<b>Mar-24</b>	0.26	18	0.19	0.18	0.25
<b>Apr-24</b>	1.02	4	0.29	0.25	0.43
<b>May-24</b>	0.35	21	0.22	0.21	0.27
<b>Jun-24</b>	0.55	5	0.23	0.21	0.27

Historically, LPA has maintained maximum turbidity measurements lower than the regulatory standards of 5 NTU for non-filtering purveyors and filters the water to well below 1 NTU before distribution (Figure 9.1). For this reporting year, LPA had zero results greater than 5 NTU in the 365 samples taken. The maximum turbidity reading of 1.87 NTU for this reporting year is less than the previous reporting year's maximum of 44.56 NTU, which is the highest annual maximum for the 10-year reporting period of July 1, 2014, to June 30, 2024. Annual maximum turbidity at LPA shows an increasing linear trend (Figure 9.1). The highest annual mean for turbidity reported at LPA in the 10-year reporting period of July 1, 2014, to June 30, 2024, is 1.15 NTU reported in 2022, followed by 0.62 NTU reported in 2016 and 0.61 NTU in

2020. The 10-year reporting period shows an increasing linear trend for annual mean turbidity (Figure 9.1).

### **Microbial Quality**

LPA met Federal and State guidelines for total and *E. coli* coliform for filtering systems. The maximum total coliform count was 13.40 coliform-forming units per 100 mL (CFU/100 mL), a decrease from the previous years' 18.5 CFU/100 mL. The maximum total coliform reading was taken on June 25, 2024, temperatures rose to 82.4° F, from the weekly mean temperature of 67.7°F, with sustained winds of 1.0-10.0 mph reported from the west (Table 5.4). The increase in water temperature by 14°F above the weekly mean and above 80° F likely attributed to the maximum total coliform result. The highest monthly mean total coliform result also occurred in June 2024 (Table 13.2, Figure 9.2). The maximum total coliform result for the reporting year is less than the previous reporting year and similar to the 2014 result of 12.1 CFU/100 mL. Annual maximum total coliform has a decreasing linear trend line for the 10-year reporting period of July 1, 2014, to June 30, 2024 (Figure 9.3).

**Table 13.1: LPA annual source water total and *E. coli* coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected daily from raw water at the LPA intake.**

	<b>Total coliform (# colonies/100 mL)</b>	<b><i>E. coli</i> coliform (# colonies/100 mL)</b>
<b>Mean</b>	2.23	0.04
<b>Median</b>	0.00	0.00
<b>Max</b>	13.40	1.00
<b>90th Percentile</b>	0.00	0.00
<b>Colony-Forming Samples</b>	9.00	1.00
<b>Total Number of Samples</b>	24.00	24.00

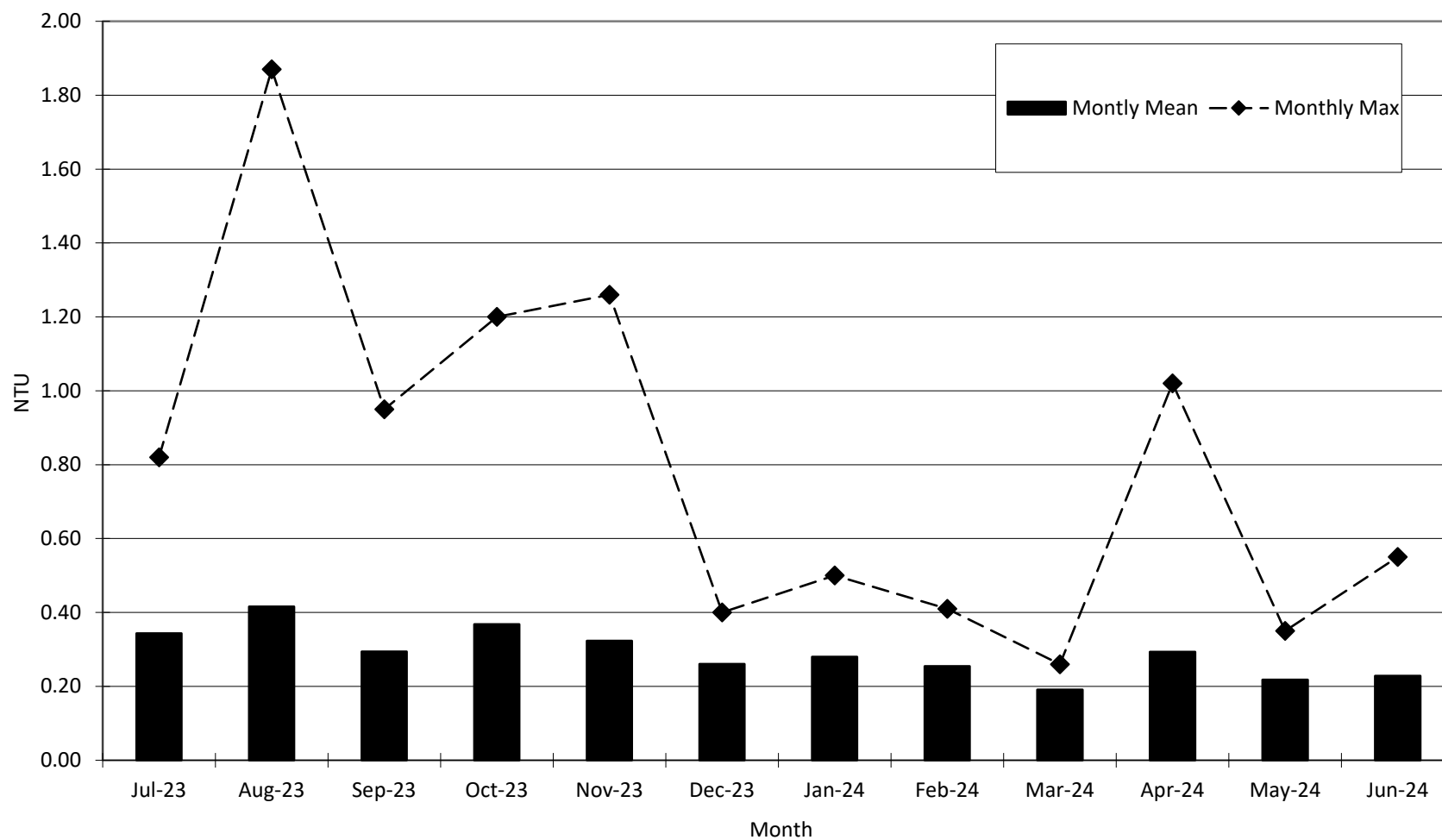
Total coliform was detected in 9 of the 24 samples analyzed, equaling 36% (Table 13.1). The yearly mean total coliform count was 2.23 CFU/100 mL, a decrease from the 2022-2023 mean of 3.58 CFU/100 mL, similar to results throughout the 10-year reporting period (Table 13.1, Figure 9.3). During the reporting year of July 1, 2017-June 30, 2018, labeled as 2017 in figures, the waters of Lake Tahoe did not experience deep water mixing due to the high temperatures throughout the winter. The lack of deep water mixing likely produced elevated water temperatures at raw water intake depths, influencing elevated coliform readings throughout TWSA member agencies. This likely influenced the maximum total coliform result in the 10-year reporting period of 613 CFU/100 mL.

LPA also completed tests for *E. coli* coliform on all samples tested for total coliform. Of the 24 samples analyzed for *E. coli* coliform, one sample detected *E. coli* coliform (Table 13.2). The maximum result was 1 CFU/100 ML, the annual average for *E. coli* coliform was 0.04 CFU and 90% of the samples were below zero.

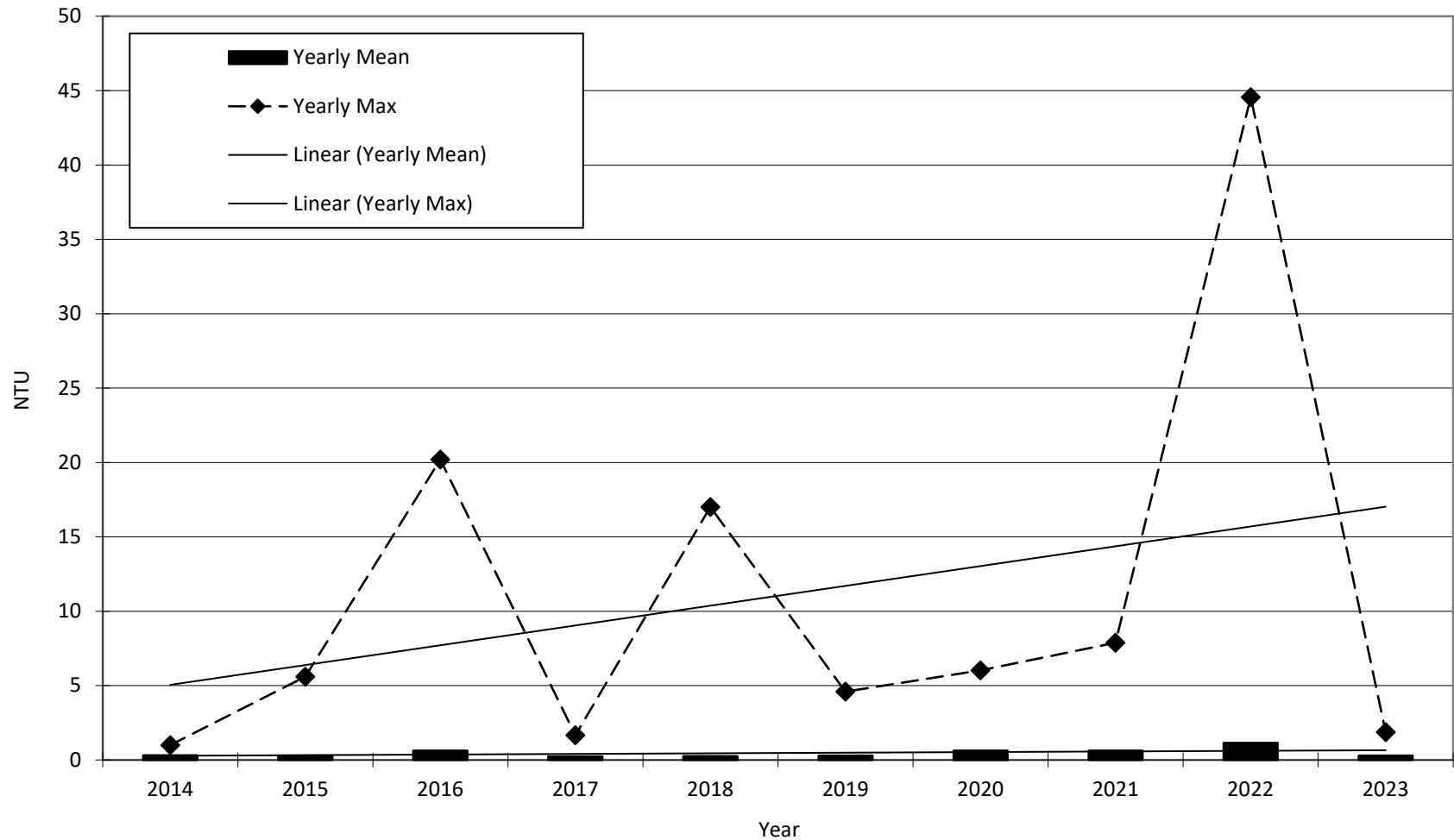
**Table 13.2: Lakeside Park Association monthly source water Total and E. coli Coliform data results from July 1, 2023, through June 30, 2024. Analyses completed on samples collected daily from raw water at the Lakeside Park Association intake.**

	<b>Maximum Total Coliform (# colonies/100 ml)</b>	<b>Mean Total Coliform (# colonies/100 ml)</b>	<b>Maximum E. coli Coliform (# colonies/100 ml)</b>	<b>Mean E. coli Coliform (# colonies/100 ml)</b>
<b>Jul-23</b>	9.70	6.40	0.00	0.00
<b>Aug-23</b>	6.30	4.15	0.00	0.00
<b>Sep-23</b>	0.00	0.00	0.00	0.00
<b>Oct-23</b>	0.00	0.00	0.00	0.00
<b>Nov-23</b>	7.30	3.65	0.00	0.00
<b>Dec-23</b>	0.00	0.00	0.00	0.00
<b>Jan-24</b>	1.00	0.50	1.00	0.50
<b>Feb-24</b>	0.00	0.00	0.00	0.00
<b>Mar-24</b>	0.00	0.00	0.00	0.00
<b>Apr-24</b>	0.00	0.00	0.00	0.00
<b>May-24</b>	2.00	1.00	0.00	0.00
<b>Jun-24</b>	13.40	11.00	0.00	0.00

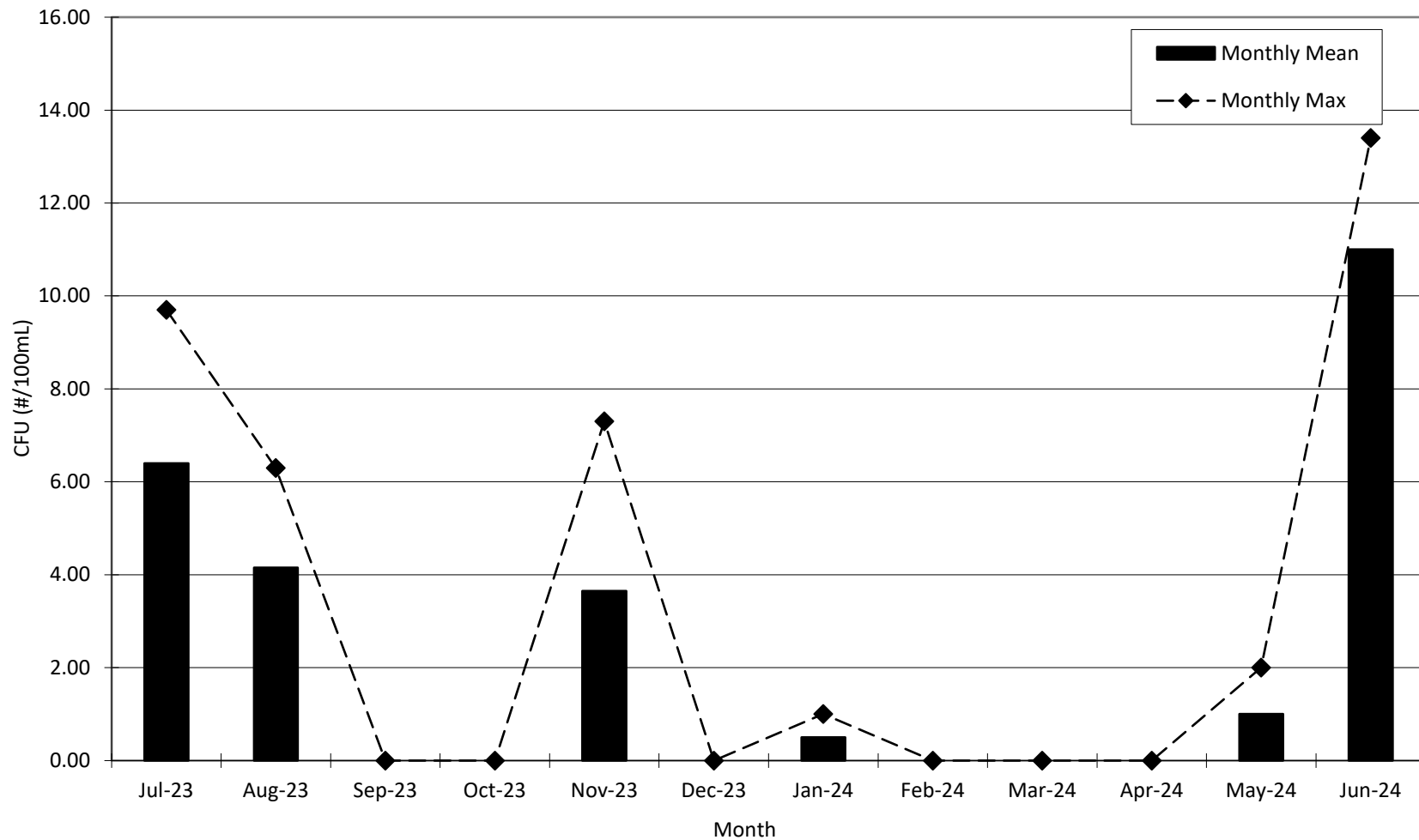
**Figure 9.0: Monthly Mean and Max Turbidity Results for Lakeside Park Association between July 1, 2023 and June 30, 2024.**



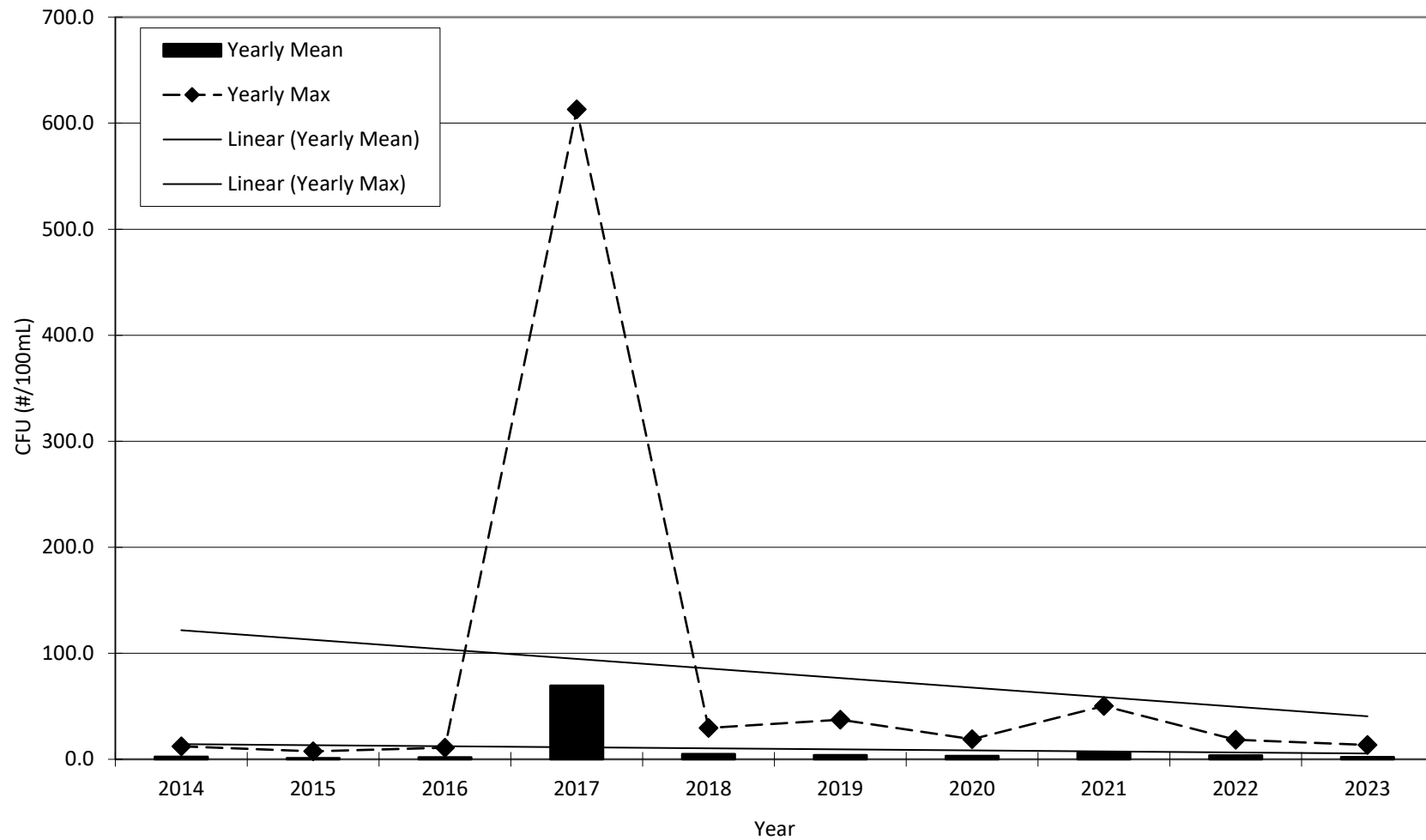
**Figure 9.1: Yearly Mean and Max Turbidity Results for Lakeside Park Association between July 1, 2014 and June 30, 2024.**



**Figure 9.2: Monthly Mean and Max Total Coliform Results for Lakeside Park Association between July 1, 2023 and June 30, 2024.**



**Figure 9.3: Yearly Mean and Max Total Coliform Results for Lakeside Park Association between July 1, 2014 and June 30, 2024.**



## **North Tahoe Public Utility District**

### **Water Quality Data Summary 2023-2024**

During the 2023-2024 reporting year, North Tahoe Public Utility District (NTPUD) remained within Federal and State water quality requirements. During the same period, the Environmental Protection Agency (EPA) notes no violation of the health, reporting, or monitoring requirements of the Safe Drinking Water Act (Table 5.8). Additional regulatory information for NTPUD is provided in the Consumer Confidence Report found in Appendix B.

#### ***Turbidity***

Between July 1, 2023, and June 30, 2024, NTPUD met Federal and State guidelines for turbidity by remaining within regulatory limits. The monthly maximum and mean turbidity measurements did not exceed the filtration avoidance criteria for turbidity of 5 NTU (Figure 10.0, Table 14.0). The highest turbidity reading for the reporting year was 0.55 NTU, recorded on September 19, 2023, which corresponded with a wind event from the northeast that produced sustained winds of 3.3-24.8 mph, creating mixing by wave action (Table 5.1). The annual mean turbidity was 0.20 NTU, and 90% of results were below 0.26 NTU (Table 14.0). The highest monthly mean turbidity, 0.26 NTU, occurred in July 2023 (Table 14.0).

**Table 14.0: NTPUD source water turbidity data results from July 1, 2023, through June 30, 2024. Turbidity analyses completed on samples collected daily from raw water at the NTPUD intake.**

<b>Month</b>	<b>Monthly max (NTU)</b>	<b>Date monthly max</b>	<b>Monthly mean (NTU)</b>	<b>Monthly median (NTU)</b>	<b>90<sup>th</sup> percentile</b>
<b>Jul-23</b>	0.39	6	0.26	0.25	0.30
<b>Aug-23</b>	0.30	26	0.24	0.24	0.28
<b>Sep-23</b>	0.55	19	0.22	0.21	0.26
<b>Oct-23</b>	0.28	25	0.20	0.20	0.27
<b>Nov-23</b>	0.26	8	0.20	0.20	0.23
<b>Dec-23</b>	0.42	6	0.19	0.19	0.23
<b>Jan-24</b>	0.43	23	0.17	0.16	0.19
<b>Feb-24</b>	0.44	5	0.17	0.15	0.23
<b>Mar-24</b>	0.21	1	0.12	0.13	0.16
<b>Apr-24</b>	0.32	24	0.18	0.18	0.25
<b>May-24</b>	0.23	31	0.18	0.18	0.20
<b>Jun-24</b>	0.38	26	0.24	0.23	0.26

Historically, annual maximum turbidity has been variable at NTPUD. Annual maximum results range from 0.50 NTU-1.03 NTU over the 10-year reporting period of July 1, 2014, to June 30, 2024, with one result greater than 1.0 NTU and nine below (Figure 10.1). The 10-year maximum result, 1.03 NTU, was recorded on June 7, 2017, during a wind event from the east, with gusts ranging from 18 mph to 21 mph, creating a mixing effect. The annual maximum of 0.55 NTU for this reporting year is greater than the previous reporting year's annual maximum of 0.54 NTU. Linear trend line analysis shows a decreasing trend in annual maximum for the 10-year reporting period (Figure 10.1).



NTPUD has historically maintained mean turbidity values below 0.50 NTU, including 0.20 NTU for this reporting year. The lowest annual mean in the TWSA data set for NTPUD from 2003-2023, 0.15 NTU, was recorded in 2020. Annual mean turbidity shows a decreasing linear trend over the 10-year reporting period of July 1, 2014, to June 30, 2024 (Figure 10.1).

### **Microbial Quality**

NTPUD met Federal and State guidelines for total coliform and fecal coliform for the reporting year. The maximum total coliform reading was >1600 most probable number of colony-forming units per 100 mL (MPN/100 mL), the annual mean was 20.02 MPN/100 mL, and 90% of the samples were below 30 MPN/100 mL. The maximum fecal coliform result was taken on August 24, 2023. The maximum fecal coliform reading was 7 MPN/100 mL, the annual mean was 0.22 MPN/100 mL, and 90% of the samples were below zero MPN/100 mL. The maximum fecal coliform result was taken on September 7, 2024.

**Table 14.1: NTPUD annual source water total and fecal coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected from raw water at the NTPUD intake.**

	<b>Total coliform MPN ( # colonies/100 mL)</b>	<b>Fecal coliform MPN (# colonies/100 mL)</b>
<b>Mean</b>	20.02	0.22
<b>Median</b>	0	0
<b>Max</b>	>1600	7
<b>90th Percentile</b>	30	0
<b>Colony-Forming Samples</b>	74	12
<b>Total Number of Samples</b>	154	154

\*NTPUD reported one "too numerous to count" result of >1600 MPN/100 mL. The result is represented as 1600 MPN/100 mL.

The annual maximum total coliform reading for NTPUD is >1600 MPN/100 mL, in exceedance of the filtration avoidance criteria of 100 MPN/100 mL. Results greater than the laboratory reporting limit for NTPUD results of >1600 MPN/100 mL are commonly referred to as "too numerous to count." The NTPUD annual maximum reading of >1600 MPN/100 mL was taken on August 24, 2023, and has been reported to state regulators. The weather on August 24, 2023, included sustained winds of 3.7-19 mph from the east-northeast (Table 5.4). The wind generated mixing effect has also been noted in the previous "too numerous to count" events at NTPUD recorded in June 2016 and April 2023.

Additionally, three days prior to the maximum total coliform result for NTPUD, Hurricane Hilary made landfall on the west coast, becoming a tropical storm before crossing into southern California on August 20-21, 2023. Hilary was the first tropical storm to pass over California since Nora in 1997<sup>1</sup>. The storm's effects entered the Lake Tahoe Basin on August 20, 2023, with the Tahoe City Area NOAA station recording 0.58 inches of rainfall and 0.38 inches of rain the following day. The USGS creek gage on Ward Creek shows an increased discharge between August 21st and August 22nd, as the precipitation moved through Stream Environment Zones (SEZ) that terminate in Lake Tahoe (Figure 1.6). The UC Davis

<sup>1</sup> National Oceanic and Atmospheric Administration, NOWData, for Tahoe City Area, daily data for a month, August 2023, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202308>.

monitoring stations recorded surface water temperatures above 65°F<sup>2</sup> (Figure 1.7). The combination of warm surface water temperatures and stream environment zone flushing likely impacted the maximum total coliform at NTPUD on August 24, 2023.

Filtration Avoidance Criteria require that sample results must satisfy the criteria of ≤ 100 MPN/100 mL in at least 90% of measurements from the previous six months. NTPUD took 76 measurements of total coliform between February 24, 2023, and August 24, 2023; of these measurements, three results were greater than 100 MPN/100 mL for a percentage of results ≥ 100 MPN/100 mL of 3.95%, less than the 10% requirement for filtration avoidance. The August 24, 2023, total coliform result of >1600 MPN/100 mL, meets the requirements for filtration avoidance criteria described above. The "too numerous to count" value will be reported as 1600 MPN/100 mL.

**Table 14.2: NTPUD monthly source water total and fecal coliform data results from July 1, 2023, through June 30, 2024. Coliform analyses completed on samples collected from raw water at the NTPUD intake.**

	Maximum total coliform (# colonies/100 mL)	Mean total coliform (# colonies/100 mL)	Maximum fecal coliform (# colonies/100 mL)	Mean fecal coliform (# colonies/100 mL)
<b>Jul-23</b>	50.00	10.86	2.00	0.17
<b>Aug-23</b>	1600.00	155.34	6.00	0.00
<b>Sep-23</b>	50.00	26.17	7.00	0.00
<b>Oct-23</b>	48.00	14.24	0.00	0.00
<b>Nov-23</b>	48.00	7.74	0.00	0.00
<b>Dec-23</b>	7.80	1.40	2.00	0.17
<b>Jan-24</b>	130.00	8.67	4.50	0.30
<b>Feb-24</b>	7.80	0.74	1.80	0.67
<b>Mar-24</b>	2.00	0.17	0.00	0.00
<b>Apr-24</b>	2.00	0.50	0.00	0.00
<b>May-24</b>	2.00	0.43	0.00	0.00
<b>Jun-24</b>	7.80	3.19	2.00	0.17

\*NTPUD reported one "too numerous to count" result of >1600 MPN/100 mL. The result is represented as 1600 MPN/100 mL.

NTPUD reported three results in exceedance of 100 MPN/100 mL during the reporting year. All results are within the filtration avoidance criteria of ≤ 100 MPN/100 mL in at least 90% of measurements from the previous six months (Table 14.3). The percentage of results greater than filtration avoidance criteria in the previous six months ranges from 2.63% to 3.95%, all less than the 10% requirement.

<sup>2</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2024, Water Temperature Profile, [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL\\_Final\\_reduced\\_2.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/2024SOTL_Final_reduced_2.pdf), page 8.3

**Table 14.3: Results in exceedance of filtration avoidance criteria for total coliform, including the date and number of results in the previous six-month period, and calculated percentage of results greater than 100 CFU/100 mL.**

Criteria	Result in exceedance of 100 MPN/100 mL	Result Date	Total number of results in 6 months previous	The number of results greater than the criteria	The percentage of dates greater than the criteria in the previous 6-months
<b>Total Coliform</b>	240	08/17/23	76	2	2.63%
<b>Total Coliform</b>	>1600	08/24/23	76	3	3.95%
<b>Total Coliform</b>	130	1/4/2024	77	3	3.90%

Linear trendline analysis of the 10-year reporting period from July 1, 2014, to June 30, 2024, shows an increasing trend in annual maximum total coliform at NTPUD (Figure 11.3). It should be noted that the 10-year reporting period holds five "too numerous to count" results that have been reported as 1600 MPN/100 mL in the reporting years 2015, 2022, and 2023. All results are within the  $\leq 100$  MPN/100 mL filtration avoidance criteria in at least 90% of measurements from the previous six months.

The annual mean total coliform result for the reporting period of July 1, 2023, to June 30, 2024, is 20 MPN/100 mL. This result is greater than the previous reporting year's reading of 18 MPN/100 mL and the second largest in the 10-year reporting period from July 1, 2014, to June 30, 2024, after 33 MPN/100 mL in 2015 (Figure 10.3). Over the 10-year reporting period, annual mean results show an increasing linear trend over time (Figure 10.3).

NTPUD also completed tests for fecal coliform on all samples tested for total coliform. During the reporting year, fecal coliform was detected in 12 of the 154 samples (Table 14.1 and 14.2). The maximum fecal coliform reading was 7 MPN/100 mL, the annual mean was 0.21 MPN/100 mL, and 90% of the samples were below zero MPN/100 mL. The maximum fecal coliform result was taken on September 7, 2023.

Within the 10-year reporting period of July 1, 2014, to June 30, 2024, NTPUD has had three notable total coliform events other than the event described for this reporting year. First, during the 2015 reporting year, NTPUD reported three "too numerous to count" results of >1600 MPN/100 mL that were attributed to high concentrations of pine pollen in suspension and the rolling wave effect produced by easterly winds. The NTPUD annual maximum is reported as 1600 MPN/100 mL for 2015 in statistics for this reporting year.

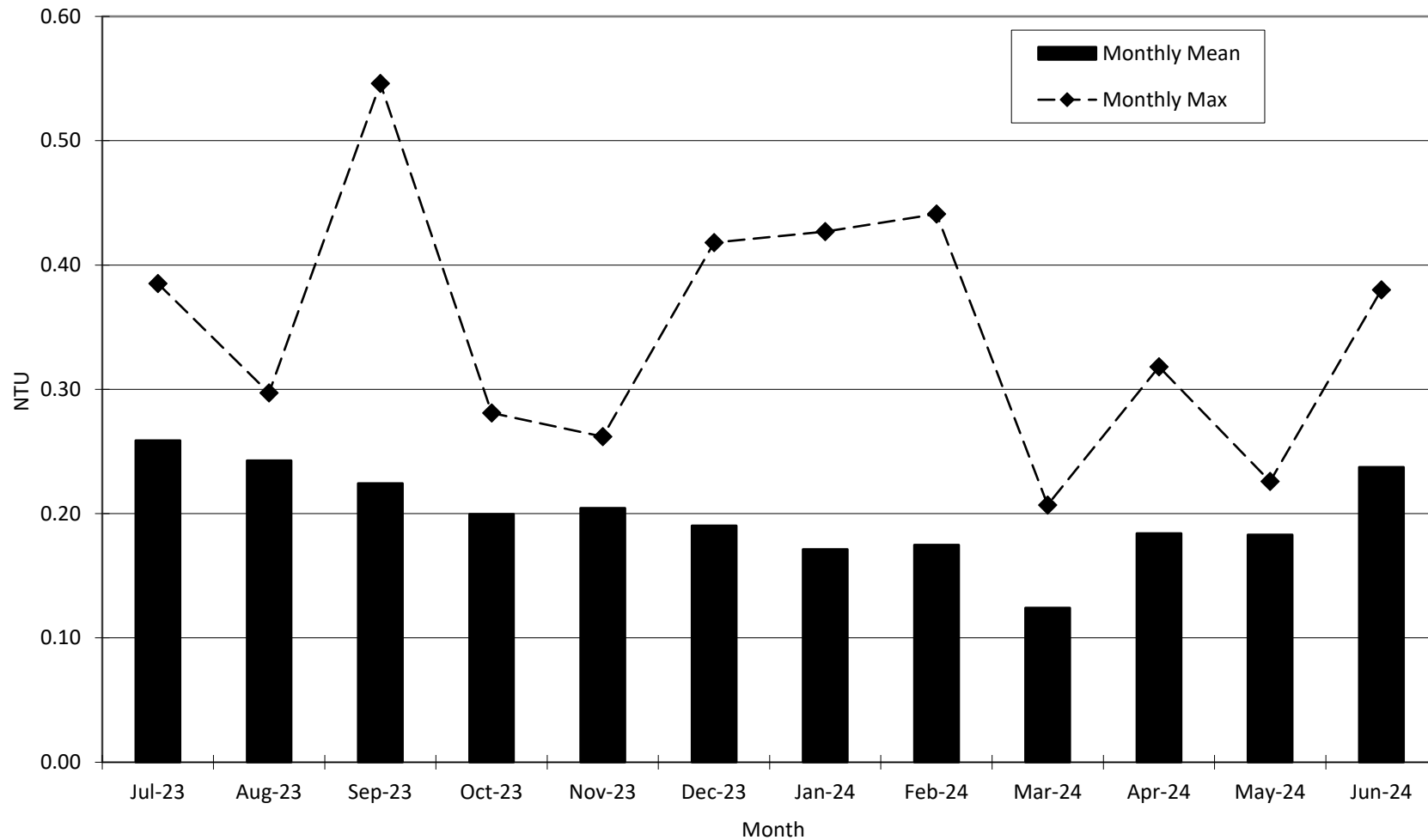
During the 2017 reporting year, NTPUD reported their maximum total coliform value of 500 MPN/100 mL. It is likely that NTPUD and several other purveyors were affected by the increase in water temperature caused by the absence of deep water mixing for the sixth consecutive year<sup>3</sup> and increased seasonal sediment wash from the winter season of 2016-2017, reported by the Tahoe Environmental Research Center as greater than the previous five years combined<sup>4</sup>.

<sup>3</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2018, [http://tahoe.ucdavis.edu/stateofthelake/sotl-reports/2018/SOTL\\_complete.pdd](http://tahoe.ucdavis.edu/stateofthelake/sotl-reports/2018/SOTL_complete.pdd), page 2.3

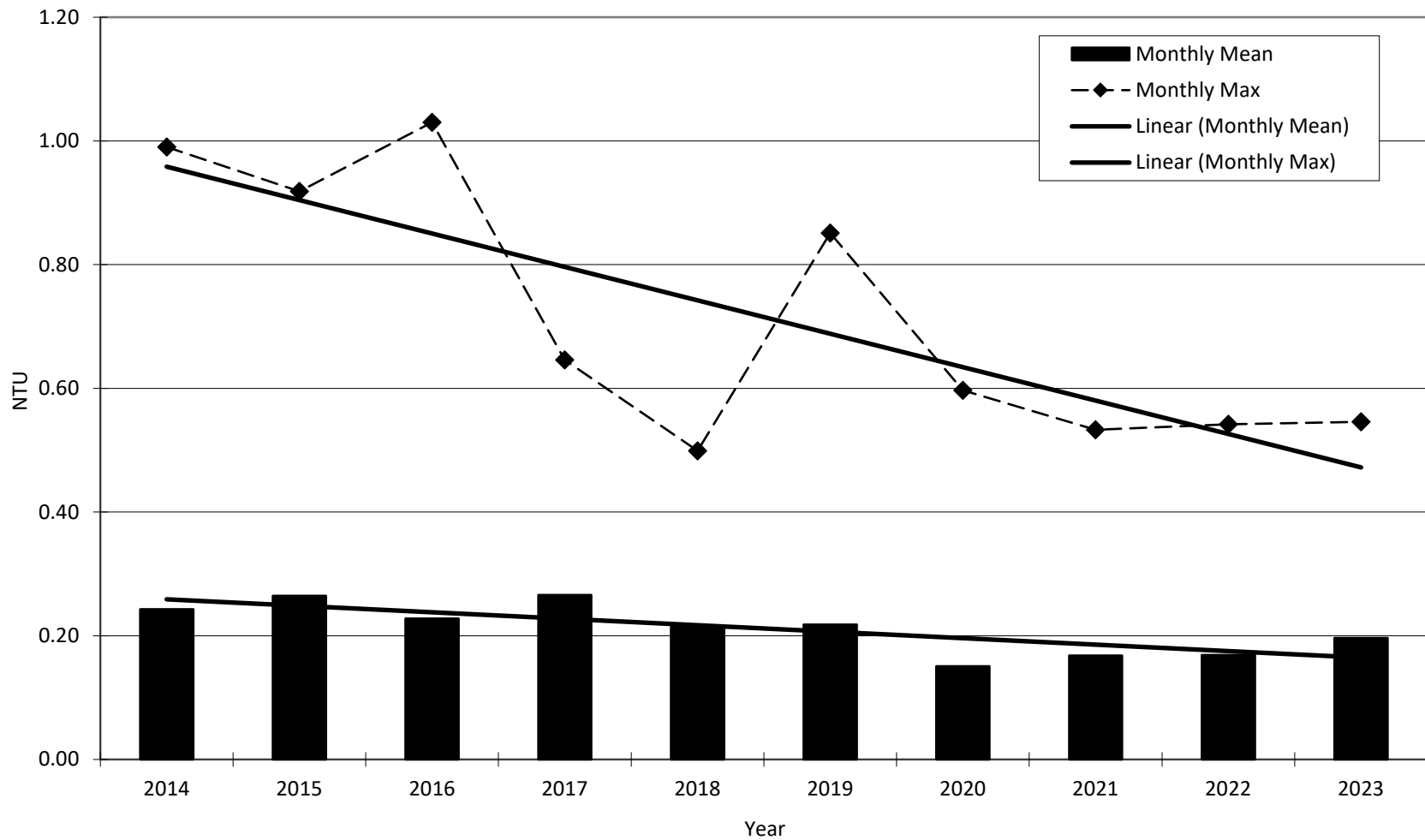
<sup>4</sup> UC Davis Tahoe Environmental Research Center, State of the Lake 2018, [http://tahoe.ucdavis.edu/stateofthelake/sotl-reports/2018/SOTL\\_complete.pdd](http://tahoe.ucdavis.edu/stateofthelake/sotl-reports/2018/SOTL_complete.pdd), page 2.1

During the 2022 reporting period, NTPUD reported their maximum total coliform value of >1600 MPN/100 mL on April 27, 2023. During the week prior to April 27, 2023, the Lake Tahoe region experienced its first round of seasonal runoff in parallel to a rain on top of snow event, with precipitation as rain recorded on April 23-24, 2023. This flush of the watershed through Stream Environment Zones (SEZs) likely influenced the maximum total coliform result at NTPUD in 2022, reported as 1600 MPN/100 mL in statistics for this reporting year.

**Figure 10.0: Monthly Mean and Max Turbidity Results for North Tahoe Public Utility District between July 1, 2023 and June 30, 2024.**



**Figure 10.1: Yearly Mean and Max Turbidity Results for North Tahoe Public Utility District between July 1, 2014 and June 30, 2024.**



**Figure 10.2: Monthly Mean and Max Total Coliform Results for North Tahoe Public Utility District  
between July 1, 2023 and June 30, 2024.**

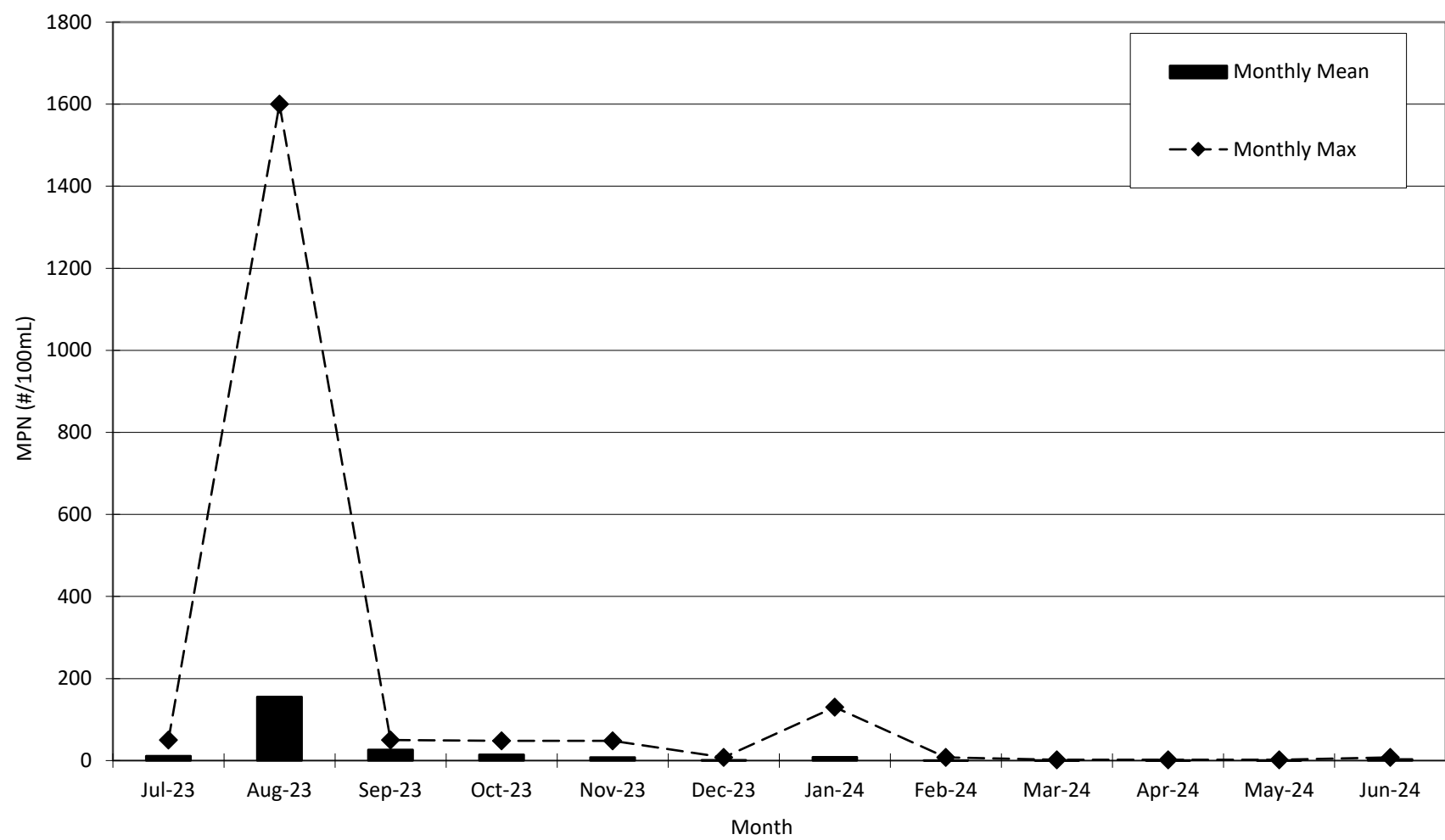
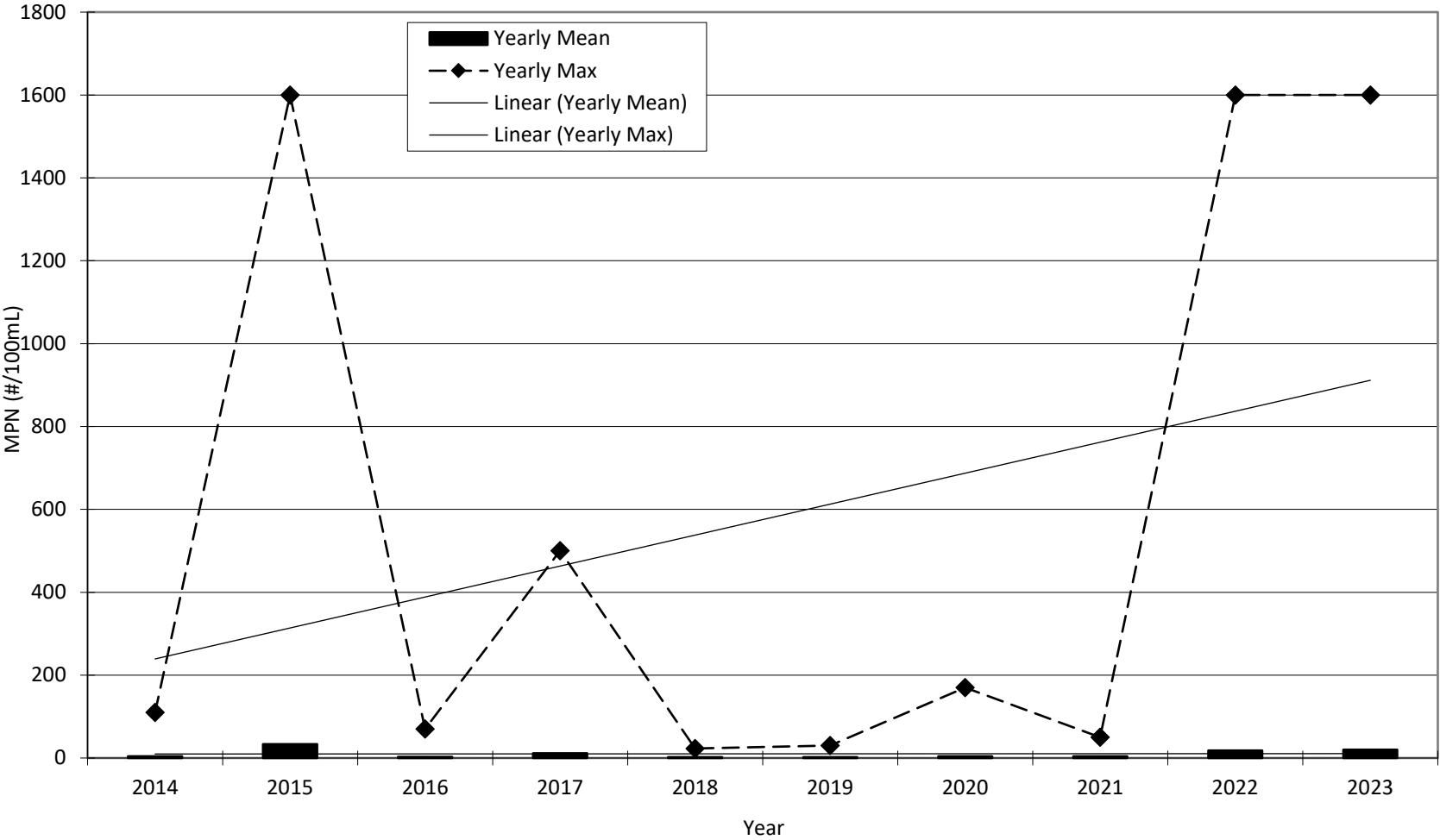


Figure 10.3: Yearly mean and max total coliform results for North Tahoe Public Utility District between July 1, 2014 and June 30, 2024.





## **V. DESCRIPTION OF WATER SUPPLY**



The purpose of describing a watershed that affects a drinking water supply is to provide information that will help to evaluate the vulnerability of the source (EPA 1999). TWSA purveyor members are located around Lake Tahoe, in California and Nevada. Most TWSA full members take water directly from the lake to service both a permanent and visitor population. Several have auxiliary groundwater sources. South Tahoe Public Utility District, a TWSA associate member, utilizes groundwater sources only. The watershed description briefly summarizes general location and features of the basin and source water, water system, population, land ownership, and local agreements. The lake's location, unique physical characteristics, and national support for its protection and preservation, create a distinctive political backdrop and regulatory system.

Lake Tahoe is one of the deepest, oldest, and clearest lakes in the world. As such, it is a highly sought out destination for recreation, tourism, and home ownership. Clarity and exceptional water quality are the basis of Lake Tahoe water quality goals. These important features give Lake Tahoe important designations. Both the federal government and California government have designated Lake Tahoe an "Outstanding National Resource Water (ONRW) Tier 3 which is the highest designation available. Nevada has designated Lake Tahoe a "Water of Extraordinary Ecological or Aesthetic Value". Designated as a Tier 3 303(d) Outstanding National Water Resource by CA Environmental Protection Agency (CAEPA) under the Clean Water Act (CWA), Lake Tahoe was identified as an impaired body of water for not meeting applicable water quality standards established through the CWA. Along with this designation, comes the requirement to establish Total Maximum Daily Loads (TMDL) for the pollutants that contribute to the water quality impairments.

A public water system (PWS) is a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves at least 25 individuals. EPA and delegated states and tribes regulate these public drinking water systems. Public drinking water systems may be publicly or privately owned, and provide drinking water to 90 percent of Americans.

**The Tahoe Fund and Earthviews Release First-Ever “Street View” Style Map of Lake Tahoe’s Entire Shoreline - Interactive Map Offers 360-degree Views and Underwater Images of Lake Tahoe**



<https://arcgis.earthviews.com/public/lake-tahoe-east-0722#19>

In September 2022, Tahoe Fund and EarthViews released the first-ever “Street View” style map of all 72 miles of Lake Tahoe’s shoreline. This interactive map offers a 360-degree view of the shoreline, as well as underwater views and water quality data.

“This map allows people to see Tahoe like never before,” said Amy Berry, CEO of the Tahoe Fund. “You can tour Emerald Bay, ‘paddle’ through the iconic rocks of Sand Harbor, or explore the hidden beaches along the East Shore with just the click of a button. Best of all, this new tool is bringing a wealth of data and information to scientists and conservation organizations working to improve the health of the Lake.”

According to UC Davis Tahoe Environmental Research Center, conditions differ widely around the Lake’s nearshore, or the area ranging about 350 feet from the shoreline, due to variations in temperature, stormwater flow and runoff, aquatic invasive species, the effects of recreation, and fluctuation in lake levels. With these factors impacting water quality and the Lake’s iconic clarity, it’s critical to closely monitor the conditions on the shoreline. “This comprehensive look at today’s conditions will serve as a significant historical marker,” explained Brian Footen, president and co-founder of EarthViews. “Scientists will be able to look back 5, 10, or 50 years from now and understand how water quality and the physical shoreline have changed over time.”

To create this map, Footen spent seven days circumnavigating the Lake in a kayak, with cameras and water quality measurement tools strapped to the vessel. Using mobile mapping technology, Footen was able to capture synchronized imagery and data every ten seconds as he navigated along the nearshore.

### **Location and Hydrology**

Lake Tahoe is a high alpine lake located within both the Nevada and California state lines. It is 22 miles long and 12 miles wide, with a surface area of 122,200 acres or 193 sq. miles. Approximately two-thirds of the land area is within California and one-third within Nevada. To the west, the Sierra Nevada Mountain range borders the basin across from the Carson Range on the east side of the lake. The basin is described as a high alpine and sub-alpine ecosystem. The primary soil type is granite (USGS 2003).

Lake Tahoe is the largest alpine lake on the North American continent and the second deepest lake in the United States. Lake Tahoe is the eleventh-deepest lake in the world with a maximum depth of 1,657 feet (505 meters) and an average depth of 1,027 feet (313 meters). The source of water for Lake Tahoe is precipitation. A large amount of precipitation falls into the lake directly (USGS 2003). The Lake Tahoe Basin (USGS watershed #16050101) has 63 sub watersheds draining into the lake and one outlet, the Truckee River.

Lake Tahoe contains an estimated 39.75 trillion gallons or 122 million acre feet of water. That's enough water to cover the entire state of California to a depth of 14.5 inches. The water that evaporates daily is 1.4 million tons, enough to supply the needs of 3.5 million people on a daily basis. The water in Lake Tahoe is 99.7 percent pure, about the same as distilled water. With one outlet, it takes an average of 650-700 years for a particle to leave the lake (CTC 2003).

### **Ancestral Land Acknowledgement**

The Wašičiw (Washoe people) have always lived here. From the onset of creation to now, dáʔaw - often mispronounced as “Tahoe” - has always been the center of Wašičiw ʔitdeʔ (the homelands of the Washoe people). For Wášiw People, the knowledge of place is passed down orally and the most significant places are the streams surrounding the lakes, the meadows where families camped, and the areas where traditional stories and modern events took place; simply put, these places are where the people cared for the land and the land provided for the people. Recent research demonstrates that upwards of 80% of Earth’s remaining biodiversity can be found within lands held by Indigenous peoples.



Consider learning more about the Wašičiw by reading this Tahoe in Depth article written by Herman Fillmore (Washoe Tribe) and Kira Smith (TRPA) at <https://www.trpa.gov/wp-content/uploads/tahoeindepth/Winter2021/index-h5.html?page=1&fbclid=IwAR1VS5VwCDJ4JSS0pzp9NpHXqehKnvbVA6fkFP3LpGRIPB5iVQiuniMmDHA&page=17>

By comparing the similarity of artifacts found at archaeological sites, archaeologists track the Washoe way of life back about two thousand years. Linguists think Washoe origins are earlier than any other Sierran or Great Basin cultures. The Washoe language is unique and unrelated to those spoken by any neighboring tribes. Washoe tradition indicates their homeland has always included Lake Tahoe, without reference to migrations from other worlds, as is common in other cultures. The Washoe were first to name Lake Tahoe simply "the Lake," just as locals do today. “Da ow ga”, the Washoe word for "lake" is thought to be the source for "Tahoe ". [https://www.fs.usda.gov/detail/lbmu/learning/history-culture/?cid=fsm9\\_046620](https://www.fs.usda.gov/detail/lbmu/learning/history-culture/?cid=fsm9_046620).

Today, approximately 1500 enrolled members of the Washoe Tribe of Nevada and California live on "Colonies," tribal lands scattered in the Reno, Carson Valley, and Gardnerville areas of Nevada and in Woodfords, California. Tribal headquarters are in Gardnerville and Stewart Indian School. An active tribal government continues to lobby for a land base in the Lake Tahoe basin and works with federal and state agencies and private land owners to protect locations important to Washoe Heritage.



# Traditional Washoe Places

## Streams, Tributaries, and Significant Places



Map Source: TRPA

During a recent visit to Lam Watah, a cultural site you may visit where Washoe people once lived, one tribal Elder stated: *"Yes, [the lake] was a sacred place. It is to us yet, even though it is so different today from what it was in our people's time, before the white people came. It is hard to see what is happening to it, the surrounding area. The land is valuable, and not just in monetary value, but it was our land and we love it. We were taught to respect everything from the land...So it is very precious to us still...we were the first people to take care of the lands and all the plants and things that grow...And it feels good to come up here and see these things and to walk around and remember...and hopefully the people who are here now will have respect and take care of the area."*

## Uncommon Clarity

Historically, a white plate called a Secchi disk could be seen in the lake at depths of 100 feet. A Secchi disk is an indirect measurement of clarity. The clarity has been reduced on average by 1 foot per year over the last thirty years. The decrease in clarity was attributed to storm water runoff, urban development, air quality and erosion (EPA 2005).

Clarity levels at Lake Tahoe in 2022 and 2019 showed the biggest improvements, according to researchers at the University of California, Davis, who have studied the lake for the last half century. The improvements are in part due to continuous work from the Lake Tahoe community to lower pollutant addition to the lake. They were also influenced by the drought, as reduced precipitation meant fewer contaminants flowed into Lake Tahoe, particularly during the summer, when clarity levels were the highest recorded since 2002. (TERC 2015)

In addition to aesthetic enjoyment, the exceptional quality of water in the Lake Tahoe Basin supports a number of beneficial uses related to human and environmental health, including drinking water supply, water contact recreation, wildlife habitat, and aquatic life and habitat. During the development of the Lake Tahoe TMDL, the plan created to reverse the decline in deep-water transparency in Lake Tahoe and to restore clarity, it was discovered that up to two thirds of the decrease in clarity of Lake Tahoe can be attributed to fine sediment particles (FSP = less than 16 microns). Also determined through the development of the TMDL was that storm water runoff originating in urban areas accounted for 72% of the FSP that eventually enters the lake.

The clarity of Lake Tahoe has long been one of the most important indicators of the changing condition of this iconic water body. In 2019, Lake Tahoe's clarity decreased nearly 8 feet from the previous year's dramatic 10-foot improvement. The average annual value in 2019 was 62.7 feet. The lowest value was recorded in 2017, when clarity was 60 feet.

Such year-to-year and even day-to-day fluctuations are common. A truer picture of the clarity is often indicated by a five-year running mean, which shows a mean clarity of 67.3 feet, according to the data released by the UC Davis Tahoe Environmental Research Center. Lake Tahoe's average annual Secchi clarity measurements since 2000 are listed below. There are winter and summer clarity variables, winter tend to have more clarity depth. <https://tahoe.ucdavis.edu/secchi>

## Lake Tahoe's Clarity the Best It's Been Since 1980s

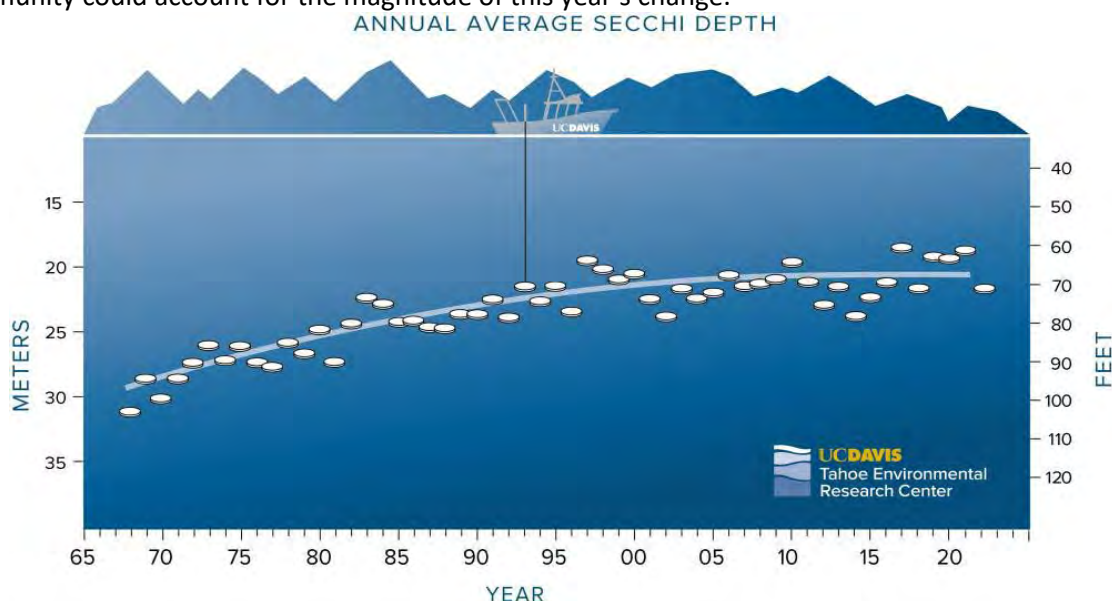
***The Return of Native Zooplankton Aided Tahoe Clarity Efforts in 2022*** For the last five months of 2022, Lake Tahoe was the clearest it has been since the 1980s. That is due in part to a resurgence of the lake's native zooplankton. They've provided a natural clean-up crew to help restore the lake's famous blue waters. The primary factors affecting lake clarity are the concentration of particles in a specific size range, such as silt and clay, and tiny phytoplankton, or algae. The phytoplankton *Cyclotella*, a single-celled alga is in this size range and has impacted clarity in most years. Zooplankton are small, microscopic animals. Some zooplankton, particularly *Daphnia* and *Bosmina*, are specialized to consume particles in that critical size range.



"*Daphnia* and *Bosmina* largely disappeared from the lake after they were grazed down following the introduction of the *Mysis* shrimp in the 1960s," said Geoffrey Schladow, director of the UC Davis Tahoe Environmental Research Center. "In late 2021, the *Mysis* population unexpectedly crashed, and it took

12 months for the *Daphnia* and *Bosmina* to build up their numbers and start their natural cleansing.”

Other factors are known to influence year-to-year changes in clarity. These include the magnitude of the runoff, the warming of the lake surface and the depth to which the lake mixes in the previous winter. The report examined all these factors and concluded that only the change in the zooplankton community could account for the magnitude of this year’s change.



**In 2023, the annual average Secchi depth was 68.2ft (20.8m).**

2022	71.7ft (21.9m)	2016	69.2ft (21.1m)	2010	64.4ft (19.6m)
2021	63.0ft (19.2m)	2015	73.1ft (22.3m)	2009	68.1ft (20.8m)
2020	62.5ft (19.1m)	2014	77.8ft (23.7m)	2008	69.6ft (21.2m)
2019	62.7ft (19.1m)	2013	70.1ft (21.4m)	2007	70.1ft (21.4m)
2018	70.9ft (21.6m)	2012	75.3ft (23.0m)	2006	67.7ft (20.6m)
2017	59.7ft (18.2m)	2011	68.9ft (21.0m)	2005	72.4ft (22.1m)

\*Lake Tahoe’s average annual clarity in 2017 was at its lowest level, 59.7 feet, since regular measurements began in 1968.

## State of the Lake: Climate Change Impacts Tahoe’s Health

By Katherine Hill - August 12, 2024

<https://yourtahoeuide.com/2024/08/state-of-the-lake-climate-change-impacts-tahoes-health/>

Microplastics, wildfire smoke, changes in temperature, vast swings in lake clarity from winter to summer, and an increase in rain-on-snow events caused by long-term changes in the climate highlight the annual State of the Lake Report, released on Aug. 8 from the Tahoe Environmental Research Center (TERC). The State of the Lake Report summarizes scientific research conducted by TERC in 2023, noting trends in changes in Lake Tahoe’s ecosystem from its clarity, which dropped to 68.2 feet in 2023, to changes in water temperature, algal growth, aquatic invasive species and precipitation of rain and snow, among other factors. The clarity report, released on July 30 and first reported on YourTahoeGuide.com, shows the continued trend of improving in the winter and deteriorating in the summer. However, 2023 saw some of the biggest swings in clarity, according to TERC. Winter lake conditions were the clearest observed since 1983 and the 10th best on record, with visibility of 91.8 feet under the surface, compared with 72.2 feet in 2022, according to the report. The summer of 2023, however, saw the fifth murkiest on record with an average of 53.5 feet, compared with 68.9 feet in 2022. Overall, the annual average for lake clarity dropped to 68.2 feet from its 2022 value of 71.9 feet. “That’s something that’s

really important to understand, is that we're seeing bigger and bigger changes," said Dr. Alex Forrest, TERC interim director at the State of Lake Report discussion on Aug. 8 at Granlibakken in Tahoe City. Read the full State of the Lake report at [tahoe.ucdavis.edu/stateofthelake](https://tahoe.ucdavis.edu/stateofthelake)

### **Rising Air and Water Temperatures**

One of the long-term trends being seen as a result of climate change is the increase in air and water temperatures at Lake Tahoe, which leads to more precipitation falling as rain rather than snow, among other changes.

In 2023 the average surface water temperature continued to rise, but the air temperature was colder in the winter than had been trending, according to TERC. The colder temperatures during the winter of 2023 enabled Lake Tahoe to experience a deep mixing event in which water from the bottom of the lake circulates to the top of the lake. This mixing is important to the lake's health and to the increased winter clarity of 91.9 feet that was recording in 2023. The clarity then dropped to 53.5 feet during the summer of 2023 as sediment from the large winter snowfall entered Lake Tahoe as it melted, which also contributed to the growth of microscopic plants and algae. The drop was the fifth-worst summer clarity reading on record. The deep mixing event in early March 2023 and fine particles that were swept into the lake by runoff events in May and June also affected the amount and distribution of nitrogen and phosphorus in the lake, both important nutrients for plankton, according to the State of Lake. These tiny plants (phytoplankton) and animals (zooplankton) are the basis for the food web in the lake.

### **Impacts of wildfire smoke**

TERC researchers are also examining how wildfire smoke in the Tahoe region and smoke that is blown into the Tahoe Basin from fires around the West and as far away as Canada are impacting Lake Tahoe's health. "TERC scientists Adrienne Smits and Professor Steve Sadro are studying other lakes in the Tahoe region as part of the California Mountain Lake Network, a set of 15 lakes representing different elevations and environments," according to the report. "They contributed to research published earlier this year showing that between 2019 and 2021, almost every lake in North America was affected by wildfire smoke on at least one day a year."

### **Microplastics**

Attendees to the State of the Lake talk on Aug. 8, 2024 also expressed concerns about trash around Tahoe's beaches and in the lake and the impact of microplastics in the environment. Plastics are found in clothing, packaging, car tires and many items that people use on a daily basis. While not a lot of research has been done to date on the presence of microplastics in Lake Tahoe, microplastics and nanoplastics (which can be as small as a virus) are concerning and need more attention from researchers and the public, according to Dr. Monica Arienzo, assistant research professor at Desert Research Institute and a panelist at the Aug. 8 discussion.

A study by a coalition of researchers discovered that Lake Tahoe has the third-highest amount of microplastics among 38 freshwater reservoirs and lakes around the globe, according to the study published in 2023 in the scientific journal Nature. Read more about microplastics in and around Lake Tahoe at [YourTahoeGuide.com/trash](https://YourTahoeGuide.com/trash).

### **Human Impacts**

Visitors and locals alike can do their part to help protect Lake Tahoe and its environment, according to TERC. The public can learn more at the Tahoe Science Center in Incline Village, NV., the science exhibit at

the Tahoe City Visitor Center and at a science exhibit that opened on Aug. 15 at the new Kings Beach Visitor Center.

As well, the public can volunteer as citizen scientists by reporting observations on algae, invasive species, litter, water quality and ashfall from wildfires, among other things at [citizensciencetahoe.org](http://citizensciencetahoe.org).

### **Soils and Vegetation**

More than 80 percent of the watershed is vegetated (montane-subalpine type), covered predominantly by mixed coniferous forests, though bare granite outcrops and meadows are also common. About 2 percent of the watershed is impervious surface associated with urban development, which equates to over 5,000 acres (20 km<sup>2</sup>) (Minor and Cablk 2004). Much of the impervious land cover is adjacent to the lake or its major tributaries. 14 of the 63 individual watersheds have at least 10 percent impervious land area.

Most urban development exists along the lake's shoreline, with the largest concentration at South Lake Tahoe in the south, Tahoe City in the northwest, and Incline Village in the northeast. The north and west shores are less densely populated. Much of the east shore is undeveloped.

TWSA purveyors' combined service areas span 23 sub-watersheds in the Lake Tahoe Basin including: Bijou Park, Burke, Carnelian Bay, Carnelian Canyon, Cedar Flats, Dollar Creek, East Stateline Point, Edgewood, First, Glenbrook, Griff, Incline, Kings Beach, Logan House, McFaul, Mill, North Zephyr, Second, Slaughter House, Tahoe Vista, Third, Watson Creek and Zephyr creeks.

TWSA service areas in California range from the City of South Lake Tahoe, (STPUD and Lakeside) north along the west side of Lake Tahoe to Tahoe City PUD and then into North Tahoe PUD service areas, including Kings Beach, CA. The western service and watershed boundaries of Tahoe City Public Utility District extend from north of Emerald Bay to Dollar Hill, and along the Truckee River to the Nevada County line. This service area is very large, encompassing almost 22 square miles. There are numerous small independent water companies (non-TWSA) within these areas as well. NTPUD areas include Carnelian Bay, Tahoe Vista, Kings Beach and Brockway, CA.

TWSA service areas in Nevada include the member agencies: Incline Village GID, Glenbrook, Douglas County (Cave Rock/Skyland/Zephyr Cove), Round Hill GID, Kingsbury GID and Edgewood Water Company.

Other water suppliers located within the Tahoe Basin include several small municipal systems and private homeowners.

### **General Climate**

In general, Tahoe's climate is characteristic of an alpine ecosystem. Summer average daily temperatures range between 57°F and 65°F. Annual winter temperatures vary between 40°F and 50°F with minimums ranging between 20°F and 25°F. Snowfall occurs generally in October through March with most snow precipitation accruing in January through March (WRCC 2005)

With air and water temperatures trending warmer, climate change is considered a major driver for ecological changes occurring in the lake, along with urbanization and invasive species. Stratification (lake mixing) has been affected by warming temperatures as well. During a typical summer the lake becomes stratified, with warmer waters on top and cooler water at depth. In the winter these layers mix, a



process that refreshes the lake and keeps it healthy. The extended stratification season on Lake Tahoe has major implications for water quality. “A longer stratification period increases the risk of losing oxygen at the bottom of the lake,” Schladow explained, “and this can release a huge, almost infinite supply of phosphorus to the lake in a process known as internal loading.” Phosphorus is the limiting nutrient in Lake Tahoe. The more there is - the more algae can grow, causing a decline in water clarity. (TERC 2012)

Precipitation as rain and snow is the single most important factor influencing pollutant delivery to Lake Tahoe. Precipitation drives the mobilization and transport of pollutants from the landscape into the tributaries or directly into the lake. The lake’s surface area, which is relatively large compared to its watershed area, is an important factor because a significant amount of precipitation (36 percent) enters the lake directly. Therefore significant amounts of airborne pollutants (fine sediment, nitrogen, and phosphorus) enter the lake directly.

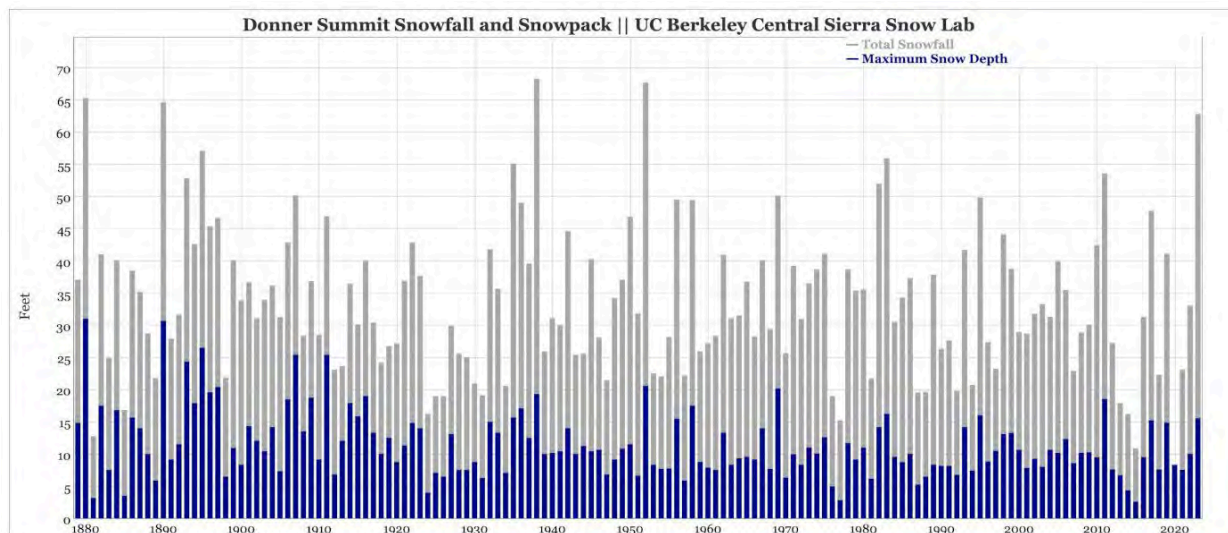
The Lake Tahoe Basin has a Mediterranean-type climate characterized by wet winters and dry summers. Most precipitation in the basin falls between October and May as snow at higher elevations and as snow/rain at lake level. Over 75 percent of the precipitation is delivered by frontal weather systems from the Pacific Ocean between November and March. However, precipitation timing can vary significantly from year to year (Coats and Goldman 2001, Rowe et al. 2002). Lower elevations receive about 20 inches (51 cm) of annual precipitation, but the upper elevations on the west side of the basin receive about 59 inches (150 cm) (USDA 2000).

The snow pack at higher elevations typically melts and runs off in May and June. However, at lower elevations near the lakeshore, the snow pack typically melts earlier in the spring and can even melt mid-winter, if temperature and solar radiation conditions are right. Commonly, the lower elevation snow pack melts completely before the tributaries crest with snowmelt from the higher, colder elevations.

Thunderstorms, especially rain-on-snow events, can lead to high runoff in a short amount of time, contributing to pollutant transport into Lake Tahoe and its tributaries. Thunderstorms in summer or fall can be intense and can generate large loads for short periods of time, typically in isolated geographic locations. However, summer thunderstorms contribute little to annual precipitation and typically are not responsible for significant pollutant loads to tributaries (Hatch et al. 2001, S. Hackley unpublished). The effects of climate change are being studied by the Tahoe Science Consortium. Increased temperatures may shift more precipitation events to rain versus snow, which has the potential to increase runoff and affect forest health. Winter snowmelt is often occurring earlier and at a higher rate than in the recent past.

A well-defined rain shadow exists across the lake from west to east (Crippen and Pavelka 1970, Sierra Hydrotech 1986, and Anderson et al. 2004). The west shore averages about 35 inches/year (90 cm/year) of precipitation, while the east shore averages about 20 inches/year (51 cm/year).

Meteorologically, the long-term trends that have been prevalent do not change year-to-year. A changing climate is evident in almost all the long-term meteorological trends including rising air temperature and the declining fraction of precipitation as snow. The weather experienced in a given year can be far more variable.



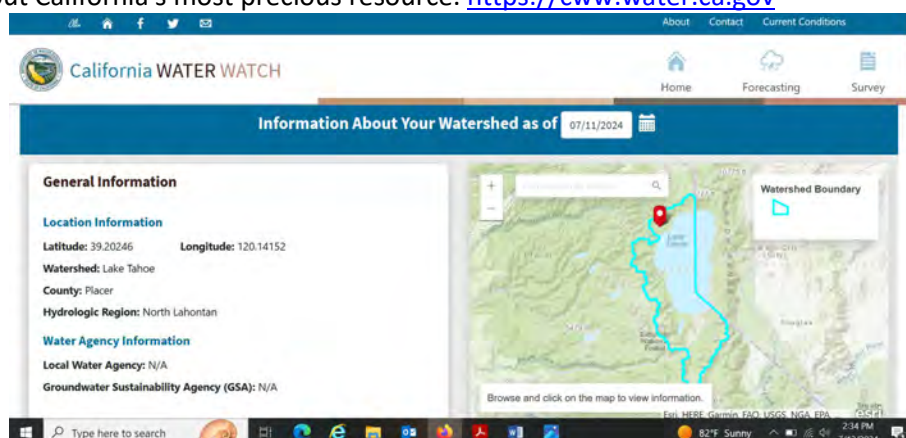
By century's end, the Tahoe basin is projected to experience air temperatures up to 9 degrees higher than today's average. A shift from a snow-based to a rain-based climate will result in peak stream-flows occurring months earlier than present day, with those flows arriving as warmer water. Consequences could include changes to fish spawning, a loss of water storage and elevated wildfire risk.

[http://www.thestormking.com/Weather/Sierra\\_Snowfall/sierra\\_snowfall.html](http://www.thestormking.com/Weather/Sierra_Snowfall/sierra_snowfall.html)

That's according to the annual Tahoe: State of the Lake report, developed by TERC and available at <https://tahoe.ucdavis.edu/stateofthelake>. The report presents data regarding lake clarity, temperature, snowpack, invasive species, algae, nutrient loads and more, all in the context of the long-term record. The UC Davis Tahoe Environmental Research Center (TERC) is increasingly using new approaches to enrich the long-term data record for Lake Tahoe. These include real-time measurements at over 25 stations around the basin; remote sensing from autonomous underwater vehicles, satellites, and aerial drones; and the deployment of a suite of numerical models. These tools are all focused on quantifying the changes that are happening; and, at the same time, understanding what actions and measures will be most effective for control, mitigation, and management. Precipitation totals are swinging drastically from year to year; and the percentage of snow/rain events as well.

### Key Water Conditions Data Points and Resources

Current local and statewide water conditions are available by your region and even your neighborhood. This information is updated dynamically from a variety of data sources. Research, learn, and stay informed about California's most precious resource. <https://cww.water.ca.gov>



Statewide water conditions: [http://cdec.water.ca.gov/water\\_cond.html](http://cdec.water.ca.gov/water_cond.html)

Daily Reservoir Storage Summary: <https://cdec.water.ca.gov/reservoir.html>

Monthly water supplier reports on water production and conservation:

[https://www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal/conservation\\_reporting.html](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.html)

Information on state drought actions and assistance: <https://www.drought.ca.gov>

Conservation tips and resources for consumers: <https://saveourwater.com>

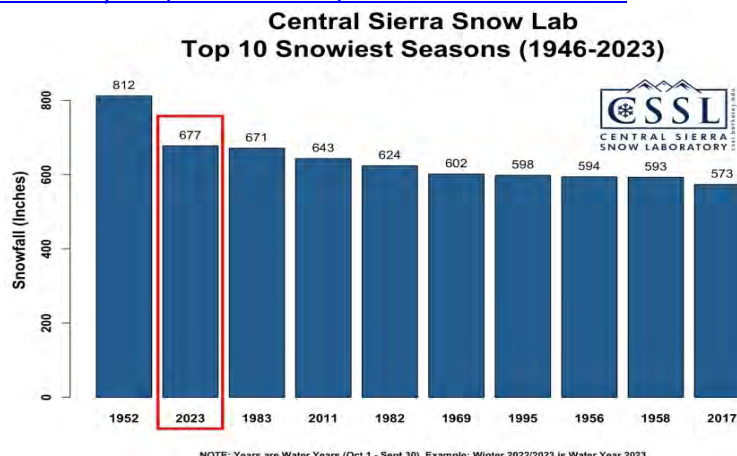
### 2023-2024 was an Average Year for Winter Precipitation

<https://earthobservatory.nasa.gov/images/152783/sierra-snowpack-springs-back>

Sierra Nevada snowpack is known for its booms and busts. After more than a decade of either unusually wet or unusually dry years, snowpack in the Sierras has been uncharacteristically close to average in 2024. Prior to the early-May storm, accumulated snowfall for the current water year at Donner Pass was within one inch of the 1991-2020 average (360 inches), according to the Central Sierra Snow Laboratory. The snow on May 5 nudged the total to 108 percent of the average for that location. Although the 2023-2024 winter season got off to a dry start, storms later in the season replenished the snowpack across much of the range. Between February 28 and March 3, an atmospheric river and a winter storm delivered widespread precipitation to the western U.S. and dropped an estimated 4 to 10 feet (1 to 3 meters) of snow in the Northern and Central Sierras. Following the May snowfall, the California Department of Water Resources reported that the snow water equivalent was above average in the Northern Sierra, close to average in the central part of the range, and below average in the southern portion.

### 2022-2023 Record Setting Winter Precipitation with 56.4 FEET, 2<sup>nd</sup> Snowiest Winter on Record

<https://vcresearch.berkeley.edu/research-unit/central-sierra-snow-lab>



### 2023: Record Breaking Precipitation Resets the Western Watersheds

California drought status: Oct. 2023: California is 99.93% drought-free, according to an update from the U.S. Drought Monitor. Approximately 3,000 people remain in drought areas, according to the U.S. Drought Monitor—a significant decrease from roughly 9,800 people in September and about 903,000 people in August. The state has been free of "severe," "extreme" and "exceptional" drought conditions since April.

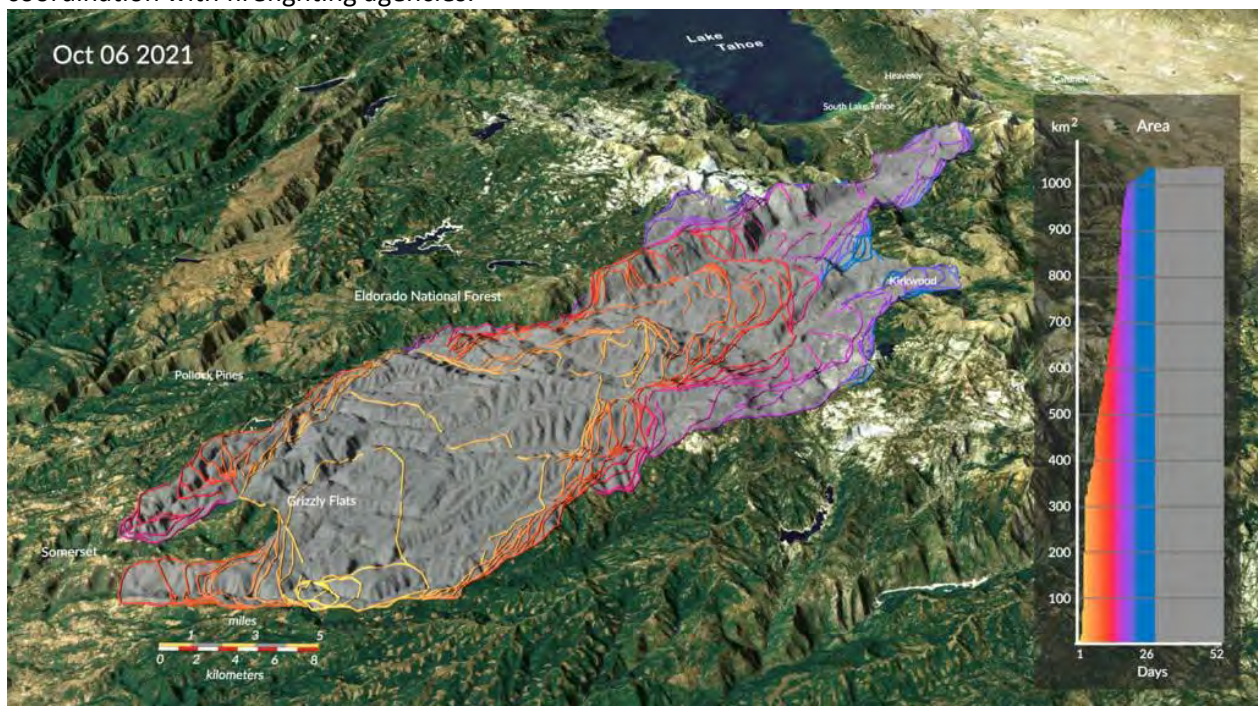
### 2022: California and Much of the Western U.S. Is Immersed in a Third Consecutive Year of Extreme Drought. <https://drought.ca.gov/media/2022/08/Weekly-CA-Drought-Update-08292022-final.pdf>

This is also the third statewide drought declared in California during this century (2007-2009, 2012-2016,

2020 – present). January, February, and March 2022 were the driest on record dating back over 100 years, with just six inches of precipitation observed across the Sierra Nevada. Hot and dry conditions are expected to continue through November indicating a late start to water year 2023, extending fire season and setting the stage for dry watersheds under any snowpack that forms in winter. The current outlook for water year 2023 is another year of drought as the third consecutive winter with La Nina conditions is expected. The State is taking action to prepare for the possibility of a fourth dry year. To replace and replenish the water that thirstier soils, vegetation, and the atmosphere will consume under hotter and drier conditions, Governor Newsom announced an adaptation strategy that targets capturing, recycling, de-salting, and conserving water supply. The California Drought Update is a weekly roundup of conditions, state actions and upcoming developments. It is produced by an interagency team that includes the California Natural Resources Agency, the California Environmental Protection Agency, the Governor's Office of Emergency Services, the California Department of Food and Agriculture, the Department of Water Resources, the Department of Fish and Wildlife, the State Water Resources Control Board and the Department of Public Health

### **Wildfires: Caldor Fire – Threatens the Entire South Tahoe Region**

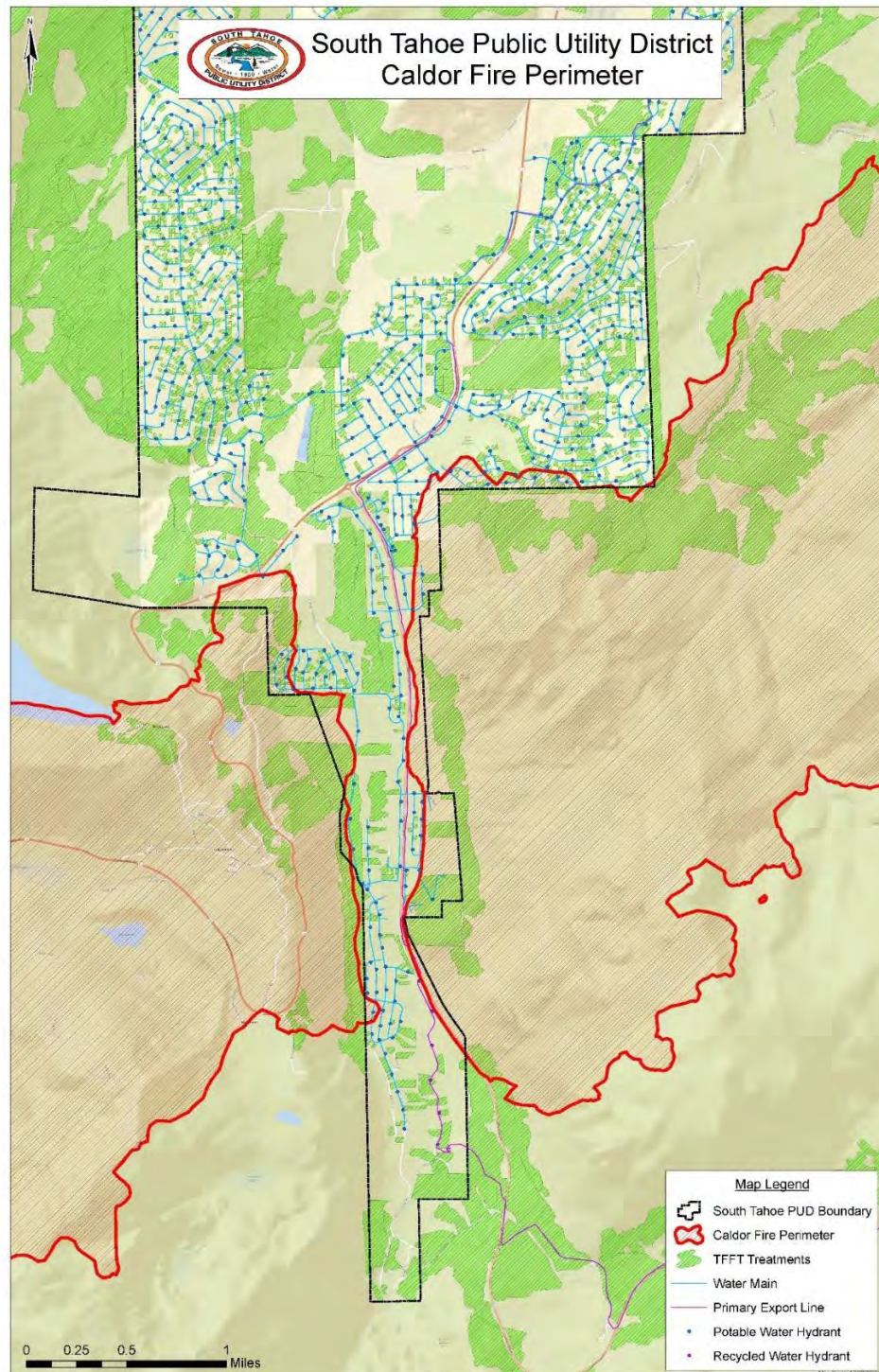
Mid-August to Mid-October 2021: The Caldor Fire threatens the entire South Lake Tahoe region. Regional water providers did not see impacts to drinking water quality; although shoreline water quality issues with algal blooms is exacerbated in summer 2022. South Lake Tahoe PUD was the most impacted agency; with staff having to handle maintaining operations during a full city evacuation and intensive coordination with firefighting agencies.



The Caldor Fire was a large wildfire that burned 221,835 acres (89,773 hectares) in the Eldorado National Forest and other areas of the Sierra Nevada in El Dorado, Amador, and Alpine County, California, in the United States during the 2021 California wildfire season. The fire was first reported on Saturday, August 14, 2021, and was fully contained on Thursday, October 21, 2021. The Caldor Fire destroyed 1,003 structures and damaged 81 more, primarily in the US Highway 50 corridor and in the community of Grizzly Flats, 2/3 of which was destroyed by the fire.



On August 30, it became the second fire to cross the Sierra Nevada mountain range, following the Dixie Fire, which crossed a few days earlier on August 18. It then threatened the communities of Meyers and South Lake Tahoe, causing evacuations to be ordered for more than 20,000 people before the fire's progress was halted. The Caldor Fire was the third largest and second-most-destructive of the 2021 season in California, and the 15th-largest and 16th-most destructive in recorded California history.



### **Caldor Fire Impact on Lake Tahoe's Clarity, Ecology Studied Amidst Ongoing Wildfire Season**

<https://www.unr.edu/nevada-today/news/2021/caldor-fire-lake-tahoe>

As the Caldor Fire encroached on Lake Tahoe, a team of researchers from the University of Nevada, Reno began collecting samples of ash falling from the sky. Professor of Biology Sudeep Chandra is collaborating with a team of researchers across five institutions to study the effects of wildfire smoke on Lake Tahoe. Chandra is Director of the University's Global Water Center, the Ozmen Institute for Global Studies and the project's principal investigator (PI). This public impact research study follows close behind the Global Water Center research completed on Castle Lake in Northern California where results showed the lake changed considerably following six wildfires in 2018 that led to smoke hanging over the water. Castle Lake is a good comparison to Lake Tahoe, and once the Caldor Fire started in the Tahoe Basin, the scientists mobilized quickly to get monitoring equipment into the lake's watershed.

The duration and intensity of the Caldor Fire exceed that of any previous fires studied in the region. The research aims to answer questions about how the living and nonliving particles in the lake are changing due to smoke in the Tahoe Basin airshed, and what that means for Tahoe's clarity.

### **How the Caldor Fire Could Pollute Lake Tahoe's Iconic Blue Waters**

<https://www.kqed.org/news/11887060/how-the-caldor-fire-could-pollute-lake-tahoes-iconic-blue-waters>

Smoke and ash from wildfires near Lake Tahoe — one of the deepest lakes in the world — are already clouding the lake's famously clear water, researchers say. While the long-term effects are unclear, ash and soot are now coating the surface of the High Sierra lake and veiling the sun, which can disrupt the lake's ecosystem and its clarity. More debris and sediment are likely to wash into the lake from runoff and rain this fall and winter. "It's not going to turn the lake green or anything like that, in my opinion. But certainly the clarity of the lake, how deep you can see in the lake, could be affected for several years," said Randy Dahlgren, professor emeritus of soils and biogeochemistry at the University of California, Davis. "It all depends on Mother Nature."

Researchers are now trying to figure out what the residue and flames from the Caldor Fire, which crossed a granite ridge and spread into the Lake Tahoe basin on Monday, could mean for the iconic cobalt-blue lake. "We've never had a fire of this extent before ... This one is off the charts," said Geoffrey Schladow, director of the University of California, Davis's Tahoe Environmental Research Center.

The research center's tests of the lake already show that its clarity declined in recent days, although Schladow said it may be temporary. The changes could be caused by a combination of factors: smoke preventing sunlight from penetrating the lake's depths, ash muddying its water or more algae growing near its surface.

### **2022 State of Lake Tahoe: Particle and Algae Levels Are Soaring — wildfires may be to blame**

Read more at: <https://www.sacbee.com/news/local/article263944846.html>

In 2021, Lake Tahoe's algae and particle levels soared to unprecedented levels. Long-established phytoplankton behavior changed, and zooplankton populations collapsed. Scientists think wildfires may be partially to blame. On Thursday, UC Davis's Tahoe Environmental Research Center released its annual State of the Lake report, which detailed phenomena observed in Lake Tahoe in 2021. Scientists observed unprecedented changes in aquatic organism populations, phytoplankton behavior and in algal growth. TOP VIDEOS "Any one of these changes would be a big deal in a single year," center director Geoffrey Schladow said in a Thursday news release. "All three occurring at once is particularly alarming and a huge opportunity to learn lessons that can be used to inform future management." Last summer, the

Caldor Fire ripped across the Sierras, prompting evacuations in South Lake Tahoe and charring over 220,000 acres of forest near the lake. Another fire to the north, the Loyalton Fire, also brought smoke to the basin as it charred 47,029 acres. Experts initially celebrated Lake Tahoe's continued clarity in the aftermath of the fires, but in Thursday's report, they attributed growing algae and particle levels in part to the wildfires' effects. Floating algae increased by 300% in 2021, the report said, reaching record-high levels and exacerbating the threat of algal blooms that could invade popular swimming areas. For the first time on record, the dominant alga in the lake was *Leptolyngbya*, a genus of cyanobacteria that thrives in smoky conditions. Particle levels in the lake also hit a record high in 2021, with scientists finding that particles from wildfires "may be a source" of the increase. But although particle levels are at their highest, Lake Tahoe still remains clearer than it was in 2017, its murkiest year.

According to the center's Lake Tahoe clarity report released this month, 2021's clarity was the second-lowest on record — 61 feet. Wildfire smoke may also have caused Lake Tahoe's phytoplankton to change long-established behaviors. As the summer progressed, phytoplankton moved closer to the lake's surface, which scientists say "may be due to reduced sunlight and UV radiation during wildfire smoke events."

#### **Snowpack Conditions for 2021–22 = 38% of Average (April 2022)**

<https://sierranevada.ca.gov/californias-2021-22-snowpack-prelude-to-a-drought/>

Governor Newsom declared in his (2022) March 28 drought emergency executive order, the new year began with "the driest January and February in recorded history for the watersheds that provide much of California's water supply." As a result, April snow depths, when snowpack is typically near its deepest, were a scant 38 percent of average. Worsening drought conditions are expected to exacerbate regional wildfire and forest health crises. The National Interagency Fire Center has predicted that California's potential for wildfires will increase to higher than normal in 2022 due to low snowpack and precipitation combined with high temperatures.

#### **2020-2022 Drought Deepens. 2021 Drought Conditions in California Were the Worst on Record.**

<https://www.cnn.com/2021/10/14/us/california-summer-drought-worst-on-record/index.html>

The West's historic, multi-year drought is threatening water supply, food production and electricity generation. It has drained reservoirs at incredible rates and fueled one of the most extreme wildfire seasons the region has ever experienced.

In California, drought conditions this summer were the most extreme in the entire 126-year record -- a clear sign of the role climate change plays in the perilous decline of the state's water resources. Data from the National Oceanic and Atmospheric Administration shows that drought months are becoming the new normal, with rainy months becoming fewer and farther between. Climate researchers say two major factors contributed to this summer's severe drought: the lack of precipitation and an increase in evaporative demand, also known as the "thirst of the atmosphere." Warmer temperatures increase the amount of water the atmosphere can absorb, which then dries out the landscape and primes the environment for wildfires. Based on the Palmer Drought Severity Index, July 2021 was the driest month on record in California since records began in 1895. June, July and August 2021 were three out of the state's five driest months on record.

This summer tied the Dust Bowl summer in 1936, for the hottest on record in the US. It was also the hottest summer on record in California, where the persistent heat pushed almost 50% of the state into what the US Drought Monitor classifies "exceptional drought" -- its most extreme classification. The prolonged drought California is experiencing began in 2012. Since then, wet months have been rare,



with just two notable wet periods: Winter 2016-2017 and Spring 2019. Before this year, 2014 held the record for the most extreme drought conditions, with June and July that year facing similar circumstances as today.

#### **2019-20 Drought Returns After Record Setting Precipitation in the Previous Year.**

<https://www.tahoedailytribune.com/news/everything-has-missed-us-after-record-setting-2019-tahoe-resorts-left-out-to-dry-in-february-2020/>

While other ski resorts in the Western U.S. experienced record-breaking snowfall in February, those around the Lake Tahoe Basin have been left out to dry. Palisades Tahoe had its snowiest month ever at their upper mountain, piling up 313 inches of snow in February 2019, compared to just 3 inches this month. The February total was the sixth lowest on record, tracked since 1904.

#### **Record Setting Precipitation Was Noted for Winter 2018-19.**

<https://thetahoeweekly.com/2019/06/2019-a-top-10-winter-for-water-not-snow>

“Local and even national media relentlessly touted “record snowfall” headlines for the Tahoe Sierra, but as is often the case these days, the claims were generally overblown. No doubt that ski resort snowfall tallies for February set new records, but it wasn’t enough to bump seasonal snowfall amounts even close to historic levels measured at the Central Sierra Snow Laboratory (CSSL) near Donner Pass.

Precipitation, however, is a more critical metric than snow and the news in that category is good. Characterized by intense snowstorms and prolonged periods of generally wet and often gloomy weather, the winter of 2019 resulted in an impressive amount of precipitation (rain plus snow water equivalent). The June 1 data dispatch from Randall Osterhuber, lead scientist at the CSSL, reported 84.4 inches of precipitation measured so far at Donner Pass. That ranks 2019 at No. 10 in precipitation since 1871, with the potential to surpass 2011 at No. 9 with just 0.6 inches more. Even so, 2019’s current precipitation total at the snow lab is 37 inches shy of 2017’s — the wettest winter of record.

#### **2016-17 Was Unique with Another Record Setting Winter Precipitation Level, almost 200% Of Normal Precipitation.**

Some areas revived more than 700 inches (58 feet) of snow in winter 2016-17. The transition from extreme drought to record setting precipitation resulted in the lake completely filling up in 6 months, for the first time in 11 years, and allowing for seasonal releases downstream, for the first time in years.

#### **Winter 2014-15 Was Noted as The Lowest Recorded Snowpack In 150 Years, With Further Estimation That It Was the Lowest Snowpack In 500 Years Based on Tree Ring Records.**

<http://phys.org/news/2015-09-sierra-nevada-snowpack-lowest-years.html>

#### **Monthly - Weather Averages Summary**

Long-term data sets on multiple precipitation and weather factors is available at <http://www.weatherbase.com/weather/weather.php3?s=608762>

#### **Description of the Watershed**

The lake has one outlet on its northwest side, forming the start of the Truckee River, which ultimately drains to Pyramid Lake, a terminal lake in Nevada. The lake’s hydraulic residence time is 650 years, which means that on average it takes 650-700 years for water that enters the lake to leave the lake. Because of its volume, depth, and geographic location, Lake Tahoe remains ice-free year-round, though Emerald Bay has frozen over during some extreme cold spells. A concrete dam was completed in 1913 to regulate water outflow at the Truckee River outlet in Tahoe City, California. In 1988, the dam was



seismically retrofitted and enlarged to its current configuration. The upper six feet of the lake forms the largest storage reservoir in the Truckee River basin, with an effective capacity of 240 billion gallons (745,000 acre-feet) (Boughton et al. 1997). The dam is under strict federal control and all water allocations dictated by the Truckee River Operating Agreement. (TROA). Lake Tahoe's natural rim sits at 6,223 feet, but lake maximum capacity, set by a legal decree in 1915 at 6,229.1 feet, which gives the water master the ability to control the lake's level between those six feet.

Lake Tahoe is unique, the forces and processes that shape it are the same as those acting in all natural ecosystems. As such, Lake Tahoe is an analog for other systems both in western U.S. and worldwide. Extensive studies are conducted on climate change's potential effects on Lake Tahoe by UC Davis and other researchers.

Many monitoring parameters have research information available at <http://tahoe.ucdavis.edu/research/climate-change/modeling-climate.html>

### **Climate Change Adaptations**

Climate change now affects everything in the Lake Tahoe Basin. Climate scientists project increasingly common weather extremes that will transform Tahoe, with impacts on lake clarity, natural resources, communities, and the economy. Climate change has already affected facilities and restoration projects and will continue to challenge how the agencies plan and implement in the future.

Climate change is increasing the lake's water temperature and affecting regional weather patterns in ways that could change the lake's ecosystem and cause more of a decline in the lake's clarity. Warmer water provides a more hospitable environment to algae and invasive species. Lake Tahoe's water is almost one degree F warmer than it was 30 years ago, according to UC Davis researchers. The average surface temperature in July has increased 5 degrees F since 1999. Average Tahoe temperatures have risen more than 2 degrees F. Spring snowmelt occurs a week earlier than in the 1950s, according to studies by the Scripps Institute of Oceanography in San Diego and the U.S. Geological Survey. In the coming decades, UC- Davis scientists predict more rain and less snow will fall in Tahoe, and there will be more flood-causing storms where rain falls on snow. Streams and rivers will flow with greater intensity, causing more fine sediment to flow into the lake.

### **California Tahoe Conservancy**

<https://tahoe.ca.gov/programs/climate-change>

The Conservancy's strategic plan includes a goal to foster basinwide climate change adaptation and sustainable communities. To achieve this goal, the Conservancy focuses on four areas:

1. Developing the Lake Tahoe Climate Adaptation Action Portfolio (CAAP)
2. Providing grants to support climate change adaptation
3. Adapting the Conservancy's own programs
4. Engaging partners and collaborating with scientists

## Tahoe Climate Adaptation Primer

<https://tahoe.ca.gov/wp-content/uploads/sites/257/2021/06/Tahoe-Climate-Adaptation-Primer.pdf>

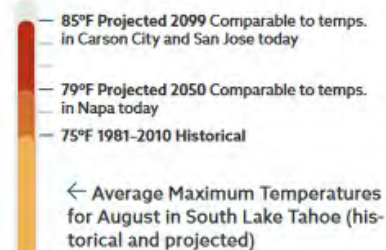
This primer reviews:

1. Anticipated climate change impacts based on the integrated vulnerability assessment.
2. Ongoing adaptation work by existing partnerships involving California and Nevada agencies, the TRPA, federal agencies, the Washoe Tribe, local jurisdictions, nonprofit organizations, and businesses.
3. This information is categorized into three Basin sub- systems: Lake Tahoe, Forested Uplands, and Communities.
4. The primer concludes with what lies ahead for Tahoe. It reviews ongoing and upcoming statewide planning led by California and Nevada.
5. It also reviews the goals of a new Basinwide mitigation, adaptation, and resilience initiative led by the TRPA, as well as local jurisdiction plans and initiatives.

## IMPACTS & ADAPTATION

This section summarizes the vulnerability of Lake Tahoe and the surrounding forests and communities to climate change. It also identifies ongoing adaptation work in the region. It begins by identifying projected changes in temperature and shifts in precipitation, which touch all aspects of Tahoe's ecology, economy, and culture.

■ **AVERAGE TEMPERATURES WILL INCREASE** by 3.6 to 9 degrees by 2100. This will make August at the end of the century as hot as August currently is in San Jose—85 degrees on average. (All degrees in this primer are given in Fahrenheit.)



■ **PRECIPITATION AT LAKE LEVEL WILL SHIFT** from primarily snow to primarily rain due to warmer temperatures. In addition, rising temperatures will lead to more rain-on-snow events and earlier snowmelt.

■ **STORMS WILL BECOME MORE INTENSE.** While the total amount of precipitation in the Sierra Nevada will not likely change, year-to-year precipitation will become more variable and peak storm events will increase by up to 30 percent.

■ **BY THE END OF THE CENTURY PEAK RUN-OFF IN THE BASIN WILL OCCUR FIVE MONTHS EARLIER** in the year. This is because precipitation will fall more regularly as rain rather than snow, and flow into streams immediately, rather than accumulating as a snow-pack that slowly melts into the summer.

### PEAK RUNOFF OCCURS EARLIER IN THE YEAR



## TRPA Climate Resiliency

<https://www.trpa.gov/programs/climate-resiliency/>

TRPA and its partners in the bi-state Lake Tahoe Region have long been recognized as leaders in sustainability. A significant new environmental threat, one that many believe will affect the sustainability of the entire planet, has emerged: climate change. The Lake Tahoe Basin is already experiencing the direct impact of climate change. These include rapid change to the ecological composition of our natural environment, more severe and frequent hazard events, retreating snowpack, and socio-economic shifts (such as fluctuation of trends in visitation). Climate change directly impacts the ability of TRPA and regional partners to achieve and maintain thresholds and will cause major disruptions to the region's economic, social, and ecological systems.

### TAHOE REGIONAL PLANNING AGENCY

The TRPA has started a new Climate Resilience Strategic Initiative. Through stakeholder collaboration and public engagement, the TRPA will use the 2014 Lake Tahoe Sustainability Action Plan as a basis for developing a Tahoe Climate Resilience Strategy. The TRPA will integrate the states' actions into the strategy. Partners

will identify and prioritize mitigation, adaptation, and resiliency actions that fill climate information and implementation gaps. Ultimately, the TRPA will create a bi-state climate strategy that guides its environmental review, code, policy, and plan amendments. The TRPA will also update its sustainability indicator dashboard to create a real-time climate score-board to track regional progress.

### IMPLEMENTATION OF EXISTING CLIMATE ACTION PLANS

Several state and local jurisdictions have already started or will begin to implement their recently completed climate plans. These include:

- Lahontan Water Board's 2019 Climate Change Mitigation and Adaptation Strategy
- Placer County's 2020 Sustainability Plan
- City of South Lake Tahoe's 2020 Climate Action Plan
- South Tahoe Public Utility District's 2019 Climate Adaptation Plan

### OPPORTUNITY AREAS

Basin partners can provide additional state and national climate adaptation leadership by aligning more closely with California and Nevada planning frameworks in the following areas:

1. Demonstrating the importance of equity and climate justice, including engaging tribal, low-income, and minority communities.
2. Developing an implementation and monitoring plan to track adaptation success and adjust strategies as needed.
3. Evaluating co-benefits and synergies between adaptation strategies to maximize multiple-benefit outcomes.
4. Filling critical knowledge gaps, focusing on the research and monitoring needs identified by the Tahoe Science Advisory Council in its Science to Action Plans.

Through continued partnership, the Basin can get ahead of the climate change curve, and ensure that all Californians, all Nevadans, and all visitors to Lake Tahoe can enjoy its natural beauty and welcoming mountain culture far into the future.

## Water Systems Descriptions / Service Records 2023-24

TWSA full-member water purveyors [Table 1]:

- Maintained approximately 22,824 service connections.
- Supplied water to an estimated 37,457 full-time residents (appx 60% the basin's F-T residents).

Table 1: Number of full-time customers and service connections for TWSA partner agencies.

Agency	County, State	Full Time/Year-Round Population Served / Customer Number	Number of Service Connections
Cave Rock/Skyland	Douglas, NV	897	535
Edgewood	Douglas, NV	0-5000 (seasonal)	35
Glenbrook	Douglas, NV	1,000	282
IVGID	Washoe, NV	9,462	8,115 (connections) 4,285 (accounts)
KGID	Douglas, NV	5,195	2,999
LPA	El Dorado, CA	2,648	142
NTPUD	Placer, CA	4,161	3979 Total 3409 Tahoe Main System 292 Carnelian Bay System 278 Dollar Cove System
RHGID	Douglas, NV	1,200	479
TCPUD	Placer & El Dorado, CA	6,607 utility system total 319 McKinney/Quail system	5,760 utility system total 573 McKinney/Quail system
ZWUD	Douglas, NV	1,287	498
<b>Total</b>		<b>37,457</b>	<b>22,824</b>

Note: Seasonal visitation can double or triple community occupancy.

sources:

\* water purveyor

^Safe Drinking Water Information System (SDWIS)

+ <https://www.census.gov/quickfacts/fact/table/inclinevillagecdpnvada/INC110219>

TWSA agency flows [Table 2]:

- 2023-2024 Average daily flow ranged between 144,512gpd and 2,682,740gpd.
- 2023-2024 Peak daily flow ranged between 361,200gpd and 5,460,000gpd.

Table 2: Average Daily Flow and Peak Daily Flow, gallons per day (gpd).

Agency	2021-2022		2022-2023		2023-2024	
	Average Daily Flow	Peak Daily Flow	Average Daily Flow	Peak Daily Flow	Average Daily Flow	Peak Daily Flow
Cave Rock/Skyland	312,424	916,000	526,166	1,219,680	<b>273,779</b>	<b>600,125</b>
Edgewood	616,663	1,672,148	581,000	850,00	<b>616,282</b>	<b>979,000</b>
Glenbrook	263,150	571,680	236,600	565,4800	<b>229,452</b>	<b>507,742</b>
IVGID	2,667,000	5,930,000	3,082,000	5,150,000	<b>2,682,740</b>	<b>5,460,000</b>
KGID	677,410	1,115,071	696,086	1,068,974	<b>684,000</b>	<b>1,120,035</b>
LPA	96,845	286,700	142,294	316,900	<b>144,512</b>	<b>369,700</b>
NTPUD - Tahoe intake/full system	789,279/ 953,452	1,488,000/ No Data	814,340/ 940,451	1,383,413/ No Data	<b>700,100/ 899,100</b>	<b>1,385,874/ No Data</b>
RHGID	188,103	536,200	281,007	500,579	<b>169,783</b>	<b>544,900</b>
TCPUD - Tahoe intake*/full system	0/ 1,410,000	0/ 3,440,000	0/ 1,347,000	0/ 3,665,000	<b>0/ 1,366,219</b>	<b>0/ 3,066,000</b>
ZWUD	183,706	523,000	197,280	306,720	<b>175,596</b>	<b>361,200</b>

\*TCPUD McKinney-Quail Tahoe Intake offline 2022-2024

## Intakes

The majority of TWSA purveyors pull water directly from Lake Tahoe to service their customers. Nevada State Law provides recommendations that drinking water intakes extend 1,000 feet (ft.) from the shore, set 15 ft. below the surface, and 4 ft. from the bottom. (NAC 445A.6698, NRS 445A.860). The TWSA purveyors' intakes range from 500 ft. to 5,500 ft. long, 17 ft. to 600 ft. deep and set 3 ft. to 6.5 ft. above the lake bottom [Table 3.0].

Table 3: TWSA partner agencies' intake length, depth\*, and distance from Lake Bottom, in feet(ft).

Agency	Length	Depth	Bottom
Cave Rock/Skyland^	1,726	75	6
Edgewood+	5,500	535	4
Glenbrook	2,000	60	6
IVGID	670	30	4
KGID	750	60	5
LPA	2,300	37	4
NTPUD	1,800	28	4.75
RHGID	2,450	52	4
TCPUD (McKinney/Quail)	800	26	3
ZWUD	1,100	63	6.5

\*Intake depth is dependent on the lake level. The depth is measured from Lake Rim.

^In 2023: Cave Rock/Skyland intake was shortened with NDEP approval – to increase efficiency based on need to remove inline pumps.

+In 2017 Edgewood intake extended 3,000ft and deepened 600ft to access water suitable for use in heat exchangers in the Edgewood Lodge project. Raw water and distribution line rerouted and ~2mi of distribution line added to meet the demands of the project.



### Population and Land Ownership

TWSA suppliers service the needs of both a small permanent and a large, seasonal visitor population. The Tahoe Basin is home to approximately 55-60,000 full time, year-round residents. More than half the full-time, year-round population is based in the South Lake Tahoe area. There is no established estimate for the entire Tahoe Basin. Below is a sampling of available data.

### Tahoe Basin Full-Time/Year-Round Population Estimates

(source: <http://www.census.gov/popfinder>)

[https://www.census.gov/quickfacts/fact/table/inclinevillagecdpnvada/INC110219\\_2020](https://www.census.gov/quickfacts/fact/table/inclinevillagecdpnvada/INC110219_2020)

<https://www.census.gov/quickfacts/southlaketahoeccitycalifornia>

Table 4: Lake Tahoe Basin Population Estimates by Region.

Incline Village, NV	9,462
Placer County, CA (Tahoe only)	10,448
Douglas County, NV (Tahoe only)	5,402
South Lake Tahoe/El Dorado County, CA (Tahoe only)	21,197 (SLT)/ 30,728
<b>Total</b>	<b>56, 040</b>

### Tahoe As a Tourist Destination – More Visitors Than Previously Estimated. Revised Tourism Numbers Now Estimate 15+ Million Visitors A Year. <http://www.trpa.org/tahoe-facts/>

Lake Tahoe and the surrounding area continue to rank as a top holiday destination for both international and domestic vacationers. Heavy seasonal visitation (primarily summer and winter ski season) greatly increases the service requirements for area water providers. Year-round resident population is estimated at 55,000. Annual visitation is more than the combined number of visitors to Grand Canyon National Park (3.2 million), Yosemite National Park (4 million) and Yellowstone National Park (2.7 million). Prior visitor population estimates were much lower, ranging between 3 million (TERC 2012) to 5 million (LTBMU 2012).

### Development and Growth

The Tahoe Basin is primarily “built-out”. The Tahoe Regional Planning Agency (TRPA), a bi-state environmental regulatory agency, is responsible for balancing human development and environmental protection in the Lake Tahoe Basin. Land coverage is strictly allocated and limited. Most available land coverage is already allocated, therefore most major projects are redevelopment focused rather than expansive. Development within the basin occurs almost entirely on the low-lying, gentle slopes near the lake shore. Much of the Tahoe Basin urban area is built-out, with efforts focusing on low-impact, re-development (LID) of existing properties. Most development is regulated by the local jurisdictions/TRPA.

A majority of the land (~80%) in the Tahoe Basin is either owned by the US Forest Service or is CA/NV state land. The Lake Tahoe Basin Management Unit (LTBMU) manages 150,000 acres of National Forest Land in the Lake Tahoe Basin. It is the largest basin landholder. LTBMU’s programs include watershed management, urban lots, recreation and wildlife. Approximately 20-25% of the land in the Tahoe Basin is privately owned [Plate 2] (NTCD 2002, HDR 1992).

## Lake Tahoe Destination Stewardship Plan - Taking Care of Tahoe

### Shared Vision:

Tahoe is a cherished place, welcoming to all, where people, communities, and nature benefit from a thriving tourism and outdoor recreating economy

<https://stewardshiptahoe.org>

The multi-jurisdictional development of the Lake Tahoe Destination Stewardship Plan and efforts to educate visitors about how to help take care of Tahoe has drawn the attention of national media outlets, including CNN Travel and Comstock's in 2023.

<https://www.norhtahoecommunityalliance.com/community-vitality/to-take-care-of-tahoe-everyone-has-a-role-to-play-opinion/>

Shared Vision: Tahoe is a cherished place, welcoming to all, where people, communities, and nature benefit from a thriving tourism and outdoor recreating economy. Alignment around a Shared Vision The region created a shared vision to address critical challenges and improve the Tahoe experience – for all – through a comprehensive, collaborative approach. This Shared Vision was shaped over the past year by extensive public engagement, research tools and approaches, and a thorough analysis of how Tahoe's famed tourism and outdoor recreation experience impacts the region. This vision represents the desired outcome of the Lake Tahoe Destination Stewardship Plan.

Strategic Pillars and Action: The Shared Vision for Tahoe is built upon four Strategic Pillars. By acting on all four Strategic Pillars, the Shared Vision can be achieved. Within the plan, each of these Strategic Pillars encompasses a major goal along with objectives and priority action steps to achieve it.

- Foster A Tourism Economy That Gives Back
- Turn A Shared Vision Into Shared Action
- Shape The Tahoe Experience For All
- Advance A Culture Of Caring For Tahoe

The plan includes 32 actions organized by strategic pillar that will help implement the shared vision. The newly formed Lake Tahoe Destination Stewardship Council, hit the ground running by acting on initial priorities and rallying both new and existing members to contribute financial and human resources.

Demonstrating Tahoe's characteristic resilience, dedication, and strong penchant for collaboration, commitments to new funding were secured, existing programs were reinforced, and new initiatives were developed with an eye toward the shared vision for Tahoe. This is a work plan to keep teams on track and moving forward toward the shared goals of fostering a tourism economy that gives back, advancing a culture of caring, and improving the Tahoe experience for all.

### Take Care Tahoe [www.takecaretahoe.org](http://www.takecaretahoe.org)

A workgroup of more than 60 participating agencies, this group coordinates custom environmental stewardship messaging for the Tahoe region. Many of the TWSA main outreach topics are in this pool.

### Lake Tahoe Sustainable Recreation Working Group

<https://www.trpa.gov/programs/sustainable-recreation>

The Lake Tahoe Sustainable Recreation Working Group (formed in 2017) is a multi-sector working group of conservation and recreation professionals, private and nonprofit partners, and recreation stakeholders. The primary goal, and ultimate desired outcome is to provide high-quality outdoor

recreation experiences, while preserving and restoring the outstanding natural and cultural resources of the Lake Tahoe Basin.

### **Sustainable Recreation Pledge**

<https://www.gotahoenorth.com/sustainable-travel-pledge>

Become A Steward of Lake Tahoe: Commit to exploring the Lake Tahoe region responsibly and help preserve our treasured spaces by leaving them better than you found them. Adhere to instructions and signage, rules are in place for your safety and the wellbeing of our environment. Lend a hand during one of our community clean-up days and volunteer through North Lake Tahoe's Ambassador program. Think like a local! Ride public transportation and support small businesses and events – tourism dollars help keep our communities vibrant and strong.

### **2015 North Lake Tahoe Tourism Master Plan**

<https://www.gotahoenorth.com/wp-content/uploads/2015/09/2015-North-Lake-Tahoe-Tourism-Master-Plan1.pdf>

The 2015 North Lake Tahoe Tourism Master Plan (2015 Tourism Master Plan) lays out a framework of tourism investment strategies that can work in concert to continue to transform North Lake Tahoe into a national and international destination. Visitors have historically retreated to North Lake Tahoe for its tremendous natural beauty and recreational opportunities. The combination of high mountain peaks, a 125,000 acre lake and charming small communities make North Lake Tahoe a place loved by many. Almost 45% of current visitors come from the Bay Area, Northern California and western Nevada (Over 25% of visitors come from the San Francisco/Oakland/San Jose area, 13% from Sacramento/Stockton/Modesto and almost 6% from Reno). Approximately 8% of visitors are international. 42% of visitors are day visitors with overall visitation concentrated on weekends and peak holiday periods.

### **Tahoe Tourism Economic Influences Studied**

<https://www.usatoday.com/story/travel/2021/10/17/covid-19-underscores-need-diversify-tahoe-tourist-economy/8502646002/>

The COVID-19 pandemic helped expose the growing vulnerability of Lake Tahoe's increasingly tourism-dependent economy as housing costs balloon, year-round residency declines and more workers commute from afar or seek jobs elsewhere, a new report says. The Tahoe Prosperity Center says the findings in the study it commissioned with the help of a grant from the U.S. Economic Development Administration underscore the need to better diversify Tahoe's economy, build more affordable housing and utilize an increasingly skilled work force. "Exorbitant home prices, the high cost of living, long-haul commuters, a shortage of workers, and a flat to down economy over the past 10 years point to an economy that is not healing itself, nor resilient to disruptive changes that impact visitor-based economies more deeply," the study said.

### **The Tahoe Prosperity Center (TPC)**

<https://tahoeprosperity.org/envision-tahoe>

TPC was created at the recommendation of the Tahoe Prosperity Plan in 2010 to act as the steward for identified strategies therein. In 2021, the Tahoe Prosperity Center was selected by the U.S. Economic Development Administration to facilitate a Regional Economic Recovery and Resiliency Strategy for the people of the Tahoe-Truckee Region because of our consistent work with our partners in housing, broadband, and workforce development. We launched Envision Tahoe: Prosperity Plan 2.0. This work began with an initial report to analyze "baseline" conditions, followed by a second report that collected and synthesized input from stakeholders throughout the Tahoe community.



On its surface, the Tahoe-Truckee regional economy appears strong, powered by billions of dollars in annual tourism spending and skyrocketing real estate values. A deeper look reveals that the tourism industry accounts for more than 60% of the Basin's economic output, up from approximately 40% in 2010. While tourism will always be a mainstay in Lake Tahoe and a vital part of our economic future, relying so heavily on just one industry for local livelihoods, and as a tax base for our schools, healthcare, police, and fire is risky. COVID-19, the Caldor Fire, worsening drought, and workforce and housing crises, have placed new urgency on ensuring that the Tahoe Basin economy not only recovers, but becomes stronger and more resilient through diversification strategies.

### **The Prosperity Playbook**

[https://tahoeprosperity.org/wp-content/uploads/FinalJUNE-2022\\_Pro Prosperity-Playbook.pdf](https://tahoeprosperity.org/wp-content/uploads/FinalJUNE-2022_Pro Prosperity-Playbook.pdf)

In June 2022, the Envision Tahoe effort culminated in the "Prosperity Playbook." The Playbook lays out a vision the economy our community desires to have in the future: diversified, resilient, and inclusive. The Envision Tahoe team chose a "Playbook" because, by its nature, it is nimble and includes strategies that are adaptable to changing conditions. It is able to seize opportunities and look for near-term wins while maintaining focus on the ultimate goal. Among its many "plays" are progress toward fundamental issues, such as housing, transportation and tourism. Also included are new strategies, such as driving entrepreneurship, supporting new industry clusters, and creating new skill pathways for workers. Importantly, the "Prosperity Playbook" creates an opportunity to make progress in many, connected areas through collaboration, measurement and accountability. This Prosperity Playbook builds on the two earlier Envision Tahoe reports. You can find all three of the Envision Tahoe publications at [www.tahoeprosperity.org/envision-tahoe](http://www.tahoeprosperity.org/envision-tahoe).

Lake Tahoe is a world-class destination, frequented by 15 million visitors a year. The area's \$5 billion annual economy is now dominated by tourism, as the Envision Tahoe Baseline Report showed. In addition to this report, Tahoe Prosperity Center's current programs include:

- Alert Tahoe – adding emergency preventative fire cameras around the lake to protect Tahoe from catastrophic wildfire (and to protect our community, environment and economy).
- Connected Tahoe – expanding high-speed internet access and cell phone coverage.
- Tahoe Workforce Housing – getting rid of blight and building local workforce housing.
- Workforce Tahoe – ensuring Tahoe businesses and residents are prepared for the changing jobs, regional influences and education needs in the new global economy.
- Envision Tahoe - With the publication of the "Prosperity Playbook," the Envision Tahoe process moves into its next critical phase: community action to achieve a more diversified, resilient, inclusive economy for all.

This influx creates unique potential impacts to communities, transportation and water quality. During a busy summer weekend day, 300,000+ visitors are estimated to enter the basin. The area includes 14 ski resorts, 14 golf courses, 35 public beaches, 180.5 miles of bike paths, and 425 miles of official unpaved trails. (TRPA 2002). The basin supports an estimated 23 million visitor 'days' per year (US Census 2000). The most current 2010 National Visitor Use Monitoring (Regional Annual Visitation Use Estimate) for the Lake Tahoe Basin Management Unit (LTBMU) shows 5,786,000 National Forest visits\* to the National Forest lands here, and 8,999,000 Site Visits. (Source: LTBMU 2012).

\*A "visit" is defined as the entry of one person upon a National Forest to participate in recreation activities for an unspecified period of time. A National Forest visit can be composed of multiple site visits. (Meaning that a single person doing multiple visits, might be counted multiple times). \*A "site visit" is the entry of one person onto a National Forest site or area to participate in recreation activities for an unspecified period of time. Local Chambers use their own estimate of around 3,000,000 visitors over the entire Lake Tahoe Basin, so you can see the numbers do vary. (Don Lane. USFS (LTBMU) pers. comm.)

### **Lake Tahoe Real Estate Trends**

Tahoe Real Estate market performs quite differently than the national average. In 2020, from Covid-19 impacts (work from home opportunities) the Tahoe housing market experienced a record setting price surge and limited inventory. Second home ownership and occupancy in those units increased. Even in an area the size of Lake Tahoe, market trends can vary dramatically from neighborhood to neighborhood. Land prices and housing costs in the Tahoe Basin are some of the highest in the nation.

#### **South Lake Tahoe, CA Housing Market**

<https://www.redfin.com/city/18630/CA/South-Lake-Tahoe/housing-market>

The median sale price of a home in South Lake Tahoe was \$723K last month, up 12.0% since last year. The median sale price per square foot in South Lake Tahoe is \$474, down 6.0% since last year

#### **Kings Beach, Lake Tahoe, CA Housing Market**

<https://www.redfin.com/city/23616/CA/Kings-Beach/housing-market>

The median sale price of a home in Kings Beach was \$874K last month, up 4.0% since last year. The median sale price per square foot in Kings Beach is \$553, up 14.0% since last year.

#### **Incline Village Real Estate Market Overview**

<https://www.redfin.com/city/31207/NV/Incline-Village/housing-market>

The median sale price of a home in Incline Village was \$1.8M last month, up 2.3% since last year. The median sale price per square foot in Incline Village is \$824, down 8.1% since last year.

### **Agreements-Regulatory Controls**

Lake Tahoe's famous clarity is a result of the unique physical environment and has gained world support for its protection and preservation. The Tahoe Basin, cradled between Nevada and California, presents a complex political backdrop for protecting Lake Tahoe as a water source. The local governments include: two states, six counties, one city and multiple special districts.

Lake Tahoe is one of the most regulated watershed basins in the country. Much of the attention of the regulatory authorities and scientific community have been directed towards Lake Tahoe's famous clarity, which does not directly address many of the concerns of the drinking water suppliers. An ongoing goal of TWSA members is to incorporate drinking water issues into basin planning, and community programs through education and outreach.

Lake Tahoe was designated a Tier III Outstanding Natural Resource Water (303d) under the Clean Water Act in 1972. Lake Tahoe has the highest level of protection as an ONRW water body and non-degradation rule applies. The effort to protect Lake Tahoe consists of the participation and development of numerous regulatory agencies and special interest groups including: the Tahoe Regional Planning Agency, Lake Tahoe Basin Management Unit, Lahontan Regional Water Quality Control Board and the Nevada Department of Environmental Protection. Historically, the focus has been on protecting its unique clarity.

The Lake Tahoe Basin is a unique system that has gained world-wide recognition. The lake location and unique status as one of two alpine lakes in the world of its character (the other is Lake Baikal, in Siberia, Russia) creates a complex political system of government, non-profit, special district, and concerned citizens.

The Tahoe Regional Planning Agency (TRPA) is responsible for balancing human development and environmental protection in the Lake Tahoe Basin. TRPA is responsible for meeting nine environmental thresholds. The thresholds include: water quality, air quality, soil conservation, vegetation, fisheries, wildlife, scenic resources, community design, recreation, and noise (Bi-Compact 1980). TRPA addresses source water protection issues in the TRPA Code of Ordinances. Lake Tahoe's nearshore conditions are now receiving more attention in the regulatory arena. As one of its strategic initiatives, the Tahoe Regional Planning Agency worked with community members and stakeholders for almost 20 years, to update its shoreline policies and regulations. The plan was approved in October, 2018. For more information about the Shoreline Plan, visit [www.shorelineplan.org](http://www.shorelineplan.org).

The Nevada Division of Environmental Protection and the Lahontan Regional Water Quality Control Board enforce state law and policies, respectively, to protect public health, water quality and to sustain ecosystems.

The Nevada Division of Environmental Protection Bureau of Safe Drinking Water is the regulating authority for Lake Tahoe water suppliers within Nevada.

The California Bureau of Health Protection Services regulated water suppliers within California until June 30, 2014. On July 1, 2014, the CA Drinking Water Division was transferred into the State Water Board.

The Tahoe Regional Planning Agency, USDA Forest Service, the Lahontan Regional Water Quality Control Board and the Nevada Division of Environmental Protection work together to update their agencies' resource management plans for the Lake Tahoe Basin.

The Tahoe region is undergoing development of several long term strategic plans. These include an updated Tahoe Regional Plan to serve as the guiding documents for TRPA. Because TRPA is exploring new territory in the field of environmental planning, the Regional Plan will continue to mature as we learn more about how man impacts the environment. The Code of Ordinances is the most visible of several documents that make up the Regional Plan. <http://www.trpa.org/regional-plan/code-of-ordinances>

The Code regulates, among other things: land use, density, rate of growth, land coverage, excavation and scenic impacts. The regulations are designed to bring the region into conformance with the threshold standards established for water quality, air quality, soil conservation, wildlife habitat, fish habitat, vegetation, noise, recreation and scenic resources. At the same time, the Lake Tahoe Basin Management Unit (LTBMU) has sought public comment on the Forest Plan revision; which is designed to serve as a long term guide for managing National Forest System lands in the Tahoe Basin. [http://www.sierraforestlegacy.org/FC\\_ProjectsPlans/FPR\\_LTBMU.php](http://www.sierraforestlegacy.org/FC_ProjectsPlans/FPR_LTBMU.php)

The Lahontan Regional Water Quality Control Board (LRWQCB) also revised regulations relative to pollution discharges in its region. <http://www.swrcb.ca.gov/rwqcb6>

A revised Basin Plan removes the former prohibition on direct water application of herbicides/pesticides within the LRWQCB jurisdiction, replacing it with a project review/exemption review regulation. This statutory change opens up the potential for aquatic invasive species management within Lake Tahoe using chemical methods. TWSA has been, and remains, a vocal opponent of the approval to allow potential project use of aquatic herbicides and pesticides in Lake Tahoe.

The Tahoe Keys Control Methods test allowing for limited use of herbic ides, was granted regulatory approval and implemented in 2022.

[https://www.waterboards.ca.gov/lahontan/water\\_issues/programs/tahoe\\_keys\\_weed\\_control](https://www.waterboards.ca.gov/lahontan/water_issues/programs/tahoe_keys_weed_control)

This decision was revoked in court in 2024.

<https://www.tahoe-daily-tribune.com/news/court-rules-in-favor-of-parties-challenging-herbicide-release-in-tahoe-keys/>

**NEW: Medium and Small PWS for U.S. EPA’s Fifth Unregulated Contaminant Monitoring Rule (UCMR5) EPA Emerging Contaminants Sampling (including microplastics) to begin 2023-2025.** (Editor Note: At time of publication, IVGID, KGID (NV) and TCPUD, NTPUD (CA) are registered to begin sampling.)

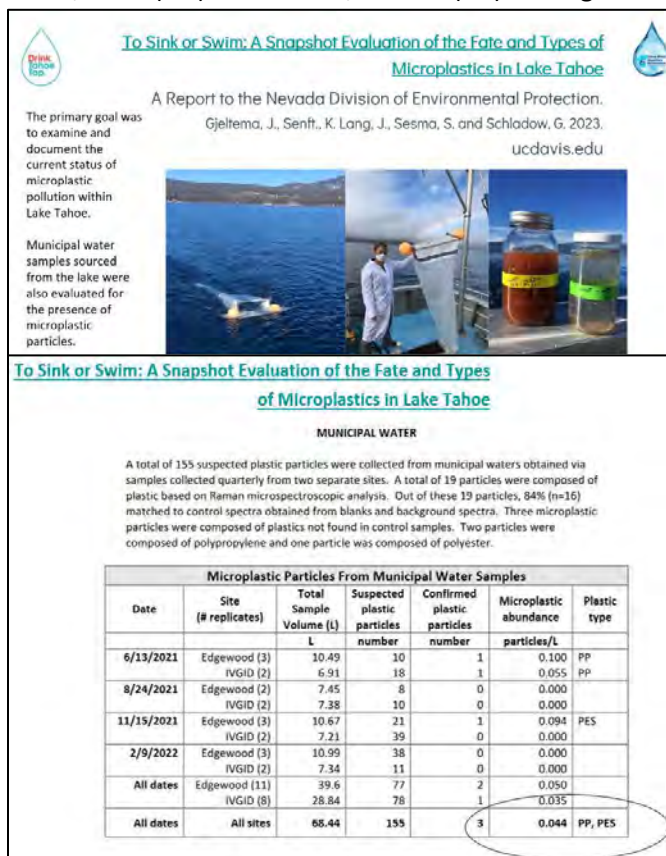
TWSA Staff have been working closely with global researchers on micro plastics in freshwater lakes, divers and drinking water sources. Staff presented on the UCMR5 regulatory process at the Tahoe Science Council Conference in October 2023. TWSA, partnered with NDEP to commission a multi-source sampling study on micro plastics, including sampling on 2 of the filtration exempt intakes. The intake sampling showed *extremely low particle count*.

### Lake Tahoe Municipal Tap Water 2022 Microplastics Sampling:

Average of 0.044particles/L or 1particle per 22.7/L, At 3L/day potential 1 plastic particle/week

Medium and Small PWS public water system (PWS) may be subject to the requirements of the next Unregulated Contaminant Monitoring Rule (UCMR 5), published on December 27, 2021 (86 FR 73131). UCMR 5 requires certain PWS to collect drinking water samples for 29 per- and polyfluoroalkyl substances (PFAS) and lithium analysis during a 12-month period between 2023 and 2025.

The UCMR dataset is one of the primary sources of information on occurrence and population exposure used to develop regulatory decisions for contaminants in the public drinking water supply by EPA. The Safe Drinking Water Act was amended in 2018 and now specifies that a nationally representative sample of PWSs serving fewer than 3,300 people as of February 1, 2021, are required to participate in UCMR. While participation by some medium PWSs (those serving between 3,300-10,000 people) is subject to EPA receiving additional appropriations, EPA has determined that it has appropriations available to support UCMR 5.



## **Long Term 2 Enhanced Surface Water Treatment Rule (LT2 rule/ LT2ESWTR)**

<http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/index.cfm>

The deadline for compliance was October 1, 2014. All TWSA members have achieved compliance. The USEPA developed the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 rule/LT2ESWTR) to improve drinking water quality and provide additional protection from disease-causing microorganisms and contaminants that can form during drinking water treatment. Pathogens, such as Giardia and Cryptosporidium, are often found in water, and can cause gastrointestinal illness (e.g., diarrhea, vomiting and cramps) and other health risks.

Cryptosporidium is a significant concern in drinking water because it contaminates surface waters used as drinking water sources, it is resistant to chlorine and other disinfectants, and it has caused waterborne disease outbreaks. Consuming water with Cryptosporidium, a contaminant in drinking water sources, can cause gastrointestinal illness, which may be severe in people with weakened immune systems (e.g., infants and the elderly) and sometimes fatal in people with severely compromised immune systems (e.g., cancer and AIDS patients).

The purpose of LT2ESWTR is to reduce disease incidents associated with Cryptosporidium and other pathogenic microorganisms in drinking water. The rule applies to all public water systems that use surface water or ground water that is under the direct influence of surface water. The rule will bolster existing regulations and provide a higher level of protection of your drinking water supply by:

- Targeting additional Cryptosporidium treatment requirements to higher risk systems.
- Requiring provisions to reduce risks from uncovered finished water storage facilities.
- Providing provisions to ensure that systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.

This combination of steps, combined with the existing regulations, is designed to provide protection from microbial pathogens while simultaneously minimizing health risks to the population from disinfection byproducts. This includes about 14,000 systems serving approximately 180 million people.

Systems initially monitor their water sources to determine treatment requirements. This monitoring involves two years of monthly sampling for Cryptosporidium. To reduce monitoring costs, small filtered water systems first monitor for E. coli—a bacterium that is less expensive to analyze than Cryptosporidium and monitor for Cryptosporidium only if their E. coli results exceed specified concentration levels.

### **Treatment**

Filtered water systems are classified in one of four treatment categories (bins) based on their monitoring results. Most systems classified in the lowest bin and will face no additional requirements. Systems classified in higher bins were required to provide additional water treatment to further reduce Cryptosporidium levels by 90 to 99.7 percent (1.0 to 2.5-log), depending on the bin. Systems will select from different treatment and management options in a “microbial toolbox” to meet their additional treatment requirements. All unfiltered water systems must provide at least 99 or 99.9 percent (2 or 3-log) inactivation of Cryptosporidium, depending on the results of their monitoring.

### **Unfiltered Water Systems Required to Add Treatment (Redundancy)**

Previously, existing regulations did not require unfiltered systems to provide any treatment for Cryptosporidium. Although unfiltered systems maintain watershed control programs to protect water quality, recent national surveys have shown Cryptosporidium to be present in the sources of unfiltered

systems. Without treatment, these Cryptosporidium will pass into the water distributed to consumers. Available data indicate that the average risk from Cryptosporidium in unfiltered systems is higher than in filtered systems, so that treatment by unfiltered systems is required to achieve comparable public health protection.

Further, with available technologies like UV and ozone, treatment for Cryptosporidium is feasible for all unfiltered systems. Consequently, EPA is establishing requirements under the LT2ESWTR for all unfiltered systems to treat for Cryptosporidium, with the required degree of treatment depending on the source water contamination level.

### **Filtration Avoidance General Criteria**

For a drinking water system to qualify for filtration avoidance under the Surface Water Treatment Rule (SWTR) the system cannot be the source of a waterborne disease outbreak, must meet source water quality limits for coliform and turbidity and meet coliform and total trihalomethane MCLs. Disinfectant residual levels and redundant disinfection capability must also be maintained. Filtration avoidance also requires that a watershed control program be implemented to minimize microbial contamination of the source water. This program must characterize the watershed's hydrology, physical features, land use, source water quality and operational capabilities. It must also identify, monitor and control manmade and naturally occurring activities that are detrimental to water quality. The watershed control program must also be able to control activities through land ownership or written agreements. (Filtration avoidance criteria are detailed in 40 CFR §141.71.) There are 160,000 public water systems in the United States. 60 systems possess filtration avoidance permits. 6 of those systems are at Lake Tahoe; all are TWSA members.

### **Treatment Requirements for Filtration Avoidance**

<b>Water Quality Parameter</b>	<b>SWTR</b>	<b>SWTR + LT2ESWTR</b>
Giardia	3 log removal/inactivation	3 log removal/inactivation
Virus	4 log removal/inactivation	4 log removal/inactivation
Cryptosporidium		2 log removal/inactivation
Turbidity	< 5 NTU	< 5 NTU
Total Coliform	<100/100 ml	<100/100 ml
Fecal Coliform	<20/100 ml	<20/100 ml

*(Source: USACE Risk Assessment Report 2008)*

### TWSA Operators Under Filtration Exemption

- Ozone plus Ultra Violet Disinfection; chlorine residual for delivery: IVGID, KGID, Edgewood, ZWUD Glenbrook
- Ultra-violet (UV) disinfection and chlorine residual for delivery: NTPUD

### TWSA Operators Using Filtration

- Filtration and chlorine residual for delivery: TCPUD (coagulation, pressure filter), Cave Rock/Skyland (micro-filtration; .2 micron), RHGID (direct filtration; Trimate micropfloc), LPA (direct filtration; Trimate micropfloc)



### **TWSA Member Actions to Achieve LT2 Compliance**

Regulatory requirements for raw water testing preceded any LT2 treatment upgrades. During this required testing, no *Cryptosporidium* detections were reported by TWSA members. As of the required deadline of October 1, 2014, the TWSA members had achieved LT2 Compliance (or were granted regulatory extension). EPA Emerging Contaminants Sampling to begin 2023-2025

### **The Safe Drinking Water Information System (SDWIS)**

<http://water.epa.gov/scitech/datait/databases/drink/sdwisfed/index.cfm>

EPA's Safe Drinking Water Information System (SDWIS) databases store information about drinking water. The federal version (SDWIS/FED) stores the information EPA needs to monitor approximately 156,000 public water systems. The state version (SDWIS/STATE) is a database designed to help states run their drinking water programs.

SDWIS contains information about public water systems annual water quality, including any violations of EPA's drinking water regulations, as reported to EPA by the states. These regulations establish maximum contaminant levels, treatment techniques, and monitoring and reporting requirements to ensure that water systems provide safe water to their customers. This search will help you find your drinking water supplier and view its violations and enforcement history.

The online database (<http://www.epa.gov/enviro/facts/sdwis/search.html>) allows anyone to select systems either by locating systems within a geographic area or by entering the water system ID number. For more detailed information about the water you drink, contact your local water supplier directly or call your state drinking water agency. To find the phone number for your state's drinking water agency, visit: <http://water.epa.gov/drink/local/index.cfm> or call the Safe Drinking Water Hotline at 1-800-426-4791.

### **EPA's ECHO System**

EPA's ECHO system is used to determine whether a system is in compliance with MCLs and other regulations. <https://echo.epa.gov/facilities/facility-search?mediaSelected=sdwa>

### **Consumer Confidence Reports (CCRs)**

Links/references to TWSA member agency CCRs are included in Chapter 4 & Appendix B in this report. All TWSA Members were well within compliance standards for drinking water quality provided to customers in the reporting year. Tahoe tap water continues to rank among the best drinking water in the nation. Community water systems are public water systems that have at least 15 service connections or regularly serve at least 25 year-round residents. The Consumer Confidence Rule requires public water suppliers that serve the same people year-round (community water systems) to provide consumer confidence reports (CCR) to their customers. These reports are also known as annual water quality reports or drinking water quality reports. CCRs summarize information regarding sources used (i.e., rivers, lakes, reservoirs, or aquifers) and detected contaminants, compliance and educational information. The reports are due to customers by July 1, annually. Online postings of the CCRs are available by visiting the water agencies website, or by contacting the agency. New US EPA regulations allow for electronic delivery opt-out by customers. Due to the small customer base, the primary delivery method for TWSA members is printed, mailed CCRs.

**Links to Member CCRs:**

TCPUD - <http://www.tahoecitypud.com/water-quality>

NTPUD - <https://ntpud.org/public-utilities/water/quality>

IVGID - <https://www.yourtahoeplace.com/public-works/about-public-works/forms-documents>

Douglas County, NV (Cave Rock/Skyland/Zephyr) -

[https://www.douglascountynv.gov/government/departments/public\\_works/annual\\_water\\_quality\\_consumer\\_confidence\\_report](https://www.douglascountynv.gov/government/departments/public_works/annual_water_quality_consumer_confidence_report)

KGID - <https://kgid.org/water-quality-report-consumer-confidence-report>

RHGID - <http://www.rhgid.org>

LPA - <http://lakesideparkassociation.org>

STPUD - <http://stpud.us/customers/water-quality-reports>

Glenbrook - Contact water agency for CCR information (775) 790-0711.

Edgewood - CCR not required; contact water agency for information (530) 588-4111.

For a detailed report on TWSA and member agency water quality sampling procedures, reporting and analysis please see

[https://162.79.29.162/psw/partnerships/tahoescience/documents/p079\\_DrinkingWaterQualityIndicatorReporting.pdf](https://162.79.29.162/psw/partnerships/tahoescience/documents/p079_DrinkingWaterQualityIndicatorReporting.pdf)

**Urban Water Management Plans (UWMP)**

The State of California Urban Water Management Planning Act (Act) requires each urban water supplier with 3,000 or more connections, or supplies at least 3,000 acre-feet per year (AFY) of water, to submit UWMPs to the California Department of Water Resources (DWR) every five years. The UWMP Act requires urban suppliers to report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures (DMMs), including implementation schedule and strategy. The purpose of developing an UWMP is to evaluate whether a water supplier can meet the water demands of its water customers as projected over a 20 or 25 year period. The UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. This evaluation is accomplished through analysis of current and projected water supply and demand for normal or average conditions, as well as during water shortages.

NTPUD: <http://ntpud.org/master-plans>

TCPUD: <http://www.tahoecitypud.com/download/general/uwmp.pdf>

STPUD: [http://www.stpud.us/plan\\_documents.html](http://www.stpud.us/plan_documents.html)

The **Nevada State Water Plan** is designed to guide the development, management and use of the state's water resources. It assesses the quantity and quality of our water resources, identifies constraints and opportunities which affect water resource decision making, and seeks to coordinate future actions to ensure that Nevadans obtain the greatest benefit from their water resources in the years to come. The first state water plan, *Water for Nevada*, was developed in the late 1960s and early 1970s. It identified a variety of issues and contained recommendations for improved water management, many which have now been implemented. Administration and management of the state's water resources has continued to evolve much to the benefit of the state's residents and the resources themselves.

<http://water.nv.gov/programs/planning/stateplan/documents/sum-es.pdf>



## TWSA Member Agency Capital Improvement Projects and Infrastructure Upgrades



### Kingsbury GID (KGID):

#### Challenges/ Incidents 2023:

- Sewage overflow in vicinity of NV State Beach.
- Extraordinary snowpack provided potential for extreme runoff event to carry sediments and other contaminants to lake via discharges near intake.
- Use of fire chemicals in the watershed have continuous and slow accumulation in the lake.
- Unmonitored logging of properties along the electrical corridor without stormwater BMP or erosion controls and now new logging roads are established without regard to the downstream impacts.
- Fuel Reduction logging along the electrical transmission lines was conducted without erosion controls. New or improved access roads were cut into the forest and sediments were not contained with BMPs. The district notified the responsible authorities and noted no significant improvements.
- The district also experienced replacement of the electrical distribution conductors which often included digging for new poles or tree removal. This work was done without any permits for road use and often resulted in debris (sediments and tree material) left in the roadways.
- The district was in communication with NV Energy and their subcontractors to improve procedures reducing sediments. In addition, the district conducted manual street cleaning in these areas as well as ensured the drop inlets and stormwater catchments and infrastructure were cleaned.
- The district continues to perceive nano plastics and PFAS/PFOS as the greatest threat to source water quality combined with the regulatory trends of legislative action for standards verse the codified and systematic procedures outlined in law.
- District has implemented the AWWA standards for monitoring the water loss. This was the second year of the use providing useful and standardized reporting methodology for management and policy decisions verse the homemade and unreliable system previously used.

#### 2023 CIP:

- The district completed renovations to its Administrative and Operations Center, allowing the district to be consolidated on a site with adequate stormwater controls and avoid the overcrowding and street parking and generally inadequacy of the previous site.
- The district's aggressive capital repair/renovation program for the past 3 years has resulted in significant reduction in water leads. From 22 in CY22, 7 in CY 23 and just 1 in CY24. The district

has under design the replacement of over 7,200 linear feet of water main which will eliminate the remaining sections of vulnerable pipeline.

- KGID completed water main replacement with new service lines for approximately 1 mile eliminating the water loss and frequent line failures in this section of the community.
- In addition, the district embarked upon the consolidation of the Ponderosa Mobile Home Park system into the district water distribution system. The Ponderosa system was notorious for leaks and lacked individual water meters for the residents. It is anticipated that these projects will significantly reduce the total water use, eliminate the summertime run-off as well as reducing sewer flows. These efforts improve water quality and incrementally reduce the carbon footprint of the community.
- Build out of the Sierra Colina development added 52 new services and ¼ mile of water main. KGID completed repairs to numerous retaining walls to restore sediment controls.
- KGID reformed the development guidelines to use more reliable ductile iron pipe and copper service lines. These materials are proven more durable and provide resiliency and reduce recovery time following wildfire events.
- The district participated in a watershed cleanup which removed several tons of debris from Edgewood Creek within the commercial area of the district.
- District completed the first phase of the Stormwater Masterplan which identified projects in the highest reaches of the district (both in basin and outside). Work on specific projects designed for CY 2024 completion.
- KGID issued several water waste notices to residents and commercial businesses within the district.
- KGID conducted a community outreach event to promote water saving/fire resistant landscapes. District provided water conservation materials in billing notices and as handouts at the front counter. The district completed the AWWA format for water audit to quantify water loss.
- The district had audit/calibration of the water intake and water production meters to resolve conflict of the reporting.

#### 2022 CIP:

- Kingsbury GID works on the current Water and Road Improvements Project. This project includes the following improvements with their estimated dates in 2022 and the roads affected.
- Waterline Replacement: Sunflower Circle, Griffin Court, and Donna Way to Kimberley Brooke Lane and Tina Court have been completed.
- Road Rehabilitation: Sunflower Circle, Eugenia Court, and Griffin Court have been completed
- Roadway Section Replacements: Tramway Dr. from Quacking Aspen to the Ridge View.
- Road Sealing project for the following roads have been completed: Tramway Dr., Quacking Aspen Ln., Jack Dr., and Amy Ct. Terrace View Dr., Reinken Ln., and Edgewood Dr. Donna Way to end of Kimberly Brooke Ln., Barton Ct. & Dr., Carol Ct. and Drew Ct.

#### Previous CIP:

- KGID has completed a waterline replacement project. This project consisted of replacing approximately 2,250 linear feet of a 4" steel line with 6" C-900 and added 2 new fire hydrants to this section. Improving water quality and fire protection. A new pressure reducing vault was installed to replace an old one. The old vault was in the roadway creating traffic control issues when service and maintenance was performed. The new vault was installed off of the roadway to alleviate this issue. 21 galvanized and copper service lines have been replaced with Polyethylene lines. Lastly 200 linear feet of 6" spiral welded steel watermain was replaced with 6" C-900.
- KGID has pre-placed 2 large FSAA compound meters within the service area, for use with wireless metering, to access two (difficult to access -confined space entry) private locations with fire

hydrants. KGID completed replacing the 12" steel line in Hwy 50 that serves as the secondary feed for the Lakeside Inn and Casino. The replacement of the steel 12" from Kahle to the Nugget PRV is also completed, approximately 100' of pipe. A 6"FSAA with a ¾" X 2" compound bypass has been purchased to replace the Abbey Rd vault meter. A 8"FSAA with a 1" X 3" compound bypass has been purchased to replace the Kahle Community Center vault meter.

- KGID's new \$19 million water treatment plant was activated in 2015. KGID completed construction of a new, state of the art water treatment plant to come into compliance with LT2. The facility is a 6 MGD plant utilizing UV and Ozone, as well as onsite chlorine generation. Construction began in September of 2014 and the plant came online December 2015.
- A new luxury development, Tahoe Beach Club consists of 143 Luxury Condominium Residences. Plans include a 160-foot floating pier extension near the KGID intake. Construction related activities had the potential to present problems for the District due to the proximity to the intakes. Post construction activities will be assessed for the potential for contamination of the source water. KGID is working with the developer and is preparing comments. NDEP has commissioned an additional Risk Assessment Study for this intake.

#### Round Hill GID (RHGID):

- New water rates 2024. <https://rhgid.org/rates-adopted-july-1-2022-through-june-30-2027/>
- The Caldor Fire was a potential threat to water quality and specifically turbidity. We monitored our turbidities around the clock and continued with frequent testing. Turbidities only fluctuated upwards 0.02 mg/L on influent turbidimeters and had no effect on finished water.

#### Previous CIP:

- RHGID rebuilt 5 Pressure Reducing Valves (PRV's) on water mains.
- RHGID is currently in the process of replacing meter mains at the Castle Rock subdivision, which is funded through the NDEP SRF. All precautions have been made as per contract and regulations. Our fire hydrant replacement in conjunction with STPUD grant project is complete. We are scheduled to have an assessment to begin rehabilitation and/or replacement of 2 PRV's in the lower portion of our water system.
- RHGID replaced a 50 year old, dilapidated, 500,000 gallon concrete water storage tank located in the upper pressure zone with a new 500,000 gallon welded steel tank.

#### Edgewood Water Company:

- During 2024, EWC will have 1.15 MG bolted steel tank recoated on the exterior. The interior has a lining in it. The welded 1.15 MG tank will have the interior and exterior recoated. Also, in 2024 both tanks are scheduled for inspection in April or May.
- New meter services are as follows:
  - Event Center: 6 inch domestic, 2x 1 ½ inch irrigation meters.
  - Edgewood Villas: Four new Villas, each 2 inch meters.
- Replaced aging 14-inch raw water meter and installed a clamp on meter on raw water line at pump station. This was done to accomplish redundancy.

#### Previous CIP:

- EWC installed a second VFD for pump #2 at our pump house. Installation was completed by Arctic Electric and controls were done by Sierra Controls. The second VFD gives us the redundancy.
- Edgewood Water Company was involved in the expansion/modification of the water treatment and distribution system to accommodate the 150 room Edgewood Lodge and 40 shared residences that are part of the Edgewood Lodge Project. The project was completed and opened in June, 2017. <http://www.edgewoodtahoe.com>

- EWC has completed the LT2 project that included new UV treatment using the Calgon Carbon UV system. Also as part of LT2, EWC upgraded the ozone system with new ozone generators, dryers, destruct systems and analyzers.
- EWC constructed a lake intake extension (5,500 feet out and 600 feet down) to access water suitable for use in heat exchangers to be used by the Edgewood Lodge Project. The intake extension allowed for a unique HVAC modification, cold lake water is used in circulation on the properties for the property cooling needs. EWC rerouted part of the raw water line and distribution line in addition to adding approximately 2 miles of distribution line to meet the demands of the Edgewood Lodge Project.

Lakeside Park Association (LPA):

Threat: There is a storm drain outfall from the Stateline Ave runoff that releases into Lake Tahoe adjacent to the intake line. Lakeside Park Association has been in contact with the City of South Lake Tahoe, agents are working on securing funding for a complete streets program to include mitigation of this storm drain.

CIP:

- Generator Replacement Project – Lakeside Park Association replaced two obsolete generators at the pumphouse station and water plant buildings.
- Plant Pump Replacements – Replacement of two recycle pumps and one raw water pump along with related electrical components.
- SCADA Controls - Upgrades to the SCADA system were performed to ensure accuracy for data collection and reporting as well as several integrations for the overall system.
- Generator Automatic Transfer Switch - A new automatic transfer switch was installed at the water plant generator replacing the obsolete transfer switch that had failed.
- Filter Controls - Rehabilitation of the filter controls was performed when the valve actuators failed to open and close the valving. Additionally, set points were re-established to factory specifications to ensure reliable and accurate operation of the filter units.
- New Metered Services - Lakeside Park Association is a small water system that falls under the connection requirement for metering the water system in its entirety, however all new connections to the system must be metered pursuant to the Water Measurement Law. As such, there are now 1 residential and 2 commercial metered services.
- Water Rates Adjusted -Lakeside Park Association increased its water rates in 2023 by 4%.

Previous CIP:

- Azure Ave Mainline Replacement Project
- \*Replace aged 6" welded steel water main with 8" C900 & appurtenances and provided for a loop in the system where there once was a dead-end line.
- Capital Project: Stateline Ave Mainline Extension Project
- \*Installed 8" C900 water main and appurtenances including a fire hydrant to a newly annexed area where the homes were never connected to a water system. This was accomplished by entering into a water service agreement with South Lake Tahoe Public Utilities District and by changing the existing water rights include this area.
- New Pump Control Panel w/ Operator Interface & Surge Protection Replace / install two new Marathon Motors
- Install new variable frequency drives at all 3 motors New VPN for remote capabilities / support
- Install redundant transmitters for reliability Install new check valves & piping
- Greenwood – Hill Water Main Replacement Project. The project included installation of approximately 612 lf of 8" water main, reconnection of 10 services and related improvements.

- New metal roof for the existing water plant building.
- Lakeside Park Mutual Water bills its customers a bimonthly flat rate. Prior Projects:
- Ultraviolet C Pilot Test for aquatic weeds control  
<http://www.laketahoenews.net/2017/03/ultraviolet-light-used-kill-tahoe-weed>  
[https://tahoercd.org/wp-content/uploads/2019/02/UV\\_Plant\\_Control\\_Pilot\\_2018\\_Monitoring\\_FINAL.pdf](https://tahoercd.org/wp-content/uploads/2019/02/UV_Plant_Control_Pilot_2018_Monitoring_FINAL.pdf)
- Killing aquatic invasive weeds in Lake Tahoe with ultraviolet C light was tried for the first time summer 2017. The California Tahoe Conservancy Board on March 16 agreed to spend \$260,128 on the pilot project in South Lake Tahoe. The money was awarded to the Tahoe Resource Conservation District, which has been integral in working on ways to eradicate various invasive species from Lake Tahoe. John J. Paoluccio of Inventive Resources Inc. has developed a system in which the plants are killed – almost like getting a lethal sunburn. The light damages the DNA and cell structure of the aquatic invasive weeds. This stops reproduction and eliminates the weed in a few days. The CTC staff report says, “The project will help the Tahoe RCD determine the optimum intensity and duration of treatment necessary for eradication of AIS plants.” UV Light methods continue to be used at Lakeside Marina. <https://tahoercd.org/aquatic-invasive-species-control-projects>
- Cedar Water Line Replacement Project completed in 2016. This project included replacement of
- 760 feet of 6” and 2” steel water line with 8” c900 water main. New services and a fire hydrant added. Security fencing placed around water treatment site.

#### Previous Threat:

- Caldor Fire: Fire Retardant and run off after the fire was a concern although to-date there are not any signs of water quality degradation that has been observed during the treatment process.
- Tahoe Keys Control Methods Test Project: A test project to mitigate aquatic weeds within the Tahoe Keys waterways included a component that introduced herbicides to Lake Tahoe, our source water – which has never been allowed until May 25, 2022. In response to this, Lakeside Park Association monitored the project and conducted periodic herbicide sampling to ensure that there was no residual herbicide detected in the source water and subsequent drinking water.

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#### Glenbrook Water Cooperative:

In 2015, volunteers in the League to Save Lake Tahoe's Eyes on the Lake program discovered a new infestation of aquatic invasive plants in Glenbrook Bay, on Lake Tahoe's eastern shore. In 2016/17 Glenbrook homeowners and League volunteers pitched in to help remove the infestation using manual methods. See how they did it: <https://www.youtube.com/watch?v=bRspQNXy4CM>

Glenbrook replaced the ozone generators and installed new UV reactors. The Glenbrook Water Treatment Plant upgrade was completed by September 2014.

In February 2016, officials from the Glenbrook Water Cooperative in Glenbrook, NV accepted the Gold Medal Award at the Great American Water Taste Test. Glenbrook was selected by a panel of judges at the GAWTT finals from thousands of entries.

#### Incline Village GID (IVGID):

<https://www.yourtahoepace.com/ivgid/resources/construction-updates>

The Incline Village General Improvement District (IVGID) currently maintains 90 miles of water mains to deliver safe and reliable potable water to all areas of Incline Village and Crystal Bay. Unfortunately, water infrastructure doesn't last forever and, as a substantial portion of the District was developed using corrosion and leak prone thin wall steel pipe, the District has a robust annual water main replacement

program. Since 1982, the District has replaced approximately 38 miles of steel water mains throughout Incline Village and Crystal Bay at a cost of \$17-million, not adjusted for inflation. There is approximately six miles of steel water mains (roughly seven percent of the District's total water main inventory) still slated for replacement.

The Incline Village General Improvement District is working on several major Capital Improvement Projects (CIP) throughout the District, addressing major infrastructure upgrades, repairs, replacements and other enhancements. IVGID's Engineering Division, within the Department of Public Works, generally takes the lead on the design, bidding, and management of these projects.

IVGID 2023-26 CIP:

- Old steel water main replacement and fire flow enhancement improvements continue each year. Residential meter registers and transponder replacements will start this FY and continue for the next 2-3 years. Rate schedule adjustments.
- Crystal Peak Waterline (5/1/2023): The Crystal Peak Road Watermain Replacement Project is a part of the multi-year capital improvement program to replace the 1960s-era thin-wall steel watermain. This project will replace the 6" main within Crystal Peak Road (between Lakeshore Boulevard and Martis Peak Road) with a new 8" watermain.
- Wetlands Improvements (9/15/2023): The Wetlands Effluent Disposal Facility, owned by IVGID, is located in the Carson Valley, Nevada and was built in 1984. General maintenance of the facility is completed each year, and this larger project was identified as a FY 2021-22 Capital Improvement Project (CIP). Due to the nature of the grading work proposed, the wetlands need to be as dry as possible for the construction equipment to be able to enter the wetland cells. It was anticipated that this work would occur during the fall, which tends to be the driest part of the year. The Project consists of grading work to re-establish channels in a few locations that have silted in and become overgrown with vegetation. Also included is grading work to repair the berm between Cells 1A and 1B. Over the years, wave action has damaged this berm, resulting in short-circuiting of the effluent flow.
- Effluent Pipeline Project – 2524SS2010: The Effluent Pipeline Project has begun this summer, with construction on Highway 28. The replacement project proposed to replace the remaining Segment 3 pipeline (13,700 linear feet) and all of the Segment 2 Pipeline (16,300 linear feet) beginning at the Spooner Pump Station and continuing south along SR-28. These are the only remaining stretches of EEP along the east shore of Lake Tahoe that has not been replaced. Segment 3 experienced significant leaks in 2009 and 2014, and subsequent investigations confirmed progressive corrosion of this bell and spigot pipe with wholesale replacement required. A conditional assessment of Segment 2 determined that there is significant corrosion along this segment as well and full replacement is needed.
- Effluent Storage Tank Project – 2599SS2010: The Incline Village General Improvement District (IVGID) owns and operates the Wastewater Resource Recovery Facility (WRRF) that serves the Incline Village and Crystal Bay communities. As part of the WRRF there are two unlined ponds that are available for use in an emergency situation. The WRRF is permitted for operations by the Nevada Department of Environmental Protection (NDEP). NDEP has conditioned the operating permit such that IVGID may no longer use the two unlined ponds in the event of an emergency. Therefore, Public Works staff have been working with the design consultant, Jacobs, for the design of a 2- million gallon effluent storage tank.

Previous CIP:

- 2022 Wastewater Resource Recovery Facility Building Upgrades: A 2022 Capital Improvement Project, this project replaces the existing non-operable sliding gate at the Water Resource



Recovery Facility with a new electronic vertical pivot security gate. The vertical pivot gate will operate in all weather conditions. Installation of the gate is required in order for the District to be in compliance with AWIA 2018 safety and security protocols for water and sewer infrastructure.

- 2022 Recreation Center Locker Room Remodel: The Recreation Center Locker Room Remodel improvements include new tile, fixtures, and lockers with integrated security systems, as well as modifications to comply with current ADA building and fire codes. With all demolition completed and new floor and wall tile installed, our next steps include the installation of lockers, benches, lighting, and other fixtures.
- 2021 Burnt Cedar Swimming Pool Improvements: A 2021 Capital Improvement and Board of Trustees Priority Project, this project will reconstruct the two (2) existing pools (full size and toddler) at Burnt Cedar Beach.
- 2020 WRRF Aeration System Improvements: The aeration process of wastewater treatment supplies oxygen to facilitate the biological activity that converts raw sewage into treated wastewater effluent. The plant has six 200,000-gallon aeration basins with two jet aeration clusters per basin supplied by computer controlled multistage centrifugal aeration blowers. This project funds the design and replacement of the aeration equipment.
- 2021 Water Reservoir Coatings and Site Improvements: A 2021 Capital Improvement Project, this project coats the exterior of IVGID reservoirs R2-1 and R6C-1.
- 2021 Replace & Reline Tanager Sewer Mains, Manholes and Appurtenances: the replacement and rehabilitation of sewer mains, manholes and appurtenances.
- 2022 Slott Peak Court - Water Main Replacement: A 2022 Capital Improvement Project, this project includes replacing the aging steel water main in Slott Peak Court and miscellaneous water system improvements.
- Water Reservoir Safety and Security Improvements – Phase 1: This project replaces the ladders that access the top of ten out of thirteen of the District’s potable water tanks, and install intermediate access platforms, protective railings and new fall protection devices. Exterior access to the roof area is required to meet the needs of the District for water quality monitoring and to perform routine repairs to radio communication equipment. The ladders also need to be secured from access by the public. The reservoir ladders, fall protection, platforms, and protective railings will meet the current Occupational Safety and Health Administration (OSHA) safety standards. Due to budget constraints, the Board awarded the contract for ten reservoirs out of the thirteen bid to Resource Development Company on April 10, 2019.
- Water Reservoir Safety and Security Improvements- Phase 2: The second phase of this project will provide the same safety and security improvements to the other three potable water reservoirs not awarded with Phase 1, above. This work was awarded to Paso Robles Tank at the June 10, 2020 Board of Trustees meeting. Construction is substantially complete.
- 2020 Watermain Replacement & Fire Flow Enhancement Project, Martis Peak Road: A 2020 Capital Improvement Project, this project included slip lining a 14-inch water main under State Route 28 and replacing aging steel water main in Martis Peak Road and Rifle Peak Court. IVGID Engineering Staff completed the design and the construction contract was awarded at the June 23, 2020 Board of Trustees meeting. Construction is complete.
- Crystal Shores AIS Treatment: <https://www.laketahoeinfo.org/Project/Detail/3800> A local HOA worked with Tahoe RCD on identification and bottom barrier/diver control of a small infestation of Eurasian Water Milfoil at the Crystal Shores marina. The aquatic plant removal work implemented at Crystal Shores West, Crystal Shores East, and Crystal Shores Villas is part of a multi-year lake-wide strategy to remove aquatic invasive plants from the nearshore of Lake Tahoe Basin. Together with removal and/or reduction of all aquatic invasive species (including invertebrates and warm

water fish), these projects contribute to the Environmental Improvement Program (EIP # 01.04.02.06).

North Tahoe PUD (NTPUD):

<https://ntpud.org/watersewer>

- Completed the installation of approximately 7,700 linear feet of new 8-inch watermain and 12 new fire hydrants on Golden Avenue, Rainbow Avenue, and Secline Street in the Kings Beach Grid neighborhood.
- Completed the replacement of the 5 Model 15 satellite sewer pump stations.
- Rehabilitated 9 lower lateral sewer services using trenchless technology (CIPP).
- Replaced 2 booster pumps at the Zone 1 Booster Pump Station.
- Completed water models of the Agate Bay Water and Fulton Water Companies systems for future emergency intertie projects.
- Began design on the 8 Model 16 satellite sewer pump stations
- Completed design on Brockway Fire Protection Water Infrastructure 2024 project to install approximately 1,937 linear feet of 8 inch water main in Highway 28 between Park Ave and the Nevada State Line, 431-feet of new water main in the undeveloped Placer County Pier Street right-of-way, 21 replacement residential water services, four new fire hydrants, and a 50-foot crossing of Highway 28 in the Lake Forest area near Lardin Ave.
- Completed construction on the N-1 Satellite Sewer Pump Station Rehabilitation project to reduce risk of sanitary sewer overflow to source water.
- Completed the Zone 2 Water Storage Tank Electrical Service project to install commercial power to the tank to replace the battery power.
- Began construction to install approximately 7,700 linear feet of new 8-inch watermain and 12 new fire hydrants on Golden Avenue, Rainbow Avenue, and Secline Street in the Kings Beach Grid neighborhood.
- Completed approximately 3,100 linear feet of new 12-inch watermain and 6 new fire hydrants in Carnelian Bay from Gar Woods Restaurant to Watson Creek.
- Began replacement of the 5 Model 15 satellite sewer pump stations.
- Completed the Tahoe Vista Recreation Area Scenic Overlook project to reduce erosion and runoff into the lake.
- Completed the Spring 2023 Lower Sewer Lateral Lining project to rehabilitate sanitary sewer laterals from customers' property line cleanout to the sewer main. This project includes lining six (6) sewer services throughout Kings Beach to extend their useful life.
- Completed the Grey and Toyon Lower Lateral Lining project to rehabilitate sanitary sewer laterals from customers' property line cleanout to the sewer main. This project includes lining eight (8) sewer services on Grey Lane and Toyon Road to extend their useful life.
- Updated NTPUD's Spill Emergency Response Plan and Sanitary Sewer Management Plan, per the recently adopted California regulations.

Previous CIP:

- Purchased three new portable generators to replace the existing, aged portable generators.
- Began permanent Chlorine injection into the Carnelian Bay System in January 2022.
- Installed ten new meters, and swapped out 25 meters.
- NTPUD continues an aggressive water conservation education and services program including a low-flow toilet rebate credit program for water customers.
- Implemented annual water and sewer rate adjustments for all customers on July 1, 2020 and July 1, 2021, per the District's 5-year rate adjustment plan.



- Continued Stage 2 Water Conservation regulations in alignment with the State of California’s emergency drought declaration and to maintain our mandated 20% by 2020 standard.
- Kingswood West Water Storage Tank Rehabilitation (Project #2031): Rehabilitation of a 500,000-gallon water storage tank in the Kingswood West subdivision.
- N-1 Satellite Sewer Pump Station Rehabilitation (Project #1952): Project includes new pumps/motors, controls, generator, station valves/piping, new influent gravity main, and fence for scenic improvements.
- Easement & Vegetation Clearing (Project #2024): Survey staking (marking) easement limits and subsequent vegetation removal as applicable for select locations as deemed applicable.
- National Avenue SCADA Improvements – Phase 3 (Project #1622). Fall 2020.
- Base Facilities Emergency Power Distribution (Project #1953): Provides Annex, fuel pumps, and shop power supply from Base emergency generator. Project is partially grant funded (75%) through FEMA/CalOES. December, 2020
- Kingswood West SCADA Hub Rehabilitation: Full rehabilitation of platform, back-up power supply, cabinets, and all SCADA and Radio components. SCADA hub located adjacent to Kingswood West tank and serves the District’s entire SCADA and hand-held Radio communications backbone.
- 2020 Zone 2 Watermain Loop (Project #21XX): 250 feet of 8” watermain to loop upper portion of pressure zone 2 enhancing fire flow capacities. 2020.
- National Sewer Pump Station Rehabilitation (Project #1953): Full rehabilitation of sewer pump station. The last of four (4) main pump stations to receive full rehabilitation in this current rehabilitation cycle. 2021.
- Kingswood Water Main Replacement Project
- Secline Pump Station Rehabilitation
- C-1 Wet Well and Dry Well Modifications
- Carnelian Bay Water West Main Replacement
- Zone 2 Water Tank Project
- Tahoe Marina Estates Water Line Replacement Project (In conjunction with Placer County Erosion Control Project)
- Cutthroat Water Main Replacement
- Kingswood Booster Pump Station Stairs
- Dollar Cove Water Treatment Study
- Lincoln Green Water Line Replacement
- Kingswood West Tank Security Fence
- Beaver Street Water and Sewer Line Replacement Project (In conjunction with Placer County Erosion Control Project)

### **Tahoe City PUD (TCPUD)**

<http://www.tcpud.org/capital-improvement-projects>

The West Lake Tahoe Regional Water Treatment Plant is anticipated online in spring 2025. TCPUD completed substantial progress on West Lake Tahoe Regional Water Treatment Plant, including ongoing construction at the lake intake pump station, final site work at the water treatment plant, equipment vendor site visits and training, and pre-commissioning of the water treatment plant with domestic water. The water treatment plant is expected to be fully tested and commissioned by spring 2025. This multi-year construction project began in June 2021 continues through 2024. The project will replace an existing temporary and seasonal water treatment facility currently located in Chambers Landing. The

new water treatment plant will be located at 275 Lodge Drive and will provide a permanent, all-season, drought-resistant drinking water source. The water treatment plant will become the primary source of drinking water to the McKinney-Quail Water Service Area, with the capacity to expand to other water systems along Lake Tahoe's west shore, resulting in a coordinated regional solution for drinking water and fire protection. The investment in this project, currently estimated at over \$20 million, represents one of the most significant investments made by the TCPUD Board of Directors to improve and protect the reliability of the water supply for a significant portion of Lake Tahoe's west shore. Major aspects of the project include installation of submersible pumps and replacement of water intake pipe in Lake Tahoe, construction of a lake intake pump station building, installation of new waterlines from Lake Tahoe to the treatment plant, construction of the treatment plant, replacement of existing waterlines, and demolition of existing temporary water treatment facilities.



#### TCPUD CIP Projects 2023-2025:

- Prepared the 2024 Rate Study to establish maximum water and sewer rates for fiscal years 2025-2029.
- Executed an Operating Agreement with the Tahoe Swiss Village Utility, Inc. (TSVU) to begin operating the water system before an official transfer of ownership in early 2025. The acquisition of TSVU will add approximately 450 connections to TCPUD, most of which are currently unmetered.
- Continue design and permitting for reconstruction of the Madden Creek Water System Reconstruction Project. Construction is expected to begin in spring 2025.
- Continue design, permitting and land easements for the Lower Meeks Bay Pressure Reducing Value Project. Construction is expected to begin in spring 2025.
- Continue design and permitting for the Rubicon Tank Feed Line Project. Construction is expected to begin in spring 2025.
- Continue selection of a Progressive Design Build team for the reconstruction of the Tahoe Cedars Water System Reconstruction Project, including invitation to short-listed contractors to prepare submittals in response to a Request for Proposals.
- Complete the Smart Meter Installation Project including approximately 800 smart meters installed in 2024, totaling 3,500 since 2022.
- 2023: Completed Phase II of the SMART Meter Replacement Project, including replacement of approximately 1,200 water meter registers and transmitters within specific neighborhoods in the TCPUD service area.
- Completed the Dardanelles Water Line Replacement Project which replaced approximately 1350 feet of undersized water line and added 3 new fire hydrants to improve aging infrastructure and increase fire protection.
- Conducted topographic design surveys for Phase III and VI of the Madden Creek water system reconstruction project to prepare for reconstruction that will improve aging infrastructure and increase fire protection.

- Completed substantial progress on West Lake Tahoe Regional Water Treatment Plant, including a new lake intake water line, demolition of the interim water treatment plant, construction of a new lake intake pump station, and building construction of the new water treatment plant.
- TCPUD Board adopted Ordinance 308 establishing an Infrastructure Improvement Charge for customers of the Tahoe Cedars and Madden Creek water service areas. The Charge represents the specific cost of upsizing water lines and installing fire hydrants to improve fire protection standards as part of the project to completely reconstruct the Tahoe Cedars and Madden Creek water systems.

Previous CIP 2022:

- Completed Phase II of the Madden Creek Water System Interconnection and Distribution Improvements Project which included 1,200 linear feet of 12-inch water line transmission, service laterals, and meters.
- Replaced a segment of water main in the Tahoe Cedars Water System (TCWS) that was found to be actively failing and in need of immediate replacement. The project consisted of replacing approximately 550 linear feet of 6-inch water main with 8-inch water main and associated service laterals. A 2021 Adopted Water System Master Plan for the TCWS calls for reconstruction of the entire water system due to its age and deteriorating condition.
- Imposed a moratorium on fire hydrant flow testing in the Tahoe Cedars Water System because of the number of leaks resulting from these tests.
- Initiated development of a Preliminary Design Report for the West Shore Regional Storage Augmentation Project. The Report will identify and recommend storage and transmission main water system interconnection improvements to serve the West Lake Tahoe region. The improvements are necessary to efficiently and effectively meet the demand conditions, including maximum domestic demand, emergency supply, and fire suppression.
- Began Phase I of the SMART Meter Upgrade Project, including replacement of approximately 800 water meters within specific neighborhoods in the TCPUD service area.
- TCPUD Board adopted the 2020 Urban Water Management Plan in February 2022.
- Board Declared Stage 2 water conservation measures in May 2022.
- Tahoe Cedars Interconnection (4,900 feet of 12" water main connecting McKinney Quail System to Tahoe Cedars System)
- Rideout Well (Redundant Source for Timberland System)
- Timberland Water System Replacement (4,000 feet of water main, 64 water services/meters and 12 new fire hydrants)
- Bunker Water Tank completed. This work included construction of a new 1.2 million gallon water steel storage tank to replace the existing undersized and aged redwood tank. The existing water tank, constructed of redwood in 1960, has a storage capacity of 500 k gallons. This project was the highest priority due to current deficiencies, including continued water leakage.
- TCPUD consolidated three private water systems on January 2, 2018, adding 1,573 connections or 38% increase in water customer base. For a current map of District systems, visit: [http://tahoe.360-biz.com/sites/default/files/images/DistrictWaterServiceAreas\\_2018\\_1.pdf](http://tahoe.360-biz.com/sites/default/files/images/DistrictWaterServiceAreas_2018_1.pdf)
- Madden Creek Interconnection (2,000 feet of 12" water main connecting McKinney Quail System to Madden System): In January 2018, TCPUD acquired and began operating the Madden Creek Water System (formerly Mid Sierra Utilities). Since the acquisition, TCPUD Board of Directors has dedicated significant time towards understanding how to invest in and improve the water supply and fire suppression capabilities of the Madden System. TCPUD identified a high priority need for backup water supply and additional water storage for the Madden System. To accomplish this, the District developed this project to interconnect the Madden System to the TCPUD's McKinney-Quail

Water System. The Project will provide the needed backup water supply and emergency water storage, in addition to replacement of critical water system components to enhance fire protection and improve water delivery and pressure. Due to the size and complexity of the Project, it has been broken into a two-phased construction schedule; the first phase includes the McKinney-Quail interconnection and associated high pressure transmission line replacement, and the second phase includes water distribution, servicing, and fire protection improvements. Phase 1 construction was scheduled to start in late summer 2019. The project will benefit the public by enhancing water supply and reliability as well as improving fire protection within the water system service area.

- **Timberland Water Company Interconnection and Distribution Improvements:** In January 2018, TCPUD acquired the former Timberland Water Company and began providing water service to Timberland's former customers on January 2, 2018. TCPUD staff identified the Project as a high priority capital improvement project to begin construction activities in 2019. The first phase of the Project includes installation of approximately 4,440 linear feet of 8-inch water main, 487 linear feet of 4-inch water main, 80 service reconnections and meters, 10 new fire hydrants, and 6 refurbished fire hydrants to replace the varying 2-inch to 6-inch existing system infrastructure. Since acquiring the Timberland Water System in 2018, TCPUD Board of Directors has dedicated significant time understanding how to invest in and improve the water supply and fire suppression capabilities of the system. The Board has approved over \$2 million in 2019 towards this estimated \$3.7 million capital infrastructure project. The project will benefit public health through enhancement of water supply and reliability as well as improving fire protection within the water system service area.
- **Tahoe City Mainline Emergency Water Supply:** The work consists of constructing approximately 1,400 feet of 12-inch raw water line along Grove Street from the existing Grove Street lake intake to the Tahoe City Golf Course property. The Tahoe City water system currently relies on groundwater wells for drinking water production. The waterline will provide the District with the ability to utilize the existing Grove Street lake intake as a backup water supply source, and provides the District with the ability to supply raw water to the golf course for irrigation.
- **Grouse Drive and Upper Ellis Water Line Replacement Project:** The work on Grouse Drive consisted of the replacement of 1,005 feet of 6" waterline with new 12" waterline from Bald Eagle Rd to the eastern Snowbird Loop. The work will include the installation of new fire hydrants and replacing service lines to the existing meter pits. The upper Ellis Road work will consist of the replacement of approximately 1,214 feet of 4" and 6" waterline with new 12" waterline from Snowbird Loop to the valve just south of the existing PRV located near lot 100. This work will also include installation of new fire hydrants and replacing service lines to the existing meter pits.
- **Highway 89 Conductor Casing Crossings:** Install empty conductor casing crossings at various points along Highway 89 between Tahoma and Tahoe City. These casings will allow for installation of future water line crossings for anticipated transmission system improvements. Key locations may include areas currently served by other water purveyors. For the next 2-3 years CalTrans will be constructing their environmental improvement project from Tahoma to Tahoe City. Installation of these casings prior to or during the CalTrans project will allow the casing to be installed by open cut method. After the CalTrans project is complete the same conductor would have to be installed by bore and jack, which is both costly and not always successful due to rock and soil conditions.
- **Tahoe City Public Utility District Water & Sewer Rate Study:** HDR Engineering, Inc. (HDR) presented the draft report on the water and sewer rate study update conducted for the Tahoe City Public Utility District (District). For this update, the study objectives were to provide an independent review of the five-year financial plan, develop rate structure alternatives for Board consideration, and develop a five-year rate schedule that will result in sufficient revenue to fund the operating

and capital needs of the water and sewer utilities.

- Tahoe City Well Replacement Project: Tahoe City Main water system (Dollar Hill to Tavern Heights) relies primarily on the Tahoe City Wells No. 2 and 3 for source water. During the summer months both wells are required to meet maximum day demand. The loss of one of the wells may require the use of a lake intake depending on the time of year. Use of a lake intake would require heavy chlorination and the posting of a boil water advisory. The existing Well No. 1 is of good water quality, however similar to Well No. 2 was not drilled deep enough originally. The well was drilled in 1958 and was not cased below 50'. A new well will need to be drilled, however, all of the existing infrastructure can be reused saving considerable expense on other items. This project could delay the need for the development of another water source (surface water treatment plant) for the Tahoe City Main water system.
- Highland and Rubicon Line Replacements: This work consisted of the replacement of the District-owned portion of approximately 139 water service lines in the Highlands subdivision and 150 in the Rubicon Water System. All of the lines in the Highlands are located in easements at the back of the properties, while all of the lines in Rubicon are in the road. The service lines located in these areas have experienced significant failures due to polybutylene pipe material becoming brittle and pipe connection methods. Over 25 laterals in each area have been repaired in the last three years. Replacing all of the services at once will save a significant amount of crew time and overall material cost, as well as limiting water loss and property damage due to failure.
- Tahoe City Sewer System Rehabilitation Project: The Tahoe City Public Utility District (District) completed a project to rehabilitate a portion of the Tahoe City sewer system. The sewer lines in the project area were constructed in 1952 and are some of the oldest in the District's system. As part of the project, the District and its consultants will be working within the neighborhood to locate and investigate the condition of existing sewer lines and laterals. Construction occurred in 2015.
- TCPUD continues an aggressive water conservation education and services program including rebate credit programs for water customers.

#### Douglas County Water Systems (Cave Rock, Skyland, Zephyr):

- April 2024 CIP: Cave Rock - Two Clearwell booster were replaced.
- October 2022 CIP: Cave Rock Water Distribution Phase 3-B upgrades were completed. The Cave Rock System had new piping and meter pits installed.
- November 2022 CIP: Cave Rock intake water line and inline booster upgrade was completed. The Douglas County water conservation plan was updated in March 2022.

#### Previous CIP:

- Douglas County conducted a system-wide SCADA upgrade for water systems at Lake Tahoe and Carson Valley. The upgrade is a key component to providing safe, reliable drinking water to customers of Douglas County. The County has recently consolidated all water systems under the responsible care of Douglas County into one Lake Tahoe and Carson Valley water rate structure. The water rate consolidation and increase will provide revenue to implement a robust 10 year Capital Improvement Plan for water systems at both Lake Tahoe and the Carson Valley.
- Douglas County has recently adopted a consolidated water rate structure for water systems at both Lake Tahoe and the Carson Valley. The consolidated water rate includes a 6% increase in the rate. See Douglas County website for additional information.
- Cave Rock evaluation for intake line replacement or upgrade was conducted in 2015-16, in the event that the lake level continues to drop due to the drought.
- U V addition to ZWUD Treatment plant was completed and online spring of 2015.

- Marla Bay Intake - 10" check valve was replaced fall of 2015.
- Uppaway Booster Station was completed summer of 2015.

### 2023 TRPA "Best in Basin" Awards

<https://www.trpa.gov/31st-annual-best-in-basin-award-winners-announced>

31st Annual Best in Basin Award Winners Announced



Sep 25, 2024 - Lake Tahoe, Stateline, Nev. – The Tahoe Regional Planning Agency (TRPA) Governing Board today recognized nine projects and programs with Best in Basin awards for exceptional environmental design and stewardship of Lake Tahoe. For more than 30 years, TRPA's Best in Basin award program has annually recognized projects that exhibit outstanding planning and execution and lead the way in regional collaboration and environmental stewardship. The award winners this year range from forest health projects to citizen science monitoring. "The Best in Basin award-winning projects provide outstanding environmental benefits for Lake Tahoe while also symbolizing what can be achieved when we work together to harmonize the human and natural environments," TRPA Executive Director Julie Regan said. "We applaud the hard work, innovation, and stewardship included in this year's winning projects."

Best in Basin award recipients for 2022 and 2023 are as follows:

- BEBOT – Beach Cleaning Robot – Lake Tahoe Beaches, Nev./Calif.  
Eco-Clean Solutions, JB Harris & JT Chevallier  
Science and Innovation
- Spooner Lake Frontcountry Improvement Project – Spooner Lake Nevada State Park  
Nevada Tahoe Resource Team  
Sustainable Recreation and Forest Health
- IVGID Effluent Export Pipeline – Nevada State Route 28  
Incline Village General Improvement District and Granite Construction  
Water Quality and Watershed Restoration
- Slaughterhouse Meadow Restoration Project – Glenbrook, Nev.  
Glenbrook Homeowners Association  
Forest Health and Defensible Space
- San Bernardino Class 1 Bike Trail Project – Meyers, Calif.  
El Dorado County  
Transportation and Sustainable Recreation



- Saxon Creek Aquatic Organism Passage Project – Corral Trailhead, Calif.  
Nevada Tahoe Conservation District  
Water Quality and Watershed Restoration
- Lake Tahoe Wildlife Hospital and Rehabilitation Facility – South Lake Tahoe, Calif.  
Lake Tahoe Wildlife Care  
Science and Innovation
- Saint Joseph Community Land Trust Riverside Homes – South Lake Tahoe, Calif.  
Saint Joseph Community Land Trust  
Affordable Housing and Community Revitalization
- Upper Truckee River and Marsh Restoration Project – South Lake Tahoe, Calif.  
California Tahoe Conservancy  
Water Quality and Watershed Restoration Project

Other significant projects were awarded honorable mention at this year's awards:

- Desolation Hotel by the Pipkin Family – South Lake Tahoe, Calif.
- Tahoe Vista Recreation Area Improvements by North Tahoe Public Utility District – Tahoe Vista, Calif.
- 2nd Street and Barton Ave. Drainage Improvements by the City of South Lake Tahoe – South Lake Tahoe, Calif.

#### **2022 TRPA “Best in the Basin” Awards**

<https://www.trpa.gov/30th-anniversary-best-in-basin-award-winners-announced>

For 30 years, TRPA has annually recognized projects that exhibit outstanding planning and execution and lead the way in regional collaboration and environmental stewardship. The award winners this year range from forest health projects to citizen science monitoring. “The Best in the Basin Awards recognize outstanding achievements for Lake Tahoe and our communities and set a standard of excellence in the region,” TRPA Deputy Director and External Affairs Chief Julie Regan said. “It’s impressive to see that after 30 years of awards, innovative projects that go above and beyond are forging ahead.”

Additional information is available at [trpa.gov/how-we-operate/awards](https://www.trpa.gov/how-we-operate/awards).

#### **Securing Funding for Watershed Control Programs**

Appointed staff members from each participating water agency form the TWSA Board of Directors. The largest partner, IVGID, offers its Resource Conservationist as the Association’s Executive Director. IVGID provides additional staff support for TWSA activities with the services of the Director of Public Works and Resource Conservation Technician. A partner agreement stipulates cost sharing of the expenses incurred by IVGID on behalf of the association. Members pay an annual fee, in part proportional to the size of their service areas and in part, in equal amounts representing common administrative costs. The average annual budget is now \$150,000-160,000.

This funding is used to support TWSA programs including: staffing costs, agency advocacy, event sponsorship, customer handouts such as dog waste campaign expenses, refillable water bottles, radio and print advertising, member staff training, school programs, scholarships and TWSA publications. Other projects such as the USACE Lake Tahoe Risk Assessment Model are cost shared above the annual budget, as needed.

### Public Education

The Tahoe Water Suppliers Association has a defined public outreach and education campaign for the Lake Tahoe Basin. Our websites are [www.TahoeH2O.org](http://www.TahoeH2O.org) (and) [www.DrinkTahoeTap.org](http://www.DrinkTahoeTap.org).

Key outreach messages included: “Drink Tahoe Tap®”, the “Tap It” network; “Do You Know Where Your Drinking Water Comes From?”, “Protect the Source” and “They Drop It; You Drink It”. Extensive information of the various outreach campaigns are listed in the Action Plan Highlights earlier in this report.

TWSA provides referrals to the Nevada Tahoe Conservation District and Tahoe Resource Conservation District free BMP landscape evaluation services. By working with partner agencies, the topic of aquatic invasive species prevention is provided to the public. Water conservation, appreciation of tap water, watershed protection and pollution prevention messages are delivered to the public. The primary means of distribution of educational campaigns include videos, print media, web, tv, and radio ads, public service announcements, and personal interaction at community events.



TWSA has a long-standing program of sponsorship of refillable water containers (bottles) and refill stations as a major outreach component.

### Water Efficiency (Water Conservation) Activities

Water conservation plans and outreach are an integral part of the member agencies’ messages to customers. Efforts concentrate on outdoor water usage rather than indoor usage. In the past 3 years, many of the TWSA members have lowered base gallon allocations, reduced tier trigger levels, and increased consumption and service rates.

### 2024 California Water Conservation Updates

<https://www.kutakrock.com/newspublications/publications/2024/july/california-water-conservation-regulations>

California State Water Resources Control Board Adopts Permanent Water Conservation Regulations  
In the past decade, California has endured two multi-year droughts that have led to temporary restrictions on water use. The temporary restrictions were lifted when drought conditions eased. In an effort to ensure sufficient water supplies for future dry periods, the California Legislature passed two bills (AB 1668 and SB 606) in 2018 which mandate water conservation measures on a permanent basis.

The legislation laid out a new long-term water use framework for urban water suppliers in California and called for the California State Water Resources Control Board (the “SWRCB”) to adopt implementing regulations for the following:

- Indoor residential water use;
- Outdoor residential water use;
- Landscape irrigation; and
- Water loss.



On July 3, 2024, the SWRCB adopted the required implementing regulations. Although the regulations go into effect on January 1, 2025, no water use reductions will be enforced until 2027. The regulations do not directly restrict water use by individuals or businesses and they do not apply to suppliers of irrigation (i.e., non-potable) water, suppliers with fewer than 3,000 connections or those that supply less than 3,000 acre-feet of water per year. The regulations will apply to approximately 405 urban water suppliers (including cities, water districts and private water companies) that supply approximately 95% of California's population with potable water. However, many of these suppliers are already carrying out water conservation efforts that meet the regulatory standards.

For suppliers whose conservation efforts will need to be ramped up, the regulations do not establish a one-size-fits-all approach. Instead, water conservation thresholds for each supplier will be customized based on factors such as local climate and precipitation, local land uses (with higher thresholds for newly built residential areas and land used for livestock or agriculture), the level of recycled water deliveries, and historical water use. In recognition that it may be more difficult and more costly for lower-income areas to meet the standards, median household income is also taken into account. Information about each affected supplier's service area characteristics can be found [here](#).

Suppliers must establish annual water budgets for their customers' indoor residential, outdoor residential and landscape irrigation uses as well as limits on water losses, which will be combined to establish a Water Use Objective (the "WUO"). The WUO includes allowances for certain variances and temporary adjustments, such as the use of water in cooling centers during periods of extreme heat or to counter negative impacts to wastewater collection and treatment, and bonuses for potable reuse efforts. In lieu of water budgets for landscape irrigation, suppliers can adopt alternative measures such as installing dedicated irrigation meters or providing rebates to replace inefficient irrigation fixtures, replace turf or install green infrastructure (e.g., swales or rain gardens).

The WUO will be met even if individual components in the formula exceed their budgeted use limits in a given year. For example, if indoor residential water use by a supplier's customers exceeds the budgeted amount, the WUO will still be met if the sum of water use in all categories does not exceed the total WUO budget. Suppliers will be presumed to be in compliance with the regulations if their customers' water use in 2040 does not exceed 70% of their water use in 2026. The regulations require suppliers to reduce their water budgets no less frequently than during each five-year period through 2040. The regulations also require each urban water supplier to provide to the SWRCB in a machine-readable format, by January 1 of each year, commencing January 1, 2025: (i) its WUO; and (ii) a report detailing actual water use among the various user categories for the prior year. Fines for non-compliance with the regulations can reach as much as \$10,000 per day.

The expectation is that compliance with the regulations will be more cumbersome for smaller urban water suppliers in lower-income areas, as many larger suppliers have already adopted water budget-based rates. Environmental groups have criticized the regulations as requiring too little conservation in the near term, while water industry groups have called for financial support from the SWRCB or other state agencies to ensure that the standards can be met without undue hardship to retail customers.

### **30x30 California Conservation Efforts**

<https://www.gov.ca.gov/wp-content/uploads/2020/10/10.07.2020-EO-N-82-20-signed.pdf>

<https://openspacetrust.org/blog/pathways-to-30x30-report/>

Following Governor Gavin Newsom's October 2020 executive order and President Biden's May 2021 directive to conserve 30% of California's and America's land and coastal waters by 2030 — the 30x30

initiatives — there is broad consensus that achieving this goal is both necessary and important. Why is this important? Because our land and waters contain the planet’s biodiversity — from the smallest organisms to the largest predators. When species are diminished, it affects whole ecosystems, and when ecosystems suffer, their ability to provide clean water, clean air, pollination and the many other functions we rely on is vastly reduced. By the state’s own estimates, California has already protected 24% of its lands in a “legally durable” — that is, permanent — manner. But scientists have determined that the goal of 30% serves only as a starting point, and that for our future climate and environmental health, it’s necessary to protect at least 50%. recent report called “Pathways to 30x30: Accelerating Conservation of California’s Nature” lays out a roadmap for the state’s initiative. It was put together by the California Natural Resources Agency (CNRA), the agency responsible for implementing the Governor’s order. The three primary goals of 30x30 are:

- Mitigate and build resilience to climate change
- Protect and restore California’s unique biodiversity
- Expand equitable access to nature and its benefits

### 20 x 2020 Water Conservation Plan

The California systems are making efforts to achieve the CA 20 x 2020 rule (20% reduction in water use by year 2020). The *20x2020 Water Conservation Plan* sets forth a statewide road map to maximize the state’s urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. It aims to set in motion a range of activities designed to achieve the 20 percent per capita reduction in urban water demand by 2020. These activities include improving an understanding of the variation in water use across California, promoting legislative initiatives that incentivize water agencies to promote water conservation, and creating evaluation and enforcement mechanisms to assure regional and statewide goals are met. The 20x2020 Plan discusses these many activities in detail.

[https://www.waterboards.ca.gov/water\\_issues/hot\\_topics/20x2020](https://www.waterboards.ca.gov/water_issues/hot_topics/20x2020)

### Water Efficiency – TWSA Education and Outreach Programs

Program	Detail	Estimate of Potential Reach
Staff	3 full time staff assigned to Waste Not (and Tahoe Water Suppliers Association) education and outreach. Current staff are AWWA Water Efficiency Practitioner Grade I certified and attended (Irrigation Association) Irrigation Auditor Training	All IVGID customers, all TWSA customers
Drink Tahoe Tap/ Take Care Tahoe suite Print Media / Ads	Tahoe Tribune Newspaper Tahoe.com Tahoe Quarterly Magazine Tahoe Local Magazines	(Tribune) 20,000 newspapers distributed per issue (Other publications) 60,000- 100,000 copies per printing
Mobile Water Stations	15 mobile water bottle filling stations available for free event use.	2023 = 50 events; appx 200,000 users

Presentations	Presentations to local schools (K-20), Homeowner Association, Board of Realtors, etc. Ongoing classroom presentations on source water protection and water conservation.	1-6 presentations annually on IVGID services and programs, including water conservation. Presented to various grades at Incline Village Elementary, Middle School, High School. (200-500 students) Sierra Watershed Education Partnership Trashion Shows focus on water conservation and Drink Tahoe Tap®.
Earth Day (2 annual)	Water Conservation / Water Quality education booth	5,000+ attendees (North Shore) 800 attendees (South Shore)
Children's Science Days (2 annual)	Water Conservation / Water Quality education booth	1000+ elementary grade students
SnapShot Day	Tahoe to Pyramid Lake regional citizens monitoring program	Over 300 volunteers watershed-wide, annual event
Other Community Outreach events	Collaboration at environmental education events held in Incline Village, North and South Lake Tahoe. Staff provides a Water Quality/Conservation education booth, taste test and activities.	50-2000 attendees per event; average 1-4 events monthly. 25+ annual.
Demonstration Garden Classes	Classes related to native plant gardening, irrigation , composting	5 to 10 students at each class; series of 4-6 classes offered each summer.
NTCD BMP Classes	3 hour BMP workshops	3 to 5 classes annually; 20 attendees per class
Beach sampling	District staff conducts regular sampling at 6 Incline Village locations.	12-18 samples annual
Water Bottle Filling Stations (permanent)	18 stations funded to date	100,000 annual
Drink Tahoe Tap map	Launched Nov 2023	50+ refilling locations listed
Television and radio	Public service announcements	Assorted messages annual; custom or regional Take Care messaging
Utility Bill Flyers	Information focused on water conservation	4,200 "PW News" newsletters mailed to utility customers 12 x annually. Water conservation information featured in summer months.
Brochures to class participants, utility customers and attendees at public events	"Drink Tahoe Tap" "Protect the Source". "Keep your Water Clean" "Tahoe Water Conservation Tips" "Water Conservation at Home" "Native Plants" "Leak Detection" "IVGID Water System" IVGID Wastewater System"	500 to 2000 of each flyer printed and distributed annually
Watershed Protection Signage / Tools	Dog Waste Stations; Cigarette Butt bins; Take Care signage	100 Dog waste stations distributed within the watershed ; 125 cigarette bins distributed in watershed; multiple signage placements  Water Refill Station Grant Program

Websites: Tahoe Water Suppliers Association IVGID Social Media	<a href="http://www.TahoeH2O.org">www.TahoeH2O.org</a> <a href="http://www.DrinkTahoeTap.org">www.DrinkTahoeTap.org</a> <a href="http://www.ivgid.org">www.ivgid.org</a> Facebook: Drink Tahoe Tap; IVGID Public Works	5,000 – 10,000 annual hits Custom and regional Take Care messaging
Conservation Tools for customers	Dye tabs, leak detection cards, shower times, Tahoe Landscape Guide, native wildflower seeds, refillable water bottles, dog waste bags	5,000 -10,000 annual
Efficiency Rebates	\$100 HE appliance rebates (ULF toilet/HE clothes washer)	1-100 customers; annual
Landscape Water Use Consultations & Audits	District staff provides free, on-site analysis of irrigation practices for customers. Full audits conducted on as-need basis.	1-10 per summer
“Water Waste” door hangers	District staff posts educational door hanger at properties observed with runoff, poor irrigation practices, daytime watering, etc.....	50 per summer
High Water Use ‘courtesy alert’ messages	Customers with monthly bills trigger high use; leak detection warning; customized billing messages; advertising the free water use consultations.	25 to 300 per month; summer
Billing Analysis	Meter reads are analyzed by District Meter Reader and billing staff for large increases attributed to leaks, over-irrigation.	15 to 100 customers per month

### Metering

- IVGID has all metered connections, with a 3 tier increasing block rate structure.
- NTPUD is a fully metered system, with a 2 tier increasing block rate structure.
- KGID is a fully metered system, with a 3 tier increasing block rate structure.
- Glenbrook is not metered.
- Douglas County has some meters installed in the Cave Rock and ZWUD systems.
- TCPUD is fully metered and began consumption based water rates for residential customers in 2009.
- Edgewood changed out all meters in 2009-2010.
- RHGID is a fully metered system, with a 3 tier increasing block rate structure.
- KGID conducted a community outreach event to promote water saving/fire resistant landscapes.
- KGID provided water conservation materials in billing notices and as handouts at the front counter.

### Leak Detection

- IVGID meter reading staff conducts monthly billing analysis and on-site leak detection assistance for customers. Distribution system leak detection is ongoing. The district has reduced system water loss to less than 10%.
- TCPUD’s program includes annual leak detection. TCPUD completes a system-wide water audit program, monthly. Thirteen separate areas comprising the entire water service area are audited

monthly. A running annual audit is also conducted for the entire system using AWWA provided software. TCPUD installed a backwash recycling system at the McKinney Quail Water Treatment facility. Over 90% of backwash water is now recycled. TCPUD also started a large meter testing program.

- NTPUD has installed the next generation MLOG radio. Itron has combined the MLOG technology with their ERT series and it is called the 100W + Leak Sensor. When deployed, it monitors the segment of the distribution system around the clock, acoustically surveying the integrity of the system. The 100 Series module collects and stores up to 40 days of hourly reads from the customer-side leaks. At the same time, it is also collecting and storing the data from the leak sensor. The leak sensor samples the pipe conditions every 22.5 minutes, totaling 64 times per day. These readings are collected from the 100W at the same time the automated meter reading is done. Each sensor will cover up to 300 linear feet. The District began installing the 100W with each new meter upgrade and/or ERT replacement. Presently, the 100W + sensors are being installed in areas of habitual leaks that warrant monitoring.
- KGID conducts in house detection, ongoing.
- KGID completed the AWWA format for water audit to quantify water loss.
- KGID uses audit/calibration of the water intake/water production meters to resolve conflict of the reporting.
- RHGID tracks unaccounted for water.

### **Member Water Use Efficiency (Conservation) in California**

California water conservation policy mandates extensive education, outreach and enforcement measures. Common conservation measures implemented include: tiered rates, irrigation restrictions, probation on water use on hardscaping, requirements for water efficient indoor fixtures, online water waste reporting forms and more.

North Tahoe PUD <http://ntpud.org/conservation>

The North Tahoe Public Utility District has set conservation restrictions; details are on the website. NTPUD adopted new water rates effective July 1, 2024. The new rates include an annual escalator, subject to Board approval. Here is the link to the current water service rates: <https://ntpud.org/my-account/current-water-sewer-rates/>

High Efficiency/Energy Star Toilet, Dishwasher, Clothes Washer Rebates  
Low Flow Faucets & Showerhead rebate  
Weather Based “Smart” irrigation controller rebate

South Tahoe PUD <http://stpud.us/waterconsv>

STPUD has a dedicated Water Conservation Specialist on staff. The South Tahoe Public Utility District has set conservation restrictions. Information is detailed on their website.

Toilet Rebates  
High-Efficiency clothes washer rebate  
Turf Buy-Back Program  
Irrigation Equipment upgrade to High Water Efficiency system  
Water Wise House call

Lakeside Park Association <http://lakesideparkassociation.org>

LPA issued letters to customers on watering restrictions and enforcement. Additional measures can be required of commercial customers.

Tahoe City PUD <http://www.tahoecitypubd.com/utility-services/water/water-conservation>

The Tahoe City Public Utility District has set conservation restrictions and information in posted on their website. 2016: Through the self-certification process TCPUD, the District certified a water supply surplus; setting the conservation goal at zero. TCPUD is offering rebate programs for WaterSense and Energy Star appliances specifically, dishwashers, clothes washing machines, and Smart Irrigation sensors and devices.

TCPUD has been acquiring and upgrading older water systems on Tahoe's north and west shores. Prepared the 2024 Rate Study to establish maximum water and sewer rates for fiscal years 2025-2029. Executed an Operating Agreement with the Tahoe Swiss Village Utility, Inc. (TSVU) to begin operating the water system before an official transfer of ownership in early 2025. The acquisition of TSVU will add approximately 450 connections to TCPUD, most of which are currently unmetered.

High Efficiency/Energy Star Toilet, Dishwasher, Clothes Washer Rebates

Smart Irrigation Sensors and Devices

State of CA Turf Removal Rebate (SaveOurWaterRebates.com)

### **Water Efficiency (Conservation) in Nevada**

The State of Nevada did not declare a drought emergency; however, water providers enacted conservation education and voluntary water reductions.

Incline Village GID: <http://water.nv.gov/programs/planning/plans/InclineVillageGID.pdf>

IVGID launched a Water Sense appliance rebate for residential customers in 2019. \$100 rebates are offered for ultra-low flow toilet or high efficiency clothes washer appliances

<https://www.yourtahoeplace.com/news/ivgid-public-works-launches-water-efficient-appliance-rebate-program>

Douglas County: <http://images.water.nv.gov/images/WCP/DouglasCounty.pdf>

Round Hill GID: [http://water.nv.gov/programs/planning/plans/Round\\_Hill\\_GID.pdf](http://water.nv.gov/programs/planning/plans/Round_Hill_GID.pdf)

Kingsbury GID: <http://water.nv.gov/programs/planning/plans/KingsburyGID.pdf>

### **Edgewood**

Updated their water conservation and Integrated Resource Plans in 2018. They are working with key customers on submetering and water efficiency measures.

### **Miscellaneous Water Conservation Measures**

All member agencies maintain leak detection programs to reduce system water losses. Members offer customer leak detection tools, services, and investigate water loss. Member agencies' rate structures vary, either using flat rates or increasing tier rate structures. No members use decreasing block rates.

TWSA Staff maintain AWWA Water Efficiency Practitioner Certification (level 1) and have been trained in irrigation auditing. Water conservation information is featured on the TWSA website and in outreach materials offered at regional events. IVGID, TCPUD, NTPUD and STPUD offer water conservation fixture rebates and water conservation tools to residents.

IVGID and Nevada Tahoe Conservation District (NTCD) offer free landscape design and outdoor water use audits to the Nevada side of the Lake Tahoe Basin. The Tahoe Resource Conservation District offers similar services on the California side.



## Mapping (See maps located at end of report)

Using the 2002 Sanitary Survey updates and corresponding watershed maps as a template, the Tahoe Water Suppliers Association started a watershed mapping program in 2003. TWSA staff has developed extensive reference maps, defined by watershed, on the Lake Tahoe basin as a method to: describe the watersheds, identify land ownership and land use changes, ascertain potential sources of drinking water contamination, and locate potential areas of future monitoring. Maps have been created for the water purveyors that describe land ownership, land use, general description and location, service boundaries, potential contaminating sources and recreation. The maps have been useful in describing the watershed features, identifying inconsistencies and areas of improvement for basin-wide mapping programs, locating potential sources of contamination, and structuring education and monitoring programs.

## Fire Flow / Emergency Interties

Investing in fire suppression infrastructure in our communities:

Improving fire hydrant coverage

Replacing old, undersized waterlines

Increasing water storage capacity Increasing water distribution capacity


Creating interconnections between public and private water systems

Collaborating to address the patchwork of small, geographically isolated, and undersized water systems.

Regional fire-flow funding updates are also provided in earlier section “Action Plan Highlights”.

Beginning in 2007- 2008, TWSA members began to research the feasibility of additional infrastructure to link several district water supplies, in order to increase water availability during potential emergencies.

It was determined the agencies in the southeastern section of the lake had the most potential to intertie.

Lake Tahoe Community Fire Protection Partnership Projects	Future Lake Tahoe Community Fire Protection Partnership Projects (2016-2021)
	<p>These projects represent construction spending that equates to 172.8 new jobs created!</p> <p><b>South Tahoe Public Utility District</b></p> <p>Approximately 56,400 lineal (35,564 lineal feet located in a designated disadvantaged community) feet of replacement for aged and undersized waterlines to increase the water supply for fire flow. Estimated cost: \$14,685,000</p> <p><b>Incline Village General Improvement District</b></p> <p>Approximately 12,000 lineal feet of replacement for aged and undersized waterlines to increase water supply for fire flows. New hydrants every 500 lineal feet also need to be installed. Estimated cost: \$3,600,000</p> <p><b>Tahoe City Public Utility District</b></p> <p>Water Treatment plant and transmission line replacements to upgrade water production supplies in a new consolidation with a private water company in Tahoma. Current water production plant and water lines are insufficient to provide fire flows. Water storage tank replacement of a significantly deficient 500,000-gallon redwood constructed tank to help maintain fire suppression capacity. Estimated cost: \$ 6,700,000</p> <p><b>North Tahoe Public Utility District</b></p> <p>Approximately 30,000 lineal feet (29,000 lineal feet located in a designated disadvantaged community) of deteriorating waterlines in a highly forested residential neighborhood will be replaced for fire flow enhancement. Fire hydrants will also be installed every 500 lineal feet. Estimated cost: \$ 8,400,000</p> <p><b>Kingsbury General Improvement District</b></p> <p>Approximately 6,000 lineal feet of aged and undersized waterlines will be replaced to increase fire suppression water supply. Fire hydrants will also be installed every 500 lineal feet. Estimated cost: \$2,000,000</p> <p><b>Douglas County</b></p> <p>Cave Rock Water System needs significant upgrades due to current leakage leading to deterioration of tank foundations and water losses in the system. Improvements to the water system will increase fire suppression water storage. Additional water system upgrades are also needed Estimated cost: \$ 25,000,000</p> <p><b>Round Hill General Improvement District</b></p> <p>Round Hill GID needs to replace 50-year-old starters at the Office Booster Station with new soft starts, thereby maintaining fire storage and fire flows. Estimated cost: \$ 2,950,000</p> <p><b>Lakeside Park Mutual Water District</b></p> <p>Approximately 3,000 lineal feet of deteriorating waterline will be replaced to enhance fire flow. Estimated cost: \$840,000</p>

## **TWSA/United States Army Corps of Engineers (USACE)**

### **Lake Tahoe Source Water Risk Assessment 2008**

Current research in the Tahoe Basin includes studies on the effect of shoreline activities on drinking water quality. Perri Standish-Lee of Black and Veatch completed a study on the effects of human recreation on drinking water quality in 2006. Results indicate that any activities capable of introducing contaminants to Lake Tahoe's Near Shore Zone can have a direct impact on water quality. Water quality degradation can result in a possible waterborne disease outbreak or a loss of filter avoidance; thus, putting the burden of water filtration installation costs on local residents.

The Risk Assessment Project/Model (Phase 1), primarily funded by USACE with some TWSA matching funds, was completed in the fall of 2008. This project quantified the risk of contamination from potential sources for three of the TWSA water suppliers' drinking water intakes, and provided a working spreadsheet to evaluate potential risks from spills and Shorezone development. The Risk Assessment can be used to identify potential mitigation for high risk activities and/or emergencies. Importantly, the assessment will help identify response time necessary, based on time of travel maps, to protect human health during an emergency. The development of the model provides water purveyors with a hands-on system to quantify immediate potential threats to the raw water used in the municipal water delivery systems, from proposed projects. It also helps to identify potential mitigations for a proposed activity, and provide water suppliers with information to react to emergency spills and/or leaks of potential contaminants within the watershed.

### **TWSA Risk Assessment / Model Projects (RAM)**

Copies of the Risk Assessment Reports are available by contacting the TWSA Executive Director.

### **2013-14 Refinements of 2008 Model**

The NDEP began discussion of further refinement of the 2008 Report and initiated a contract with the Tahoe Science Consortium (TSC) through IVGID as a fiscal agent in June 2013. Working collaboratively with researchers at the TSC, the NDEP and TWSA commissioned the study to use new, more highly refined, water current data in the model and re-evaluate at a minimum the southeastern corner of Lake Tahoe (Intake areas for Edgewood/Kingsbury/Lakeside).

### ***"2014 Lake Tahoe Flow Modeling, Potential Pathogen Transport and Risk Modeling Report"***

S. Geoffrey Schladow, Andrea Hoyer, Francisco Rueda and Michael Anderson/ June 2014:

In spring 2013, NDEP initiated discussion with TWSA to fund Phase 2 of the Lake Tahoe Risk Assessment Model developed in 2008 (Black & Veatch, B&V Project No. 41717). Phase 2 was funded by NDEP (\$74,000) and TWSA (\$19,000) for a total of \$95,000 in 2013-14. There has been significant improvement in the data available on lake currents since 2008, so the upgrades were allowed to provide better modeling with more refined area grids based on this new data. This project re-analyzed lake water current patterns in the southeastern corner of Lake Tahoe, in the area of the Edgewood and Kingsbury intakes. The analysis is related to public water systems at Lake Tahoe and the impact that local potential contaminating activities have on the source water. In addition to new data, new potential contaminating activities have been proposed near the public water system intakes, which will also impact system specific risk models.

### **Flow Modeling and Pathogens (PO # S004422)**

Executive Summary: Swimming and other body-contact recreational activities have been identified by the USEPA, the Nevada Division of Environmental Protection, the California Department of Health Services and other public health professionals as a potential source of microbiological contamination of



recreational waters. This study was undertaken to quantify the impacts of body contact recreation on microbial water quality at the Kingsbury General Improvement District (KGID) and Edgewood Water Company intakes on Lake Tahoe. This study builds upon the risk assessment conducted previously (Black and Veatch, 2008), and specifically incorporates 5 new features:

- (i) Findings of new 3-D hydrodynamic simulations for the nearshore southeastern portion of Lake Tahoe.
- (ii) Development of a finer-scale 50 m x 50 m finite-segment pathogen fate-consumer risk model.
- (iii) Additional recreational use associated with the proposed Beach Club and Edgewood Lodge/Resort developments.
- (iv) Risk assessment for the Edgewood Water Company intake.
- (v) Treatment plant upgrades at KGID and Edgewood that include UV disinfection meeting the requirements of the Long Term 2 Enhanced Surface Water Treatment rule (LT2). As in the prior study, this risk assessment focused on *Cryptosporidium* because of its low infectious dose, environmental persistence and resistance to conventional disinfection.

Mean annual *Cryptosporidium* concentrations were predicted using a Monte Carlo-based pathogen fate-consumer risk model. Dose-response calculations applied to predicted concentrations following treatment provided probabilistic estimates of health risks resulting from consumption of recreationally-impacted treated drinking water.

Model simulations demonstrate that the additional recreational use at Beach Club and Edgewood Lodge/Resort beaches, in conjunction with improved understanding of transport, results in increased potential for *Cryptosporidium* to reach the KGID and Edgewood intakes. For example, the median annual concentration at the KGID intake increased from 0.0018 oocysts/100 L (Black and Veatch, 2008) to 0.0082 oocysts/100 L, although the additional 3-log removal achieved with UV disinfection following ozonation greatly lowered treated water concentrations and substantially lowered risk of infection. The predicted median annual risk of infection was lowered from 0.23 (Black and Veatch, 2008) to 0.0011 infections/10,000/yr (this study) for KGID, while the probability of exceeding the USEPA target of 1 infection/10,000/yr was reduced from 4.9% (Black and Veatch, 2008) to <0.02 infections/10,000/yr (the lowest probability limit based upon the number of simulations). The median predicted annual risk level for the upgraded ozone+UV Edgewood plant was 0.0007 infections/10,000/ yr, with <0.02% probability of exceeding the USEPA target (lowest probability limit).

The modeling results that underpinned these conclusions provide a number of additional insights to minimizing pathogen entrainment into drinking water intakes. Primarily, by using a technique developed under this project, it is now possible to determine the source area of pathogens (or any other contaminant) that arrive at a water intake. The results also provide insight into the complex interplay between the windfield, the strength of the lake's thermal stratification and the transport patterns of pathogens. Most notably, having an intake located below the maximum depth of the thermocline greatly reduces the frequency of pathogen arrival at the intake. This has other implications with respect to lake level and drought conditions.

With prolonged drought episodes (predicted to be more frequent under future climatic conditions), lake level will be lower and thereby reduce the depth of the water intakes. Under those conditions the period of time favorable for pathogen transport to the intakes is likely to increase significantly. Similarly, the time of water withdrawal can be used to minimize risk. Night time and early morning withdrawals seem to pose the greatest risk, as pathogens released the previous day have had little opportunity to be de-activated by solar radiation. This highlights the linkage between drinking water quality and maintenance of high water clarity, particularly in the nearshore region. Maximizing the penetration of UV radiation from solar radiation into the water column provides "free" water treatment.

The release of a surrogate for herbicide transport from the vicinity of Tahoe Keys was simulated, and showed that herbicide could be transported to the vicinity of the nearshore regions of south-east Lake Tahoe within a 24 hour period. Within that period, material did not actually arrive at any of the water intakes, but based on other results in this report, that would occur within less than 48 hours. It must be borne in mind that these results are a first estimate of the fate of herbicides. No account has been taken of the dilution that a real plume of herbicide would be subject to, and the possible breakdown into other chemicals. Likewise the toxicity (if any) of the herbicide for the case of consumption or body contact recreation has not been considered as it was beyond the scope of the study. However, should the use of herbicides be permitted at Lake Tahoe, there is a strong case that a more complete study of the fate of these products on public health should be undertaken.

A TWSA sponsored workshop on this report and the current data was offered on Nov. 5 and 6, 2014 by Dr. Schladow at both north and south Tahoe locations. The presentations were covered by local media. <http://www.laketahoenews.net/2014/11/scientists-studying-life-below-taho-s-surface/> and at <http://www.recordcourier.com/news/13714581-113/lake-tahoe-schladow-wind>

### **2008 Phase 1:**

#### **Executive Summary - TWSA B&V Project 41717 Summary & Conclusions**

Time of travel maps were developed for the watershed. Watershed travel times varied with flow; at low flow rates, the time to reach Lake Tahoe from 1 to 2 miles ((1.6 – 3.2 km) away in the watershed was less than 16 hours, while high flow resulted in travel times from anywhere in the watershed to be less than 10 hours.

Pathogen fate-consumer risk model calculations found water quality to be generally good at the Burnt Cedar, McKinney-Quail and Kingsbury Grade intakes, although body contact recreation does represent a potential threat to drinking water quality for intakes with high levels of recreation use nearby and, most importantly, limited removal at the treatment plant.

Three primary variables most directly influence the risk posed to water quality at the water supply intakes in Lake Tahoe:

- Recreational use (including the number of recreators, location of recreation and prevalence of infection within the recreator population).
- Direction and magnitude of advective currents in the vicinity of the intake.
- Effectiveness of treatment processes at the water treatment plant (WTP).

The vulnerability of the intakes to sewage and fuel spills and other contaminating events within the watershed will also be dependent upon the location and magnitude of an input, the direction and speed of advective and dispersive transport, dilution, contaminant losses within the water column.

#### **Risk Assessment Model 2008**

As part of the Risk Assessment, a model was developed. The model serves as a tool for decision making, by evaluating potentially contaminating activity within one quarter mile (1320 feet) of intakes and can help determine the level of risk of human disease, transmission, and infection.

The RAM can be used to identify potential mitigation for high risk activities and/or emergencies. Importantly, the assessment will help identify response time necessary, based on time of travel maps, to protect human health during an emergency.

### ARkStorm@Tahoe Project

<http://tahoescience.org/arkstorm-project>

Addressing social and ecological impacts of extreme winter storm events in the Lake Tahoe region. What is an ARkStorm? Atmospheric rivers (ARs) are large flows of water vapor that typically occur in fall and winter, bringing huge amounts of moisture over the Pacific to the U.S. West Coast. Landfalling ARs are storm events with the potential to deliver extreme amounts of precipitation to the West Coast, including California and Nevada, over a just a few days. The name “ARkStorm” was coined to describe large AR storm sequences, which, for instance, can produce precipitation in California that in places can exceed totals experienced only once every several hundred to 1,000 years. Scientists with the U.S. Geological Survey (USGS) Multi Hazards Demonstration Project (MHDP) designed a scientifically-plausible winter ARkStorm scenario for California emergency managers, stitching together historical AR storms from 1969 and 1986, separated by only 4 days. This hypothetical ARkStorm would rival but not exceed the intense California winter storms of 1861 and 1862 that left the Central Valley of California flooded and the state’s economy destroyed. It was designed to exceed any single storm in the 20th Century. On September 12, 2013 a meeting was facilitated at Incline Village General Improvement District (IVGID) for the TWSA members and other agency representatives to discuss the operations of water and sewer supply systems during a potential long-term storm event. A March 14, 2014 Tabletop Exercise (TTX) was run at the Regional Emergency Operations Center (REOC) in Reno, NV. Winter 2016-17 became an ‘test’ ARkStorm situation, with flooding impacts in the Truckee River Corridor and Reno/Carson areas.

### Water Demand and Sewer Services

TRPA: [http://www.trpa.org/wp-content/uploads/18\\_Ch12\\_Implementation\\_FINAL\\_9\\_30\\_2016.pdf](http://www.trpa.org/wp-content/uploads/18_Ch12_Implementation_FINAL_9_30_2016.pdf)

#### Water Demand

Water rights in the Lake Tahoe Region are controlled by the Truckee River Operating Agreement (TROA), which was signed on September 6, 2008 and went into effect in 2015. The TROA formalizes, regulates and monitors water rights and water use in the Tahoe Region, the Truckee River watershed, and the final outflow areas of Pyramid Lake and the Carson River in Nevada. Under the TROA, total water extractions in the Tahoe Region are capped at 34,000 acre feet per year, limiting each state as follows:

California: 23,000 acre feet per year  
 Nevada: 11,000 acre feet per year

The Tahoe Region has numerous public water systems, including large-scale and small-scale (i.e., less than 200 households) systems. In addition, there are many single-use intake lines along Lake Tahoe's shoreline and wells. The large-scale water and wastewater treatment systems in the Tahoe Region are provided by public utility districts (PUDs) and general improvement districts (GIDs). On the California side of the Region, PUDs may acquire, construct, own, complete, use, and operate a variety of services, including water, electricity, recreational facilities, drainage facilities, street lighting, and fire protection. Similarly, Nevada GIDs oversee the development, maintenance, and use of public facilities such as water and sewer systems, streets and sidewalks, and parks and open space. Since 1968, all wastewater in the Tahoe Region has been treated and pumped out of the Region to avoid discharge into the lake. Districts are bound by service areas and directed through boards created by local governments.

The following PUDs and GIDs operate within the Tahoe Region:

Cave Rock Estates GID	Oliver Park GID
Incline Village GID	Round Hill GID
Kingsbury GID	South Tahoe PUD
Lakeridge GID	Tahoe City PUD
Logan Creek Estates GID	Zephyr Cove GID
Marla Bay GID	Zephyr Heights GID
North Tahoe PUD	Zephyr Knolls GID

The Tahoe Water Suppliers Association (TWSA, 2015) consists of public water suppliers in the Lake Tahoe Region that use Lake Tahoe as their source of drinking water. TWSA consists of:

Cave Rock Water System (Cave Rock; Douglas County)
Edgewood Water Company (Edgewood)
Glenbrook Water Cooperative (Glenbrook)
Incline Village General Improvement District (IVGID)
Kingsbury General Improvement District (KGID)
Lakeside Park Association (LPA)
Zephyr Water Utility (Zephyr; Douglas County)
North Tahoe Public Utility District (NTPUD)
Round Hill General Improvement District (RHGID)
Skyland Water Company (Skyland; Douglas County)
South Tahoe Public Utility District (STPUD)
Tahoe City Public Utility District (TCPUD)

In 2015, TWSA suppliers served approximately 20,597 service hookups, supplying water to approximately 34,410 residents. The average daily water flow for TWSA suppliers ranges from 100,000 gallons per day (gpd) to 2,690,000 gpd. Peak daily water flow ranges from 424,000 gpd to 5,945,000 gpd (TWSA, 2015).



Numerous water purveyors distribute water from groundwater sources throughout the Region, including South Tahoe Public Utility District, Lukins Brothers Water and the Tahoe Keys Water Company.

Water demand in the Lake Tahoe Region varies year to year due to changes in resident and/or visitor populations, length of summer growing seasons (for outdoor irrigation), and drought conditions (which can lead to local water restrictions imposed by local utility districts). Water conservation is encouraged by many Lake Tahoe water purveyors. The South Tahoe Public Utility District (STPUD), for example, provides a lawn turf buy-back program, water-efficient appliance rebates, leak detection assistance, and irrigation efficiency evaluations.

### **Sewage Disposal**

The Porter-Cologne Act in California, and an executive order by the Governor of Nevada dated January 27, 1971, prohibit discharges of domestic, municipal or industrial wastewaters to Lake Tahoe, its tributaries, groundwater, or the portion of the Truckee River within the Tahoe Region.<sup>8</sup> As a result, Tahoe Region wastewater is generally collected, treated, and discharged to locations outside of the Region in one of the following four sewer export systems:

1. South Tahoe Public Utility District - Wastewater for the City of South Lake Tahoe and unincorporated portions of El Dorado County (south of Emerald Bay) is exported to Alpine County, California, via a sewer export line over Luther Pass (California State Route 89).
2. Douglas County Sewer Improvement District - Wastewater for Douglas County is exported to the Carson Valley in Nevada, via a sewer export line over Daggett Pass (Nevada State Route 207, Kingsbury Grade).
3. Incline Village General Improvement District - Wastewater for Washoe County is exported to the Carson City/Stewart area, Nevada, via a sewer export line over Spooner Summit (U.S. Highway 50).
4. Tahoe City and North Tahoe Public Utility Districts - Wastewater for Placer County and the portion of El Dorado County north of Emerald Bay is exported to the town of Truckee, California, via a sewer export line in the Truckee River Canyon (along California State Route 89).

Exceptions may be granted to discharges under alternative plans (for wastewater disposal authorized by state law, and approved by a state agency with appropriate jurisdiction). TRPA may also approve sewage holding tanks or other no-discharge systems in accordance with Subparagraph 60.1.3.C of the TRPA Code of Ordinances as a temporary measure, or as a permanent measure in remote public or private recreation sites, where a sewer system would create excessive adverse environmental impacts.

The California Water Quality Control Board, Lahontan Region, has authority to issue wastewater discharge waivers in the California portion of the Lake Tahoe Region. In Nevada, this authority rests with the Nevada Department of Environmental Protection (NDEP). Exceptions have been given to cabins in remote summer home tracts on the California side of the Region (including Upper and Lower Echo Lakes, Fallen Leaf Lake, Lily Lake, Glen Alpine, and Emerald Bay). Some summer homes are allowed to discharge "gray water" to leach field systems, but are also required to contain and transport "black water" sewage to an approved sewer dump station for treatment in a sewer plant.

<sup>8</sup> See section 60.7, TRPA Code of Ordinances

There are five sewer treatment plants located in the Tahoe Region, each of which exports treated sewage into one of the four export lines noted above. Existing sewage capacity for these plants, including “reserved” capacity, is summarized in Table 12-18, below. As the table indicates, none of the five Tahoe sewer treatment plants are near their total capacity. In discussions with sewer plant officials, all five sewer plants were originally designed for a much larger population than currently expected at Lake Tahoe. Excess plant capacity is a result of a number of factors, including TRPA growth controls and localized population decreases, combined with water conservation efforts, and public purchases of environmentally sensitive lands.

**Table 12-18. 2015 Sewage Disposal Capacity in Millions of Gallons per Day (MGD)**

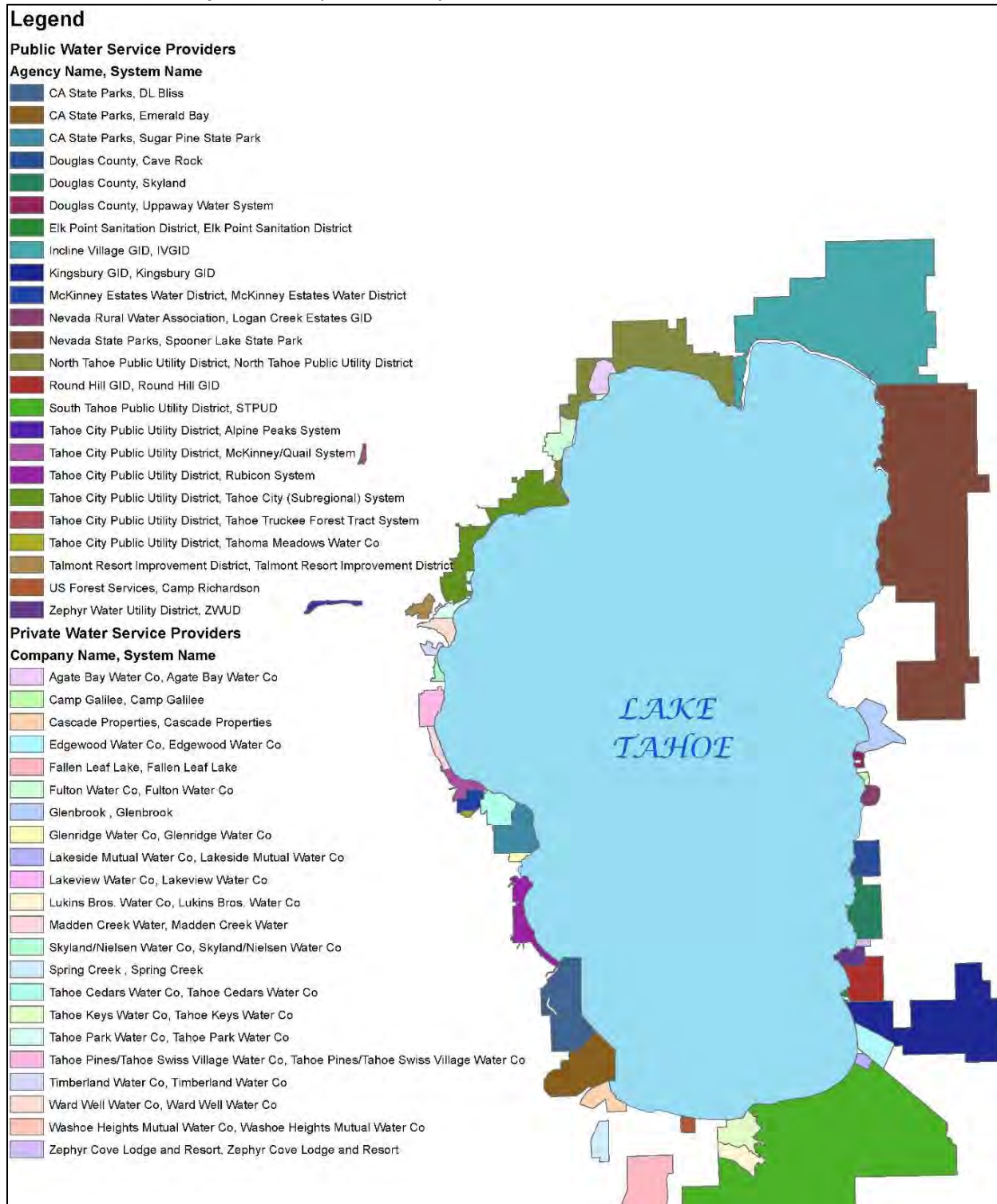
Sewer Collection District	Approximate 2015 Peak Sewer Flow	Approximate Capacity <sup>1</sup>	Approximate Reserve Capacity
North Tahoe PUD	0.65 <sup>3</sup>	6.00	5.35
Tahoe City PUD <sup>2</sup>	1.16	7.80	6.64
South Tahoe PUD	4.93	7.70	2.77
Incline Village GID	1.61	3.00	1.39
Douglas County SID	2.31	3.75	1.44

**Notes:**

1. The North Tahoe and Tahoe City Public Utility Districts share a common North Shore sewer export line to Truckee, where sewage is combined with four other sewer collection districts for treatment by the Tahoe-Truckee Sanitation Agency (T-TSA). Sewer plant capacity for NTPUD and TCPUD is, therefore, a factor of export line capacity and total capacity of the T-TSA treatment facility (9.60 million gallons per day).
2. TCPUD’s sewer collection is split between a North Shore and a West Shore collection system. TCPUD’s portion of the shared TCPUD-NTPUD North Shore export line has a capacity of 3.5 MGD. TCPUD’s West Shore collection system has a capacity of 4.3 MGD, and is “fixed” by pumping capacity at their Sunnyside pump station.
3. Equals 2015 average sewer flow. A peak flow estimate was not available from NTPUD.

*Source: Tahoe Region Sewer Districts*

## Tahoe Basin Water Systems. Graphic courtesy of STPUD.





## US EPA Factsheet on Unfiltered Systems

<https://www.epa.gov/dwreginfo/drinking-water-rule-quick-reference-guides>



# Comprehensive Surface Water Treatment Rules Quick Reference Guide: Unfiltered Systems

Overview of the Rules					
Title*	Surface Water Treatment Rule (SWTR) - 40 CFR 141.70-141.75 Interim Enhanced Surface Water Treatment Rule (IESWTR) - 40 CFR 141.170-141.175 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) - 40 CFR 141.500-141.571 Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) - 40 CFR 141.700-141.722				
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia lamblia</i> , and <i>Cryptosporidium</i> .				
General Description	<p>The Surface Water Treatment Rules:</p> <ul style="list-style-type: none"><li>► Applies to all public water systems (PWSs) using surface water or ground water under the direct influence of surface water (GWUDI), otherwise known as "Subpart H systems."</li><li>► Requires all Subpart H systems to disinfect.</li><li>► Requires Subpart H systems to filter unless specific filter avoidance criteria are met.</li><li>► Requires unfiltered systems to perform surface water monitoring and meet site specific conditions for controls of microbes.</li></ul>				
*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.					
Overview of Requirements					
The purpose of this table is to show how the requirements for the IESWTR, LT1ESWTR and LT2ESWTR build on the existing requirements established in the original SWTR.					
APPLICABILITY: PWSs that use surface water or GWUDI (Subpart H systems) that do not provide filtration.		Final Rule Dates			
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002	LT2ESWTR 2006
Population Served	≥ 10,000	✓	✓		✓
	< 10,000	✓	For sanitary survey provisions only	✓	✓
Regulated Pathogens	99.99% (4-log) removal/inactivation of viruses	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	99.9% (3-log) removal/inactivation of <i>Giardia lamblia</i>	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	99% (2-log) removal of <i>Cryptosporidium</i> (through watershed control)		✓	✓	Regulated under IESWTR and LT1ESWTR
	99% (2-log) inactivation of <i>Cryptosporidium</i> for systems reporting ≤ 0.01 oocysts/L; 99.9% (3-log) inactivation of <i>Cryptosporidium</i> for systems reporting > 0.01 oocysts/L.				✓
Treatment Requirements	Entrance to distribution system (≥ 0.2 mg/L)	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Detectable in the distribution system	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Must use a minimum of two disinfectants to meet the <i>Cryptosporidium</i> , <i>Giardia lamblia</i> , and virus inactivation requirements.				✓
Source Water Monitoring Requirements	Monitoring of <i>Cryptosporidium</i> to calculate arithmetic mean of sample concentrations and determine additional treatment requirements				✓
Unfiltered System Requirements	Avoidance Criteria	✓	✓	✓	Regulated under SWTR, IESWTR and LT1ESWTR
Disinfection Profiling and Benchmarking	Systems must profile inactivation levels and generate benchmark, if required		✓	✓	✓
Sanitary Surveys (state requirement)	CWS**: Every 3 years NCWS**: Every 5 years		✓	Regulated under IESWTR	Regulated under IESWTR
Finished Reservoirs/ Water Storage Facilities	All new facilities constructed must be covered		✓	✓	Regulated under IESWTR and LT1ESWTR
	Uncovered finished water facilities must be covered or discharge treated				✓
Operated by Qualified Personnel as Specified by State		✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR

\*\*Community water system (CWS), Noncommunity water system (NCWS)



## Filtration Avoidance Criteria

Since December 30, 1991, systems must meet source water quality and site specific conditions to remain unfiltered. If any of the following criteria to avoid filtration are not met, systems must install filtration treatment within 18 months of the failure. The following table outlines the avoidance criteria established by the SWTR and later enhanced by the IESWTR and LT1ESWTR.

Filtration Avoidance Criteria			
		Requirement	Frequency
Source Water Quality Conditions	Microbial Quality	Monitor fecal coliform or total coliform density in representative samples of source water immediately prior to the first point of disinfection application: ► Fecal coliform density concentrations must be $\leq 20/100$ mL; OR ► Total coliform density concentrations must be $\leq 100/100$ mL. Sample results must satisfy the criteria listed above in at least 90% of the measurements from previous 6 months.	► 1 to 5 samples per week depending on system size, AND ► Every day the turbidity of the source water exceeds 1 NTU
	Turbidity	Prior to the first point of disinfection application, turbidity levels cannot exceed 5 NTU.	Performed on representative grab samples of source water every 4 hours (or more frequently)
Site Specific Conditions	Systems must:	Calculate total inactivation ratio daily and provide 3-log <i>Giardia lamblia</i> and 4-log virus inactivation daily (except any one day each month) in 11 of 12 previous months (on an ongoing basis).	Take daily measurements before or at the first customer at each residual disinfectant concentration sampling point: ► Temperature ► pH (if chlorine used) ► Disinfectant contact time (at peak hourly flow) ► Residual disinfectant concentration measurements (at peak hourly flow)
	System must comply with:	► MCL for total coliforms in 11 of 12 previous months (as per Total Coliform Rule) ► Stage 1 Disinfectants and Disinfection Byproducts Rule requirements.	
	Systems must have:	► Adequate entry point residual disinfectant concentration (see disinfection requirements). ► Detectable residual disinfectant concentration in the distribution system (see disinfection requirements). ► Redundant disinfection components or automatic shut-off whenever residual disinfectant concentration $< 0.2$ mg/L. ► A watershed control program minimizing potential for contamination by <i>Giardia lamblia</i> cysts and viruses in source water; IESWTR and LT1ESWTR update this requirement by adding <i>Cryptosporidium</i> control measures. ► An annual on-site inspection by state or approved third party with reported findings. ► Not been identified as a source of a waterborne disease outbreak.	

## Disinfection

Disinfection must be sufficient to ensure that the total treatment process of the system achieves at least:

- 99.9% (3-log) inactivation and/or removal of *Giardia lamblia*.
- 99.99% (4-log) inactivation and/or removal of viruses.

Subpart H systems using chlorine dioxide, ozone, or ultraviolet (UV) disinfection must achieve additional *Cryptosporidium* log credit by using the Microbial Toolbox option under the LT2ESWTR. Systems must also comply with the maximum residual disinfectant level (MRDL) and maximum contaminant levels (MCL) requirements specified in the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) and the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).

Residual Disinfectant Monitoring and Reporting Requirements			
Location	Concentration	Monitoring Frequency	Reporting (Reports due 10th of the following month)
Entry to distribution system.	Residual disinfectant concentration cannot be $< 0.2$ mg/L for more than 4 hours.	Continuous, but states may allow systems serving 3,300 or fewer persons to take grab samples from 1 to 4 times per day, depending on system size.	Lowest daily value for each day, the date and duration when residual disinfectant was $< 0.2$ mg/L, and when state was notified of events where residual disinfectant was $< 0.2$ mg/L.
Distribution system - same location as total coliform sample location(s).	Residual disinfectant concentration cannot be undetectable in greater than 5% of samples in a month, for any 2 consecutive months. Heterotrophic plate count (HPC) $\leq 500$ /mL is deemed to have detectable residual disinfectant.	Same time as total coliform samples.	Number of residual disinfectant or HPC measurements taken in the month resulting in no more than 5% of the measurements as being undetectable in any 2 consecutive months.

## LT2ESWTR Source Water Monitoring and Treatment Requirements

Each PWS must determine the arithmetic mean of all *Cryptosporidium* samples collected during monitoring.

A combined distribution system (CDS) is an interconnected distribution system consisting of the distribution systems of the wholesale system and of the consecutive systems that receive finished water from that wholesale system. Under the LT2ESWTR, wholesale systems in a CDS must comply with the LT2ESWTR based on the population of the largest system in their CDS.

EPA has established four schedule categories based on system size to simplify the discussion of the LT2ESWTR monitoring requirements. Schedule 1 applies to systems that serve 100,000 or more people or in a CDS that largest system serves 100,000 people. Schedule 2 applies to systems that serve 50,000 to 99,999 people or in a CDS that largest system serves 50,000 to 99,999 people. Schedule 3 applies to systems that serve 10,000 and 49,999 people or in a CDS that largest system serves 10,000 and 49,999 people. Schedule 4 applies to systems that serve less than 10,000 people.

Source water monitoring requirements are as follows:

- ▶ Schedule 1-3 systems must sample for *Cryptosporidium* at least monthly for 2 years.
- ▶ Schedule 4 systems must sample for *Cryptosporidium* at a frequency of either (a) at least 2 times per month for 1 year or (b) 1 time per month for 2 years.
- ▶ All systems must begin a second round of monitoring no later than 6 years after determining initial *Cryptosporidium* level.

Treatment Requirements		
If Arithmetic Mean <i>Cryptosporidium</i> Level is:	System Must Provide Treatment to: <sup>a</sup>	Disinfectant System Must Use:
≤ 0.01 oocysts/L	2-log <i>Cryptosporidium</i> inactivation	<ul style="list-style-type: none"> <li>▶ At least 2 disinfectants to provide 4-log virus, 3-log <i>Giardia lamblia</i> and 2- or 3-log <i>Cryptosporidium</i> inactivation.</li> <li>▶ Each disinfectant must achieve by itself the total inactivation required for one of these target pathogens</li> </ul>
> 0.01 oocysts/L or if PWS chooses not to monitor for <i>Cryptosporidium</i>	3-log <i>Cryptosporidium</i> inactivation	

<sup>a</sup> Inactivation credit for treatment with chlorine dioxide, ozone or UV light.

## Microbial Toolbox: Inactivation Options, Credits and Criteria

The Microbial Toolbox provides a list of the tools that systems can use, and receive treatment credits for, in order to meet additional treatment requirements of LT2ESWTR. The toolbox provides systems with the flexibility to use any combination of applicable treatment options as long as the systems are in compliance with design, operational, and performance criteria which are not detailed in this document. Unfiltered systems must use one of the following inactivation/disinfection tools to receive the corresponding credits:

- ▶ Chlorine dioxide: log credit received is based on measured CT in relation to the CT table.
- ▶ Ozone: log credit received is based on measured CT in relation to the CT table.
- ▶ UV: log credit received is based on validated UV dose in relation to the UV dose table; reactor validation testing is required to establish UV dose and associated operating conditions.

## System Reporting Requirements

System Reporting Requirements	
Report to State:	What to Report:
Within 10 days after the end of the month:	<ul style="list-style-type: none"> <li>▶ Source water quality information (microbial quality and turbidity measurements).</li> <li>▶ In addition to the disinfection information above, systems must report the daily residual disinfectant concentration(s) and disinfectant contact time(s) used for calculating the CT value(s).</li> </ul>
Within 10 days after the end of the first month following the month when the source water monitoring sample(s) were collected:	<ul style="list-style-type: none"> <li>▶ Results from the required source water monitoring.</li> </ul>
By October 10 each year:	<ul style="list-style-type: none"> <li>▶ Report compliance with all watershed control program requirements.</li> <li>▶ Submit report on the on-site inspection, unless that state conducted the inspection, in which case the state must provide the system with a copy of the report.</li> </ul>
Within 24 hours:	<ul style="list-style-type: none"> <li>▶ Turbidity exceedances of 5 NTU and waterborne disease outbreaks.</li> </ul>
ASAP but no later than the end of the next business day:	<ul style="list-style-type: none"> <li>▶ Instance where the residual disinfectant level entering the distribution system was &lt; 0.2mg/L.</li> </ul>
Based on system's LT2ESWTR schedule <sup>a</sup> :	<ul style="list-style-type: none"> <li>▶ Sampling schedules and monitoring results for source water monitoring</li> <li>▶ Certain data elements of <i>Cryptosporidium</i>, <i>E. coli</i> and turbidity analyses.</li> </ul>

<sup>a</sup> See each of the four LT2ESWTR by schedule QRCs available Online at <http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/compliance.cfm> for additional details.



## Disinfection Profiling and Benchmarking Requirements

A disinfection profile is the graphical representation of a system's microbial inactivation over 12 consecutive months.

A disinfection benchmark is the lowest monthly average microbial inactivation value. The disinfection benchmark is used as a baseline of inactivation when considering changes in the disinfection process.

Disinfection Profiling and Benchmarking Requirements			
The purpose of disinfection profiling and benchmarking is to allow systems and states to assess whether a change in disinfection practices reduces microbial protection. Systems must develop a disinfection profile that reflects <i>Giardia lamblia</i> and viruses inactivation, calculate a benchmark (lowest monthly inactivation) based on the profile, and consult with the state prior to making a significant change to disinfection practices.			
Requirement	IESWTR	LT1ESWTR	LT2ESWTR
Affected Systems:	Community water systems (CWS), nontransient noncommunity water systems (NTNCWS), and transient noncommunity water systems (TNCWS) serving $\geq 10,000$ .	CWS and NTNCWS serving $< 10,000$ only.	Any CWS, NTNCWS, or TNCWS that proposes to make a significant change in disinfection practice*.
Begin Profiling By:	April 1, 2000	<ul style="list-style-type: none"> <li>July 1, 2003, for systems serving 500-9,999 people.</li> <li>January 1, 2004, for systems serving <math>&lt; 500</math> people.</li> </ul>	<ul style="list-style-type: none"> <li>Upon completion of initial round of source water monitoring. AND</li> <li>12 consecutive months prior to making the proposed change.</li> </ul>
Frequency & Duration:	Daily monitoring for 12 consecutive calendar months to determine the total logs of <i>Giardia lamblia</i> inactivation (and viruses, if necessary) for each day in operation.	Weekly inactivation of <i>Giardia lamblia</i> (and viruses, if necessary), on the same calendar day each week over 12 consecutive months.	At least weekly inactivation of <i>Giardia lamblia</i> and viruses, for at least 1 year. May use data collected for profile under IESWTR and LT1SWTR.
States May Waive Disinfection Profiling Requirements If:	TTHM annual average $< 0.064$ mg/L and HAA5 annual average $< 0.048$ mg/L: <ul style="list-style-type: none"> <li>Collected during the same period.</li> <li>Annual average is arithmetic average of the quarterly averages of 4 consecutive quarters of monitoring.</li> <li>At least 25% of samples at the maximum residence time in the distribution system.</li> <li>Remaining 75% of samples at representative locations in the distribution system.</li> </ul>	One TTHM sample $< 0.064$ mg/L and one HAA5 sample $< 0.048$ mg/L: <ul style="list-style-type: none"> <li>Collected during the month of warmest water temperature; AND</li> <li>At the maximum residence time in the distribution system.</li> </ul> Samples must have been collected after January 1, 1998.	<ul style="list-style-type: none"> <li>The system has an existing disinfection profile for both <i>Giardia lamblia</i> and viruses, and has neither made a change in disinfection practices nor changed sources since the profile was developed; OR,</li> <li>The system has at least 1 year of existing data that can be used to complete a disinfection profile, and has neither made a significant change to its treatment practice nor changed sources since the data were collected.</li> </ul>
Disinfection Benchmark Must be Calculated If:	<ul style="list-style-type: none"> <li>Systems required to develop a disinfection profile and are considering making a significant change in disinfection practice*.</li> <li>Systems must consult the state prior to making any modifications to disinfection practices.</li> </ul>	Same as IESWTR, and systems must obtain state approval prior to making any modifications to disinfection practices.	Complete a disinfection profile and benchmark for viruses and <i>Giardia lamblia</i> .

\*A significant change in disinfection practice is defined as (1) change in the point of disinfection, (2) change to the type of disinfectant, (3) change to the disinfection process, or (4) any other modification designated by the state.

## VI. POTENTIAL SOURCES OF POLLUTION

Watershed Control Programs provides information on the potential sources of pollution in order to identify and control activities that may lead to the deterioration of the quality of a drinking water source (EPA 2003). General threats to source water quality are defined in federal and state regulations. Previous sanitary surveys have identified threats specific to the watersheds contributing to the purveyor's source water. Sources of pollution are identified through source water quality and land use monitoring.

This chapter is a summary of activities in the Lake Tahoe Basin, which are characterized in general, as potential sources of pollution by the U.S. Environmental Protection Agency, other regulatory agencies, previous sanitary surveys or by other means. The popularity of Lake Tahoe as a recreation destination for 15+ million visitors a year creates unique potential impacts to water quality.

The Environmental Protection Agency defines general watershed characteristics and activities that are detrimental to drinking water quality as:

Point sources of contamination such as wastewater (sewage) treatment plants, industrial discharges, barnyard feedlots, or private septic systems	Animal populations specific to potential Giardia contamination
Effect of precipitation, terrain, soil types, and land cover	Discharge to ground water which recharges the surface source
Road construction	Logging
Pesticide usage	Grazing animals
Recreation activities	Unauthorized activity in the watershed

Potential pollution sources in purveyors' watersheds have been identified in previous sanitary surveys including:

- Sewer system breaks/spills
- Recreation
- Trash disposal
- Changes in land ownership, zoning or land activities that affect water clarity
- Erosion, stream pollution, storm run-off, and urban run-off which contributes to the pathogenic contamination of source water
- Wildfire
- Wildlife

The **TWSA Risk Assessment Models (2014/2008)** and earlier studies for North Tahoe PUD conducted by Black & Veatch, analyzed the potential release of fecal coliform and other viral and bacteriological contaminants from swimmers on Tahoe North Shore beaches. The study indicated that intake location and water current patterns show minimal potential for contamination, but potential exists. The report is posted at: [https://www.yourtahoeplace.com/uploads/pdf-public-works/Schladow\\_Risk\\_Assessment\\_Phase\\_2\\_Final\\_Report\\_Jun\\_2014\\_FINAL.pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/Schladow_Risk_Assessment_Phase_2_Final_Report_Jun_2014_FINAL.pdf)

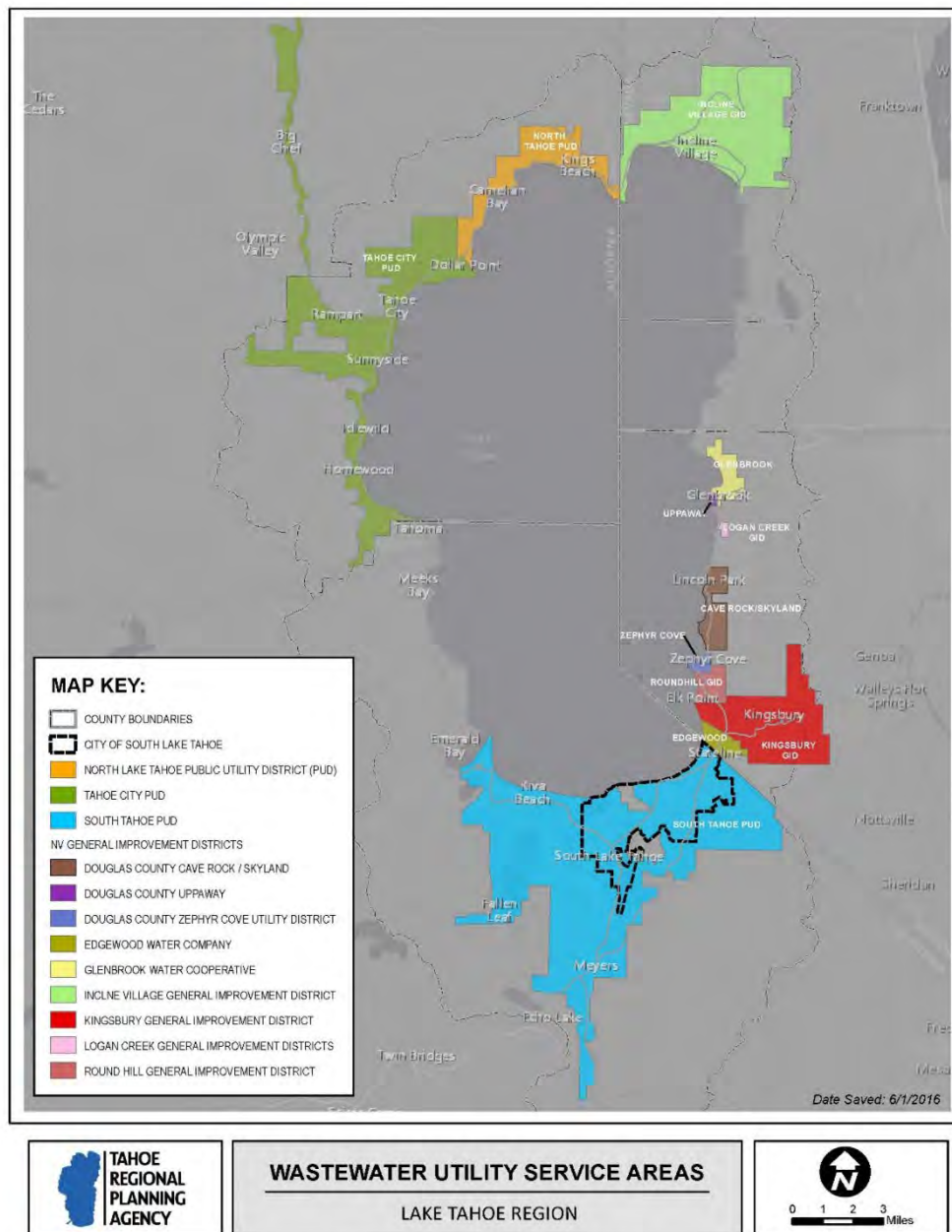
## Sewer Systems and Wastewater Treatment

In 1966, a significant control action (Porter-Cologne Act) took place to protect the pristine quality of Lake Tahoe when Nevada and California acted to prohibit the discharge of treated wastewater effluent into the lake. All sewage is exported out of the Tahoe Basin, and there are strict stormwater and TMDL management requirements. Wastewater treatment is a major area of concern for water quality. Treatment plants were retrofitted with export pipelines and pump stations to transport the effluent out of the basin. Sewage systems were expanded to export untreated wastewater to the Town of Truckee, California, for treatment and disposal for the north and west shores. In 1971, both states prohibited septic tanks and required that all sewage generators be connected to an existing sewage system.

In Tahoe, these programs are administered by the CA Lahontan Regional Water Quality Control Board (LRWQCB) and the Nevada Department of Environmental Protection (NDEP).

All treatment and collection facilities participate in local and county spill notification programs.

The Lake Tahoe Wastewater Treatment Infrastructure Partnership (LTWIP) was formed in 2007, as an informal association of local agencies providing wastewater services. Group activities are referenced in later sections of the annual report. However, sewerage transportation is necessary and infrastructure is vulnerable; and spills occur.



TRPA MAP DISCLAIMER: This map was developed and produced by the TRPA GIS department to provide a preliminary analysis for the shoreline update process. It is provided for reference only and is not intended to show map scale accuracy or all inclusive map features. Document Path: F:\GIS\MXDS\Nearshore\WO\_2016\WWUtilities.mxd



### Carnelian Bay Sewer Spill 2024

At approximately 8:00 p.m. on Thursday, July 18th, 2024, a private contractor working on Highway 28 in Carnelian Bay struck the North Tahoe Public Utility District's (NTPUD) main sewer export pipeline. Sewage from the pipeline overflowed into the nearby parking lot and did reach Lake Tahoe. The NTPUD estimates that approximately 125,000 gallons of untreated sewage discharged from the District's export pipeline at the break site. Emergency response crews were able to collect approximately 40,000 gallons of the spill at the site and return it to the export system immediately. The remaining 85,000 gallons flowed through the nearby parking lot and into Lake Tahoe. With support from neighboring utilities, NTPUD utility crews completed disinfection and remediation of the entire impacted area above and adjacent to Lake Tahoe on Friday, July 19 at 4:00 p.m. Additional work to repair damage to landscaped areas near the shoreline is ongoing.



<https://ntpud.org/carnelian-bay-sewer-spill/>

<https://ntpud.org/news/final-incident-update-wednesday-july-31/>

The NTPUD's main sewer export pipeline was repaired and the District's wastewater system is operating as normal. District engineers and utility operation managers continue to monitor the incident site and pipeline repair.

Placer County lifts health advisory and opens public access to Carnelian West Beach. Placer County Environmental Health, the California Tahoe Conservancy, and NTPUD are pleased to report that water quality tests taken over recent days at Carnelian West Beach show that bacteria levels have returned to a normal range and are within California beach water quality standards. As of this message at 5:00 pm Wednesday, July 31, the shoreline health advisory zone and beach closure are lifted for Carnelian West Beach. Residents and visitors may resume water contact and recreation activities at this location. Information about the incident is available online at – <https://www.ntpud.org> .

For public questions about the advisory and related health risks, contact: Placer County 530-745-2300 [environmentalhealth@placer.ca.gov](mailto:environmentalhealth@placer.ca.gov) For questions about the beach cleanup efforts, sewer impacts or beach closures, contact: North Tahoe Public Utility District Justin Broglio 530-414-8401 [jbroglio@ntpud.org](mailto:jbroglio@ntpud.org) .

<https://www.moonshineink.com/tahoe-news/recapping-the-carnelian-bay-sewage-spill/>

Safety protocols in reaction to the July 18 Carnelian Bay pipeline spill that leaked 85,000 gallons of raw sewage into Lake Tahoe are effectively over. Patton Landing and Carnelian West beaches have reopened, and Placer County has removed its health advisory, which extended a mile-and-a-half along the Carnelian Bay shoreline, straddling the spill site.

The investigation to understand what led to a Caltrans contractor striking the 24-inch main sewer export pipeline remains underway and involves multiple entities. Any penalties or potential litigation won't be known until after everything is buttoned up.

"The North Tahoe Public Utility District is very pleased with how our team responded to the pipeline strike and sewer emergency on July 18," wrote Justin Broglio, PUD public information officer, in an email to *Moonshine Ink*. "The NTPUD is grateful for the mutual aid we received from our neighboring agencies



(Tahoe City PUD, Truckee Sanitary District, Olympic Valley Public Service District, Incline Village General Improvement District, South Tahoe PUD, and Placer County) and from Q&D Construction (who happened to be working for Southwest Gas nearby). With their help, we were able to respond and complete the repair, cleanup, and disinfection much more rapidly.” He also credited the public for its understanding during closures, the water quality team for collecting samples, and the communications teams for keeping people updated.

### TRPA Water Quality (208) Plan

[https://www.trpa.gov/wp-content/uploads/documents/archive/Final-U.S.-EPA-Adopted-Lake-Tahoe-208-WQMP\\_2013.06.19.pdf](https://www.trpa.gov/wp-content/uploads/documents/archive/Final-U.S.-EPA-Adopted-Lake-Tahoe-208-WQMP_2013.06.19.pdf)

In June 2013, TRPA released the 208 Plan required for certain areas by the Federal Clean Water Act (section 208). These plans promote efficient and comprehensive programs for controlling water pollution in a defined geographic area. The Lake Tahoe 208 Plan (TRPA, December 12, 2012) which initiated the need for parallel updates of the Plan by the states of Nevada and California and the U.S. Environmental Protection Agency.

The Lake Tahoe Water Quality Management Plan (also known as the 208 Plan or WQMP) is a framework that sets forth the components of the water quality management system in the Lake Tahoe Region, the desired water quality outcomes for the Tahoe Basin, and the mechanisms adopted by all the relevant entities to achieve and maintain those outcomes.

The WQMP is organized to reflect the water quality management plan elements required by the U.S. Environmental

Protection Agency’s (U.S. EPA) regulations at 40 C.F.R. Section 130.6, which implements Sections 208 and 303(e) of the Clean Water Act, as well as the unique situation in the Lake Tahoe Region. The following are excerpts:

TABLE 2 – WQMP COMPONENTS AND SUBSEQUENT AMENDMENTS INCORPORATED BY REFERENCE	
AGENCY	DOCUMENT
TRPA	July 26, 2012 Bi-State Recommendations
	Regional Plan
	Code of Ordinances
	Regional Plan EIS
	BMP Handbook
Lahontan Regional Water Quality Control Board	Water Quality Control Plan for the Lahontan Region (Lahontan Basin Plan)
	Lake Tahoe TMDL for the California portion of the Region
	Lake Tahoe TMDL Substitute Environmental Document
	Other TMDLs for California 303d listed waters in the Region
Nevada Division of Environmental Protection	Lake Tahoe TMDL for the Nevada portion of the Region
	Other TMDLs for Nevada 303d listed waters in the Region
The Counties, City of South Lake Tahoe, and State Departments of Transportation	Load Reduction Plans
	Conforming Area Plans
U.S. Forest Service	U.S. Forest Service Forest Plan for the Lake Tahoe Region
	Conforming Area Plans
	U.S. Forest Service Soil and Water Conservation Handbook in California
	U.S. Forest Service BMP Manual in Nevada
<p style="text-align: center;"><b>Lake Tahoe (208) Water Quality Management Plan</b>  Final U.S. EPA Adopted Plan– June 19, 2013   Page 8</p>	

## CHAPTER 3: EFFLUENT LIMITATIONS

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Effluent limitations are restrictions imposed on quantities, discharge rates, and concentrations of pollutants discharged into waters of the United States.<sup>29</sup> The CFR requires WQMPs to include water quality based effluent limitations as a plan element in accordance with CWA Section 303.<sup>30</sup>

### 3.1 NPDES PROGRAMS

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific pollutant discharge limits, monitoring and reporting requirements, and other special conditions as appropriate.<sup>31</sup> The CWA allows the U.S. EPA to authorize state and other governments to implement the NPDES Program, including permit issuance and enforcement authorities. The U.S. EPA has oversight responsibilities and works closely with the authorized states and tribes on strategic planning, priority-setting and measurement of results.<sup>32</sup> Since its introduction in 1972, the NPDES permit program is responsible for significant improvements to water quality in the United States.<sup>33</sup>

The States of California and Nevada are approved by the U.S. EPA to implement the NPDES Program in their respective states and their NPDES permits are subject to U.S. EPA review. The LRWCB administers the NPDES program for the California portion of the Lake Tahoe Region and the NDEP Bureau of Water Pollution Control administers it for the Nevada portion.

The NPDES program regulates both stormwater and non-storm discharges from point sources and issues stormwater permits for the following:

- Municipal Separate Storm Sewer Systems (MS4s) of certain sizes or as designated by the permitting authority;
- Industrial facilities in any of the 11 designated categories that discharge to an MS4 or to waters of the United States; and
- Construction activity that disturbs one or more acres of land or disturbs less than one acre but is part of a larger plan of development.<sup>34</sup> All eligible discharges must prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that includes a monitoring and reporting program.<sup>35</sup>

The following NPDES permits, which may be subject to change through the permit modification, reissuance and termination process, are currently either applicable state-wide or to the Lake Tahoe Region specifically:

#### California NPDES Permits



## CHAPTER 4: MUNICIPAL AND INDUSTRIAL WASTE TREATMENT

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The CFR requires WQMPs to identify municipal and industrial waste treatment operations in accordance with Section 208 of the CWA.<sup>50</sup>

California prohibited the discharge of treated wastewater into Lake Tahoe through enactment of the Porter-Cologne Act, and Nevada did the same through the Executive Order by the Governor of Nevada dated January 27, 1971.<sup>51</sup> Both states prohibited septic tanks and required that all sewage generators be connected to an existing sewage system.<sup>52</sup>

The TRPA Regional Plan Public Services and Facilities Element includes goals and policies that provide for adequate level of public services while the Water Quality Subelement includes provisions that protect Lake Tahoe's water quality.

The TRPA Code of Ordinances Chapter 60 – Water Quality prohibits the discharge of domestic, municipal, or industrial wastewater to Lake Tahoe and its tributaries.<sup>53</sup> Chapter 32 of the Code of Ordinances includes wastewater service requirements for projects proposing construction of a new structure or reconstruction or expansion of an existing structure.<sup>54</sup>

The TRPA BMP Handbook includes technical guidance on best practices for waste management and material pollution prevention.<sup>55</sup>

### 4.1 LARGE UTILITIES, PUBLIC UTILITY DISTRICTS AND GENERAL IMPROVEMENT DISTRICTS

Wastewater treatment in the Tahoe Region is provided by public utility districts (PUDs) and general improvement districts (GIDs). Districts are bound by service areas and directed through boards created by local governments.

On the California side of the Region, PUDs may acquire, construct, own, complete, use, and operate a variety of services, including water, electricity, recreational facilities, drainage facilities, street lighting, and fire protection. The following Public Utility Districts operate various wastewater collection and treatment operations in the California portion of the Lake Tahoe Region in accordance with federal, state and regional law:

North Tahoe Public Utility District (NTPUD) provides sewer services to the residents of the north shore of Lake Tahoe. The District's boundary ranges from the Nevada state line in Crystal Bay to Dollar Hill in California and includes the communities of Kings Beach, Tahoe Vista, Brockway Vista, Carnelian Bay, Cedar Flat and Agate Bay.<sup>56</sup>

South Tahoe Public Utility District provides sewage collection, treatment, and export to protect Tahoe's delicate ecosystem for portions of El Dorado County within the Tahoe Region.<sup>57</sup>

Tahoe City Public Utility District (TCPUD) provides sewer services for a 31 square mile area within both Placer and El Dorado Counties, extending from Emerald Bay to Dollar Hill, and along the Truckee River to the Nevada County line.<sup>58</sup>

In Nevada, maintenance of public facilities including sewers within private developments is the responsibility of the property owners within the development. Under the authority of NRS, a county may establish a General Improvement District (GID) for this purpose.<sup>59</sup> Nevada GIDs oversee the development, maintenance, and use of public facilities such as water and sewer systems, streets and sidewalks, and parks and open space.<sup>60</sup> The following GIDs operate various wastewater collection and treatment operations in the Nevada portion of the Lake Tahoe Region in accordance with federal, state and regional law:

Cave Rock Estates GID serves approximately 80 properties in Douglas County adjacent to Lake Tahoe Cave Rock formation.<sup>61</sup>

Douglas County Sewer Improvement District operates a sewer treatment facility for portions of Douglas County within the Lake Tahoe Region.<sup>62</sup>

Kingsbury General Improvement District (KGID) provides sewer collection services to Stateline Nevada residences off of State Route 207 or Kingsbury Grade.<sup>63</sup>

Incline Village General Improvement District (IVGID) is responsible for processing and removing sewage and wastewater for communities of Incline Village and Crystal Bay, Nevada.<sup>64</sup>

Lakeridge GID<sup>65</sup> and Logan Creek Estates GID<sup>66</sup> serve portions of Douglas County.

Marla Bay GID serves residents of Marla Bay, Nevada.<sup>67</sup>

Oliver Park GID serves a portion of Douglas County, Nevada off of Kahle Drive.<sup>68</sup>

Round Hill General Improvement District provides wastewater collection service to 470 private residential customers and 50 commercial customers in Zephyr Cove, Nevada.<sup>69</sup>

Zephyr Heights GID<sup>70</sup>, Zephyr Cove GID<sup>71</sup> and Zephyr Knolls GID<sup>72</sup> serve portions of Douglas County.

Treatment plants of four local districts (Tahoe-Truckee Sanitation Agency, IVGID, Douglas County Sewer Improvement District #1, and STPUD) are retrofitted with export pipelines and pump stations to transport treated effluent out of the Region.<sup>73</sup> Since



1968, all wastewater in the Tahoe Region is pumped from treatment plants out of the Region to avoid discharge into the Lake.<sup>74</sup>

### LOCAL SOLID WASTE COLLECTION AND DISPOSAL

South Tahoe Refuse (STR) provides refuse and recycling service within the City of South Lake Tahoe, the unincorporated El Dorado County areas and the Tahoe Township area of Douglas County.<sup>75</sup> STR collects more than 100,000 tons of waste each year. This waste is collected and sorted for recycling at the South Tahoe Refuse Materials Recovery Facility (MRF) located at STR's transfer station in South Lake Tahoe, California. The MRF initiates or improves separation of aluminum cans, glass, plastics, cardboard, different grades of paper, tin, metals, appliances, milled wood, green waste, stumps, construction debris (concrete, asphalt), and tires.<sup>76</sup>

Incline Village General Improvement District (IVGID) with Waste Management, Tahoe Truckee Sierra Disposal (TTSD)<sup>77</sup>, and the WASTE NOT program provides trash and recycling services for communities of Incline Village and Crystal Bay, Nevada.<sup>78</sup>

The Tahoe-Truckee Sierra Disposal Company, Inc. (TTSD) provides waste removal services for the Lake Tahoe Region from Emerald Bay to Crystal Bay. The company handles approximately 63,000 tons of solid waste per year. All materials collected by TTSD, including garbage and recyclables, are hauled to the Eastern Regional Materials Recovery Facility (MRF), located between Truckee and Squaw Valley in Placer County, where they are sorted in an effort to meet California's mandatory solid waste diversion requirements. The MRF, which was built in 1994–1995, handles household recyclables, including plastics, aluminum, tin, glass, cardboard, newspaper, carpet, and computers. Also, the facility recycles "white goods," such as refrigerators and freezers, and waste wood, which includes dimensional wood (e.g., construction remnants) and lot clearing debris. Material that is not recyclable is treated as solid waste and taken to the Western Regional Sanitary Landfill in Roseville or to the Lockwood landfill in Nevada.<sup>79</sup>

### Trash or Hazardous Waste Spills

No trash or hazardous waste spills from solid waste collection or transportation companies have been reported to the EPA during the past year. All solid waste is collected and transferred out of the basin. There are no active landfill sites within TWSA member boundaries or the Tahoe Basin. Several transfer / MRF sites exist.

**Household Hazardous Waste (HHW)** collection sites and collection days are located throughout the basin, in order to provide an easy way for homeowners to drop off small quantities of home-generated wastes, potentially harmful to water quality if disposed on improperly. HHW Drop-off Sites are maintained at Incline Village GID (NV), and the Cabin Creek and South Tahoe Refuse Transfer Station (CA). These programs offer a valuable service to water quality protection, by offering services for proper disposal of toxic substances. The IVGID site handles approximately 20 ton of combined HHW/electronic waste materials annually. [www.ivgid.hhw.org](http://www.ivgid.hhw.org)

### Don't Trash Tahoe

Over the past several years, the presence of litter and trash in the communities and on public lands has been gaining local and national attention. The League to Save Lake Tahoe has been spearheading monthly cleanups around the basin, and organizing community teams called "Tahoe Blue Crews". [www.keeptahoeblue.org/our-work/shoreline-protection/tahoe-blue-crew-why](http://www.keeptahoeblue.org/our-work/shoreline-protection/tahoe-blue-crew-why).

IVGID Waste Not and other area partners host episodic volunteer trash cleanup events for the Incline Village, Crystal Bay, NV and Tahoe Nevada (east shore) regions.

The **Tahoe Take Care** campaign provides multiple outreach messages on stewardship actions for locals and visitors. <https://takecaretahoe.org/>. This topic was greatly expanded in 2020 with new messaging developed about reducing plastic waste, refilling with tap water, and other messages. Many of the top suggestions touch on existing Waste Not /TWSA outreach messages and programs.

### **Clean Tahoe Program**

Since 1988, Clean Tahoe has provided litter cleanup service to the City of South Lake Tahoe and El Dorado County. Field crew workers drive regularly scheduled routes throughout neighborhoods and remove visible litter and illegally dumped items. In all, more than 350 miles of public thoroughfares are serviced in South Tahoe alone. They also respond to calls each day from citizens reporting illegally dumped items and animal-in-trash incidents. The Clean Tahoe field crew is also responsible for servicing certain trash and recycle cans throughout the communities.

2021-2024 North Shore Expansion: A unified agency response for on-going litter and trash issues emerge for Tahoe's north shore; with the opening of a Clean Tahoe Team office in Kings Beach; servicing Truckee, Kings Beach, Tahoe City, Incline Village, and Crystal Bay. A \$350,000+ investment by multiple jurisdictions is pooled for this project.



### **Cigarette Butts**

IVGID Waste Not/TWSA, the League to Save Lake Tahoe and Keep America Beautiful have teamed up on a cigarette butt bin disposal project to place 250 bins at high use areas. To date, 125+ units have been installed around the lake. <https://www.keeptahoeblue.org/news/press-releases/250-cigarette-butt-collection-canisters-to-be-installed-at-lake-tahoe>

### **Cigarette Canister Program Keeps Butts out of Lake Tahoe**

<https://takecaretahoe.org/success-stories/cigarette-canister-program-keeps-butts-out-of-lake-tahoe/>

“Stop at a Tahoe beach, popular trail or parking lot after any nice day in the Basin, and you’re bound to find cigarette butts littered on the ground. They’re unavoidable. In fact, at volunteer clean-up events organized by the League to Save Lake Tahoe (the League), cigarette butts were the top collected trash item in 2018. In that year alone, volunteers picked up more than 27,600 butts!

In June of 2019, the League to Save Lake Tahoe and the Tahoe Waters Suppliers Association launched a program to combat cigarette litter. Their initiative calls for distributing an initial 250 cigarette butt collection canisters at high-use locations around Lake Tahoe. You can spot them by their Take Care Tahoe and Keep Tahoe Blue branding. The aim of the “Tahoe Cigarette Disposal Program” is to reduce toxic chemicals from littered cigarette butts leaching into the environment in order to protect wildlife, reduce litter on Lake Tahoe’s shoreline and protect Lake Tahoe’s famed water clarity.

Cigarette canisters have been installed at key locations, including trailheads, beaches and businesses. The cigarettes collected in the canisters are gathered and shipped to TerraCycle, a recycling and waste

reduction organization. The program has thus far been a success, and there are plans to install more than the initial round of 250 canisters. The League to Save Lake Tahoe, in collaboration with its partners, continue to organize volunteer community clean-up events around the Basin after popular vacation dates like Labor Day weekend, the 4<sup>th</sup> of July and Earth Day. If you are a business owner who would like to adopt and install a canister, or if you are a concerned citizen who would like to inform the League of a hot spot where a canister would help, please email [cigarettedisposal@keeptahoeblue.org](mailto:cigarettedisposal@keeptahoeblue.org). “

### **Over 27,600 Cigarette Butts Picked Up at Keep Tahoe Blue Cleanups in 2018 - Lake Tahoe, CA**

<https://takecaretahoe.org/success-stories/cigarette-cannister-program-keeps-butts-out-of-lake-tahoe/>



The League to Save Lake Tahoe and the Tahoe Waters Suppliers Association (TWSA) actively distribute cigarette butt collection canisters at key locations around Lake Tahoe. The aim of the Tahoe Cigarette Disposal Program is to reduce toxic chemicals from littered cigarette butts from leaching into the environment, to protect wildlife, and to reduce litter on Lake Tahoe’s shoreline and vicinity. The program came about after the League noticed that cigarette butts were the top collected items at cleanup events. “We are so excited to be partnering with the TWSA to build the awareness that cigarette butts are a toxic form of litter that doesn’t biodegrade,” said Marilee Movius, community engagement manager for the League. “With the help of these new cigarette butt canisters, it will be easy for everyone to properly dispose of cigarette butts and Keep Tahoe Blue. An estimated 98 percent of cigarette filters are made of plastic fibers, which means they do not biodegrade and can become a form of micro-plastic.

### **Microplastics as an Emerging Contaminant**

Micro-plastics have emerged as a potential contaminant of concern in freshwater surface waters, including Tahoe. Despite Tahoe’s unique situation of a self-contained basin, with no major upstream influences such as industrial discharges or sewage, recent research has shown micro-plastics to be present in both shoreline sediment samples. Probable vectors of distribution include atmospheric deposition and trash/ urban runoff. Two area research agencies are conducting micro-plastic sampling efforts, of open water, selected drinking water intakes and storm drain sites.

TWSA and other partners initiated a special outreach campaign on this topic. Details are in Executive Summary section. Launching in October, 2019 IVGID/TWSA began working on a Nevada Division of Environmental Protection (NDEP) Nonpoint Source (NPS) Program Grant for the proposal titled “Pilot Project to Reduce Sourcewater Plastic Pollution in Lake Tahoe”, approved for grant funding up to the amount of \$61,995.00.

In additional, NDEP secured \$25,000 in funding from the 2019 Multipurpose Grant to support a limited scope of research described in the proposal “Baseline Plastics Research on the Fate of Plastics in Lake Tahoe.”



## 2020 -2026- CALIFORNIA Begins Program to Monitor Microplastics in Drinking Water

[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/microplastics.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/microplastics.html)

On March 19, 2020, a proposed definition of 'microplastics in drinking water' was adopted by the State Water Board. A proposed definition of 'microplastics in drinking water' prepared on February 1, 2020 was reviewed by an external panel of experts. The draft definition reviewed by the expert panel and their comments are available.

As stated in Health and Safety Code section 116350 *et seq.*, California Safe Drinking Water Act (Act) requires the State Water Resources Control Board (State Water Board) to administer provisions related to drinking water to protect public health. The Act allows the State Water Board to conduct research, studies, and demonstration programs to ensure provision of a dependable, safe supply of drinking water, which may include improving methods to identify and measure the existence of contaminants in drinking water and to identify the source of the contaminants. The Act also grants the State Water Board the authority to implement regulations that may include monitoring of contaminants, and requirements for notifying the public of the quality of the water delivered to customers.

On September 28, 2018, Senate Bill No. 1422 was filed with the Secretary of State, adding section 116376 to the Health and Safety Code, and requiring the State Water Board to adopt a definition of microplastics in drinking water on or before July 1, 2020, and on or before July 1, 2021, to adopt a standard methodology to be used in the testing of drinking water for microplastics and requirements for four years of testing and reporting of microplastics in drinking water, including public disclosure of those results.

## EPA Emerging Contaminants - Water Provider Sampling (5th UCMR) to begin 2023-2025

Website for current information: [https://www.epa.gov/system/files/documents/2023-08/ucmr5-data-summary\\_0.pdf](https://www.epa.gov/system/files/documents/2023-08/ucmr5-data-summary_0.pdf)

Beginning in 2023, several TWSA water suppliers begin mandatory water sample collections in compliance with the Fifth Unregulated Contaminant Monitoring Rule (UCMR 5) established by the U.S. Environmental Protection Agency (EPA). URCM 5 requires nationwide monitoring for per/polyfluoroalkyl substances (PFAS) and lithium in public drinking water systems from 2023 – 2025. Microplastics, such as polytetrafluorethylene used as nonstick coating on cooking pans, can be composed of PFAS meaning they will be monitored in the municipal waters of Lake Tahoe under URCMR5. 2025.

At the time of publication - IVGID, KGID, NTPUD and TCPUD have begun sampling.



Medium and Small PWS public water system (PWS) are subject to the requirements of the next Unregulated Contaminant Monitoring Rule (UCMR 5), published on December 27, 2021 (86 FR 73131). UCMR 5 requires certain PWS to collect drinking water samples for 29 per- and polyfluoroalkyl substances (PFAS) (microplastics) and lithium analysis during a 12-month period between 2023 and The UCMR dataset is one of the primary sources of information on occurrence and population exposure used to develop regulatory decisions for contaminants in the public drinking water supply by EPA.

The Safe Drinking Water Act was amended in 2018 and now specifies that a nationally representative sample of PWSs serving fewer than 3,300 people as of February 1, 2021 are required to participate in UCMR. While participation by some medium PWSs (those serving between 3,300-10,000 people) is subject to EPA receiving additional appropriations, EPA has determined that it has appropriations available to support UCMR 5.

### 2023: Lake Tahoe Has High Concentration of Microplastics, Global Research Shows

Research published in Nature reveals concentrations of microplastics in 38 lakes with plastic debris from textiles frequently identified: <https://www.unr.edu/nevada-today/news/2023/lake-tahoe-microplastic>

Microplastics, small fragments of fibers from clothing, packaging, and other plastic residue have invaded freshwater lakes and watersheds globally and in alarming quantities, according to new research published in the scientific journal Nature under the title 'Plastic debris in lakes and reservoirs.' Lake Tahoe, known for its purity and high level of legal protection had the third highest concentration of plastic of 38 lakes tested around the world and higher than in the surface water at the ocean's gyres where the floating islands of debris emblematic of the world's plastic pollution crisis collect. "One of the highest priorities at Lake Tahoe is to keep the water quality clear and pristine," Sudeep Chandra, Professor of Limnology and Director of the Global Water Center at the University of Nevada, Reno, said. "Clarity is the signature of Lake Tahoe and the mantra Keep Tahoe Blue is not taken lightly. With this study, we now know that plastics exist in high concentrations in Lake Tahoe and could be having an impact on the ecosystem and the animals living in the lake. This shows us that there are always emerging issues that need to be addressed so we can try to preserve the lake into the future."

### Microplastics In Lake Tahoe; Drinking Water = Tahoe Tap Remains Safe And Healthy

[https://www.yourtahoeplace.com/uploads/pdf-public-works/July\\_2023\\_Microplastics\\_in\\_Lake\\_Tahoe\\_\(longer\\_press\\_release\).pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/July_2023_Microplastics_in_Lake_Tahoe_(longer_press_release).pdf)

Table 3. Detailed project overview of sample collections, laboratory methods, spectral analysis and size detection limits.

Project Overview					
Summary of Samples and Analysis					
Sample Type & Collection Method	Collection Method	Number	Sample Preparation	Analysis Methods	Particle Size Limits
Surface Water (0m Depth)	Tow Net (335µm mesh)	12 monthly tows over 1 year	Digestion of organic material Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>335µm
Subsurface Water (15m avg. Depth)	Tow Net (335µm mesh)	12 monthly tows over 1 year	Digestion of organic material Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>335µm
Vertical Water (0, 15, 50, 250, 450m)	Van Dorn Grab Sample	4 quarterly samples over 1 year	Sample Filtering Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>20µm
Lake Sediment	Box Core Grab Sample	1 collection	Digestion of organic material Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>20µm
Asian Clams	Ponar Sediment Sampler	30 clams from single collection	Digestion of organic material Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>20µm
Kokanee Salmon	Procured by local fishermen	3 salmon stomachs	Digestion of organic material Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>20µm
Municipal Water	Procured at two municipal sources	4 quarterly samples over 1 year	Filtration Hand Selection and Mounting	Raman microspectroscopic Analysis Visual Particle Characterization Digital imaging and measurement	>20µm

Recent research published in Nature.com, included Lake Tahoe among a global list of 38 freshwater lakes with high concentration of microplastics detected. However, as part of ongoing watershed protection programs, the Tahoe Water Suppliers Association (TWSA) has worked in partnership with the

Tahoe Environmental Research Center (TERC/UC Davis) and the Nevada Division of Environmental Protection (NDEP) pro-actively studied the presence of microplastics in the surface waters of Lake Tahoe.

**To Sink or Swim: A Snapshot Evaluation of the Fate and Types of Microplastics in Lake Tahoe;** published in 2023, by UC Davis Tahoe Environmental Research Center researcher, Katie Senft, and associates, examined Lake Tahoe water sampled at six different depths from top to bottom.

[https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report\\_Final\\_20230302.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report_Final_20230302.pdf)

Part of the sampling included a drinking water intake specific study. This study consisted of eight sampling events of two municipal drinking water sources in Lake Tahoe from summer 2021 to winter 2022. Samples were taken from the North Shore of Lake Tahoe at the Incline Village Improvement District and the South Shore at Edgewood Water Company.



This information yielded an average microplastic abundance of 0.044 particles/L, which points to minimal exposure to microplastics at Tahoe drinking water sources. The association members continue to be keenly aware of and closely following the science of microplastics and the monitoring protocols. They have been actively engaged in removing plastics and preventing more plastics from entering the watershed through public education and awareness efforts. They have determined this to be the best tool to alleviate accumulation of microplastics in the environment.

The municipal water samples collected consisted of two particles of polypropylene and one particle of polyester in 68.44 liters (L) of water. Comparison: Average of 325 microplastic particles per liter of bottled water. <https://www.frontiersin.org/articles/10.3389/fchem.2018.00407/full> Sherri A. Mason What this means for Tahoe Tap drinkers is: 1 microplastic particle detected per 23 liters of water (0.044 particles/L); Possible ingestion of 1 microplastic particle every 7 days (based on average consumption.)

**Researchers conduct complementary research to determine the threat of microplastics at Lake Tahoe**  
<https://storymaps.arcgis.com/stories/0a2ceba61c47470e8e18566268f9bfcf>

Microplastics originate from people but they enter the environment in a number of ways. Scientists have narrowed down some likely sources including wastewater, litter, roadways, storm drains, and deposition from the atmosphere. TERC and DRI are studying several of these potential sources to Lake Tahoe.

Litter has long been a concern around Lake Tahoe, and is assumed to be a primary avenue for microplastics getting into the lake. Litter left on beaches or entering the water directly from recreational boating are the most likely pathway. Streams and storm drains that flow into the lake pick up and carry plastic on their way to Lake Tahoe. The League to Save Lake Tahoe (Keep Tahoe Blue) and DRI collaborate on a citizen science project to collect storm drain water for microplastics testing.

Roadways are a major contributing source of microplastics as tires are commonly made of synthetic rubber (plastic) which wears down over time. These small pieces of tire can easily wash into the lake through storm drains.

Wastewater, which is domestic, industrial, commercial, or agricultural water that has been contaminated by human use, can be a major source of microplastics in many places. Synthetic fibers from clothing, such as synthetic fleece, enter wastewater as they shed off of clothing in washing machines. However, because domestic and commercial wastewater is pumped out of the Lake Tahoe Basin, it is not a source of microplastics in the Basin.

### **Media Coverage of Trash and Plastics Issue**

<https://www.kolotv.com/2020/07/02/raleys-working-with-tahoe-organizations-and-uc-davis-to-reduce-plastic-waste/>  
<https://www.sierrasun.com/news/environment/microplastic-cleanup-research-continues-at-lake-tahoe/>  
<https://www.tahoedailytribune.com/news/microplastic-clean-up-research-continues-at-lake-tahoe/?fbclid=IwAR0ZrNliqsQD21ULLd0GsJrFmsEffgh3r2lg8wG7EQQS01oMkzxNnuQQaTk>  
<https://www.ktvn.com/story/42349550/incline-village-raleys-encourages-customers-not-to-buy-plastic-water-bottles-as-part-of-new-initiative>  
<https://www.sierrasun.com/opinion/columns/darcie-goodman-collins-tina-dvon-gallier-save-lake-tahoe-from-single-use-plastics/>  
<https://www.sierrasun.com/news/the-fate-of-plastics-in-lake-tahoe/>  
<https://www.sierrasun.com/news/environment/clean-up-the-lake-pulls-more-than-8200-pounds-of-trash-from-tahoe-donner/>  
<https://www.sierrasun.com/news/pack-it-in-pack-it-out-locals-protest-surge-of-litter-left-in-truckee-tahoe-area/>  
<https://www.sierrasun.com/news/power-of-the-people-how-truckee-tahoe-locals-are-taking-to-beaches-to-clean-up-litter-left-by-visitors/>  
<https://www.sierrasun.com/news/placer-county-temporarily-increases-trash-service-in-north-lake-tahoe/>  
<https://www.sierrasun.com/news/environment/trash-problem-piling-up-around-lake-tahoe/>  
<https://www.sierrasun.com/news/litter-mitigation-on-tap-at-truckee-town-council/>  
<https://www.sierrasun.com/news/mitigating-microplastics-what-types-of-plastics-are-getting-into-lake-tahoe-and-landing-on-beaches/>  
<https://www.sierrasun.com/news/community/loop-the-lake-collects-over-200-pounds-of-trash/>  
<https://takecaretahoe.org/success-stories/raleys-is-first-tahoe-area-grocery-store-to-encourage-customers-not-to-buy-single-use-water-bottles/>  
<https://www.tahoedailytribune.com/news/partnership-aims-to-get-more-people-drinking-tahoe-tap-water/>

### **Microplastics are found in Lake Tahoe's waters for first time ever (8/26/19)**

<https://www.latimes.com/environment/story/2019-08-26/lake-tahoe-microplastic-pollution-detected>  
LAKE TAHOE, Calif. — Scientists have detected microplastic pollution in Lake Tahoe's deep blue waters for the first time. Now they are trying to determine its source and potential harm to the lake's flora and fauna. Preliminary analyses of water samples collected by researchers at the [Desert Research Institute](#) in Reno revealed the presence of particles of synthetic fiber and bits of red and blue plastic no bigger than the head of a pin. "On one level, we're heartbroken and disappointed by this discovery," said Monica Arienzo, an assistant research professor at the institute and leader of the investigation. "We really hoped we wouldn't find much of this material in Tahoe's water, which is almost entirely snowmelt." At the same time, she said, the team is looking forward "to diving deep into the many questions and concerns it raises."

Tracing the particles to their source won't be easy. Recent studies have shown that particles from discarded plastic products — flip-flops, toys, toothbrushes, water bottles, synthetic clothing, Styrofoam packaging and myriad others — can be transported long distances through the atmosphere by wind, rain and falling snow. As a result, the pollution in the basin cradling Tahoe's water could be local, or from locations around the world. "Right now, we're not sure where it came from," Arienzo said. "But we're definitely going to try and figure it out."



The finding complicates a long struggle against erosion, sewage effluent, unbridled development, invasive clams and algae to save the lake, 6,225 feet in elevation. Federal state and local governments have spent more than \$2 billion over the last six decades buying land and developing erosion control and wetlands restoration projects.

Microplastic debris is an emerging concern among scientists and environmentalists. Researchers recently [found surprisingly high levels of microplastics](#) in Arctic snow, demonstrating the global reach of these tiny particles of pollution.

The study of microplastics in freshwater alpine lakes such as Lake Tahoe is still in its infancy.

<https://www.sierrasun.com/news/the-fate-of-plastics-in-lake-tahoe/>

#### **Litter Abatement – several Water Bottle Bans passed in region:**

City of SLT's water bottle ban goes smoothly. Update July 2024 CBS SACRAMENTO:

<https://www.youtube.com/watch?v=JzsPOhJ8t6o>

April 2024: South Lake Tahoe Bans Single Use Plastic Water Bottles - In fall 2022, the City of South Lake Tahoe Council voted to ban the sale and distribution of single use plastic water bottles (in sizes under 1 gallon) within the city limits. <https://www.cityofslt.us/CivicAlerts.aspx?AID=1863>

**OUR TAP WATER IS EXTRAORDINARY**

The Tahoe Water Suppliers Association (TWSA), which includes California and Nevada public water agencies, provides outstanding, pure drinking water that is exceptional from the source. Its members possess six of the total 60 "filtration avoidance" permits awarded among the 160,000 public water systems across the U.S.

The City supports TWSA's Drink Tahoe Tap campaign, which encourages consumption of our extraordinarily tasty tap water instead of water from plastic bottles.

**WE ARE ALL STEWARDS OF THE LAKE**

Discarded plastics are particularly damaging to our water quality because they break down into smaller pieces and persist in our environment.



To encourage the reuse of personal water bottles over the single use of plastic bottles, the City is installing more public water refill stations.

**SALE OF SINGLE-USE PLASTIC WATER BOTTLES IS BANNED**

On April 24, 2024, the ordinance will prohibit retail sale or distribution of any single-use plastic bottled water under one gallon. Bottled water is any product that contains water as the sole ingredient, without added flavors, electrolytes, vitamins, etc. While non-plastic alternatives do not violate the ordinance, the City encourages refilling with Tahoe Tap instead of promoting single-use alternatives.

**Drink Tahoe Tap.**

For more information, and to view the ordinance, visit [cityofslt.us/plasticwaste](https://www.cityofslt.us/plasticwaste) or scan the QR code.

 CITYOFSLT.US • (530) 542-6000 • @CITYOFSLT 

See resources available from the Drink Tahoe Tap® campaign and the **Tahoe Environmental Research Center**.

While alternatives to single-use plastic are available and do not violate the ordinance, the City encourages refilling reusable water bottles with our award-winning local tap water. For more information about the Plastic Water Bottle Ban, please reach out to Sara Letton at [sletton@cityofslt.us](mailto:sletton@cityofslt.us).

**SOUTH LAKE TAHOE, CA, October 4, 2022** – Today, the City of South Lake Tahoe City Council adopted a single-use plastic water bottle ban, effective April 22, 2023 for city facilities and permitted, temporary activities and special events. The ban will expand to sales citywide on April 22, 2024, allowing businesses additional time to prepare for this shift. The ban will prohibit the sale of single-use plastic water bottles less than one gallon with an exception for emergency situations designated by the City Manager.

Single-use plastics are a significant source of waste and pollution due to the sheer volume of these products produced and used by consumers and the long amount of time they exist in the environment after their short, useful life ends. Discarded plastics are particularly damaging to water quality as they do not break down or decompose. Instead, they eventually break apart into microplastics that end up washed downstream into waterbodies. Through the course of an ongoing study, the University of California Davis's Tahoe Environmental Resource Center (TERC) recently found plastic in almost every sample taken from beaches around the Lake. Because no wastewater is discharged to Lake Tahoe, most of the microplastic waste appears to be coming from plastic litter, especially plastic bottles and bags.

Visitors and businesses can contribute to the stewardship of Lake Tahoe by drinking local tap water or purchasing more sustainable single-use options. The Tahoe Water Suppliers Association (TWSA), a consortium of local municipal water agencies, and TERC, developed the 'Drink Tahoe Tap' campaign to encourage people to embrace the award-winning tap water and ditch the single use plastic water bottles. Even Raley's, one of the area supermarkets, has been a committed partner displaying 'Drink Tahoe Tap' water bottles in the front of their stores.

"We aim to find ways to support an already roust 'Drink Tahoe Tap' marketing campaign and look forward to working with our business community to help them embrace this opportunity to participate in the stewardship of Lake Tahoe," said Sara Letton, the City's Sustainability Coordinator. "The community really stepped up to overwhelmingly support this at the first City Council presentation, but we also heard loud and clear from our business community that they are looking for some support as the ban is implemented." In response, the City plans to install water bottle refill stations at strategic locations throughout the community over the next couple of years and will work with local partners on outreach and education to drive behavior change toward refilling with tap water.

### **Hazardous Algae Blooms (HABs)**

A live and archive portal is maintained at:

[https://www.waterboards.ca.gov/lahtontan/water\\_issues/programs/swamp/harmful\\_algal\\_blooms.html](https://www.waterboards.ca.gov/lahtontan/water_issues/programs/swamp/harmful_algal_blooms.html)

Freshwater Cyano HABs Program (Blue-Green Algae)

[https://www.waterboards.ca.gov/water\\_issues/programs/swamp/freshwater\\_cyanobacteria.html](https://www.waterboards.ca.gov/water_issues/programs/swamp/freshwater_cyanobacteria.html)

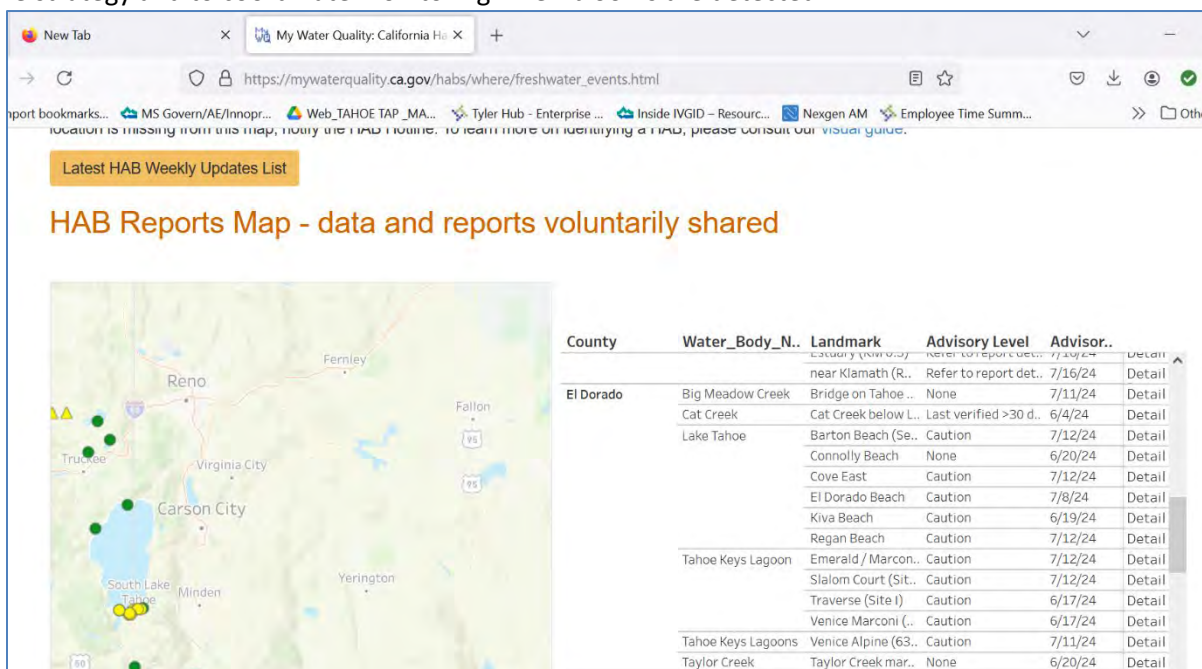
Observations of harmful algal blooms (HABs) and algal toxins have increased globally in recent years. HABs are problematic because they can affect multiple beneficial uses including recreation, aquatic life, and drinking water by reducing aesthetics, lowering dissolved oxygen concentration, causing taste and odor problems, and producing potent toxins.

See an algae bloom? Report it here: <https://mywaterquality.ca.gov/habs/do/#how>

Water Board staff are working with state and local entities to identify and respond to HAB incidents throughout California. The Water Board first began to formally address this issue in 2005 when it formed the Blue Green Algae Work Group, later renamed the California Cyanobacteria Harmful Algal Bloom Network (CCHAB). An initial product of this group was the Voluntary Guidance Document (original release 2010, updated 2016). Subsequently, SWAMP prepared California Freshwater HAB Assessment



and Support Strategy to articulate a coordinated program to assess, communicate and manage HABs in California. Since then staff at both the State and Regional Water Boards have worked to coordinate monitoring and follow up when algal blooms are detected. SWAMP has also developed the infrastructure (bloom reporting form, guidance documents, field and lab procedures, etc.) to support the strategy and to coordinate monitoring when blooms are detected.



**HAB Incidents (Tahoe region):** Visit <https://mywaterquality.ca.gov/habs>

Suspected algae blooms are reported in Lahontan's Sierra and Lake Tahoe regions in each summer. Warming water, low water levels and nutrient loading may be exacerbating this issue.

The California Water Board maintains an interactive map showing routine monitoring locations and event reports: [https://mywaterquality.ca.gov/habs/where/freshwater\\_events.html](https://mywaterquality.ca.gov/habs/where/freshwater_events.html)

There is no HAB real-time monitoring website for the Nevada side of Lake Tahoe. In Nevada, suspected HABs are tracked by the state's Department of Environmental Protection. Nevada's harmful algal bloom data is comprised of algae samples collected from public water bodies by trained state staff following the Strategic Response Plan (SRP) and Standard Operating Procedures (SOP).

NDEP and analytical laboratories analyze algae samples to make health advisory determinations. NDEP releases a Weekly HAB Update with the most recent data and health advisories. Please subscribe to the Nevada HABs Listserv to receive weekly HAB updates.

According to the UC Davis Tahoe Environmental Research Center in Incline Village, the algae being seen at Lake Tahoe is more than their long-term researchers have ever seen in their careers. TERC released a report Wednesday based on their research in 2022 on the three types of algae in Lake Tahoe: The type of algae you may have experienced varies all around the lake and changes week by week.

### Attached Algae (Periphyton)

Using monthly helicopter flights, TERC has been able to track the extent and seasonal changes of

periphyton. For example, in June, extremely heavy growth was seen on the north shore extending from Homewood to Dollar Point. The photo above shows the area south of the outflow of the Truckee River and in front of Common's Beach near Tahoe City. The yellow-brown patches along the shore show the extent of the periphyton. The two photos below were taken on the same day from the lake and show the appearance above and below the water. As these algae age in early summer, they erode off the rocks and can end up washing up on beaches. The causes of periphyton "blooms" are still not fully understood. Nutrients from runoff and from groundwater are important. Low lake levels, such as we have in 2022, are also believed to play a role. The periphyton are not harmful, but they decrease our enjoyment of the lake and its shore.

### **Filamentous algae**

The second kind of algae seriously impacting the lake this summer are metaphyton. These stringy, filamentous, green algae were increasingly found around the shoreline starting in mid-summer. These are the algae that most people notice and ruin a day at the beach. They leave the water looking like pea soup, cling to swimmers, and easily wash up on the beaches.

On the beach, they slowly decompose, producing noxious odors and attracting flies. The cause of the green algae is directly linked to the presence of invasive Asian clams. The clams appeared at Lake Tahoe 15 years ago and have spread from the south shore up the east shore to Sand Harbor, NV. Wherever the clams appear, the algae follow soon after. They are not harmful unless you value losing the enjoyment of Tahoe's clear water and clean beaches.

### **Harmful Algal Blooms**

The third kind of algae that are posing a threat to our beaches is freshwater harmful algal blooms (FHABs) or more simply, HABs. These are known scientifically as cyanobacteria or blue-green algae. These have rarely been seen at Tahoe's beaches, but the frequency of warning signs and potential sightings is increasing. In other lakes where they occur intensely, they produce thick algal scums, and noxious odors, which have the potential to cause severe skin irritation and to even be toxic. HABs are very serious and agencies in both California and Nevada keep a close watch on them.

### **Spill Incidents for the Reporting Year**

Spill information is received via reports from the Nevada Division of Environmental Protection Spill Reporting Program and the Lahontan Regional Water Quality Control Board records. The postings include incidents occurring on the Nevada and California sides of the lake. The list is not comprehensive to include all incidents.

Nevada Tahoe area spills are reported as they occur, to TWSA through the NDEP Spill Hotline notification system: <https://nevadaenvironmentalactivities.ndep.nv.gov/Spill/ReportForm.aspx>  
Telephone: [1-888-331-6337](tel:1-888-331-6337)

In California, there are online resources available to track hazardous waste spills, including an annual state-wide sanitary sewer overflow compliance report:

[https://www.waterboards.ca.gov/water\\_issues/programs/sso/docs/](https://www.waterboards.ca.gov/water_issues/programs/sso/docs/).

A search of this database yields several small incidents for the reporting year.

Sanitary Sewer spills are reported via the California Water Board Web Portal:

[http://www.waterboards.ca.gov/water\\_issues/programs/ciwqs/publicreports.shtml#sso](http://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.shtml#sso) This portal focuses on sanitary sewer overflow reports. Reports are logged on an interactive map by discharge type.

**SEARCH CRITERIA:** [\[REFINE SEARCH\]](#)

- County (Placer)
- Region (6)
- Spill Type (Category 1; Category 2; Category 3)
- Start Date (07/01/2022)
- End Date (06/30/2023)

The information in this table does not include Category 4 spills, as defined in the Statewide Sanitary Sewer Systems General Order 2022-0103-DWQ ([https://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/water\\_quality/2022/wqo\\_2022-0103-dwq.pdf](https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0103-dwq.pdf)).

More information about the Spill Public Report is found at the bottom of this page.

[\[VIEW PRINTER FRIENDLY VERSION\]](#)[\[EXPORT THIS REPORT TO EXCEL\]](#)

Region	Responsible Agency	Sanitary Sewer System	WDID	Total Number of Spills	Total Volume of Spills (gal)	Total Volume Recovered (gal)	Total Volume Reached Surface Water (gal)	Percent Recovered (%)	Percent Reached Surface Water (%)	Miles of Pressure Sewer	Miles of Gravity Sewer	Miles of Laterals	Number of Pump Stations
6	Northstar CSD	Northstar Community Svcs Dist CS	6SSO11111	1	7,690	150	0	1	0	7.3	23.6	4.6	3
6	Tahoe City PUD	Tahoe City Public Utility Dist CS	6SSO11118	3	285	250	0	87	0	4.0	150.0	40.0	21
				4	7,975	400	0			11.3	173.6	44.6	24.0

## Sanitary Sewer Overflows (SSOs) Reports

Interactive SSO Report:

[https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportSSOServlet?reportAction=criteria&reportId=sso\\_main](https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportSSOServlet?reportAction=criteria&reportId=sso_main)

Sanitary sewer system agencies covered under Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (WQO No. 2006-0003-DWQ), referred to as Enrollees, are required to report all SSOs for which their agency has responsibility into the State Water Resources Control Board's SSO database. Enrollees are also able to report sewage discharges from privately owned laterals or collection systems, for which the Enrollee has knowledge of the event but is not responsible, on a voluntary basis. These discharges are known as private lateral sewage discharges (PLSDs) and are separate from SSOs. Please visit the SSO Program Web Page for additional information on SSO reporting and the State Water Board's regulatory efforts to reduce the numbers and volumes of SSOs statewide.

The SSO Report allows users to view summary information of SSOs and private lateral sewage discharges reported by Enrollees as well as complete reports submitted for specific sewage discharge locations

Public Sewage Spill Incident Map:

[https://www.waterboards.ca.gov/water\\_issues/programs/sso/sso\\_map/sso\\_pub.html](https://www.waterboards.ca.gov/water_issues/programs/sso/sso_map/sso_pub.html)

These interactive geographic information system (GIS) maps, updated nightly, plot all certified sanitary sewer overflows (SSOs) and Private Lateral Sewage Discharges from sanitary sewer collection systems (not including any spills from wastewater (sewage) treatment plants), reported by agencies into the state's online California Integrated Water Quality System. This includes the spill location, amount, source, and name of the responsible or reporting agency.

Private Lateral Spill Incident Map:

[https://www.waterboards.ca.gov/water\\_issues/programs/sso/sso\\_map/sso\\_priv.html](https://www.waterboards.ca.gov/water_issues/programs/sso/sso_map/sso_priv.html)

A second map allows users to see Private Lateral Sewage Discharges, voluntarily reported from enrollees

in the program from pipes which empty into public sewer collection systems. Private lateral spills are caused from failures in pipes that tie private businesses and homes into the public sewer collection system, and are maintained by individual property owners. They often suffer from overflows which can affect public sewer collection systems.

SSO Data Flat Files: [https://www.waterboards.ca.gov/water\\_issues/programs/sso/docs/index.php](https://www.waterboards.ca.gov/water_issues/programs/sso/docs/index.php)

The CIWQS SSO database provides information entered by Enrollees of General Order 2006- 0003-DWQ. The data are available to the public, agencies, and interested stakeholders. The data files include: Enrollee spill data, no-spill certification statements, private lateral sewage discharges, sewer system management plan elements data, and sanitary sewer facility information.

#### **Storm Water Facilities Reports**

[https://www.waterboards.ca.gov/water\\_issues/programs/ciwqs/publicreports.html#facilities](https://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.html#facilities)  
[Facility-At-A-Glance](#)

This report allows users to view a wide range of information regarding a specific facility on one screen. This includes owner, violations, inspections, and orders and other regulatory measures issued to a facility.

Interactive Regulated Facilities Report:

<https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility>

This report allows the user to display information by city, county, or region. The user can select a program, agency type, and permit status. They are then shown a summary table based on their criteria, which enables them to drill down for more information.

SMARTS Database: <https://smarts.waterboards.ca.gov/> – Click on the “Public User Menu” button on the SMARTS website

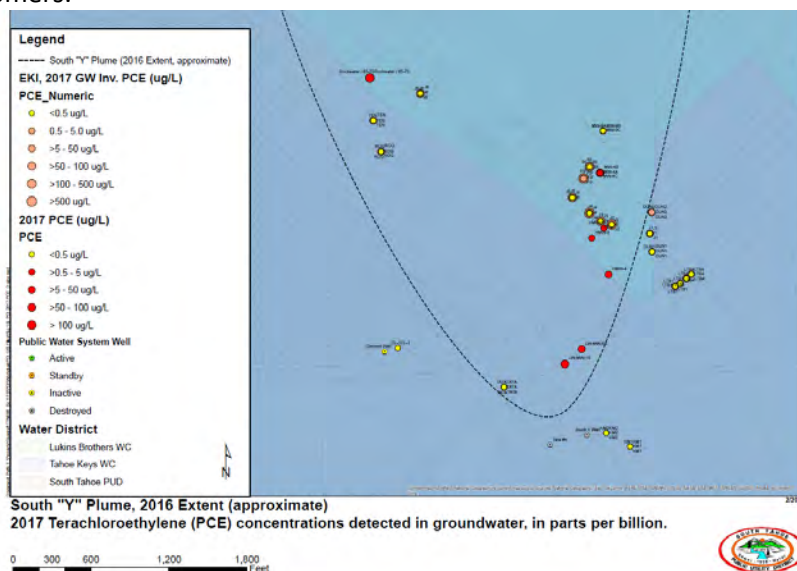
In addition, the CA Water Board operates Geotracker an interactive database on former and current hazardous waste sites. GeoTracker is the Water Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. GeoTracker contains records for sites that require cleanup, such as Leaking Underground Storage Tank (LUST) Sites, Department of Defense Sites, and Cleanup Program Sites. GeoTracker also contains records for various unregulated projects as well as permitted facilities including: Irrigated Lands, Oil and Gas production, operating Permitted USTs, and Land Disposal Sites. GeoTracker portals retrieve records and view integrated data sets from multiple State Water Board programs and other agencies. Users can view these data through a Google Maps GIS interface. <https://geotracker.waterboards.ca.gov/>

#### **PCE and Uranium levels create groundwater contamination in South Lake Tahoe**

These contaminants are not an immediate concern for Lake Tahoe surface water, however groundwater contamination is a growing concern in the south Tahoe Basin. Surface water can be influenced by groundwater, and directional flow is towards the lake. These issues are being monitored by TWSA staff.

## PCE Groundwater Contamination at South Tahoe “Y” Area <https://stpud.us/groundwater>

In 1989, the contaminant tetrachloroethylene (PCE) was first found in drinking water wells near the intersection of Highways 50 and 89, referred to locally as the South “Y” area. Today, the PCE remains in groundwater and forms a contaminant plume believed to cover an area of more than 400 acres. PCE is a manmade chemical that was used from the early 1960s through the mid-1980s as a solvent for dry cleaning clothes and degreasing metal. During the late 1980s, concerns about the toxicity of PCE led Federal and State environmental agencies to list PCE as a probable carcinogen and as a toxic pollutant. Presently, five public drinking water wells in the South “Y” area have been impaired by the PCE Plume. None of (STPUD’s) District wells are currently affected. When PCE is detected in a well, the well is shut down and treatment is added to remove the contaminant; or an alternative source of drinking water supply is provided. Water suppliers and regulatory agencies in the South Lake Tahoe area are working together to protect and sustain our groundwater resource ensuring that safe drinking water is provided to all of our customers.



- [Fact Sheet](#)
- [Frequently Asked Questions](#)
- [Press](#)-Since the contaminant tetrachloroethylene (PCE) was first found in drinking water wells near the South “Y” in 1989, the issue has been extensively covered in the news.
- [Public Meeting Flyer](#)
- [PCE Plume Map \(LARGE\)](#)
- [Groundwater at the South Y \(Groundwater Partnership, February 7, 2018\)](#)
- [South Y Pre-Design Investigation Workplan \(Agreement D1712508\) \(KJC, March 23, 2018\)](#)
- [Baseline Health Risk Assessment \(KJC, January 2019\)](#)
- [Groundwater Fate and Transport Modeling Report \(DRI, June 2019\)](#)
- [Pre-Design Investigation Report \(KJC, July 2019\)](#)
- [Groundwater Fate and Transport Modeling Report – Addendum \(DRI, September 2019\)](#)
- [Feasibility Study Report \(KJC, May 2020\)](#)
- [Interim Remedial Action Plan \(KJC, May 2020\)](#)
- [Public Webinar IRAP Presentation \(03/31/2020\)](#)
- [Responsiveness Summary \(STPUD, 6/12/2020\)](#)





Lahontan Regional Water Quality Control Board  
2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150  
Phone (530) 542-5400 • Fax (530) 544-2271  
<http://www.waterboards.ca.gov/lahontan>

## **Lahontan Water Board Receives \$4.6 Million Grant to Investigate Perchloroethylene (PCE) Contamination in South Lake Tahoe's Groundwater**

### **FOR IMMEDIATE RELEASE**

**Date:** March 13, 2019

**Contact:** Doug Smith

**Phone:** (530) 542-5453

**SOUTH LAKE TAHOE, Calif.** – The Lahontan Regional Water Quality Control Board (Lahontan Water Board) announced today it has received a \$4.6 million grant to investigate regional perchloroethylene (PCE) groundwater contamination in South Lake Tahoe affecting drinking water wells.

Multiple drinking water supply wells, including those operated by three different water suppliers, have been affected or are threatened by the PCE contamination. In spite of these impacts, South Lake Tahoe water purveyors continue to provide a safe water supply for South Lake Tahoe residents, businesses, and visitors.

"While Lake Tahoe's beauty and clarity remains a worldwide attraction, our drinking water supplies are at risk of further contamination unless prompt action is taken," said Patty Kouyoumdjian, Executive Officer for the Lahontan Regional Water Board. "This grant gives us the critical funds to fully investigate the regional PCE groundwater contamination, track down all potential sources of pollution, expedite cleanup and protect our remaining drinking water sources."

Funds from the grant award, issued by the State Water Resources Control Board's [Site Cleanup Subaccount Program](#) (SCAP), will be used for investigating an area referred to as the "South Y area" of South Lake Tahoe in El Dorado County (generally surrounding the intersection of Highways 50 and 89 and extending north and northeasterly).

The project will investigate the horizontal and vertical extent of regional PCE groundwater contamination, including potential sources of the regional contamination. "Sentry" groundwater monitoring wells will also be installed to monitor groundwater near several water supply wells,

providing information water suppliers can use to better protect their water supply systems from the PCE contamination.

Several businesses in the South Y area are known or suspected to have used, stored, or disposed of PCE or PCE-containing products. PCE is a common ingredient in many dry-cleaning and metal degreasing products.

PCE has been detected in groundwater in the South Y area at concentrations as high as approximately 1,700 parts per billion (ppb) and in individual supply wells as high as approximately 60 ppb. The drinking water maximum contaminant level for PCE is 5 ppb. The water supply wells with detections exceeding 5 ppb PCE were shut down to ensure customers continue receiving safe drinking water.

PCE is a colorless liquid that can be harmful when ingested, inhaled or touched. Short-term exposure can cause acute effects, such as dizziness, headaches, and nausea, among other things, while prolonged exposure is known to cause cancer and neurological problems.

In 2017, the Lahontan Water Board issued a Cleanup and Abatement Order (CAO) requiring multiple responsible parties to investigate and cleanup the full lateral and vertical extent of PCE contamination originating from a property in the South Y area that formerly operated a dry-cleaning facility. In addition, there have been several other investigations that have occurred over many years in the South Y area. However, the investigations have been site-specific or localized investigations and have failed to evaluate the full extent of the regional PCE contamination.

"This will be the first comprehensive regional investigation of the South Y area PCE contamination and should provide valuable information allowing the Lahontan Water Board, water suppliers, and other parties to better address the contamination through water treatment and cleanup," Kouyoumdjian said. "We are pleased to lead this effort and are looking forward to a very productive investigation."

The Lahontan Water Board received the grant money from SCAP, a relatively new program established by [Senate Bill 445 \(Hilli, 2014\)](#) authorizing grants for projects to investigate sources of surface water and groundwater contamination, and to remediate the harm to human health, safety, or the environment caused by existing or threatened surface or groundwater contamination. The Lahontan Water Board will coordinate with its contractor and oversee implementation of the grant-funded work, which is expected to begin in early summer 2019.

The Lahontan Regional Water Quality Control Board is a California state agency responsible for the preservation and enhancement of the quality of California's water resources in eastern California. For more information about the Lahontan Water Board visit its [website](#).

###

contamination clean-up process.

## **Lahontan Water Board Issues Cleanup Order for PCE Contamination in South Lake Tahoe**

STPUD update on the PCE groundwater contamination in South Lake Tahoe

([www.STPUD.us](http://www.STPUD.us)):

72% of the water supply in South Lake Tahoe is under threat from PCE contamination (see map). Immediate steps are necessary to protect South Lake Tahoe's drinking water supply. While Lahontan Regional Water Quality Control Board (Lahontan) is working to hold the polluters accountable, the water suppliers are taking a parallel track to protect South Lake Tahoe's community water supply from further contamination. The South Lake Tahoe water suppliers (South Tahoe Public Utility District, Lukins Brothers Water Company and Tahoe Keys Water Company) have met with Lahontan staff, State Water Resources Control Board staff and presented during the public comment period at the Lahontan Board meeting on September 13, 2018 on the immediate steps necessary to protect South Tahoe's drinking water supply.

As of August 2018, the State Water Board Division of Financial Assistance moved forward with processing Lukins Brothers Water Company application to install granular activated carbon (GAC) treatment to restore 750gpm of lost water supply.

The State Water Board Division of Drinking Water requested South Lake Tahoe water suppliers develop an Emergency Response Plan to address the possible use of impaired sources for emergency response. A multi-agency Emergency Response Plan was identified as a priority by the water suppliers to ensure the continued availability of potable water. Lahontan received SB445 funding to start a groundwater contaminant investigation (spring 2019) which would involve: regional plume delineation; installation of sentinel wells to monitor contaminant movement; and contaminant source area identification.

Lahontan staff and the water suppliers plan to meet monthly to identify next steps and secure additional funds to address the PCE groundwater contamination. Lahontan plans to work with the water suppliers to host quarterly public meetings to keep the public up to date on the PCE groundwater



# TAHOE KEYS WATER COMPANY UPDATE

We hope this newsletter finds you well. As we continue to navigate through challenges with our water supply and infrastructure, we want to provide you with an important update on recent developments and future initiatives at Tahoe Keys Water Company (TKWC).

**Water Supply Update:** Since 2021, TKWC has been managing reduced water production from two of our wells due to necessary treatment for uranium contamination. Despite California no longer being in a drought, these operational constraints require us to maintain a watering schedule to ensure consistent water pressure throughout our system.

Currently, TKWC can produce approximately 2200 gallons of water per minute, supplemented by an emergency intertie with Lukins Brothers Water Company. This limited capacity underscores the importance of conservation efforts and adherence to our watering schedule to prevent potential water pressure issues.

**Infrastructure Improvements:** We are pleased to announce that the TKWC Board has approved the engineering and design phase of a new supply well and water storage tank. Once completed, these enhancements are expected to significantly increase our source capacity, providing more reliable water access for our community. We are committed to keeping you informed as this project progresses.

Additionally, TKWC is moving forward with the installation of meters at every service in Tahoe Keys, in compliance with state mandates. This project involves a comprehensive rate study, the procurement of advanced meter reading and billing software, and the physical installation of meters. These meters will enable us to better monitor and manage water usage, ensuring fair and equitable distribution across our community.

**Community Engagement and Education:** We understand the importance of clear communication regarding water conservation and infrastructure improvements. TKWC remains dedicated to keeping you informed about the reasons behind our current policies and the positive impacts expected from our ongoing initiatives. Your support and cooperation are crucial as we work together to enhance our water system's reliability and sustainability.

Thank you for your continued understanding and support as we strive to provide safe, reliable, and sustainable water services to the Tahoe Keys community.

### **One Tahoe Keys well down due to uranium levels - no landscape irrigation allowed summer 2021**

<http://southtahoenow.com/story/03/16/2021/one-tahoe-keys-well-down-due-uranium-levels-no-landscape-irrigation-allowed>

SOUTH LAKE TAHOE, Calif. - One well of the Tahoe Keys Property Owners Association (TKPOA) has been taken off line due to too much naturally occurring uranium in the water and there is high probability a second one will be shut down April 1, 2021. Due to this situation, TKPOA has informed all homeowners that landscape irrigation was banned in the Tahoe Keys from April 1 to November 1, 2021.

Uranium in Well #2 exceeded the Maximum Contaminate Level (MCL) of 30 parts-per-billion (ppb) for uranium and it was taken off line in December 2020. "It is not uncommon to have elevated concentrations of uranium in areas with lots of granitic rock, such as the Tahoe Basin and throughout the Sierra Nevada," said Ben Letton of the Lahontan Regional Water Quality Control Board.

Once a permanent solution is in place for the TKWC to provide the required water service levels to allow for landscape irrigation and meet all other water demands this rule can be modified or repealed by the Board of Directors, as appropriate. Normally uranium in drinking water is removed with granulated activated carbon, with it absorbing impurities as the water passes through it. TKPOA and TKWC are working with MC Engineering to install temporary uranium treatment units at both Wells #2 and #3 to bring them back online in a limited capacity. The Tahoe Keys is a 740-acre private marina community laced with eleven miles of inland waterways located at the southern tip of Lake Tahoe in South Lake Tahoe, California. Most of the 1529 members who own homes, townhouses or vacant lots.

### **Shorezone Recreation and Boating Activity**

As one of its strategic initiatives, the Tahoe Regional Planning Agency worked with community members and stakeholders to update its shoreline policies and regulations. Significant changes to regulations, enforcement and monitoring on the impacts of watercraft recreation, both on the water and associated land developments/structures, are proposed.

The shoreline of Lake Tahoe is of both local and national significance. The 72 miles of Lake Tahoe's shoreline offers a diversity of views that range from sandy beaches to isolated coves, rocky shorelines, and steep cliffs. While Lake Tahoe's clarity goals, measured near the center of the lake, are of utmost importance, the shoreline is where most locals and visitors interact with Tahoe's blue waters.

### **Lake Tahoe Shoreline Plan**

<http://shorelineplan.org>

<https://www.trpa.org/programs/shorezone>

The TRPA Governing Board approved a new Shoreline Plan for Lake Tahoe in October 2018. The plan supports boating, paddling, swimming, and other water-based recreation, while also ensuring effective natural resource management for continued attainment of environmental goals in the Lake Tahoe Region. Adoption of the Shoreline Plan occurred October 24, 2018. Since 2015, the Tahoe Regional Planning Agency (TRPA), along with critical stakeholder partners, has developed the Shoreline Plan to develop guidelines for appropriate uses along the shore of Lake Tahoe.

This Shoreline planning initiative updates the shorezone element goals and policies in TRPA's Regional Plan and the shorezone chapters in the TRPA Code of Ordinances. The overarching goal of the Shoreline Plan is to enhance the recreational experience along Lake Tahoe's shores while protecting the environment and responsibly planning for the future.

## **Permitting**

The Shoreline Plan lifts a longstanding moratorium on new shorezone structures at Lake Tahoe, setting caps and regulations for new shorezone structures such as piers, moorings, and public boat ramps. The plan also creates a framework for marinas to enhance their facilities if environmental improvements are made part of the project.

TWSA provided comment in this process. Comments were submitted on water quality concerns. A request was submitted in for expansion of the zone of protection (requiring notification to water providers) around intakes from the current 600 ft. buffer to 1,320 ft. This larger zone of protection (partly by ordinance, partly by review process) is now incorporated in new regulatory review process.

On March 22, 2017, RPIC endorsed a set of policies (see page 131 of the Governing Board packet available at: <http://www.trpa.org/wp-content/uploads/March-22-2017-Governing-Board-Packet.pdf>) that included the following language: “Public drinking water intakes: within ¼ mile of water intakes, water purveyors will be notified and consulted on project conditions.” (source: Brandy McMahon, bmcMahon@trpa.org, correspondence)

## **Boating**

The Shoreline Plan creates new programs to ensure shoreline structures and boating activity do not harm the environment, scenery, or recreation experiences at Lake Tahoe. These programs include coordinated enforcement against illegal boat moorings on the lake, more projects to prevent the spread of harmful aquatic invasive species, enhanced monitoring to better assess noise and scenic impacts from boating activity and shoreline structures, stronger boating safety education, and new provisions to keep boats with aftermarket exhaust systems that exceed TRPA, California, and Nevada noise limits from operating on the lake.

The cost of these programs will be paid for through new fees apportioned to various shoreline users and structures. These fees include annual mooring registration fees, an increase in boat sticker fees, and boat rental concession fees. Lake Tahoe watercraft inspection sticker fees increased by \$12 in 2019. This increase is needed to help pay for boater education, no-wake zone enforcement, and projects to prevent the spread of harmful aquatic invasive species in Lake Tahoe.

## **No-Wake Zones**

The new shoreline program includes stronger boater education and enforcement of the 600-foot no-wake zone at Lake Tahoe. The plan expands the no-wake zone to include all Emerald Bay and creates a 100-foot no-wake zone buffer around swimmers and paddlers and a 200-foot no-wake zone buffer around shoreline structures. These no-wake zones are in place to prevent unsafe boating in areas where boaters, paddlers, and swimmers share the lake, and to reduce noise impacts from boating.

Environmental documents were prepared in 2017. See [http://shorelineplan.org/wp-content/uploads/2017/09/Shoreline-EIS-Scoping-Summary-Report\\_Sept.2017.pdf](http://shorelineplan.org/wp-content/uploads/2017/09/Shoreline-EIS-Scoping-Summary-Report_Sept.2017.pdf)

## **Key Policy Issues That the Plan Addresses:**

- Recreational Access
- Streamlining the Approval Process
- Public and Private Access to the Lake
- Environmental Effects of Access
- Recreational Facilities
- Low Lake Levels
- Marinas and Boating

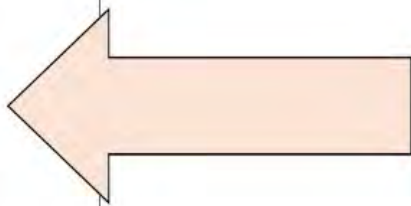


- 2) Add the suggested language below to Section 84.3.2.E.7 (page 84-4)  
 (84.3 Mooring Structures, 2. General Standards, E. Allocation, and Permitting:  
 Add: 7.) “For additional structures located within 1/4 mile of a public drinking water intake, TRPA shall notify and consult with the appropriate water purveyor(s) as part of the application process.”

The comments below outline the reasoning behind the requested language changes.

- All structures have potential impact to drinking water supply infrastructure. There have been multiple instances where buoy blocks and anchor lines have been moved by littoral drift, and/or deliberate human alteration. This has placed boats very close to municipal water intakes. Some intakes here at Lake Tahoe have suffered damage from these actions. Boats have sunk close to, and on top of, active intake lines. Having a greater ability to consult with TRPA, and TRPA enhanced enforcement regarding mooring placements, would provide greater protection to the water supply.
- The EIS summarizes the intent for consultation within ¼ mile for “any proposed shoreline structure”, and the potential for impacts to water supply, in the EIS Summary section 15.3, excerpt below.

**Table ES-1 Summary of Impacts and Mitigation Measures**

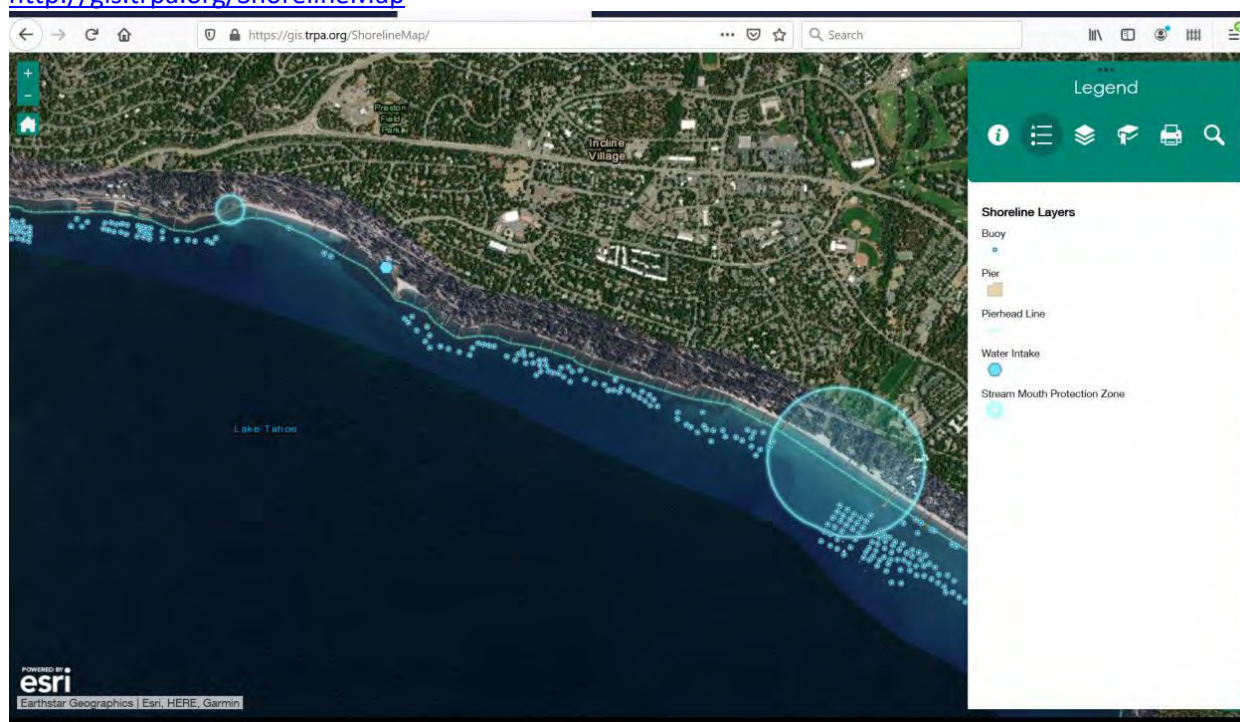
Impacts			Significance without Mitigation	Mitigation Measures		Significance with Mitigation
B = Beneficial	NI = No impact	LTS = Less than significant	PS = Potentially significant	S = Significant	SU = Significant and unavoidable	
<p>not result in adverse effects. Specific projects implemented in accordance to the adopted Shoreline Plan would be subject to permit processes and conditions pursuant to TRPA regulations and, depending upon location and whether or not there is federal discretion, CEQA and NEPA statutes and implementing regulations. Such review could include site-specific impact analysis and adoption of feasible mitigation measures that must be implemented to assure that standards of the region are met.</p> <p>With the addition of access points to the lake and the increase in navigational hazards in the form of longer piers and additional structures in the water, the Shoreline Plan alternatives could result in a long-term increase in the risk of accidental discharge of fuel and other hazardous materials into the lake. Alternative 1 would require that TRPA consult with water purveyors when evaluating applications and development of permit conditions for any proposed shoreline structure within one quarter mile of a drinking water intake, while Alternatives 2, 3 and 4 would require consultation within 800 feet. Furthermore, as described in Chapter 6, "Hydrology and Water Quality," Impact 6-4, given the rapid rate of biodegradation of hydrocarbon compounds, the non-toxic levels monitored on the lake, and current TRPA regulations pertaining to control of discharges of contaminants from boating facilities using best management practices (BMPs).</p>						

**TWSA Comment summary:**

Tahoe Water Suppliers Association	Concerned with zone of protection for water supply intakes. Suggests using Marina Best Management Practices to control debris, oil and AIS fragments, such as trash skimmer and/or water 'air gates'.	Water Quality
Tahoe Water Suppliers Association	Concerned with potential contamination from nearshore development, impacts from boating (especially buoy fields which are encroaching on intake infrastructure and fuel spills), AIS management issues in Tahoe and the Keys, and human water contact recreational bacterial/viral potential contamination.	Public Health and Safety, Recreation, Water Quality
North Tahoe Public Utility District	Concerned about boats sinking near water intakes due to weather. Suggests setting and enforcing a deadline for boats to be removed from the water, especially on buoys around water intakes.	Recreation, Water Quality

To view a map of Lake Tahoe's shoreline including an inventory of shoreline structures (such as marinas and boat ramps), natural features, and environmental constraints go to:

<http://gis.trpa.org/ShorelineMap>



**Process:** TRPA and its partners selected an internationally recognized mediation entity, the [Consensus Building Institute \(CBI\)](#), to design and implement a strategic, organized process that engages stakeholders on all issues. [Click here for a detailed outline of the process and timeline.](#)

**Shoreline Studies – Resources:** A number of studies and reports completed in the past have focused on the impacts of shoreline activities and boating. These studies are helping inform TRPA's ongoing shoreline planning initiative and are being made available on the website as a resource for the public. [www.shorelineplan.org](http://www.shorelineplan.org)

**Topics:** Air Quality/Boating and Watercraft Use/Carrying Capacity/Dredging/Economics Fisheries/Low Lake Level Adaptation/Miscellaneous/Noise/Scenic/Water Quality

**Findings – Findings summary available here:**

<http://shorelineplan.org/wp-content/uploads/2016/06/CBI-Shoreline-Assessment-Findings-for-Public-Review.pdf>

**Tahoe Boating Regulations**

<https://tahoeboatinspections.com>

The revised Shoreline Plan has strong boater (and marina) education, policies, restrictions BMP and enforcement components. <http://shorelineplan.org>

TRPA boating regulations and information about the mandatory boat inspection program is included later.

Recreational boating presents a potential source of pollution. Accidental boat submersion, release of fuel, release of sewage, and the potential introduction of aquatic invasive species (AIS) are all areas of concern. TRPA and other agencies have worked to educate boaters on clean boating practices. TRPA established a blue boating program under the 2008 Shorezone Ordinance; however, the Blue Boater Program (which included water quality monitoring and additional boat inspection requirements on engine tuning) is not in operation.

TRPA's ordinance does require:

- All boats are prohibited from sewage release except at designated pump-out stations.
- All motorized boats are required to undergo a vigorous AIS inspection before launch.
- All boat launch ramps are locked if there is no inspector on site.
- Any spill incidents are reported to the US Coast Guard and state regulatory agencies who then notify water providers of any potential problems near their intakes.
- All watercraft engines must be 4 stroke to reduce hydrocarbon emissions.
- All non-motorized watercraft are requested to undergo voluntary inspection.
- TRPA boating regulations and information about the mandatory boat inspection program included in the next chapter of this report.

**Shorezone Development and Projects**

TWSA staff regularly attends monthly Interagency Shorezone Coordination Group meetings, in order to keep TWSA purveyors informed of development with possible impacts to the drinking water intakes. A ¼ mile (1320 ft.) buffer is the trigger for prompting water provider input on potential permanent projects. Since 2008, TWSA staff has been receiving copies of re-issued and newly permitted boat buoy permits from Nevada State Lands. Many of these structures are located outside the ¼ mile intake buffer, and as a result, the water providers do not provide comment. Any project of significance to the water providers is forwarded to the applicable agency for comment submittal to Nevada State Lands.

Over this time, several large development projects were under recent review for potential impacts: the Glenbrook Buoy Field Expansion, the Beach Club on Lake Tahoe and the Edgewood Lodge and Golf Course Improvement Project. See excerpts below:

**Edgewood Lodge and Golf Course Improvement Project**

<http://www.tahodailytribune.com/news/local/edgewood-celebrates-completion-of-100m-lodge>

They broke ground on the new Edgewood Lodge at the south shore of Lake Tahoe in October of 2015,



but plans and environmental improvements began years before that in preparation for the new 169,000 square-foot hotel and spa with dining, shopping and adventures options along with 154 rooms.

Some of the environmental improvements completed to date include: moving the stormwater off the casino corridor and pulling through the ponds on the golf course, a dam system at Friday's Station that supplies water to the course and Edgewood Creek improvements, a cooling system using lake water, dredging the current ponds around the course and bring back to their natural state and the daylighting of Edgewood Creek.

TWSA staff and member agencies were involved in public comment regarding potential impacts to Edgewood Water Company's drinking water quality from an expanded beach access area near the intakes. The Edgewood Tahoe Lodge Project includes significant water quality improvements for the Edgewood Creek watershed. The plan includes the transfer of development rights from blighted sites within city limits to the Lodge Project.

During the summer of 2012, the project proponent (Edgewood Companies) contract engineer (R.O. Anderson) and Project Manager (Brandon Hill) held several meetings and conference calls to address NDEP Bureau of Safe Drinking Water and TWSA Member concerns. These concerns centered on: Potential increased microbial contamination from the new beach access area (area will have limited access capped at 250 people/day). Requesting use of the TWSA Risk Assessment Model (which was then conducted) and additional support material to verify the contractor submission that project would have no impact to water quality.

Correspondence from NDEP and R.O. Anderson Engineering on behalf of Edgewood Companies providing information on the Risk Assessment run conducted July 2012 and other studies reinforcing their position. This information is archived in earlier TWSA Annual Reports.

#### **Beach Club on Lake Tahoe Development - KGID Treatment Plant Relocation**

<http://southtahoenow.com/story/07/28/2016/old-kgid-treatment-plant-and-trailers-removed-new-luxury-project>

The Kingsbury General Improvement District's (KGID) new \$19 million water treatment plant was relocated to the back of the property in 2015. The state of the art facility utilizes ultraviolet treatment to the ozone disinfection, which meets Environmental Protection Agency requirements. "This is a great example of the partnership between private industry and the public sector coming together to make both projects happen" said Cameron McKay, general manager of KGID.

What was once home to 155 mobile homes and the old KGID water treatment plant took one big step towards being a luxury condominium project when developers tore down the plant. Going up on the 20-acre site is the Tahoe Beach Club Lakefront, a 143 two-five-bedroom luxury condominium residences.

The buildings are LEED-certified to improve and restore its natural surroundings. Streams spanning over two acres will be restored and native vegetation will be utilized throughout the property. Once finalized the project will reduce the number of sediment run-off from approximately 11,000 to 600 pounds a year. Greenhouse gas emissions anticipate to be reduced by more than 60 percent. The project also complements the Nevada Tahoe Conservancy District's efforts to restore ecological function of Rabe Meadow within the Burke Creek channel, reduce pollutants into the lake and improve safety in case of a flood.

Editor Notes: On February 29, 2008 NDEP submitted comments that the DEIS did not fully address potential impacts to the Kingsbury GID water system. The DEIS noted that water lines would need to be re-routed, and that buildings will be adjacent to the existing surface water treatment plant. The proposed pier was adjacent to the drinking water intake. As of 2014, several problems had been resolved, allowing for the project to progress.

### **Glenbrook Buoy Field Expansion (DO-2814-07)**


[http://www.trpa.org/documents/agendas/hearings%20officer/summaries/2007/may\\_8\\_2007\\_Summaries.pdf](http://www.trpa.org/documents/agendas/hearings%20officer/summaries/2007/may_8_2007_Summaries.pdf)

Nevada State Lands Agreement 'buoy field notice' process : Expansion to the buoy field adjacent to the Glenbrook Water Company intake was determined by NDEP as a potential source of contamination due to potential source water contamination events from increased boating activity. Mitigation measures agreed upon by NDEP staff include the yearly signing of a notice of awareness for proper boating practices by the buoy users. TWSA has a digital copy of the annual letters on file. In 2008, the Glenbrook Homeowners Association began the required annual notices and reported no incidents since mitigation process began.

Buoy assignments are given out annually by lottery. Buoy occupants are required to sign a letter stating that they are aware of the proximity of the Glenbrook water intake to the buoy field, and that any accidents or spill incidents need to be reported immediately.



Glenbrook  
HOMEOWNERS ASSOCIATION  
P.O. Box 447, 208 Old Hwy 50, Glenbrook, NV 89411



2023 NV STATE LANDS AGREEMENT

## NOTICE TO BUOY USERS WARNING

THE GLENBROOK DOMESTIC WATER SYSTEM INTAKE LINE AND INTAKE STRUCTURE ARE LOCATED IN THE IMMEDIATE VICINITY OF THE CABANA BUOY FIELD. ANY DISCHARGE OF GAS, OIL, CHEMICALS, OR SEWER EFFLUENT MUST BE REPORTED IMMEDIATELY SO THAT APPROPRIATE CLEAN UP MEASURES CAN BE TAKEN TO PROTECT YOUR WATER SUPPLY WHICH MAY INCLUDE THE SHUTTING DOWN OF THE WATER TREATMENT PLANT.

**TO REPORT A SPILL:**

1. PLEASE CALL THE WATER SYSTEM OPERATOR AT: 775-790-0711 OR 775-790-0414.
2. CALL THE HOMEOWNERS ASSOCIATION AT 775-749-5266.
3. THE FIRE DEPARTMENT SHOULD ALSO BE CALLED AT 911.

I hereby acknowledge that I have received this notice and take full responsibility for ensuring that any spill is promptly reported.

SIGNATURE OF BUOY USER \_\_\_\_\_ PRINTED NAME \_\_\_\_\_  
DATE \_\_\_\_\_

**FOR OFFICE USE:**

Document Received

- ☐ 1. Buoy Application
- ☐ 2. Signed Buoy Agreement
- ☐ 3. Signed Shuttle Service Agreement
- ☐ 4. Signed NV State Lands Notice
- ☐ 5. Copy of Boat Registration – must match homeowner's name
- ☐ 6. Copy of Boat Insurance – must match registration

EMP Initials \_\_\_\_\_  
Date \_\_\_\_\_

Nevada State Lands Agreement - page 1/1

This documentation is maintained by the Glenbrook Homeowners Association and provided to TWSA for review and archiving. The Nevada Bureau of Safe Drinking Water has stated in association with this project that if increased microbial contamination occurs, the agency will re-evaluate the purveyor's filtration avoidance status.

### **Chemical and Pesticide Usage - Herbicides in Lake Tahoe**

The use of aquatic herbicides was authorized (January 2022) for controlled and limited use in Lake Tahoe in the TKPOA Control Methods Test. Extensive information on the topic and TWSA involvement is included in this next section. The final decision on approval of an herbicide exemption was with the Lahontan RWQCB Board, with additional approval needed from TRPA. Current information is posted at: <https://tahoekeysweeds.org>

The TKPOA Control Methods Test application was approved in 2022 - permitting targeted herbicides as a one-time weed control method (along-side and in combination with other methods). This decision was reversed in court in 2024.

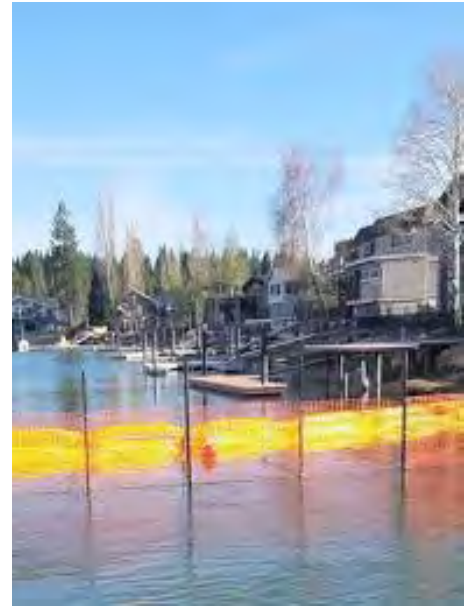
The 3 year test follows up in year 2 & 3 with only non-chemical controls permitted and includes extensive monitoring requirements. The goal is to reduce and control the abundant growth of invasive and nuisance aquatic weeds that are compromising water quality and degrading beneficial uses of the Tahoe Keys lagoons, as well as threatening the future ecosystem and water quality of Lake Tahoe.

TWSA members have expressed great concern over the potential impacts to drinking water quality for the past 10+ years. TWSA staff and members attend monthly meetings for many years, with the TKPOA working group, which includes the League to Save Lake Tahoe, Tahoe Sierra Club, Lahontan staff, TRPA staff and other stakeholders. TWSA has provided ongoing public comment on the plan at the TRPA Governing Board, CA State and Lahontan Water Board meetings.

**April 2024: Court rules in favor of parties challenging herbicide release in Tahoe Keys - permit vacated**

<https://www.tahoedailytribune.com/news/court-rules-in-favor-of-parties-challenging-herbicide-release-in-tahoe-keys/>

El Dorado Superior Court Judge Gary Slossberg deemed the California Sportfishing Protection Alliance and Sierra Club prevailing parties in a lawsuit taking issue with herbicides released in the Tahoe Keys lagoons. The court's ruling, filed late April, commanded the Lahontan Regional Water Quality Control Board vacate and set aside approval of the project involving herbicides, and any approvals rendered in furtherance of project implementation.



## 2024 Litigation of the Regulatory Approval of the Tahoe Keys Property Owners Association Control Methods Test (CMT).

May 2024

### Executive Summary

TWSA Staff have reviewed the litigation between the CA Sportfishing Protection Alliance & the Sierra Club (Fishing/Sierra) and Lahontan Regional Water Quality Control Board (LRWQCB)/ Tahoe Keys Property Owners Association (TKPOA). The Case was presided over by the El Dorado Superior Court (court), and the ruling was filed on April 25, 2024. The Fishing/Sierra successfully proved the TKPOA CMT project was in opposition to the Basin Plan and CEQA, as well as ongoing and not moot.

The LRWQCB requested dismissal of the Case No.: 22CV0841 due to mootness, as the aquatic pesticides have already been discharged to the water of Lake Tahoe. Mootness doctrine dismissal was not successful for three reasons: (1) the CMT project is ongoing, (2) meaningful relief can be given by negating the Basin Plan Exemption for pesticide use and certification of the EIR to prohibit the CMT data as a basis for analysis in determining future strategies to manage aquatic invasive plant (AIP) problem in the Tahoe Keys lagoons, and (3) the mootness doctrine has an exemption for public interest.

The court found that the LRWQCB abused its discretion in granting the exemption to the prohibition of the discharge of pesticides in the Water Quality Control Plan for the Lahontan Region (basin plan). The basin plan holds exemption criteria for the discharge of pesticides into Lake Tahoe's water when all seven criteria have been met. The court found that two of the seven criteria were not met as they require non-chemical methods must be evaluated and deemed infeasible. The court did an independent review and found that bottom barriers, laminar flow aeration (LFA), and UV-C light are not infeasible if combined with cooperation and innovation of technologies. Also, the court found that the LRWQCB exclusions for feasibility by cost and scope are insufficient for deeming the non-chemical method unfeasible.

The court found that the LRWQCB failed to proceed in a manner required by law by certifying an Environmental Impact Report (EIR) without an analysis of the reasonably foreseeable consequences of repeated pesticide use. The court did so by reviewing case law, studies of AIP projects in Minnesota and Massachusetts, and communications from the LRWQCB to the TKPOA, as well as The Washoe Tribe of NV and CA. The court found that the CMT project's feasible and foreseeable consequences will lead to future aquatic pesticide applications. The TKPOA cannot break the complete chemical treatment of the lagoons into smaller projects to receive regulatory approval.

The court nullified the LRWQCB approval of the CMT, including all approval given, including the basin plan exemption and certification of the EIR. The vacating prohibits using the TKPOA CMT project data as a basis for analysis in determining future Tahoe Keys Lagoons AIP management strategies.

The TWSA has been a stakeholder in the TKPOA CMT project and has provided comments to the regulatory agencies in opposition to the use of herbicides in the water of Lake Tahoe. Including the submittal of the 2018 letter stating similar objections to those in this litigation, including but not limited to the full vetting of non-chemical methods first as required by the basin plan, the use of cost as a metric of feasibility in antidegradation analysis, and the foreseeable future use of herbicides once introduced.

## Staff Summary

TKPOA  
El Dorado County Superior Ct  
Case No: 22CV0841

Petitioners: CA Sportfishing Protection Alliance & Sierra Club (Fishing/Sierra)  
Respondent: Lahontan Regional Water Quality Control Board (LRWQCB)  
Real Party: Tahoe Keys Property Owners Association (TKPOA)

The matter before the court, a petition requesting the court

1. Issue a peremptory writ of mandate commanding LRWQCB to vacate and set aside Tahoe Keys Lagoons Aquatic Week Control Methods Test (CMT) and any and all approvals rendered pursuant to and/or in furtherance of the implementation of the CMT project.
2. Preliminary and permanently enjoin the LRWQCB and TKPOA in interest from any and all activities undertaken pursuant to the CMT.
3. Award Fishing/Sierra cost of action and reasonable attorneys' fees
4. Grant any other relief the court deems just and proper

Issues for resolution before El Dorado County Superior Court (The Court)

- A. Whether the petition should be dismissed under the mootness doctrine,
- B. Whether approval of the Tahoe Keys Lagoons Aquatic Week Control Methods Test (CMT) violates the Water Quality Control Plan for the Lahontan Region (Basin Plan) and
- C. Whether approval of the CMT violates the CEQA.

### Application of the Mootness Doctrine

Though herbicides (Endothall and Tricopyr) have been used in the waters of Lake Tahoe, the court finds that mootness doctrine exemption for significant public interest applies, and before exemption criteria are needed, the Case is not moot because meaningful relief can be given. The meaningful relief is setting aside the LRWQCB actions and prohibiting the use of CMT data as a basis for analyzing future strategies to manage AIP in the Tahoe Keys Lagoons.

### Process Followed by the Court

Having found that the CMT project is ongoing, the court reviewed the CMT project for meeting the seven criteria for Basin Plan exemption of the pesticide prohibition under Code of Civil Procedures 1094.5 and exercised its independent judgment in finding that the LRWQCB abused its discretion by finding that their approval methodologies for the Basin Plan exemption criteria are not supported by the weight of the evidence. By approving the CMT basin plan exemption, the LRWQCB decision "Flies in the Face of the clear language and purpose of the interpreted provision" and does not meet the requirement of "the interpretation has been consistently maintained," as this is the first application for basin plan exemption. The court also proceeded over the LRWQCB certification of the EIR required by CEQA. The Fishing/Sierra presented an unduly narrow project description, and there was no analysis of the reasonably foreseeable consequences of repeated pesticide use. The court reviewed the Case under



public resources code 21168.5 as a claim of legal error, as the LRWQCB certified the Final EIR (CEQA document) that failed to proceed in the manner required by law.

The case law used in the litigation can be found in the court filing of case No: 22CV0841.

#### Mootness Case Law:

- I. Marshall v. Pasadena Unified School Dist. (2004) 119 Cal. app.4th 1241
- II. Department of Corrections v. Office of Administrative Hearings (1998) 66 Cal. app.4th 1100
- III. Hixon v. County of Los Angeles (1974) 38 Cal. app.3d 370 (Hixon)
- IV. Environmental Protection Information Center, Inc. v. Maxxam Corp. (1992) 4 Cal. App.4th 1373 (EPIC)

#### Basin Plan Violations Case Law

- I. Fukuda v. City of Angels (1999) 20 Cal.4th 805 (Fukada)
- II. Communities for a Better Environment v. State Water Resources Control Bd. (2003) 109 Cal.App.4th 1089 (Communities)
- III. Tesoro Refining & Marketing Co. LLC v. Los Angeles Regional Water Quality Control Bd. (2019) 42 Cal.App.5th 453 (Tesoro).

#### CEQA Violation Case Law

- I. Artificial-Narrow Project Description Case Law
  - North Coast Rivers Alliance v. Kawamura (2015) 243 Cal. App.4th 647
- II. Reasonably foreseeable consequences Case Law:
  - Laurel Heights Improvement Assn. V. Regents of University of CA (1988) 47 cal.3d 376
  - City of Santee v. County of San Diego (1989) 214 cal. App. 3d 1438. Ruing, page 32, lines 20-21 and 24-25.

#### Whether Approval of the CMT Project Violates the Basin Plan

The court determined if the CMT met the Basin Plan requirements by reviewing the seven criteria for the use of pesticides in the waters of Lake Tahoe. The Fishing/Sierra contended that (1) the basin plan does not allow for testing of pesticides, (2) that three of the seven criteria for exemption were not satisfied. During the proceedings, the LRWQCB argued that testimony provided by former staff members should not be given more weight than other public commenters; the court agreed, though citations from Harrold Singer are provided in the filing document. Mr. Singers' testimony that "this is the first time the LRWQCB has been asked to approve an exemption to the prohibition of the discharge of pesticides to Lake Tahoe" was the only evidence the court could find about the history of applications for Basin Plan Exemption. With the extent of the LRWQCBs interpretation of the pesticide prohibition exemption criteria being the narrowly-drawn CMT project goal to *per se* exclude the consideration of non-chemical methods first, the court declined to afford deference to the LRWQCB interpretation. The court found that the basin plan does allow for testing of pesticides in the waters of Lake Tahoe if all seven criteria for exemption are satisfied and that non-chemical methods means first must be evaluated and deemed infeasible, and finding of infeasibility must not merely be because the use of non-chemical methods does not satisfy the goal of testing pesticides. A narrowly drawn project goal cannot deem



alternatives to pesticides infeasible, which is precisely what Lahontan staff presented to the LRWQCB in the Staff Report.

- "The stated goal of the CMT is to test pesticides, with a finding under criterion 1 that non-chemical methods are inappropriate or ineffective because they cannot be used to achieve the project goal to test the pesticide. Such an outcome clearly would be absurd and contrary to the intent of the exemption criteria. Yet this is the precise approach taken by the LRWQCB" – ruling page 13, lines 5-21
- "Limiting the CMT project to evaluation only non-chemical treatment methodologies will reduce the knowledge to be gained and will not accomplish the goals of the project." –Ruling page 13, lines 22-24.

The court found that the LRWQCB abused its discretion in granting the exception to the Basin Plan because the weight of the evidence is contrary to the LRWQCB findings that the CMT satisfied criteria 1 and 6. Fishing/ Sierra had contended criteria 5 was also not met, as the upland influences on plant growth are not fixed (stagnant water, nutrient loading, and water filtration), and the problem will continue after chemical use; the court found their argument fits into criteria 1 and 6, not 5. The aquatic plants are the problem to be solved by the CMT, with a statement that "it may be better policy to require the root cause of AIP infestation prior to discharge of pesticide."

Basin Plan exemption Criterion 1, 5, and 6 can be found on page 10 of the ruling. Criterion 1 and 6 review revolves around fully vetting non-chemical methods first, as stated by the TWSA board throughout the CMT stakeholder process and both written and verbal public comments.

The court did an independent review of three non-chemical methodologies provided by Fishing/Sierra, Bottom Barriers, LFA, and UV-C Light to assess if the weight of the evidence is contrary to the LRWQCBs, finding these non-chemical methods are inappropriate or ineffective.

- I. Bottom Barriers – The court finds that bottom barriers could be part of a successful coordinated effort to use non-chemical methods to address AIPS in the Tahoe Keys. With improved cooperation between homeowners and the integration of other non-chemical methods.
- II. LFA – the inclusion of LFA in the project undercuts the argument that alternatives to pesticides have already been thoroughly evaluated and that on-chemical measures are inappropriate or ineffective in achieving the object goals under carton 1. The court finds that the weight of the evidence established that LFA could be part of an integrated strategy for AIPS in the Tahoe Keys Lagoons.
- III. UV-C light – the inclusion of UV-C light in the CMT undercuts its argument that UV-C light has been thoroughly tested and determined to be inappropriate and ineffective. The fact that UV-C light has been successful at Lakeside Marina, even though structurally different from TKPOA, does not mean that UV-C light could not be effective with modification in the Tahoe Keys Lagoons. Concluding otherwise, the court finds it is overly speculative and does not satisfy the requirement of a thorough evaluation of this method.

The court is mindful that the stated project goal is to test various methods, including herbicide, but as discussed in the previous section, such a narrow-tailed project goal cannot be used to evade the need to evaluate non-chemical methods first to achieve the overarching goal of protecting water quality. Additionally, experimental and unproven methods are not equal to ineffective or inappropriate.

Included in the review of non-chemical methodologies, the court also considered feasibility factors under CEQA guideline 15364. The court reviewed the record, and the most compelling argument in favor of finding non-chemical methods ineffective or inappropriate is the reported relief cost of chemical methods. The CEQA code states that cost is but one of many factors in feasibility. The court finds that the CMT application analysis as to cost is insufficient to find bottom barriers, LFA, and UV-C light infeasible.

The TWSA board included similar language found in the court ruling in regard to cost in the October 28, 2021, TWSA Board approved letter (8-yes, 3-no, 1-abstain) submitted to the LRWQCB as part of the regulatory approval process.

The court finds that costs are presented in a vacuum with little analysis of what these costs would mean for the TKPOA community and how other factors within the feasibility definition of CEQA guideline 15364 play into the analysis. The TKPOA CMT Application lists 1,529 homes and townhomes, a commercial marina, and a commercial center. The court reasonably infers that these homeowners and businesses would charge the cost of the aquatic invasive plant mitigation undertaking.

The court cannot find that the cost of bottom barriers, LFA, and UV-C light alone makes them infeasible.

The scale of the AIS infestation is also a variable used by the TKPOA to dismiss non-chemical methods. The court finds that absent the thorough evaluation required by criterion 1; the court finds the TKPOA has not established that it has conducted such a conclusion that non-chemical methods cannot be employed at a scale that can address the full magnitude of the TKPOA infestation. Such a conclusion is overly speculative and cannot form a basis for deeming the reviewed non-chemical method is infeasible or inappropriate.

Under the intended judgment standard, starting with the presumption that the LRWQCBs' findings are correct, Fishing/Sierra has provided evidence to the court that finds:

- The weight of evidence is contrary to the LRWQCB's finding that the CMT satisfied Basin Plan exemption criteria 1 and 6. Therefore the court found that the LRWQC abused its discretion in granting the exemption.
- The court finds that Basin Plan Criterion 5 was met
- The court finds that the Basin Plan allows for issuing exemption for pesticide testing, providing all seven criteria are met.

#### Whether approval of the CMT Violates CEQA

CEQA requirements- The court reviewed the Fishing/Sierra claims that the LRWQCB failed to proceed in a manner required by law by (1) approving a final EIR with an unduly narrow project description, (2) approving a Final EIR without analysis of the reasonably foreseeable consequences of repeated pesticide use. The court finds that both challenges are claims of legal error, and a de novo (from the beginning review) is appropriate.

- I. Whether the LRWQCB erred in approving a Final EIR with an unduly narrow project description.

The Fishing/Sierra contest that the project description of the CMT seeks to test aquatic weed control methods, including herbicide, "point blank requires the use of herbicides" and violates CEQA as the final EIR omitted the analysis of reasonable alternatives.

The LRWQCB counters that the Fishing/Sierra are artificially narrowing the project description and the Draft EIR analysis had reasonable alternative analysis of

- i. Testing of non-chemical methods
- ii. Dredge and replace substrate
- iii. Non-action alternative by continued existing AIS control.

The court finds that the EIR provides a sufficient analysis of the above alternatives and declines to find that the LRWQCB fails to proceed in a manner required by law in approving an initial EIR with an unduly narrow project description.

- II. Whether the LRWQCB erred in approving a Final EIR without an analysis of the reasonably foreseeable consequences of repeated pesticide use.

Discussion on case law

- "An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation."  
"An EIR must include analysis of the environmental effects of the future expansion of other actions if: (1) it is a reasonably foreseeable consequence of the initial project, and (2) the future expansion or action will be significant in that it would likely change the scope or nature of the initial project or its environmental effects."  
-Laurel Heights Improvement Association v. Regents of the University of California (1988) 47 Cal. 3d 376. Ruling, page 28, lines 2-3 and 23-24.
- "Thus 'reasonably anticipated future projects; should be considered in an EIR and discussed in a cumulative analysis'"  
"In addition, even projects anticipated beyond the near future should be analyzed for their cumulative effect."  
-City of Santee v. County of San Diego (1989) 214 Cal. App. 3d 1438. Ruling, page 32, lines 20-21 and 24-25.

The Fishing/Sierra argue that the LRWQCB failed to proceed in a manner required by law by certifying a final EIR that failed to analyze what it deems is the reasonably foreseeable consequence of the CMT project of repeated pesticide application. Noting evidence into the record supporting the likelihood of repeat pesticide use:

- i. Pesticides do not address the root causes of the AIP infestation, and AIPs will likely re-emerge. Submitting studies:
  1. Minnesota Lakes: effects of repeated, early season, herbicide treatments of curlyleaf pondweed
  2. Massachusetts: eutrophication and aquatic plant management

3. Minnesota Lakes: evolution of Lakewide, early season herbicide treatments for control of curlyleaf pondweed.

Though from different states, it is reasonable to anticipate the re-emergence of AIPS after the use of the herbicide.

- ii. The TKPOA's initial 2018 effort to gain Basin Plan exemption reflects the likelihood of repeated pesticide use.
  1. A letter from the LRWQCB to the TKPOA requesting additional information from the proposal that was eventually denied by the LRWQCB:  
"Following the initial Two-Year test, TKPOA proposed to apply one or more of the aquatic herbicide(s) over a period of 10 additional years." The letter continues, "Available evidence from the use of herbicides along with non-chemical controls to control AIS in California indicates long-term herbicide use will be required." – Ruling page 31, lines 8-14.
  2. A letter from the LRWQCB to the Washoe Tribe of NV and CA states that "the (2018) proposed project is significantly larger in scope than the previously proposed Test Project and proposed long-term aquatic weed control methods, including use of aquatic pesticides." – Ruling page 31, lines 16-19.

The LRWQCB clarified that the CMT project authorized a one-time application of pesticides only and that the assumption that it will lead to future repeated pesticide use is speculative and erroneous. Siting the Lahontan Staff Report's response to comments and the EIR that highlight the one-time application of pesticides, adding, "future treatment methodologies may or may not include chemical treatment. A separate environmental review and permitting process... required for any future herbicide projects." –ruling pages 31 to 32.

The LRWQCB claims that Fishing/Sierra is requesting that they engage in sheer speculation in requiring the EIR to consider future pesticide applications because of the CMT.

The court finds that by using the case law and studies provided by Fishing/Sierra, repeated pesticide use is reasonably foreseeable and should have been considered in the EIR, even if the LRWQCB emphasizes that the CMT is for one-time use of pesticide.

Further, limiting the EIR's analysis to just a one-time use, in the court's view, is tantamount to "chopping a large project into many little ones," explicitly disfavored in case law. Instead, the cumulative impact of repeated pesticide use should have been addressed in the EIR.

Following case law, the court finds:

1. Repeated use of pesticides is a reasonably foreseeable consequence of the initial project, and
2. The future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects.

Thus, the court finds that the LRWQCB failed to proceed in a manner required by law in approving a final EIR without an analysis of the reasonably foreseeable consequence of repeated pesticide use.

#### Deposition

The court found that the Case is not moot, as meaningful relief can be granted to Fishing/Sierra. Further, even if the mootness doctrine did apply, the court finds that the resolution of the issues before the court are in the public interest, triggering an exemption to the mootness doctrine. The court declined to dismiss the Case per the mootness doctrine.

The court finds that the weight of the evidence is contrary to the LRWQCB finding that the CMT satisfied the Basin Plan Exemption Criteria 1 and 6. Therefore, the court finds that the LRWQCB abused its discretion in granting the exemption. The court finds that basin plan criterion 5 was met. The court finds that the Basin Plan allows for issuing exceptions for pesticide testing, providing all criteria are met.

The court finds that the LRWQCB failed to proceed in a manner required by law in approving the final EIR without analysis of the reasonably foreseeable consequences of repeated pesticide use. The court finds that the unduly narrow project description in the Final EIR is allowable, as Fishing/Sierra's evidence did not establish that the LRWQCB failed.

The court issued a writ of mandate commanding the LRWQCB to vacate and set aside its approval of the CMT and any and all approvals rendered pursuant to and or in furtherance of the implementation of the project.

The court ordered the LRWQCB to withdraw its approval of the pesticide prohibition exemption from the Basin Plan and withdraw its certification of the final EIR.

Fishing/Sierra are the prevailing parties.





The TKPOA WQ Department has published the year end reports that detail projects that took place during the 2023 season. The major works are the Annual Report: Control Methods Test (CMT) Year 2, the WDR Integrated Management Plan (IMP), the WDR Nonpoint Source Water Quality Management Plan (NPS) and the TKPOA AIS End of Season report.

#### **Annual Report: Control Methods Test Year 2 (2023)**

The Annual Report is a permit required report detailing the objectives, methods, implementation, and results for the Control Methods Test. This was written and reviewed in a collaborative effort using data gathered by the TKPOA team and ESA – a third party TRPA contractor. This report is submitted to Lahontan Regional Water Quality Control Board (LRWQCB) by March 1st every year for the CMT three-year project. The findings of the CMT will inform future decisions for the long-term plan and help TKPOA push for an ecologically sound, economically viable, and permittable solution to the aquatic invasive weeds infestation.

#### *Highlights from the Annual Report for the 2023 season:*

- The criterion for implementing Group B methods was data driven. Rake sampling and biovolume scans were used to determine what areas needed additional treatments to maintain the 75% knockback in specific sites. No herbicides were applied in 2023.
- The TKPOA WQ team collected 10,169 points of water quality data at 100% completeness. Over 40,000 data points were obtained, including interval data logged from miniDOTs, as part of the CMT Year 2 monitoring compliance. The overall project had 98% monitoring completeness, a major achievement for a project of this magnitude.

- The water level was about 4ft deeper in 2023 and nearly twice the volume. This resulted in newly submerged shoreline areas which increased habitat for aquatic plants to grow from the dormant seed bank of the untreated areas (areas that had not received Group A treatments in 2022).
- Successful knock-back of target species was evident in 2023 within sites that had been treated with Endothall or Triclopyr in 2022. Eurasian watermilfoil remained nearly absent in treated sites.
- Dispersed across the sites, Bottom Barriers (BB) and Diver Assisted Suction Harvesting (DASH) treatments totaled around one acre each and UV had around three acres of spot treatments. Each method showed positive results in sustaining control. After BB removal, those treatment areas had the most regrowth of invasive plants. In 2024, all Group B methods will expand in treatment capacity. In addition, the duration of treatments will also extend further in the season, if weather allows.
- The success in the removal of targeted invasive species possibly gave the native Coontail an opportunity to grow more significantly due to less competition. Coontail is unrooted allowing it to float around lagoons – this impacted testing sites, rake data and regrowth in treated areas.
- Native plant species showed higher relative abundance in treatment sites when compared to untreated control areas. Areas treated with DASH showed the most regrowth of the native *Elodea canadensis*.

#### **2014 Waste Discharge Requirements (WDR)**

TKPOA is required to report and take action to reduce all potential sources of pollutants around the Keys lagoons in both water and land-based management practices. The



WDR requires two reports: The Integrated Management Plan (IMP) and the Nonpoint Source Plan (NPS). Both reports are submitted to LRWQCB by January 31st every year.

*Highlights from the IMP (water-based projects):*

- The TKPOA harvesting crew removed 4,910 cubic yards or 606 tons of weeds. A new disposal method to eliminate the need for drying harvested material onsite was successful in streamlining the operation. This change proved to be practical and cost effective, therefore, will be continued in 2024.
- The Boat-Backup Station remained a highly effective method in fragment control. Compliance from boaters remained high as fragments were successfully removed from boat props before entering Lake Tahoe proper.
- The West Channel double bubble curtain increased its compressor capacity to add strength in the flow of bubbles. The East Channel bubble curtain was off for most of the season due to electrical issues. Monitoring will continue in 2024 to inform the effectiveness of these air curtains.
- Less occurrences of Harmful Algae Blooms (HABs) were in the lagoons this season. This could be attributed to higher water levels, colder temperatures, and less stagnation from the previous years. A new method using ultrasonic wave technology was implemented in two locations to help suppress the algae blooms from forming. These units will be reinstalled in 2024 and monitored for effectiveness.
- A new method for monitoring how deep sunlight reaches down the water column was introduced. Photosynthetically Active Radiance (PAR) will be used to help inform plant growth expectations throughout the season.
- Major equipment, including all harvesters, boats, and trailers have been repaired and restored to full working condition. The Water Quality shop was rebuilt and reorganized into a functional space.
- TKPOA AIS crew has refined and expanded mapping capabilities using advanced software programs such as ArcGIS and Biobase.

*Highlights from the NPS (land-based projects):*

- Stormwater runoff was monitored to understand the nutrient levels entering the waterways. Sampling sources in the Keys lagoons and surrounding marsh areas indicate that TKPOA's lagoons are not a primary pollutant of nutrients and that surrounding marshland areas have a similar, if not worse, nutrient water quality.
- The TRPA's BMPs continue to be the best control for preventing pollutants from entering the lagoon

waterways. The TKPOA highly encourages all homeowners to attain the BMP certification for their parcels. Currently 35%, or 88 acres, of land within the Keys hold the certification.

- Phosphorus fertilizers are banned from use in the Tahoe Keys.
- Using boat inspection stations for decontamination before launching in Tahoe is required in ensuring no new invasive species are introduced into the Lake. Non-motorized watercraft and clothing, such as wetsuits and waders, are also suggested to be cleaned and dried before use in Tahoe as these can also harbor non-native species.
- Native landscaping guidebooks are available to share processes of how to transform lawns into lagoon-friendly landscaping areas.
- TKPOA hosts a variety of outreach and training programs to inform homeowners about the waterways and how they can get involved to help around the lagoons. Town Hall Forum webinars are posted on the project website so homeowners can watch at their convenience.
- TKPOA has seven cigarette butt canisters around the common areas for safe and clean disposal of cigarette litter.

**Laminar Flow Aeration**

TKPOA has three Laminar Flow Aeration (LFA) sites. The purpose is to evaluate whether circulation using aeration on the lagoon bottom will help reduce the muck sediment layer formed by decaying plant matter. The muck layer is the primary source of nutrients available to plants. This report was submitted to LRWQCB on January 14th for the testing program for activities done outside the CMT.

*Highlights from the LFA report:*

- The LFA project has expanded in conjunction within the CMT. It will continue to be explored as a possible treatment working in combination with other non-herbicide methods.
- New methods for monitoring muck depth have been implemented and will be a main factor in determining the effectiveness of the LFA systems.

Non-permit required reports such as the AIS End of Season Report, Macrophyte Surveys, Ecotonal Reports, and Bottom Barrier Reports have all been published and expand on projects, activities, and achievements throughout the year from the waterways team. All these reports mentioned above can be accessed in their entirety on [keysweedsmanagement.org](https://keysweedsmanagement.org). If you have any questions regarding these reports or accessing them, please contact [waterquality@tahoekeyspoa.org](mailto:waterquality@tahoekeyspoa.org).

In 2018, the Tahoe Keys Property Owners Association (TKPOA) submitted the Tahoe Keys Lagoons Aquatic Weed Control Methods Test (CMT) Application, to Lahontan Water Board. This triggered the

need for an [Environmental Impact Report](#) (EIR) required by the [California Environmental Quality Act](#) (CEQA) and Lahontan Regional Water Quality Control Board (Lahontan Water Board), and an Environmental Impact Statement (EIS) required by the Tahoe Regional Planning Agency (TRPA).

The environmental analysis (CEQA and Antidegradation Analysis) determined that the use of U.S. Environmental Protection Agency (EPA) and the Department of Pesticide Regulation (DPR) approved herbicides can meet the strict environmental standards of Lake Tahoe's classification as a [Tier Three, Outstanding National Resource Water](#).

#### **EPA Approval given for Lahontan Basin Plan Amendment Changes, Sept. 10, 2015.**

Regulatory changes, initiated in 2011, by the Lahontan Regional Water Quality Control Board (LRWQCB) to the "Lahontan Basin Plan Amendment", removed a former prohibition on aquatic herbicides and replaced it with a project review process. EPA approval was given Sept. 10, 2015. The U.S. Environmental Protection Agency (EPA) has reviewed the California State Water Resources Control Board (SWRCB) Resolution Number 2012-0018; Amendment to the Water Quality Control Plan for the Lahontan Region (Basin Plan): To Replace a Pesticide Water Quality Objective with a Waste Discharge Prohibition on Pesticides with Exemption Criteria (the Amendment).

#### **Aquatic Invasive Species Overview**

<https://tahoercd.org/our-work/aquatic-invasive-species/tahoe-ais-control-monitoring>

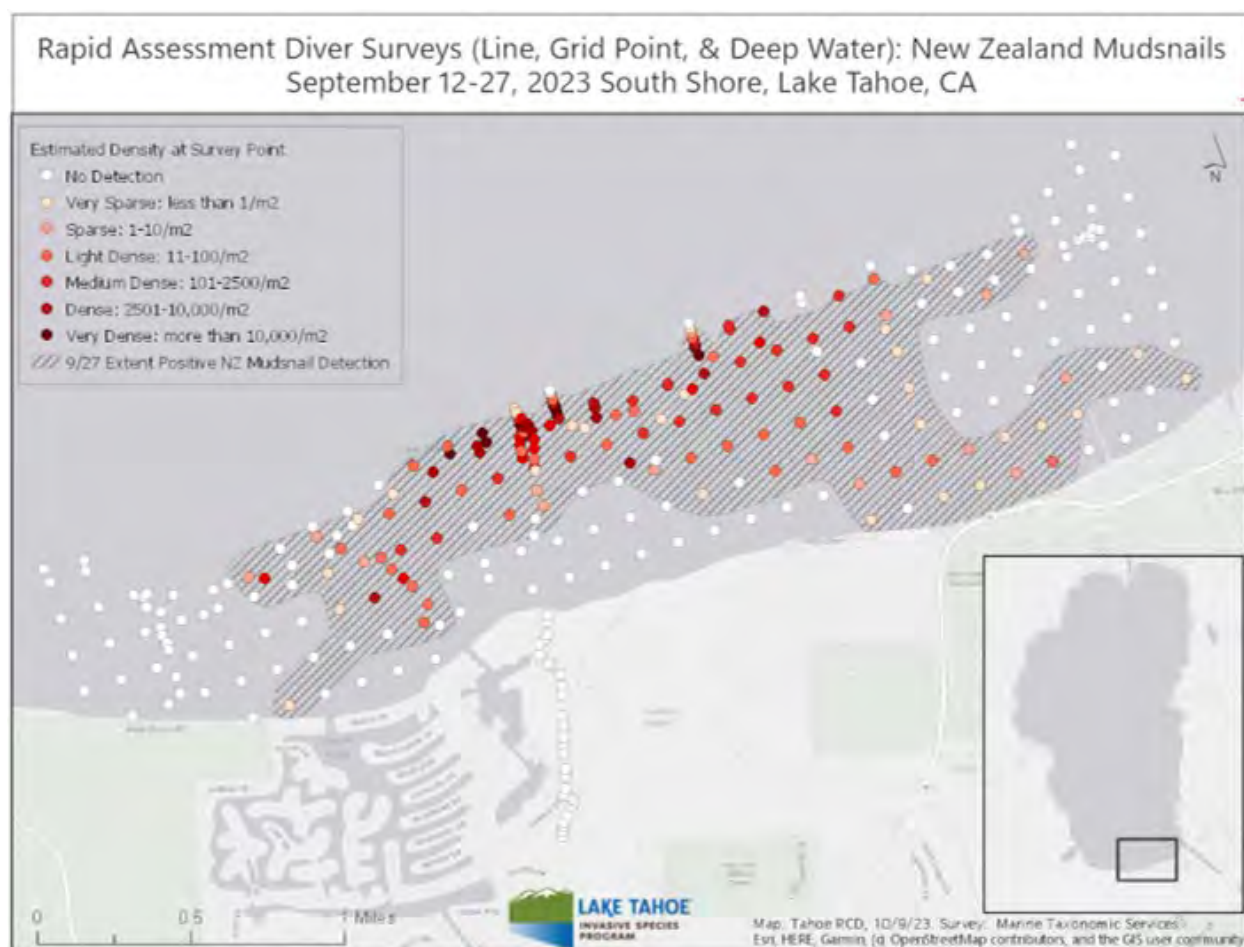
#### **2023: Verified Detection of A New Invasive Species In Lake Tahoe: New Zealand Mudsnail**

<https://www.trpa.gov/new-zealand-mudsnail/>

*Updated 10/19/2023*

A new aquatic invasive species, New Zealand mudsnail, has been discovered in Lake Tahoe. This is the first time the species has been detected in the Tahoe Basin. This [fact sheet](#) explains what you need to know right now. Following rapid response protocols under the federally approved Lake Tahoe Aquatic Invasive Species Management Plan, an Incident Team has been established comprised of staff from the Tahoe Resource Conservation District (Tahoe RCD) and Tahoe Regional Planning Agency (TRPA).

The Lake Tahoe Aquatic Invasive Species Program includes comprehensive monitoring of Lake Tahoe for aquatic invaders. Contract divers with Marine Taxonomic Services, Ltd. surveying invasive weeds on the South Shore of Lake Tahoe discovered tiny snails on the bottom of the lake nearly a half mile offshore from the mouth of the Upper Truckee River. Consultation with experts and a DNA lab analysis confirmed the species is New Zealand mudsnail.



As of October 14, lake-wide surveys have not detected New Zealand mudsnails in other areas of the lake beyond where they were first seen. Further survey of area shows the invasive species has infested a 3-mile area of South Shore, shown on the map below. The density of mudsnails ranges across the infestation area, with up to 10,000 mudsnails per square meter measured in a few areas.

The Lake Tahoe Aquatic Invasive Species Program is calling upon its collaborative coordinating committee of scientists, wildlife biologists, non-profits, and resource managers to gather information and evaluate management options. The Lake Tahoe Science Advisory Council is engaged to ensure the best available science is used to inform management decisions. The public has been alerted to the threat. Boat inspection program protocols and paddler resources have been updated with new recommendations and requirements to help stop the spread of New Zealand mudsnails to other lakes and other parts of Lake Tahoe.





## Invasive New Zealand mudsnails are in Lake Tahoe

In September 2023, divers discovered a new aquatic invasive species (AIS), the New Zealand mudsnail, in Lake Tahoe. This is the first time the species has been detected in the Tahoe Basin and the first new invasives species detection since the Lake Tahoe Watercraft Inspection Program began in 2008.

### ➤ Why are New Zealand mudsnails a concern?

AIS can permanently damage Lake Tahoe, one of the highest, deepest, and clearest lakes in the world. Non-native species can overwhelm Tahoe's native species and hurt the clarity of the lake. Once established AIS are costly to control and usually impossible to completely remove.

New Zealand mudsnails were first discovered in 1987 in Idaho and have since spread to 22 states including California and Nevada. They are most likely spread by recreational equipment such as boats or fishing gear that haven't been Clean, Drained, and Dry. Because they are tough, tiny (smaller than a grain of rice!), and can multiply rapidly, their population can grow quickly.

### ➤ How did they get into Lake Tahoe?

We may never know how the snails got into Lake Tahoe. Because New Zealand mudsnails have already been found nearby in the Lower Truckee River near Reno, and the Lower American River near Sacramento, it is likely they were carried to Tahoe on boats, fishing gear, paddlecraft, life vests, and beach toys that weren't Clean, Drained, and Dry.

### ➤ Who found them and where are they?

Agencies regularly monitor Lake Tahoe for new AIS infestations. SCUBA divers looking for aquatic invasive plants offshore of the mouth of the Upper Truckee River in South Lake Tahoe discovered the species. They immediately contacted local agencies and collected specimens to be sent to snail experts for identification and DNA analysis.



*Credit: Michigan Department of Natural Resources*

### ➤ What is being done?

The Tahoe Regional Planning Agency and Tahoe Resource Conservation District lead the regional response team. The top goal right now is to stop New Zealand mudsnails from spreading to other parts of Lake Tahoe and other waterbodies by taking these actions:

- **Information Gathering:** The team deployed divers to conduct more surveys to determine the extent of the infestation. These surveys show that the infestation appears to be limited to a 3-mile stretch on the South Shore of Lake Tahoe between the Tahoe Keys and Ski Run Marina.
- **Partner Coordination:** The team is calling upon scientists, biologists, non-profits, and resource managers to gather information and ensure the best available science is used to make decisions.
- **Adding Protective Measures:** The team updated boat inspection program protocols and paddler resources to ensure extra protection for all regional waterbodies and has expanded educational signage.



### ➤ What can I do?

Please be vigilant about keeping your boat, fishing gear, paddlecraft, e-foils, and beach toys Clean, Drained, and Dry to avoid spreading New Zealand mudsnails or other invasive species. Every person who enjoys Lake Tahoe shares the responsibility to protect these treasured waters. Follow the QR codes at right to get specific instructions based on popular activities.

#### Learn how to Clean, Drain, and Dry your motorized or non-motorized watercraft and equipment:

- Boats, e-foils, jetskis, and other motorized watercraft: [tahoeboatinspections.com](http://tahoeboatinspections.com)
- Kayaks, paddleboards, dive gear, and other non-motorized watercraft: [tahoekeepers.org](http://tahoekeepers.org)



Photo by: Lake Tahoe Water Trail

#### BOATERS



#### PADDLERS/BEACHGOERS



#### ANGLERS



[trpa.gov/new-zealand-mudsnail](http://trpa.gov/new-zealand-mudsnail)



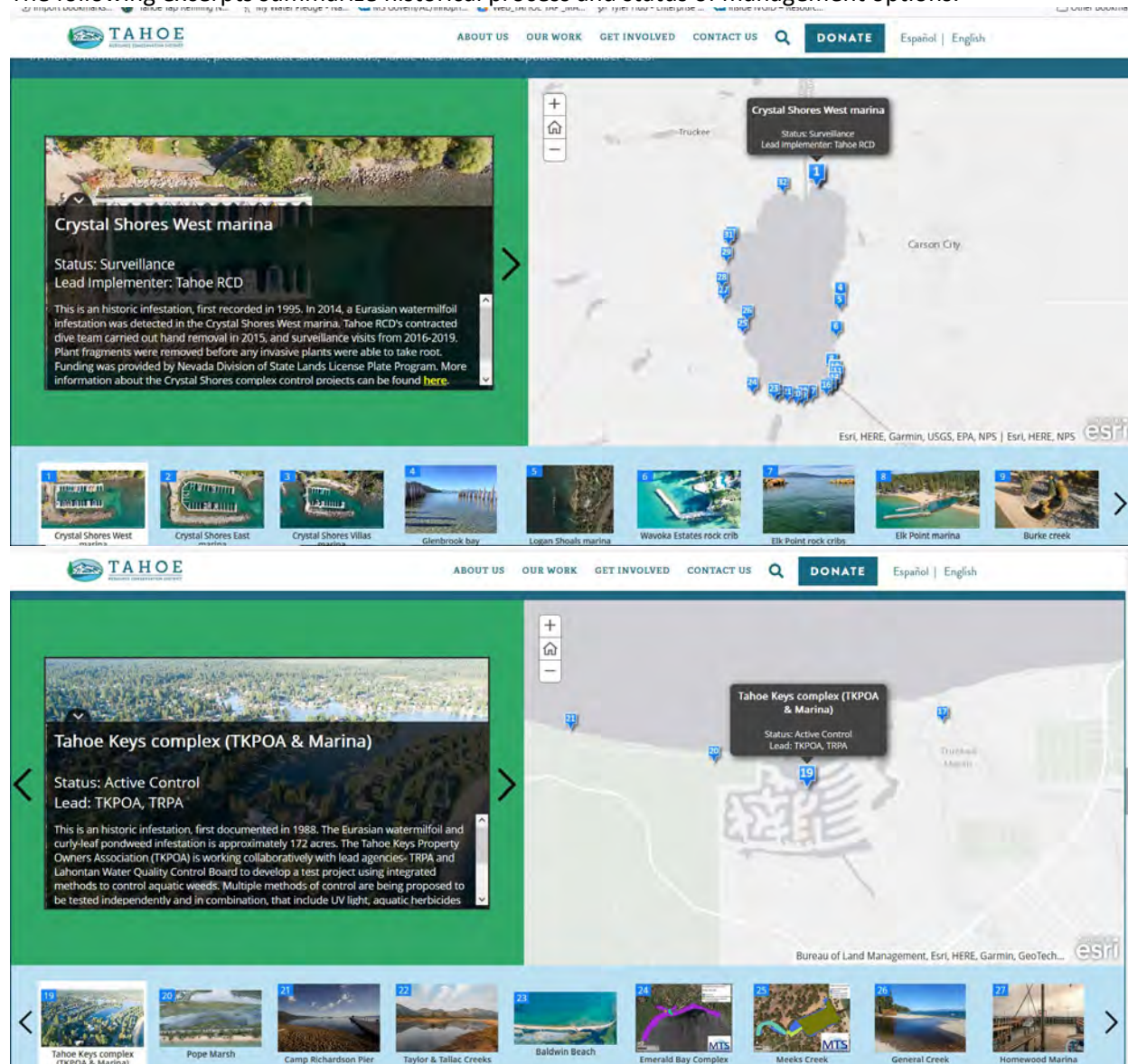
**LAKE TAHOE**  
INVASIVE SPECIES  
PROGRAM

Published by TRPA - October 2023



The focus on control of aquatic invasive species (AIS) has become a leading topic of concern in Tahoe over the past 10 years. Greater understanding of the extent of the subject has become more relevant in agency management programs. The spread of the more aggressive Curlyleaf Pondweed in the Tahoe Keys waters is of mounting concern.

The following excerpts summarize historical process and status of management options.



Tahoe RCD is the lead implementation and monitoring agency for many Tahoe AIS Projects, with more than 30 AIS control and monitoring projects listed on their website.

<https://tahoercd.org/our-work/aquatic-invasive-species/tahoe-ais-control-monitoring>





AUGUST 2017

Photos: League to Save Lake Tahoe (left), jettengram.com (right)

## A brief history of aquatic invasive species at Lake Tahoe

In 2008, with some of the most destructive aquatic invasive species (AIS) known, quagga and zebra mussels, approaching Lake Tahoe's doorstep, Lake Tahoe Basin partners jumped into action to launch the nation's most comprehensive boat inspection program. Now nine years later and with no invasions, the Lake Tahoe AIS Program is widely considered a national model for how to effectively keep new AIS from entering a water body.

However, prior to shutting the door on new AIS in 2008, nearly 30 non-native species had already made their way into the lake. Documentation of these species and their locations around the lake began in the mid-1990s even though many were introduced (both intentionally and accidentally) many decades prior. Since their introduction, they have established into infestations and are spreading rapidly, altering the environment in ways that could change Tahoe forever.

Aquatic invasive plants, warm water fish and invertebrates have the adaptive ability to make their surroundings more hospitable for themselves and other invasives, while simultaneously threatening the well-being of Tahoe's native species. These AIS are thriving in the lake right now. By cycling nutrients, altering food webs, preying on native species and covering pristine beaches with clam shells and mats of weeds, they threaten a \$5 billion economy while destroying the unique clarity that makes Lake Tahoe an annual destination for over 24 million visitors. The good news is that Tahoe agencies have a plan in place to systematically control these species and take back the lake.

## Plan for the control of aquatic invasive species at Lake Tahoe

In 2015, researchers at the University of Nevada, Reno, completed a comprehensive plan to control AIS already established in the waters of Lake Tahoe. This ecologically-based approach to prioritizing species and infestation sites identified two aquatic plants, Eurasian watermilfoil and curlyleaf pondweed, and warm water fish, as the primary targets for control work in the immediate future. Emphasis also remains on early detection and rapid response to any new satellite infestations of aquatic invasive plants and Asian clams.

Coupled with other factors such as feasibility, permitting and project cost, a five year action list was developed to aid in the search for funding needed to complete the job.

A Eurasian watermilfoil infestation in one of three Crystal Shores marinas. Photo on left taken July 2015 prior to the placement of bottom barriers. Photo on right taken 2016 after control treatment was complete. Photos: Tahoe Resource Conservation District



## Tahoe Taking Action - 2017

Control of AIS is a multi-year endeavor that seeks to reduce the impacts from aquatic invaders to a point of insignificance. An integrated approach using numerous techniques is essential to success. Work taking place in 2017 is fueled by public/private partnerships and funding sources including California Tahoe Conservancy (SB630 and Prop 1), League to Save Lake Tahoe, Nevada Division of State Lands, Proposition 84, Tahoe Fund, Tahoe Regional Planning Agency, Truckee River Fund, and numerous private contributions. Below are some projects underway in Lake Tahoe today.



### Tahoe Using New Innovative Technology

Lead: Tahoe Resource Conservation District

Tahoe RCD and Inventive Resources, Inc. are embarking on a project using ultraviolet light to treat aquatic invasive plants in Lake Tahoe. Ultraviolet-C light works by damaging the DNA and cellular structure of invasive plant life that currently threatens the health of the lake. While this technology needs further field testing to determine its full potential, ultraviolet light could augment Tahoe RCD's methods, especially in low-water years, in tight spaces within marinas, or in river systems.



### Success at Crystal Shores

Lead: Tahoe Resource Conservation District

Crystal Shores marinas are now weed-free. After three years of treatment using bottom barriers and diver-assisted suction removal, surveys show no new plants sprouting this season. Moving forward, this site will receive annual surveys to maintain the success and catch any new potential infestations early. Early detection of the infestation and the rapid response by public and private partners to begin treatment was critical for the success of this project.



### Asian Clams at Sand Harbor State Park

Lead: Tahoe Regional Planning Agency/Nevada Division of State Lands

A control project began in mid-June at Lake Tahoe Nevada State Park, Sand Harbor, to treat a small, isolated population of Asian clams before it spread to an unmanageable level. The project consists of covering approximately 4 acres of the lake bottom near the boat ramp with thin rubber barriers which is intended to suffocate the clams. While boating in the area, please do not anchor within the project to avoid ripping or tearing the barriers.



### Tahoe Keys Passes Special Assessment to Combat Weeds

Lead: Tahoe Keys Property Owners Association

The Tahoe Keys Property Owners Association (TKPOA) is proud to announce a nearly 2/3 "FOR" vote was achieved in April 2017 authorizing up to \$2.4 million over 4 years to test various ways to control the invasive weeds in the Tahoe Keys lagoons, including bottom barriers, plant fragment control methods, laminar flow aeration and other innovative approaches. The "FOR" vote also authorizes the TKPOA to propose a small-scale, pilot test to assess the effectiveness of aquatic herbicides on the invasive plants, if permitted.



### Eyes on the Lake Volunteers Take Action

Lead: League to Save Lake Tahoe

Tahoe's citizen science monitoring program, Eyes on the Lake, is comprised of volunteers reporting presence and absence of aquatic invasive plants. In 2016, volunteers identified two new invasive weed infestations and reported them to resource managers. Both locations are receiving control work this season because of these dedicated volunteers.



**YEAR 2  
ANNUAL  
REPORT**

## MAIN TAKEAWAYS

Following a thorough analysis and significant public input, in 2022 the Tahoe Keys Property Owners Association (TKPOA) began a project to test innovative methods to control the largest infestation of aquatic invasive weeds in the Lake Tahoe Basin. Aquatic invasive species pose a serious risk to Tahoe's water quality and clarity, native species, and the public's enjoyment of the lake.

In 2023, TKPOA completed the second year of the three-year Tahoe Keys Control Methods Test. In the first year, they significantly reduced plant biomass using an array of methods, including the one-time, targeted use of herbicides sequestered behind protective curtains. **The goal of year two tests was to maintain the year one weed “knock-back” using entirely non-chemical Group B methods, such as UV light treatment, bottom barriers, and diver-assisted suction harvesting.** No herbicides were applied in 2023.

Scientists analyzed tens of thousands of data points and so far they've seen **the initial knock-back in invasive plant density was largely sustained in herbicide-treated sites and some non-chemical sites.** Extremely different water levels\* provided valuable insight into how deeper water affects treatment areas. Main takeaways include:

- 1 Successful knock-back of targeted invasive plants in 2022 was largely sustained in 2023 where herbicide was applied.
- 2 UV treatments were the most effective midchannel. Shoreline areas are difficult to navigate for the large array of lights.

\*The water level was about four feet deeper in 2023 compared to 2022 and twice the volume. This resulted in submerged shoreline areas, which increased habitat for aquatic plants to grow in areas that had not received any treatments in 2022. At the same time, plant growth decreased in deep areas in both control and treated areas because light was unable to penetrate.

[www.tahoekeysweeds.org](http://www.tahoekeysweeds.org).

<https://youtu.be/85CZdV8wD0U>

<https://tahoekeysweeds.org/wp-content/uploads/2024/03/Control-Methods-Test-Year-2-Main-Takeaways-Flyer-FINAL-2.pdf>

- 3 Bottom barriers were successful; however, instances of regrowth were found after removal in late fall. The bottom barriers likely need to be implemented for longer, and/or multiple years to be fully effective.
  - Bottom barriers don't kill curlyleaf pondweed turions (seeds), which can remain viable in the soil for years. Removing this invasive species will likely include the use of bottom barriers with other non-chemical treatments.
- 4 The successful removal of targeted invasive species possibly gave native species such as *Elodea canadensis* an opportunity to grow more due to less competition. Unfortunately, more Coontail was observed, which is a native plant that was targeted for control through the CMT due to its nuisance characteristics.
- 5 Group B treatments, such as UV light treatment, bottom barriers, and diver-assisted suction harvesting, should be focused during spring and fall when curlyleaf pondweed growth is at its peak to remove new turions produced by plants and defend against old turions sprouting.

**This summer is the final year of the Control Methods Test.** TKPOA will expand the use and duration of non-chemical methods, weather-permitting, such as UV light treatment, bottom barriers, and diver-assisted suction harvesting. No herbicides will be applied in 2024.



Learn more and read the full reports at  
**TAHOEKEYSWEEDS.ORG**

## 2023 Updates:

<https://tahoekeysweds.org/wp-content/uploads/2023/10/CMT-Year-2-Interim-Report-10-16-2022-FINAL.pdf>

Summer 2023 Control Methods Test (CMT) Implementation and Interim Results:  
Special Report<sup>1</sup>  
Prepared by: Dr. Lars Anderson

### EXECUTIVE SUMMARY

Aquatic invasive plants (AIP) are an increasing environmental problem in the Tahoe Keys lagoons and in Lake Tahoe. Current mechanical harvesting in the lagoons does not adequately control AIP and can produce plant fragments that enter Lake Tahoe where they establish new populations. After decades of combatting the aquatic weed problem, the Tahoe Keys Property Owners Association (TKPOA) worked through a collaborative stakeholder process to develop the Control Methods Test (CMT) project to test a variety of AIP control methods to determine which combination may be most effective to effectively knock back and sustain control of AIP within the unique environment of the Tahoe Keys. The project is part of the Lake Tahoe's Environmental Improvement Program. Results of the CMT will help to develop improved long-term management of AIP in the Keys lagoons and reduce their incursion into Lake Tahoe.

The first year of the three-year Control Methods Test (CMT) began in 2022 with the goal of assessing the effectiveness of several different tools to significantly knock back AIP in certain test sites within the Tahoe Keys lagoons. The Year 1 (2022) CMT ("Group A") test methods included UV-light, Laminar-Flow Aeration (LFA) and the one-time use (2022 only) of two aquatic herbicides (Endothall and Triclopyr) permitted and approved by the Lahontan Regional Water Quality Control Board (Water Board) and the Tahoe Regional Planning Agency (TRPA). These treatment methods were applied between May and November along with an extensive environmental and effectiveness monitoring program. The goals of Years 2 and 3 are to determine what non-chemical methods may be most effective in maintaining the knockback achieved in Year 1.

Year 1 treatments resulted in a 75% reduction of AIP biomass in most test sites (herbicide treatments and UV-Only treatments). This level of AIP reduction met the criteria established in the CMT project for the use of "Group B": non-herbicide follow up methods in Year 2 (Bottom Barriers, Diver-Assisted Suction Harvesting ("DASH"), and UV-Spot Treatments). (Although LFA did not reduce AIP in Year 1, this treatment method is being tested for multiple years for effectiveness and therefore Group B methods were applied in some areas within one LFA site.) The CMT Year 2 implementation actions and preliminary results of Year 2 are provided in this report. The Year 1 CMT reports can be found at the following links:

[Summer 2022 CMT Implementation Special Report](#)

[Tahoe Keys Lagoons Aquatic Weed Control Methods Test – Year 1 Preliminary Results](#)

[Tahoe Keys Lagoons Annual Macrophyte Control Efficacy Monitoring Report](#)

[Tahoe Keys Lagoons Aquatic Weed Control Methods Test Annual Report – Year 1](#)

<sup>1</sup>This serves as the interim report required in the APAP.

### Purpose of Year 2 Control Methods Test (CMT)

The goal of the CMT in 2023 was to provide answers to four critical questions including:

1. Did 2022 Group A CMT Methods have continuing "carry over" control of AIP in 2023?
2. Did Group B methods (UV Spot Treatments, Diver Assisted Suction Harvesting, and Bottom Barriers) sustain control of aquatic weeds in sites where target invasive plant biomass was reduced by 75% in 2022?
3. What changes in nutrients and basic water quality were observed?
4. Did treatments enhance conditions for desirable native plants?

The intense monitoring of Year 2 CMT treatment effects resulted in collecting over 243,000 data points to help answer these questions. However, interpretation of Year 2 (2023) data, relative to Year 1 is complicated by the extremely different field conditions in 2023 compared to 2022. Larger volume and longer duration of snowmelt inflows into the lagoons in 2023 resulted in more than 4 feet deeper water than in 2022. The higher water levels created more habitat for aquatic plants because in 2023 approximately 15% more shoreline was covered by water in areas that had not received Group A treatments in 2022. Deeper water in 2023 also resulted in very low light penetration in several sites, which in turn reduced plant growth. However, the evaluation of Group B methods performed in Year 2 was based on the abundance of plants and species present as compared against areas within the same Year 1 test site, but outside the actual Group B spot treatment location. The criterion for success is sustained 75% reduction of target invasive plant biomass inside the specific Group B areas.

### Carry Over CMT Year 1 Effects of AIP

By comparing "heat maps" generated by hydroacoustic scans in late summer of 2022 and 2023, it is clear that the reduction (greater than 75% knock back) in AIP density resulting from Year 1 treatments was largely sustained, particularly in herbicide-treated sites in Area A (Figure 1). The combined localized areas treated with Group B methods in Year 2 is very small compared to total area of test sites treated in Year 1 (See Figure 2). Note that in Figure 1, the color scale of the heat maps reflects Year 1 site-level success, not the Year 2, Group B treatment locations. Biovolume and species in 2022 and 2023 were assessed by physical rake sample and showed that even outside the 2023 Group B treatment areas, Eurasian watermilfoil was nearly eliminated in sites that had been treated only with Endothall or Triclopyr in Year 1. However, all target plants were more prevalent in the near-shoreline areas that had only become submersed in 2023 due to four-foot higher water levels.

**Tahoe Keys Property Owners Association (TKPOA) Application for Exemption - 2021-22 Regulatory Review Approved.** <https://tahoekeysweds.org/wp-content/uploads/2022/10/CMT-Interim-Report-09-30-2022-FINALv5.pdf>





Figure 1. Overview map of CMT Sites and monitoring locations.

The scale of all CMT treatment sites is designed to be relatively small: less than 50 acres compared with the total size of the West Lagoon (about 110 acres), or the total Tahoe Keys size of 170 acres. Within the total of all sites in the CMT, herbicides were only applied to 15.5 acres. Within Lake Tallac, herbicide was applied to only 2 acres of the total 30 acres in that site (Table 1). Specific treatment areas comprising the CMT included: UV light-only (4.9 acres); UV- light in combination sites (5.6 acres); herbicide in combination areas (3.1 acres); herbicide-only (23.7 acres); controls (6.6 acres); LFA (12.9 acres).

The design for environmental monitoring is an integral part of the CMT to assess efficacy of test treatments, herbicide fate and transport, nutrients, general water quality parameters, and harmful algal blooms. Implementation of monitoring is described below. (For details of monitoring requirements and other specific conditions of the CMT, please consult the CMT Project NPDES Permit No. CA6202201 and associated Aquatic Pesticide Application Plan (APAP) and other related documents available on the Lahontan website.

[https://www.waterboards.ca.gov/lahtontan/water\\_issues/programs/tahoe\\_keys\\_weed\\_control/#d-ocs-adopted2022](https://www.waterboards.ca.gov/lahtontan/water_issues/programs/tahoe_keys_weed_control/#d-ocs-adopted2022)

## MANAGEMENT OF THE CMT

The CMT is a scientifically rigorous test project implemented under field conditions that require flexibility and adaptations, as well as cooperation and communications with affected TKPOA homeowners and boaters and regulatory agencies. The successful initiation of the CMT utilized 12 teams (contractors and agency staff, TKPOA staff, and volunteers) totaling about 100 people for different phases of the CMT. Fielding these teams and supporting associated operational costs have been provided by TKPOA, TRPA and the League to Save Lake Tahoe for LFA components.

Sierra Ecosystem Associates (SEA) has overall Project Management responsibilities and coordinates on-line and in person meetings among the lead agencies, service contractors and consultants. However, an important separation was made between management responsibilities: TKPOA has responsibilities for managing and contracting for the CMT Herbicide and Rhodamine Dye applications and standard water quality monitoring, whereas TRPA has responsibilities for ensuring that an independent team conduct monitoring of conditions during treatments, in addition to its regulatory role.

TRPA's selection of contractors was based on their extent of experience in herbicide monitoring, water quality knowledge, and experience/knowledge with the aquatic weeds persisting in the Tahoe Keys. TRPA's management of contract services includes key monitoring compliance actions such as sampling and analysis for herbicides and degradants, specific water quality sampling for nutrients and specific monitoring for effects of CMT treatments on aquatic plants. Table 2 provides the contractors, responsible contracting entity and services provided. Figure 3 summarizes the CMT management organization and tasks associated with CMT implementation.

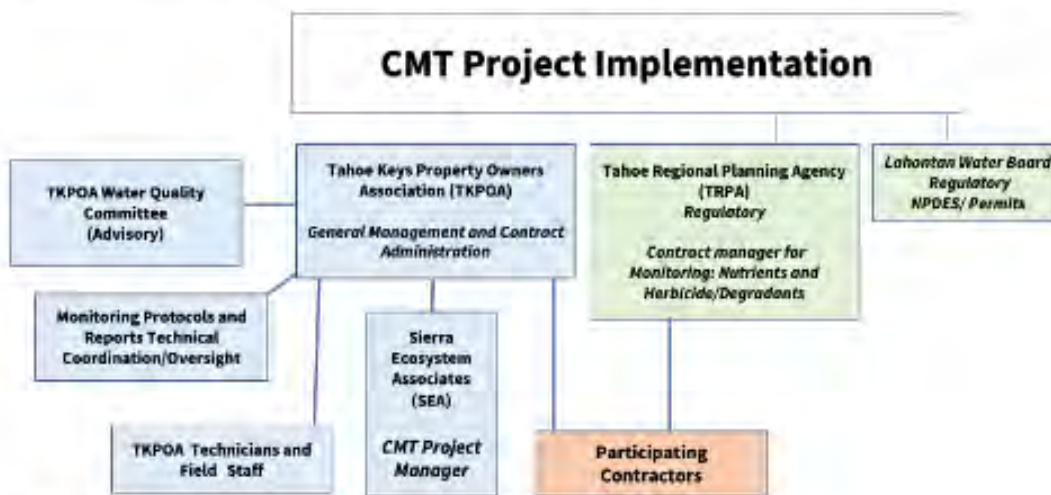


Figure 2. CMT Project Management Organization



### **TKPOA Application for Prohibition Exemption for use of herbicides - process**

Multiple documents are available. CEQA documents and draft environmental analysis documents, including anti-degradation analysis, were released in 2020-22. All materials submitted for the current application are posted on a public information page (and) on the Lahontan website.

[www.waterboards.ca.gov/lahontan](http://www.waterboards.ca.gov/lahontan) / [www.Tahoekeysweeds.org](http://www.Tahoekeysweeds.org) / [www.keysweedsmanagement.org](http://www.keysweedsmanagement.org)

(Editor Note 1: The Tahoe Water Suppliers Association Board of Directors' position on non-emergency AIS management is as follows: Lake Tahoe's ONRW Tier 3 status warrants that permitted herbicide use should be considered only after the full vetting of all non-chemical control methods. In the case of the introduction of zebra or quagga mussels {which would be considered an emergency} chemical methods could be warranted.) (Editor Note 2: In addition to weed problems, some of Tahoe Keys Lagoons were subject to localized blue green algae growth and associated cyanobacteria blooms for several weeks each summer. The situation is monitored and public health notices posted, but no control actions are taken. <https://southtahoenow.com/story/08/24/2022/harmful-algal-blooms-around-lake-tahoe-caution-warnings-issued>)

### **Background:**

Aquatic invasive plants affect all the marinas around Lake Tahoe and continue to spread, constituting the immediate threat to Lake Tahoe, according to the University of Nevada, Reno's 2015 Implementation Plan for the Control of Aquatic Invasive Species within Lake Tahoe. The comparatively warm and shallow waters of the Tahoe Keys lagoons (located in South Lake Tahoe) make for the perfect habitat for the aquatic invasive plants (Eurasian watermilfoil and curly leaf pondweed). Ongoing harvesting programs pulled roughly 100 cubic yards of weeds in 1984 - around 10,000 cubic weeds were removed in 2016. They have now taken over more than 90 percent of the 172-acre lagoons.

In 2015, the TKPOA commissioned Sierra Ecosystem Associates (SEA) to prepare an Integrated Weeds Management Plan (IWMP). The IWMP in its May 2016 revision focused on non-chemical control methods. However, a one-time pilot test of herbicides was initially proposed for 2018, separate from the IWMP activities. In 2022, a limited scope test project was approved.

The goals of the **Nonpoint Source Water Quality Management Plan** are to reduce runoff and the sediment, nutrients and other pollutants that runoff can carry into the keys lagoons and into Lake Tahoe.

In 2018, the Project Title was changed from Tahoe Keys Lagoons Restoration Project to **Tahoe Keys Aquatic Weed Control Methods Test (CMT)**. In summer 2019, Public Scoping was conducted by the lead agencies. Multiple meetings and workshops were offered for public engagement. Extensive comments were submitted, and the project was modified from those comments. In June 2020, the DRAFT Environmental Impact Report / Environmental Impact Statement (DEIR/DEIS) was released. Multiple virtual workshops were held for public education on the project during summer 2020-21.

[https://www.trpa.org/wp-content/uploads/Tahoe-Keys\\_DRAFT-EIR-EIS.pdf](https://www.trpa.org/wp-content/uploads/Tahoe-Keys_DRAFT-EIR-EIS.pdf)

**2021:** A TWSA staff summary is available at: [https://www.yourtahoepace.com/uploads/pdf-public-works/TKPOA\\_CMT\\_TWSA\\_Staff\\_Summary\\_01292021.pdf](https://www.yourtahoepace.com/uploads/pdf-public-works/TKPOA_CMT_TWSA_Staff_Summary_01292021.pdf)

In August 2020, TWSA and the consultant firm, Water Quality and Treatment Solutions (WQTS), provided extensive comment on the environmental documents. Link to the comment letters:

[https://www.yourtahoepace.com/uploads/pdf-public-works/TWSA\\_COMMENTS\\_TKPOA\\_DEIR\\_2020\\_FINAL\\_with\\_WQTS\\_attachment\\_SUBMITTED\\_8\\_27\\_2020\\_\(1\).pdf](https://www.yourtahoepace.com/uploads/pdf-public-works/TWSA_COMMENTS_TKPOA_DEIR_2020_FINAL_with_WQTS_attachment_SUBMITTED_8_27_2020_(1).pdf)



## Tahoe Keys Lagoons Aquatic Weed Control Methods Test (CMT) Environmental Certification TWSA Staff Summary (Feb. 2021)

[https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA\\_CMT\\_TWSA\\_Staff\\_Summary\\_01292021.pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA_CMT_TWSA_Staff_Summary_01292021.pdf)

Tahoe Keys Lagoons Aquatic Weed Control Methods Test (CMT) Environmental Certification Process for the Lahontan RWQCB Board:

- Certify-Final EIR/EIR
- Grant-Basin Plan Prohibition Exemption
- Adopt-NPDES Permit

**Full Documents:** [https://tahoekeysweeds.org/environmental\\_analysis/](https://tahoekeysweeds.org/environmental_analysis/)

Due to NPDES permit data gaps - the certification process was delayed until winter 2022, with scheduled implementation in 2022. The Tahoe Keys Property Owners Association (TKPOA) sought approval for their exemption to the Lahontan Basin Plan Amendment on the prohibition of herbicide use in Lake Tahoe, as represented in the 2018 Aquatic Pesticide Application Plan (APAP), the goal of the project is to reduce aquatic weed biomass by 75% to improve water quality and recreation for beneficial use.

The Lead Agency (Lahontan) required full environmental review of the proposed project, due to the proposed discharge of aquatic herbicides into receiving waters of the Tahoe Keys Lagoons, a Tier III Outstanding National Resource Water (ONRW Tier III) for ecological and recreational value. After designation of the Tahoe Keys Lagoons as the greatest threat to the environmental health of Lake Tahoe, the TRPA has secured federal funding through the Lake Tahoe Restoration Act (\$3M) to facilitate a solution to the aquatic weed problem at the Tahoe Keys Lagoons. As part of the California Environmental Quality Act (CEQA) process, the TKPOA has worked with regulators and stakeholders to produce a proposed project for herbicide use, and after an initial public scoping process, three additional project alternatives.

The proposed project, and three alternatives underwent review by an independent third party consultants chosen by the lead agencies, and produced the DEIR/EIS. As required by the (CEQA) Process, the DEIR/EIS is not recommending a project action to the lead agencies; it is providing the necessary information for informed decision making, with the required designation of an Environmentally Superior Alternative.

The DEIR/EIS has chosen a project alternative as the **Environmentally Superior Alternative, Action Alternative 1 (Testing of Non-Herbicide Methods Only)**. The proposed Project, Action Alternative 2 (Tahoe Keys Dredge and Replace Substrate), and the No-Action Alternative would have unavoidable impacts on recreational boating that would not occur under Action Alternative 1 (Testing of Non-Herbicide Methods Only). Additionally, the permitting process for the proposed project requires an Antidegradation Analysis, to be released in the fall of 2020, as part of the Draft National Pollutant Discharge Elimination System (NPDES) permit.

The DEIR/EIS has found that the proposed project and the alternative actions will have **no significant impact** to Environmental Health, Aquatic Biology, Utilities, and all reviewed objectives, that cannot be avoided with mitigation measures including early treatment, real time monitoring, pretreatment surveys, and containment. The non-action alternative has been found to have **potentially significant unavoidable impact** due to the increase infestation of aquatic weeds from the Tahoe Keys Lagoons throughout greater Lake Tahoe.

## **TWSA Staff Draft EIR/EIS Highlights for Purveyors**

- No Finding of significant impact to all objectives from proposed project, alt. 1, Alt. 2.

### **Filtration Exemption References**

**Issue UT-1: Effects on Water Supply.** A primary concern raised by water purveyors sourcing Lake Tahoe has been the potential to affect the quality of water taken at their drinking water intakes, such that they would no longer qualify for the filtration exemption. Of the six treatment requirements listed in Table 3.4.2-1, the only one that could be affected by the Proposed Project would be turbidity. The Proposed Project has no potential to influence microbial contamination or trihalomethanes in Lake Tahoe. This analysis of potential impacts also considers the potential for herbicides or degradates to reach water intakes in detectable concentrations, such that drinking water sourced at these intakes would be rendered contaminated or unsuitable for human use.

No mitigation would be required beyond that proposed for water quality (Section 3.3.4) and designed as part of the Proposed Project, as no impacts to utilities would occur. TKPOA has proposed contingency plans, including monitoring and alert systems (TKPOA 2018e; see also the IEC/IS), that would be implemented if necessary, to remove herbicides and other chemicals to treat the potable water before distribution. The negligible potential for impact forestalls the need for other mitigation. **No significant unavoidable impacts** to utilities would occur.

**Detectable Concentrations of Herbicides and Degradates in Receiving Waters.** The potential impact of detectable concentrations of herbicides and degradates in receiving waters will be **less than significant** for the Proposed Project, given the timing and limited extent of application. A spill response plan would also be employed, and double turbidity curtains would be used to prevent movement of herbicides toward the West Lagoon connecting channel. LFA or other aeration technology will be used at test sites to accelerate the degradation of herbicide active ingredients and degradates.

**Protection of Drinking Water Supplies.** This issue would have **less than significant** effects for the Proposed Project, given measures to contain the herbicide applications with double turbidity curtains to prevent movement of active ingredients toward the West Lagoon connecting channel and Lake Tahoe. Dye tracing and well monitoring will document herbicide movement, and existing or mobile carbon filtration systems would be activated to remove herbicide residues if they reach wells.

**Effects on Water Supply (Utilities).** No impact to this issue would occur under the Proposed Project or any of the alternatives. **No significant unavoidable environmental effects would occur** for this issue under the Proposed Project and Action Alternatives. Though the degree of potential significance is speculative, the No Action Alternative could result in a potentially significant turbidity-related impact if intakes are located in shallow waters where habitat could support uncontrolled growth of aquatic weeds.

### **Significant impact of non-action alternative**

Environmental Health (as aquatic weed infestations persist and grow in the Tahoe Keys lagoons), conditions may become increasingly favorable for HABs. Past detections of cyanotoxins have reached caution levels at Tahoe Keys, and continuation of the existing programs to monitor and warn people at Tahoe Keys when cyanotoxins are present may continue to be effective in protecting against any additional risks of exposure to cyanotoxins. However, the conditions that cause cyanobacteria to produce cyanotoxins are not well understood, and it is uncertain whether concentrations of these toxins would increase in the future. Given this uncertainty, the impact of HABs may present a **potentially significant unavoidable impact** of the No Action Alternative.

**Aquatic Biology:** The No Action Alternative is expected to lead to expansion of aquatic weed growth in the lagoons and in other nearshore areas of Lake Tahoe, particularly with continued spread of curlyleaf pondweed infestations. Therefore, significant and unavoidable impacts would be expected (1) in aquatic macrophyte community composition, (2) in the expansion of curlyleaf pondweed, (3) to further degrade habitat conditions for the larger aquatic BMI community, similar to that for the Tahoe Keys lagoons, and (4) to further degrade habitat conditions for special status fish species and native or recreationally important game fish species, potentially blocking access to spawning habitat.

**Built/Human Environment:** Long-term **significant unavoidable impacts** to recreational boating could accumulate for this issue under the No Action Alternative, if the continued harvesting of aquatic weeds as currently practiced by the TKPOA is ineffective in preventing the spread of the weeds to Lake Tahoe.

**Mitigation Measures (Feasible, measurable and specific)**

Mitigation measures for the proposed project are provided in the 2018 Aquatic Pesticide Application Plan (APAP), the draft EIR provides the following mitigation measures:

- |   |  |
|---|--|
| ▪ Applicator qualifications                 | ▪ Public outreach Carbon filtration contingency (wells only) |
| ▪ Spill response plan                       | ▪ Double turbidity curtain barriers                          |
| ▪ Dye tracing                               | ▪ Best management practices                                  |
| ▪ Well monitoring and contingencies         | ▪ Timing and size of treatment                               |
| ▪ West Channel monitoring and contingencies | ▪ Aeration   |

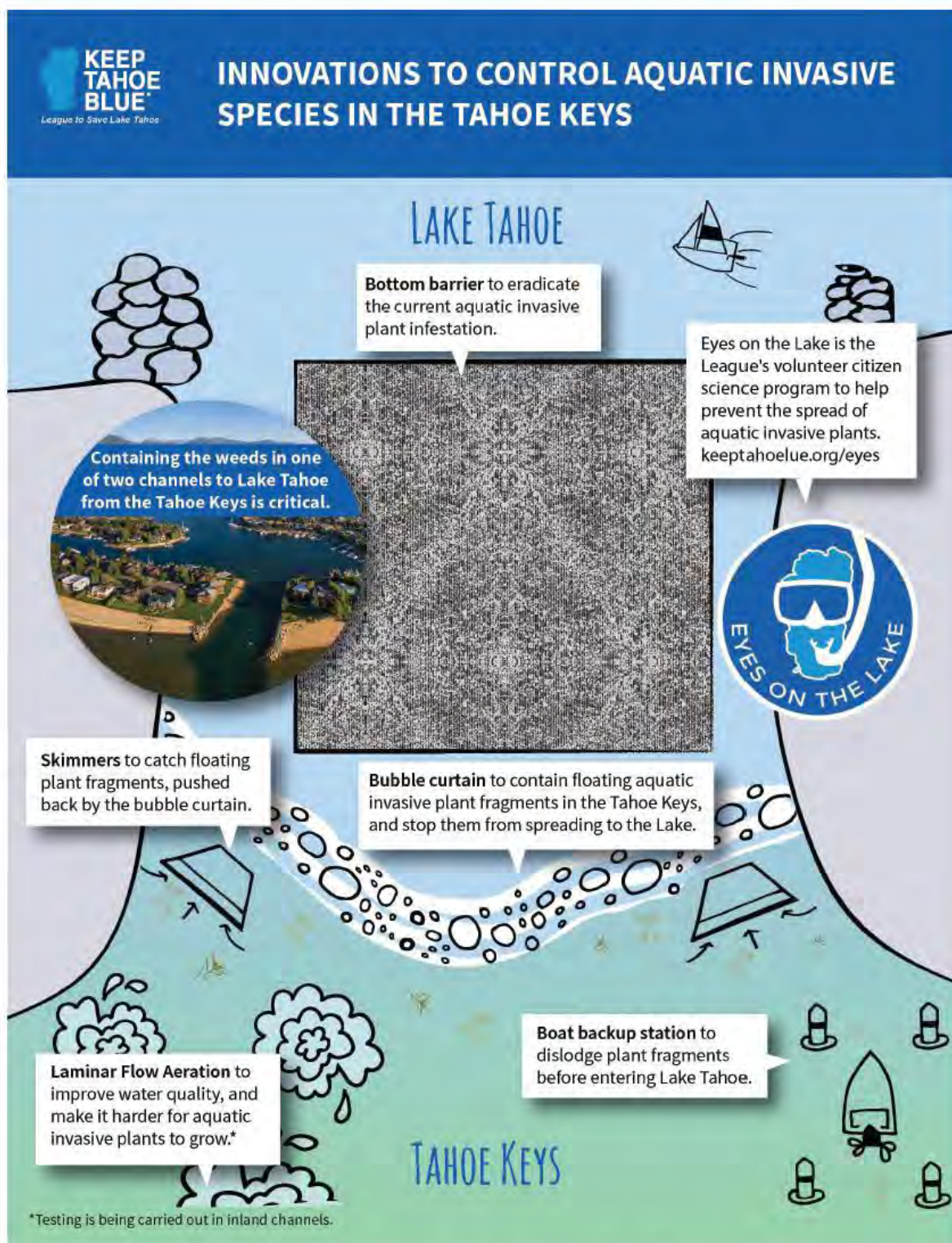
**TWSA Public Comments**

In 2020-21, significant comments were submitted by the TWSA Board, and multiple independent reviews were commissioned, of the CEQA draft environmental review (DEIR/DEIS). This correspondence is posted at: [https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA\\_COMMENTS\\_TKPOA\\_DEIR\\_2020\\_-\\_FINAL\\_with\\_WQTS\\_attachment\\_SUBMITTED\\_8\\_27\\_2020\\_\(1\).pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA_COMMENTS_TKPOA_DEIR_2020_-_FINAL_with_WQTS_attachment_SUBMITTED_8_27_2020_(1).pdf)

[https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA\\_CMT\\_TWSA\\_Staff\\_Summary\\_01292021.pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TKPOA_CMT_TWSA_Staff_Summary_01292021.pdf)

[https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA\\_FINAL\\_comments\\_on\\_Lahontan\\_Permit\\_\(submitted\\_10\\_28\\_2021\).pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/TWSA_FINAL_comments_on_Lahontan_Permit_(submitted_10_28_2021).pdf)

Extensive correspondence by TWSA is archived in earlier TWSA Annual Reports.





**Tahoe Keys (TKPOA) Circulation System Operating Permit -Waste Discharge Requirements (WDR)**  
[http://www.waterboards.ca.gov/lahontan/board\\_info/agenda/2014/july/item\\_12.pdf](http://www.waterboards.ca.gov/lahontan/board_info/agenda/2014/july/item_12.pdf)

**2014 Reissuance of WDR Permit:**

In 1975, the Lahontan Regional Water Board issued a permit to TKPOA which allowed operation of a water treatment facility and a circulation system for the lagoons. These systems were state-of-the-art at that time and their purpose was to keep the waterways clear. By the late 1970s, a few residential homes had been constructed on the private lots, and construction of the homes significantly increased after the building moratorium was lifted in 1985. Most homes at the Keys were built in the late 1980s through the 1990s. Throughout this time, TKPOA operated the circulation and treatment facilities intermittently as needed to reduce turbidity and prevent stagnation and the Water Board updated the permit periodically. Though the treatment and circulation systems were being operated, the lagoons were experiencing exponential growth of aquatic weeds.

The treatment system has not been operated following an incident in August 1998 where TKPOA allegedly discharged alum flocculent from to the waterways. To resolve the alleged violation, the Water Board and TKPOA entered into a settlement agreement whereby TKPOA agreed to spend \$198,000 performing water quality improvement projects. These projects included a bioassessment study, installation of filters in storm drain inlets, and increased harvesting removal of aquatic weeds. By 2005, TKPOA completed all terms of the settlement agreement, yet the lagoon aquatic weeds had not been controlled. Since then, TKPOA has been exploring options for controlling the invasive aquatic weeds and has been consulting with Water Board staff on understanding the viable options. The proposed Waste Discharge Requirements (WDR) are a result of intensive collaboration over many months between TKPOA and Water Board staff. The purpose of this new WDR is to require TKPOA to develop and implement management control measures to prevent the discharge of pollutants from non-point source activities.

The WDR allows TKPOA to operate its water circulation system and place bottom barriers in the lagoons to suffocate invasive aquatic weeds. Specific orders in the WDR require TKPOA to develop and implement a Non-Point Source Management Plan for land-based activities, and an Integrated Management Plan for Aquatic Invasive Species for all water-based activities. Under a Municipal NPDES Stormwater Permit, the City of South Lake Tahoe (CSLT) is responsible for all stormwater within its jurisdiction, which includes TKPOA. The CSLT and TKPOA have agreed to coordinate operation and maintenance of shared stormwater facilities.

To strengthen TKPOA's involvement in stormwater management and to comply with the Lahontan Basin Plan, the WDR requires TKPOA to either document coordination with the CSLT to demonstrate that shared stormwater treatment facilities treating private property discharges and public right of- way stormwater are sufficient to meet the CSLT's average annual fine sediment and nutrient load reduction requirements, or meet the surface water numeric effluent limits.

The TWSA supported the required Non-Point Source Plan's strong emphasis in fertilizer and nutrient management with mandatory public education, water quality monitoring and specific goals and deadlines for a management plan for nutrient reduction. TWSA also supported the provisions of the Integrated Weed Management Plan and the nonchemical control of aquatic weeds.

## **Lahontan Regional Water Board Water Quality Control Plan (Basin Plan) Changes to the Water Quality Objective for Pesticide Application to Water**

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/basin\\_plan/pesticidebpa.shtml](http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/pesticidebpa.shtml)

This project was an amendment to the Water Quality Control Plan for the Lahontan Region regulating aquatic pesticide/herbicide use in Chapter 4 of the Basin Plan. The amendment replaced existing region wide water quality objectives for pesticides. The amendment gives the Lahontan Water Board discretion to allow exemptions to the pesticide prohibition for aquatic pesticide treatments proposed for purposes of protecting public health or safety or ecological integrity and only if such projects satisfy specific exemption criteria under the National Pollution Discharge Elimination System program.

Since 2010, TWSA has been active in drinking water quality advocacy. The use of herbicides remains one of chief concern and activity in the previous reporting years for TWSA member agencies.

TWSA involvement did yield enhanced public notification measures: any proposed chemical use project now requires notification and solicitation of comments from potentially affected water providers, regardless of the distance of the provider's service area from the proposed projects.

Another result of the public comment process has been TWSA maintaining presence on the Nearshore Aquatic Invasive Weeds Working Group (NAIWWG) and the Tahoe Keys Water Quality Working Group.

Initially, Lahontan staff began rewriting the amendment in early 2010, without input from the water providers, or the Nevada drinking water and water quality regulators (Nevada Department of Environmental Protection {NDEP} and California Department of Public Health {CDPH}). By providing written and public comment, TWSA staff was successful in bringing the issue of the Tahoe drinking water purveyors' filtration exempt status and their concerns to the LRWQCB. LRWQCB staff was then given direction to work with TWSA, NDEP and CDPH on the regulatory language and review process. TWSA staff and members presented public and written comments to the Lahontan Regional Water Quality Control Board and the CA State Water Board on multiple occasions.

### **Excerpt of Exemption Criteria and Mitigation Language relevant to drinking water intakes:**

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/basin\\_plan/comments111411/attachment2\\_revised093011.pdf](http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/comments111411/attachment2_revised093011.pdf)

(Note: Footnote 7: page 8: The Regional Board will consult with the Nevada Division of Environmental Protection (NDEP) when a project affects interstate waters that exist within, or flow to, the State of Nevada. The Regional Board will consult with the California Department of Public Health (CDPH) when reviewing exemption requests that may affect surface drinking water intakes.)

(Page 8): An exemption request must be submitted to the Water Board and contain the following information acceptable to the Regional Board.

Project Information to include:

Project description including, but not limited to, proposed schedule, duration, name of pesticide, method and rate of application, spatial extent, water body, control/mitigation measures to be used, contact information. Purpose and need for project. The chemical composition of the pesticide to be used, including inert ingredients. Communication and notification plan to be implemented before, during and after the project. The plan will include documented measures to notify potentially affected



parties who may use the water (ground or surface) downstream for any beneficial use. The notification plan must include any associated water use restrictions or precautions. Project proponents will provide potable drinking water where necessary and shall obtain any necessary permits from CDPH and NDEP for supply of potable drinking water.

For projects conducted in an ONRW (e.g. Lake Tahoe) that may impact surface water intakes used for drinking water located within one-half mile of the point of application, the following additional requirements apply:

- i. Proponents will provide written response from the water purveyor(s) indicating (1) request for project modification (e.g., project design, monitoring, and/or mitigation measures) or (2) consent with the project with no continued involvement.
- ii. An estimate of the maximum foreseeable concentrations of pesticide components in any surface water intake used for drinking water supplies.  
Public notification requirements may be waived where project proponent is an agency signatory to Cooperative Agreement with DPH and evidence is provided of notification exemption.
- iii. Spill contingency plan to address proper transport, storage, spill prevention and cleanup.

Public comment offered to the CA State Water Board by TWSA staff in 2014 is archived in earlier annual reports. The following links directly reference 2011 TWSA, NDEP and CDPH comments regarding the Basin Plan:

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/basin\\_plan/comments051311/responses/twsa\\_wbresponse093011.pdf](http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/comments051311/responses/twsa_wbresponse093011.pdf)

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/basin\\_plan/comments051311/responses/ndep\\_wbresponse093011.pdf](http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/comments051311/responses/ndep_wbresponse093011.pdf)

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/basin\\_plan/comments051311/responses/cdph\\_dw\\_wbresponse093011.pdf](http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/comments051311/responses/cdph_dw_wbresponse093011.pdf)

### **Tahoe Resource Conservation District / Tahoe Keys Aquatic Plant Management Research Projects**

<http://tahoercd.org/aquatic-invasive-species-control-projects/>

More on information on these type of non-chemical control projects is provided in the “Controls” and “Watershed Activities” chapters.

The Tahoe RCD is the lead implementation agency for aquatic weeds control in the Tahoe Basin. They have been the agency staffing the boat inspection program, conducting underwater surveys, monitoring, installing bottom barriers and preparing reports on projects.

### **Innovative Resources Tests UVC Light Technology**

Perhaps the most promising thing to occur in recent years was the demonstration of a UV Light Project to kill aquatic weeds, conducted by Inventive Resources Inc. with technical support from Tahoe RCD. Initial results show plant control is possible using UV light. Testing continues through the CMT tests slated to 2023. A full report was published December 2018.

<http://www.tahoefund.org/our-projects/active-projects/uv-light-pilot-project/>

**Partners:** Tahoe Resource Conservation District, Inventive Resources Inc., California Tahoe Conservancy

**Total Project Cost:** \$270,000 / **Tahoe Fund Grant:** \$10,000



### **UV-C Light Test Final Report 2018-2019**

<https://tahoercd.org/tahoe-aquatic-invasive-species-resources>

## Executive Summary

This Final Monitoring Report is submitted to fulfill Contract Number CTA 16031L between the California Tahoe Conservancy (Conservancy) and Tahoe Resource Conservation District (Tahoe RCD) for the Aquatic Invasive Plant Control Pilot Project (Project). This Project tested the effectiveness of ultraviolet light, C wavelength (UV-C) on aquatic invasive plant (AIP) infestations in Lake Tahoe in two lake environments: open water and enclosed water. An interim progress report was submitted to the Conservancy in December 2017 and is available for download on Tahoe RCD's website (<https://tahoeecd.org/tahoe-aquatic-invasive-species-resources/>). The 2017 progress report included:

- A summary of work completed during the 2017 treatment period;
- Draft products, reports and interim findings, including a statement of tasks and milestones and a report of the status on each, including public and agency meetings outcomes;
- A discussion of any challenges or opportunities encountered in accomplishing the scope of work;
- An assessment of the progress compared to the timeline in the Project Schedule;
- A narrative financial report comparing costs to date and the approved scope of work and budget, and
- Copies of relevant materials produced during the 2017 reporting period under the terms of the agreement.

This Final Monitoring Report builds upon the data and preliminary findings provided in the 2017 Progress Report by considering long term post-treatment results that were measured during the 2018 growing season between June and September 2018. This report includes:

- A summary of the objectives of the project and how these objectives were accomplished (Section 3 and Section 7);
- Summary of public and agency meeting outcomes and work completed for this project (Table 1 and Appendix B);
- Findings, conclusions or recommendations for follow-up or ongoing activities that could result from the successful completion of this project (Sections 9 and 10);
- Comparison of pre-treatment and post-treatment results for macrophytes, benthic macroinvertebrates (BMI), periphyton, phytoplankton, zooplankton and water quality parameters (Section 8);
- Compilation of 2017 and 2018 field photo documentation (Appendix D);
- Copies of news articles and educational materials produced as a result of the grant agreement (Appendix F); and
- An economic assessment of AIP treatment methods used in Lake Tahoe (Section 11).

The results from the Project support initial laboratory findings that the application of UV-C light results in observed mortality of submerged aquatic plants, both in an enclosed waterbody (i.e., marinas) and open waterbody (i.e., beach littoral) systems. Most submerged aquatic plants (i.e., macrophytes) treated with UV-C light exhibited signs of deterioration within 7 to 10 days following treatment. Complete eradication of AIP may not be achieved with only one treatment, but a decrease in plant percent cover, mean plant height, and thus plant density, was observed. For future treatment, macrophytes should be treated with UV-C light early in the growing season (e.g., typically May and June) and treatment conducted several times throughout a season or multiple seasons. This monitoring report provides quantitative information on the physical, chemical, and biological characteristics of lake waters and substrate in the treatment area and comparisons to control sites, which represent comparable AIP infestation sites that were not treated with UV-C light.

The data collected from this Project serves two purposes: 1) to determine the success of the UV-C light treatment method and the efficacy of this method as a useful tool at a lake-wide scale, and 2) to provide information to support future environmental document analysis and permitting needs. Based on observations of UV-C light treatment at Lakeside Marina and Lakeside Beach, UV-C light is a good first line of defense when tackling large, dense areas of aquatic plants, ideally treating in the beginning of the growing season. This technology provides a marked cost advantage and was the least costly method reviewed however, cost should not be the main factor considered when choosing a control method. There is significant interest and support from public and private sectors to further develop this pilot Project and the utility of UV-C light as a technique to treat AIP in Lake Tahoe. It is our recommendation that UV-C light prescription treatments consider the following: project area, treatment frequency, project duration, size of light array, plant species present, desired outcomes, and cost. UV-C technology should be used along with other techniques and technologies in an appropriate and comprehensive manner to be most effective. Additional UV-C light treatment applications and projects should be implemented and monitored for a period of 2-3 years to investigate the full potential of this tool.

#### Possible constraints:

- Plant height and density is an initial constraint, that may predicate additional rounds of treatment
- Visibility in the water column can obstruct the precision of application to the plant crown
- Site configuration and use need to be addressed through adaptation of the treatment apparatus and treatment timing

v

UV-C Light Plant Control Pilot Project – Final Monitoring Report

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## Truckee River Eurasian Water Milfoil Removal Project

The Tahoe RCD is pioneering a project on the Truckee River to control the aquatic invasive plant, Eurasian Watermilfoil, which has been growing prolifically there since the late 1990s. Made possible by strong partnerships, this project follows other successful removal projects that have targeted aquatic invasive plants in Lake Tahoe, particularly in Emerald Bay. Eurasian watermilfoil likely entered the Truckee River during the overflow of the dam in 1997 and has established a thriving population over the last 5-7 years. The goals of this project are to, create a baseline map of the infestation from the outlet at Lake Tahoe downstream to River Ranch at Alpine Meadows Rd, and systematically implement control efforts to remove this aquatic invasive plant within this reach of the Truckee River. Asian Clam Control and Removal Asian clam control in Lake Tahoe is a multi-agency, collaborative effort. Starting with a pilot project in Marla Bay and off shore of Lakeside Beach, researchers and managers looked at two different methods of control; rubber bottom barriers and diver assisted suction removal. Initial tests in the southeast portion of the Lake showed that covering clam populations with rubber barriers was effective in starving clams of dissolved oxygen, thus killing them. Expanding on these initial tests, in 2012, approximately five acres of rubber barrier material was deployed on a relatively low density clam population in the mouth of Emerald Bay.

### **Early Detection Monitoring (Veliger monitoring)**

Since 2010, the Tahoe Regional Planning Agency, with assistance from the Tahoe RCD conducts veliger monitoring in Lake Tahoe, Echo Lake and Fallen Leaf Lake. Veligers are the larval stage of bivalve mollusks which includes quagga and zebra mussels, two potential invaders of Lake Tahoe. Monitoring is an essential element to ensure that the Watercraft Inspection Program has been effective in preventing quagga and zebra mussels from establishing populations in Lake Tahoe. Ten locations are surveyed monthly from late June until the end of September; eight locations in Lake Tahoe include Elks Point, Tahoe Keys, Emerald Bay, Meeks Bay, North Tahoe Marina, Sand Harbor, Obexers Marina, and Cave Rock along with Fallen Leaf Lake and Echo Lake. Sampling consists of eight vertical plankton tows at each site. The samples are then sent to a laboratory to be analyzed. All of the samples to date have returned with no zebra or quagga mussel veligers present.

An overview of Tahoe agency programs was offered in 2014. The link to the presentation is: [http://tahoercd.org/wp-content/uploads/2014/05/AllPresentations\\_May2014AIS-public-forum.pdf](http://tahoercd.org/wp-content/uploads/2014/05/AllPresentations_May2014AIS-public-forum.pdf)

### **2016 Dye Tracer Study in Tahoe Keys**

In 2016, the earlier Rhotamine Dye study test was replicated in the Tahoe Keys. A Final Report was published in 2017. See [www.TahoeKeysweeds.org](http://www.TahoeKeysweeds.org) for information.

### **Chemical Risks: Perchlorate (SLT Plume and Fireworks)**

Perchlorate is of concern due to a historic groundwater plume in the City of South Lake Tahoe, which is migrating and contaminating several wells. There are also potential lake impacts from community fireworks displays. South Tahoe PUD has taken a leading role in management of the investigatory process of the PCE plume. <http://stpod.us>. Details provided in other sections of this report.

### **Fireworks – Return to Incline Village 2024.**

South Lake Tahoe and Incline Village traditionally hold a fireworks display; conducted by professional fireworks providers and are staged from barges anchored several hundred yards off shore. Event organizers require the next day cleanup of any firework debris, several include underwater dive cleanups. Perchlorate as a potential drinking water contaminant has entered the discussion surrounding these events. TWSA staff has conducted research and continues to monitor the situation surrounding fireworks use.

### **Tahoe North Shore selects drones instead in 2022**

<https://yubanet.com/regional/north-lake-tahoe-to-celebrate-labor-day-weekend-with-drone-light-shows-in-kings-beach-and-tahoe-city/>

In 2022, the north shore communities did not host fireworks; instead, they provided computerized drone shows for the public (rebooked to Labor Day due to winds). Personal use of fireworks is banned in the Tahoe Basin.

In 2014, several citizens filed a lawsuit regarding debris from the displays. The parties reached an agreement to allow the fireworks displays to continue.

<http://www.rgj.com/story/news/2014/04/01/south-tahoe-fireworks-will-continue/7162969/>

Under the settlement, the authority will ratchet up post-show cleanup activities and make a hotline available for residents to report fireworks debris. Under the settlement, the authority will ratchet up post-show cleanup activities and make a hotline available for residents to report fireworks debris.

## **Lead Cables in Emerald Bay - AT&T will remove 100,000 pounds of lead from Lake Tahoe**

By Gregory Thomas, | Travel & Outdoors Editor | Sep 18, 2024

AT&T will remove about 107,000 pounds of lead from Lake Tahoe that some locals worry has been leaching toxins into the water for decades, according to a settlement agreement announced Wednesday. Roughly 6 miles of antiquated underwater telecommunications cables sheathed in lead belong to the company and extend along the lake's West Shore between Rubicon Bay and Emerald Bay. Under the settlement agreement, AT&T is expected to remove them before June 2025, according to Chris Shutes, Executive Director of the California Sportfishing Protection Alliance, which had sued AT&T over the issue. "This is a monumental win for the environment, the communities who drink Lake Tahoe water, the people with lake-dependent livelihoods, and the millions of annual visitors," Shutes said in a Wednesday press release. In 2021, at the urging of concerned Tahoe residents the sportfishing alliance sued AT&T to remove the cables, claiming they were discharging lead and represented a public health risk. In a settlement agreement reached in 2022, AT&T agreed to remove the cables, but then withdrew from that commitment a year later, effectively reopening litigation over the issue.

In the meantime, a grassroots group of residents called the Tahoe Lead Removal Project emerged to raise awareness and procure the necessary permits and funding to extract the cables. On Wednesday, the leader of that group, West Shore resident Evan Dreyer, said he was encouraged by the recent settlement agreement and that his group's work would continue as long as the cables remained in the lake. In a statement issued Wednesday, AT&T President-California Marc Blakeman reiterated the company's claim that the cables in question "are safe and pose no threat to public health or the environment" while confirming that the removal process would move ahead. "With the litigation behind us, we are fulfilling our original commitment to remove the cables in Lake Tahoe," Blakeman said in the statement.

The company said it will work with the League to Save Lake Tahoe, the nonprofit group behind the Keep Tahoe Blue campaign, to facilitate the removal. "It's encouraging to see a major corporation stand by its word, and we look forward to continuing our work with AT&T and regulatory agencies to ensure their commitment to remove the cables is fulfilled – both safely and in the near term," said Jesse Patterson, Chief Strategy Officer for the League to Save Lake Tahoe.

### **Wildlife and Domestic Animals**

The Tahoe Basin is home to many species of native, introduced, adapted and domestic animals. The significance to drinking water includes the potential of bacterial contamination from animal defecation/feces. Due to large population sizes, the main threats include: 1) domestic dogs and 2) colonies of Canadian Geese, which inhabit local beaches and defecate at the shoreline.



### **TWSA Dog Waste Education Campaign**

TWSA staff's ongoing beach and stream monitoring points to no significant impact on drinking water quality from wildlife. Dr. Marc Walker, University of Nevada Reno faculty, conducted extensive studies on dog feces and water quality, between 2004 and 2007 at Burke Creek. His study revealed that once feces have desiccated, there is no ongoing bacteriological impact on water quality. This report is available on request.

TWSA efforts on the 'They Drop It, You Drink It' dog waste awareness campaign now includes a custom dog waste dispenser with biodegradable bags; given to dog owners after they sign a pledge to pick up more dog waste. TWSA provides funding for bulk waste dispensers, bags and custom signage for high use public dog areas.

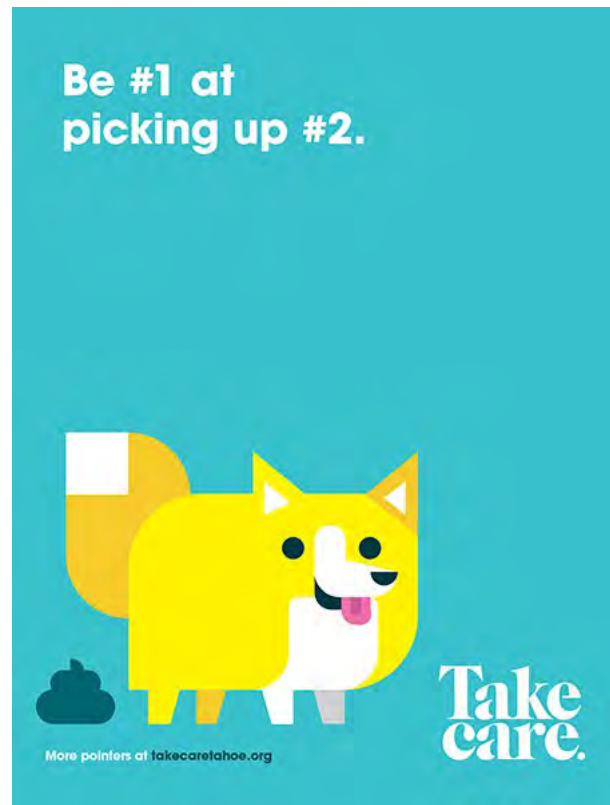
As of October 2022 there were 100 waste bag units installed on the east, south and north shores of Lake Tahoe including Nevada State Park, Johnson Meadows, Burke Creek, Third Creek, Bijou Meadows, Van Sickle Bi-State Park and the new Tahoe City and Tahoe Vista Dog Parks. TWSA commits funds for refill bags annually. Pickup bag rolls, leash dispensers signage are provided to individuals at the IVGID Public Works offices, at events and upon request.

TWSA and Take Care Tahoe offer dedicated educational resources on this topic:

<https://takecaretahoe.org/take-action/dog-dooey/>

<https://www.yourtahoeplace.com/news/the-scoop-on-dog-poop>

<https://www.moonshineink.com/tahoe-news/clash-of-the-leashes/>



## Excerpt from Burke Creek Final Report 2011

[http://ntcd.org/nv\\_ourtahoewatershed/documents/Burke%20Creek%20Final%20Report.pdf](http://ntcd.org/nv_ourtahoewatershed/documents/Burke%20Creek%20Final%20Report.pdf)

### Dog Waste and Water Quality

Dog waste was ranked as the 5<sup>th</sup> most important concern in the community survey for the Oliver Park GID. Community residents complained of dog waste littering the trails along Burke creek and around their neighborhood. Dog waste is also a concern from a water quality perspective. Fecal Coliform bacteria which are found in the feces of warm-blooded animals, including humans, pets, livestock, beavers, and birds, can be a human health hazard. This is especially valid in the case of Burke creek which enters Lake Tahoe at Nevada Beach, one of the most popular recreation sites in the Basin.

Fecal Coliform is measured in colony forming units (CFU) counted per 100 milliliters of water (CFU/100ml). CFU are roughly equivalent to the number of bacteria cells. The Lahontan Regional



Burke Creek Community Watershed Partnership  
NRCS and Partners  
2011



Water Quality Control Board standard for fecal coliform is 20 counts per 100 ml for a single occurrence. In 2010, the fecal coliform at the mouth of Burke creek were measured at 49 CFU's, more than double the water quality standard and the highest level measured in any creek in the Basin. Figure 11 shows the fecal coliform measurements for 15 south shore monitoring sites from 2010. The other highly contaminated site, South Zephyr Creek, is located near a horse-back riding stable and has had numerous violations in the past.

While the fecal coliform numbers from 2010 are impressive, they are an improvement from 2009 when over 60 CFU were detected. Prior to the 2010 measurements, a dog waste station was installed near the parking lot as an Eagle Scout project. Water quality improvement for Burke Creek over the past year could be attributed to the dog waste station.

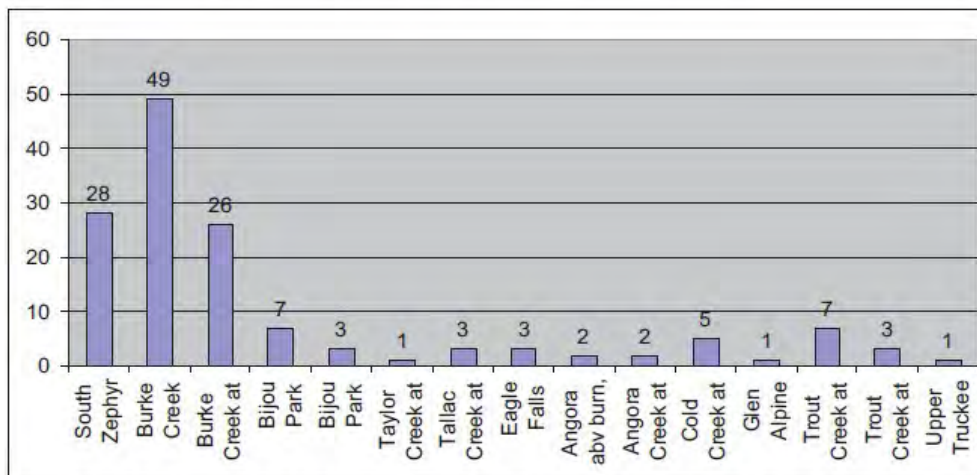


Figure 11. Fecal Coliform CFU's for 15 Monitoring Sites. Source: "Snapshot Day" 2010\*.

\*This figure contains incomplete labels but is un-editable.

During the CWP survey, residents of the Oliver Park GID asked for improvements in signage directing dog walkers on how to dispose of dog waste properly and greater access to waste containers. Many dog owners use the clean-up bags supplied by the dog waste station, but then leave these bags along the trail rather than disposing of them properly.

### **IVGID Goose Patrol Volunteer Dog Team**

[http://inclinerecreation.com/outdoor\\_recreation/beaches/geese\\_patrol](http://inclinerecreation.com/outdoor_recreation/beaches/geese_patrol)

IVGID uses a volunteer Goose Patrol team of approximately 40 dogs and human volunteers to haze and chase geese from District property. Dogs on the Geese Patrol wear red vests and owners have special identification authorizing them to be at the beaches. Arriving at a variety of times throughout the day, the dogs chase the geese back into the water. Because of their efforts, fewer geese come to the beaches or stay at the beaches. Cleanup from the geese droppings has been greatly reduced, hence saving labor and staff resources.

### **Grazing – Historical Impacts**

[http://water.epa.gov/polwaste/nps/success319/ca\\_bigmeadow.cfm](http://water.epa.gov/polwaste/nps/success319/ca_bigmeadow.cfm)

Under the Porter-Cologne Act, the USFS manages grazing allotments in accordance with a State Water Resources Control Board-certified water quality management plan. The plan sets forth an iterative process that governs the implementation, monitoring and revision (as appropriate) of BMPs used to control nonpoint source pollution. If BMPs are not effective—even after revision—the USFS can choose to mitigate the water quality impact, refine water quality standards and/or cease the activity. All resource activities are managed under the limitations provided in a USFS site-specific environmental assessment developed by an interdisciplinary team of experts. The USFS-LTBMU develops allotment-specific management plans in cooperation with its grazing permittees.

In the decade prior to the grazing ban (1999), USFS-LTBMU tried to mitigate the impacts on water quality from cattle grazing by installing BMPs such as cattle stream crossings and cattle exclusion fencing upstream of the crossings. Within the protected stream areas, the USFS-LTBMU planted vegetation and stabilized streambanks using cobbles and erosion control cloth. The USFS-LTBMU conducted its own water quality monitoring to assess the effectiveness of the various BMPs.

In the areas where cattle weren't excluded, the USFS implemented the following BMPs: off-stream water sources, rest rotation, reduced herd size and shortened grazing season. Despite these efforts, water quality continued to violate the FC bacteria objective. In 1999, the USFS-LTBMU informed the permittees who grazed the Meiss Meadows area that "a viable grazing strategy cannot be developed that would likely meet the state-mandated water quality standards..." As a result, the USFS permanently ceased all grazing on the Meiss Meadows area, which includes the Big Meadow Creek and Upper Truckee River basins.

### **Results**

Removing livestock from the area allowed the waterbodies to recover. The USFS collected and analyzed approximately 43 samples at three separate locations in Big Meadow Creek during 2000, 2001, 2002 and 2008. FC levels have declined and now meet the water quality objective of less than a log mean of 20 units/100 mL (Figure 2). Similarly, the USFS collected and analyzed approximately 103 surface water samples from the Upper Truckee River (above Christmas Valley) during the years 2000, 2001, 2002, 2003, 2004 and 2008. Like Big Meadow Creek, FC levels in the Upper Truckee River have declined steadily since 1999 and now meet the water quality objective.

These significant reductions in FC bacteria counts restored the water contact recreation use, prompting the Lahontan Water Board to remove 4.5 river miles of Upper Truckee River and 1.4 river miles of Big Meadow Creek from California's CWA section 303(d) list of impaired waters in 2010.

### **Grazing - 2013 U.C. Davis Study**

[http://news.ucdavis.edu/search/news\\_detail.lasso?id=10636](http://news.ucdavis.edu/search/news_detail.lasso?id=10636)

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0068127>

Limited livestock grazing is available seasonally in the Tahoe Basin. A new study released in 2013 by U.C Davis states cattle grazing and clean water can coexist on national forest lands, according to research by the University of California, Davis. The study, published today in the journal PLOS ONE, is the most comprehensive examination of water quality on National Forest public grazing lands to date. “There’s been a lot of concern about public lands and water quality, especially with cattle grazing,” said lead author Leslie Roche, a postdoctoral scholar in the UC Davis Department of Plant Sciences. “We’re able to show that livestock grazing, public recreation and the provisioning of clean water can be compatible goals.”

### **Grazing Animals: Baldwin Grazing Allotment - Site Closed to Grazing**

[http://www.fs.fed.us/r5/ltbmu/documents/projects/BGAMP/FINAL\\_Baldwin\\_Allotment\\_EA\\_20090723.pdf](http://www.fs.fed.us/r5/ltbmu/documents/projects/BGAMP/FINAL_Baldwin_Allotment_EA_20090723.pdf)

The Lake Tahoe Basin Management Unit (LTBMU) permanently ended authorized livestock grazing on the Baldwin Allotment in order to meet state and federal resource standards and achieve desired conditions. The proposal included an amendment to the 1988 LTBMU Land and Resource Management Plan to close the Baldwin Grazing Allotment to eliminate grazing in the future.

The Baldwin Grazing Allotment was located in El Dorado County on the south shore of Lake Tahoe in the Fallen Leaf Management Area. The U. S. Forest Service Lake Tahoe Basin Management Unit (LTBMU) managed the Baldwin Grazing Allotment in the Tallac Creek watershed. The allotment was approximately 200 acres and the only grazing allotment on the lakeshore of Lake Tahoe. The allotment is dissected by Tallac Creek, which provides inflow to Lake Tahoe and supports native and introduced fish species. Wetland and riparian areas provide habitat for wildlife species, such as willow flycatcher and sensitive plant taxa, including *Botricium* spp. and *Epilobium* spp. The beach pasture was also adjacent to a known Tahoe yellow cress population, which is identified in the conservation plan as a medium priority restoration site, and a population recreational beach facility.

### **Logging**

There are no commercial logging operations in the Tahoe Basin. Tree removal is restricted (permit required) by TRPA for trees greater than 12” in diameter. Most logging is conducted by one of the designated Fire Districts, in relation to forest fuels reduction projects. These operations are mitigated through measures such as special operational and equipment requirements for work on steep slopes and in Stream Environment Zones (SEZs). Most work is conducted in late fall, early winter and early spring. On-site prescribed burns are currently the main method for removal of forest biomass.

### **Cabin Creek Biomass Facility Project**

<https://www.placer.ca.gov/2900/Cabin-Creek-Biomass-Energy-Facility>

Early on in implementation of the Biomass Utilization Program, it was recognized that having a market for woody biomass would provide economic assistance and incentive for completing the kinds of forest management and fuels reduction projects that are needed to reduce the threat and impacts of high intensity wildfire. Further, it was recognized that biomass energy facilities represent a viable and proven option for providing such a market for biomass. That led to the planning for a biomass energy facility that would create a market for woody biomass being created in the Lake Tahoe Basin.

**Tahoe Truckee Community Foundation Summary of biomass projects:**  
<https://www.ttcf.net/forests-climate/forest-futures-salon-biomass-energy>

### **A Key Element in Moving Forward**

Addressing our regional biomass will play a pivotal role in fostering healthier forests and resilient communities in the Tahoe Truckee region. Biomass utilization can provide more diverse economic benefits, while creating sustainable solutions for forest management. As we move forward, we will continue to monitor the data, partnerships and on-the-ground solutions that address biomass and the adoption of modern technologies that can truly transform our region for the better.

*\*\* This is the third in a three part blog series on regional biomass based on our Forest Futures Salon in September 2023. [See recording here](#).*

*\*\*Our regional agencies and on-the-ground partners have been grappling with this issue and working to align our local understanding of the issue and generate solutions. Here is a short list of projects and partners that we are currently tracking:*

**North Tahoe Truckee Biomass Task Force** – A partnership that supports agencies seeking to construct biomass facilities by creating a space for knowledge sharing to accelerate the build of biomass outlets. TTCF is a member of this Task Force.

**Cabin Creek Biomass to Energy Facility** – Treat 18,000 Bone Dry Tons (BDTs) per year; produce 2,000 tons of biochar per year; 2 megawatt gasification to electric facility – this energy will be used to charge the future TART electric bus fleet.

**Northstar Community Services District Wood Energy Facility** – Treat 3,800 BDTs per year; 2 megawatt boiler facility – this energy will be used to heat 14 buildings in The Village at Northstar (targeting energy production in 2025 pending permits and funding).

**CAL FRAME (California Forest Residual Aggregation and Market Enhancement)** – A study being led by Placer County and Placer County Water Agency to assess ways to more efficiently connect biomass coming from forest restoration projects to outlets for use. The vision is to create a pilot aggregation entity that will support the contracting process between entities doing on-the-ground fuel reduction work and wood product businesses (March 2025 anticipated final report).

**Town of Truckee Feasibility Study** – This is a partnership between Truckee Donner Public Utilities District, Town of Truckee, Truckee Fire Protection District, and Truckee Tahoe Airport District. Early stage study on ways to utilize the estimated 10,000 BDTs per year generated by fuel reduction projects of the partners – potential bioenergy plant at the Public Service Center in Truckee (October 2023 anticipated report and recommendation).



**Alpenglow Timber Wood Product and Thermal Energy Facility** – Small Diameter Sawmill will support 1,500 acres of restoration per year; create 6 full-time jobs; produce 5.4 million board feet of lumber per year (targeting 2025 pending permits and funding).

If you have questions or would like to learn more about woody biomass, please contact Forest Futures Director, Nicole Miller, at [nicole@ttcf.net](mailto:nicole@ttcf.net).

[Read regional biomass blog #1.](#)

[Read regional biomass blog #3.](#)

**59,000 -acre Lake Tahoe West Restoration Project** ([StoryMap Here](#))

<http://southtahoenow.com/story/08/23/2020/interactive-story-book-released-highlight-59000-acre-lake-tahoe-west-restoration-pr>

Lake Tahoe West partners have released an interactive “story map” to explain ongoing and proposed actions to restore forests and watersheds across 59,000 acres of Lake Tahoe’s west shore.

Community members and visitors can use the story map to learn more about the threats to the west shore landscape, and how science is informing a landscape-scale restoration approach to addressing those threats. Through the Lake Tahoe West Restoration Partnership, land management agencies, local partners, and other stakeholders are working together to increase resilience to high-severity wildfire, drought, climate change, and insect and disease outbreaks. Multiple restoration efforts are already underway. The story map highlights current projects on the west shore to reduce fire hazards near communities, restore meadows, and create healthier, more resilient forests. The Lake Tahoe West Restoration Partnership is a collaborative, multiple-stakeholder effort led by the USDA Forest Service Lake Tahoe Basin Management Unit, California Tahoe Conservancy, Tahoe Regional Planning Agency, California State Parks, Tahoe Fire and Fuels Team, and National Forest Foundation.



## **VII. ANNUAL WATERSHED ACTIVITIES SUMMARY**

This chapter provides a summary of the major findings or changes within the watershed related to: lake biology, invasive species, recreation, landownership or zoning changes, water quality monitoring programs, research and wildfires.

### **About Lake Tahoe and the Tahoe Basin**

<http://www.trpa.org/tahoe-facts> (and) <https://tahoe.ucdavis.edu/stateofthelake>

#### ***Lake Tahoe Fast Facts***

- Lake Tahoe is 2 million years old
- Holds 39 trillion gallons of water
- Size of watershed: 501 sq. miles
- Lake surface area: 192 sq. miles
- 12 miles wide
- 22 miles long
- 72 miles of shoreline
- 2nd deepest lake in the United States
- Average depth: 1,000 feet (305 meters)
- Lake surface area: 191 square miles (495 square kilometers)
- Watershed area: 312 square miles (800 square kilometers)
- 1,645 ft. deep, one of the deepest lakes in the world
- 6,223 ft. elevation (natural rim)
- Trees in the basin: 17 million
- 2 states: CA, NV
- 5 counties, 1 city
- 55,000 Tahoe Basin year-round residents
- Tourist population: 15 + million
- Majority of private property owners are part-time residents
- U.S. Forest Service and state agencies manage almost 90% of land area
- 43,470 developed parcels in the basin
- Assessed property values in the basin total = \$15.5 billion
- Average surface water temperatures are 68° Fahrenheit in the summer and 41° in the winter
- 63 streams feed into Lake Tahoe but only one, the Truckee River, flows out
- Approximately 15 million people visit Lake Tahoe every year
- Nearly 10 million vehicles drive into the basin annually
- Outstanding National Resource Water (Tier 3) under the Clean Water Act
- Lake Tahoe is the second deepest lake in the United States
- A single drop of water entering the Lake today will take 650 years to find its way out.
- Length of time it would take to refill the lake: about 600 years
- Number of large lakes worldwide with annual clarity exceeding Tahoe's: 0
- Highest peaks in the Tahoe Basin: Freel Peak at 10,891 ft.; Mt. Rose at 10,776 ft.
- The daily evaporation from Lake Tahoe (half a billion gallons) would meet the daily water needs of 5 million Americans. Evaporation from the lake surface during the year equals approximately 52 inches of water, with August being the month of maximum evaporation. One inch of evaporation is equivalent to 3.5 billion gallons.
- The number of algal cells in Lake Tahoe is approximately 30 million trillion

- Outflow from Lake Tahoe into the Truckee River stopped for 364 days in 2015.
- Latitude: 39 degrees North
- Longitude: 120 degrees West
- Highest peaks in the Tahoe Basin: Freel Peak at 10,891 ft.; Mt. Rose at 10,776 ft.

**Tahoe Regional Precipitation. Most of Tahoe’s annual precipitation falls in the winter months.**

<https://www.sierraattahoe.com/season-snow-totals>

A year by year summary of precipitation is included in the Description of the Watershed section.

Long term drought is affecting the region. Some emergency measures have remained in place to address long-term conservation and efficiency. The California Water Board maintains a Water

Conservation Portal: [https://www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal)

The [2023 Tahoe: State of the Lake Report](#) has officially been released by the Tahoe Environmental Research Center, or TERC, at the University of California, Davis. The report describes the past year as one of rapid biological change. The 2023 report presents data collected during 2022 and puts it in context with historical records. It also serves as an important resource for restoration, management and monitoring decisions.

UC Davis researchers have been monitoring the second deepest lake in the United States continuously since 1968, and the report provides an update for nonscientists on a variety of factors affecting the health of Lake Tahoe.

The ***UC Davis Tahoe: State of the Lake Report*** informs non-scientists about the most important factors affecting lake health and helps influence decisions about ecosystem restoration and management within the Lake Tahoe Basin. The report was funded by the California Tahoe Conservancy, the Lahontan Regional Water Quality Control Board, the Tahoe Fund, the Tahoe Lakefront Owners Association, the Tahoe Regional Planning Agency, the Nevada Division of Environmental Protection, the Tahoe Water Suppliers Association, the League to Save Lake Tahoe and the Incline Village Waste Not Program, and individual donations.

Annually in August, the University of California–Davis (UC Davis) issues the *Tahoe: State of the Lake Report*.

The University of California, Davis, has conducted continuous monitoring of Lake Tahoe since 1968, amassing a unique record of change for one of the world’s most beautiful and vulnerable lakes. The *State of the Lake Report* summarizes how natural variability, long term change and human activity have affected the lake’s clarity, physics, chemistry and biology over that period. The data reveals a unique record of trends and patterns – the result of natural forces and human actions that operate at time scales ranging from days to decades. These patterns tell us that Lake Tahoe is a complex ecosystem, behaving in ways we don’t always expect.

The long-term data set collected on the Lake Tahoe ecosystem by U-C Davis and its research collaborators is a valuable tool for understanding ecosystem function and change. *Tahoe: State of the Lake Report* presents the most recent year’s data in the context of the long-term record.

Lake Tahoe, with its iconic blue waters straddling the borders of Nevada and California, continues to face a litany of threats related to climate change. But a promising new project

### **Rapid changes**

The report details changes in lake clarity and the possible links to a sudden decline in the *Mysis* shrimp population. Extensive algal blooms in the nearshore of the lake and new data on microplastics are also

detailed. Other topics include new monitoring and modeling efforts, lowered nitrogen and phosphorus levels and research into the efficacy of no wake zones. “The lake is in a state of rapid change, which presents us the opportunity and the challenge to better understand the lake with more and smarter monitoring,” Schladow said. “Within 2022 we had more changes throughout the lake than we’ve experienced over decades.”

The biggest change in the lake had to do with the rapid improvement in clarity from August through December, which was the best measured since the 1980s. This was preceded by the population collapse of *Mysis* shrimp, a species introduced to the lake decades ago, and other changes in the lake’s native phytoplankton and zooplankton.

### **Nitrogen, algae changes**

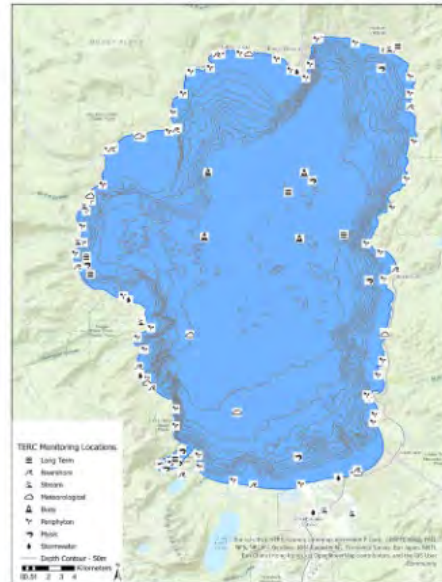
In other positive developments, restoration and management efforts continued to reduce nutrient and fine particle loads entering the lake. Total nitrogen coming into the lake from the Upper Truckee River, which is the largest source of water into the system, was 11.1 metric tons per year compared to the mean annual load of 17.3 metric tons per year.

Other biological changes included huge swings in the algal population and their rate of photosynthesis. As the water level fell in 2022 and temperatures increased, so did the makeup of the algal community, with a Cyanobacteria comprising the greatest number of phytoplankton. More areas of attached algae, or periphyton, were also noted in 2022. Some 16 miles of beach were fouled by decaying algae washing up on the beaches. Other report highlights:

- Water levels in the lake change throughout the year based on weather, inflows and outflows. A wet November and December filled up the lake, bringing it almost to maximum capacity.
- Microplastic pollution is an issue in Lake Tahoe, where samples show levels akin to San Francisco Bay. “What goes into Tahoe, stays in Tahoe,” Schladow said. “It’s a worry for every aquatic system.”
- TERC has 25 stations around the Lake Tahoe Basin that relay real-time measurements, as well as autonomous underwater vehicles, satellites, drones and helicopters. New, machine learning technology helped to better monitor beaches and nearshore areas.
- Extreme weather froze Emerald Bay and led to a longer period of vertical mixing in Lake Tahoe.
- A new, undergraduate student summer internship program launched in June.
- To remove tiny invasive shrimp could be a big step toward climate-proofing its famed lake clarity.

Archived SOTL Reports are available on the TERC website: (<http://tahoe.ucdavis.edu/stateofthelake>).

TAHOE BASIN DATA COLLECTION SITES



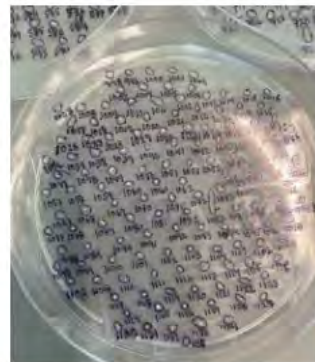
The microplastics of Lake Tahoe

A research team comprised of TERC researchers and the UC Davis One Health Institute completed the most comprehensive evaluation of microplastics in Lake Tahoe to date. The study was funded by the Nevada Division of Environmental Protection and the Tahoe Water Suppliers Association.

Using a Manta Trawl, water samples were collected from the lake surface and from 6 depths within the lake, down to 1,500 ft. Additionally, lake sediments and biota (Asian clams and kokanee salmon) were sampled. Following collection, processing, and isolation of particles suspected to be plastic, the particle composition was determined using Raman spectroscopy. Based on chemical identity determined by Raman spectroscopy, particles were classified into different types of plastics.



Manta trawl skims the water, collecting microplastics from Lake Tahoe's surface. Photo: K. Senft



A meticulous count microplastics pulled from lake samples. Photo: S. Sesma



## The microplastics of Lake Tahoe, continued

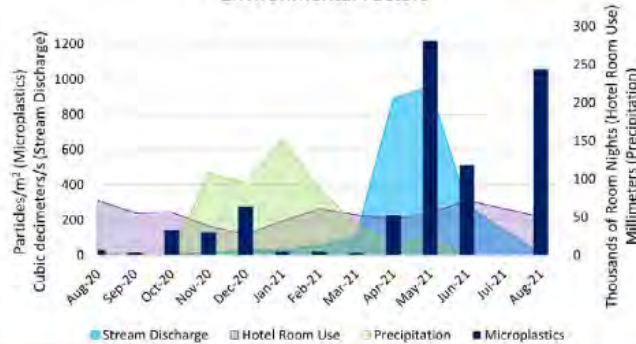
The microplastic abundance on the surface waters of Lake Tahoe are some of the highest reported amongst North American lakes (range: 13,000 – 1,220,000 particles/km<sup>2</sup>). However, higher values have been reported in other systems such as Lake Taihu, China (range: 10,000 – 6,800,000 particles/km<sup>2</sup>) and the San Francisco Bay (range: 34,000 –

1,800,000 particles/km<sup>2</sup>). This study was limited by the mesh size of the traditional methodology of a Manta trawl, which allowed the escape of microplastics less than 335 microns or 1/64 of an inch. It is believed that smaller microplastics are far more abundant and are more likely to have human health and wildlife

health impacts. A current pilot study, titled "The Ones that Got Away", is examining particles down to 1 micron (4 hundred thousandths of an inch) in size.

Our full report is available at [https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report\\_Final\\_20230302.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/LakeTahoe%20Microplastics%20Report_Final_20230302.pdf)

Relationship of Microplastics at Lake Tahoe to Environmental Factors



## The state of Lake Tahoe beaches

The nearshore of Lake Tahoe is where the public most often interacts with the lake and where public opinion regarding the lake's aesthetic character is primarily formed. Beyond aesthetics, the condition of the shore is a symptom of the overall health of the entire lake ecosystem and the presence of periphyton (attached algae) and metaphyton (unattached algae) are strong indicators.

In 2022, Lake Tahoe's nearshore regions and beaches experienced some of the most extreme conditions ever observed. Whether it was the broad expanses of attached algae (periphyton) around Tahoe City or the acres of washed-up filamentous algae (metaphyton) on the southern shoreline, these were not conditions that anybody wanted to continue.



Metaphyton and iron-rich pools at Conservancy Beach, September 29, 2022.  
Photo: S. Hackley



Metaphyton washing up on Kiva Beach, August 2022.  
Photo: K. Senft

## University of California-Davis' "State of the Lake Report (SOTL) 2022"

<https://tahoe.ucdavis.edu/stateofthelake>

### Tahoe Environmental Research Center (TERC) Education Programs: Micro-plastics reduction education campaign in 2020-2023.

See also Executive Summary of this report.

[www.drinktahoetap.org](http://www.drinktahoetap.org)

<https://tahoe.ucdavis.edu/microplastics>

2020 in-person activities at the Center were restricted in response to Covid-19. Multiple online resources were made available. In June 2021, the Center reopened featuring a large scale micro-plastics education display. The display is duplicated at the Sand Harbor Visitor Center.

This project was a collaborative effort from TERC's researchers and educators, with grant sponsorship from NDEP/US EPA.



### Tahoe Environmental Research Center (TERC) Micro-plastics Research

Extensive microplastics research has been conducted in marine research, however the research of its impacts on freshwater ecosystems is limited. TERC is working with the Desert Research Institute (DRI), Clean Up the Lake, the League to Save Lake Tahoe, Raley's stores, Sierra Watershed Education Partnerships, and Tahoe Water Suppliers Association, to lead the research and education efforts at Lake Tahoe in this emerging field. For more information contact [Heather Segale](#) or [Katie Senft](#).

Scientists from TERC and DRI are collaborating to study the threat microplastics pose to the health of Lake Tahoe. The teams are studying different aspects of the problem.

**Microplastics** are defined as any type of plastic fragment that is less than 5 mm in length. Plastics enter the natural environment from a variety of sources including cosmetics, clothing, and industrial processes. They break into smaller and smaller fragments by sunlight and physical abrasion from wind and waves, but never disappear. Research has shown microplastics entering the food chain, leaching chemicals, and showing up in soil and drinking water.



*Katie Senft of TERC, flushes the Manta trawl net of any remnants of microplastics. Purchase of the net was sponsored by TWSA.*

While TERC is researching the fate of microplastics to determine where they end up in the lake, DRI is studying the inputs—inflowing streams, accumulation on snow, storm drains, and even dryer vents.

In summer 2018 and 2019, field researcher Katie Senft led a pilot project through a summer internship program with TERC and found microplastics in many of the samples of beach sand collected. Building on that pilot project with funding from the Nevada Division of Environmental Protection (NDEP) and the U.S. Environmental Protection Agency (EPA), Senft's team continues to investigate the fate of microplastics in Lake Tahoe.

The team began sampling for microplastics in summer 2020, performing regular trawls at various depths throughout the lake, and collecting deep-water sediment samples to capture heavier plastics. Researchers also sample municipal water treatment facilities and Kokanee salmon and Asian clam tissues to assess the impacts on filter-feeding biota. Sampling protocols build on previous studies to measure microplastics in the waters at every depth of the lake and other areas of the surrounding watershed. Samples aimed to confirm microscopic particles will be subject to Raman microspectroscopy by Dr. Jenessa Gjeltrema, associate professor in zoological medicine at UC Davis. Gjeltrema uses the technology to determine the types of microplastics found in very tiny pieces. TERC's science team takes a multidisciplinary approach. Only by looking at the watershed as a whole—with its trees, animals, roadways, and people—can we truly understand what's happening to the lake. The plastic problem is similar. We cannot understand the ecological harms without exploring the human industries and big corporations that created the plastic problem in the first place

### TERC Center Programs

Through TERC's education and outreach programs, the goal is to provide science-based information about the Lake Tahoe region in order to foster responsible action and stewardship. We provide engaging exhibits, interactive hands-on education activities, and conduct effective outreach to draw student groups, residents, and visitors to our facilities. Our education programs inspire an interest in

environmental science, stimulate curiosity, and motivate active conservation and preservation of freshwater resources. Tahoe Science Center and Green Building Tours are offered by appointment only. The UC Davis Tahoe Environmental Research Center (TERC) **Monthly Lecture Series** provides a forum for community members to hear from scientific experts. Speakers include authorities on various environmental issues, scientific research, regional subjects, and topics of general interest.

### Citizen Science



#### CURRENT DIRECTIONS

##### Plastics in Lake Tahoe

Microplastics, tiny pieces of plastic smaller than five millimeters, are impacting ecosystems worldwide. Microplastics have also been found at Lake Tahoe, despite efforts to clean up beaches and prevent litter. TERC has been studying the location and extent of microplastic pollution in the lake and has launched efforts to educate visitors and change local consumers' plastic habits as part of the Drink Tahoe Tap® and Take Care Tahoe campaigns. With funding from the Nevada Division of Environmental Protection, the microplastics work is a collaboration between TERC researchers, educators, and several local partners.



*A day at the beach (top) goes awry when plastic that is left behind ends up in the lake. Many of those plastics are broken apart and become microplastics. Photos: A. Top*



*Photo: B. Wynne*



(<http://CitizenScienceTahoe.com>)

It is something anyone can do at any beach in Tahoe. Just download the free Citizen Science Tahoe app.

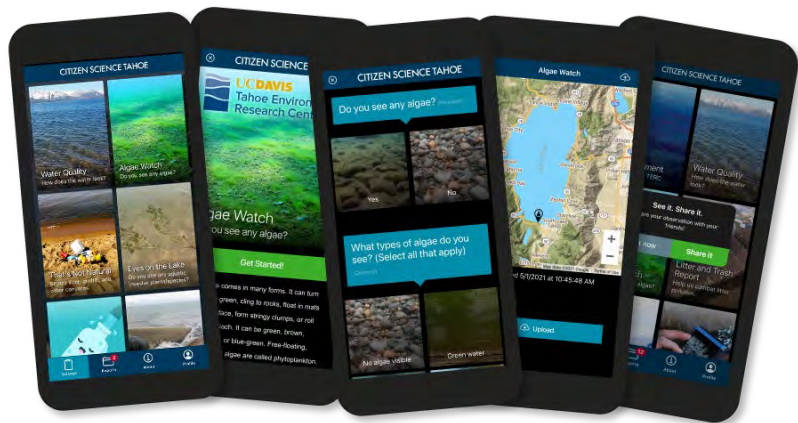
**What you can report with the app:**

- **Water Quality:** How does the water look? When the water is not clear, it can point to localized erosion or other problems that may require more investigation.
- **Algae Watch:** Do you see any algae? Understanding the location and timing of algae growth can help us better control it.
- **That's Not Natural:** Do you see litter, graffiti, or other human impacts where they shouldn't be? Did you pick up litter? Your reports will drive solutions for these "hot spots," including community cleanup events.
- **Eyes on the Lake:** Have you spotted aquatic invasive weeds? Report your sightings of these aquatic invaders to help prevent Tahoe's blue waters from turning a murky green.
- **Pipe Keepers:** Lake Tahoe is losing water clarity to stormwater pollution that runs off roads and urban areas. Protect Lake Tahoe by reporting polluted runoff.
- **Tahoe. Rain or Snow?:** Send us updates in real-time to share whether it is raining, snowing, or a wintry-mix.
- **Stories in the Snow:** Share your snow crystal images.
- **Drink Tahoe Tap - Where?:** Find or report a water fill station.

**See it – share it – make a difference:** With online platforms, citizen scientist volunteers can collect and share important data about their surrounding environment. You can help researchers by taking a few minutes to report what you see around the lake – whether it's an algal bloom, cloudy water, invasive species, or litter on the beach. Science needs both sides of the story, so users are encouraged to report both the positive and negative things they see.

**How it works:** Using the Citizen Science Tahoe app, you can submit observations along with your photos and comments. Each report automatically captures where and when the observation was submitted, with options to submit anonymously. The Citizen Science Tahoe App is available for Apple and Android phones. Users do not need to utilize their cellular data and can

wait to upload images when connected to Wi-Fi. This makes the app easy to use in even the most remote locations! Instructions available [here](#). Support available [here](#).



**Why it helps:** Data from various locations around the lake (spatial data) and from multiple dates throughout the year (temporal data) helps scientists to better understand the nearshore environment – the location where most visitors see the lake. The observational data collected by citizen scientists will be used by researchers to better understand conditions around the lake and to compare observations with sensor readings.

**Core partners:** UC Davis Tahoe Environmental Research Center (TERC) developed the first version of the Citizen Science Tahoe app in 2015 to compare the results of citizen science observations of the Lake's nearshore with the real-time nearshore monitoring network. This early version of the app was developed using grant funding from the Institute of Museum and Library Services. The League to Save Lake Tahoe (Keep Tahoe Blue) joined UC Davis TERC shortly after, and Desert Research Institute (DRI) joined in 2017 to expand the project and provide a fun and easy way for Tahoe-lovers to share observations about the natural environment at Tahoe to inform research and advocacy. These core partners create engaging surveys on important environmental issues facing Lake Tahoe and collaborate regularly to update and improve features on the app, compare data, and share interesting outcomes from the observations.

**Participating members:** Citizen Science Tahoe participating members bring a unique set of skills and perspectives to the team that improve the app for everyone. They contribute their expertise and passion for the Tahoe environment as well as expanded outreach to get more people involved and more data and observations in the hands of researchers and environmental advocates. Learn more about our participating members below. Together our community grows. The latest participating members to join in the Citizen Science Tahoe project include Clean Up the Lake, Tahoe Fund, and Tahoe Water Suppliers Association.

**Demo Gardens:** UC Davis TERC partners with Lake Tahoe Master Gardeners, the Truckee Community Garden, and the North Tahoe Demonstration Garden to bring family-friendly garden workshops that will encourage people to build beautiful and sustainable gardens that enhance the environment and foster an interest in citizen science.

**K-12 Programs:** UC Davis provides students with an opportunity to learn about science at Lake Tahoe with the following thematic programs: Water on Earth, Ecology, Tahoe Food Web, Landforms, Earthquakes and Plate Tectonics, and Lakes of the World. Activities align with state science curriculum. UC Davis TERC offers a 15-week (January through May) Youth Science Institute afterschool program for high school students. They offer the Trout in the Classroom program each year. Along with partner organizations, UC Davis provides training and support for participating teachers.

The annual **Science Expo** event is designed to increase student excitement and interest in science through interactive, hands-on activities, games, and demonstrations. Science Expo is hosted by UC Davis TERC, with support from the Rotary Club. Science Expo includes five days of hands-on science activities in North Lake Tahoe and four days in South Lake Tahoe for third-, fourth-, and fifth-grade students from the greater Lake Tahoe and Truckee Region. There is also an evening public event for all families and lovers of science at both locations.

**Teacher Programs:** Project WET, Project Learning Tree, Project WILD Workshops are held each year for teachers and informal educators in the region. Hosted in collaboration with other partners such as the US Forest Service and Sierra Watershed Education Partnerships. **Summer "Tahoe Teacher Institute"** - We partner with various school districts to host a summer Tahoe Teacher Institute focused on science, technology, engineering, and math (STEM) education.

**Volunteer Docent Program:** The volunteer docent training program is currently offered once a year in the spring. The training program consists of three to four sessions. Docents can also join the program by meeting with our staff, reading the Docent Manual, and shadowing tours until they are comfortable hosting tours.



The Thomas J. Long Foundation Education Center (TERC) at Incline Village, averages 12,000+ contacts annually. In addition, TERC hosts monthly public lectures and workshops, makes presentations to local organizations and takes a limited number of visitors out on research vessels. TERC organizes and hosts annual events and programs including Children’s Environmental Science Day, Science Expo, Youth Science Institute, Trout in the Classroom program, Project WET workshops, Summer Tahoe Teacher Institute and a volunteer docent training program. Several new exhibits were developed including upgrades to the interpretive signage located in the Native Plant Demonstration Garden outside the Tahoe City Field Station; addition of two aquariums at the Eriksson Education Center in Tahoe City; the Microplastics Display, Virtual Watershed Sandbox and Clarity Model Interactive exhibit in Incline Village; and the 3D movie “Lake Tahoe in Depth” for viewing in the Otellini 3D Visualization Lab in Incline Village.

### **Desert Research Institute (DRI) Microplastics Research**

<https://www.dri.edu/labs/microplastics>

<https://ucscscienotes.com/feature/lake-tahoes-pristine-legacy-threatened-by-microplastics/>

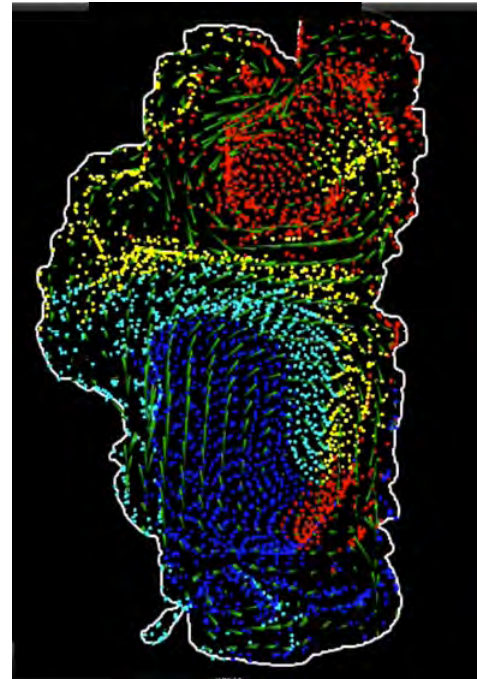
DRI’s Monica Arienzo, Zoe Harrold, Meghan Collins, Xuelian Bai, and University of Nevada, Reno undergraduate Julia Davidson are exploring these questions in two bodies of freshwater in Nevada: Lake Tahoe and the Las Vegas Wash. There have been far fewer studies in freshwater, and far fewer even in alpine lakes,” explained Collins, Education Program Manager at DRI. “This study is really well placed to identify what microplastics may be in the water, their sources, and their characteristics.”

The research team is collecting samples from four different sites in Las Vegas—one in Lake Mead and three in the Las Vegas Wash—and six sites in Lake Tahoe. Sites were selected to include areas both high and low human activity, like the Tahoe Keys with significant boat traffic and Emerald Bay State Park where human impact is low. Additional sampling was also conducted at three stormwater outfalls into Lake Tahoe in collaboration with the League to Save Lake Tahoe’s [Pipe Keepers citizen science program](#). “The sampling methods we’re using are unique,” said Arienzo, assistant research professor and project lead. “Past studies collected samples by trailing a large net from a boat or standing with it in a moving stream. Our approach is to sample and filter water in the field for microplastics using a pump, which allows us to filter upwards of 15 gallons of water in locations with still water and in places where boat access is limited.” Using a backpack, makes sampling in remote and hard to access locations more feasible,” Arienzo added. To make this novel method work, researchers place a stake with a funnel clipped to it about 20 feet from the water’s edge. The funnel, positioned on the surface of the water, is connected to tubing that runs back to the pump on shore, which draws water through the tubing and over a series of filters which can capture particles of different sizes.

### TERC Studying Circulation Patterns / Water Current Drifters

<http://terc.ucdavis.edu/research/lake-tahoe/drifters.html>

Measuring the water current at a single point provides valuable data – but only at that point. What is often important to know is how water moves all around the lake, and where it would carry pollutants or invasive species once they were in the lake. Water current drifters do that. TERC has used surface drifters attached to underwater sails (or drogues) to measure the paths that they take when carried by currents. A GPS unit in the drifter keeps track of the ever changing position, and in recent versions that data is sent to us in real-time via satellite. The drifter studies to date have revealed a lot of new information about Lake Tahoe. We know that the circulation is dominated by two main eddies or gyres. The one in north travels counterclockwise, while the one in the south moves clockwise. Smaller gyres occur at the edges of these major gyres, and they disappear and reappear depending on the winds. The first hint that Asian clams could travel across the lake from east to west in less than a day was revealed by a drogue study. Our interest is now on understanding the small gyres that run along the nearshore regions of the lake.



Funding for this research has spanned many years, with numerous sources. Funders include the US EPA, East Bay Municipal Utility District (EBMUD), SNPLMA, the UC CITRIS Program and private donors. Our newest collaboration is with the students of the Tahoe Expedition Academy in King's Beach. Together we will be monitoring the currents off the north shore of Lake Tahoe and developing a web application to show the current movements.

### Recreation Activities in The Watershed

*(\*Editor Note: There was an active proposal under consideration by LRWQCB for a pilot test of herbicides at the Tahoe Keys in 2021-22. A test project was initiated May 2022.)*

### Aquatic Invasive Species (AIS) Management and Prevention:

"A non-indigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters." (NANPCA 1990).

- If any single factor had to be identified as the most important change in the state of Lake Tahoe since 2008 - it would be the dramatic increase of Asian clams and other Aquatic Invasive Species.
- 2024 marks 15 + years of the Tahoe Boat Inspection Program, and front-line defense against new invasive species. <https://tahoeboatinspections.com>, <https://tahoeboatinspections.com/tahoe-keepers/about-ais/>
- Lake Tahoe continues to test negative for the presence of Quagga or Zebra mussels. However in fall 2023; New Zealand Mudsnaills were detected in South Lake Tahoe.

This topic is a major part of TWSA's work over the past years. Staff maintain presence on multiple working groups and provides comment during regulatory process.



### **2024 Boating Season Begins with Clean, Drain, & Dry**

May 1, 2024 - *New region-wide protocols in place to prevent the spread of New Zealand mudsnails*

Contact: [Jeff Cowen](#), Tahoe Regional Planning Agency Public Information Officer

**Lake Tahoe, Nev./Calif.** — Lake Tahoe watercraft inspection stations are open for the season to help prevent the spread of aquatic invasive species and boaters can now book an appointment for this summer online, the Tahoe Regional Planning Agency (TRPA) and the Tahoe Resource Conservation District (Tahoe RCD) announced today. With the discovery last year of invasive New Zealand mudsnails in Lake Tahoe, the agencies are urging boaters, paddlers, beachgoers, and anglers to learn how to prevent the spread of this new threat to the waters of the Lake Tahoe Region.

“Boaters can help keep the waters of the Tahoe Region safe from aquatic invasive species by arriving Clean, Drained, and Dry,” said Tom Boos, Senior Environmental Specialist at TRPA. “This is the number one way to reduce the risk of invasive species and it helps boaters get on the water faster.” Boats and trailers are one of the largest potential sources of spread of aquatic invasive species in the Western U.S. Under Lake Tahoe’s program, every motorized watercraft is inspected or decontaminated before launch, and paddle craft can opt for a free inspection at any regional inspection station. Since 2008, staff have inspected 113,000 boats for aquatic invasive species, which can have devastating environmental and economic impacts.

### **A New Invasive Species in Lake Tahoe**

In September 2023, the agencies confirmed the presence of a new aquatic invasive species in Lake Tahoe, the [New Zealand mudsnail](#). It was the first detection of a new invasive in the region since mandatory inspections began in 2008.

“Now that Lake Tahoe is a higher risk to other waterbodies, it’s up to every boater, paddler, angler, and beachgoer to ensure they’re doing their part to limit its spread, within Lake Tahoe and throughout the region,” Boos said.

TRPA and Tahoe RCD immediately responded to the New Zealand mudsnail detection last year with updated watercraft inspection protocols and public education on the location of the mudsnails and how to limit their spread. Diver surveys showed the invasive species had infested a 3-mile area of Lake Tahoe’s South Shore, according to the assessment surveys.

Unrelated to the devastating Quagga and Zebra mussel, New Zealand mudsnails are about the size of a grain of rice (2-6-mm) and can rapidly reproduce. Densities of up to 10,000 snails per square meter were measured in the lake last year. First discovered in Idaho in 1987, they are currently found in 22 states including California and Nevada, and as close as the Lower Truckee River near Reno, Nev.

## What You Can Do to Protect Lake Tahoe

- Be vigilant about Clean, Drain, and Dry.
- Heed special instructions for [boaters](#), [anglers](#), and [non-motorized users and paddlers](#).
- Paddlers can learn how to self-inspect and become a [Tahoe Keeper](#).
- Download the free Tahoe Boating App at [tahoeboating.org](http://tahoeboating.org) for an interactive map that shows location relative to the New Zealand mudsnail infestation, as well as no-wake zones, area attractions, bathrooms, and more.
- Look for mobile, solar-powered cleaning stations for kayaks, paddleboards, and canoes at popular recreation sites around the Tahoe Basin provided by the League to Save Lake Tahoe.
- Look for and support roving inspectors at popular beaches and launch ramps this summer provided by funding from the Tahoe Fund and TRPA.

*The Lake Tahoe Aquatic Invasive Species Program is implemented by 40 public and private partner organizations, including federal, state, and local jurisdictions, research partners, public utility districts, and private marinas. The Tahoe Regional Planning Agency and the Tahoe Resource Conservation District lead the program in collaboration with the public and private partners. The program's mission is to prevent, detect, and control aquatic invasive species in the Region so that future generations can enjoy Lake Tahoe. For additional information, contact Jeff Cowen, TRPA Public Information Officer, at 775-589-5278.*

## Additional Risk-Reducing Measures

In addition to advertising, billboards, and social media, program managers emphasized the new online appointment system this year by placing ads in national publications. In addition to added convenience and reduced wait times, the appointment system improves communication with boaters about the Clean, Drain, Dry message. TRPA and Tahoe RCD also joined a new, nationwide "Call Before You Haul" hotline that puts boat transporters in contact with watercraft inspectors at their destination. The measures likely reduced the number of detections, according to the agencies.

"Strengthening partnerships and adding innovations increases efficiency and further reduces the threat to Tahoe," TRPA Aquatic Resources Program Manager Dennis Zabaglo said. "Our collaborative approach and focus on helping boaters are part of the reason Lake Tahoe's program has become a model program in the nation."

Zabaglo has represented the Lake Tahoe Watercraft Inspection Program to congressional and state legislative bodies and as Chair of the Western Regional Panel on Aquatic Nuisance Species. He was also recently named to a blue-ribbon commission to develop policy solutions to prevent and reverse the spread of AIS in the U.S.

The national recognition has helped attract additional funding to the region. Earlier this year, the U.S. Fish and Wildlife Service announced a cooperative agreement with TRPA to fund high-priority Lake Tahoe Aquatic Invasive Species Program projects, including removal of Eurasian watermilfoil, public outreach and education, and investments in permanent inspection stations. A total of \$17 million from the Bipartisan Infrastructure Law will be available over the next five years, with \$3.4 million in the first year. The U.S. Fish and Wildlife Service is also engaging the Washoe Tribe of California and Nevada to support Tribal leadership and involvement in the Lake Tahoe program.

### **Permanent Inspection Stations**

Equipment upgrades and infrastructure improvements, such as securing permanent inspection stations, are also important to the program's success, according to Tahoe RCD's Kilian. Since 2010, inspectors have annually set up and broken down three to five regional inspection stations, each requiring separate permits and agreements with landowners. "Pursuing permanent inspection stations can maximize efficiency of the program and build the long-term reliability and sustainability of boat inspections," Kilian said.

The new federal funding along with funding from the State of Nevada is helping TRPA design the basin's first permanent station at Spooner Summit, Nev. near the location of the current inspection site. The agency is investigating opportunities for the Meyers, Calif. inspection station as well. In 2008, TRPA and Tahoe RCD began a large-scale, mandatory, lake-wide campaign to educate and boaters on the AIS threat to Lake Tahoe and provide mandatory inspection of boats by trained inspectors before launching at public and private ramps.

Boat inspections are conducted at off-site locations in the summer at key entrance points to the Tahoe Basin. It is mandatory to undergo inspection off-site, then proceed with an intact seal from the inspection site before launching from a ramp at Lake Tahoe. Ramps are gated and locked when inspectors are not present. Boaters pay a sliding scale fee annually, based on boat size and type, to defray costs on the inspection program. Decontamination is provided off-site if the inspector determines a high level of risk. Boats are cleaned with 140 degree F water and chlorine solution. Significant federal and state grant funding has supported the inspection program to date.

Fallen Leaf Lake, located adjacent to Lake Tahoe, maintains its own inspection program. Any trailered boat wanting to launch at the Fallen Leaf Lake Marina must have a green Fallen Leaf Lake inspection seal in order to launch. Boats without an inspection seal or those with a Lake Tahoe inspection seal will be required to get an inspection and decontamination

In 2011, voluntary inspections were more stringently implemented in California areas just outside the Tahoe Basin, at Donner Lake and Boca/Stampede Reservoirs. This program is coordinated and staffed by Tahoe RCD.

### **A New Invasive Species in Lake Tahoe 2023**

<https://www.trpa.gov/new-zealand-mudsnail/>

In September 2023, Tahoe agencies confirmed the presence of a new aquatic invasive species in Lake Tahoe, the [New Zealand mudsnail](#). It was the first detection of a new invasive in the region since mandatory inspections began in 2008. his [fact sheet](#) explains what you need to know right now. Following rapid response protocols under the federally approved Lake Tahoe Aquatic Invasive Species Management Plan, an Incident Team has been established comprised of staff from the Tahoe Resource Conservation District (Tahoe RCD) and Tahoe Regional Planning Agency (TRPA).

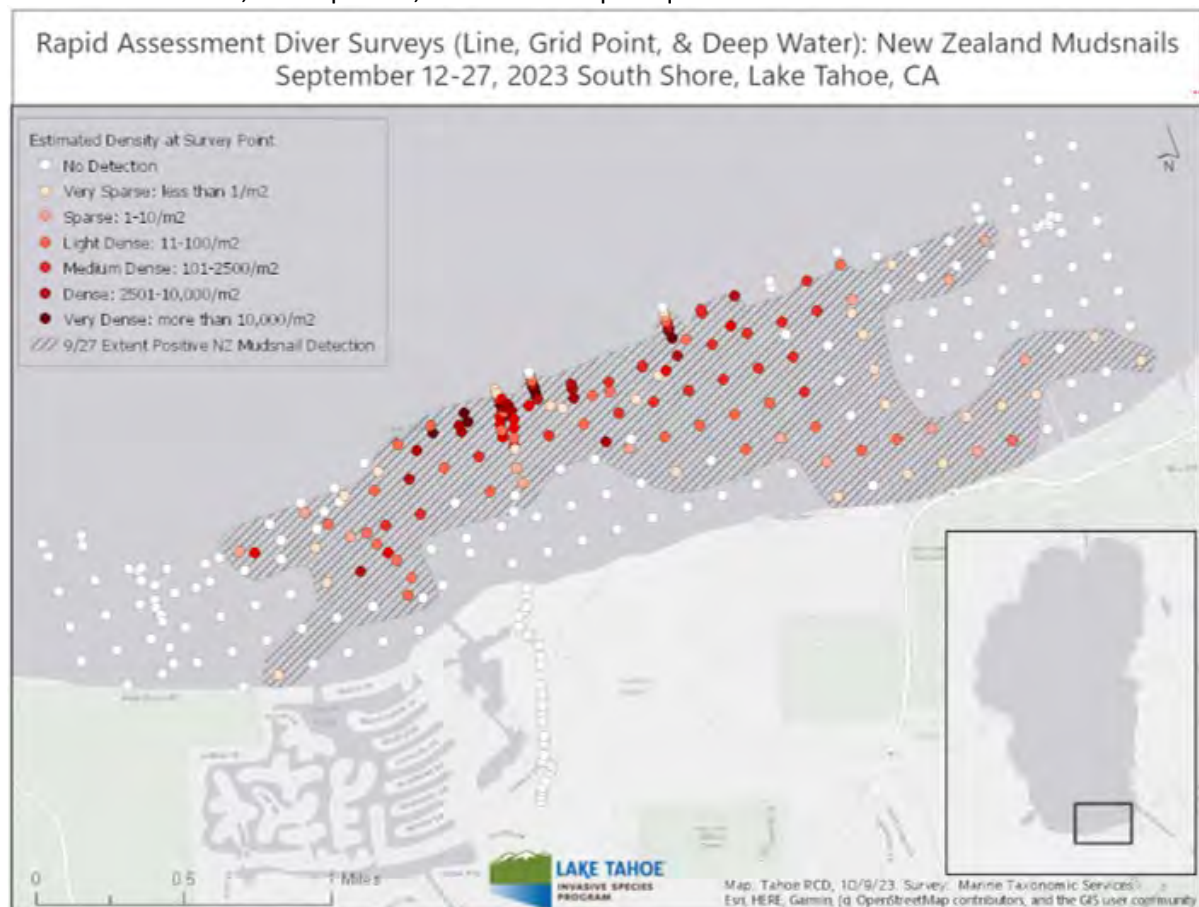
The Lake Tahoe Aquatic Invasive Species Program includes comprehensive monitoring of Lake Tahoe for aquatic invaders. Contract divers with Marine Taxonomic Services, Ltd. surveying invasive weeds on the South Shore of Lake Tahoe discovered tiny snails on the bottom of the lake nearly a half mile offshore from the mouth of the Upper Truckee River. Consultation with experts and a DNA lab analysis confirmed the species is New Zealand mudsnail.



Aquatic invasive species are a national problem. When a non-native species is introduced into a waterbody, they can outcompete native species and impair natural habitats and water quality. New Zealand mudsnails are an invasive species first discovered in North America in the Snake River, Idaho in 1987. They are now found in 22 states including California and Nevada and as close as the Lower Truckee River near Reno. Due to their hardiness, very small size, and ability to rapidly reproduce, they are able to colonize new waters quickly. New Zealand mudsnails are about the size of a grain of rice (2-6-mm).

The Incident Team is in the information gathering stage. Because the snails are known to inhabit nearby waters, it is likely they were introduced from travel between them. Invasive species can be carried on boats, fishing gear, paddle craft, life vests, and beach toys, according to the national [Stop Aquatic Hitchhikers!](#) campaign.

As of October 14, 2023 lake-wide surveys have not detected New Zealand mudsnails in other areas of the lake beyond where they were first seen. Further survey of area shows the invasive species has infested a 3-mile area of South Shore, shown on the map below. The density of mudsnails ranges across the infestation area, with up to 10,000 mudsnails per square meter measured in a few areas.



### 2013 Detection of New Zealand Mud Snails in lower Truckee River

New Zealand mud snails (NZMS) were detected near Reno in the lower Truckee River in spring 2013.

<http://www.ktvn.com/story/22410534/new-zealand-mud-snails-invading-truckee-river>

After the initial detection in 2013 of New Zealand Mudsnails in the Truckee River, Nevada Department

of Wildlife (Chris Crookshanks) conducted a survey of the river from the CA/NV state line to some point east of Reno. Unfortunately, they found quite a few of the invasive mudsnails. In some locations, the densities were relatively high; however, it should be noted that they were not doing formal counts, just noting presence or absence. (Source: Pers. comm. T. Crimmens, TAHOE RCD). In Nevada, NZMS occur in the Salmon Falls Creek drainage, Beaver Dam State Park, Lake Mead National Recreation Area and the Lower Colorado River, Maggie Creek and a small portion of the Humboldt River near Carlin, NV.

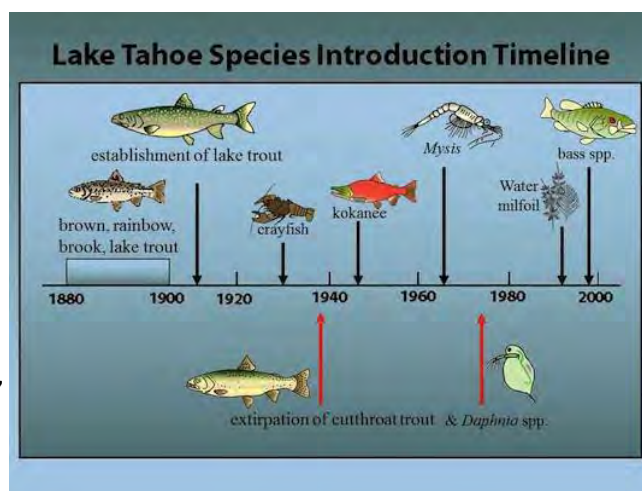
## 2015 - Lake Tahoe Aquatic Invasive Species Implementation Plan

[http://tahoercd.org/wp-content/uploads/2015/08/Implementation-Plan-AIS-Final-7\\_31\\_2015.pdf](http://tahoercd.org/wp-content/uploads/2015/08/Implementation-Plan-AIS-Final-7_31_2015.pdf)

### Additional AIS Resources at:

<http://tahoercd.org/tahoe-aquatic-invasive-species-resources/>

In July 2015, the *Implementation Plan for the Control of Aquatic Invasive Species within Lake Tahoe* by Marion E. Wittmann, Ph.D. & Sudeep Chandra, Ph.D. (University of Nevada Reno), written in collaboration with the Lake Tahoe Aquatic Invasive Species Coordination Committee, was released.



### Excerpts from the Summary are below:

Substantial changes to the economy, water quality, aesthetic value, and recreational pursuits are currently occurring in part due to the unwanted impacts of aquatic invasive species (AIS).

In 2009 and again in 2014, the Aquatic Nuisance Species Task Force (ANS Task Force), an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species, approved a Lake Tahoe Region Aquatic Invasive Species Interstate Management Plan (LTAIS Management Plan). The LTAIS Management Plan identifies threats and quantifies economic damages posed by AIS, develops management strategies for AIS in the Tahoe Basin, and supports one of the nation's most rigorous recreational boat inspection programs.

Through the development of this implementation plan, seven aquatic invasive species groups were determined under guidance from the LTAIS Management Plan and the AISCC. These groups include: warm water fishes (various species), plants (Eurasian watermilfoil, curlyleaf pondweed), invertebrates (Asian clam, mysid shrimp, signal crayfish), and an amphibian (American Bullfrog).

A comprehensive history of the invasion of each of these species and the control actions taken to date within the Tahoe Basin and elsewhere was provided. Using this information, as well as information from the peer-reviewed published literature, an assessment of the feasibility of management actions for each of species group was provided. Feasible management actions were qualified into three classifications:

Feasible control actions	Potential control actions	No feasible control options at this time
<ul style="list-style-type: none"> <li>Eurasian watermilfoil</li> <li>Curlyleaf pondweed</li> <li>Warm water fish</li> </ul>	<ul style="list-style-type: none"> <li>Signal crayfish</li> <li>American bullfrog</li> </ul>	<ul style="list-style-type: none"> <li>Mysid shrimp</li> <li>Asian clam</li> </ul>

An ecologically-based framework was used to determine a site prioritization for aquatic invasive plants and warm water fish in the Tahoe Basin.

Other factors of major significance concerning the control of AIS such as suitability of the receiving habitat, proximity to sensitive native species, or potential impact of control actions on the surrounding environment are vital components of site selection, but are not included in this model due to lack of available data. Sites with the highest prioritization included the Tahoe Keys (East and West). These sites received the highest priority largely as a result of the immensity of nuisance aquatic plant infestations, as well as the intensity or recreational boater visitation. Other highly prioritized sites included Meeks Bay, Ski Run Marina and Channel, and Lakeside Marina and swim area.

Emerald Bay was not highly prioritized for immediate control action because of recent successful efforts to remove all Eurasian watermilfoil biomass. This site is indicated as a priority for post-treatment surveillance monitoring. At present, only non-chemical methods are allowed for the control of all AIS in Lake Tahoe. This is due to the special status designation for Lake Tahoe and States of California and Nevada with rules\* prohibiting the use of chemical additions to the watershed.

Suggestions are provided for all AIS considered in this document for immediate implementation actions, the development of future control strategies or technologies, and the consideration of chemical control methods, where appropriate.

Major knowledge gaps identified include the need for:

- A consistent lake-wide surveillance program with central data storage,
- Efficacy monitoring associated with each management action taken,
- Development of specific metrics to quantify the success of the overall AIS management/implementation program at Tahoe, and
- As a majority of the AIS considered here are nearshore species, an integration of the Tahoe AIS management program with the Lake Tahoe Nearshore Management plan.

Recommendations for "next steps" include a call for the development of: a nearshore surveillance and monitoring program, metrics to evaluate the progress of AIS control actions carried out in the lake, a research plan to address data gaps, the exploration or development of new strategies or technologies for the control of AIS in Lake Tahoe, and an alignment of available resources with the priorities recommended in this implementation plan.

#### **2020 Update:**

[https://tahoercd.org/wp-content/uploads/2020/02/TahoeAISActionAgenda\\_v5.0\\_2September2019\\_reducedsize.pdf](https://tahoercd.org/wp-content/uploads/2020/02/TahoeAISActionAgenda_v5.0_2September2019_reducedsize.pdf)

Details follow in later in this section.

Summary: The Lake Tahoe Region Aquatic Invasive Species (AIS) Management Plan (2014) and Implementation Plan for the Control of Aquatic Invasive Species within Lake Tahoe (2015) document the substantial negative changes occurring to Lake Tahoe as a result of the introduction and expansion of aquatic invasive species (AIS).

To address this issue, the California Tahoe Conservancy initiated an effort in 2018 to support the development of short- and long-term management targets and a set of specific actions to control AIS in the Lake Tahoe Region. The Conservancy contracted with Creative Resource Strategies, LLC to conduct a

regional stakeholder survey and interviews, and then work with the Lake Tahoe AIS Coordinating Committee to develop a 10-year Action Agenda and complementary Investment Strategy.

Results of the Lake Tahoe Region stakeholder survey and interviews validated support for a comprehensive and aggressive AIS program, the projection that it will take 5–10 years to achieve AIS goals in the Region, the reality that a full complement of control methods will likely be needed to achieve AIS goals, and recognition that everyone has a role to play in monitoring, detecting, controlling, and funding AIS efforts. This Action Agenda proposes to implement a well-funded, comprehensive, robust, simultaneous, science-based, and aggressive suite of aquatic invasive species (AIS) actions through the next decade to reduce the economic, environmental, and social effects of AIS in the Lake Tahoe Region.

The Agenda describes a 10-year (2021–2030) two-phased effort.

Phase 1 (2021–2025) aggressively treats and controls AIS throughout the Region for five consecutive years while containing AIS and completing environmental documents and AIS control testing specific to the Tahoe Keys. Phase II (2026–2030) focuses efforts on reducing aquatic invasive plants and invasive fish in the Tahoe Keys (implementing the outcomes of the environmental assessment and testing processes occurring through 2025), while continuing to maintain, reduce, or when possible, eradicate AIS in other parts of the Lake Tahoe Region such that they minimize detrimental effects to ecosystem function.



Published by the Tahoe Regional Planning Agency – Oct. 2021

Invasive weeds were first spotted in the Tahoe Keys decades ago. These weeds were not native to Tahoe, and they had no natural competition. They quickly grew and spread, generating a vicious cycle of growth and die back that feeds further expanding growth with each year.

#### Why are weeds choking the Tahoe Keys?

The shallow, warm water in the Tahoe Keys create favorable conditions for the growth of aquatic weeds. Scientists collected over a million data points in 2019 to learn more about weed growth in the Tahoe Keys. The results show that the majority of nutrients that spur weed growth come from the weeds themselves.

- The weeds get nutrients from the deep bottom layer of muck that has accumulated from decades of weed decomposition.
- This weed dieback happens annually and continues to accumulate vast amounts of decomposing weed substrate.
- Some of the nutrients from decaying plants are also released into the water where they can stimulate harmful algal blooms (HABs).

#### What else affects weed growth in the Tahoe Keys?

- Studies show that stormwater runoff contributes approximately 10% of the nutrients that drive weed growth.
- The Tahoe Keys Property Owner Association (TKPOA) and partners are implementing measures to reduce stormwater runoff and improve water quality including:
  - Ban on fertilizers containing phosphorus.
  - Installation of best management practices (BMPs) that capture and treat stormwater.
  - Homeowner, property manager, and landscape contractor education.
  - Water quality monitoring.
  - Enforcement.

Eliminating all nutrients from stormwater runoff could not address the far more significant source of nutrients coming from the weeds themselves and the decomposing muck layer.

#### What is being done to control weeds in the Tahoe Keys?

- TKPOA uses harvesters to remove weeds, but it cannot keep up with rapid weed growth.
- Innovative weed control methods such as Laminar flow aeration, and Ultraviolet light, bubble curtains, and bottom barriers are also being tested.
- The Tahoe Keys Control Methods Test focuses on finding what combination of control methods will make the biggest impact on controlling the weeds.

Learn more at [Tahoekeysweeds.org](https://Tahoekeysweeds.org)



## **Boating: Aquatic Invasive Species - Potential Importation of Quagga/Zebra Mussels & Spread of Existing AIS**

Watercraft are the largest source for spreading Aquatic Invasive Species (AIS) into new waterways. Inspections are an essential part of preventing this inadvertent transport of alien species into the pristine waters of Lake Tahoe. Invasive species have devastating environmental and economic impacts on industries, communities and native species populations. Most invasive species do not have predators to keep their populations in balance and, once introduced, are difficult, if not impossible, to eradicate.

Mandatory watercraft inspections can stop aquatic invasive species, such as Quagga mussels, BEFORE they enter the water. Inspectors are looking for any plant or animal, dead or alive, that may pose a risk to Lake Tahoe and the surrounding waters. Tahoe has one of the strictest programs in the nation.

Primary species of concern include:

- Zebra and Quagga mussels
- New Zealand mudsnails
- Spiny waterflea
- Hydrilla and other highly invasive plants, some of which are already present in California and/or Nevada waters

Boat transport is one method of transport for aquatic invasive weeds within Tahoe. The Tahoe Keys is attempting education and control of fragment transport with a boat backup station installed onsite. Compliance is sporadic however.

There is new information that the spread of Asian Clams is affected by ballast water draw and release at Tahoe. A very small, new population at Sand Harbor receive bottom barrier treatment in summer 2017. There is new outreach to boaters to fill up ballast water at least a mile from shore, to mitigate the transport of Asian Clam veligers in the ballast water.

From the State of the Lake Report 2017 (pg.6.17):

The Nevada Division of State Lands has commenced a project to control the emergence of a satellite population of Asian clams adjacent to the boat ramp at Sand Harbor State Park, Nevada. While Asian clams are now widespread along the southern shore of Lake Tahoe, their recent appearance at one of the most scenic locations on the north shore would seem puzzling. A multi-agency boat inspection program prevents new invasive species from entering the lake from outside. The currents in the lake are such that the rapid transport from south to north is inconceivable.

The most likely scenario is that Asian clams are now being transported within Lake Tahoe by boats. The boating activity that seems to have the greatest potential for this is wakeboarding. A boat outfitted for wakeboarding would typically fill its ballast tanks with up to 600 gallons of water. If this water happened to be drawn from a clam infested area in summer, it is very possible that veligers (the larval offspring) would also be drawn in. At the end of a fun day, if the ballast tanks were emptied at a different, clam-free area, then in-lake transport would have occurred.

Two obvious actions can prevent this accelerated spread from occurring. First, all filling and emptying of ballast tanks should take place at least one mile from shore. The deep waters there are less likely to contain veligers, and any would invariably sink to the cold depths where they cannot reproduce. Secondly, it would be extremely prudent to require that all ballast tanks be equipped with filters that can effectively remove all particulate material.



**What are Quagga and Zebra mussels & how many waterbodies are known to be infested with them?**

Quagga (*Dreissena bugensis*) and Zebra (*Dreissena polymorpha*) mussels are destructive aquatic invasive species that grow to about 1 inch in diameter. They can be larger than 1 inch or they can even be microscopic. They reproduce quickly and in large numbers. Once established, eradication is often difficult or impossible. The small, freshwater bivalve mollusks are triangular with a ridge between the side and bottom. It has black, cream or white bands, and often features dark rings on its shell almost like stripes. Quagga and Zebra mussels are native to the Ukraine and Russia. Zebra mussels were first discovered in the Great Lakes in 1988, and a year later, Quagga mussels were discovered in the same area. It is believed they arrived in America via ballast water discharge that contained their free swimming larva called veligers. Since 2007, these species have been found in Lake Mead, Lake Havasu, the Colorado River drainage and other significant and also small western U.S. water bodies.

**What is the environmental impact of the Quagga and Zebra mussel?**

Quagga and Zebra mussels will upset the food chain by consuming phytoplankton that other species need to survive. They are filter feeders that consume large portions of the microscopic plants and animals that form the base of the food web. One adult mussel can filter up to 1 liter of water per day. Their consumption of significant amounts of phytoplankton from the water decreases zooplankton and can cause a shift in native species and a disruption of the ecological balance of entire bodies of water. In addition, they can displace native species, further upsetting the natural food web. Quagga and Zebra mussels have few natural predators in North America. It has been documented that several species of fish and diving ducks have been known to eat them, but these species are not an effective control. In some cases, the mussels concentrate botulism toxin causing bird die offs.

**What is the economic impact of the Quagga and Zebra mussel?**

A recent study by the U.S. Army Corps of Engineers estimates a mussel invasion could cost Tahoe's tourism economy more than \$22 million per year. Quagga and Zebra mussels can colonize on hulls, engines and steering components of boats and other recreational equipment. If left unchecked, the mussels can damage boat motors and restrict cooling. They also attach to aquatic plants and submerged sediment and surfaces such as piers, pilings, water intakes and fish screens. In doing this they can clog water intake structures hampering the flow of water. They frequently settle in massive colonies that can block water intake and threaten municipal water supply, agricultural irrigation and power plant operations. U.S. Congressional researchers estimated that an infestation of the Zebra mussel in the Great Lakes area cost the power industry \$3.1 billion in the (1990s) period, with an economic impact to industries, businesses and communities of more than \$5 billion. California could spend hundreds of millions of dollars protecting the state's water system from a Quagga/Zebra infestation.

**Quagga Mussel and AIS Impacts to Nevada's Waters**

[http://www.ndow.org/uploadedFiles/ndoworg/Content/Boat/Aquatic\\_Invasive\\_Species/AIS-Threats-Nevada-Waters.pdf](http://www.ndow.org/uploadedFiles/ndoworg/Content/Boat/Aquatic_Invasive_Species/AIS-Threats-Nevada-Waters.pdf)

Nevada currently has a variety of AIS inhabiting waterways. Other species of concern are purple loosestrife, tamarisk, Eurasian milfoil, curlyleaf pond weed, didymo (alga), Asian clams, Asian carp, common carp, New Zealand mud snail, tilapia, and various aquarium fish.

Some economic impacts for Nevada AIS include:

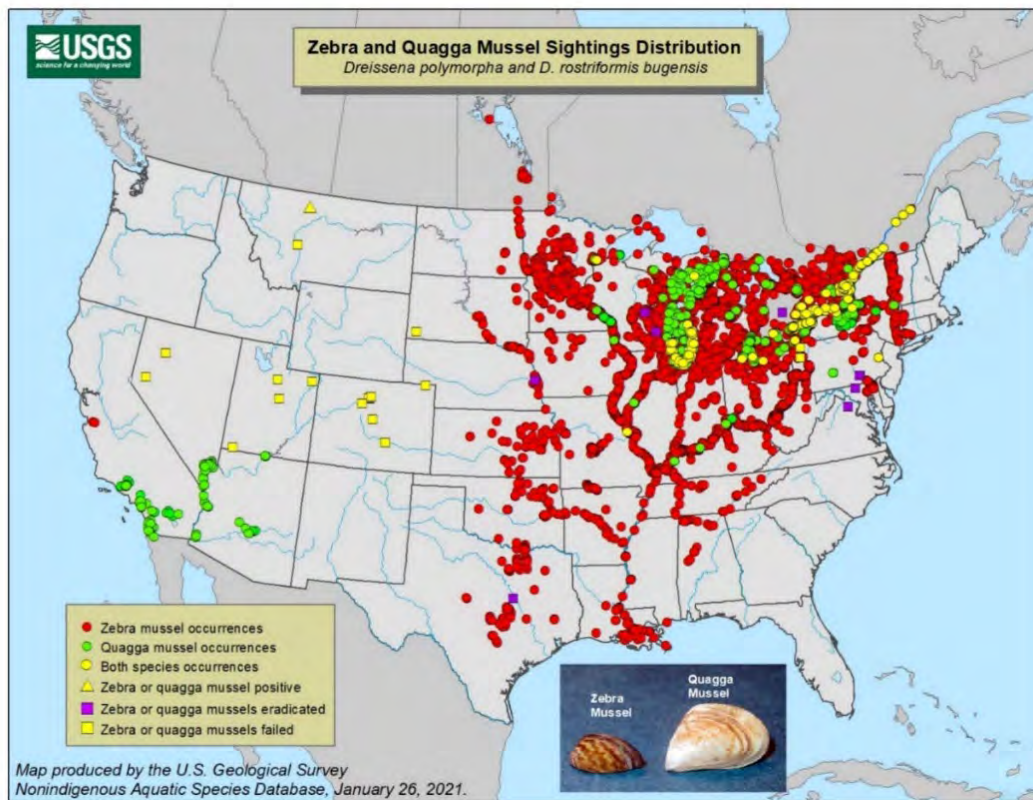
- \$1 million year Hoover Dam annual budget for Quagga mussel control (BOR Per. Comm. 2011)
- \$172,600 annually for chlorination additions at Southern Nevada Water Authority: removal of Quagga's from one drinking water intake tunnel \$340,000: routine maintenance and removal \$6,000: proposed chemical control \$560,000: research on the invasion \$300,000 (SNWA Per. Comm. 2011).

- \$3-5 million to retrofit the water filtration system at NDOW's Lake Mead Fish Hatchery due to Quagga infestation.

The discovery of Quagga mussel contamination in Lake Havasu, Lake Mead, and the Colorado River Basin created an emergency need in 2008 for the Tahoe area to address prevention. Recent studies (by researchers at TERC/UC Davis/UNR) indicate the survivability potential is real for these species if introduced to Lake Tahoe. If established at Lake Tahoe; Quagga mussels or Zebra mussels could cause profound changes to the alpine lake's sensitive ecosystem. The mussels could clog water intakes, cover boats and piers, and litter pristine beaches with sharp shells and decaying, reeking biomass.

A map of mussel detections is available at:

[http://nas.er.usgs.gov/taxgroup/mollusks/ZebraMussel/maps/southwest\\_Quagga.pdf](http://nas.er.usgs.gov/taxgroup/mollusks/ZebraMussel/maps/southwest_Quagga.pdf)



### Nevada Boat Inspections

[http://www.ndow.org/Boat/Aquatic Invasive Species](http://www.ndow.org/Boat/Aquatic_Invasive_Species)

Under the direction provided in Assembly Bill 167 by the Nevada State Legislature in 2011, NDOW was provided authority to implement an Aquatic Invasive Species (AIS) Prevention Program. The goals of the program are to prevent the spread of AIS threatening Nevada's waterways and to prevent new introductions of AIS. Implementation of the program includes the development and approval of AIS regulations, seasonal inspection and decontamination stations, monitoring, coordination with stakeholders and government entities, and AIS prevention education and outreach for the public. The program is funded through collection of an AIS watercraft decal and federal assistance grants. In 2014, NDOW began watercraft inspection stations seasonally at Lahontan Reservoir, Rye Patch Reservoir, and Wildhorse Reservoir.

In Nevada, Zebra mussels are not currently present; however, Lake Mead National Recreation Area discovered Quagga mussels in Boulder Basin in 2007. Since that time, the mussels have spread throughout the lower Colorado River system. With the exception of Lake Mead National Recreation Area and the lower Colorado River, adult mussels have not been found in Nevada, however, in April 2011, Lahontan and Rye Patch Reservoirs in Northern Nevada tested positive for the presence of Quagga mussel veligers (larvae). Subsequent sampling since that time has not found any veligers or adult mussels. These water-bodies are within a few hours' drive of Lake Tahoe.

### **TWSA Involvement**

TWSA has been involved in the Aquatic Invasive Species and Boat Inspection process/working group since the threat of AIS emerged in the region as a major concern in 2007. TWSA staff provides ongoing education and outreach to the public at local events, on the threat these species pose to drinking water quality. In summer 2009, 25 large format aluminum signs with Quagga mussel information were sponsored by TWSA for installation at public access points. These signs are still on location.

The **Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG)** is a diverse group of agencies, community members and scientists dedicated to early detection and rapid response, prevention and control of aquatic invasive species in the Tahoe Basin. TWSA staff became actively involved in working with TRPA and Tahoe RCD as a member of the working group, focusing on the AIS inspection program protocols, public education and outreach.

This group conducts research in the Tahoe Keys, Emerald Bay and Lake Tahoe. More information about these projects is included later in this report.

### **TRPA Ordinances Regarding Invasive Species**

In October 2008, the TRPA Governing Board revised the TRPA Code of Ordinances to prohibit the transportation of invasive species. TRPA Code of Ordinances, Chapter 79.3 contains regulations relating to the prevention of invasion by aquatic invasive species.

Invasive species are defined in the TRPA Code as:

*...species, both aquatic and terrestrial, that establish and reproduce rapidly outside of their native range and may threaten the diversity or abundance of native species through competition for resources, predation, parasitism, hybridization with native populations, introduction of pathogens, or physical or chemical alteration of the invaded habitat. Through their impacts on natural ecosystems, agricultural and other developed lands, water delivery and flood protection systems, invasive species may also negatively affect human health and/or the economy. Aquatic invasive species shall include but not be limited to: Zebra mussel (*Dreissena polymorpha*), Quagga mussel (*Dreissena bugensis*), Eurasian water milfoil (*Myriophyllum spicatum* L.), curlyleaf pond weed (*Potamogeton crispus* L.), and large mouth bass (*Micropterus salmoides*).*

**TRPA Code of Ordinances, Chapter 79.3 A - Relates to the transport, introduction and launching of watercraft that is contaminated with aquatic invasive species:** *Prohibition: The transport or introduction of aquatic Invasive Species into the Lake Tahoe Region is prohibited. Further, the launching of any watercraft contaminated with Aquatic Invasive Species into the waters of the Tahoe Region is prohibited.*

TRPA Code of Ordinances, Chapter 79.3. B - Makes it mandatory to submit to the inspection of watercraft prior to launching when an inspector is present, makes decontamination mandatory when the watercraft is judged by an inspector to be contaminated, and closes boat launching facilities when an AIS inspector is not present:

- 1) *An owner operator of a Boat Ramp or other Boat Launch Facility (exclusive of single family residences) shall close the ramp or facility to launching of watercraft at all times when the provisions of subsection (2) have not been or cannot otherwise be provided or met.*
- 2) *All watercraft, motorized and non-motorized, including but not limited to boats, personal watercraft, kayaks, canoes and rafts, shall be subject to an inspection prior to launching into the waters of the Lake Tahoe Region to detect the presence, and prevent the introduction, of Aquatic Invasive Species. An inspection under this section is valid only if performed by a trained inspector pursuant to Tahoe Regional Planning Agency standards and requirements for Aquatic Invasive Species inspections.*
- 3) *All watercraft inspected in subsection (2) shall be subject to decontamination if determined necessary by an inspection under 79.3 B (2). A watercraft shall launch only if the required decontamination is performed and completed by a trained individual pursuant to TRPA standards and requirements for Aquatic Invasive Species decontamination and launch is authorized by a trained inspector pursuant to*
- 4) *TRPA's standards and requirements for Aquatic Invasive Species Inspections.*
- 5) *All watercraft inspected in compliance with subsection (2) and decontaminated in compliance with subsection (3) are subject to a fee to pay for the inspection and/or decontamination and other program costs.*

#### **Tahoe Resource Conservation District (Tahoe RCD) Invasive Species Program**

The Invasive Species Program at the Tahoe Resource Conservation District is divided into the Terrestrial Invasive Weed and Aquatic Invasive Species sub-programs, which focus on the removal and abatement of terrestrial and aquatic invasive species. The Tahoe RCD is the coordinator for the Lake Tahoe Basin Weed Coordinating Group and the Lake Tahoe Aquatic Invasive Species Working Group. These working groups are comprised of diverse agencies and community members dedicated to protecting the Lake Tahoe Basin from invasive species through education, research, prevention, early detection, rapid response, and control.

#### **Aquatic Invasive Species Sub-Program**

The Tahoe RCD Aquatic Invasive Species (AIS) Program was formed after the January 2007 discovery of Quagga mussels in Lake Mead, Lake Havasu, and the Colorado River Basin. The AIS Program serves as chair for the Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG). Funding received from the Bureau of Reclamation for the removal and monitoring of aquatic weeds in Emerald Bay and Ski Run Marina supported some of the program's first efforts.

The AIS Program has grown extensively since 2007, following the Lake Tahoe Aquatic Invasive Species Working Group mission. The group is working to prevent new introductions into Lake Tahoe such as Quagga and Zebra mussels, and performs monitoring, research, control, and removal of existing invasive species. This requirement has put the Tahoe RCD in the spotlight for coordination of the Watercraft Inspection Program at Lake Tahoe. LTAISWG partners are continuing research of aquatic invasive species in Lake Tahoe to better support resource management decisions in the Tahoe Basin.

### Lake Tahoe's Boater APP

<https://tahoeboatinspections.com/trpa-releases-app-designed-to-help-boaters-paddlers-navigate-lake-tahoe/> <https://tahoeboatinspections.com/news-updates>

Boaters and paddlers trying to navigate Lake Tahoe's expansive blue waters have a new tool to help in their travels. The Tahoe Regional Planning Agency recently announced the release of the new Tahoe Boating app designed to inform boaters and paddlers about Lake Tahoe, no-wake zone boundaries, area attractions, and responsible recreation. The app, according to TRPA, includes interactive mapping, giving boaters real-time location and direction of travel on the lake. Location information allows boaters to see their position in proximity to Lake Tahoe's no-wake zones which requires boaters to stay under 5 mph within Emerald Bay, 600 feet of shore, 100 feet of swimmers and paddlers, and 200 feet of structures.



Boaters and paddlers can download the free Tahoe Boating app from either the Apple or Android stores or at [tahoeboating.org](http://tahoeboating.org). The app includes:

- An interactive map that shows a boat's location relative to no-wake zones.
- Information about boating safety, aquatic invasive species, and emergency contacts.
- Locations of fuel stations and bathrooms.
- Lake Tahoe points of interest including detailed information and photos.

Tahoe RCD coordinates Lake Tahoe's Watercraft Inspection Program by providing qualified inspectors at designated inspection stations, offering technical support for private launches, trainings, and decontamination of watercraft. The Watercraft Inspection Program was implemented in 2008.

In 2014, **Tahoe RCD finalized the CEQA lakewide permit** for invasive species projects.

[http://tahoercd.org/wp-content/uploads/2014/07/CEQA\\_Final\\_Env\\_Doc\\_Lakewide\\_AIS\\_Project\\_SIGNED.wAttachments.pdf](http://tahoercd.org/wp-content/uploads/2014/07/CEQA_Final_Env_Doc_Lakewide_AIS_Project_SIGNED.wAttachments.pdf)

**In 2020, this was updated.** TWSA had no significant comments on the plan. [https://tahoercd.org/wp-content/uploads/2020/08/TRCD\\_AIP\\_NOI\\_Availability.pdf](https://tahoercd.org/wp-content/uploads/2020/08/TRCD_AIP_NOI_Availability.pdf)





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P.O. Box 5310  
Stateline, NV 89449-5310  
Phone: (775) 586-4547  
[www.trpa.org](http://www.trpa.org)

USDA Forest Service  
Lake Tahoe Basin Management Unit  
35 College Drive  
South Lake Tahoe, CA 96150  
Phone: (530) 543-2000  
[www.fs.usda.gov/ltbmu](http://www.fs.usda.gov/ltbmu)

Tahoe Resource Conservation  
District  
870 Emerald Bay Road, #108  
South Lake Tahoe, CA 96150  
Phone: (530) 543-1501  
[www.tahoercd.org](http://www.tahoercd.org)

## NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION/OPPORTUNITY TO COMMENT ON DRAFT ENVIRONMENTAL ASSESSMENT

August 14, 2020

To: California State Clearinghouse  
California Responsible and Trustee Agencies  
Interested Parties and Organizations

Nevada State Clearinghouse  
Cooperating Agencies

Action: Tahoe Resource Conservation District Lake-Wide Control of Aquatic Invasive  
Plants Project – Lake Tahoe, California and Nevada

**Project Summary:** The Tahoe Resource Conservation District (Tahoe RCD), Tahoe Regional Planning Agency (TRPA), and USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU) have directed the preparation of a joint environmental document for the Lake-Wide Control of Aquatic Invasive Plants (AIP) Project. The document is an Initial Study (IS) for Tahoe RCD pursuant to the California Environmental Quality Act (CEQA); an Initial Environmental Checklist (IEC) for TRPA pursuant to the Tahoe Regional Planning Compact, Code of Ordinances, and Rules of Procedure; and an Environmental Assessment (EA) for the LTBMU prepared pursuant to the National Environmental Policy Act (NEPA).

Tahoe RCD, on behalf of the Tahoe Aquatic Invasive Species Coordination Committee (AISCC), and in coordination with the TRPA, is proposing to conduct aquatic plant control and management throughout suitable habitat areas within the Lake Tahoe Region including the Lake itself, tributaries, and adjacent marshes of Lake Tahoe and the Upper Truckee River and Truckee River as they flow into and out of Lake Tahoe. The Project intends to continue aquatic invasive plant control efforts in locations where previous efforts have been successful, expand control efforts to include known infestation areas, expand available methods/techniques, and to allow for rapid response to detections of new aquatic invasive plant (AIP) infestations.

Suitable habitat is present in Lake Tahoe within the City of South Lake Tahoe and El Dorado and Placer counties in California and Carson City, Washoe, and Douglas counties in Nevada. Within this large project area, several control sites have been identified for potential control methods based on existing knowledge of AIP presence.

## LAKE-WIDE CONTROL OF AQUATIC INVASIVE PLANTS PROJECT LAKE TAHOE, CALIFORNIA AND NEVADA

CEQA Initial Study / Mitigated Negative Declaration

TRPA Initial Environmental Checklist / Mitigated Finding of No Significant Effect

NEPA Environmental Assessment / Finding of No Significant Impact



Prepared for:  
Tahoe Resource Conservation District  
Tahoe Regional Planning Agency  
USDA Forest Service -  
Lake Tahoe Basin Management Unit

Prepared by:  
Hauge Brueck Associates, LLC

August 2020

**Public Review and Comment:** The Draft IS/IEC/EA is available for public review and comment until September 16, 2020. The document is available for review at the following agency websites:

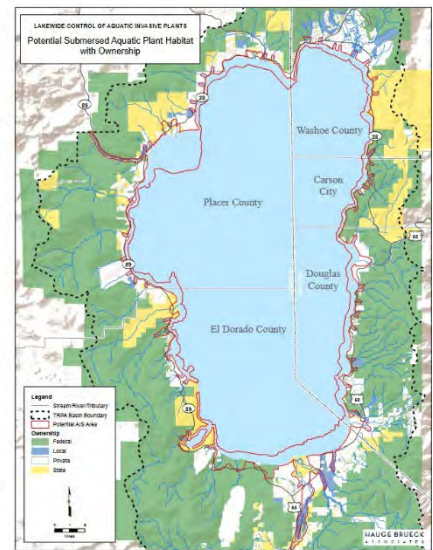
<https://www.trpa.org/document/projects-plans/>  
<https://go.usa.gov/xmgxT>  
<https://tahoercd.org/tahoe-aquatic-invasive-species-resources/>

Tahoe RCD will maintain and be responsible for the handling of public comments submitted in connection with this notice. Written comments may be mailed to Tahoe RCD, Attn: Mollie Hurt, 870 Emerald Bay Road, #108, South Lake Tahoe, CA 96150 or emailed to [mhurt@tahoercd.org](mailto:mhurt@tahoercd.org). Personal contact information is optional. However, only individuals or entities who have submitted their name, address, email and phone number (if available) with their substantive comments will be eligible to file an objection later regarding this project with the USDA Forest Service LTBMU (36 CFR 218.5). Please also note your comments and contact information will be considered part of the USDA Forest Service's public record and may be available for public inspection.

### NEPA Comment

**Process:** This project will be subject to 36 CFR 218 Project-level Pre-decisional Administrative Review Process (Parts A and B). Pursuant to 36 CFR 218.25, comments on the Lake-Wide Control of Aquatic Invasive Plants Project will be accepted for 30 days beginning on the first day after the date of publication of the legal notice in the Tahoe Daily Tribune newspaper.

Only individuals or entities (as defined by 36 CFR 218.2) who submit timely and specific written comments about this proposed project during this or another public comment period established by the Responsible Official will be eligible to file an objection later in the process. It is the commenter's responsibility to ensure timely receipt of comments (36 CFR 218.25). Other eligibility requirements are defined by 36 CFR 218.25.



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## Veliger Monitoring Program

In 2010, a veliger monitoring program was initiated by the Tahoe Regional Planning Agency, with assistance from the Tahoe RCD. Veligers are the larval stage of bivalve mollusks which includes Quagga and Zebra mussels, two potential invaders of Lake Tahoe. Monitoring is an essential element to ensure that the Watercraft Inspection Program has been effective in preventing Quagga and Zebra mussels from establishing populations in Lake Tahoe. Ten locations are surveyed biweekly from late June until the end of September; the eight locations in Lake Tahoe include Elks Point, Tahoe Keys, Emerald Bay, Meeks Bay, North Tahoe Marina, Sand Harbor, Obexers Marina, and Cave Rock along with Fallen Leaf Lake and Echo Lake. Sampling consists of eight vertical plankton tows at each site. The samples are then sent to a laboratory to be analyzed. All of the samples to date have returned with no Zebra or Quagga mussel veligers present.

## Tahoe RCD Boat Inspection Program – other lakes, other programs

The Tahoe RCD's Lake Tahoe Watercraft Inspection Program had another successful season of protecting Lake Tahoe, Fallen Leaf and Echo Lake from the introduction of new aquatic invasive species. Inspections were performed at our five inspections locations. Approximately 15,000 boats are inspected annually. Since the addition of convenient off-highway locations enabled boaters to receive their watercraft inspections and decontaminations when entering the Lake Tahoe Basin, marinas and boat launches were freed up from being the busiest locations for inspections. This prevention effort also includes a more rigorous non-motorized watercraft inspection and education (The Tahoe Keepers Program) process at ramp facilities, US Forest Service kiosks and Fallen Leaf Lake. Paddlers were also educated about self-inspecting and decontaminating canoes, kayaks and paddleboards.

## Tahoe RCD Aquatic Invasive Weeds Control Program

<https://tahoercd.org/our-work/aquatic-invasive-species/>

Beginning in 2005, the Tahoe RCD has been directly involved with over 30 non-chemical, aquatic invasive weed control projects. These projects represent treatment of almost 30 acres of invasive weeds.

## Emerald Bay weed eradication

After several years of manual treatments, in 2013, weeds were completely eradicated from California State Parks' Emerald Bay. Intensive treatment always included use of all three control methods (barriers, suction removal, and hand removal) in combination to remove all visible plants in a discrete treatment site. Maintenance treatment involved follow-up removal of all recolonizing plants in a discrete treatment site after initial intensive treatment. Barriers were not necessary for maintenance removal. No maintenance removal was necessary in 2015; there were no NI plants detected in Emerald Bay.

Year	Location	Biomass (gallons)	Biomass (Cubic Yards)	Suction Removal Area (sf)	Barrier Area (sf)	Total Treatment (sf)	Total Treatment (acres)	Treatment Density Class
2005	Emerald Bay - Avalanche Beach	238	1.18	2,000		2,000	0.05	high
2006	Emerald Bay - Avalanche Beach	1258	6.23	12,000		12,000	0.28	high
2007	No Weed Removal	0	0.00	0	0	0	0.00	very low
2008	Emerald Bay - Parson's Rock		0.00		500	500	0.01	high
2009	Emerald Bay - Avalanche Beach		0.00		400	400	0.01	high
2009	Emerald Bay - Parson's Rock		0.00		10,000	10,000	0.23	high
2009	Emerald Bay - Vikingsholm Swim Beach	360	1.78	3,600	0	3,600	0.08	high
2010	Elk Point Marina	60	0.30	14,000	0	14,000	0.32	high
2010	Emerald Bay - Vikingsholm Swim Beach	303	1.50	4,000	8,500	12,500	0.29	moderate
2010	Emerald Bay - Parson's Rock	101	0.50	2,000	0	2,000	0.05	high
2010	Lakeside Marina	2020	10.00	40,000	0	40,000	0.92	high
2011	Emerald Bay - Avalanche Beach	217.5	1.08	132,000	13,200	145,200	3.33	moderate
2011	Emerald Bay - Parson's Rock	262.5	1.30	34,000	7,000	41,000	0.94	high
2011	Emerald Bay - Vikingsholm Swim Beach	150	0.74	96,250	1,200	97,450	2.24	low
2011	Tahoe Keys	0	0.00	0	17,200	17,200	0.39	high
2012	Emerald Bay - Avalanche Beach	560	2.77	82,000	44,000	126,000	2.89	moderate
2012	Emerald Bay - Parson's Rock	30	0.15	8,700	0	8,700	0.20	low
2012	Emerald Bay - Vikingsholm Swim Beach	2	0.01	1,750	0	1,750	0.04	very low
2012	Tahoe Keys	0	0.00	0	14,075	14,075	0.32	high
2012	Lakeside Beach	277	1.37	12,200	68,400	80,600	1.85	high
2012	Lakeside Marina	2890	14.31	0	35,720	35,720	0.82	high
2012	Ski Run Channel	11527	57.07	71,840	65,360	137,200	3.15	high
2013	Emerald Bay - Avalanche Beach	146.25	0.72	20,075	28,800	48,875	1.12	moderate
2013	Emerald Bay - Mouth of Eagle Creek	26.25	0.13	14,000	0	14,000	0.32	moderate
2013	Emerald Bay - Parson's Rock	5	0.02	36,750	0	36,750	0.84	very low
2013	Emerald Bay - Parson's Rock North	7	0.03	1,000	0	1,000	0.02	moderate
2013	Emerald Bay - Vikingsholm Swim Beach	2.5	0.01	31,500	0	31,500	0.72	very low
2013	Lakeside Beach		0.00	29,550	43,200	72,750	1.67	moderate
2013	Ski Run Channel	6831	33.82	115,956	19,080	135,036	3.10	high
2013	Tahoe City Dam	0	0.00	0	0	0	0.00	high
2013	Truckee River	0	0.00	0	0	0	0.00	high
2013	Mouth of Taylor Creek	200	0.99	0	0	90,000	2.07	moderate
2013	Mouth of Tallac Creek	990	4.90	0	0	26,000	0.60	moderate
2014	Emerald Bay	15	0.07	450	0	450	0.01	low
2014	Truckee River	3200	15.84	6,425	0	6,425	0.15	high
2014	Dam - Truckee River	0	0.00	0	18,400	18,400	0.42	high
2014	Crystal Shores East	0	0.00	0	10,400	10,400	0.24	moderate
Totals		31679.00	156.85	772,046	405,435	1,293,481	29.69	



## KEEP INVASIVE MOLLUSKS OUT OF LAKE TAHOE: CLEAN, DRAIN, AND DRY YOUR BOAT EVERY TIME

### Invasive Aquatic Mollusks:



#### Asian Clam (*Corbicula fluminea*)

**Size:** 1 to 1 1/2 inches (25 to 40 mm)

**Food:** These clams filter particles suspended in water, including bacteria, algae, and detritus.

**Preferred Habitat:** silt, sand, and gravel in near-shore areas from approximately 10 to 30 feet (4 to 10 m)

**Primary Means of Introduction:** intentional release of aquarium clams, angler bait dumping, microscopic larvae transferred via un-drained boats

**Already present in South Lake Tahoe**

Photo Credit: U.S. Geological Survey, Florida Integrated Science Center



ZEBRA MUSSEL

QUAGGA MUSSEL

#### Zebra Mussels (*Dreissena polymorpha*) and Quagga Mussels (*Dreissena bugensis*)

**Size:** 1/4 to 1 1/2 inches (5 to 40 mm)

**Food:** These mussels filter particles suspended in water, including bacteria, algae, and detritus.

**Preferred Habitat:** hard substrate from 10 to 200 feet (4 to 60 m)

**Primary Means of Introduction:** Adults attach to watercraft and fishing gear, and microscopic larvae are transferred in water of un-drained boats.

Currently **not present in Lake Tahoe**; however, quagga mussels were recently discovered in Lake Mead. Please **clean, drain, and dry** your fishing gear and watercraft. **Both mussels have devastating impacts on aquatic ecosystems.**



#### New Zealand Mudsnails (*Potamopyrgus antipodorum*)

**Size:** Small! 1/10 to 1/5 inch (2 to 6 mm)

**Food:** periphyton (algae)

**Preferred Habitat:** silt, sand, cobble, and aquatic vegetation at depths from 13 to 130 feet (4 to 40 m)

**Primary Means of Introduction:** attached to watercraft and fishing gear, larvae in water of un-drained watercraft

Currently **not present in Lake Tahoe**, but have invaded many areas of the West. Please help to keep these invaders out of Lake Tahoe! More information on how to prevent the spread of New Zealand Mudsnails is available from the California Department of Fish and Game: <http://www.dfg.ca.gov/invasives/mudsnail/>

Photo Credits: R. Draheim, Portland State University Center for Lakes and Reservoirs

### Invasive species cause serious economic and ecological damage to aquatic ecosystems.

The Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG) is currently working to prevent invasions in Lake Tahoe. The public is invited to attend meetings and encouraged to volunteer!

For more information, please go to <http://www.tahoercd.org/AquaticInvasives.php>, or contact the Tahoe Resource Conservation District (TRCD) at 530-543-1501, ext. 113

## Invasive Aquatic Plants of Lake Tahoe



#### Eurasian Water-milfoil (*Myriophyllum spicatum* L.)

**Characteristics:** long underwater stems, feathery foliage, tolerant to shallow and deep waters, distinguished from native milfoil by threadlike leaflets usually found in pairs of more than 14

**Primary Means of Introduction:** native to Europe and Asia, present in much of the United States and Canada, spread from lake to lake by boat trailers and aquarium dumping, has been spreading around Lake Tahoe for 15-20 years

**Problems:** impedes water flow, disrupts navigation, inhibits recreational activities, decreases water quality, reduces plant diversity

**Management:** physical (hand pulling, harvesting, cutting) and mechanical control

**Prevention:** clean all vegetation off boats and equipment

**Established communities present in Lake Tahoe. Current management techniques controlling populations; eradication is not achievable.**

Photo credit: Robert Johnson, Cornell University; Ruthanna Hawkins, Cayuga Lake Watershed Network



#### Curly Leaf Pondweed (*Potamogeton crispus* L.)

**Characteristics:** submersed aquatic plant with oblong blue-green leaves that have very wavy margin, reproduces by turions (see inset)

**Primary Means of Introduction:** native to Eurasia, Africa, and Australia; has begun to expand rapidly in Lake Tahoe over the past three years; primarily has spread in warm, shallow waters (such as marinas)

**Problems:** impedes water flow, disrupts navigation, inhibits recreational activities, decreases water quality, reduces plant diversity

**Management:** physical (hand pulling, harvesting, cutting) and mechanical control

**Prevention:** clean all vegetation off boats and equipment

**Established communities present in Lake Tahoe. Current management techniques controlling populations; eradication is not achievable.**

Photo credit: Three Lakes Council, South Salem, New York  
Photo credit (inset): Leslie J. Melisoff, University of Connecticut

Eurasian water milfoil and curly leaf pondweed populations are highly concentrated in the South basin, near the Tahoe Keys area, with smaller populations throughout the lake. Both plants currently dominate the submersed aquatic plant community, causing increased nutrient pumping from sediment (a cause of decreased water clarity).

The Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG) is currently working to prevent the spread of invasive species in Lake Tahoe. The public is invited to attend LTAISWG meetings and is encouraged to volunteer!

For more information about aquatic invasive species, please go to <http://www.tahoercd.org/index.php/TSP/aquatic>

## Native Aquatic Plants of Lake Tahoe



#### Andean Milfoil (*Myriophyllum quintense*)

**Characteristics:** feather-like submersed leaves in whorls of two to four, blue-green emergent leaves, tiny flowers (0.7mm-1.2mm long) with four petals located at base of emergent leaves, may form multiple flower stalks, often flowers in August or September (later than most other milfoils)

**Importance:** provides habitat of aquatic animals and stabilizes sediment

Photo credit: Jennifer Parsons, Washington State Department of Ecology



#### Canadian Waterweed commonly known as Elodea (*Elodea canadensis*)

**Characteristics:** submersed leaves are bright green, translucent, oblong, 6-17 mm long and 1-4 mm broad; small white or pale purple flowers float at the surface

**Importance:** provides good habitat for many aquatic invertebrates and cover for young fish and amphibians

Photo credit: Christian Fischer



#### Coontail (*Ceratophyllum demersum*)

**Characteristics:** floats freely below the surface, no roots, 0.5-4 cm long leaves are forked into 2 flattened segments; leaves often somewhat stiff, leaves arranged in whorls of 5 to 12, tiny submersed green flowers present from June through September

**Importance:** provides habitat plant for young fish, small aquatic animals, and aquatic insects

Photo credit: Clayton Antenn, Washington State Department of Ecology



#### Leafy Pondweed (*Potamogeton foliosus*)

**Characteristics:** linear leaves that are 2-10 cm long and 1-2.5 mm wide, fibrous roots emerging from threadlike rhizomes, flowers have 2-4 whorls on an initially crowded spike (1 cm)

**Importance:** seeds and vegetation provide cover and food for aquatic animals

Photo credit: Clayton Antenn, Washington State Department of Ecology

## Lake Tahoe Region AIS Action Agenda 2021–2030

[https://www.trpa.org/wp-content/uploads/TahoeAISActionAgenda\\_Final.pdf](https://www.trpa.org/wp-content/uploads/TahoeAISActionAgenda_Final.pdf)

Lake Tahoe is an Outstanding National Resource Water renowned for its extraordinary clarity and blue color. Climate change effects, the millions of people that visit the Lake Tahoe Region annually, and aquatic invasive species (AIS) amplify existing and predicted stressors on Lake Tahoe aquatic ecosystems. Enhancing resilience to these and other stressors is needed to mitigate detrimental effects to ecosystems, the local economy, and the public.

To address the introduction and expansion of AIS to Lake Tahoe, the California Tahoe Conservancy initiated an effort to develop short- and long-term management targets and a set of specific actions to control AIS in the Lake Tahoe Region.

This Action Agenda implements a well-funded, comprehensive, robust, simultaneous, science-based, and aggressive suite of AIS control actions through the next decade to reduce the economic, environmental, and social effects of AIS in the Lake Tahoe Region.

The Agenda describes a 10-year (2021–2030) two-phased effort.

Phase 1 (2021–2025) aggressively treats and controls AIS throughout the Region for five consecutive years while containing AIS and completing AIS control planning for the Tahoe Keys.

Phase II (2026–2030) focuses efforts on reducing aquatic invasive plants and invasive fish in the Tahoe Keys while continuing to maintain, reduce, or eradicate AIS in other parts of the Lake Tahoe Region.

The Action Agenda reflects a 272% increase in pace and scale relative to current efforts at a cost of \$7.4 million annually for ten years.

Implementation will result in:

- 90% reduction to eradication of invasive plants in nearshore and upstream areas and the Tahoe Keys;
- 90% reduction in invasive fish biomass in priority areas;
- Reduction of aquatic invasive invertebrates and amphibians in regions of the lake and upstream areas;
- Effective Early Detection Rapid Response actions through the creation of an emergency invasive species fund;
- Strategic investment in new technologies and methodologies to monitor and control AIS; and
- Enhanced likelihood of recovering the Endangered Species Act-listed Lahontan Cutthroat Trout.

### EFFORT AND OUTCOME-BASED AQUATIC INVASIVE SPECIES PERFORMANCE METRICS

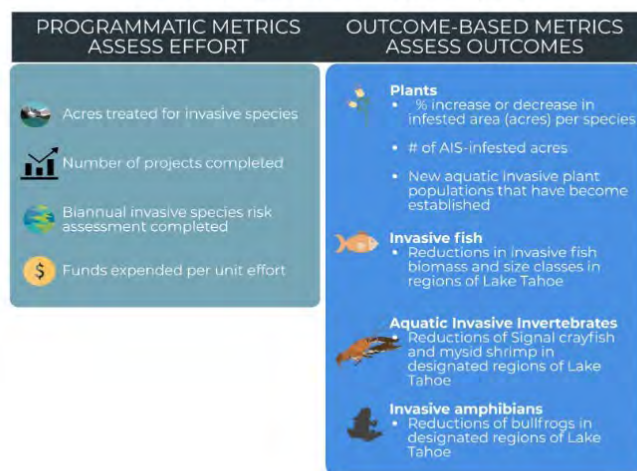


Figure 2. Programmatic and outcome-based metrics to evaluate progress of AIS control efforts in the Region.



## 2019-30 Summary of Tahoe AIS Sites and Associated Treatment

<https://tahoercd.org/wp-content/uploads/2020/05/Final-ISND-IEC-TIF-clean-with-App-A.pdf>

Table 1A. Categories and priorities of AIS locations and species for control efforts, 2019-2030. Sites in Tiers 1 and 2 in which no active treatment is occurring are undergoing planning for future treatments as well as containment to avoid spread. The species listed were documented as present, not necessarily locations where controls/treatments are ongoing, or have occurred.

Habitat Categories: M = Marsh; MR = Marina; E = Embayment; O = Open Water; T = Tributary; U = Upland Ponds

Species Categories: EWM = Eurasian Watermilfoil, CLP = Curlyleaf Pondweed, IF = Invasive fishes, AC = Asian Clams

► Table 1A. Aquatic Invasive Plants

Category	Location	Habitat	2015 IP Priority	2019 Action Agenda Category	Species	Status of Infestation	Estimated Acreage of Infestation	% Cover	Acreage of Infestation Prior to Treatment	Area Surveyed (Acres)
Tier 1	Meeks Creek	T	3	A	EWM, IF	Active treatment 2019	3		3	3.5
	Pope Marsh	M		A	EWM	Active treatment 2019	<1		<1	125
	Tahoe Keys Main Lagoon (CA)	MR, E	1,2	A	EWM, CLP, IF	Planning, testing, containment	172		172	172
	Tahoe Keys Channels Complex	O	1,2	A	EWM, CLP, IF	Planning, testing, containment	10		Unknown	175
	Taylor and Tallac Creeks (CA)	M	8	A	EWM, CLP, IF	Planning, containment	8		n/a	10
	Upper Truckee Marsh (CA)	M		A	EWM, IF	Planning, containment	3		3	5
	Upper Truckee River	T	18	A	EWM, CLP, IF	Planning, containment	1.25 (0.25 CLP, 1 EWM)		n/a	11
	Edgewood Creek and Pond Complex (NV)	U		B	EWM, CLP, IF	Planning, containment	10		n/a	20
	Lakeside Beach (CA)	O	12	B	IF	Active treatment 2019	1.5			2
	Lakeside Marina (CA)	MR	6	B	EWM, CLP, IF	Active treatment 2019	1		3	1
	Ski Run Marina (CA)	MR	4	B	EWM, CLP, IF	Planning, containment	0.5		n/a	0.5
	Ski Run Channel (CA)	O	4	B	EWM, CLP, IF	Planning, containment	3.5		n/a	5

► Table 1A. Aquatic Invasive Plants (continued)

Category	Location	Habitat	2015 IP Priority	2019 Action Agenda Category	Species	Status of Infestation	Estimated Acreage of Infestation	% Cover	Acreage of Infestation Prior to Treatment	Area Surveyed (Acres)
Tier 1	Baldwin Beach (offshore)	O		C	EWM, CLP, IF	Active treatment 2019	0.25		0.25	20
	Camp Richardson Pier	O	18	C	EWM, IF	Active treatment 2019	0.25		0.25	6
	Elk Point Marina	MR	15	C	EWM, CLP, IF	Active treatment 2019	0.5		0.5	0.75
	Timber Cove Pier	O	14	C	EWM, CLP, IF	Active treatment 2019	0.25		0.25	1
Tier 2	Burke Creek (NV Beach)	T			EWM	Active treatment 2019	0.1		0.1	0.5
	Elk Point and Round Hill shoreline structures	E			EWM	Active treatment 2019	3		3	18
	General Creek	T			EWM	Active treatment 2019	0.1		.1	.25
	Logan Shoals Marina	MR	17		EWM	Planning, containment	1.75		1.75	2
	Lower Truckee River below dam	T			EWM	Active treatment 2019	17		20	25
	Regan Beach	O	7			2—not surveyed in 2018	0.1		0.1	10
	Sand Harbor	E			AC	Active treatment 2019	22		6	25
	Tahoe Beach Club (NV beach)	T			EWM	Active treatment 2019	0.3		0.3	0.5
	Wavoka Estate Marina	MR			EWM	Active treatment 2019	0.1		0.1	0.25



Table 1B includes more detailed information about the AIS treatments that will be occurring in the two years prior to the launch of the Action Agenda. Note: Sites treated in 2019 either are treated again in 2020, or are designated as EDRR sites if they have received treatments the prior two years.

► Table 1B. 2019–2020 AIS Treatments.

Tier	Location	2019 Treatment Acreage	2020 Treatment Acreage	Species	Notes:
1	Pope Marsh	<1	<1	EWM	
	Lakeside Marina	1	1	EWM, CLP	
	Lakeside Beach		1	EWM, CLP	
	Meeks Marina and Creek	3	3	EWM	
	Baldwin Beach	0.25	EDRR	EWM, CLP	
	Camp Richardson Pier	0.25	EDRR	EWM, CLP	
	Elk Point Marina	0.5	0.5	EWM, CLP	
	Timber Cove Pier	0.25	EDRR	EWM, CLP	
2	Ski Run Marina		Planning treatment	EWM, CLP, IF	
	Elk Point and Round Hill rock cribs shoreline	3	EDRR	EWM	
	General Creek	0.1	EDRR	EWM	
	Lower Truckee River below dam	17	17	EWM	Funding to treat after 2020 currently does not exist.
	Sand Harbor			Treatment for Asian Clams	
	Tahoe Beach Club (NV beach)	0.3	EDRR	EWM	
	Burke Creek (NV beach)	0.1	EDRR	EWM	
	Wavoka Estate Marina	0.1	0.1	EWM	

► Table 1A. Aquatic Invasive Plants (continued)

Category	Location	Habitat	2015 IP Priority	2019 Action Agenda Category	Species	Status of Infestation	Estimated Acreage of Infestation	% Cover	Acreage of Infestation Prior to Treatment	Status
EDRR Sites	Boatworks/Tahoe City Marina	MR	18	All of these sites are priority sites for EDRR.	IF	no plants present 2018	0		unknown	
	Crystal Shores East (NV)	MR			EWM, IF	surveillance mode	0		0.5	
	Crystal Shores Villas (NV)	MR			EWM, IF	surveillance mode	0		0.5	
	Crystal Shores West (NV)	MR	9		EWM, IF	surveillance mode	0		n/a	
	Emerald Bay, Avalanche Beach, Vikingsholm, and Parson's Rock	O			EWM, CLP, IF	surveillance mode	<0.1		6	
	Fleur du Lac Marina	MR			EWM	surveillance mode	0		0.5	
	Glenbrook	O			EWM	surveillance mode	0		0.1	
	Nevada Beach	O	16			no plants present 2018	0		unknown	
	Star Harbor	MR/E				surveillance mode	0		unknown	
	Sunnyside Marina	MR	18		IF	no plants present 2018	0		unknown	
	Tahoe City Dam	O/T			EWM, IF	surveillance mode	<0.1		0.2	
	Tahoe Tavern	O	13			no plants present 2018	0		unknown	
	Tahoe Vista boat ramp	MR			EWM	surveillance mode	0		0.2	

### 3.21.1 Cumulative Setting

Table 3.20-1 provides a list of cumulative projects that could occur simultaneously with implementation of the proposed program.

Table 3.20-1 Cumulative Projects List

Project Name	Location	Description	Project Status
UV Light Pilot Control Project	Tahoe Keys, Lakeside Marina and Lakeside Beach	Involves use of ultraviolet-C light to damage the DNA and cellular structure of invasive plants.	2019-2020
2014 Lake Tahoe Aquatic Invasive Plant Control Implementation Project	Lake Tahoe, marinas, Truckee River	Uses various control methods to treat aquatic invasive plants.	Ongoing, funding dependent
Lake-wide Control of Aquatic Invasive Plant Project Lake Tahoe, California and Nevada with new methods proposed	Lake Tahoe, marinas, Truckee River	Uses various control methods to treat aquatic invasive plants.	Environmental review currently in progress
Truckee River Eurasian Watermilfoil Removal	Truckee River	Map and implement control efforts to remove Eurasian watermilfoil.	Ongoing, funding dependent
Asian Clam Control and Removal	Sand Harbor	Includes installation of rubber bottom barriers and use of diver assisted suction removal.	Ongoing, funding dependent
Veliger monitoring	Fallen Leaf Lake, Elks Point, Tahoe Keys, Emerald Bay, Meeks Bay, North Tahoe Marina, Sand Harbor, Obexers Marina, Cave Rock, and Echo Lake.	Involves monitoring for larva of bivalve mollusks using plankton tows.	Ongoing, seasonal annual monitoring
Ski Run Marina Aquatic Invasive Plant Control Pilot Project	Ski Run Marina	Uses laminar flow aeration to determine efficacy of aquatic invasive plant control.	Ongoing

Tahoe Resource Conservation District/Tahoe Regional Planning Agency  
Target Invasive Fish Control Program at Lake Tahoe IS/ND and IEC/FONSI

3-103

Source: Compiled by Ascent Environmental 2019

Project Name	Location	Description	Project Status
Tahoe Keys Aquatic Weed Control Methods Test	Tahoe Keys Lagoons and Marina	Would involve use of three different types of herbicides followed by a maintenance period using non-chemical control methods. It would also involve use of laminar flow aeration.	Environmental review in progress.
General Creek Aquatic Plant Control Project	General Creek	Surveillance monitoring and removal of Eurasian watermilfoil.	Ongoing
Meeks Bay Aquatic Invasive Species Plant Control and Monitoring Project	Meeks Bay Marina	Removal of Eurasian watermilfoil and monitoring.	Ongoing
Taylor and Tallac Ecosystem Restoration Project, Phase I	Tallac and Taylor Creek	Restore ecological processes and functions by eradicating/controlling aquatic invasive species.	No current activities
Baldwin Beach Eurasian Watermilfoil Removal Project	Offshore Baldwin Beach	Surveillance monitoring and removal of Eurasian watermilfoil.	Ongoing
Pope Marsh Eurasian Watermilfoil Removal Project	Pope Marsh	Surveillance monitoring and removal of Eurasian watermilfoil.	Ongoing
Camp Richardson Eurasian Watermilfoil Removal Project	Camp Richardson	Surveillance monitoring and removal of Eurasian watermilfoil.	Ongoing
Upper Truckee River and Marsh Restoration Project	Upper Truckee River and Marsh	Restore Upper Truckee Marsh and remove the sailing lagoon. Invasive species control for Eurasian watermilfoil and curly-leaf pondweed will be implemented.	Ongoing
Timber Cove Eurasian Watermilfoil Removal Project	Timber Cove	Surveillance monitoring and removal of Eurasian watermilfoil.	Ongoing
Nevada Shoreline Aquatic Invasive Plant Control	Wavoka Estates rock crib	Removal of Eurasian watermilfoil followed by surveillance monitoring.	Ongoing
	Tahoe Beach Club	Removal of Eurasian watermilfoil followed by surveillance monitoring.	Ongoing
	Burke Creek	Removal of Eurasian watermilfoil followed by surveillance monitoring.	Ongoing
Elk Point Eurasian Watermilfoil Removal Project	Elk Point Rock Crib	Removal of Eurasian watermilfoil followed by surveillance monitoring.	Ongoing
Elk Point Marina Aquatic Invasive Plant Control Project	Elk Point Marina	Removal of Eurasian watermilfoil and curlyleaf pondweed populations in Elk Point Marina followed by surveillance monitoring.	Ongoing

**2015 Truckee River Aquatic Plant Control Project** [http://tahoeboatsinspections.com/wp-content/uploads/2015/08/2015\\_08\\_14\\_TruckeeRiverAISControl.pdf](http://tahoeboatsinspections.com/wp-content/uploads/2015/08/2015_08_14_TruckeeRiverAISControl.pdf)

### Crystal Shores (Incline Village, NV) East Milfoil Barrier Project 2014-2017

<https://spark.adobe.com/page/rRkQODQzhBBHa>

2017 update: all weeds have been eradicated using bottom barriers and hand removal.

The homeowners association of Crystal Shores East in Incline Village stepped up in 2014, to remove invasive weeds from their marina by partnering with local experts. An infestation of approximately 10,000 square feet of Eurasian watermilfoil (*Myriophyllum spicatum*) was crowding out their marina. Eurasian watermilfoil is a submerged aquatic plant that grows in still or slow-moving water and reproduces mainly by fragmentation. It was first discovered in Lake Tahoe in the late 1990's on the South shore of Lake Tahoe. Over the years, small fragments of this plant have made their way across the 22 miles of famous blue waters and established new colonies. The Tahoe RCD and Crystal Shores East Homeowners Association combined public and private dollars to treat this satellite population of aquatic invasive weeds, with financial support from the Nevada Division of State Lands. Treatment for this location includes a combination of bottom barriers and diver assisted hand removal. "Bottom barriers," sheets of synthetic material, are used to block sunlight and inhibit the plants from photosynthesis, were placed on the infestation. Diver follow up included hand pulling.



## Tahoe RCD Truckee Regional Aquatic Invasive Species Prevention Program 2012 Final Report

[http://tahoercd.org/wp-content/uploads/2013/06/TRAISPP\\_Annual\\_Report\\_2012.pdf](http://tahoercd.org/wp-content/uploads/2013/06/TRAISPP_Annual_Report_2012.pdf)

Since 2010, the Tahoe Resource Conservation District (TAHOE RCD) has coordinated with local partners in the Middle Truckee River Watershed (outlet of Lake Tahoe to the California state line) to implement the Truckee Regional Aquatic Invasive Species Prevention Program (TRAISPP). The principle objectives of this pilot program were to better understand invasive species issues in the region, provide outreach and education on invasive species, organize regional resource managers, evaluate usage patterns, and evaluate the feasibility of watercraft inspections and decontaminations. The geographical scope of coordination has extended through the entire Truckee River watershed, from Lake Tahoe to Pyramid Lake. The degree of coordination and cooperation among partner agencies underscores the importance and need for regional management efforts.

Program waterbodies: Donner Lake / Stampede Reservoir / Independence Lake / Boca Reservoir / Webber Lake Prosser Reservoir / Martis Creek Lake / Lake of the Woods.

### Tahoe Keepers

<http://tahoekkeepers.org>

<http://tahoebotinspections.com/tahoe-keepers/>

In 2011, this online, non-motorized boat education/inspection program was launched. Tahoe Keepers, the outreach initiative targeted at paddlers, has been able to raise awareness to approximately 1500 people annually.

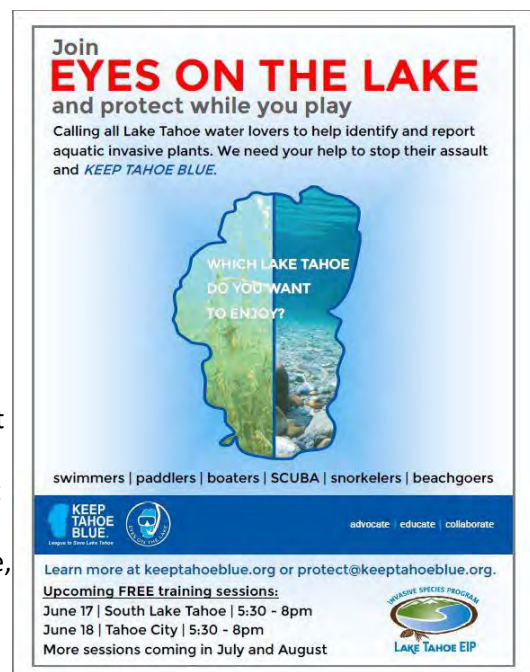
The League to Save Lake Tahoe helped to plan and implement the outreach and education portions of the Tahoe Keepers stewardship program. Funds came from the Lake Tahoe Quagga Mussel Prevention Fund, which the League formed in conjunction with the Tahoe Lakefront Owners Association.

[TahoeKeepers.org](http://TahoeKeepers.org) provides video training on how to properly clean, drain and dry watercraft and gear and dispose of any plants or debris away from lakes and streams. Preventing invasive species is an important part of protecting Lake Tahoe's shoreline beauty.

### Eyes on the Lake (EOL)

<http://keptahoeblue.org/our-work/eyes/>

Eyes on the Lake is the League to Save Lake Tahoe's newest volunteer program helping to prevent the spread of aquatic invasive plants in Tahoe's waters. If you are a water lover at Tahoe (SCUBA diver, paddler, swimmer, beachgoer, or boater) and want to help ensure Tahoe's waters are pristine, then Eyes on the Lake is for you. Volunteers will learn how to identify plants in the classroom and in the field.





The two main targets of our Eyes on the Lake program are curlyleaf pondweed and Eurasian watermilfoil, which are already established in several locations throughout the lake and are difficult and expensive to control. These weeds clog recreation equipment, degrade shoreline beauty, and impede views of the lake's bottom. Milfoil is a common aquarium plant that was first introduced to the Tahoe Keys decades ago. It has now spread to dozens of locations throughout Tahoe by hitching a ride on boats.

A certified Eyes on the Lake volunteer receives training to:

- Identify aquatic invasive plants;
- Complete simple surveys while you are enjoying Tahoe's waters, and report what you find;
- Provide information to the Lake Tahoe Aquatic Invasive Species Program that can result in early detection of new infestations and more effective treatment.
- If you see something suspicious while out on the water report what you find to the Aquatic Invasive Species Hotline at (888) 824-6267.

### Tahoe Pipe Keepers

<http://keptahoeblue.org/our-work/Pipekeepers>

Tahoe Pipe Keepers is a volunteer based water quality monitoring program that examines the turbidity (clarity) of the water being released from storm drains into Lake Tahoe and tributaries. Since the program's launch in October 2012, a dedicated group of volunteers have braved the elements, during and after storm events to collect water samples, take photos and raise awareness about the impact of storm drains on lake and river waters.

To date, Pipe Keepers volunteers have collected over 2,000 water samples from 33 pipes around Lake Tahoe. There are over 170 stormwater outfalls that dump stormwater runoff directly into Lake Tahoe.

Fine sediment particles are smaller than the width of a human hair and can remain suspended in Lake Tahoe for years, even decades, degrading its deepwater clarity. Sources of fine sediment include road traction abrasives (road sands) that are applied to our streets and highways in the winter; dirt and pollutants from streets, parking lots and neighborhoods; and even degradation of roads and other surfaces. All this material washes into storm drains during rain storms and snowmelt and pollutes the Lake.



## Filamentous Algae Blooms (FABs)

### Hazardous Algae Bloom (HABs)

<https://www.unr.edu/nevada-today/news/2021/worldwide-lakes-decline>

Many of the world's most iconic clear lakes are degrading at an alarming rate – shallow, nearshore lake bottoms are being carpeted by bright green fronds of slimy algae, especially during the summer. These filamentous algal blooms, known as FABs, need lots of light, so they occur at lake edges where people want to swim and play.

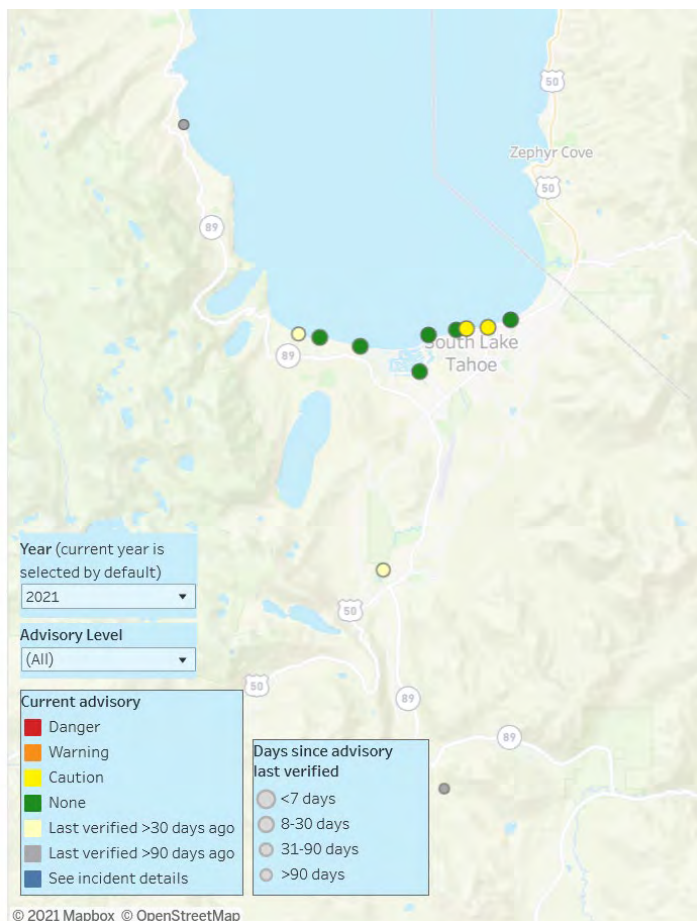
Scientists are unsure why FABs are suddenly showing up in remote mountain lakes, as well as in some large lakes such as Lake Tahoe (USA), Lake Baikal (Russia) and Lake Wakatipu (New Zealand), but an international group of lake scientists is ready to tackle the problem. In a scientific article published in BioScience, "[Blue waters, green bottoms: benthic filamentous algal blooms are an emerging threat to clear lakes worldwide](#)," scientists from around the world explore how nutrient pollution, climate change, loss of aquatic animals that eat algae, and invasive species contribute to the increased occurrence of green bottoms.

Co-author and Professor Sudeep Chandra at the University of Nevada, Reno noted, "The interdisciplinary, international team of scientists that met together at Lake Tahoe impressed upon me the need to develop a science-based framework to guide our future understanding of FABs. The paper highlights the factors from local to global pressures that might contribute to this profusion of algae on lake bottoms."

Freshwater and estuarine HABs (FHABs) have occurred in California since at least 1925, when a dog fell ill after drinking water at Clear Lake -- the first report of a FHAB dog sickness in the state. Now almost one hundred years later, FHABs continue to occur in lakes, reservoirs, and rivers throughout the state and during all months of the year. Blooms occur in high elevation lakes in the Sierra Nevada mountains down to coastal estuaries, where cyanotoxins are exported into the marine environment.

[https://mywaterquality.ca.gov/habs/where/freshwater\\_events.html](https://mywaterquality.ca.gov/habs/where/freshwater_events.html)

They also occur in sensitive desert landscapes where water is already a scarce resource. In parts of the state, environmental conditions, particularly drought conditions, promote cyanobacterial blooms that persist through the winter, making FHABs a year-round issue in California. When cyanobacteria bloom and produce cyanotoxins they threaten drinking water supplies, wildlife, domestic animals, and human health. With greater than 3000 lakes, 190,000 river miles, rainfall spanning deserts to temperate rainforests, and over 40 million inhabitants, the diversity of environments in California forms a complex social and ecological context within which cyanobacteria bloom.





The Water Boards first began to address HAB prevalence in 2006 when it supported the formation of the Blue Green Algae Work Group with many other concerned entities, later the group was renamed the California Cyanobacteria Harmful Algal Bloom Network (CCHAB). An initial product of this group was the Voluntary Guidance Document that describes a standardized framework to HAB response in recreational waterbodies (original release 2010, updated 2016).

**Link to California HAB data (historical and current):**

[https://www.waterboards.ca.gov/lahontan/water\\_issues/programs/swamp/harmful\\_algal\\_blooms.html](https://www.waterboards.ca.gov/lahontan/water_issues/programs/swamp/harmful_algal_blooms.html)

At Lake Tahoe, the most recent incidents have occurred primarily in the South Shore area, including the Tahoe Keys. Annual blooms have been investigated and monitored by Lahontan Regional WQCB. The TKPOA Water Quality Committee and the Water Quality Staff monitor and report on HABs to the Lahontan Water Board. Water quality sampling, signage and monitoring has been ongoing.

2017: Toxic algae detected in some Tahoe Keys waterways

<https://www.tahoedailytribune.com/news/toxic-algae-detected-in-some-tahoe-keys-waterways> August 26, <http://www.laketahoenews.net/2017/08/toxic-algae-bloom-tahoe-keys-lagoons>

**Lake Tahoe Aquatic Invasive Species Working Group**

The Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG) is a diverse group of agencies, community members and scientists dedicated to early detection and rapid response, prevention and control of aquatic invasive species in the Tahoe Basin. TWSA staff became actively involved in working with TRPA and Tahoe RCD as a member of the working group, focusing on the AIS inspection program protocols, public education and outreach.

**Asian Clams**

In spring 2008, UC Davis researchers discovered extensive beds of an invasive bivalve, the Asian clam (*Corbicula fluminea*), in the nearshore of Lake Tahoe along the southeastern edge of Lake Tahoe. Clam densities reach over 6,000 per square meter and are among the highest anywhere in the world. In Lake Tahoe Asian clams can affect plankton levels and food webs, out-compete native species, and cause attached algae to form nuisance blooms. More information on TERC Asian Clam research is presented later in this chapter.

**Asian Clam Removal Projects 2011-14**

In 2011-13 the majority of work on AIS was located much farther away from TWSA member intakes; focused on the Emerald Bay, Tahoe Keys and Ski Run areas in South Lake Tahoe.

In 2011, the project expanded to Emerald Bay where a small population of Asian clams has colonized at the mouth of the bay. Tahoe RCD continued to manage and coordinate these efforts in collaboration with our partners and funders: UNR, UC Davis, U.S. Fish and Wildlife, Tahoe Regional Planning Agency, CA State Parks, Nevada Department of Environmental Protection, Lahontan WQCB, and Lake Tahoe Water Purveyors.

## Asian Clam Population in Lake Tahoe – Experimental Controls 2009-2013



10-foot by 10-foot rubber bottom barriers were tested as a strategy for managing Asian clam populations



Researchers sampled Asian clam densities before and after rubber bottom barrier experiment



Autonomous Underwater Vehicle (AUV) is used to map clam beds around Lake Tahoe

In 2012, the AIS group began a larger scale Asian clam control project in the mouth of Emerald Bay. TWSA involvement in these projects was reduced since the barrier projects were not in proximity to drinking water intakes.

### 2012: UC Davis scientists assemble 5 acres of mats for Tahoe Asian Clam Project

[http://www.news.ucdavis.edu/search/news\\_detail.lasso?id=10368](http://www.news.ucdavis.edu/search/news_detail.lasso?id=10368)

Oct. 16, 2012 - Rubber barriers bound for the lakebed of Lake Tahoe's Emerald Bay were assembled at the University of California, Davis's part of the biggest Asian clam control project in the lake's history. The invasive clams threaten the lake's health and famed clarity. UC Davis scientists, staff and students are unfolding the long, black mats and enhancing them with rebar, brass grommets and valves that will hold the barriers in place underwater and enable scientific analysis of the project. Scientists from UC Davis and the University of Nevada, Reno first devised and tested the concept of using rubber barriers to smother Asian clams in 2010, when they placed an acre of the barriers on the lake bottom. This first-of-its-kind method killed 100 percent of the clams. The success of those efforts and additional research led to this bigger project, which involves a team of interagency partners.

By treating the Emerald Bay infestation in the early stage, impacts can be minimized or avoided. The treatment will also help prevent the spread of these invasive clams to other areas of Lake Tahoe. The project cost is about \$810,000 and is funded by the Lahontan Regional Water Quality Control Board, U.S. Fish and Wildlife Service, and U.S. Forest Service Pacific Southwest Research Station.

### Marla Bay Asian Clam Removal Asian Clams: 2010 experiment

In the summer of 2010, two sets of half-acre barriers were installed to test whether large-scale application of this experimental method is a feasible option. The bottom barriers were installed in Marla Bay, NV, and Lakeside, CA, and consisted of 20 rolls of 10-foot-wide and 100 foot long high density polyethylene. Both of these larger scale project areas were again located within proximity to TWSA member agency water intakes. The project team worked closely with the water providers to plan the project to avoid potential impacts to drinking water quality. TWSA staff, Rebecca Williams, served as a member of the project team, conducting the water quality monitoring sampling and consulting with the team on mitigation requirements for the permits.

### The Control of Asian clam (*Corbicula fluminea*) in Lake Tahoe with Benthic Barriers: The Influence of Water Temperature on Mortality

<http://terc.ucdavis.edu/publications/documents/marlabayfinalreport.pdf>

Final report for the Marla Bay Asian Clam Project published 2011.

### **Water Supplier Needs - Asian Clam Project Mitigation Measures**

The Tahoe Water Suppliers Association (TWSA) has been in attendance for Working Group meetings since 2009 and was part of the development of this project and the monitoring plan and mitigations. TWSA staff have been actively conducting water quality sampling during experiments as needed.

Mitigation measures applied to all aspects of the project except the initial pre-installation background monitoring. The water purveyors were to be contacted within 72 hours of any work commencing.

Bacteria results were to be obtained within 24 hours of time sampled, reviewed and methodology will be amended accordingly. If E. coli counts were detected or at the request of any TWSA member, a raw water sample can be taken at all the 5 TWSA intakes in the vicinity to insure no migration of microbial waste associated with barrier removal. The ultimate mitigation for the water supplier is to rely on storage and turn off pumpage for some period of time. In addition, if at any time during project activities, a spill or release of fuel from boats or operations occurred spill procedures were to be instituted and a sample for total petroleum hydrocarbons taken and sent to the lab. Spill information, emergency contact list, procedures, and forms were on hand for any project activity.

### **Potential Effects of AIS on the Regional Economy**

As the regional economy of Lake Tahoe developed, local concerns grew that the Tahoe Region could become overcrowded and lose its scenic appeal. In 1968, the Tahoe Regional Planning Agency was formed to achieve and maintain defined environmental threshold carrying capacities (thresholds). Significant resources have been channeled into the simultaneous regulation of development while moving toward achievement of thresholds (LTVA 2008). A challenge lies in minimizing adverse impacts of the recreation industry, including introduction of AIS, on the lake's natural environment, which in turn is the major draw for the recreational visitation. Sustainable recreation is vital to the local economy.

In 2011, the Lake Tahoe Region's natural and recreational amenities were estimated to draw between 3 and 5 million visitors annually. These estimates have shot to 15-20 million in 2019. The 1999 Lake Tahoe Watershed Assessment reported that visitors spend an average of around \$114 dollars per visitor day (Nechodom *et al.* 1999). This spending translates to local employment and income. In addition to supporting local jobs and generating income, the natural beauty and recreational utility at Lake Tahoe is reflected in property values within the region. Shoreline properties, in particular, are especially valuable and sensitive to AIS impacts. The lake also provides drinking water for the residents and thousands of visitors in the region.

### **Potential Impacts to Water Supply**

Some Nevada water suppliers have been granted filtration avoidance status from the NDEP Bureau of Safe Drinking Water (NDEP-BSDW); based on ongoing compliance: source water quality remains within specified required limits for turbidity and coliform and an annual Watershed Control program update (TWSA Annual Report) indicates the watershed is at low risk for pathogens.

Recent efforts to test aquatic herbicides for aquatic weed control are of concern to the water suppliers due to the filtration exemption status of six of the water purveyors in the TWSA. Tahoe's status as an ONRW Tier 3 waterbody warrants special consideration in regulatory review of a potential herbicide application. The Board supports using herbicide last, only after other non-chemical methods have been fully vetted on a larger scale than previous tests. Recent public comment is posted at:

<https://www.yourtahoepace.com/public-works/water/source-water-protection/tahoe-keys-iwmp-to-control-weeds> .

The main concern that with regard to water supply is the tendency of Quagga and Zebra mussels (if introduced) is that the mussels biofoul freshwater intake pipes. This invasion not only requires costly maintenance or periodic replacement of pipes, but it can result in the loss of filtration exemption due to the presence of mussels and plants in the water intake systems that raise human health concerns. Plants and invertebrates may colonize in large numbers near intakes, depositing organic contaminants into the water. If water suppliers cannot rely on the water drawn from the lake to be free of microbial contaminants, then further purification infrastructure might be necessary, raising unit costs for suppliers, and ultimately consumers.

The table below provides estimates of the necessary infrastructure spending to maintain current production levels without sacrificing drinking water quality in the event of a serious mussel and plant infestation near, on, or in the intake system. The redundant intake system would allow suppliers to take intakes offline in rotation for cleaning and maintenance without interrupting service. The presence of organic material in supply water can result in taste and odor problems that require another level of purification.

In 1990, \$1 million, per million gallons per day (MGD) was estimated in capital costs for design and construction of tertiary treatment. The estimate includes a chlorine injection system to prevent mussels from colonizing the inside of intake pipes. (Source: Pers. Comm. Perri Standish Lee/Black and Veatch)

In total, a conservative infrastructure cost of approximately \$25 million could be borne by the region's water suppliers if invasive mussels infest the lake. The low and median estimates are presented in the table below. Operation and maintenance costs will contribute to this total. For example, according to the recommended chlorine levels for injection systems by the U.S. Army Corps of Engineer's Zebra Mussel Chemical Control Guide, Lake Tahoe Region suppliers as a whole will need to use about 147 pounds of liquid chlorine per day, or 27 tons per year (Sprecher and Getsinger 2000). At a price of around \$500 per ton (City of Lewisville 2008), water suppliers would need to spend more than \$250,000 per year on chlorine alone.

**Estimated Water Supply Infrastructure Costs** (source: LTAISMP)

Cost Category	\$ 2008 Low	\$ 2008 Median	Justification
Redundant Intake System	3,100,685	4,429,549	Continued operation while performing maintenance
Taste & Odor Control System	20,326,710	29,038,157	Maintains clean taste and odor
Chlorine Intake Injection System	252,000	360,000	Prevents mussel colonization on inside of intakes
Annual Cleaning & Maintenance	1,219,603	1,742,289	Defoul intake on rotation; regular O&M
Annual Liquid Chlorine Supply	175,000	250,000	One year supply chemical cost
<b>Total</b>	<b>\$ 24,898,997</b>	<b>\$ 35,819,996</b>	

## **Lake Tahoe Basin Interagency Dreissenid Mussel Rapid Response Plan**

[http://tahoercd.org/wp-content/uploads/2014/11/01\\_Updated\\_Lake-Tahoe-AIS-Management-Plan\\_Final\\_July-2014.pdf](http://tahoercd.org/wp-content/uploads/2014/11/01_Updated_Lake-Tahoe-AIS-Management-Plan_Final_July-2014.pdf)

Updated 2014. Interagency Response Plan Practice Exercise conducted Sept. 12 & 13, 2012.

Prepared for the Lake Tahoe Aquatic Invasive Species Coordination Committee by:  
U.S. Fish and Wildlife Service. For further information about this Interagency Dreissenid Mussel Rapid Response Plan for the Lake Tahoe Basin, please contact Steve Chilton, U.S. Fish and Wildlife Service (775-589-5265; [steve\\_chilton@fws.gov](mailto:steve_chilton@fws.gov)).

The purpose of this plan is to provide a framework for an effective rapid response to the discovery of any Dreissenid mussel (mussel) aquatic invasive species (AIS) in Lake Tahoe. In this document, “rapid response” means that soon after a detection of a Dreissenid mussel (veliger or adult) in Lake Tahoe is discovered, 1) the responsible agency will make a determination of whether it is potentially significant and/or detrimental and 2) if that is the case, the responsible agency will develop and implement a course of action. This also would apply to mussels that are discovered in an adjacent waterway or lake .

### **Changes In Landownership, Zoning, Or Land Activities**

#### **Approximate land ownership in the Lake Tahoe Basin is:**

National Forest 75%  
States and Local Government 10%  
Private 15%

#### **Revised Land Management Plan for the Lake Tahoe Basin Management Unit**

**Forest Plan & Final Environmental Impact Statement (FEIS)** - Revised Land and Resource Management Plan, August 2015 for Alpine, El Dorado, and Placer Counties, California and Douglas and Washoe Counties, and Carson City, Nevada

[https://fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprd3844951.pdf](https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3844951.pdf)

[http://www.fs.usda.gov/detail/lbmu/landmanagement/projects/?cid=fsm9\\_046482](http://www.fs.usda.gov/detail/lbmu/landmanagement/projects/?cid=fsm9_046482)

### **Introduction to the Land Management Plan - Purpose**

The purpose of this Land Management Plan (also known as the Forest Plan) is to provide strategic guidance to the Lake Tahoe Basin Management Unit (LTBMU) for forest management over approximately the next 15 years.

The Lake Tahoe Basin is situated on the eastern side of the Sierra Crest and extends across the state line between California and Nevada. The LTBMU was established in 1973, to facilitate consistent management of National Forest System (NFS) lands within the Lake Tahoe Basin watershed. These lands were previously managed by three separate national forests: Tahoe, Eldorado, and Toiyabe.

While the LTBMU is small in comparison to most National Forests, as the Tahoe Basin's largest land manager, its issues, resources and values are (in comparison) very large. The Forest Service manages 78% of all lands in the Lake Tahoe Basin; National Forest ownership in the Lake Tahoe Basin has grown from 35,000 acres in the 1950s to 154,850 acres. NFS lands include 3,366 urban forest parcels on sensitive lands acquired through the Santini-Burton Act.

The LTBMU contributes to the tourist-based economy through provision of recreation opportunities including downhill skiing, cross-country/backcountry skiing, snowshoeing, hiking, beach access, camping, and sightseeing. Ongoing conservation education programs inform residents and visitors of all ages



about the natural environment in which they live, work, and play. Partnerships continue to be important. Numerous groups provide their assistance in such activities as trail maintenance and construction, historic building maintenance, and interpretive programs. Many of the resorts, campgrounds, and the Tallac Historic Site are operated by private enterprises under special use permits –these partnerships support the local economy by providing jobs.

Over 75% of the area around Lake Tahoe is public land managed by the United States Department of Agriculture (USDA) Forest Service. Totalling over 150,000 acres, this land includes beaches, hiking and biking trails, wilderness areas, historic estates and developed recreation areas such as campgrounds and day use areas. The forest is managed to provide access for the public and to protect the natural resources of the area. The Forest Service manages the land in the Lake Tahoe Basin as a unique kind of National Forest, called the Lake Tahoe Basin Management Unit, or LTBMU for short.

The LTBMU is managed in many ways like other National Forests, but because of the needs of the lake and the relationship it has with the forests that surround it, the LTBMU has special focus areas, including:

- Erosion Control Management
- Watershed Restoration
- Fire and Fuels Management
- Forest Management
- Recreation Management

### **National Forest Lands at Lake Tahoe**

Through acquisition and land exchanges since the 1950s, National Forest land ownership has grown from 35,000 acres to 154,830 acres, including 3,366 Santini-Burton parcels.

Since 1997, more than 3,064 acres have been acquired by state and federal agencies. Significant acquisitions during this period include more than 300 acres and 2,600 feet of lakefront at the Upper Truckee Marsh, nearly 1,800 acres associated with High Meadows and recently the additional 777 acreage surrounding Incline Lake in Nevada. The majority of National Forest lands encompass most of the non-urban wetlands, meadows and Stream Environment Zones (SEZ); important fish and wildlife habitat; and the available open space for recreation and environmental interpretation opportunities.

### **2023: Tahoe Conservancy acquiring 31 acres in South Lake Tahoe; Motel 6 to be demolished**

<https://www.rgj.com/story/news/2024/03/21/motel-6-in-tahoe-to-be-removed/73042808007/>

The Tahoe Conservancy acquired 25 acres of mountain meadow and wetlands and other acreage with a Motel 6 and commercial buildings it will remove. Tahoe Conservancy acquiring 31 acres in South Lake Tahoe; Motel 6 to be demolished. The California Tahoe Conservancy, a state agency that focuses on restoration of natural and recreational resources in the Lake Tahoe Basin, is acquiring 31 acres of "environmentally sensitive land" in the Upper Truckee River corridor in California that includes a Motel 6 and vacant restaurant building, both now set for removal.

The Tahoe Conservancy brought together nearly \$16 million in acquisition and support funds from itself and several partners to acquire 25 acres of mountain meadow and wetlands, a two-acre single-family home site and four acres of former floodplain where the Motel 6 and an adjacent commercial building and a parking lot now sit along U.S. Route 50 in South Lake Tahoe.

“We are grateful to our funding partners for making this possible,” said Conservancy Board Chair Adam Acosta. “This historic acquisition of the Knox Johnson and Motel 6 property achieves a decades-old goal and brings one of the last privately held sections of the river corridor under public ownership.”

The Tahoe Conservancy said it anticipates closing escrow and completing its recent acquisition in the coming weeks. Chris Carney, communications director for the California Tahoe Conservancy, confirmed to the RGJ on Wednesday that the Tahoe Conservancy was in the process acquiring the property.

The Tahoe Conservancy's acquisition of the property in South Lake Tahoe, northeast of Highway 89 and U.S. Route 50, will protect critical wetland and meadow habitat, along with improving future climate resilience and helping restore the river corridor, it said.

The acquisition, a decades-long priority for state and regional partners, means over 96% of the lower nine miles of the Upper Truckee River is now under public ownership. One-third of the Lake Tahoe Basin drains into the Upper Truckee River, which means restoration is key to protecting Lake Tahoe, according to the Tahoe Conservancy.

“All of us at WCB are thrilled to help fund this high-priority acquisition that links continuous public ownership along the Upper Truckee River floodplain,” said Jennifer Norris, executive director of the Wildlife Conservation Board. “This purchase will safeguard the region’s biodiversity, including its wetlands and meadows which provide habitat for songbirds, waterfowl, amphibians, fish, and bears and contribute to California’s 30×30 conservation goal.”

Lake Tahoe has lost nearly 30 feet in water clarity since the area boomed in the 1950s and through the next decade, the Tahoe Conservancy said. The purchase removes development out of sensitive lands--a goal of the Lake Tahoe Environmental Improvement Program and Lake Tahoe Regional Plan. The state of California has a goal to conserve 30% of its natural lands by 2030.

The Tahoe Conservancy currently holds 560 acres in its Upper Truckee Marsh property to the north of the recent purchase. The Tahoe Resource Conservation District, a grant-funded local agency that works in the Tahoe Basin on conservation-related fronts, owns a 206-acre property, Johnson Meadow, to the south of Route 50. The purchase now connects these two areas. The Tahoe Conservancy is planning to demolish the Motel 6 building that was built in the 1970s along with vacant restaurant structure on the property.

Carney said the purchase will include "a single 31-acre property, and Motel 6 will end operations by the time it becomes state property." "Once it becomes state property, we will be able to begin planning for demolition with the California Department of General Services," he said. "We anticipate completing demolition in 2025."

In a statement, Motel 6 said, "We can confirm that the owners of this Motel 6 location are selling the property to the California Tahoe Conservancy, and we are working diligently to ensure a smooth transition." The Conservancy will "retire or transfer the property's development rights and coverage for future use on town center redevelopment."

Plans also include the preservation of the surrounding mountain meadow and wetlands. There are also opportunities to restore wetland habitat on the recently purchased property and future restoration in the Upper Truckee Marsh. The purchase was funded by the Tahoe Fund and the League to Save Lake

Tahoe that both gave \$100,000 each. The California Wildlife Conservation Board gave \$6 million with \$4.4 million coming from the Tahoe Conservancy. Also, The Tahoe Regional Planning Agency gave \$3.5 million and the California Department of Fish and Wildlife brought \$1.5 million to the table.

### **2018 Johnson Meadow Acquisition**

Partner: Tahoe Resource Conservation District; California Tahoe Conservancy, California Department of Fish & Wildlife, Barton Health, Heavenly Resort Total Project Cost: \$8,315,000  
Tahoe Fund Contribution: \$100,000

Johnson Meadow, 206 acres of beautiful meadow in South Lake Tahoe and the largest privately-owned section of the Upper Truckee River, is now publicly owned. This is a major milestone for the health of Lake Tahoe. The Upper Truckee River has been identified as the most impaired watershed in the Tahoe Basin and the highest contributor of fine sediment impacting the clarity of the Lake. The river discharges about 2,200 metric tons of fine sediment per year and delivers approximately 60 percent of the fine sediment that enters Lake Tahoe annually from stream erosion.

Acquisition of this property will allow for future restoration of the river that will have a dramatic impact on the Lake's famed clarity. The acquisition will also improve wildlife habitat, climate change resiliency and recreation connectivity. The purchase of the property was made possible through a collaboration between Tahoe Resource Conservation District, the California Tahoe Conservancy, California Department of Fish & Wildlife, Tahoe Fund, and the former property owners, who owned Johnson Meadow for almost a century.

Over the next several years, the Tahoe RCD and their partners will need to identify \$10-15 million in funding to begin restoration efforts for Johnson Meadow and \$60 million for the entire Upper Truckee River Watershed. *(Editor Note: TWSA sponsored 8 dog waste bag stations for this property, in partnership with Tahoe RCD.)*

### **Purchase of Incline Lake, Nevada**

2018 Update: The [USDA Forest Service Lake Tahoe Basin Management Unit \(LTBMU\)](#) has issued a draft decision for management of 1,083 acres of National Forest System lands off the Mt. Rose Highway (SR 431) above Incline Village, Nev. The draft decision incorporates Alternative 2 - "The Incline Plan is a huge step toward improving National Forest recreation opportunities and public access on the North Shore of Lake Tahoe," said Jeff Marsolais, LTBMU Forest Supervisor, in a press release. "I am confident this plan provides for restoration of this important ecosystem as well as sustainable recreational benefits for current and futures generations in the Incline area."

In July 2008, 777 acres around Incline Lake was removed from private land holding and seasonal occupancy, by purchase through the National Forest Service with funds from the Southern Nevada Public Lands Management Act (SNPLMA). The property is a significant watershed resource, a prime recreational resource for the surrounding communities and visitors to the Lake Tahoe region, and host to a variety of plants and wildlife. The property represents approximately 25% of the watershed for Third Creek, a significant source of water for Lake Tahoe, and is located within IVGID's boundaries. The land is adjacent to the Tahoe Meadows and the Mt. Rose Wilderness on Highway 431 outside Reno, NV. Purchase of this area provides significant watershed protection for the Incline Village GID. Incline Lake was drained in 2008 with the removal of the man-made earthen dam which created the lake, from safety concerns.

Restoration activities include: removing the dam diversion ditch that connects Third Creek to the former Incline Lake bed; restoring stream channels and aquatic species habitat throughout the area; revegetating degraded areas with native vegetation species; restoring damaged wetlands, which resulted from previous water diversion activities; repairing erosion along the Franktown Ditch; developing a plan for future white bark pine management; and reducing tree density in meadow and wetland areas through forest thinning and restoration of aspen communities.

The purpose of the Forest Plan amendment is to change the management area designation of approximately 400 acres of the project area (west of Third Creek) from general conservation (general forest) to back country. The draft Decision Notice/Finding of No Significant Impact is available at [fs.usda.gov/goto/ltbmu/InclineMgmt](https://fs.usda.gov/goto/ltbmu/InclineMgmt).

### **Historical Activity**

Public acquisition and restoration of sensitive lands directly support achievement of all nine environmental thresholds. Since 1982, USFS, California Tahoe Conservancy, and Nevada Division of State Lands acquisition programs have acquired and protected more than 20,000 acres of sensitive lands, comprised of more than 10,000 subdivided lots.

By acquiring many of the sensitive lands adjacent to rivers, creeks, meadows, and the lake, public agencies have protected and preserved the integrity of cultural and historic resources of the indigenous people who occupied the Tahoe Basin in years past.

### **Program Highlights:**

- Reduced the development potential within the Lake Tahoe Basin by approximately 20 percent.
- Protected thousands of acres of wetlands, meadows, and steep slopes prone to erosion.
- Protected miles of rivers and streams.
- Provided a land base for stormwater quality projects to achieve further water quality improvement.
- Protected valuable soil, vegetation, wildlife, and fisheries resources from further degradation.
- Enhanced public ownership and access to Lake shoreline.
- Protected and enhanced scenic resources.
- Improved air quality by retaining vegetation.
- Reduced vehicle miles traveled associated with residential and commercial development.

### **Commercial Crawfish Harvesting Approved in Nevada and California Tahoe Waters**

In December 2011, the Nevada Department of Wildlife and the Nevada Division of State Lands approved for the first time, a commercial fishing operation at Lake Tahoe. This project did not focus on fish extraction, rather it allowed for the first time commercial crawfish harvesting. The project received approval based on support from TERC researchers that it may serve well as a control method on the naturalized invasive species (Signal Crawfish). Harvest operations began in the summer 2012, with the launch of the Tahoe Lobster Company. In 2013, California removed a prohibition on commercial harvesting.

### **Basin Monitoring Programs**

More information also available in the “Controls” section of this report.

**Tahoe Science Advisory Council** <https://www.tahoesciencecouncil.org/>

The Tahoe Science Advisory Council was established in 2015 by a memorandum of understanding ([MOU](#)) between the State of California and Nevada. The Council is an independent group of scientists who work collaboratively to advise policy makers to promote, enhance, and maintain the ecological integrity of the Lake Tahoe and its watershed. The Council utilizes the best available scientific information on matters of interest to both the states of California and Nevada to preserve Lake Tahoe. By bringing together representatives from academic institutions and agencies, the Council aims to leverage efforts and maximize resources, streamline and bridge research and restoration activities from watershed to lake. Council members include two representatives from participating academic institutions and government agencies.

**Cortez Masto's Bill to Reauthorize the Lake Tahoe Restoration Act Passes Senate**

<https://www.cortezmasto.senate.gov/news/press-releases/passed-cortez-mastos-bill-to-reauthorize-the-lake-tahoe-restoration-act/>

**7/25/24 - Washington, D.C.** – Senator Catherine Cortez Masto's (D-Nev.) legislation to extend the authorization of the *Lake Tahoe Restoration Act* for 10 years passed the Senate today. Cortez Masto's [legislation](#) is cosponsored by Senators Jacky Rosen (D-Nev.), Laphonza Butler (D-Calif.), and Alex Padilla (D-Calif.), and it would allow federal funds to continue maintaining the environment, supporting local jobs, and strengthening the tourism economy around Lake Tahoe. The legislation now heads to the U.S. House of Representatives.

"Sustainability programs in Tahoe must be able to keep up their operations so we can continue to keep the lake clean and support our local communities – not just today, but for future generations. That was the vision previous Senate leaders had for Lake Tahoe, and it is what I've been fighting for," **said Cortez Masto**. "Passing the reauthorization of the *Lake Tahoe Restoration Act* through the Senate is a huge step forward, and I urge my colleagues in the House to pass this vital bill into law as soon as possible."

"Lake Tahoe is one of our state's natural treasures and a driver of northern Nevada's local economy," **said Senator Rosen**. "We've come a long way in protecting and preserving our beautiful lake and surrounding communities from the effects of climate change, and we must continue to build upon those efforts. I'm thrilled to see that the Senate has passed our legislation to make sure that future generations can enjoy Lake Tahoe, and I'll keep fighting until it becomes law."

"Lake Tahoe is a treasure, and we must do everything we can to protect it for future generations," **said Senator Padilla**. "As the threats of climate change continue to escalate, I'm thrilled to have worked alongside my California and Nevada colleagues to successfully pass the reauthorization of the *Lake Tahoe Restoration Act* through the Senate to provide critical funding to preserve Lake Tahoe and protect it against pollution, invasive species, and wildfires."

The *Lake Tahoe Restoration Act* is bicameral, and is cosponsored in the U.S. House of Representatives by Representatives Mark Amodei (R-Nev.-02), John Garamendi (D-Calif.-03), Dina Titus (D-Nev.-01), Susie Lee (D-Nev.-03), Steven Horsford (D-Nev.-04), John Duarte (R-Calif.-13) and Kevin Kiley (R-Calif.-06). It will allow critical funding to support environmental protection and habitat restoration programs across the basin for the next ten years. This law has delivered millions in federal dollars to Lake Tahoe since the original law passed in 2000.

Senator Cortez Masto has been a champion for Lake Tahoe, leading efforts in the Senate to conserve the region and protect the Lake. She recently [secured](#) \$24 million to extend the popular East Shore Train



around Lake Tahoe, and almost \$8 million to help the Tahoe Transportation District [purchase](#) new electric hybrid busses and improve transit safety. She [secured](#) nearly \$17 million in funding for the *Lake Tahoe Restoration Act* in the Bipartisan Infrastructure Law, in addition to [critical resources](#) to address microplastic pollution in the Lake and to improve transportation options to and from Reno. She has led calls for a comprehensive, collaborative, and science-based approach to [protect Lake Tahoe](#) from the threat of climate change. Cortez Masto helped pass the [Great American Outdoors Act](#), which was signed into law to repair and maintain public lands nationwide.

**Cortez Masto, Rosen Announce \$3.4 Million From Bipartisan Infrastructure Law To Protect Lake Tahoe**  
<https://www.cortezmasto.senate.gov/news/press-releases/cortez-masto-rosen-announce-3-4-million-in-funding-from-bipartisan-infrastructure-law-to-protect-lake-tahoe/>

**6/6/24 - Washington, D.C.** – Today, U.S. Senators Catherine Cortez Masto (D-Nev.) and Jacky Rosen (D-Nev.) announced \$3.4 million in funding from the Bipartisan Infrastructure Law to prevent and combat the spread of aquatic invasive species in Lake Tahoe. This grant award is part of the U.S. Fish and Wildlife Service’s (USFWS) [Lake Tahoe Environmental Improvement Program](#), and it will support continued collaboration with the Washoe Tribe of Nevada and California and the Tahoe Regional Planning Agency in the Basin. Additionally, in 2020 Senators Cortez Masto and Rosen [created](#) the Invasive Species in Alpine Lakes Pilot Program to protect lakes like Lake Tahoe.

“I’m doing everything I can to make sure Lake Tahoe is protected for generations to come, and I’m glad to see these federal dollars I secured will help to restore native wildlife habitat and stop the spread of invasive species threatening the lake,” said Senator Cortez Masto. “I will keep working to deliver more resources for Nevada to protect our beautiful national treasures.”

“Lake Tahoe is a crown jewel of the West with an ecosystem like no other, and we must do everything we can to preserve it for generations to come,” **said Senator Rosen**. “I’m proud to have helped secure funding from the Bipartisan Infrastructure Law to protect the Lake Tahoe Basin from invasive species and preserve one of our state’s most beautiful natural wonders.”

The Lake Tahoe Basin faces significant threats from aquatic invasive species, including the Eurasian watermilfoil. This invasive weed disrupts aquatic ecosystems and outcompetes native plants. This year’s funding will support three key areas:

- **Continuing to remove Eurasian watermilfoil in the Taylor and Tallac creeks and marshes**, which are infested with approximately 17 acres of the invasive species.
- **Working with the Washoe Tribe to curb the spread of aquatic invasive species and restore the habitat of native species like the Lahontan cutthroat trout**, which holds cultural significance for the Tribe.
- **Investing in permanent inspection stations** that prevent aquatic invasive species from entering Lake Tahoe.
- 

**The Tahoe Science Consortium (TSC)**

<http://tahoescience.org>

The Tahoe Science Consortium (TSC) included representatives from the Desert Research Institute, University of Nevada Reno, University of California, Davis, Tahoe Regional Planning Agency, the U.S. Geological Survey, and the U.S. Forest Service. The Lake Tahoe Science Advisory Group identified key research and monitoring needs for the Lake Tahoe Basin.

The TSC provides recommendations for the funding of public projects funded by the Southern Nevada

Public Lands Management Act (SNPLMA). A searchable database of the many projects funded at Tahoe is available at: [http://www.blm.gov/nv/st/en/snplma/snplma\\_prephase\\_1.html](http://www.blm.gov/nv/st/en/snplma/snplma_prephase_1.html)

TAHOE SCIENCE CONSORTIUM - SCIENCE SYNTHESIS REPORT 2016

<http://tahoescience.org/wp-content/uploads/2016/07/TSC-Exec-Summary-Web.pdf>

### **SNPLMA SCIENCE INVESTMENTS (2007- 2012)**

Tahoe Science Projects are supported by the Southern Nevada Public Lands Management Act.

#### **Science Synthesis Report**

[Executive Summary](#)

[Full Report](#)

The Tahoe Science Program was created through the [Southern Nevada Public Lands Management Act](#) (SNPLMA) to conduct science to inform efforts to restore Lake Tahoe and its watershed, as authorized in the Lake Tahoe Restoration Act. Beginning in 2006, the Pacific Southwest Research Station (PSW) assumed responsibility for sponsoring science projects beginning with Round 7. The PSW Station established a competitive grant award program with a rigorous peer review process coordinated by the [Tahoe Science Consortium](#), a collection of universities and agencies with active research programs at Lake Tahoe. The PSW program coordinator and the Tahoe Science Consortium worked each year with the resource management agencies in the Tahoe Basin to identify research priorities and solicit proposals.

Specific research areas varied from year to year within the eight science themes. These eight priority research issues spanned the research needs identified and prioritized by management agencies in the Tahoe Basin.

In 2016, the Tahoe Science Consortium [Science Synthesis Report](#) was presented to SNPLMA sponsors (U.S. Congress and federal agency partners), the science community, and the general public. The report offers an overview of the key findings from the research projects supported by the SNPLMA Science Program and illustrates their relevance to management actions in the Lake Tahoe Basin. The Science Synthesis Report distills hundreds of research projects, publications and reports from this program into succinct findings that provide relevant knowledge for resource managers in the basin.

The portfolio of projects supported through the SNPLMA Science Program - 100 projects (95 research and 5 TSC operations) projects were funded in SNPLMA Rounds 7-12. The TSC SNPLMA Science Program was as an integral part of the basin-wide Environmental Improvement Program (EIP), led by management Agency executives from federal, state, and bi-state agencies.

#### **Current Tahoe Research Projects**

[https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/6\\_RecentResearch\\_2\\_1.pdf](https://tahoe.ucdavis.edu/sites/g/files/dgvnsk4286/files/inline-files/6_RecentResearch_2_1.pdf)

## Current Research Synthesis

Since 1959, UC Davis has been engaged in monitoring the status and health of Lake Tahoe and its watershed. The monitoring data are an invaluable resource for assessing the impact of changes that have occurred due to anthropogenic factors and natural variability. Additionally, we engage in shorter-term research that seeks to answer specific questions or to gain understanding of processes and events. This research relies on the long-term monitoring data to provide a context, but it is distinctly separate. The results of this research—conducted by TERC students, postdoctoral researchers, faculty, and staff, and often in collaboration with other institutions, companies, and agencies—has made Lake Tahoe the smartest lake in the world, and arguably the most influential.

## Nearshore Monitoring Network

<https://tahoe.ucdavis.edu/nearshore-network>



Manta Trawl net being pulled across the surface of Lake Tahoe behind the UC Davis Research Vessel John LeConte.  
Provided / UC Davis Tahoe Environmental Research Center

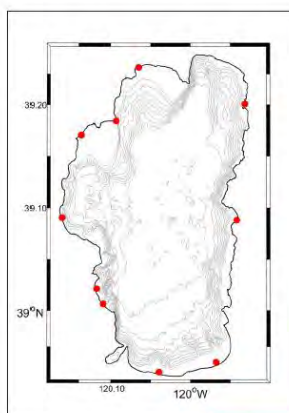
## CURRENT DIRECTIONS

### Three New Insights from the Nearshore Network

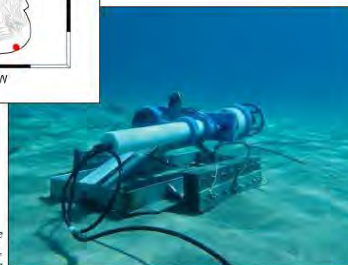
In 2014, TERC installed the first Nearshore Water Station at Homewood, California. Since then, an additional ten Stations have been added all around Lake Tahoe and in adjacent Cascade Lake. The idea was simple – work with property owners who have direct access to the lake, install underwater cables from their docks to an instrument located in seven feet of water, and monitor water quality every 30 seconds. The measurements provide the data needed to distinguish water quality around the lake.

That has been achieved, but more importantly the data have revealed a new understanding of processes that occur lake-wide and in the nearshore. The following pages will highlight some of this new knowledge.

We thank those who have financially supported this project and/or provided access to their docks, the Glenbrook Homeowners Association, and the Lahontan Regional Water Quality Control Board.



The red dots indicate locations of Nearshore Stations around Lake Tahoe



A Nearshore Station on the sandy bottom at Rubicon, CA. Photo: B. Allen

In 2014, TERC established a network of water quality monitoring stations at the perimeter of Lake

Tahoe. The program aims to improve understanding of water quality variability in the nearshore zone. This system provides the essential data needed to guide restoration and future stewardship.

As of December 2018, there are 10 stations installed around Lake Tahoe, and an additional station on Cascade Lake, which feeds into Lake Tahoe. Each station consists of an optical instrument - measuring turbidity (clarity), algal concentration, and dissolved organic matter concentrations - along with a CTD, measuring water temperature, conductivity, lake level, and wave height. An underwater cable enables a real-time data feed.

### **Annual Lake Tahoe to Pyramid Lake Snapshot Day**

<http://tahoetruckeesnapshotday.org>

<https://www.keeptahoeblue.org/our-work/combating-pollution/snapshot-day>

Since spring 2008, TWSA staff has held a leadership role in this event, serving as the North Lake Tahoe Coordinator. TWSA staff provides staff support, some event funding, grant fund management and other leadership roles for this event.

Fecal coliform sampling on Snapshot Day attempts to locate 'hot spots' or areas of potential microbial sources. Over the years Snapshot Day leaders have changed the locations where fecal coliform sampling occurs, which has helped them determine which sites will continue to be monitored annually and which sites do not pose a microbial threat (Source: R. Whitney pers. comm. 2006).



### **Snapshot Day Event Summary**

In 2024, Snapshot Day reached its 24rd anniversary. It remains one of the longest running citizen watershed monitoring events on the West Coast of the United States. Snapshot Day continues to highlight successful engagement with the public in active watershed stewardship, while providing valuable data to the responsible agencies. As previous data sets are compiled and data storage is improved, this program can show long-term trends and better assist agencies in watershed conditions analysis. Snapshot Day sampling encompasses the North Shore Lake Tahoe, South Shore Lake Tahoe, Middle Truckee River near the town of Truckee and Lower Truckee River from the Nevada Stateline to Pyramid Lake. This collaborative effort is sponsored by the Incline Village General Improvement District, the League to Save Lake Tahoe and the Truckee River Watershed Council.

### **Incline Village Clean Water Team (Volunteer Monitoring)**

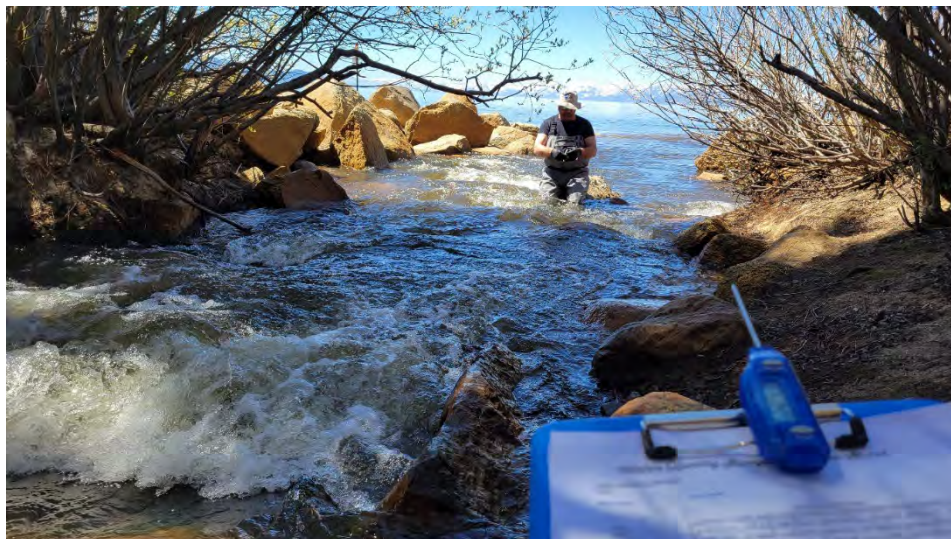
The Incline Village Clean Water Team has ended due to low participation. It is under consideration for re-establishment as an 'Adopt-A-Stream program' in order to offer volunteers more participatory tracks such as photo documentation of stream conditions and litter removal, in addition to water sample grabs. Past history on the program: The streams in Incline Village discharge directly into Lake Tahoe. To protect their drinking water source, the Incline Village Clean Water Team (IVCWT) monitoring helped identify existing problems and helps prevent future water quality issues.



### IVGID/ TWSA Staff Beach Sampling Program

IVGID/TWSA staff has collected regularly scheduled water samples from Incline beaches and stream mouths since 2003. The database is used to track potential contamination locations or trends.

Long- term data sets are available upon request to [wastenot@ivgid.org](mailto:wastenot@ivgid.org).

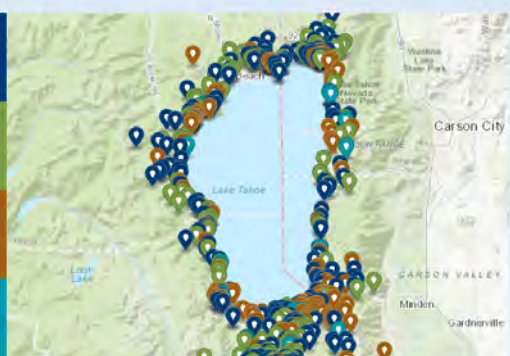


### LAKE TAHOE ENVIRONMENTAL IMPROVEMENT PROGRAM

The Lake Tahoe Environmental Improvement Program (EIP) is an unparalleled partnership working to achieve the environmental goals of the Region. Local, state, and federal government agencies, private entities, scientists, and the Washoe Tribe of Nevada and California have collaborated for more than 20 years to restore the environmental health of Lake Tahoe.

This landscape-scale collaboration is a partnership between nearly 80 public and private organizations.

### EIP OVERVIEW | BASIN-WIDE IMPROVEMENTS



**766**  
projects completed

**\$ 2.7B**  
dollars invested

**Lake Tahoe Info Monitoring Dashboard:** Lake Tahoe Info tracks monitoring programs throughout the Tahoe Region. Featured monitoring programs have detailed monitoring data, maps, and photos available in the system. Other Monitoring Programs are tracked with useful information such as partnering agencies, related indicators, and documents.

**TRPA EIP Tracker Database:** <https://eip.laketahoeinfo.org>

TRPA launched the EIP in an effort to better implement the Regional Plan and highlighted it at the Presidential Forum at Lake Tahoe in 1997. Recognizing that capital investments, research, and monitoring were essential components of the Regional Plan, the EIP called for an initial investment of \$908 million in capital projects and \$58 million in research and monitoring over 10 years. The EIP also identified hundreds of specific projects and programs to be undertaken by more than 50 funding partners including federal, state, and local agencies, and the private sector. The projects were focused on improving air, water, and scenic quality, forest health, fish and wildlife, and public access to the Lake and other recreation areas.



The Tahoe Integrated Information Management System (TIIMS) was previously used to house and disseminate information about the Lake Tahoe Basin's planning and restoration efforts. TIIMS contains tools to meet the needs of all stakeholders within the Basin. Citizens, research scientists, and resource managers can use TIIMS as a one-stop site for information about Lake Tahoe. TIIMS represented a complete information management solution. TIIMS Partners include Federal, State, tribal, and local agencies within the Lake Tahoe Basin which are involved in a myriad of planning and restoration efforts throughout the watershed ranging from permitting to regulatory enforcement to maintaining and improving the quality of surface and groundwater resources.

#### **Lake Tahoe Status and Trend Monitoring Evaluation Program**

<https://monitoring.laketahoeinfo.org>

#### **Lahontan Water Board & Nevada Division of Environmental Protection**

#### **Total Maximum Daily Load Study (TMDL)**

<https://www.epa.gov/tmdl/lake-tahoe-total-maximum-daily-load-tmdl>

<https://www.epa.gov/lake-tahoe/lake-tahoe-water-quality-improvement-programs>

The United States Environmental Protection Agency (EPA) approved NDEP's Lake Tahoe Total Maximum Daily Load Report (TMDL) submittal in 2011. This Final EPA approved version has been revised from the California adopted version for which EPA approval was gained the same day. The revisions were necessary to correct errors, clarify Nevada's regulatory structure and approach to implementation and emphasize that the proposed implementation timelines may need to be adjusted for a variety of reasons, but particularly the availability of future funding. The errata sheet indicates all the differences between these versions. However, it is important to emphasize that despite the submittal and approval of distinct reports, the Lake Tahoe TMDL effort represents a common and consistent plan between the States of Nevada and California to address the clarity decline within Lake Tahoe.

#### **Final TMDL**

Under the Clean Water Act and California law, final TMDLs must contain all the elements addressed during Phase One and Two of the Lake Tahoe TMDL. The Lake Tahoe TMDL implementation plan presents a detailed process for achieving load reductions over a specified time frame. Several expectations have emerged among Lake Tahoe TMDL collaborating agencies. The Lake Tahoe TMDL will integrate with the Pathway efforts to update resource management plans by providing load reduction targets that can be incorporated into the TRPA Regional Plan, the Environmental Improvement Program, and Lake Tahoe Basin Management Unit Forest Plan. The Lahontan Water Board and NDEP will incorporate the Lake Tahoe TMDL implementation needs into the Lahontan Basin Plan and NDEP Continuous Planning Process documents.

The Lake Tahoe TMDL monitoring plan describes procedures for tracking load reductions and documenting progress toward achieving milestones. It also describes how project effectiveness measurements and ongoing research will refine the understanding of factors driving loading to the Lake. The monitoring plan will become the scientific basis for the formal cycles of continual improvement and adaptive management that will be initiated during Phase Three of the Lake Tahoe TMDL. All elements from Phases One and Two will be packaged in a Final TMDL document that will complete Phase Two. Current discussions of likely time frames for achievement of the Lake Tahoe TMDL load reductions range from 30 to 100 years.

# Lake Tahoe TMDL 2024 Strategy & Current Themes

FINAL – JANUARY 2024

The TMDL Strategy provides consistent direction to inform and prioritize day-to-day activities and communications by Lahontan Water Board and the Nevada Division of Environmental Protection TMDL Program Managers.

## Long-Term Goal

Guide implementation of cost-effective load reduction measures to: (1) reverse clarity loss of Lake Tahoe, (2) achieve an interim target of 78 feet of clarity by 2031, (3) and achieve the TMDL numeric target of nearly 100 feet by 2076.

## 5-Year Milestone Objectives (through 2026 ~ updates)

- Support effective implementation of the Lake Clarity Crediting Program to ensure that Urban Implementers achieve the 2026 load reduction milestone of 34% fine sediment particle, 19% Total Nitrogen, and 21% Total Phosphorus specified in the TMDL.
- Help guide Tahoe Science Advisory Council (Science Council) workplan activities and prioritization to be responsive to TMDL Programmatic Information needs and perspectives.
- Support local government and highway department efforts to secure sustained stormwater program and facility operations and maintenance funding.

## Annual Objectives & Actions (through 2024 Calendar Year)

- Urban implementers continue the work required to attain 2024 annual targets.
- Engage with the Science Council and provide input on TMDL-related projects, key management questions, information needs, and annual workplan development and prioritization, especially those projects funded by TMDL agencies.
- Determine if 0-16 µm Fine Sediment Particle (FSP) size class is a sufficient proxy for 1-4.76 µm particle size fraction and work with Regional Storm Water Monitoring Program (RSWMP) managers to determine feasibility of reporting 1-4.76 µm particle size fraction.
- Support efforts for the Science Council to review clarity-related monitoring parameters, including consideration of increased monitoring of biological parameters.
- Execute the TMDL Management System annual cycle.
- Explore the process and funding to update RSWMP's Data Management System.
- Explore the process and funding to update Pollutant Load Reduction Model (PLRM) with new climate information and other outdated software and data sets.

## Current Themes (External talking points to drive focus and motivate action)

- The long-term rate of change in clarity is a more meaningful metric of the lake's health than year-to-year variations. The decline in annual average Secchi depth ended 20 years ago, and despite attaining the ten-year fine sediment load reduction milestone, and the 11-year load reduction targets, the Secchi depth has not changed.
- Fine sediment and algae continue to be the primary drivers of lake clarity. While the relative impact of these factors varies over time, findings support continuing efforts to control fine sediment and nutrient inputs to the lake.
- Climate change is affecting watershed hydrology and in-lake physical and ecological conditions which interact to impact lake clarity. Research and monitoring for FSP and nutrients are ongoing.
- While roadway operations and maintenance are cost-effective pollutant reduction opportunities, stormwater treatment controls remain essential during large runoff events (rain on snow) and at times when wintertime traction abrasives are unable to be recovered in a timely manner.

- Tracking and reporting compliance for the non-urban source categories is essential to appropriately assess TMDL implementation progress.
- TMDL Program Managers are committed to documenting and being responsive to stakeholders who continue to have opportunities to participate in the Lake Tahoe TMDL adaptive management process.
- TMDL Program Managers actively work with the science community and other stakeholders to consider nearshore conditions and concerns in the context of load-reduction efforts taken to protect Lake Tahoe's clarity.

## Charting the Course to Clarity

[http://www.waterboards.ca.gov/lahtontan/water\\_issues/programs/tmdl/lake\\_tahoe/docs/cac\\_208\\_09\\_final.pdf](http://www.waterboards.ca.gov/lahtontan/water_issues/programs/tmdl/lake_tahoe/docs/cac_208_09_final.pdf)

This report presents highlights of the strategy for restoring Lake Tahoe's clarity. For the first time since researchers began continuously measuring Lake Tahoe's famed water clarity 40 years ago, UC Davis scientists reported today that the historical rate of decline in the lake's clarity has slowed considerably in recent years. Scientists at the UC Davis Tahoe Environmental Research Center say that by using new,

more sophisticated models for detecting trends and, by factoring out the effects of annual precipitation, they have concluded that the historic rate of decline in the lake's clarity has slowed since 2001.

### **Climate Change**

Global climate change is projected to have unprecedented impacts on the health of the environment and economy in the Lake Tahoe Basin. As temperatures rise and more precipitation falls as rain rather than snow, management efforts to protect the Basin's forests, fish and wildlife, and fabled water clarity will face unique challenges.

To address these impacts, the Environmental Improvement Program (EIP) partner agencies are formulating a Basin-wide strategy to address climate change. The strategy is intended to ensure that all major planning and regulatory programs at Lake Tahoe are designed to take into account the projected impacts of climate change.

For example, future EIP water quality and erosion control projects will need to be designed for larger peak flows in the winter, and habitat improvement projects will need to take into account potential changes in the type, location, and distribution of vegetation communities. The climate change strategy will provide a starting point for sustainable decision making in the Tahoe Basin. These actions will be addressed in a combination of plans and programs, including the EIP, the Lake Tahoe Regional Plan Update, the Regional Transportation Plan, Community Plans, and local actions.

As part of this comprehensive strategy, the EIP broadly focuses on maintaining healthy forest ecosystems and watersheds and on improving mobility and access with environmentally-friendly transit. Mandates and incentives to develop sustainably-designed communities, projects, and green infrastructure will be developed as part of the update of the TRPA Regional Plan.

The most significant impacts of a future, modeled climate change at Lake Tahoe are changes in hydrologic conditions and reduced frequency of complete vertical mixing of the lake. Hydrology output from the downscaled climate modeling suggests a significant reduction in the amount of precipitation falling as snow in the Tahoe basin. This could have consequences for water supply as well as winter recreational sports. Should the lake's deep mixing be restricted to the extent the models suggest, internal loading of nutrients from the sediments will be very significant and will drive a fundamental change in the biological productivity status of both the pelagic and littoral regions of the lake. These nutrients, particularly phosphorus, will be available to drive algal growth. Reducing the load of external nutrients entering the lake in the coming decades may be the only possible mitigation measure to reduce the impact of climate change on lake clarity and trophic status.

The meteorologic and geographic conditions in the Tahoe basin combine to create a vulnerable ecosystem. Temperatures in the Basin are increasing faster than in the surrounding region. This may be due to the influence of the lake and its heat (energy) budget on local air temperature, although a decrease in the reflectivity of the snowpack from deposition of soot (black carbon) may also play a role. Second, under historic and current conditions the lake mixes to the bottom on the average of only once every four years. Continued warming will increase the lake's thermal stability, and likely shut down its vertical mixing altogether. Third, on occasion, the lake historically has fallen below its natural outlet elevation during prolonged dry years. Lake level modeling in our study suggests that under some greenhouse gas emission scenarios, outflow from Lake Tahoe could cease by the end of the 21st Century.

### **Sierra Nevada Alliance (SNA) Community and Resource Protection Programs**

<https://sierranevadaalliance.org/>

Since 1993, the Sierra Nevada Alliance has been protecting and restoring Sierra lands, water, wildlife, and communities. The Sierra Nevada Alliance exists to elevate and support Sierra ecosystems and communities. We are a hub for stewardship of the Sierra Nevada, which we achieve by empowering and collaborating with our partners. Every Sierra ecosystem and community is healthy, resilient, and collectively cared for through thriving partnerships, as a legacy for future generations.

### **Sierra Climate Change Program**

<https://sierranevadaalliance.org/programs/regional-climate-change/>

We provide technical and grassroots support to communities throughout the Sierra in mitigating climate change and building resilience to its impacts. The Alliance's Climate Resiliency Program goals consider both climate action planning and climate adaptation. We aid communities that are taking action on climate change by assisting in the development and implementation of climate action and adaptation plans. Similarly, we work to meet or exceed local renewable energy and greenhouse gas emissions reduction goals. The Sierra Climate Change Program alerts the public and decision makers to the impacts of climate change in the Sierra and ensure that smart local resource management plans (watershed plans, general plans, hydropower relicensing, integrated regional water management, forestry, etc.) are adopted that protect natural resources by reducing emissions and adapting to climate change. Climate change is presently impacting the Sierra and future impacts could be catastrophic.

The Sierra Nevada supplies 55% of California's developed water rights plus most of the water for Northwestern Nevada through a vast water delivery system that is highly dependent on the Sierra snowpack. Over the past 100 years, there has been a 25% reduction in runoff from April to July in the central Sierra –Sacramento region, and a 10% reduction in the southern Sierra. Leading scientists agree that temperatures will rise even under the best emission reduction scenarios. This increase in temperature results in a projected decline of 25 -40% of the snowpack between years 2025-2050; by 2100 losses could reach 75-90%. The Sierra Nevada Alliance is working with conservation representatives, resource managers, and community leaders to ensure they have cutting edge tools to adapt resource plans and projects that protect Sierra waters, wildlife, and rural communities.

### **Desert Research Institute (DRI) Center for Watersheds and Environmental Sustainability**

The Desert Research Institute and the University of Nevada, Reno have worked together for decades to provide comprehensive studies that have led to a better understanding of threats to Lake Tahoe's air and water quality and the health of the forest. This report was jointly issued to highlight some of the collaborative scientific research that is conducted by both institutions at the Lake Tahoe Summit. The summary of most recent projects, including Aquatic Invasive species and nearshore water quality projects, is available at: <http://www.dri.edu>

### **Desert Research Institute of Nevada (DRI) Lake Tahoe Watershed Projects**

<https://www.dri.edu/?s=tahoe>

Some of the ongoing DRI projects that deal with nutrient and fine sediment loading to Lake Tahoe and the health of the watershed include:

<https://www.dri.edu/new-study-investigates-link-between-clothes-dryers-and-microplastic-pollution-in-lake-tahoe/>

<https://www.dri.edu/people-powered-research-citizen-science-makes-microplastics-discovery-at-lake-tahoe-possible/>

*Past work includes:*

- Identifying atmospheric sources of dust and nutrients in the Tahoe basin
- Determining atmospheric dust and nutrient deposition rates on the lake surface
- Measuring and modeling fugitive dust emissions from roads in the Basin
- Characterizing stormwater runoff fine sediment and nutrient loads
- Evaluating nutrient and fine sediment loading for different land uses
- Determining groundwater nutrient loading to the lake
- Conducting near-shore lake clarity surveys to identify areas of high nutrient and fine sediment loading from surface water, stormwater, and groundwater inflows
- Determining shoreline erosion contributions of fine sediment and nutrients to the lake
- Identifying and quantifying microbiological communities in the lake
- Evaluating restoration project effectiveness in removing fine sediment and nutrients from surface water runoff
- Evaluating BMP structures effectiveness in removing fine sediment and nutrients from surface water runoff
- Determining the amount of impervious cover, such as roads, parking lots, and roofs that produce increased stormwater runoff in the Lake Tahoe watershed
- Evaluating the effects of fire on atmospheric sources of nutrients entering the lake
- Identifying the sources of fine sediment that enter the lake
- Developing bio-engineer systems for removal for nutrients and fine sediment in stormwater runoff
- Evaluating the efficiency of highway runoff structures for removal of nutrients and fine sediment
- Evaluating the health of the American Martin population in the watershed
- Help structure adaptive management, so that as new information is gained in the Basin management practices can include this information
- Develop a stormwater monitoring program for the Lake Tahoe watershed

**Impacts of Land Use on Water Quality in Lake Tahoe Watersheds**

Prepared by Desert Research Institute for NDEP by Gayle L. Dana, Richard B. Susfalk, Paul Verburg  
<http://www.dri.edu>

The goal of this study was to conduct a source assessment of nutrients and sediments in the Third and Incline Creek Watersheds in support of the Lake Tahoe TMDL. The primary objectives were to characterize sediment and nutrient loading from specific land uses and understand nitrogen (N) and phosphorus (P) transport pathways.

Suspended sediment loading was greatest from both watersheds during snowmelt events and was typically dominated by sediment originating from the undeveloped land use accounting for 41-45% of the total sediment exiting the Incline Creek watershed. The ski area and urbanized land uses each contributed between 25 to 32% of the whole watershed sediment load. The undeveloped land use also dominated Third Creek, contributing up to 72% of sediment load delivered directly to Third Creek. In addition to this 27,000 to 356,000 kg of suspended sediment delivered by Third Creek during yearly snowmelt, Rosewood Creek delivered another 45,000 to 109,000 kg to Third Creek just upstream of its discharge to Lake Tahoe. However, on a relative flux basis, suspended sediment delivery from the undeveloped land use was the lowest of all land uses studied. For example, suspended sediment fluxes from the undeveloped land use were between 38 to 73% lower than that from urban and ski area land uses within Incline Creek. When normalized by the water flux, sediment mobilization from the urbanized land use during rain or snow events was typically five times greater than that from the undeveloped



land use, compared to 15 times greater during rain events, on average. Nitrogen fluxes were decoupled from phosphorus fluxes in the Third Creek urbanized land use, as the highest total N fluxes occurred during the lower water year of 2005. This was in contrast to total P in both watersheds and total N in the Incline Creek urbanized area that had the greatest total nutrient fluxes in conjunction greater water fluxes.

### Lake Tahoe Divers Conservancy

<http://www.alpengroup.org/tahoe-divers-conservancy>

The Tahoe Divers' Conservancy (TDC) is a grassroots, community based, organization advocating for the protection of Lake Tahoe and other marine environments of the Sierra Nevada. The mission of the TDC is to document, study and conserve the complex marine environment that defines Lake Tahoe. Scientific research divers conduct on-going research and long term monitoring programs. TCD's advisory board is comprised of marine science experts who provide guidance and assistance on research projects. The TDC has been an active partner in the aquatic invasive species pilot removal projects. The group also conducts community underwater and beach cleanups, and maintains an active education and outreach schedule.

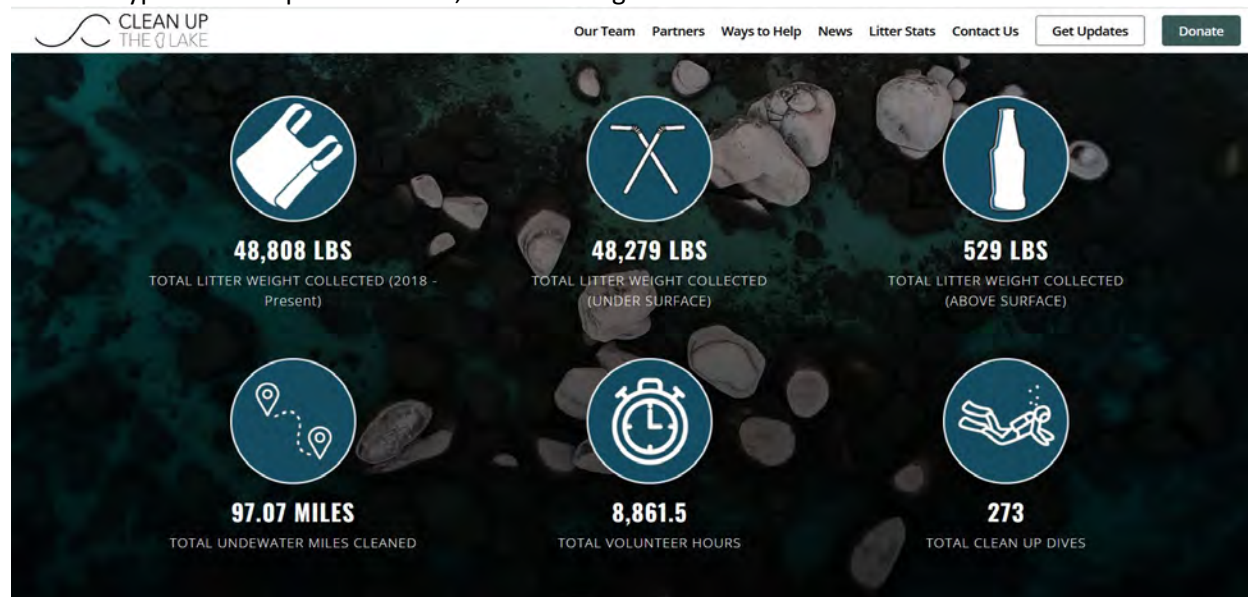
### Clean Up the Lake - The 72 Mile Underwater Clean Up

<https://cleanupthelake.org/our-team>

<https://www.kcra.com/article/effort-to-clean-up-lake-tahoe-gets-more-funding/34877910#>

<https://www.sfchronicle.com/tahoe/article/The-trophies-are-trash-in-Lake-Tahoe-diving-16358360.php>

2020 saw the formation of a non-profit group with the mission to conduct a 72 mile diver underwater cleanup of Lake Tahoe in summer 2021. Community response has been overwhelmingly supportive. CUTL conducted a massive lake-wide cleanup program, documenting the debris found by location and material type. As of September 2022, the following was documented:



**CUTL Litter Categorization process:**

Removing litter from Lake Tahoe via scuba divers and other volunteers is only the first step to our mission. To increase the impact of litter removal we categorize and collect data on every single piece of litter that we remove from the lake. This process has been developed from the United Nation Environmental Program (UNEP) and Intergovernmental Oceanographic Commission's (IOC) litter categorization standard. This standard separates items into 9 different material types (plastic, metal, wood, etc.) and then by 83 various uses (fishing, recreation, construction etc.)

**Wildfires And Watershed Impacts**

August, 2021 - The Caldor Fire erupts. The Caldor Fire becomes the 15th-largest and 16th-most destructive wildfire in California's recorded history, according to Cal Fire. Its cause remains under investigation.

**October 2021 - Caldor Fire 100% contained, nearly two months after South Lake Tahoe evacuations**

<https://www.sacbee.com/news/california/fires/article255173052.html>

Fire crews work to repair containment lines of California's Caldor Fire in ElDorado County, California. The fire, that was first reported on August 14, had burned 221,775 acres and was 98 percent contained by October 16.

The Caldor Fire, which destroyed hundreds of homes in rural El Dorado County and displaced tens of thousands of residents in and near South Lake Tahoe in early September, is now 100% contained. The blaze grew to 221,835 acres (347 square miles) before the U.S. Forest Service announced full containment Thursday. Containment does not mean the fire is extinguished, only that crews have constructed a full perimeter of containment lines around the fire. More than 500 firefighters remain assigned to the Caldor Fire, continuing mop-up and repair efforts to ensure those containment lines hold. "For example, although the fire is contained, large diameter trees and stump holes will continue to smolder well into the winter months," Forest Service officials wrote in a Thursday morning incident update. Containment took more than two months. The Caldor Fire started Aug. 14 near the town of Grizzly Flats, which was largely destroyed as the blaze ripped to the north toward the Pollock Pines area in its fierce initial sprint, before winds started blowing it to the northeast. Through the latter half of August, the fire continued to creep east along Highway 50 and eventually made its way to the western edge of the Lake Tahoe Basin. The city of South Lake Tahoe, home to about 22,000 residents, was put under a mandatory evacuation order Aug. 30, lifted Sept. 5 as weather and fire behavior began to improve. A roughly 50-mile stretch of Highway 50 was also closed to the public for about a month. The Caldor Fire destroyed just over 1,000 structures, most of them in Grizzly Flats but some along the Highway 50 corridor near the summit, near Phillips and Twin Bridges, according to a damage map from Cal Fire. Two civilians were transported from Grizzly Flats with burn injuries. No fatalities were reported.

Read more at: <https://www.sacbee.com/news/california/fires/article255173052.html#storylink=cpy>

*Tahoe In Depth* Special Caldor Fire Issue

[https://www.trpa.gov/wp-content/uploads/CaldorFire\\_12pgs\\_No20\\_FINAL\\_web.pdf](https://www.trpa.gov/wp-content/uploads/CaldorFire_12pgs_No20_FINAL_web.pdf)

This issue highlighted lessons learned from the Caldor Fire. During the fire suppression, more than 490 engines, 77 water tenders, 26 helicopters, numerous air tankers, 78 hand crews, 96 bulldozers, and over 4,200 personnel were coordinated to support the firefighting effort. LTBMU firefighters alone laid over 42,000 linear feet (approximately 8 miles!) of fire hose as part of this collective effort.

The changes in reduced fire intensity resulting from prior forest management also helped minimize the direct tree mortality in the residual forest as demonstrated by less tree and crown torching. Remaining living trees within the fire area will help sustain Tahoe's beloved forest character and will promote conditions for protecting water quality, natural regeneration, and diverse wildlife habitats as the ecosystem recovers.

Below is the feature on water utility-fire response nexus:

## Municipal water crucial in fight against the Caldor Fire

By Shelly Thomsen  
SOUTH LAKE TAHOE PUBLIC UTILITY DISTRICT

"This firefight would have looked a lot different without access to South Lake Tahoe Public Utility District's fire hydrants," said Brad Zlendick, fire chief for Lake Valley Fire Protection District. "It wasn't just firefighters out there; the District's crews were working alongside us to make sure we had water where we needed it, when we needed it."

South Lake Tahoe Public Utility District (STPUD) provides water to the community of South Lake Tahoe. Prior investments in high-capacity wells, upsizing waterlines, and installing fire

hydrants enabled STPUD to provide continuous high-volume water for the firefight.

"Despite the majority of our staff being evacuated, I'm really proud that our team continued to perform, working around the clock to ensure firefighters had adequate water to protect our community," said John Thiel, general manager for STPUD.

Prior to the fire, STPUD staff removed hazardous fuels and critical spare parts from field sites. As power outages rolled through town, crews drove throughout the fire zone turning on and refueling generators to power water tanks and booster stations. STPUD worked with fire

personnel to turn off sprinklers that were running continuously and drawing down water tanks, preserving more than 2.8 million gallons per day for the firefight. It is important for property owners to remember in future fire evacuations to turn off sprinklers to ensure firefighters have enough water supply and pressure to fight the fire.

The intensive use of STPUD's fire hydrants to fill water trucks and fight the fire stressed the aging and undersized water system. "Amid thick smoke and raining ash, our water crew was busy fixing more than a dozen leaks to maintain adequate water flow and pressure," said Thiel.

While the herculean effort of firefighters, police, and utility workers kept the Caldor Fire from entering the neighborhoods, additional investments are needed to upsize waterlines and booster stations to increase fire hydrant flow throughout STPUD's service area.

STPUD continues to work with local, state, and federal partners to secure additional grant funds for fire suppression infrastructure.

*Shelly Thomsen is the public affairs and conservation manager for the South Lake Tahoe Public Utility District.*

tahoedePTH.org

TAHOE IN DEPTH ■ PAGE 5

### Tahoe firefighters share lessons from Caldor Fire in new video

<https://www.tahoedailytribune.com/news/tahoe-firefighters-share-lessons-from-caldor-fire-in-new-video/>

SOUTH LAKE TAHOE, Calif. – As the community celebrates 100% containment of the Caldor Fire, firefighters are sharing lessons learned from the fight to protect neighborhoods in Christmas Valley, Meyers, and South Lake Tahoe in a new [bilingual video](#) and a special issue of the Tahoe Regional Planning Agency's [Tahoe In Depth](#) newspaper.

Firefighters from Lake Valley Fire Protection District, South Lake Tahoe Fire Rescue and other local, state and federal firefighting agencies noted that in the months and weeks prior to the fire, residents took important steps that helped save their homes such as moving firewood away from homes, cleaning up pine needles, and preparing for a potential evacuation. "It was inspiring to see that residents did what they could to help us help them. It really made a difference," said Kim George, a fire captain with South Lake Tahoe Fire Rescue, in a press release.

### Securing Funding for Fire Flow Needs

Since 2008, more than \$3,000,000 in federal funds have been matched (50/50) by from partnership members. In 2016, Sustainable Community Advocates brought forth on behalf of TWSA and individual water suppliers, an initiative to Secure TRPA approval to add Specific Water Supply and Transmission Projects that Improve Firefighting Capability to the adopted list of Environmental Improvement Program



## (EIP) Projects (Expand Focus Area 02 – Forest Management).

The purpose of this request from the Tahoe Basin Fire Chiefs and members of the Tahoe Water Suppliers Association (TWSA) that TRPA formally add specific water supply and transmission projects that improve firefighting capability to the list of projects adopted in the Lake Tahoe EIP (Expand Focus Area 02 - Forest Management). Consistent with the provisions of TRPA Code Chapter 15, the TRPA Governing Board delegates to its Executive Director the authority to approve this request, so long as it meets the eligibility criteria set forth in Chapter 15.

As a result of the Angora Fire in 2007, and re-prioritized due to the Caldor Fire, emphasis was placed in the Tahoe Basin on developing adequate water supply and services to address fire flow needs. Public water systems in the Tahoe Basin were designed for daily, community water use needs; they were not designed to provide the continuous, high volume output of water needed for firefighting in the “wildland urban interface” which characterizes many Tahoe neighborhoods. TWSA members have been actively working to secure funding for infrastructure upgrades including: storage tank replacements, booster stations, interties between separate water systems, and emergency power systems to provide additional water supply in case of emergency.

### Tahoe Douglas Fire Boat

<https://www.tahoe-fire.org/news/entry/tdfpd-fire-flow-initiative-program>

#### FIRE FLOW INITIATIVE - NEW FIRE BOAT



As part of the Fire Engineer's recommendation, the District has ordered a new fire boat, which is currently being built to our specifications in Wisconsin. The new boat will be equipped with a Skyhook digital anchoring system and joystick steering in the wheelhouse and on the bow, which are safety features that make piloting the boat easier during an emergency response. It will be capable of pumping 1,500 gallons per minute,

is designed to allow anchoring on the beach and connection to standpipes. The boat will have a fast response time, as it will be powered by twin 350HP Mercury Verados capable of traveling up to 45 mph. Other features are GPS, sonar, search lights, and Forward Looking Infrared Radar (FLIR). Fallen Leaf Lake Fire has FLIR on their boat which they have used to assist Search and Rescue efforts in the water and on land by locating missing hikers from the water with the infrared. It will also have a landing-craft door, which lowers into the water for safer rescue of victims.

A project team of firefighters reviewed specifications for the design, will continue to monitor the construction, and will coordinate training when the boat is delivered in November. The cost of the boat is approximately \$500,000 and has been paid for by donations and fees from homeowners opting to participate in the FFI program. The manufacturer, Lake Assault, said that the boat will be well-built and if properly maintained, should last 20 years.



Tuesday Sep 17, 2024 - **Tahoe TAP Podcast: Tahoe Water for Fire Suppression Partnership** - Enjoy this fascinating discussion on how Tahoe is preparing for the future efforts to protect this beautiful region.

[Ep. 48 - Tahoe Water for Fire Suppression Partnership](https://tahoetap.podbean.com/e/ep-48-tahoe-water-for-fire-suppression-partnership)

<https://tahoetap.podbean.com/e/ep-48-tahoe-water-for-fire-suppression-partnership>

Join hosts Mike Peron and Rob Galloway for another exciting episode of Things, Adventure, and People, where we dive deep into all things Tahoe! In this episode, we kick off with a local news roundup, covering the top stories from around the Tahoe region.

Then, we shift gears to focus on the [Tahoe Water for Fire Suppression Partnership](#), a vital bi-state collaboration formed in response to the [2007 Angora Fire](#). We're joined by three special guests: Justin Broglio (PIO at [North Tahoe PUD](#)), Shelly Thomsen (Director of Public and Legislative Affairs at [South Tahoe Public Utility District](#)), and Kim Boyd (Director of Strategic Affairs at [Tahoe City Public Utility District](#)).

Together, they share how the partnership is working to upgrade the region's outdated water infrastructure—originally designed for summer cabins—to better support firefighting efforts. This includes installing new fire hydrants, upsizing waterlines, and adding emergency generators and water storage tanks. Since 2009, the partnership has leveraged \$20 million in federal funding to implement over \$52 million in critical fire suppression projects, with an additional \$120 million needed over the next five years to safeguard Tahoe's communities from wildfire.

### **Tahoe Water for Fire Suppression Partnership (TWFSF)**

<https://tahoewaterforfire.org>

TWFSF is a bi-state collaboration of Lake Tahoe Basin water agencies formed in response to the 2007 Angora Fire. The Partnership's mission is to accelerate the installation of a resilient water infrastructure to address fire suppression needs. Robust water infrastructure serves a vital purpose to protect the environment, economy, and people against catastrophic wildfire. TWFSF works closely with our local and regional Fire Protection agencies to advance support for critical fuels management and water infrastructure projects.

Water Infrastructure for Firefighting = Maintaining and upgrading the region's aging water infrastructure



to provide critical water to defend our communities against catastrophic wildfires.

- Investing in fire suppression infrastructure in our communities
- Improving fire hydrant coverage
- Replacing old, undersized waterlines
- Increasing water storage capacity
- Increasing water distribution capacity
- Creating interconnections between public and private water systems
- Collaborating to address the patchwork of small, geographically isolated, and undersized water systems in the Lake Tahoe Basin

The Partnership installs Water Infrastructure for Firefighting that upgrades the region's antiquated water infrastructure, originally built only to support summer cabins. This includes the installation of new fire hydrants, upsized waterlines, new water storage tanks, emergency generators, and critical interties between the public and private water companies.



### **Fuels Reduction Plans for the Lake Tahoe Basin**

#### **Updated Lake Tahoe Basin Community Wildfire Protection Plan**

<https://www.tahoelivingwithfire.com/resources-tahoe-basin-wildfire-protection-plan-update/>

The Lake Tahoe Basin Community Wildfire Protection Plan (CWPP) is being updated to reflect the needs of local communities around the basin. Funded by the California Tahoe Conservancy (CTC), the update is a collaborative effort between federal, state, and local agencies, along with community stakeholders, to reduce the risk of catastrophic wildfires in our area. The last update for the Tahoe Basin's CWPP was nearly 7 years ago and a lot has changed on the landscape in those seven years including the completion of many fuels reduction projects, substantial development of Fire Adapted Communities, and the impacts of the Caldor Fire in South Lake Tahoe.

The purpose of the CWPP update is to ensure that the plan remains current and reflects the changing conditions and needs of our community. It will incorporate the latest technology and best practices for wildfire management and prevention, as well as the input and feedback of community members. CWPPs are essential as they help reduce the risk of catastrophic wildfires and increase the resilience of communities.

- **Create fire-adapted communities:** The plan provides mitigation strategies and community-driven action plans to help create communities where citizens are engaged and active in preparing for wildfire. It facilitates interagency cooperation and strengthens communication and support between agencies and the public.
- **Restore and maintain fire-resilient landscapes:** The plan provides prioritized locations for fuel reduction treatments to enable land managers to effectively work across jurisdictions and address risks to ecosystems and communities at a landscape scale.
- **Provide effective and efficient wildfire response:** The plan provides strategic treatments on the landscape that will facilitate safer and more successful suppression. This plan provides for tracking, reporting, and sharing of both fuel reduction accomplishments and homeowner/community initiatives.

#### **Lake Tahoe Basin Management Unit (LTBMU)**

Most of the communities in the Lake Tahoe Basin are listed on the national federal registrar for communities at risk of catastrophic fire (LTEEC 2004). A majority of the land in the Tahoe Basin is owned by the US Forest Service, Lake Tahoe Basin Management Unit (LTBMU). LTBMU actively completes

control burns annually to reduce the risk of a catastrophic fire in the Basin. The Lake Tahoe Basin Management Unit prescribed burns are updated regularly at <http://www.fs.fed.us/r5/ltbmu/fire/current.shtml>.

### **Angora Fire 2007**

The Angora Fire began on June 24, 2007 in the North Upper Truckee area in South Lake Tahoe, California and was fully contained on July 2, 2007. It burned in a particularly sensitive area: a watershed that provides a quarter of the water that runs into the lake. About 10 percent of the watershed was destroyed. The Angora Fire burned approximately 3,100 acres of land area in the southwest portion of the Lake Tahoe Basin, California. Undeveloped montane, mixed conifer forest habitat was the dominant land type within the burn area, but significant areas of urban development were also affected.

### **Angora Fire Effect on Water Supply**

TWSA water purveyors have indicated no changes in raw water intake turbidity readings due to the Angora Fire. Unlike the east and north shores, the majority of South Lake Tahoe water supplies are fed from groundwater sources, which are less affected by erosion than the lake source intakes.

### **Lake Tahoe Basin Management Unit (LTBMU) Monitoring Strategy for the Angora Burn Area**

[http://www.fs.fed.us/r5/ltbmu/documents/angora-fire/angora\\_restoration/2009\\_Docs/Angora\\_Restoration\\_Prop\\_Action\\_02\\_11\\_2009\\_FINAL.pdf](http://www.fs.fed.us/r5/ltbmu/documents/angora-fire/angora_restoration/2009_Docs/Angora_Restoration_Prop_Action_02_11_2009_FINAL.pdf)

In the immediate aftermath of the Angora Fire, the Lake Tahoe Basin Management Unit moved quickly to determine monitoring and assessment needs related to impacts on US Forest Service lands, as well as consequent effects to downslope and downstream resources. Monitoring questions and strategies were identified which would provide essential information to evaluate the impacts of the fire on forest resources and establish a baseline for evaluation of natural recovery and restoration efforts. These monitoring strategies are currently being evaluated as part of planning for the Angora Phase III Restoration Project. The current monitoring strategy is described in this document.

In addition to the studies undertaken by the Forest Service, a small number of studies by other organizations have been granted area access permits to allow researchers and other agencies' staffs to conduct their own research and monitoring efforts and/or to assist the USFS in its data collection efforts. The long term monitoring strategy will be defined as part of the environmental analysis conducted for the Angora Fire Restoration Project.

### **Formation of the California-Nevada Tahoe Basin Fire Commission**

[http://www.nltfpd.net/pdfs/TahoeBasinFireRpt\\_Findings.pdf](http://www.nltfpd.net/pdfs/TahoeBasinFireRpt_Findings.pdf)

As a result of the Angora Fire, the California-Nevada Tahoe Basin Fire Commission was formed as a bi-state management planning committee, tasked with streamlining defensible space planning and fuels reduction projects, in the fall of 2007. The California-Nevada Tahoe Basin Fire Commission completed a comprehensive review of the laws, policies, and practices that affect the vulnerability of the Tahoe Basin to wildfires. The Commission also looked at the myriad of natural and human factors that make this Basin so unique, but also render it uniquely susceptible to the occurrence and deleterious impacts of wildfires.

### **Commission's findings relative to water quality**

The unique water quality and clarity of Lake Tahoe is a natural resource of global significance and is dependent on protection from catastrophic wildfires in the Lake Tahoe Basin. Lake Tahoe is one of the three clearest lakes of its size in the world. The water quality of the Lake and its tributaries is fundamental to the scenic quality and global significance of the Lake Tahoe Basin, yet water quality

depends on a fragile balance among soil, vegetation, and human impact. The focus of water quality protection in the Basin is to minimize human disturbance, and to reduce or eliminate the addition of pollutants that result from development or other disturbance. There is perhaps no single disturbance event with greater potential deleterious impact on the Lake than a catastrophic wildfire.

## **Tahoe Climate Assessment / Water & Waste Water Infrastructure**

### **Integrated Vulnerability Assessment of Climate Change in the Lake Tahoe Basin 2020**

[https://tahoe.ca.gov/wp-content/uploads/sites/257/2020/04/Integrated-Vulnerability-Assessment-of-Climate-Change-in-the-Lake-Tahoe-Basin\\_2020.pdf](https://tahoe.ca.gov/wp-content/uploads/sites/257/2020/04/Integrated-Vulnerability-Assessment-of-Climate-Change-in-the-Lake-Tahoe-Basin_2020.pdf)

Key climate change hazards threaten the Basin’s built environment with damage and/or disruption.

#### **Water Treatment and Flooding**

Wastewater is conveyed out of the Basin via underground pipes, which could become exposed and damaged from flooding and erosion following extreme precipitation events. In addition, lift stations tend to be located in low-lying areas, with several stations in or near 100-year floodplains. Sewer systems could be inundated from storm water leaking into manholes. Peak streamflow and runoff are projected to increase by an average of about 16 percent for six modeled catchments in the Basin by mid-century.

#### **Hazard 1: Extreme Precipitation, Runoff, and Flooding**

Projected changes in precipitation patterns for the Basin—such as an increase of both rain-on-snow events and heavy rainfall occurrences—are likely to result in larger and more frequent “extreme” flooding events (i.e., floods that meet or exceed the current 100-year flood threshold). Flooding from overflowing rivers, creeks, ravines, or lowland areas may disrupt critical roadways—many of which have few alternative routes—as well as bike paths and recreation facilities. Flooding can also damage sensitive equipment located on or near ground level. Equipment such as water pumps, communications devices, or electrical switches at substations may be subject to damage from flooding. Erosion related to flooding can undermine roadbeds, scour bridges, and impact power poles, pipelines, and other physical infrastructure. Wastewater removal and treatment infrastructure in the Basin is particularly vulnerable to flooding. The STPUD wastewater treatment plant is partially located in a 100-year flood zone, although land survey data shows that facilities at the plant are above the 100-year flood elevation. Inundation here, at sewer lift stations, or elsewhere that causes wastewater to runoff into the Lake, could cause significant ecological harm. Likewise, flooding could overwhelm the Basin’s existing storm water detention basins, adding large volumes of particulates and other runoff pollutants to Lake Tahoe.

#### **Hazard 2: Extreme Precipitation and Landslides**

Landslide hazards result from a complex interaction of geology, hydrology, and ecological systems. Climate-related factors, such as the projected change in soil moisture and extreme precipitation, are important risk factors for landslide and debris flow. Landslides can severely damage infrastructure located on or below a sliding slope, such as roads, pathways, power and communications lines, water storage tanks, and pipelines. Landslides also cause lengthy disruptions as tons of rock, soil, and debris must be removed to restore service. The highways connecting Basin communities traverse high mountain passes, canyons, and cuttings alongside potentially hazardous slope zones. In areas already prone to landslide hazards (e.g., State Route 89 around Emerald Bay), projected increases in the frequency and intensity of extreme precipitation events may increase the frequency of landslides.

#### **Hazard 3: Snowpack and Avalanche**

Climate models for all scenarios project a decline in the Basin’s maximum snowpack, which is the main

climate-related factor affecting avalanche hazard. A decline in peak snowpack indicates a likely reduction in the number, frequency, and severity of slab avalanches. However, while the number and severity of avalanches are likely to decline, visitor traffic to the Basin is projected to increase in the future, particularly during winter seasons with heavy snowfall. This could increase the number of people exposed to avalanche hazards.

#### **Hazard 4: Wildfire**

The current wildfire threat to infrastructure varies significantly across the Basin, depending mainly on the proximity of infrastructure to combustible fuels. Moreover, climate change is projected to affect risk factors that both increase and decrease the wildfire hazard in the Basin. Climate models project changes to temperature and hydrology that affect the growth and accumulation of combustible vegetation. This influences projected wildfire intensity geographically within the Basin and across emissions scenario/projection timeframes. In all scenarios, increases in fire intensity (as indicated by the projected size of a potential fire were one to occur) are projected in the mountains west and south of the Lake. Because climate change can reduce wildfire risk factors such as vegetation growth and density of combustible fuels, fire intensity may increase or decrease depending on the location in the Basin. Throughout the rest of the Basin, the direction and degree of change vary across emissions scenarios and timeframes.

## VIII. POLLUTION CONTROLS

General methods for controlling pollution in watersheds include: obtaining written agreements with public landowners; participation in regional planning efforts; public education; collaboration between watershed stakeholders and regulators, emergency response programs, and securing funding for watershed programs (EPA 2003). The Tahoe Water Suppliers Association (TWSA) designs programs to meet EPA guidelines and local regulations.

This chapter is a summary of TWSA and Tahoe Basin regional agency control activities during the reporting year including: regulatory changes, environmental improvement projects, public education, mapping and spill reporting projects.

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**CA Drinking Water Program transferred from the Department of Public Health to State Water Board.** A major reorganization of the state agency was implemented in 2014.

[http://www.waterboards.ca.gov/drinking\\_water/programs/index.shtml](http://www.waterboards.ca.gov/drinking_water/programs/index.shtml)

### 2014 Reorganization Summary

CA State policy declares that every human being has the right to clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes [AB 685 (Eng, Chapter 524, Statutes of 2012)].

The Administration had evaluated the current governance structure of the state's drinking water and water quality activities and concluded that aligning the state's drinking water and water quality programs in an integrated organizational structure would best position the state to both effectively protect water quality and the public health as it relates to water quality, while meeting current needs and future demands on water supplies.

With the Legislature's approval and appropriate legislation, this alignment was achieved by moving the Drinking Water Program from the Department of Public Health to the State Water Board on July 1, 2014.

The Administration's goal in transferring the Drinking Water Program is to align the state's water quality programs in an organizational structure that:

- 1) Consolidates all water quality regulation throughout the hydrologic cycle to protect public health and promote comprehensive water quality protection for drinking water, irrigation, industrial, and other beneficial uses;
- 2) Maximizes the efficiency and effectiveness of drinking water, groundwater, and water quality programs by organizing them in a single agency whose primary mission is to protect water quality for beneficial uses including the protection and preservation of public and environmental health;

DRINKING WATER PROGRAM / ADMINISTRATIVE STAFFING AT DEPARTMENT OF PUBLIC HEALTH	
Drinking Water Program Staffing	Number of Staff
Executive Division	15
Operator Certification	7
Drinking Water Technical (SRF)	40.5
Regulatory - Northern CA	77.5
Regulatory - Southern CA	104
ELAP	25
<b>TOTAL Drinking Water Program</b>	<b>269</b>
Administrative Staffing	Number of Staff
Administrative Staff	6
Legal Division	5
Legislation/Public Affairs	1
Information Technology	10
<b>TOTAL Administrative Staff</b>	<b>22</b>
<b>TOTAL Permanent Staff</b>	<b>291</b>
<i>NOTE: The total number of Drinking Water Program staff includes 291 permanent staff positions as well as temporary help.</i>	



- 3) Continues focused attention on providing technical and financial assistance to small, disadvantaged communities to address their drinking water needs;
- 4) Consolidates financial assistance programs into a single state agency that is focused on protecting and restoring California water quality, protecting public health, and supporting communities in meeting their water infrastructure needs;
- 5) Establishes a one-stop agency for financing water quality and supply infrastructure projects;
- 6) Enhances water recycling, a state goal, through integrated water quality management; and
- 7) Promotes a comprehensive approach to communities' strategies for drinking water, wastewater, water recycling, pollution prevention, desalination, and storm water.

### **US EPA Regulatory Changes**

#### **EPA Emerging Contaminants Sampling (5th UCMR) to begin 2023-2025**

Beginning in 2023, water will begin mandatory water sample collections in compliance with the Fifth Unregulated Contaminant Monitoring Rule (URCM 5) established by the U.S. Environmental Protection Agency (EPA). URCM 5 requires nationwide monitoring for 29 per- and polyfluoroalkyl substances (PFAS) and lithium in public drinking water systems from 2023 – 2025. Microplastics, such as polytetrafluoroethylene used as nonstick coating on cooking pans, can be composed of PFAS meaning they will be monitored in the municipal waters of Lake Tahoe under URCMR5.



IVGID, KGID and TCPUD have registered to begin sampling in 2023.

Medium and Small PWS public water system (PWS) are subject to the requirements of the next [Unregulated Contaminant Monitoring Rule \(UCMR 5\)](#), published on December 27, 2021 (86 FR 73131). UCMR 5 requires certain PWS to collect drinking water samples for 29 per- and polyfluoroalkyl substances (PFAS) (microplastics) and lithium analysis during a 12-month period between 2023 and

The UCMR dataset is one of the primary sources of information on occurrence and population exposure used to develop regulatory decisions for contaminants in the public drinking water supply by EPA. The Safe Drinking Water Act was amended in 2018 and now specifies that a nationally representative sample of PWSs serving fewer than 3,300 people as of February 1, 2021 are required to participate in UCMR.

### **Perchlorate in Drinking Water**

[https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/Perchlorate.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Perchlorate.html)

The Division of Drinking Water (DDW), at a [July 5, 2017 public hearing](#), presented to the State Water Board its findings and recommendations related to DDW's review of the perchlorate maximum contaminant level (MCL). DDW's recommendations (see the [Perchlorate Review Public Document](#)) were to first establish a lower detection limit for purposes of reporting (DLR) to gather additional occurrence data, and then revise the MCL, if the new data support development of a new standard.

The State Water Board approved DDW's proposal to investigate, develop, and propose revisions to the perchlorate DLR (see [Resolution 2017-0041](#)). The Perchlorate Detection Limit for Purposes of Reporting (DLR) has been approved. The rule was scheduled to take effect July 1, 2021. Information on the current status of the regulation can be found on the [perchlorate regulation webpage](#).

Perchlorate and its salts are used in solid propellant for rockets, missiles, and fireworks, and elsewhere (e.g., production of matches, flares, pyrotechnics, ordnance, and explosives). Their use can lead to releases of perchlorate into the environment.

South Lake Tahoe has selected locations with perchlorate issues. Visit: [www.stpud.us/groundwater](http://www.stpud.us/groundwater)

The California Department of Public Health (CDPH) – (via the Drinking Water Program, now the State Water Board, Division of Drinking Water) was mandated by §116293(b) of the Health and Safety Code to adopt a drinking water standard for perchlorate [maximum contaminant level (MCL)]. Health and Safety Code §116365 mandates that the MCL be set as close as possible to the public health goal (PHG), while considering cost and technical feasibility. The PHG is the concentration of a drinking water contaminant that does not pose a significant risk to human health if ingested in drinking water, established by Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA).

Health and Safety Code §116365(g) requires the State Water Board, at least once every five years, to review its MCLs. In the review, the State Water Board's MCLs are to be consistent with criteria of §116365(a) and (b). Those criteria state that the MCLs cannot be less stringent than federal MCLs, and must be as close as is technically and economically feasible to the PHGs established by the OEHHA. Consistent with those criteria, the State Water Board is to amend any standard if any of the following occur: (1) Changes in technology or treatment techniques that permit a materially greater protection of public health or attainment of the PHG, or (2) New scientific evidence indicates that the substance may present a materially different risk to public health than was previously determined. Each year by March 1, the State Water Board is to identify each MCL it intends to review that year. In 2015, OEHHA revised the PHG for perchlorate from 6 ppb to 1 ppb. The revised PHG prompted the review of the perchlorate MCL.

#### **Long Term 2 Enhanced Surface Water Treatment Rule (LT2 rule/ LT2ESWTR)**

<http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/index.cfm>

The deadline for compliance was October 1, 2014. All TWSA members have achieved compliance or were exempted due to existing treatment processes. Information on TWSA member compliance is available in "Chapter V - Description of the Water Supply".

The USEPA developed the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 rule/LT2ESWTR) to improve drinking water quality and provide additional protection from disease-causing microorganisms and contaminants that can form during drinking water treatment. Pathogens, such as *Giardia* and *Cryptosporidium*, are often found in water, and can cause gastrointestinal illness (e.g.,

diarrhea, vomiting and cramps) and other health risks. In many cases, water needs to be disinfected through the use of additives such as chlorine to inactivate (or kill) microbial pathogens.

Existing regulations did not require unfiltered systems to provide any treatment for *Cryptosporidium*. Although unfiltered systems maintain watershed control programs to protect water quality, recent national surveys have shown *Cryptosporidium* to be present in the sources of unfiltered systems. Without treatment, these *Cryptosporidium* will pass into the water distributed to consumers. Available data indicate that the average risk from *Cryptosporidium* in unfiltered systems is higher than in filtered systems, so that treatment by unfiltered systems is required to achieve comparable public health protection. Further, with available technologies like UV and ozone, treatment for *Cryptosporidium* is feasible for all unfiltered systems. Consequently, EPA is establishing requirements under the LT2ESWTR for all unfiltered systems to treat for *Cryptosporidium*, with the required degree of treatment depending on the source water contamination level.

### **CALIFORNIA Revised Total Coliform Rule (RTCR) Overview** [Final Regulation Text](#)

Beginning July 1, 2021, the California Revised Total Coliform Rule (RTCR) became effective. The revisions include the new Coliform Treatment Technique requirement replacing the Total Coliform MCL, and a new *E. coli* MCL regulatory limit. The Revised Total Coliform Rule establishes a “find-and-fix” approach for investigating and correcting causes of coliform problems within water distribution systems.

#### **Bacteriological Sample Siting Plans**

Existing bacteriological sample siting plans will comply with the new Federal RTCR requirements provided the plans:

1. Identify repeat sample locations for each routine sample location
2. Identify triggered source sampling needed to comply with the Groundwater Rule
3. Identify the sample schedule and rotation plan among sampling sites for collection of routine, repeat and triggered source sampling

#### **US EPA Revised Total Coliform Rule (RTCR) – Final Rule**

[http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation\\_revisions.cfm](http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm)

[Revised Total Coliform Rule: A Quick Reference Guide \(PDF\)](#)

EPA 815-B-13- 001, September 2013

Public water systems (PWSs) and primacy agencies were required to comply with the revised requirements by April, 2016. Until then, PWSs and primacy agencies must continue complying with the [1989 TCR](#). On February 13, 2013, EPA published in the Federal Register the revisions to the 1989 TCR. EPA anticipates greater public health protection under the Revised Total Coliform Rule (RTCR). The RTCR:

- Requires public water systems that are vulnerable to microbial contamination to identify and fix problems; and
- Establishes criteria for systems to qualify for and stay on reduced monitoring, which could reduce water system burden and provide incentives for better system operation.

The RTCR establishes a maximum contaminant level (MCL) for *E. coli* and uses *E. coli* and total coliforms to initiate a “find and fix” approach to address fecal contamination that could enter into the

distribution system. It requires public water systems (PWSs) to perform assessments to identify sanitary defects and subsequently take action to correct them.

### The Revised Total Coliform Rule

Date of Implementation: April 1, 2016 / Date of Regulation: February 13, 2013

EPA finalized the Revised Total Coliform Rule (RTCR). The RTCR maintains the purpose of the 1989 Total Coliform Rule (TCR) to protect public health by ensuring the integrity of the drinking water distribution system and monitoring for the presence of microbial contamination. EPA anticipates greater public health protection under the RTCR, as it requires public water systems (PWSs) that are vulnerable to microbial contamination to identify and fix problems, and it establishes criteria for systems to qualify for and stay on reduced monitoring, thereby providing incentives for improved water system operation.

The RTCR, as with the 1989 TCR, is the only microbial drinking water regulation that applies to all PWSs. Systems are required to meet a legal limit (i.e., maximum contaminant level (MCL)) for *E. coli*, as demonstrated by required monitoring. The RTCR specifies the frequency and timing of the microbial testing by water systems based on population served, system type, and source water type. The rule also requires public notification when there is a potential health threat as indicated by monitoring results, and when the system fails to identify and fix problems as required.

The entities potentially affected by the RTCR are PWSs that are classified as community water systems (CWSs) (e.g., systems that provide water to year round residents in places like homes or apartment buildings) or non-community water systems (NCWSs) (e.g., systems that provide water to people in locations such as schools, office buildings, restaurants, etc.); State primacy agencies; and local and tribal governments. The RTCR applies to approximately 155,000 PWSs that serve approximately 310 million (M) individuals.

The RTCR establishes a health goal (maximum contaminant level goal, or MCLG) and an MCL for *E. coli*, a more specific indicator of fecal contamination and potential harmful pathogens than total coliforms. EPA replaces the MCLG and MCL for total coliforms with a treatment technique for coliforms that requires assessment and corrective action. Many of the organisms detected by total coliform methods are not of fecal origin and do not have any direct public health implication.

What are the key provisions PWSs must comply with under the RTCR?

Provision Category	Key Provisions
Contaminant Level	Addresses the presence of total coliforms and <i>E. coli</i> in drinking water. For <i>E. coli</i> (EC), the Maximum Contaminant Level Goal (MCLG) is set at zero and the Maximum Contaminant Level (MCL) is based on the occurrence of a condition that includes routine and repeat samples. For total coliforms (TC), PWSs must conduct a Level 1 or Level 2 assessment of their system when they exceed a specified frequency of total coliform occurrence. Other events such as an MCL violation or failure to take repeat samples following a routine total coliform-positive sample will also trigger an assessment. Any sanitary defects identified during an assessment must be corrected by the PWS. These are the treatment technique requirements of the RTCR.

Monitoring	<p>Develop and follow a sample siting plan that designates the PWS's collection schedule and location of routine and repeat water samples.</p> <p>Collect routine water samples on a regular basis (monthly, quarterly, annually) and have them tested for the presence of total coliforms by a state certified laboratory.</p> <p>Analyze all routine or repeat samples that are total coliform positive (TC+) for E. coli.</p> <p>Collect repeat samples (at least 3) for each TC+ positive routine sample.</p> <p>For PWSs on quarterly or annual routine sampling, collect additional routine samples (at least 3) in the month after a TC+ routine or repeat sample.</p> <p>Seasonal systems must monitor and certify the completion of a state-approved start-up procedures.</p>
Level 1 and Level 2 Assessments and Corrective Actions	<p>☐PWSs are required to conduct a Level 1 or Level 2 assessment if certain conditions indicate that they might be vulnerable to contamination, and fix any sanitary defects within a required timeframe.</p>
Reporting and Recordkeeping	<p>PWSs are required to report certain items to their states. These reporting and recordkeeping requirements are essentially the same as under TCR with the addition of Level 1 and Level 2 requirements.</p>
Violations, Public Notification (PN) and Consumer Confidence Report (CCR)	<p>PWSs incur violations if they do not comply with the requirements of the RTCR. The violation types are essentially the same as under the TCR with few changes. The biggest change is no acute or monthly MCL violation for total coliform positive samples only.</p>
	<p>PN is required for violations incurred. Within required timeframes, the PWS must use the required health effects language and notify the public if they did not comply with certain requirements of the RTCR. The type of PN depends on the severity of the violation.</p> <p>Community water systems (CWSs) must use specific language in their CCRs when they must conduct an assessment or if they incur an E. coli MCL violation.</p>

### Lead and Copper Rule 2021

<http://water.epa.gov/lawsregs/rulesregs/sdwa/lcr/index.cfm>

<https://www.epa.gov/ground-water-and-drinking-water/revised-lead-and-copper-rule>

This final rule is effective December 16, 2021. Lead and copper enter drinking water primarily through plumbing materials. Exposure to lead and copper may cause health problems ranging from stomach distress to brain damage. On June 7, 1991, EPA published a regulation to control lead and copper in drinking water. This regulation is known as the Lead and Copper Rule (also referred to as the LCR or 1991 Rule). The treatment technique for the rule requires systems to monitor drinking water at customer taps. If lead concentrations exceed an action level of 15 ppb or copper concentrations exceed an action level of 1.3 ppm in more than 10% of customer taps sampled, the system must undertake a number of additional actions to control corrosion. If the action level for lead is exceeded, the system must also inform the public about steps they should take to protect their health and may have to replace lead service lines under their control. The U.S. Environmental Protection Agency (EPA) signed a final rule to extend the effective date of the Lead and Copper Rule (LCR) Revisions to December 16, 2021. This action represents the next step in [EPA's effort to take the time necessary to review the LCR Revisions](#) and ensure that it protects families and communities, particularly those that have been disproportionately impacted by lead in drinking water. This action allows the agency to continue conducting [virtual engagements](#) to gather valuable input from communities that have been impacted by lead and to seek feedback from national water associations, Tribes and Tribal communities, and EPA's state co-regulators.



This action also extends the revised LCR's compliance deadline to October 16, 2024 to ensure that drinking water systems and primacy states continue to have the full three years provided by the Safe Drinking Water Act to take actions needed for regulatory compliance. For more information, visit: <https://www.regulations.gov/docket/EPA-HQ-OW-2017-0300>.

#### Federal Register Notice: Lead and Copper Rule Revisions; Delay of Effective and Compliance

##### **Reduction of Lead in Drinking Water Act**

Date of implementation: January 4, 2014 / Date of Regulation: January 4, 2011

##### *Summary:*

Amends Safe Drinking Water Act (SDWA) Section 1417 – Prohibition on Use and Introduction into Commerce of Lead Pipes, Solder and Flux.

- Modifies the applicability of the prohibitions by creating exemptions.
- Changes the definition of “lead free” by reducing lead content from 8% to a weighted average of not more than 0.25% in the wetted surface material (primarily affects brass/bronze).
- Eliminated provision that required certain products comply with “voluntary” standards for lead leaching.
- Establishes statutory requirement for calculating lead content.

##### **Electronic Delivery of the CCR**

<http://water.epa.gov/lawsregs/rulesregs/sdwa/ccr/upload/ccrdeliveryoptionsmemo.pdf>

EPA evaluated several electronic delivery methods to determine which forms meet existing CCR Rule requirements as a part of the CCR Rule Retrospective Review. The EPA interpretive memorandum SDWA – Consumer Confidence Report Rule Delivery Options, dated January 2013, clarifies the requirements of the CCR Rule associated with the delivery of the CCR. The memorandum's attachment, Consumer Confidence Report Electronic Delivery Options and Considerations, provides an overview of electronic delivery methods and describes approaches for community water systems that may want to implement electronic delivery.

##### **Electronic Delivery**

The EPA's CCR Rule Retrospective Review evaluated several electronic delivery methods and discusses in the attachment a framework for electronic delivery methods that meet existing CCR Rule requirements. The EPA has identified two different approaches allowable under the current rule that a CWS could use in providing electronic delivery of CCRs to its bill-paying customers: 1) paper CCR delivery with a customer option to request an electronic CCR, or 2) electronic CCR delivery with a customer option to request a paper CCR. CWSs should consider a combination of delivery methods (described in the memorandum's attachment) for their CCRs based on available technology and the preferences of their customer base. The attachment to this memorandum provides important considerations for CWSs that choose to implement CCR electronic delivery. The EPA recommends that CWSs provide options for their customers that are cost-effective and practicable for the CWS, as well as convenient and understandable for their customers. Because this is a new and rapidly changing environment, the EPA recommends that primacy agencies reach out to their CWSs and provide assistance to ensure that methods of electronic delivery being considered by CWSs meet CCR Rule requirements.

## California Emerging Contaminants Regulations

[https://www.waterboards.ca.gov/drinking\\_water/programs/](https://www.waterboards.ca.gov/drinking_water/programs/)

California has ongoing, regulatory requirements for testing, monitoring and reporting on emerging contaminants of concern, beyond USEPA regulations. There are now requirements for testing a variety of potential contaminants, including chemicals and micro-plastics.

### 2019-25: Microplastics as an Emerging Contaminant

TWSA staff are actively engaged on this topic. As stated in [Health and Safety Code section 116350 et seq.](#), California Safe Drinking Water Act (Act) requires the State Water Resources Control Board (State Water Board) to administer provisions related to drinking water to protect public health. The Act allows the State Water Board to conduct research, studies, and demonstration programs to ensure provision of a dependable, safe supply of drinking water, which may include improving methods to identify and measure the existence of contaminants in drinking water and to identify the source of the contaminants. The Act also grants the State Water Board the authority to implement regulations that may include monitoring of contaminants, and requirements for notifying the public of the quality of the water delivered to customers. On September 28, 2018, [Senate Bill No. 1422](#) was filed with the Secretary of State, adding [section 116376 to the Health and Safety Code](#), and requiring the State Water Board to adopt a definition of microplastics in drinking water on or before July 1, 2020, and on or before July 1, 2021, to adopt a standard methodology to be used in the testing of drinking water for microplastics and requirements for four years of testing and reporting of microplastics in drinking water, including public disclosure of those results.

*Proposed Action - Consistent with [Health and Safety Code section 116376](#) and within its authority, the State Water Board is reviewing existing research and studies to accomplish the following tasks:*

On or before July 1, 2020: Adopt a definition of microplastics in drinking water;

On or before July 1, 2021: Adopt a standard methodology for testing of microplastics in drinking water; Adopt requirements for four years of testing and reporting of microplastics in drinking water, including public disclosure of those results;

- Consider issuing quantitative guidelines (e.g., notification level) to aid consumer interpretations of the testing results, if appropriate;
- Accredited qualified laboratories in California to analyze microplastics in drinking water.

[Health and Safety Code section 116376](#) allows the State Water Board to implement these tasks through the adoption of a Policy Handbook that is not subject to the Administrative Regulations and Rulemaking requirements of [Government Code section 11340 et seq.](#)

Microplastics are defined as “solid polymeric materials to which chemical additives or other substances may have been added” and which have “at least three dimensions that range from 1 nm to 5 mm in size” consistent with the definition adopted by the State Water Resources Control Board in 2020. Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded. Further, plastic particles larger than 5 mm in size are considered macroplastic.

### Economic Funding for Restoration Projects

Projects and studies used to understand, analyze and mitigate environmental problems such as storm water runoff and aquatic invasive species requires large amounts of funding. Prior to 2011, Lake Tahoe had a significant influx of federal money (often matched with state and local government funds) coming in to support an array of research projects, environmental improvement and capital improvement projects. Although not immediately apparent, since several large projects were being completed from prior funding. Loss of federal funding signaled a drastic slowdown in water quality improvements for the region. Some funding was reinstated in 2016, with the passage of another round of the multi-year Tahoe Restoration Act. Much of that allocation is for fuels reduction.

This influx of funding had been revitalized with new allocations. There is now an increased emphasis on private-public partnerships to accomplish restoration goals.

In 1997, Executive Order 13057 established the Tahoe Federal Interagency Partnership including the Secretary of Agriculture, the Secretary of the Interior, the Secretary of Transportation, the Administrator of the Environmental Protection Agency, and the Secretary of the Army. Representation has been delegated to nine federal agencies: USDA Forest Service, Natural Resources Conservation Service, Bureau of Land Management, U.S. Geological Survey, Bureau of Reclamation, U.S. Fish and Wildlife Service, Federal Highway Administration, Environmental Protection Agency, and U.S. Army Corps of Engineers.



### 2024: Congress Approves Lake Tahoe Restoration Reauthorization Act

[https://www.trpa.gov/congress-approves-lake-tahoe-restoration-reauthorization-act/?fbclid=IwY2xjawFhLDJleHRuA2FlbQlxMAABHWdb1kCtIXnA0ipVr6NklSqowlbRW\\_4ALzkHKtTkEMn3TxvZGE9FHeL4Q\\_aem\\_o85o30vz0Ka3ybUq9XkoNg](https://www.trpa.gov/congress-approves-lake-tahoe-restoration-reauthorization-act/?fbclid=IwY2xjawFhLDJleHRuA2FlbQlxMAABHWdb1kCtIXnA0ipVr6NklSqowlbRW_4ALzkHKtTkEMn3TxvZGE9FHeL4Q_aem_o85o30vz0Ka3ybUq9XkoNg)

9/24/2024 - A partnership of Lake Tahoe agencies applauded Congress today for its passage of a bill to reauthorize the Lake Tahoe Restoration Act (LTRA), which is the cornerstone of federal investment in the [Lake Tahoe Environmental Improvement Program \(EIP\)](#), one of the most comprehensive and successful conservation programs in the nation.

The approval extends existing funding authorizations for approximately \$300 million to 2034 and continues federal support for priority EIP projects to protect and restore Lake Tahoe. Since the EIP was formed in 1997, public and private sector partners have completed more than 830 projects including wetland restoration, bike trails, forest fuel reduction, and aquatic invasive species prevention and control. The federal commitment has helped leverage local, state, and private investments which together total more than \$2.8 billion in environmental improvements.

Known as Team Tahoe, the EIP is a partnership of more than 80 public, tribal, and non-profit organizations.

“The Lake Tahoe Region is grateful to Congress for their leadership in passing this critical piece of legislation to continue the collaborative work to protect and restore Lake Tahoe,” [Tahoe Regional Planning Agency](#) Executive Director Julie Regan said. “Extending the federal investment in the EIP will leverage millions of dollars in state and local funding to implement the top priority projects for the lake and our communities.”

Rosalie Herrera, Deputy Forest Supervisor for the [Lake Tahoe Basin Management Unit](#), said “USDA has testified in support of S. 612 as these federal funds will continue to allow work with states, local governments, and other public and private entities to provide for fuel reduction, erosion control, reforestation, watershed restoration, and invasive plant projects on federal and non-federal lands in the Lake Tahoe Basin”

Since LTRA was authorized in 2016, \$122 million in federal funds have supported EIP partners in treating 21,000 acres of forest to reduce wildfire risk, restoring 342 acres of wetlands to protect biodiversity and the lake’s clarity, and inspecting 51,000 boats for aquatic invasive species. These federal funds have been matched by \$500 million in state, local, tribal, and private matching funds. Additionally, the EIP supports an average of 1,700 jobs a year and every \$1 million in spending generates \$1.6 million in economic output.

“In the thick of election season, the successful bipartisan effort to pass the Lake Tahoe Restoration Reauthorization Act is something the whole country can celebrate,” said Dr. Darcie Goodman Collins, CEO of [League to Save Lake Tahoe/Keep Tahoe Blue](#). “In every conversation we have with lawmakers, we hear nothing but commitment to protect this national treasure. Working together is how we’ll continue to Keep Tahoe Blue.”

“We are thrilled about the extension of the LTRA, and are so grateful to the extraordinarily hard-working senators, congresspeople and staff members who represent us in Washington,” said [Tahoe Fund](#) CEO Amy Berry. “An enormous amount of work goes into preserving this pristine natural treasure enjoyed by so many. Our champions in Congress and the resources provided through the LTRA continue to inspire our generous donors to contribute to the long-term health of Lake Tahoe.”

**2023 Lake Tahoe Restoration Act – March 2023**  
<https://www.keeptahoeblue.org/advocacy/ltra/>

**Cortez Masto Leads Bipartisan, Bicameral Bill to Reauthorize Lake Tahoe Restoration Act - Bipartisan legislation reauthorizes \$415 million in funding through September 30, 2034 to reduce the threat of wildfire, combat invasive species, improve water clarity, and restore the environment in the Lake Tahoe Basin.**

U.S. Senator Cortez Masto (D-Nev.) introduced her bipartisan, bicameral legislation to extend the authorization of the *Lake Tahoe Restoration Act*. This law has delivered millions in federal funding to Lake Tahoe since the original law passed in 2000, supporting environmental protection and habitat restoration programs across the basin. This legislation is supported by Senators Jacky Rosen (D-Nev.), Dianne Feinstein (D-Calif.), and Alex Padilla (D-Calif.) and Representatives Mark Amodei (R-Nev.-02), John Garamendi (D-Calif.-03), Dina Titus (D-Nev.- 01), Susie Lee (D-Nev.-03), and Steven Horsford (D-Nev.-04).

“We’ve made incredible progress in preserving Lake Tahoe for future generations, but there is still more to do to protect the lake from the impacts of pollution, the threat of invasive species, and the increasing number of visitors who come to enjoy the lake each year,” said Senator Cortez Masto. “Reauthorizing this critical legislation will ensure the communities around Lake Tahoe continue to have the resources they need to support local jobs, welcome tourists, and



combat climate change.” “Lake Tahoe is one of our state’s natural treasures and an economic driver of Northern Nevada’s tourism and local economy. We’ve come a long way in protecting and preserving our beautiful lake and surrounding communities from the effects of climate change, and we must continue our conservation efforts,” **said Senator Rosen**. “I’m proud to help introduce the Lake Tahoe Restoration Act to make sure that future generations can enjoy Lake Tahoe.”

“The public-private partnership formed more than two decades ago to save Lake Tahoe has had tremendous success, investing more than \$2.6 billion on nearly 750 restoration projects,” said Senator Feinstein. “But now the lake is facing new threats, particularly from climate change. The lake is warming faster than our oceans and the basin faces increased risks from wildfire. Passing our bill will reaffirm the federal government’s commitment to saving the Jewel of the Sierras.”

### Lake Tahoe Restoration Act

The Lake Tahoe Restoration Act of 2016 authorized up to \$415 million over 7 years for the Environmental Improvement Program. The Act requires that the EIP maintain a priority list of projects for the program areas of Forest Health, Aquatic Invasive Species, Watershed Restoration, Lahontan Cutthroat Trout, and Accountability.

#### Priority List Summary Federal Fiscal 2022

Forest Health	\$40,350,000
Aquatic Invasive Species	\$7,200,000
Watershed Restoration	\$48,368,000
Lahontan Cutthroat Trout	\$7,720,000
Accountability	\$2,300,000
<b>TOTAL</b>	<b>\$105,938,000</b>



“Lake Tahoe is a California treasure and we must do everything we can to protect it for future generations,” said Senator Padilla. “As the threats of climate change severely escalate, we must reauthorize the Lake Tahoe Restoration Act to provide critical funding to preserve Lake Tahoe and protect it against pollution, invasive species, and wildfires.”

#### 2021-2022: Lake Tahoe Restoration Act: Bipartisan reauthorizes funding

<https://www.trpa.gov/restoration-act-priorities-listed-for-2022>

The Lake Tahoe Restoration Act of 2016 authorized up to \$415 million over 7 years for the [Environmental Improvement Program](#) (EIP) – one of the nation’s most comprehensive public/private restoration partnerships. The Act requires that TRPA and our partners maintain a priority list of projects for the program areas of Forest Health, Aquatic Invasive Species, Watershed Restoration, Lahontan Cutthroat Trout, and Accountability. The priorities for 2022 maintain forward progress on longstanding priorities and confront the deepening impacts of climate change on Lake Tahoe’s fragile environment.

Click for: [Lake Tahoe Restoration Act Priority List 2022](#)

*May 12, 2021 , Washington DC* —Senators Dianne Feinstein and Alex Padilla (both D-Calif.) today joined with Senators Catherine Cortez Masto and Jacky Rosen (both D-Nev.) to introduce [bipartisan legislation](#) to extend authorization of the *Lake Tahoe Restoration Act*.

[https://www.feinstein.senate.gov/public/index.cfm/press-releases?ContentRecord\\_id=3E3A74E6-9E03-4E37-9BA9-80DB8246A601](https://www.feinstein.senate.gov/public/index.cfm/press-releases?ContentRecord_id=3E3A74E6-9E03-4E37-9BA9-80DB8246A601)

<https://www.cortezmastomasto.senate.gov/news/press-releases/cortez-masto-leads-bipartisan-legislation-to-reauthorize-lake-tahoe-restoration-act>



The original Lake Tahoe Restoration Act was passed in 2000 and authorized \$300 million for the restoration of the lake and surrounding basin. The current authorization, which was passed in 2016, will expire in 2024. Reauthorizing the bill will prevent an interruption in conservation and restoration planning.

“We’ve made tremendous progress in restoring Lake Tahoe since President Clinton’s visit in 1997 for the first Lake Tahoe Summit. Unfortunately, climate change is magnifying the threats facing Lake Tahoe, including warming lake temperatures, declining clarity, thriving invasive species and more dangerous wildfires,” said Senator Feinstein. “We have a responsibility to protect this magnificent lake. Reauthorizing the *Lake Tahoe Restoration Act* is a big part of that effort, ensuring that the federal government remains an active partner in preserving the lake and surrounding basin.” The bill is supported by the Tahoe Regional Planning Agency, League to Save Lake Tahoe and Tahoe Chamber of Commerce. “The threatened scenic, ecological, and recreational richness of Lake Tahoe is of enormous importance to our communities, the states of Nevada and California, and the nation,” said Joanne S. Marchetta, executive director of the Tahoe Regional Planning Agency. “We applaud the bi-partisan and bi-state support for this legislation that will allow the continued restoration of a national treasure.”

### The Tahoe Fund

[www.tahoefund.org](http://www.tahoefund.org)

The Tahoe Fund, established in 2010, has stepped up as a public-private partnership proponent; seeking to raise funds from private donations and investors, in order to keep to fund critical environmental, recreation and improvement projects going in the Tahoe Basin. The Tahoe-based organization’s goal is providing funding for conservation, recreation and stewardship education projects at Lake Tahoe. TWSA partnered with the Tahoe Fund on a Bottom Barrier Challenge to raise the funds to complete the Tahoe RCD bottom barrier inventory for 5 acres of lakewide treatment use. They have also partnered with TWSA on co-funding for water refill station projects.

**WHO WE ARE**

**THE TAHOE FUND** is the first and only nonprofit dedicated to supporting environmental projects in the region. Together with local, state, federal partners and other non-profit organizations, we play many roles in the Tahoe Basin.

**Funder**  
We fund environmental improvement projects through private donations.

**Convener**  
We convene key stakeholders to facilitate dialogue and problem solving. We add value by being neutral, inclusive and innovative.

**Catalyst**  
We are a catalyst for basinwide projects and early efforts when there is a need to assist and build momentum. We are sometimes in a visible leadership position, but more often than not, we provide the support needed to bring projects to fruition.

**Advocate**  
We advocate for public funding and strategic policy changes which advance our mission and the goals in this plan.

**Spokesperson**  
We build awareness for the stewardship and care of the Tahoe Basin with residents and visitors.

**OUR FOCUS AREAS**

- Forest Health
- Lake Clarity
- Sustainable Recreation
- Stewardship
- Transportation

**WHAT WE DO**

**WE USE THE POWER** of philanthropy to improve the Lake Tahoe environment for all to enjoy.

Since our founding in 2010, we have accomplished a significant amount for Lake Tahoe, alongside our local, state, and federal partners.

**\$20M+** DONOR DOLLARS RAISED

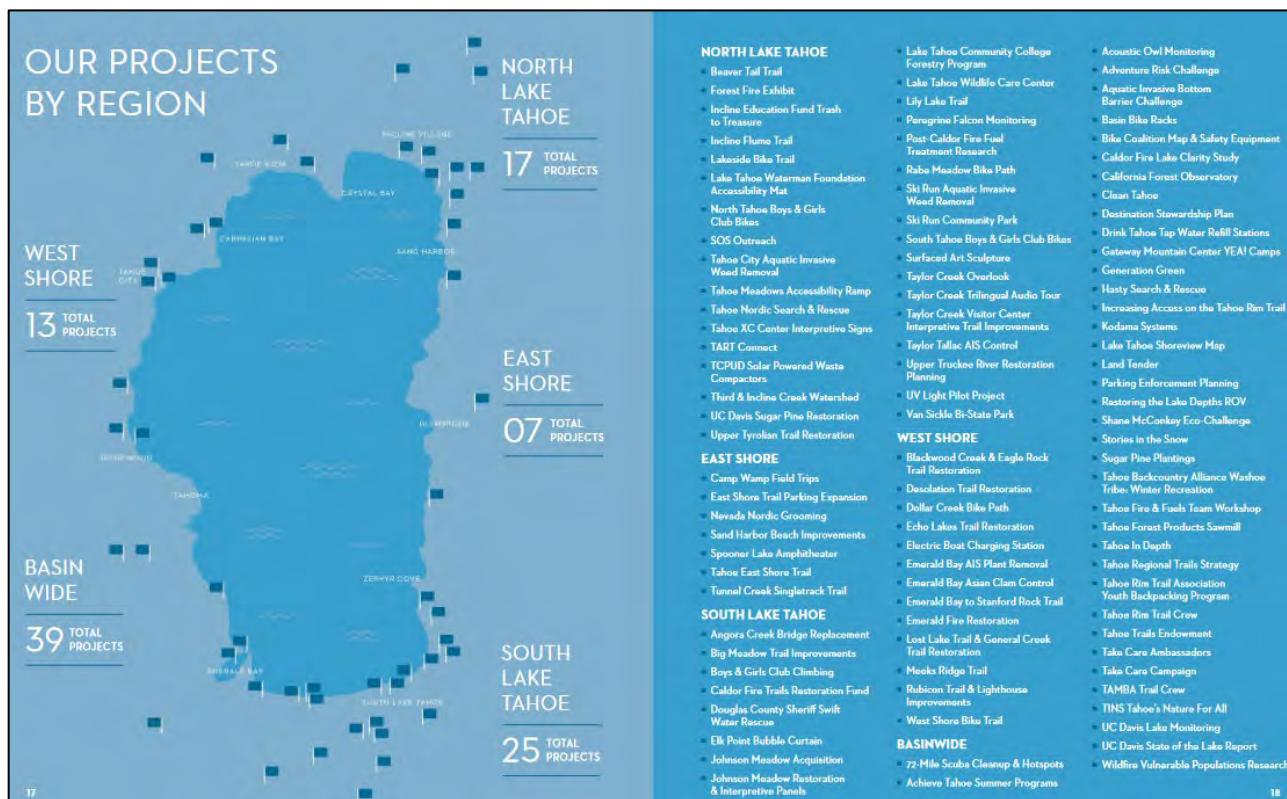
**30+** AGENCY & ORGANIZATION PARTNERS

**\$80M+** PUBLIC FUNDING SECURED

**130+** PROJECTS FUNDED

**WHAT WE BELIEVE**

We envision a Lake Tahoe where the natural and human environments are in balance and a growing community of passionate supporters enjoys and cherishes this mountain treasure.



## Tahoe Beach Apps

Looking for a public beach in Tahoe? Now there is an app for that! The Tahoe Fund, in partnership with the California Tahoe Conservancy's Tahoe License Plate Program, funded the creation and development of the [Tahoe Beaches App](#) to help residents and visitors find their way to more than 50 public beaches around Lake Tahoe. The Lake Tahoe Beaches app uses GPS to help you find nearby beaches and driving directions. You can search for beaches by beach features, including: Accessibility, Barbecues, Boat Rentals, Campfires, Campsites Nearby, Fishing Nearby, Food Concessions, Group Facilities, Overnight Parking, Paddleboard/Kayak, Jet Ski Rentals, Pets OK, Picnic Tables, Playground, Public Bathrooms, Public Transit Nearby, Shade Available, Showers and Volleyball Courts. Each beach has its own profile with helpful information such as: photos, hours of operation, parking info, contact info, nearby transit, directions, ways to help take care of the environment and a full description.

## Tahoe Fund Project Portfolio

The Project Portfolio contains projects selected by the Tahoe Fund Board of Directors for funding. The Tahoe Fund is dedicated to educating the general public on the environmental issues facing restoration efforts at Lake Tahoe and to raising funds to support EIP (Environmental Improvement Program) projects that protect the natural environment. The Tahoe Fund provides support for projects in all EIP program areas, but generally focuses its efforts in three areas: Conservation, Recreation, and Education. A full inventory of projects has been developed and is available on the website: <http://www.tahoe fund.org>

In 2016 The Tahoe Fund introduced the Tahoe Fund Environmental Venture Trust, a new approach to philanthropy in Tahoe. Like a traditional venture capital fund, the Tahoe Fund Environmental Venture Trust will provide seed funding for a variety of innovative early-stage environmental projects that will

help solve the environmental challenges facing Lake Tahoe. The returns will be purely philanthropic. By providing early-stage funding we can help kick start innovative pilot projects and get new projects off the ground.

#### **TWSA/Tahoe Fund Projects:**

##### **DRINK TAHOE TAP® Water Refill Stations**

<https://www.tahoe fund.org/projects/active-projects/drinktahoe-tap-water-refill-stations/>

Project Partner: Tahoe Water Suppliers Association

Total Project Cost: \$20,000 Tahoe Fund Grant: \$10,000; \$30,000 TWSA funds reallocated 2024.

With 99.994% purity, Tahoe tap water was voted the best tasting water in the country. The Tahoe Fund is partnering with the Tahoe Water Suppliers Association to encourage businesses in the Tahoe Basin to install more water bottle refill stations so more people can DRINK TAHOE TAP. This will encourage environmental stewardship and reduce the use of single-use plastics by providing a way to easily refill reusable water bottles. Available on a first-come basis, grants are offered to Basin businesses who fill out the application, install the water bottle refill stations and submit proof of installation and payment.



Visit this site to download the application: [https://www.yourtahoeplace.com/uploads/pdf-ivgid/Water\\_Bottle\\_Filling\\_Station\\_Updated\\_amounts\\_TWSA\\_TF\\_GRANT\\_Program\\_-\\_whole\\_packet\\_UPDATED\\_for\\_2023-24\\_\(with\\_bitly\\_shortcut\).pdf](https://www.yourtahoeplace.com/uploads/pdf-ivgid/Water_Bottle_Filling_Station_Updated_amounts_TWSA_TF_GRANT_Program_-_whole_packet_UPDATED_for_2023-24_(with_bitly_shortcut).pdf)

Covid-19 impacts had affected water fountain use, but bottle fill stations (with no or low contact operation) are considered safe for use with regular sanitation best practices.

In 2019, TWSA has partnered with Take Care/ Tahoe Fund on a water bottle filling station grant program, awarding \$500-\$1000 grants to local businesses and organizations, who put in a water filling station in public area. 20 bottle refill stations have been installed and \$14,000 of funding have been allocated through this program. For 2023-24, the TWSA Board has allocated \$30,000 towards these fill rebates.

**An interactive map of the Take Care Drink Tahoe Tap refilling locations is here:**

<https://takecaretahoe.org/water-stations>



### **2018 Aquatic Invasive Bottom Barrier Challenge**

<http://www.tahoefund.org/our-projects/active-projects>

Partner: Tahoe Resource Conservation District, Tahoe Water Suppliers Association

Total Project Cost: \$52,500 / Tahoe Fund Goal: \$26,250 / TWSA Match = 1/1 to Tahoe Fund

In 2017, the Tahoe Water Suppliers Association collaborated with the Tahoe Fund on a “Bottom Barrier Challenge”, offering up to \$26,000 of matching funds to private donations. The joint fundraising project for bottom barrier mats was launched in June 2017 as a Tahoe Fund Project, closing on Dec. 31, 2017. Aquatic invasive plants are affecting water quality around the shoreline of Lake Tahoe. Through a well coordinated program, the Tahoe Resource Conservation District has been able to remove aquatic invasive weeds with the use of bottom barriers and diver-assisted hand pulling. The current inventory of bottom barriers is 1.6 acres short of the maximum 5 acres of coverage permitted for Tahoe. The Tahoe Water Suppliers Association has issued a matching challenge to purchase the remaining 175 barriers that would bring the inventory to the full 5 acres. They will match every dollar that Tahoe Fund raises. With the full inventory of mats, we can ensure more aquatic invasive weeds are removed from the Lake and water quality is improved.”

### **Other Recent Tahoe Fund Projects:**

#### **UV Light Pilot Project**

<http://www.tahoefund.org/our-projects/active-projects/uv-light-pilot-project/>

Partners: Tahoe Resource Conservation District, Inventive Resources Inc., California Tahoe

Conservancy Total Project Cost: \$270,000 / Tahoe Fund Grant: \$10,000

In an effort to spur innovation in Tahoe, the Tahoe Fund provided the initial funds for a project that will evaluate UV light as a new method to remove aquatic invasive weeds. This innovative approach was a pilot program at Lakeside Marina & Beach and could change the way aquatic invasive weeds are controlled in Tahoe’s watershed and beyond if successful. Aquatic invasive weeds are a serious threat to the crystal clear waters of Lake Tahoe. Aquatic invaders such as Eurasian watermilfoil and curly-leaf pondweed have already established in the Lake. These non-native species change the natural make-up of the waters and threaten to significantly reduce the recreational use of the Lake and surrounding rivers. A \$5,000 grant to the Tahoe Resource Conservation District from the Tahoe Fund’s Environmental Venture Trust helped secure \$260,000 in public funding from the California Tahoe Conservancy to get the project started this year. An additional \$5,000 grant will provide underwater cameras to monitor the effectiveness of the UV light.

#### **Tahoe East Shore Trail**

Partners: Tahoe Transportation District, Nevada Division of State Parks, Tahoe Regional Planning Agency, Nevada Division of State Lands, US Forest Service, Incline Village General, Improvement District, Washoe County, Nevada Department of Transportation, Federal Highway Administration  
Funds Raised: \$1,000,000+

The Tahoe East Shore Trail (formerly the Incline to Sand Harbor Bike Path) is a spectacular three-mile paved path that will provide a new opportunity for the community to experience the natural beauty of the eastern shore of Tahoe. The path will significantly improve the safety of those traveling down the Highway 28 corridor, while creating an exceptional recreational amenity with added environmental benefits. With a 10-foot wide path, it meets the American Disability Act standards to ensure it is accessible to everyone to ride, walk or stroll. The new path begins at the intersection of

Lakeshore Drive and Highway 28, expanding the current Lakeshore bike path for three more miles down to the Sand Harbor State Park. Along the way it provides access to Hidden Beach, Memorial Point and various other scenic vistas. It is a major component of the Tahoe Trail that will one day go all the way around the Lake.

### **The Smartest Forest Fund**

Partners: U.S. Forest Service, California Tahoe Conservancy, Nevada Department of Forestry, Tahoe Forest & Fuels Team, Tahoe Central Sierra Initiative Fundraising Goal: \$5,000,000

Last year California and Nevada both experienced their biggest wildfires in history. The Sierra Nevada forest is now home to more than 100 million dead trees. In the Tahoe Basin, we have seen tree mortality explode to over 160,000 trees in just the past few years. Many feel it is not a matter of if, but when we will face a catastrophic wildfire. We know the Camp Fire in Paradise, California could happen here. For all of these reasons, the Tahoe Fund has identified forest health as our number one priority. The Tahoe Fund is launching the Smartest Forest Fund, a sub-fund of our Environmental Venture Trust, designed to use philanthropy to drive innovation through seed funding. With this Fund, we plan to invest in new ideas and pilot projects. Some will work; some may not. We know our efforts will help bolster the great work already underway by the US Forest Service, California and Nevada to accelerate the pace and scale of fixing our forest. The Tahoe Fund wants to make Tahoe's forest the Smartest Forest on the Planet, because we believe through innovation and technology we can significantly increase the pace and scale of forest restoration in the Tahoe Basin and beyond.

### **Previous and Ongoing Tahoe Fund Projects: "Tahoe In Depth"**

<https://www.trpa.gov/tahoe-in-depth/>

Tahoe Fund and other partners (including TWSA) are proud to sponsor "Tahoe In Depth", an award winning environmental newspaper that reports on environmental improvement projects around the Basin. Published twice a year, *Tahoe In Depth* reaches over 40,000 homeowners with information from some of the 50 partners working to restore the health of the Tahoe environment. Tahoe In Depth is a biannual publication that aims to inspire environmental understanding and stewardship at Lake Tahoe. The purpose of Tahoe In Depth is to give homeowners, landowners, visitors, and policymakers clear, straightforward, and interesting information about the Lake Tahoe environment – from successful restoration to ongoing challenges. The goal is to help people better understand the work being done to restore Tahoe's clarity and the role they can play in helping reach that outcome. The publication explores the natural and cultural history of the Tahoe Basin while providing balanced, reliable information on a wide spectrum of scientific and planning efforts under way to protect Lake Tahoe's unique scenic and ecological qualities.

### **"Take Care" Campaign**

Litter. Dog poop. Unsafe fires. Bear safety. Drink Tahoe Tap. These are just some of the issues impacting our region. The Tahoe Fund, in partnership with the Lake Tahoe Outreach Committee, developed the Take Care™ campaign to help reduce these impacts and promote a more responsible use of our great outdoors.

In 2020, and 2015, TWSA commissioned "Drink Tahoe Tap" graphics for this campaign. See Action Plan Highlights/Executive Summary for details.

The campaign was designed for use in outreach efforts by public agencies, private businesses and nonprofit organizations in the Region. Aimed at residents and visitors. The initial launch includes



messages for: general litter, cigarette butts and beer bottle litter, dog waste, fire safety, bear awareness, and aquatic invasive species prevention. A Take Care Toolkit featuring the digital files for all of the messages is available to download for free at [takecaretahoe.org](https://takecaretahoe.org).

“We held a workshop in September 2013 with more than 60 regional stakeholders to address these issues,” said Amy Berry, Tahoe Fund CEO and member of the Lake Tahoe Outreach Committee. “We heard loud and clear that a unified stewardship brand was needed to bring the region together to elevate our messages and see the biggest impact. We are thrilled to finally make the materials available to our regional partners for use in their outreach efforts.”

### **Lake Tahoe (Environmental) Summits**

Nevada and California federal representatives gather at the shores of Lake Tahoe annually every August, to discuss ongoing progress in restoration efforts. The Lake Tahoe Summit is now in its 20<sup>th</sup>+ years. The Lake Tahoe Summit is an occasion to reinvigorate problem solving efforts and to build pragmatic, strategic partnerships. TWSA is a sponsor of this event- providing water stations and refillable bottles to all attendees.

### **2024: INVESTING IN AMERICA: Secretary Buttigieg Keynote Address at the 28th Annual Lake Tahoe Summit**

<https://www.transportation.gov/briefing-room/investing-america-secretary-buttigieg-delivers-keynote-address-28th-annual-lake-tahoe>

8/14/2024 Zephyr Cove, NV – This week, ahead of the two-year anniversary of the signing of the Inflation Reduction Act – the largest-ever climate investment in world history, U.S. Transportation Secretary Pete Buttigieg delivered the keynote address at the 28th Annual Lake Tahoe Summit.

Every year, the Lake Tahoe Summit bring together federal, state, and local stakeholders from California and Nevada to address Lake Tahoe’s challenges, including climate resilience and transportation, and support innovative solutions to protect the lake for future generations. This year’s summit was hosted by U.S. Senator Catherine Cortez Masto and the theme was “Connecting Tahoe: Investing in Transit, Trails, and Technology for the Future.” During his address, Secretary Buttigieg highlighted the Biden-Harris administration’s investments in transportation that are reducing carbon pollution and making communities across the country, including Lake Tahoe, more resilient in the face of extreme weather. *The full transcript of Secretary Buttigieg’s remarks. Watch full remarks [here](#)*

### **2023: 27th annual Lake Tahoe Summit - Protecting Lake Tahoe: Sustainability and Stewardship in the Face of Climate Crisis**

<http://southtahoenow.com/story/07/11/2023/27th-annual-lake-tahoe-summit-kings-beach>

The 27th annual Lake Tahoe Summit was held on August 9, 2023, at the Kings Beach Recreation Area from 10 a.m. to 12 p.m. This year’s summit highlights Tahoe’s Environmental Improvement Program, a successful bipartisan, bi-state collaboration among local, state, federal, and private entities. It will also examine the challenges that lie ahead in the face of climate change and increasingly unpredictable weather whiplash, as well as the growing demands on regional infrastructure.

U.S. Senator Alex Padilla of California is this year's host and has been a key champion for Lake Tahoe in the U.S. Senate. In 2021, Padilla led the 25th annual Tahoe Summit and launched the first virtual exhibit to highlight the pioneering conservation work of the Lake Tahoe Summit.

This annual summit is a chance for locals, agencies, government, and others to come together to discuss ways to improve the Lake Tahoe basin. A booth fair featuring Lake Tahoe environmental organizations will be held before and after the program.

As a member of the Senate Environment and Public Works Committee, Padilla secured provisions in the Water Resources Development Act of 2022 to authorize U.S. Army Corps of Engineers civil works and ecosystem restoration activities in the Lake Tahoe Basin, including the planning, design, and construction of urban stormwater treatment facilities, watershed science, and environmental restoration. Most recently, Padilla was joined by his colleagues in introducing bipartisan, bicameral legislation to extend the Lake Tahoe Restoration Act through 2034.

### **2022 Tahoe Summit - Protecting Lake Tahoe's Future**

<https://www.rosen.senate.gov/2022/08/16/rosen-hosts-26th-annual-lake-tahoe-summit-discusses-efforts-to-protect-lakes-future/>

**8/16/22 - SAND HARBOR STATE PARK, NV** – U.S. Senator Jacky Rosen (D-NV) hosted the 26th annual Lake Tahoe Summit to discuss the work being done to protect and sustain Lake Tahoe for generations to come. The summit brought together policymakers from Nevada and California, federal government agencies, stakeholders, and local community leaders under this year's theme, "Protecting Lake Tahoe's Future." White House National Climate Advisor and former Environmental Protection Agency Administrator Gina McCarthy delivered the keynote address.

"Lake Tahoe is a critical part of our region's environment and ecosystem, it has incredible cultural significance for so many, and it plays a key role in our economic success," **said Senator Rosen.** "Since 1997, this summit has been a forum that brings together leaders from Nevada and California to develop solutions to protect this beloved national treasure. I was proud to host this year's summit and discuss the ways we can continue collaborating to preserve this key resource for our states."

Senator Rosen was joined by U.S. Senators Catherine Cortez Masto (D-NV) and Alex Padilla (D-CA), U.S. Representatives Mark Amodei (R-NV) and Tom McClintock (R-CA), Nevada Governor Steve Sisolak, Washoe Tribe Chairman Serrell Smokey, and Jennifer Eberlien from the National Forest Service.

Senator Rosen has been a strong advocate for federal funding that protects Lake Tahoe. Last year, Senator Rosen joined Senator Cortez Masto in introducing a bill to extend authorization of the *Lake Tahoe Restoration Act* for an additional 10 years. Senators Rosen and Cortez Masto also helped pass the bipartisan *Water Resources Development Act of 2022* (WRDA), which would improve and invest in key water infrastructure systems throughout the country. The legislation includes provisions they championed to fund environmental improvement projects within the Lake Tahoe Basin and water infrastructure upgrades throughout rural Nevada. Senator Rosen also helped write and pass the *Bipartisan Infrastructure Law*, which includes \$17 million in funding for the *Lake Tahoe Restoration Act*.

### **2021 Tahoe Summit: lawmakers offer dire warning, hope about lake's future**

<https://thenevadaindependent.com/article/at-annual-tahoe-summit-lawmakers-offer-dire-warning-hope-about-lakes-future>

The growing threat of catastrophic wildfires blazing across the West and the resulting detrimental effects, such as hazardous air quality, were top of mind for Nevada and California leaders gathered on a slightly hazy shore Thursday morning for the 25th annual Lake Tahoe Summit (Aug. 19, 2021). Before speakers launched

into remarks on climate change, wildfires, infrastructure and legislation aimed at preserving the popular year-round tourist destination, Washoe Tribe of Nevada and California Chairman, Serrell Smokey, began with a prayer.

“We’re in a changing world right now,” he said. “The waters are low. We pray for snow. We pray for better weather, we pray for better change to come ... We have a lot of fires going on around right now, a lot of areas being wiped out. We pray for restoration, we pray for regrowth and new beginnings.”

### **Tahoe preservation efforts**

Sisolak, Cortez Masto and Sen. Jacky Rosen (D-NV) highlighted the [\\$1.2 trillion infrastructure bill](#), recently approved by the Senate and awaiting a vote in the House, focused on roads, transit, airports and broadband, plus other legislation that provides funding for programs aimed at preserving the Tahoe region.

Cortez Masto said the infrastructure bill includes millions of dollars for environmental protection, habitat restoration programs and wildfire management. She’s also spearheading efforts to extend the [Lake Tahoe Restoration Act](#), saying the coming 2024 expiration could be “devastating” to the lake.

Rosen said the funding from the infrastructure bill will help address road and trail repairs, “making [Tahoe]

In addition to the environmental protection programs, the measure requires coordination between federal, state, local and private groups, including the Environmental Protection Agency (EPA) and the Tahoe Regional Planning Agency. The [original bill](#) was approved in 2000, authorizing \$300 million in federal funds for a decade-long effort to clean up the lake. The legislation expired in 2010 and wasn’t reauthorized until 2016. The effort to extend the legislation is [widely supported](#) by public and private Tahoe groups, such as the regional planning agency and the League to Save Lake Tahoe, and all six members of Nevada’s congressional delegation.

Interior Secretary Deb Haaland, the keynote speaker at the summit, pointed to the Biden administration’s “30 by 30” goal to restore and conserve 30 percent of U.S. land and ocean by 2030. “It’s a vision that recognizes that nature offers some of the most cost-effective ways to address the climate crisis that we need to do to stem the steep loss of nature and wildlife,” said Haaland, who is an enrolled member of the Laguna Pueblo Tribe in New Mexico. “And that we need to address the inequitable access to the outdoors for communities of color.” Haaland, one of the first Native American women elected to Congress and the first to serve as a U.S. cabinet secretary, said the initiative supports ranchers, farmers and private landowners while honoring the sovereignty of tribes and elevating Indigenous-led conservation efforts.

Nevada lawmakers also approved a [“30 by 30” resolution](#) during this year’s legislative session.

The cabinet secretary added that the Department of Interior is taking steps to hire more firefighters and convert more than 500 seasonal firefighters into permanent career positions this year. The Biden administration also announced earlier this week that [federal firefighters will receive a pay raise](#) starting next week.

**The next 25 years:** Many of the state leaders who spoke during the summit pointed to the future, prompting listeners to think about the state of the Tahoe region in 25 years. Rep. John Garamendi (D-CA) compared the lake to a scrapbook that keeps records of human and geological activity. “What will the lake record of us?” he said. “Failure is an option. This lake will record the highest temperatures ... and then literally the destruction of this lake ... if we fail to have the courage to step forward.”

While all-time high tourism levels boost the \$5 billion Tahoe economy, it also increases trash, pollution and at times overwhelms local infrastructure. A [2018 study](#) for the Tahoe Prosperity Center reported that the region sees as many as 24 million visitors each year. Lake clarity, which is used as a factor to determine the health of the lake, decreases during the peak tourism months, according to researchers. Measured by the depth at which a white disk can be seen, clarity levels were best in February 2020 at 80 feet and least clear in May at 50 feet. When researchers from UC Davis first began monitoring clarity levels in 1968, the white disk could be seen at 102 feet deep. The clarity restoration target is 97.4 feet.

As Tahoe continues to face abundant environmental threats caused by climate change and increased tourism, leaders at the summit urged one another to do more to protect the lake. Summit host Sen. Alex Padilla (D-CA) said he visited the region with his children in 2017, emphasizing the opportunity and obligation to ensure visiting the region will be possible for the next 25 years and beyond.

“But scientists and environmental experts continue to remind us that our window to do so is closing,” Padilla said. “Time is of the essence.”

### **2020 Lake Tahoe Summit: Resilient Tahoe**

The (first-ever virtual) 24<sup>th</sup> Annual Lake Tahoe Summit on August 25, 2020, was hosted by Senator Catherine Cortez Masto. The theme for this year’s Summit was “Resilient Tahoe” reflecting the legacy of 50 years of bi-state cooperation through the interstate compact and 24 years of bipartisan collaboration at the Summit while looking ahead to future environmental, infrastructure and economic challenges.

### **2019 Lake Tahoe Summit: Climate Change** <https://www.courthousenews.com/lake-tahoe-summit-boasts-bipartisan-rhetoric-but-division-simmers/>

For a moment as columns of sunlight drifted through the pines with the cobalt surface of Lake Tahoe in the background, it seemed as though the partisan rancor so characteristic of this political moment might temporarily evaporate. But such congeniality was short lived, if it ever lived at all. Senator Dianne Feinstein hosted the 23rd annual Lake Tahoe Summit on Tuesday to call attention to pressing environmental concerns like a warming planet and worsening wildfire conditions in California and the rest of the American West.

“The problem we are dealing with now is climate change,” California’s senior senator said during remarks delivered from the South Shore of Lake Tahoe. “There’s no denying global warming, it’s already here.”

Feinstein drew a contrast between the current summit and the first one, held in 1997 and featuring then-President Bill Clinton and Vice President Al Gore. During that event, leaders talked about how the famed clarity of the crystal blue lake in the Sierra Nevada was declining due to overdevelopment, vehicle emissions, fertilizers leaking into the lake and other ecological issues unique to the Lake Tahoe Basin.

But in 2019, the overarching issues of climate change have superseded local concerns. And officials acknowledge Lake Tahoe serves as a thermometer for a dynamically changing climate. “There is no greater effort to keep this lake clear,” said California Governor Gavin Newsom during the keynote speech at his first ever Lake Tahoe Summit. “This place is a proxy for all our efforts.”

## **UNR/DRI Tahoe Summit Research Reports**

<https://tahoe.blogs.unr.edu/2015/08/2015-tahoe-summit>

In conjunction with the annual Tahoe Summit, the University of Nevada, Reno and the Desert Research Institute publishes a report highlighting their collective research and outreach efforts in the Tahoe Basin.

## **Regulatory: Regional Planning Efforts**

### **TRPA Water Quality 208 Plan Lake Tahoe (208) Water Quality Management Plan**

Adopted June 2013

[http://www.trpa.org/wp-content/uploads/Final-U.S.-EPA-Adopted-Lake-Tahoe-208WQMP\\_2013.06.19.pdf](http://www.trpa.org/wp-content/uploads/Final-U.S.-EPA-Adopted-Lake-Tahoe-208WQMP_2013.06.19.pdf)

208 Plans are required for certain areas by the Federal Clean Water Act (section 208). These plans promote efficient and comprehensive programs for controlling water pollution in a defined geographic area. The Lake Tahoe 208 Plan was updated by TRPA on December 12, 2012, which initiated the need for parallel updates of the Plan by the states of Nevada and California and the U.S. Environmental Protection Agency.

The Lake Tahoe Water Quality Management Plan (also known as the 208 Plan or WQMP) is a framework that sets forth the components of the water quality management system in the Lake Tahoe Region, the desired water quality outcomes for the Tahoe Basin, and the mechanisms adopted by all the relevant entities to achieve and maintain those outcomes. The WQMP is organized to reflect the water quality management plan elements required by the U.S. Environmental Protection Agency's (U.S. EPA) regulations at 40 C.F.R. Section 130.6, which implements Sections 208 and 303(e) of the Clean Water Act, as well as the unique situation in the Lake Tahoe Region.

Because Lake Tahoe is located in both California and Nevada, to protect and enhance the unique environment in the Lake Tahoe Basin, the respective State legislatures approved a bi-state compact, which was ratified by the US Congress in 1969. The Lake Tahoe Regional Planning Agency Compact created a unique bi-state regional planning agency, the Tahoe Regional Planning Agency (TRPA), which has the responsibility to set environmental carrying capacity thresholds for water quality and other aspects of the environment, create and keep updated a regional plan and regulations to attain and maintain the thresholds, and implement the regional plan and regulations through various permitting processes and memoranda of understanding. Given that the Regional Plan includes bi-state water quality policies and the TRPA implements regulations to realize the objectives of those policies, in the 1970's, both Governors also designated, with approval by the U.S. EPA, the TRPA as the area-wide planning agency for the Tahoe Region under Section 208 of the Clean Water Act.

Since that designation more than 30 years ago, water quality administration has grown in complexity and programs have been added to make the management system more comprehensive. Water quality improvement programs are administered, managed, and implemented today in the Tahoe Region by a multitude of agencies at different levels of government under a wide array of statutory and regulatory authorities.

Furthermore, since the last comprehensive revision of the WQMP was approved in 1988, the State of California and the State of Nevada have determined the total maximum daily load (TMDL) of fine sediment particles, total phosphorus, and total nitrogen that may enter the Lake in order to restore the desired water clarity. The TMDL effort was the result of more than 10 years of research and



analysis at a cost of approximately \$10 million. The U.S. EPA approved the Lake Tahoe TMDL in 2011. Both States are now working with their respective local governments, state transportation agencies and other resource management agencies in the Lake Tahoe Region on an ongoing basis to identify and implement the necessary steps to reduce pollutant loads. Concurrent with WQMP adoption, the TRPA Regional Plan is being updated to complement and support TMDL implementation.

### **Tahoe Regional Planning Agency (TRPA) - Code of Ordinances**

The overriding regulations on development in the Tahoe Basin are the codes set by the Tahoe Regional Planning Agency Ordinances. These documents are available at:

<http://www.trpa.org/regional-plan/code-of-ordinances/>

### **Historical Action on Shorezone Ordinance**

Taking 20 years of negotiation and preparation, the TRPA Shorezone Ordinance (Preferred Alternative 6A) was adopted by the Tahoe Regional Planning Agency (TRPA) Governing Board in October 2008. However on Sept. 16, 2010 - the 2008 passage of the Shorezone Ordinance by TRPA was revoked by federal court ruling. The Shorezone Ordinance had been legally challenged since its adoption, by several Tahoe area environmental groups. The decision sends the Tahoe Regional Planning Agency “back to the drawing board” in regulating development near Lake Tahoe's shore. After extensive legal review - in 2013, these new codes became effective.

### **TRPA Shorezone (Shoreline) Ordinance Passes in 2018**

<http://www.trpa.org/programs/shorezone>

On October 24, 2018, TRPA Governing Board voted for adoption of Alternative 1, the Shoreline Ordinance. This completed a multi-year effort by the Tahoe Regional Planning Agency worked with community members and stakeholders to update its shoreline policies and regulations.

For more information about the shoreline planning process: [www.shorelineplan.org](http://www.shorelineplan.org).

Tahoe Regional Planning Agency (TRPA) and the Lake Tahoe Basin Management Unit (LTBMU) have developed regulations on land use related to water quality standards. While many of the standards support drinking water efforts, they do not directly address drinking water pathogens. The Tahoe Water Suppliers Association has supported local source water protection projects and planning efforts with ongoing participation in the Tahoe Regional Planning Agency's Shorezone Ordinance amendment process, Shorezone Development Review process, risk assessment of proposed projects and staff support on the Aquatic Invasive Species working group.

**Alternative 1 – Proposed Shoreline Plan:** The goal of this alternative is to enhance the recreational experience at Lake Tahoe while protecting the environment and responsibly planning for the future. This alternative, developed through a consensus-based approach, incorporates the policies developed by the Steering Committee and was endorsed by the Regional Plan Implementation Committee of the TRPA Governing Board. The Shoreline Plan would mete out new private and public development over time. At buildout, it would allow for up to 2,116 new moorings (buoys, lifts or public slips), 128 new private piers, 10 new public piers, and two new public boat ramps. Some new and existing buoys could be converted to slips, and vice versa at facilities open to the public (e.g., marinas).

TWSA member participation in the Shorezone (now called Shoreline) Ordinance amendments process has included: Submission of written and verbal comments on multiple occasions in 2016, and earlier

in 2006, 2007 and 2008, to the “Lake Tahoe Shorezone Ordinance Amendments / Environmental Impact Statement (EIS)”. The TWSA recommendation of a 1320 foot (¼ mile) ‘buffer’ around intakes was set as a trigger for water provider consultation, for proposed new piers into the current code. Buoy fields remain at 600 feet as the trigger for consultation, through the TRPA review and implementation process. This requires that any proposed project within the buffer goes through a risk assessment evaluation by the applicable water purveyor. The results will be provided to TRPA, with suggested mitigation measures.

- TWSA staff regularly monitors and attends the TRPA/Interagency Shorezone Coordination Group (reviews all shorezone project proposals); providing input relative to water purveyor concerns.

*EXECUTIVE SUMMARY* – <http://shorelineplan.org/wp-content/uploads/2018/05/0-ExecSumm.pdf>

The Tahoe Regional Planning Agency (TRPA) adopted its first Regional Plan and Code of Ordinances in 1987 to guide resource management and development, and protect the Tahoe Region’s natural ecology and unique values. The Regional Plan included a Shorezone Sub-element and implementing ordinances that regulated development along the shoreline of Lake Tahoe. The 1987 ordinances recognized that there was uncertainty about the effect of shoreline structures on fisheries. Because of this uncertainty, the ordinances prohibited new structures in areas identified as prime fish habitat and called for further study to evaluate the effects of shoreline structures on fish habitat and spawning. By the early 1990s, the studies had been completed, and they concluded that the placement of piers and buoys in spawning and feed/cover habitat has limited effect on fish populations and that those effects can be mitigated (Byron et al. 1989; Beauchamp et al. 1991, 1994). In response to the conclusions of the fish habitat studies, TRPA led multiple shorezone planning initiatives to replace the prohibition of structures in prime fish habitat with a comprehensive shoreline plan that would allow for lake access structures while protecting the environment. Any plan that would govern development along Lake Tahoe’s shoreline proved to be highly controversial. TRPA prepared multiple plans and environmental analyses in 1995, 1999, 2004, 2006, and 2008.

### **TRPA Shoreline Plan for Lake Tahoe**

The TRPA Governing Board approved the Lake Tahoe Shoreline Plan in October 2018 after more than three years of strong public outreach and collaboration with a wide range of partners. Planning partners included the Lake Tahoe Marina Association, Tahoe Lakefront Owners’ Association, League to Save Lake Tahoe, Lahontan Regional Water Quality Control Board, Nevada Division of State Lands, and California State Lands Commission. The plan is the first comprehensive update to TRPA’s shorezone regulations in several decades.

. The plan supports boating, paddling, swimming, and other water-based recreation, while also ensuring effective natural resource management for continued attainment of environmental goals in the Lake Tahoe Region. The plan includes updated shorezone regulations (Chapters 80-85 of the [TRPA Code of Ordinances](#)) and a [Shoreline Implementation Program](#). The TRPA Governing Board approved the Lake Tahoe Shoreline Plan in October 2018 after more than three years of strong public outreach and collaboration with a wide range of partners. Planning partners included the Lake Tahoe Marina Association, Tahoe Lakefront Owners’ Association, League to Save Lake Tahoe, Lahontan Regional Water Quality Control Board, Nevada Division of State Lands, and California State Lands Commission.

The cost of these programs are paid for through new fees apportioned to various shoreline users and structures. These fees include annual mooring registration fees, an increase in boat sticker fees, and boat rental concession fees for the boating season. Funds help pay for boater education, no-wake

zone enforcement, and projects to prevent the spread of harmful aquatic invasive species in Lake Tahoe.



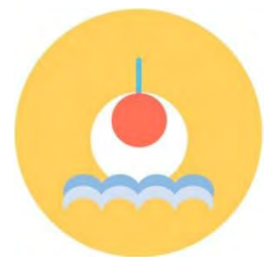
### PERMITTING

The Shoreline Plan lifts a longstanding moratorium on new shorezone structures at Lake Tahoe, setting caps and regulations for new shorezone structures such as piers, moorings, and public boat ramps. The plan also creates a framework for marinas to enhance their facilities if environmental improvements are made part of the project. For more information about

TRPA permits for moorings, structures, and other shorezone activities, please review the fact sheets at the bottom of this page or visit [TRPA's Applications & Forms Page](#).

### MOORINGS

The Shoreline Plan authorizes up to 1,486 new private moorings at Lake Tahoe, including buoys, boatlifts, and boat slips. Fifteen percent of that total will become available for permitting in 2020 through the [mooring lottery](#), with additional moorings available for permitting in following years. The Shoreline Plan requires property owners to register and permit all existing moorings with TRPA. Moorings can be registered through the [Lake Tahoe Info website](#) starting March 1, 2019.



### BOATING

The Shoreline Plan creates new programs to ensure shoreline structures and boating activity do not harm the environment, scenery, or recreation experiences at Lake Tahoe. These programs include coordinated enforcement against illegal boat moorings on the lake, more projects to prevent the spread of harmful aquatic invasive species, enhanced monitoring to better assess noise and scenic impacts from boating activity

and shoreline structures, stronger boating safety education, and new provisions to keep boats with aftermarket exhaust systems that exceed TRPA, California, and Nevada noise limits from operating on the lake.



### NO-WAKE ZONES

The new shoreline program includes stronger boater education and enforcement of the [600-foot no-wake zone](#) at Lake Tahoe. The plan expands the no-wake zone to include all Emerald Bay and creates a 100-foot no-wake zone buffer around swimmers and paddlers and a 200-foot no-wake zone buffer around shoreline structures. These no-wake zones are

in place to prevent unsafe boating in areas where boaters, paddlers, and swimmers share the lake, and to reduce noise impacts from boating.

## CHAPTER 60: WATER QUALITY

### 60.1. WATER QUALITY CONTROL

#### 60.1.1. Purpose

This section implements the Water Quality Subelement, Land Use Element, of the Goals and Policies. This section also implements, in part, TRPA's programs to attain and maintain federal, state, and local water quality standards under Article V(d) of the Compact.

#### 60.1.2. Applicability

This section sets forth standards for the discharge of runoff water from parcels and regulates the discharge of domestic, municipal, or industrial wastewaters. These standards and prohibitions apply to discharges to both surface waters and ground waters.

#### 60.1.3. Discharge Limits

Discharges shall not exceed the following standards:

##### A. Surface Runoff

Pollutant concentrations in surface runoff shall not exceed the readings in Table 60.1.3-1 at the 90th percentile.

TABLE 60.1.3-1: SURFACE RUNOFF	
Constituent	Maximum Concentration
Dissolved Inorganic Nitrogen as N	0.5 mg/l
Dissolved Phosphorus as P	0.1 mg/l
Dissolved Iron as Fe	0.5 mg/l
Grease and Oil	2.0 mg/l
Suspended Sediment	250 mg/l

1. If the constituent levels of water entering a site from upstream areas are of a superior or equal quality to the above, those waters shall meet the quality level listed in Table 60.1.3-1 prior to discharge from the site.
2. If the constituent levels of waters entering a site do not meet the quality levels in Table 60.1.3-1, there shall be no increase in the concentrations of these constituents in water discharged from the site, based on a 24-hour average.

##### B. Discharges to Ground Waters

Waters infiltrated into soils shall not exceed the maximum constituent levels in Table 60.1.3-2.

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**TABLE 60.1.3-2: DISCHARGES TO GROUND WATERS**

Constituent	Maximum Concentration
Total Nitrogen as N	5 mg/l
Total Phosphate as P	1 mg/l
Iron as Fe	4 mg/l
Turbidity	200 NTU
Grease and Oil	40 mg/l

Where there is a direct hydrologic connection between ground and surface waters, discharges to groundwater shall meet the standards for surface runoff. A direct hydrologic connection shall be presumed to exist wherever, by virtue of proximity to a surface water body, nature of soils, or slope or gradient, the residence time of runoff water discharged into the ground is too short to remove pollutants from the runoff. Sediment traps, consistent with the *Handbook of Best Management Practices*, shall be used to protect infiltration devices from excessive levels of siltation.

**C. Prohibition of Wastewater Discharge**

The discharge of domestic, municipal, or industrial wastewater to Lake Tahoe, its tributaries, the ground waters of the Tahoe region, or the Truckee River within the Tahoe region, is prohibited, except for existing discharges under alternative plans for wastewater disposal authorized by state law and approved by the state agency of appropriate jurisdiction, and for catastrophic fire protection of the STPUD Luther Pass Pump Station as detailed in subparagraph 4 below. California and Nevada prohibit wastewater discharge through the enactment of the Porter-Cologne Act, and the Executive Order by the Governor of Nevada dated January 27, 1971.

**1. Holding Tanks and Other No-Discharge Systems**

To avoid a discharge of wastewater that is prohibited, holding tanks or other no-discharge systems may be approved in the following instances:

- a. As a temporary measure associated with a temporary use, including but not limited to, sporting events, community events, and construction; or
- b. As a permanent measure associated with remote public or private recreation sites, including but not limited to, trailheads, and undeveloped walk-in campgrounds, and summer home tracts where connection to a sewer system is not feasible or would create excessive adverse environmental impacts.

**2. Accidental Releases of Sewage**

To help prevent accidental releases of sewage, all sewage collection and treatment districts shall prepare and submit a report to TRPA within 120 days of a determination by the district that any unit treatment process, or major component of its collection system serving the Tahoe region, has reached 85 percent of its design capacity. Such report shall identify



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CHAPTER 60: WATER QUALITY

60.1 Water Quality Control

60.1.4 Snow Disposal

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what measures, if any, will be needed to accommodate projected population increases consistent with the Regional Plan, including capital improvements, operational changes, changes in discharge permits, and changes in financial programs.

**3. Sewage Exfiltration**

In conjunction with TRPA project approvals for all agencies that collect or transport sewage, TRPA shall require that such agencies have in place and vigorously implement plans for detecting and correcting sewage exfiltration problems in their collection and transport facilities.

**4. Recycled Wastewater Use for Fire Protection**

This exception allows for the use of recycled wastewater in emergency conditions to prevent severe harm to life, property, and the environment and to protect public facilities from destruction by wildfire in accordance with applicable state laws. Such emergency condition of catastrophic wildfire and authorization for recycled wastewater use shall be made and certified by the fire incident commander and reported to the TRPA Emergency Response Coordinator.

**D. Prohibition of Toxic or Hazardous Waste Discharge**

The discharge of toxic or hazardous waste to Lake Tahoe, other lakes in the region, their tributaries, the ground waters of the Tahoe region, the lands of the Tahoe region, or the Truckee River within the Tahoe region is prohibited.

**E. Prohibition of Certain Watercraft**

Commencing June 1, 1999, the launching, mooring, or operation of all two-stroke engine powered watercraft within the region is prohibited, except:

1. Any two-stroke engine powered watercraft whose fuel is directly injected into the cylinder shall be exempt from the prohibition;
2. Injected in to the crankcase prior to entering the cylinder and the fuel injection engine was purchased before January 27, 1999, shall be prohibited commencing October 1, 2001;
3. Any watercraft powered by a two-stroke engine whose engine is certified as meeting the U.S. EPA 2006 standard or the CARB 2001 standard shall be exempt from the prohibition;
4. Sailboats utilizing two-stroke engines as auxiliary power shall be prohibited commencing October 1, 2001;
5. Any watercraft powered by a two-stroke engine rated at ten horsepower or less shall be prohibited commencing October 1, 1999; or
6. Any watercraft powered by an engine that has been certified as meeting EPA's 2001-2005 emission standard shall be prohibited commencing October 1, 2001.

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**60.1.4. Snow Disposal**

All persons conducting public, commercial, or private snow removal or disposal operations shall dispose of snow in accordance with site criteria and management standards in the *Handbook of Best Management Practices*, the Design Review Guidelines, and the criteria below.

**A. Requirements for Individual Parcels**

Removal of snow from individual parcels shall be limited to structures, paved areas, and unpaved areas necessary to safely park or provide safe pedestrian access. Snow shall not be plowed into or stored in a SEZ.

**B. Requirements for Dirt Roads**

Snow removal from dirt roads is subject to regulation pursuant to Section 5.12 Remedial Action Plans. When TRPA approves snow removal from a dirt road, pursuant to project approval or in accord with provisions of Section 5.12, the agency shall specify required winterization practices, BMPs, the specific means of snow removal, and a schedule for either paving the dirt road or ceasing snow removal.

**60.1.5. Deicers and Abrasive Control**

Salt and abrasives used to control ice on streets, highways, sidewalks, and parking areas shall be regulated in accordance with the standards provided below.

**A. Storage Areas**

Storage areas for deicing salt and abrasives shall be in conformance with the *Handbook of Best Management Practices*.

**B. Reporting**

The state highway departments and other large users of deicers and abrasives identified by TRPA shall maintain a tracking and reporting program to monitor the use of deicers and/or abrasives in their respective jurisdictions pursuant to State of California and Nevada requirements. TRPA shall incorporate this information into its annual monitoring report in accordance with Chapter 16: *Regional Plan and Environmental Threshold Review*.

**C. Restrictions**

The use of deicing salt and abrasives may be restricted where damage to vegetation in specific areas may be linked to their use or where their use would result in a violation of water quality standards. Mitigation for the use of road deicing salt or abrasives may be required and may include requirements to use alternative substances or change distribution patterns, frequency of application, and amount of application. Revegetation of parcels may be required where evidence indicates deicing salts or abrasives have caused vegetation mortality. Memorandums of understanding may be entered into with highway and street maintenance organizations to address use of salts or abrasives in relation to safety requirements.



## CHAPTER 60: WATER QUALITY

### 60.1 Water Quality Control

#### 60.1.6 Spill Control

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#### 60.1.6. Spill Control

All persons handling, transporting, using, or storing toxic or hazardous substances shall comply with the applicable requirements of state and federal law regarding spill prevention, reporting, recovery, and clean-up. Sewage collection, conveyance, and treatment districts shall have sewage spill contingency, prevention, and detection plans approved by the state agency of appropriate jurisdiction and submitted to TRPA for review and approval within three years of the effective date of the Regional Plan.

##### A. Cooperative Sewage Spill Plans

Sewage collection, conveyance, and treatment districts may join together to develop cooperative plans, provided that the plans clearly identify those agencies covered by the plan, are agreed to by each agency, and are consistent with applicable state and federal laws.

##### B. Sewage Spill Plan Criteria

Sewage spill contingency, prevention, and detection plans shall comply with the criteria set forth by the state agencies of appropriate jurisdiction and TRPA. Such plans shall include provisions for detecting and eliminating sewage exfiltration and stormwater infiltration from sewer lines and facilities.

#### 60.1.7. Pesticide Use

The use of insecticides, fungicides, and herbicides shall be consistent with the *Handbook of Best Management Practices*.

##### A. Pesticide Use Discouraged

TRPA shall discourage pesticide use for pest management. Prior to applying any pesticide, potential users of pesticides shall consider integrated pest management practices, including alternatives to chemical applications, management of forest resources in a manner less conducive to pests, reduced reliance on potentially hazardous chemicals, and additional environmentally sound pest management tactics.

##### B. Criteria for Pesticide Use

The following criteria apply to pesticide use:

1. Only chemicals registered with the Environmental Protection Agency and the state agency of appropriate jurisdiction shall be used and only for their registered application;
2. Alternatives to chemical application shall be employed where practical; and
3. No detectable concentration of any pesticide shall be allowed to enter any stream environment zone, surface water, or ground water unless TRPA finds that application of the pesticide is necessary to attain or maintain the environmental threshold standards.

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**60.1.8. Fertilizer Management**

**A. Fertilizer Management Approaches Generally**

Fertilizer management allowing for site-specific management approaches shall be consistent with the *Handbook of Best Management Practices*. The recommended approaches for landscaping are found in the *Home Landscaping Guide for Lake Tahoe and Vicinity* or its approved equivalent. Section 61.4 Revegetation, contains requirements for revegetation approaches. Fertilizers shall not be used, except as described below, in or near stream and drainage channels or in stream environment zones, including setbacks determined under Section 53.9: Procedure for Establishing SEZ Boundaries and Setbacks, and in shorezone areas except as otherwise provided in this subsection (see Chapter 90: *Definitions*, and Section 80.3: *Definitions*). Fertilizer use for maintenance of preexisting landscaping according to subparagraph 61.3.3.B.2 shall be minimized in stream environment zones and adjusted or prohibited if found through evaluation of continuing monitoring results to be in violation of applicable strictest water quality discharge and receiving water standards. These ordinances are applicable to both inorganic and organic fertilizer applications. Fertilizer management involves use and application approaches to achieve management standards and shall include the following considerations where appropriate:

1. The appropriate type of fertilizer to avoid release of excess nutrients;
2. Fertilizer management programs proposing the use of phosphorus shall demonstrate the need for the particular site conditions and vegetation to be maintained or established, and shall consider the use of slow release and phosphorus-free fertilizer;
3. The rate and means of application to avoid excessive application or application to non-target areas or native vegetation;
4. The timing and frequency of application to minimize the use of fertilizer, avoid early and late season fertilizer use when vegetation growth is not active;
5. Appropriate watering schedules and efficient irrigation systems to avoid excessive leaching and runoff of nutrients;
6. Preferred plant materials for the intended use and site conditions with an emphasis on native and adapted species to minimize the need of fertilizer;
7. Landscape design that minimizes the use and impacts of fertilizer application;
8. Critical areas such as backshore areas and SEZ setbacks in close proximity to Lake Tahoe and other bodies of water, or water quality treatment basins where the use of fertilizer shall be avoided;
9. Design and maintenance of drainage control systems including holding ponds where necessary;



10. Surface and groundwater monitoring programs to determine compliance with existing nitrogen and phosphorus discharge standards; any required monitoring will be at owners expense, where annual reporting is required in critical areas and as determined in program review or compliance determination;
11. Public outreach, either in the form of public and private programs, fliers for utility district and other organization distribution, and workshops, or affiliate membership outreach on fertilizer management shall be included in fertilizer management plans. Public outreach applies in particular to small residential users for agency outreach programs, owners associations, condominiums, property and landscape managers, and landscapers; and
12. For large users (defined under subparagraph 60.1.8.C below) and large turf projects, a soil testing program may be appropriate to assess the required concentrations of nitrogen and phosphorus in the soil for vegetation use, adjusting for Tahoe Basin growing conditions. This may mean no or low application rates of phosphorus-containing fertilizer will be required for some sites and uses.

**B. Fertilizer Management Programs**

Projects that include landscaping or revegetation shall include, as a condition of approval, a fertilizer management program that addresses each of the considerations set forth in subsection 60.1.8.A, as appropriate to the size of the project.

**C. Existing Uses**

**1. At TRPA Request and Large Users**

At the request of TRPA and for large users that require regular fertilizer maintenance, including but not limited to golf courses, parks, cemeteries, plant nurseries, recreational ball fields, and large residential yards with an acre or more of turf, certain uses shall be required to submit fertilizer management programs for review and approval by TRPA. Review criteria shall include the considerations listed in subsection 60.1.8. Failure to comply with the request or to provide a program satisfactory to TRPA may result in an enforcement action.

**2. Monitoring Report**

Following the first growing season after the approval of fertilizer management programs, large users of fertilizers such as plant nurseries and those managing more than one acre of turf, or as otherwise identified by TRPA under an existing large user survey, shall initiate a tracking program to monitor fertilizer use on lands under their control. Such users shall review fertilizer management programs with TRPA or Lahontan RWQCB staff and present annual reports for the prior season's use and monitoring if required to TRPA by June 1 (or as required by Lahontan) of each year. The report shall include information on the rate, amount, and location of use. This information shall be presented in a format developed by TRPA consistent with the reporting requirements of other agencies to eliminate duplication and shall be verifiable. TRPA shall include this information in its annual monitoring report under



Chapter 16, including such measures of progress as numbers of approved programs, annual fertilizer use reports received, and reported reductions in fertilizer use or monitored parameter improvement.

**D. Requirements for Fertilizer Sales**

Public outreach, including seller fertilizer recommendations consistent with subsection 60.1.8, provision of agency-developed fliers, and brochures of user information and recommended fertilizer rates from the *Home Landscaping Guide for Lake Tahoe and Vicinity* or its authorized equivalent, shall be required in conjunction with fertilizer sales in the Tahoe Basin. Outlying fertilizer retailers with potential purchases from the Tahoe Basin shall be requested to provide the same public outreach.

**E. Snow Hardeners**

The use of ammonium nitrate or other substances containing nitrogen or phosphorus to harden snow is prohibited.

## **60.2. WATER QUALITY MITIGATION**

### **60.2.1. Purpose**

The purpose of this section is to implement the Goals and Policies, Goal 4, Policy 1, Development and Implementation Priorities Subelement, Implementation Element, and specifically the requirement that new residential, commercial, and public projects completely offset their water quality impacts.

### **60.2.2. Applicability**

**A. General Applicability**

This section is applicable to all projects and activities that result in the creation of additional impervious coverage, unless the project or activity is exempted pursuant to subparagraph B below.

**B. Exemptions**

The projects and activities provided below that create impervious coverage shall be exempt from water quality mitigation requirements:

**1. Transfer**

Impervious coverage permitted as a result of transfer of coverage.

**2. 208 EIP Projects**

Capital Environmental Improvement Program projects for erosion and runoff control and stream environment zone protection and restoration projects as described in TRPA's Water Quality Management Plan for the Lake Tahoe Region.

**3. Limited Exception for Additional or Transferred Development Within Adopted Community Plans**

Additional or transferred development located within an adopted community plan, the water quality impacts of which were evaluated in the EIS for the community plan and mitigated by the provisions of the community plan, shall be exempt from the requirement of subsection

60.2.3 provided TRPA finds that the implementation element of the community plan, as a whole, meets the standards of subsection 60.2.3.

**60.2.3. Required Offsets**

All projects and activities that result in the creation of additional impervious coverage shall completely offset the potential water quality impacts of the project through one, or a combination, of the methods listed below.

**A. Mitigation Projects**

Implementation of offsite water quality control projects or stream environment zone restoration projects as a condition of project approval, pursuant to TRPA guidance on identification, design, and effectiveness of offsite mitigation projects. Applicants who wish to exercise this option shall include plans for the offsite mitigation project with their application. TRPA shall approve the offsite mitigation plans in conjunction with the approval of the project. Before issuing an approval, TRPA shall find that the offsite mitigation proposal completely offsets the expected impacts of the project.

**B. Water Quality Mitigation Fund**

Contribution to a water quality mitigation fund established by TRPA for implementing offsetting programs.

**60.2.4. Fee Required**

A fee shall be assessed for each square foot of additional land coverage created. The amount of contribution shall be established in the Rules of Procedure.

**60.2.5. Use and Distribution of Mitigation Funds**

TRPA shall deposit water quality mitigation funds in a trust account. Interest accruing to the trust account shall remain in the account until used on water quality mitigation projects or water quality planning. TRPA shall keep track of the amount of funds collected for each local jurisdiction and shall disburse funds to the local jurisdictions, upon their request, for expenditure within the jurisdiction of origin, provided TRPA finds that the expenditure is consistent with TRPA's Water Quality Management Plan. Accrued interest may be used for water quality planning in the region. TRPA shall encourage the local jurisdictions to use funds as expeditiously as possible.

**60.2.6. Stream Environment Zone Restoration Program**

To provide financial resources for implementation of the stream environment zone restoration program, at least 25 percent of the water quality mitigation funds collected for each local jurisdiction shall be used for stream environment zone restoration projects included in the TRPA's Water Quality Management Plan. This jurisdictional set-aside shall be individually evaluated and may be waived if TRPA determines that there are no more SEZ restoration projects identified in a given jurisdiction.

**60.2.7. Water Quality Revolving Fund**

TRPA shall establish a separate fund, to be known as the Water Quality Revolving Fund, for the purpose of depositing funds received through grants, fines, and voluntary contributions. TRPA may make grants from this fund to local governments and other



public entities for abatement and control of water quality problems by the same procedures as set forth in subsection 60.2.5.

## **60.3. SOURCE WATER PROTECTION**

### **60.3.1. Purpose**

This section contains regulations pertaining to recognition of source water, prevention of contamination to source water, and protection of public health relating to drinking water. It strengthens provisions of the Goals and Policies that address groundwater protection, and implements elements of the TRPA Source Water Protection Program.

### **60.3.2. Applicability**

This chapter applies to projects that are identified as a possible contaminating activity located in identified source water protection zones as depicted on TRPA Source Water Assessment maps, and retrofit of existing development with Best Management Practices that identified source water protection zones as depicted on TRPA Source Water Assessment maps, and retrofit of existing development with Best Management Practices.

### **60.3.3. Source Water Protection Standards**

To protect public health and to insure the availability of safe drinking water, TRPA shall review proposed projects identified as possible contaminating activities to source water that are located within a source water protection zone depicted on TRPA Source Water Assessment maps according to the following standards and procedures:

#### **A. Source Water Defined**

Water drawn to supply drinking water from an aquifer by a well or from a surface water body by an intake, regardless of whether such water is treated before distribution.

#### **B. Possible Contaminating Activity Defined**

Activities equivalent to TRPA primary uses identified by either the California Department of Public Health or the Nevada Bureau of Water Quality Planning, regardless of where the project is located, as having the potential to discharge contaminants to surface or groundwaters. Such uses are listed in subsection 60.3.5.

#### **C. Source Water Protection Zone Defined**

A zone delineated around drinking water sources in the following manner as depicted on the TRPA Source Water Assessment maps.

##### **1. Protection Zone**

A protection zone consisting of a fixed 600 foot radius circle shall be identified around wells, lake intakes, and springs assessed by TRPA. Protection zones shall be delineated using the best available source water location data known to TRPA. Protection zones may be located using the centroid of the parcel in which the well, lake intake, or spring is found. Protection zone delineations may be modified by TRPA as follows: Upon receipt of source water assessment information collected by the California Department of Public Health, the Nevada Bureau of

Water Quality Planning, or other public agencies responsible for conducting drinking source water assessments in accordance with state Source Water Assessment and Protection Programs and if recommended by the California Department of Public Health or the Nevada Bureau of Water Quality Planning; or upon receipt of source water assessment information provided by the property owner in which the well, spring, or lake intake is located and if the California Department of Public Health or the Nevada Bureau of Water Quality Planning concurs with the new delineation.

**D. Review of Proposed Possible Contaminating Activities Located in Source Water Protection Zones**

Proposed uses determined by TRPA to be projects that are identified as a Possible Contaminating Activity, with a project area located in a source water protection zone, shall not be approved unless TRPA finds that:

1. The project complies with the requirements to install BMPs as set forth in subsection 60.4.3;
2. TRPA has solicited comments from the operator/owner of the source water, and the department of environmental health with jurisdiction over the source water, and all such comments received were considered by TRPA prior to action being taken on the proposed project;
3. A spill control plan is submitted to TRPA for review and approval. The plan shall contain the following elements:
  - a. Disclosure element describing the types, quantities, and storage locations of contaminants commonly handled as part of the proposed project;
  - b. Contaminant handling and spill prevention element;
  - c. Spill reporting element, including a list of affected agencies to be contacted in the event of a spill;
  - d. Spill recovery element; and
  - e. Spill clean-up element.
4. Submittal of a spill control plan may be waived provided a state or local agency with jurisdiction over the subject source water provides a written statement to TRPA that a plan containing the above elements remains on file with that agency, or TRPA staff determines, at its discretion, that requiring a spill control plan would not result in significant additional protection of the source water.

**E. Requirements of Existing Uses Located in Source Water Protection Zones**

Existing uses that are identified as a possible contaminating activity located in a source water protection zone shall comply with subparagraph 60.3.3.D.3. Compliance with subparagraph 60.3.3.D.3 shall occur pursuant to the deadlines set forth in subparagraph 60.4.4.A.



**60.3.4. Source Water Assessment**

An inventory of wells, springs, and lake intakes that serve five or more user service connections shall be prepared for the Lake Tahoe Region. An inventory shall be prepared in consultation with local and state environmental health agencies. Sources omitted from the inventory due to a lack of information provided by local and state environmental health agencies shall be added as appropriate if additional source information is received by TRPA. Source water protection zones delineated on the source water assessment maps shall be modified pursuant to subparagraph 60.3.3.C.1.

**60.3.5. Possible Contaminating Activities**

**A. Residential**

1. Domestic animal raising

**B. Commercial**

**1. Retail**

- a. Service stations

**2. Services**

- a. Auto repair and service
- b. Business support services
- c. Laundries and dry cleaning plant
- d. Repair services

**3. Light Industrial**

- a. Batch plants
- b. Fuel and ice dealers
- c. Industrial services
- d. Recycling and scrap

**4. Wholesale/Storage**

- a. Storage yards
- b. Vehicle storage and parking
- c. Vehicle and freight terminals

**C. Public Service**

**1. General**

- a. Airfields, landing strips, and heliports
- b. Collection stations
- c. Hospitals
- d. Local public health and safety facilities
- e. Regional public health and safety facilities
- f. Power generating
- g. Public utility centers
- h. Schools



- 2. **Linear Public Facilities**
    - a. Transit stations and terminals
- D. **Recreation**
  - 1. Beach recreation
  - 2. Boat launching facilities
  - 3. Developed campgrounds
  - 4. Golf courses
  - 5. Marinas
  - 6. Recreational vehicle parks
  - 7. Rural sports
- E. **Resource Management**
  - 1. **Timber Management**
    - a. Timber stand improvement
  - 2. **Range**
    - a. Grazing
    - b. Range pasture management
  - 3. **Watershed Improvements**
    - a. Runoff control
- F. **Shorezone**
  - 1. Construction equipment storage
  - 2. Seaplane operations
  - 3. Tour Boat operations
  - 4. Water-oriented outdoor recreation concessions

#### **60.4. BEST MANAGEMENT PRACTICE REQUIREMENTS**

##### **60.4.1. Purpose**

This section sets forth the requirements for installation of Best Management Practices (BMPs) for the protection or restoration of water quality and for attainment of minimum discharge standards.

##### **60.4.2. Applicability**

BMPs, as described in the *Handbook of Best Management Practices* (Volume II of the Lake Tahoe Basin Water Quality Management Plan), or equivalent practices approved by TRPA, shall be applied to all public and privately owned lands.

##### **60.4.3. Project Compliance Program**

TRPA shall enforce the project compliance programs as provided below.

**A. Temporary BMPs**

Temporary BMPs in accordance with the *Handbook of Best Management Practices*, and as required in Section 33.5, shall be implemented on construction sites and maintained throughout the construction period until winterization and permanent BMPs are in place.

**B. Permanent BMPs**

Application of required permanent BMPs within the parcel or entire project area boundaries, whichever is greater, shall be a condition of project approval. Standard requirements are set forth in subsections 60.4.5 and 60.4.6.

1. Conditions of project approval shall set forth a schedule for installation of permanent BMPs on the project area. In no case shall permanent BMP installation be scheduled later than the date set for the completion of the project (see Chapter 2: *Applicability of the Code of Ordinances*).
2. Retrofitting of the project area outside the construction site boundary with permanent BMPs shall also be made a condition of project approval. If the project area involves more than one parcel, the entire project area will be treated as one parcel for purposes of this section. TRPA shall keep track of the status of retrofitting of project parcels, and or project areas, as provided in Chapter 6: *Tracking, Accounting, and Banking*.
3. The below categories of projects, if not carried out in conjunction with another type of project, may be exempt from the requirements of subparagraph 60.4.3.B.2.
  - a. Installation of erosion control facilities;
  - b. Restoration of disturbed areas;
  - c. SEZ restoration;
  - d. Underground storage tank removal, replacement, or maintenance;
  - e. Hazardous waste spill control or prevention facilities;
  - f. Sewage pump-out facilities for RVs or boats; and
  - g. Minor utility projects pursuant to subparagraph 30.6.2.F.

**60.4.4. BMP Retrofit Program**

Persons owning property not subject to a retrofit requirement prior to January 1, 1993, under subsection 60.4.3, or a discharge permit under subparagraph 60.4.4.D, shall install and maintain BMPs on their property with existing uses in accordance with the provisions below.

**A. Priority System**

Properties with existing uses shall install BMPs in accordance with subsection 53.10.5, the watershed priority system:

**1. Priority Group 1**

Properties with existing uses in watersheds with a point score less than or equal to 30 shall install BMPs not later than October 15, 2000.



**2. Priority Group 2**

Properties with existing uses in watersheds with a point score of 30 to 46, inclusive, shall install BMPs not later than October 15, 2006.

**3. Priority Group 3**

Properties with existing uses in watersheds with a point score of 47 or greater shall install BMPs by October 15, 2006, or not later than October 15, 2008, pursuant to a fee schedule to be developed for BMP inspections, evaluations, and certifications.

**B. Parcels and Unpaved Roadways without Appropriate BMPs**

Parcels and unpaved roadways without appropriate BMPs in place pursuant to the dates described above are subject to enforcement under Article IX Compliance Procedures, Section 9.19, of the Rules of Procedure for violation of 60.4.

**C. Disclosure Requirements**

Owners of property for sale shall, prior to sale, disclose to a purchaser the property's BMP status on a TRPA approved form. The purchaser of the property shall provide the disclosure form to TRPA within 30 days of sale.

**D. Discharge Permits**

Not later than December 31, 1992, TRPA shall notify property owners with existing uses in the following categories 1 through 3 below of the requirements of this subsection. Not later than March 31, 1993, the persons so notified shall inform TRPA that: (1) they have an existing valid state or federal stormwater discharge permit, (2) they will apply for a state or federal stormwater discharge permit, or (3) they will submit to TRPA a remedial action plan pursuant to Section 5.12 of the Code of Ordinances. Not later than June 30, 1994, all persons so notified shall have either a valid state or federal stormwater discharge permit or an approved remedial action plan pursuant to Section 5.12. Such permits and action plans shall be consistent with the provisions of the Water Quality Management Plan for the Tahoe Region.

**1. Commercial Uses**

Retail or entertainment facilities, greater than one acre, and storage yards.

**2. Recreation Uses**

Downhill ski areas, marinas, and golf courses.

**3. Public Service Uses**

Transportation routes, and corporation yards.

**60.4.5. Priority for Installation of Retrofitting Measures**

Schedules for BMP compliance shall include the measures proposed for each year and the estimated cost for those measures. The estimated cost shall be based on unit costs established by TRPA. Unless otherwise approved by TRPA, a schedule that phases BMP compliance shall implement the BMP measures in the following order:

- A. Pave legally established roads, driveways, and parking areas;
- B. Install drainage conveyances;
- C. Install walkways and stabilize cut and fill slopes;
- D. Vegetate denuded areas; and
- E. Treat surface runoff from land coverage.

**60.4.6. Standard BMP Requirements**

Pursuant to subsection 60.4.3, standard conditions of approval for projects shall meet the requirements provided below.

**A. Runoff Water**

Runoff water from impervious surfaces shall meet the discharge standards of Section 60.1 and shall be controlled as provided below.

**1. Infiltration Requirements**

Except as provided in subsection 60.4.8, infiltration facilities to discharge runoff to groundwater shall be required. Infiltration facilities shall be designed to accommodate the volume from a 20-year, one-hour storm. An average intensity of one inch per hour shall be used for this calculation. Infiltration facilities shall be designed utilizing the methodology set forth in the BMP Handbook. The bottom of infiltration trenches or dry wells shall be a minimum of one foot above the seasonal high water table. If TRPA finds that the runoff from impervious surfaces from a 20-year, one-hour storm will infiltrate naturally on the parcel, TRPA may waive the requirement to install infiltration facilities.

**2. Excess Runoff**

Runoff in excess of that infiltrated pursuant to paragraph 1 above shall be controlled in accordance with the methods and design standards in the Handbook.

**B. Cut and Fill Slopes**

Cuts and fills with slopes greater than 2:1 shall be stabilized with methods consistent with the BMPs.

**C. Denuded Areas**

All denuded areas, including slopes less than 2:1, shall be vegetated with approved species listed in the Handbook.

**D. Drainage Conveyances**

Drainage conveyances through a parcel shall be designed for at least a 10-year, 24-hour storm. Storm drain culverts and drain channels shall be designed by a qualified professional. Drainage conveyances through a SEZ shall be designed for a minimum of a 50-year storm.



**E. Roads, Driveways, and Parking Areas**

All roads, driveways, and parking areas proposed for year-round use shall be paved in accordance with Chapter 34: *Driveway and Parking Standards*.

**F. Protection of BMPs**

After installation, all BMPs shall be provided with adequate protection to prevent damage from vehicles.

**G. Consistency with Defensible Space Requirements**

In addition to subsections A – F above, water quality BMPs shall be installed and maintained consistent with the defensible space requirements of the applicable fire agency.

**60.4.7. Additional Requirements**

In addition to the standard requirements of subsection 60.4.6, project conditions of approval shall list any other appropriate required BMPs to meet minimum discharge standards. Construction in stream environment zones or Land Capability Districts 1 through 3, inclusive, normally shall require special conditions of approval because of the sensitivity of those areas to disturbance.

**60.4.8. Special Circumstances**

**A.** Where special circumstances occur, alternative BMPs may be approved to meet water quality standards. Special circumstances may include, but not be limited to, streets, highways, bike trails, existence of high ground water table, unusual upstream or downstream flow conditions, and presence of unusual concentrations of pollutants.

**B.** Infiltrating runoff volumes generated by the 20 year, 1-hour storm may not be possible in some locations due to shallow depth to seasonal groundwater levels, unfavorable soil conditions, or other site constraints such as existing infrastructure or rock outcroppings. For new development or redevelopment projects, site constraints do not include the existing built environment. In the event that site conditions do not provide opportunities to infiltrate the runoff volume generated by a 20 year, 1-hour storm, project proponents must either (1) meet the numeric effluent limits in outlined in subsection 60.1.3 for the 20-year 1-hour storm, or (2) coordinate with the local municipality or state highway department to document that shared stormwater treatment facilities treating private property discharges and public right-of-way stormwater sufficiently contribute to meeting the jurisdiction's average annual fine sediment particle and nutrient load reduction requirements.

**60.4.9. Maintenance of BMPs**

BMPs shall be maintained to ensure their continued effectiveness.



### **“Tahoe In Depth”**

<http://www.trpa.org/about-trpa/press-room/tahoe-in-depth/>

*Tahoe In Depth* is a biannual publication coordinated by TRPA that aims to inspire environmental understanding and stewardship at Lake Tahoe. TWSA has submitted articles on water conservation and source water protection. The purpose of *Tahoe In Depth* is to give homeowners, landowners, visitors, and policymakers clear, straightforward, and interesting information about the Lake Tahoe environment – from successful restoration to ongoing challenges. The goal is to help people better understand the work being done to restore Tahoe’s clarity and the role they can play in helping reach that outcome.

The publication explores the natural and cultural history of the Tahoe Basin while providing balanced, reliable information on a wide spectrum of scientific and planning efforts under way to protect Lake Tahoe’s unique scenic and ecological qualities.

Spearheaded by the Tahoe Regional Planning Agency, various agencies working in the Tahoe Basin have contributed stories and financial assistance to *Tahoe In Depth*. Other stories and content for the publication have been written or selected by an independent editor working with TRPA and contributors.

### **New Gateway Signs Mark Nevada Entrances to Lake Tahoe Watershed**

<http://www.trpa.org/about-trpa/press-room/new-gateway-signs-mark-nevada-entrances-to-laketahoe-watershed>

Visitors to the Lake Tahoe Summit on Tuesday, August 19, 2015 will notice new gateway signs along three Nevada highways leading into the Lake Tahoe Watershed. Installed near Daggett Summit on Nevada State Route 207, Spooner Summit on U.S. Highway 50 and on Nevada State Route 431 the Mount Rose Highway, the decorative gateway signs read, “Entering the Lake Tahoe Watershed — Help

Protect It!”. The signs were installed in July in a collaborative project led by the Tahoe Regional Planning Agency, U.S. Environmental Protection Agency, Nevada Division of Environmental Protection and Nevada Division of State Lands.

The signs are meant to help remind the millions of people who visit Lake Tahoe each year that they are entering a special place and have a duty to help protect its famously clear waters and environment. Fourth of July celebrations this year left thousands of pounds of trash on area beaches for community volunteers to clean up, showing there is still a strong need to remind people of their responsibility to help protect Lake Tahoe and its beaches. That same responsibility goes for keeping trash and other pollutants out of stormwater drainage systems and the 63 streams flowing into Lake Tahoe in a watershed that covers 312 square miles.

## TRPA Threshold Standards and Regional Plan

[https://www.trpa.gov/wp-content/uploads/documents/archive/Thresholds\\_Regional-Plan\\_Amended\\_2019\\_4\\_24.pdf](https://www.trpa.gov/wp-content/uploads/documents/archive/Thresholds_Regional-Plan_Amended_2019_4_24.pdf)

### GOAL PS-1

**PUBLIC SERVICES AND FACILITIES SHOULD BE ALLOWED TO UPGRADE AND EXPAND TO SUPPORT EXISTING AND NEW DEVELOPMENT CONSISTENT WITH THE REGIONAL PLAN.**

The intent of the Regional Plan is neither to stimulate nor to hinder development through the provision of public services and facilities. Rather, the plan attempts to provide for supportive public services and facilities consistent with the development anticipated under the plan.

#### POLICIES:

**PS-1.1 PUBLIC SERVICES AND FACILITIES SHOULD BE ALLOWED TO UPGRADE AND EXPAND CONSISTENT WITH THE LAND USE ELEMENT OF THE REGIONAL PLAN AND FEDERAL, STATE, AND LOCAL STANDARDS.**

**PS-1.2 EXPANSION OF PUBLIC SERVICES AND FACILITIES SHOULD BE PHASED IN TO MEET THE NEEDS OF NEW DEVELOPMENT WITHOUT CREATING INEFFICIENCIES FROM OVER-EXPANSION OR UNDER-EXPANSION.**

The Regional Plan provides for periodic evaluations of the capital improvements plan and attainment of environmental thresholds. These evaluations may lead to adjustments in the development management system which could affect the need for, and the timing of, expansion of public services and facilities. For this reason, prudent staging or phasing of expansion programs should be employed to minimize the risk of errors in sizing.

**PS-1.3 ALL NEW DEVELOPMENT SHALL EMPLOY APPROPRIATE DEVICES TO CONSERVE WATER AND REDUCE WATER CONSUMPTION. EXISTING DEVELOPMENT SHALL BE RETROFITTED WITH WATER CONSERVATION DEVICES ON A VOLUNTARY BASIS IN CONJUNCTION WITH A PUBLIC EDUCATION PROGRAM OPERATED BY THE UTILITY DISTRICTS.**

Water conservation will be necessary to comply with the limits of the Bi-state Compact (1969). The ability of the water purveyors in the Region to provide adequate water for domestic and other uses depends on water conservation programs. Coordination involving water issues should be pursuant to local, state, and federal law.

### GOAL PS-2

**CONSIDER THE EXISTENCE OF ADEQUATE AND RELIABLE PUBLIC SERVICES AND FACILITIES IN APPROVING NEW DEVELOPMENT UNDER THE PLAN.**

To prevent the over-burdening of public services and facilities, all new development approvals consistent with the development priorities and the planning area statements also should consider the adequacy of services and facilities. It also will be necessary to monitor the ability of utility districts and other entities to provide public services and facilities.

**POLICIES:**

- PS-2.1** NO ADDITIONAL DEVELOPMENT REQUIRING WATER SHOULD BE ALLOWED IN ANY AREA UNLESS IT CAN BE DEMONSTRATED THAT THERE IS ADEQUATE WATER SUPPLY WITHIN AN EXISTING WATER RIGHT.

This policy is necessary to prevent conflicts from arising between approved development and state water law. Conditional approvals may be appropriate in situations where the existence of a water right is uncertain.

- PS-2.2** TRPA, WATER PURVEYORS, AND THE STATES SHOULD MONITOR THE USE OF WATER WITHIN THE TAHOE REGION AND EVALUATE CONFORMANCE WITH BI-STATE COMPACT (1969) WHICH ADDRESSES WATER DIVERSIONS IN THE REGION.

It will be impossible to assess compliance with the California-Nevada Compact without a regular monitoring program. Such a program should be a cooperative venture of TRPA, the states, and the water purveyors.

- PS-2.3** NO ADDITIONAL DEVELOPMENT REQUIRING WATER SHALL BE ALLOWED IN ANY AREA UNLESS THERE EXISTS ADEQUATE STORAGE AND DISTRIBUTION SYSTEMS TO DELIVER AN ADEQUATE QUANTITY AND QUALITY OF WATER FOR DOMESTIC CONSUMPTION AND FIRE PROTECTION.

The simple existence of a water supply does not, by itself, guarantee the ability of the water purveyor to deliver adequate quantities of good quality water for domestic consumption and fire protection. These aspects are most commonly a function of system design, involving the distribution and storage of water. System design should take into account peak demands and necessary fire flows, pursuant to local, state, federal and utility district standards or Agency standards where no other standards apply.

**GOAL PS-3**

**PREVENT LIQUID AND SOLID WASTES FROM DEGRADING LAKE TAHOE AND THE SURFACE AND GROUNDWATERS OF THE REGION.**

Although this goal pertains to many of the policies included in the Water Quality Subelement, it also applies to the provision of public services and facilities.

**POLICIES:**

- PS-3.1** THE DISCHARGE OF MUNICIPAL OR INDUSTRIAL WASTEWATERS TO THE SURFACE AND GROUNDWATERS OF THE TAHOE REGION IS PROHIBITED, EXCEPT FOR EXISTING DEVELOPMENT DISCHARGING WASTEWATERS UNDER A STATE-OR TRPA-APPROVED DISPOSAL PLAN.

This policy is a reiteration of state laws and existing TRPA policy to prevent the degradation of the water quality of the Region due to sewage discharges. Certain minor facilities already in existence have exemptions from this policy. TRPA will study the feasibility of minor reuse programs within the Region.

- PS-3.2** ALL SOLID WASTES SHALL BE EXPORTED FROM THE REGION. CONSOLIDATION AND TRANSFER METHODS SHALL BE DEVELOPED TO ACHIEVE A REDUCTION IN THE VOLUME OF WASTES BEING TRANSPORTED TO LANDFILLS.

Because of their potentially harmful effects on water quality, solid wastes should



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be exported from the Region. To minimize the impacts of the requirement on air quality, a reduction in the volume of wastes should be achieved to bring about a corresponding reduction in the vehicle miles travelled by the export vehicles.

**PS-3.3 GARBAGE PICK-UP SERVICE SHALL BE MANDATORY THROUGHOUT THE REGION, AND WILL BE SO STRUCTURED AS TO ENCOURAGE CLEAN-UPS AND RECYCLING.**

Because of the fragile environment of the Tahoe Region, certain waste disposal practices may be required to ensure the maintenance of air quality, water quality and scenic values. Waste disposal programs should be reviewed by local governments (e.g., TBAG) to provide incentives and remove disincentives for clean-up programs, composting, and recycling.

**GOAL PS-4**

**TO ENSURE PROTECTION OF THE PUBLIC HEALTH, SAFETY AND GENERAL WELFARE OF THE REGION, EDUCATIONAL AND PUBLIC SAFETY SERVICES SHOULD BE SIZED TO BE CONSISTENT WITH PROJECTED GROWTH LEVELS IN THIS PLAN.**

The Regional Plan will encourage educational and public safety services including police, fire, educational and health services to provide for protection of the public health safety and welfare. TRPA will coordinate programs with appropriate local, state and federal agencies to ensure that the planned growth will also be consistent with the ability to provide these services.

**POLICIES:**

**PS-4.1 THE IMPACT ON EDUCATIONAL AND PUBLIC SAFETY SERVICES SHALL BE CONSIDERED WHEN REVIEWING PROJECTS AND PLAN AMENDMENTS PROPOSED WITHIN THE REGION. TO THE EXTENT FEASIBLE, ADVERSE IMPACTS SHOULD BE MITIGATED AS PART OF THE REVIEW PROCESS.**

TRPA shall attempt to coordinate a Region-wide review process that will include the above considerations. Except for environmentally related impacts, TRPA intends to rely on local, state and federal agencies of expertise to ensure implementation of this policy.

**PS-4.2 EDUCATIONAL AND EMERGENCY SERVICE ORGANIZATIONS SHOULD ANTICIPATE AND PLAN FOR PROJECTED DEMANDS AND NEEDS CONSISTENT WITH THE REGIONAL PLAN AND ARE ENCOURAGED TO ADVISE THE AGENCY WHEN DEVELOPMENT POTENTIALS EXCEED CURRENT OR ANTICIPATED SERVICE CAPABILITIES OR CAPACITIES.**

TRPA and other relevant agencies will coordinate with social service agencies to help identify future demands and needs anticipated with implementation of the Plan. That information will be used to identify possible deficiencies and to develop appropriate strategies to maintain an acceptable level of service.

## 2019 Update

[http://www.trpa.org/wp-content/uploads/Thresholds\\_Regional-Plan\\_Amended\\_2019\\_4\\_24.pdf](http://www.trpa.org/wp-content/uploads/Thresholds_Regional-Plan_Amended_2019_4_24.pdf)

The **Science Behind the Regional Plan** - Download the [Environmental Threshold Carrying Capacities](#)

In 1982, TRPA adopted nine environmental threshold carrying capacities (thresholds), which set environmental standards for the Lake Tahoe basin and indirectly define the capacity of the Region to accommodate additional land development. Many of the environmental thresholds will take generations to achieve and a sustained commitment to conservation is imperative. The [Environmental Improvement Program](#) is intended to accelerate threshold attainment.

### There are nine threshold areas:

**Water Quality:** Return the lake to 1960s water clarity and algal levels by reducing nutrient and sediment in surface runoff and groundwater.

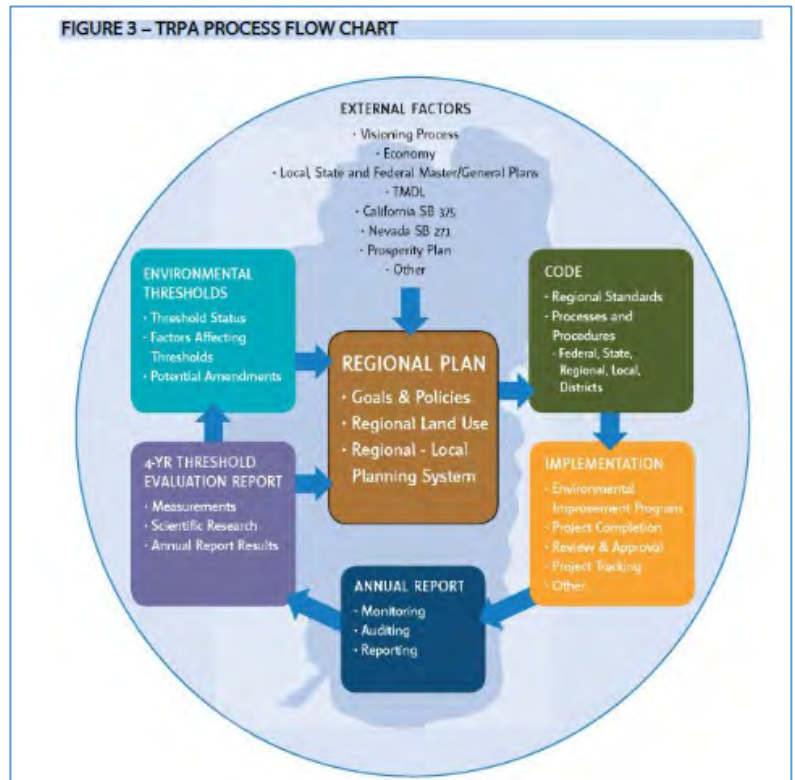
**Air Quality:** Achieve strictest of federal, state, or regional standards for carbon monoxide, ozone, and particulates; increase visibility; reduce U.S. 50 traffic; and reduce vehicle miles traveled.

**Scenic Resources:** Maintain or improve 1982 roadway and shoreline scenic travel route ratings, maintain or improve views of individual scenic resources, and maintain or improve quality of views from public outdoor recreation areas.

**Soil Conservation:** Preserve natural stream environment zones (SEZ), restore 25% of disturbed urban SEZ areas (1,100 acres), and reduce total land coverage.

**Fisheries:** Maintain 180 miles of good to excellent stream habitat, achieve nearly 6,000 acres of excellent lake habitat, and attempt to reintroduce Lahontan Cutthroat Trout.

**Vegetation:** Increase plant diversity in forests, preserve uncommon plant communities including deepwater plants, enhance late seral forests and reduce forest fuels, and maintain minimum sustainable populations of sensitive plants including Tahoe Yellow Cress.





**Wildlife:** Provide habitat for special interest species, prevent degradation of habitats of special significance.

**Noise:** Minimize noise disturbance from single events, and minimize background noise disturbances in accordance with land use patterns.

**Recreation:** Preserve and enhance high quality recreational experience. Preserve undeveloped shorezone and other natural areas, and maintain a fair share of recreational capacity for the general public.

### Threshold Evaluation Report

The [threshold standards](#) establish the shared goals for restoration and environmental quality in the Region. The goals range from specific targets for air and water quality, to broad visions for maintaining scenic beauty and enhancing the recreational experience. The [Regional Plan](#), with all of its

elements, as implemented through TRPA [ordinances](#) and rules and regulations, will achieve and maintain the adopted threshold standards while providing opportunities for orderly growth and development. Thresholds ensure that the “Tahoe experience” would not be lost for future generations.

Every four years, TRPA leads the development of a threshold evaluation report that assesses the environmental health of the Region relative to the adopted standards. We are proud to present the [2019 Threshold Evaluation](#) to residents, visitors, and others concerned with the environmental health of the Tahoe Region. This is the seventh comprehensive report since the adoption of the 1987 Regional Plan. The evaluation is a collaborative endeavor that draws on the monitoring work and analytic expertise of federal, state, and local agencies, academic institutions, and private businesses. We look forward to

#### THRESHOLD STANDARDS

Threshold standards establish the Environmental Improvement Program partners' shared goals for restoration and maintenance of the qualities of the Tahoe Region.

The adopted current threshold standards are stated below. The agency will maintain and update online inventories of the administrative status and disposition of each threshold standard.

#### WATER QUALITY

##### DEEP WATER (PELAGIC) LAKE TAHOE

###### NUMERICAL STANDARDS

- WQ1) The annual average deep water transparency as measured by Secchi disk shall not be decreased below 29.7 meters (97.4 feet), the average levels recorded between 1967 and 1971 by the University of California, Davis.
- WQ2) Maintain annual mean phytoplankton primary productivity at or below 52gmC/m2/yr.

##### LITTORAL LAKE TAHOE

###### NUMERICAL STANDARDS

- WQ3) Attain turbidity values not to exceed three NTU.
- WQ4) Turbidity shall not exceed one NTU in shallow waters of the Lake not directly influenced by stream discharges.
- WQ5) Attain 1967-71 mean values for phytoplankton primary productivity in the littoral zone.
- WQ6) Attain 1967-71 mean values for periphyton biomass in the littoral zone.
- MANAGEMENT STANDARD
- WQ7) Support actions to reduce the extent and distribution of excessive periphyton (attached) algae in the nearshore (littoral zone) of Lake Tahoe.

##### AQUATIC INVASIVE SPECIES

###### MANAGEMENT STANDARDS

- WQ8) Prevent the introduction of new aquatic invasive species into the region's waters.
- WQ9) Reduce the abundance of known aquatic invasive species.
- WQ10) Reduce the distribution of known aquatic invasive species.
- WQ11) Abate harmful ecological impacts resulting from aquatic invasive species.
- WQ12) Abate harmful economic impacts resulting from aquatic invasive species.
- WQ13) Abate harmful social impacts resulting from aquatic invasive species.
- WQ14) Abate harmful public health impacts resulting from aquatic invasive species.

##### TRIBUTARIES

###### NUMERICAL STANDARDS

- WQ15) Attain applicable state standards for concentrations of dissolved inorganic nitrogen.
- WQ16) Attain applicable state standards for concentrations of dissolved phosphorus.
- WQ17) Attain applicable state standards for dissolved iron.
- WQ18) Attain a 90 percentile value for suspended sediment concentration of 60 mg/l.

working with all stakeholders to continue to protect and restore this spectacular place for generations to come.

#### **SURFACE RUNOFF**

##### **NUMERICAL STANDARDS**

- WQ19) Achieve a 90 percentile concentration value for dissolved inorganic nitrogen of 0.5 mg/1 in surface runoff directly discharged to a surface water body in the Basin.
- WQ20) Achieve a 90 percentile concentration value for dissolved phosphorus of 0.1 mg/1 in surface runoff directly discharged to a surface water body in the Basin.
- WQ21) Achieve a 90 percentile concentration value for dissolved iron of 0.5 mg/1 in surface runoff directly discharged to a surface water body in the Basin.
- WQ22) Achieve a 90 percentile concentration value for suspended sediment of 250 mg/1 in surface runoff directly discharged to a surface water body in the Basin.

#### **GROUNDWATER**

##### **MANAGEMENT STANDARDS**

- WQ23 - WQ32) Surface runoff infiltration into the groundwater shall comply with the uniform Regional Runoff Quality Guidelines as set forth in Table 4-12 of the Draft Environmental Threshold Carrying Capacity Study Report, May, 1982. Where there is a direct and immediate hydraulic connection between ground and surface waters, discharges to groundwater shall meet the guidelines for surface discharges, and the Uniform Regional Runoff Quality Guidelines shall be amended accordingly.<sup>1</sup>

#### **OTHER LAKES**

##### **NUMERICAL STANDARD**

- WQ33) Attain existing water quality standards.

#### **LOAD REDUCTIONS**

##### **MANAGEMENT STANDARDS**

- WQ34) Reduce fine sediment particle (inorganic particle size < 16 micrometers in diameter) load to achieve long-term pelagic water quality standards (WQ1 and WQ2).
- WQ35) Reduce total annual phosphorus load to achieve long-term pelagic water quality standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).
- WQ36) Reduce total annual nitrogen load to achieve long-term pelagic water quality standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).
- WQ37) Decrease total annual suspended sediment load to achieve littoral turbidity standards (WQ3 and WQ4).
- WQ38) Reduce the loading of dissolved phosphorus to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).
- WQ39) Reduce the loading of iron to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).
- WQ40) Reduce the loading of other algal nutrients to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).
- WQ41) The most stringent of the three dissolved inorganic nitrogen load reduction targets shall apply:

<sup>1</sup> See attachment A

- i. Reduce dissolved inorganic nitrogen loads to pelagic and littoral Lake Tahoe from<sup>2</sup>:
- surface runoff by approximately 50 percent of the 1973-81 annual average,
  - groundwater approximately 30 percent of the 1973-81 annual average, and
  - atmospheric sources approximately 20 percent of the 1973-81 annual average.
- ii. Reduce dissolved inorganic nitrogen loading to Lake Tahoe from all sources by 25 percent of the 1973-81 annual average.
- iii. To achieve littoral water quality standards (WQ5 and WQ6).

#### **SOIL CONSERVATION**

##### **IMPERVIOUS COVER**

##### **MANAGEMENT STANDARDS**

- SC1-SC9) Impervious cover shall comply with the Land-Capability Classification of the Lake Tahoe Basin, California-Nevada, A Guide For Planning, Bailey, 1974<sup>3</sup>.

##### **STREAM ENVIRONMENT ZONES**

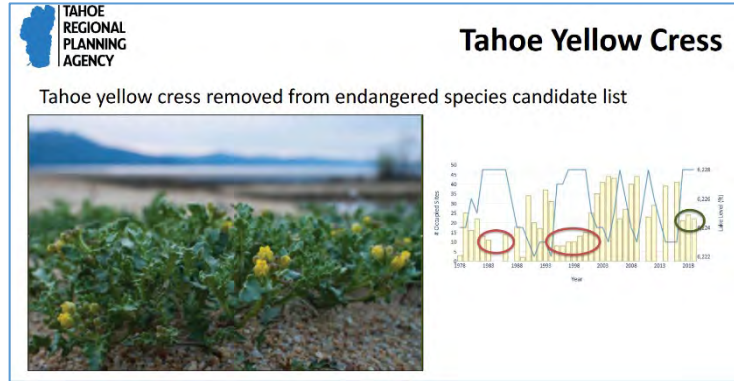
##### **NUMERICAL STANDARDS**

- SC10) Preserve existing naturally functioning SEZ lands in their natural hydrologic condition.
- SC11) Restore all disturbed SEZ lands in undeveloped, unsubdivided lands.
- SC12) Restore 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided.
- SC13) Attain a 5 percent total increase in the area of naturally functioning SEZ lands.

## 2019 TRPA Threshold Evaluation Report

<https://www.trpa.gov/wp-content/uploads/documents/GB-Agenda-Item-VI.A-2019-TVAL-Briefing.pdf>

<https://thresholds.laketahoeinfo.org/>



The screenshot shows the "Threshold Dashboard" website for Lake Tahoe. The header includes the "lake tahoe INFO" logo and navigation links for "Data Center", "Request Support", and "Log in". The main content area is titled "Evaluation Overview" and "WATER QUALITY". It contains a paragraph about the lake's transparency and the impact of urbanization and development. To the right of the text is a photograph of a lake. Below the text is a section titled "Reporting Categories" with a list of categories: Aquatic Invasive Species, Deep Water (Pelagic) Lake Tahoe, Groundwater, Nearshore (Littoral) Lake Tahoe, Other Lakes, and Surface Runoff. The website is viewed in a browser window with multiple tabs open, and the Windows taskbar is visible at the bottom.

## 2015 TRPA Threshold Evaluation Report

<http://www.trpa.org/regional-plan/threshold-evaluation>

The 2015 Threshold Evaluation Report offers a snapshot of the health of the ecosystem in the Tahoe Basin by documenting the status and trends of 178 threshold standards in nine categories:

[http://www.trpa.org/documents/rp\\_update/Final\\_TVAL/1\\_2011\\_TEVAL\\_Chapters\\_Clean\\_2012-1024/TEVAL2011\\_Ch4\\_WaterQuality\\_Oct2012\\_Final.pdf](http://www.trpa.org/documents/rp_update/Final_TVAL/1_2011_TEVAL_Chapters_Clean_2012-1024/TEVAL2011_Ch4_WaterQuality_Oct2012_Final.pdf)

[http://www.trpa.org/wp-content/uploads/10\\_Ch4\\_WaterQuality\\_FINAL\\_9\\_30\\_2016.pdf](http://www.trpa.org/wp-content/uploads/10_Ch4_WaterQuality_FINAL_9_30_2016.pdf)

## TRPA Regional Plan Update – Final EIS Released Oct. 2012

<http://www.trpa.org/regional-plan/regional-plan-eis>



Concurrent with the release of the TRPA Threshold Evaluation Report (previous section); was the release of the long awaited final TRPA Regional Plan Update. This plan, has been drafted to serve as the guiding document for basin wide human activities.

The Final Draft Environmental Impact Statement for the Lake Tahoe Regional Plan Update posted online October 24, 2012. An unprecedented level of public input has been received on the plan to date and public meetings were held October, November and December 2012 to provide opportunities for public input. The Tahoe Regional Planning Agency's Regional Plan Update is the blueprint for the Tahoe Basin's sustainable future. The Regional Plan Update will help guide how communities evolve, how ecosystems function, whether the transportation network is efficient and effective, and whether the Basin at large is restored, more pristine, and sustainable.

Public involvement in developing the updated plan has been extensive. The Final Environmental Impact Statement (EIS) includes all comments received on the EIS during the public comment period, agency responses to comments, as well as all contents of the Draft EIS.

#### **TRPA Regional Plan Development History**

TWSA was an active participant of the multi-year Regional Pathway process over its entire process. The Pathway process was used to collaboratively update the Lake Tahoe Basin Regional plans led by Tahoe Regional Planning Agency, Lake Tahoe Basin Management Unit, Nevada Environmental Protection Agency and the Lahontan Regional Water Quality Control Board.

#### **The 2012 Update: Restoring Lake Tahoe and Supporting Sustainable Communities**

<http://www.trpa.org/regional-plan>

Legal challenges to the Regional Plan were dismissed in November 2016.

<http://legal-planet.org/2016/11/05/tahoe-regional-planning-agency-wins-big-in-ninth-circuit/planet.org>

The Tahoe Regional Planning Agency (TRPA) won a major legal victory in the U.S. Court of Appeals for the Ninth Circuit. A unanimous three-judge panel of that court rejected environmentalists' challenge to TRPA's adopted Regional Plan for the Lake Tahoe Basin in [\*Sierra Club v. Tahoe Regional Planning Agency\*](#). The Ninth Circuit decision effectively concludes a decade-long process by which TRPA formulated, held multiple hearings on, and ultimately adopted a revised Regional Plan for the Tahoe Basin. That Plan's most noteworthy element is its concentration of development in relatively densely-constructed "community centers" in already-urbanized portions of the Tahoe Basin. The environmental trade-off is that in exchange for that intensified development, currently-developed areas outside those community centers will be returned to open space.

Water quality threshold standards adopted by TRPA set a target to return the Lake to the transparency observed in the late 1960s. Within the six major indicator categories, TRPA uses seven water quality standards to assess the water quality of Lake Tahoe and its tributaries. Table 3.8-1 lists each indicator category and associated standard(s). The status and trend of each threshold relative to the associated standard(s) is described in Section 3.8.2, Affected Environment.

Table 3.8-1. TRPA Water Quality Thresholds		
Indicator Category	Standard	Numerical Standard and/or Management Standard
Littoral Lake Tahoe	Sediment Loading	Decrease sediment load as required to attain turbidity values not to exceed 3 NTU in littoral Lake Tahoe. In addition, turbidity shall not exceed 1 NTU in shallow waters of Lake Tahoe not directly influenced by stream discharges.
Deep water (pelagic zone)	Winter clarity, pelagic Lake Tahoe	Average winter Secchi depth, December-March, shall not be less than 33.4 meters.
Deep water (pelagic zone)	Phytoplankton primary productivity	Annual mean phytoplankton primary productivity shall not exceed 52 gC/M <sup>2</sup> /yr.
Tributary water quality	Annual average concentrations of appropriate constituents	Concentrations of appropriate constituents in any tributary stream for which states have established standards (as mg/l); 90 <sup>th</sup> percentile value suspended sediment of 60 mg/L.
Stormwater runoff quality	Surface discharge to surface water	Pollutant concentrations in surface runoff discharged to surface water shall not exceed the following concentrations at the 90th percentile: <ul style="list-style-type: none"> <li>&gt; 0.5 mg/L dissolved inorganic nitrogen as N</li> <li>&gt; 0.1 mg/L dissolved phosphorus as P</li> <li>&gt; 2.0 mg/L grease and oil</li> <li>&gt; 0.5 mg/L dissolved iron</li> <li>&gt; 250 mg/L suspended sediment</li> </ul>
Stormwater runoff quality	Surface discharge to groundwater	Surface runoff infiltrated into soils shall not exceed the following concentrations at the 90th percentile: <ul style="list-style-type: none"> <li>&gt; 5.0 mg/L total nitrogen as N</li> <li>&gt; 1.0 mg/L total phosphorus as P</li> <li>&gt; 4.0 mg/L total iron</li> <li>&gt; 40 mg/L grease and oil</li> <li>&gt; 200 NTU turbidity</li> </ul> Where there is a direct hydrologic connection between ground and surface waters, discharges shall meet the guidelines for surface discharges (WQ-5).
Other lakes	Concentrations of appropriate constituents	Water quality parameters and standards established by California and Nevada.
mg/l = milligrams per liter NTU = Nephelometric Turbidity Units gC/M <sup>2</sup> /yr = grams of carbon per square meter per year Source: TRPA 2012a		



## REGIONAL PLAN

### Goals and Policies

TRPA has established a number of goals and policies related to water quality. Goals include the reduction of sediment and nutrients to Lake Tahoe and the elimination or reduction of other pollutants. Policies address a range of issues, including snow removal, wastewater spill prevention, underground storage tanks, dredging, and reduction of impacts from motorized watercraft. The existing goals and policies for water quality protect and enhance lake clarity and beneficial uses within the following regulatory framework:

- ▲ Concentration-based discharge standards and infiltration requirements for stormwater treatment that control water quality impacts associated with new development;
- ▲ Regulations requiring the retrofitting of developed properties with Best Management Practices (BMPs) that reduce erosion and stormwater runoff;
- ▲ Regulatory preservation and restoration of Stream Environment Zones (SEZs) to protect and enhance their water quality values; and
- ▲ Prohibiting the discharge of wastewater, toxic waste, and solid waste into Lake Tahoe, its tributaries, and groundwater resources.

### Code of Ordinances

The TRPA Code of Ordinances contains a range of requirements intended to help achieve water quality threshold standards, goals, and policies. Chapter 60 of the Code is the primary chapter directed at water quality and the installation of BMPs. A number of other chapters contain provisions pertaining to the protection of water resources and water quality for hydrology, coverage, and grading and excavation (Table 3.8-2).

Table 3.8-2. Selected Code Requirements Related to Water Quality Protection	
Code Section	Requirements
Chapter 30	Sets forth regulations concerning the land capability system, land capability districts, prohibition of additional land coverage in certain land capability districts, and transfer and mitigation of land coverage.
Chapter 33.3	Sets standards for grading and excavation.
Chapter 33.4	Sets requirements for special investigations, reports, and plans, determined to be necessary by TRPA to protect the environment against significant adverse effects from grading projects.
Chapter 33.5	Sets forth the requirements for grading and construction schedules when grading or construction is to occur pursuant to a TRPA permit.
Chapter 35	Sets forth regulations pertaining to recognition of natural hazards, including floodplains, prevention of damage to property, and protection of public health relating to such natural hazards.
Chapter 60.1	Sets discharge standards for runoff and discharge to surface and groundwater.
Chapter 60.2	Sets forth requirements that new residential, commercial, and public projects completely offset their water quality impacts.
Chapter 60.3	Contains regulations pertaining to recognition of source water, prevention of contamination to source water, and protection of public health relating to drinking water.
Chapter 60.4	Sets standards for installation and maintenance of BMPs for the protection or restoration of water quality.
Source: TRPA 2012b	

Regulations for stormwater discharge are based on maximum allowable concentrations for nitrogen, phosphorus, iron, turbidity, suspended sediments, and grease and oil. Standards for stormwater discharge to surface water are different than those for discharge to groundwater. In general, discharge standards to

groundwater are more lenient because of the natural filtering capacity of soils and the potential for nutrient uptake from vegetation. TRPA discharge standards for surface water and groundwater in the Code are the threshold standards for those indicator reporting categories (see Table 3.8-2). In addition to numerical discharge limits, the Code also restricts the discharge of wastewater and toxic substances, sets requirements for snow removal and control of salts, and sets criteria for pesticide use and fertilizer control.

In addition to stormwater runoff quality standards, regulations are in place for containment of stormwater runoff volumes and flows. These regulations are designed to reduce the hydrologic impacts of urbanization on peak runoff rates and volumes, protect water quality, and protect property and public safety. TRPA regulations require containment, at a minimum, of the stormwater runoff volume generated by a 20-year return period, 1-hour duration "design storm" from impervious surfaces. The calculation of runoff volume is made by multiplying the intensity of the 20-year, 1-hour design storm (taken as 1 inch of rain in 1 hour) by the impervious surface area. Runoff that is contained and subsequently infiltrated is required to meet the maximum concentration requirements for discharge to groundwater (Table 3.8-2).

### WATER QUALITY MANAGEMENT PLAN FOR THE LAKE TAHOE REGION (208 PLAN)

The *Water Quality Management Plan for the Tahoe Region (208 Plan)* was prepared by TRPA in compliance with Section 208 of the federal Clean Water Act. The 208 Plan contains overlapping elements with the Regional Plan, including the Handbook of Best Management Practices, the Stream Environment Zone Protection and Restoration Program, and the Capital Improvement Program for Erosion and Runoff Control. The 208 Plan identifies pollution sources, control needs, and management practices to improve water quality.

The 208 Plan contains management programs that pertain to urban runoff and erosion, airborne nutrients, waste management, natural area management, and other water quality issues in Lake Tahoe and the Shorezone. Programs are implemented through designated management agencies, including TRPA, the U.S. Forest Service (USFS), and other federal, state, and local governments. To determine if water quality goals are attained and maintained, water quality programs require continuous scientific monitoring of environmental conditions related to the threshold standards for pelagic Lake Tahoe, littoral Lake Tahoe, tributary streams, surface runoff, groundwater, land coverage, and SEZs. TRPA must publish annual or semi-annual reports on monitoring program implementation and must evaluate the results at least every 5 years (Goals and Policies, p. VII-23).

## FEDERAL

### FEDERAL ANTIDEGRADATION POLICY

The U.S. Environmental Protection Agency (EPA) has designated Lake Tahoe an Outstanding National Resource Water (ONRW). ONRWs are provided the highest level of protection under EPA's Antidegradation Policy, stipulating that states may allow some limited activities that result in temporary and short-term changes to water quality, but that such changes should not adversely affect existing uses or alter the essential character or special uses for which the water was designated an ONRW. EPA interprets this provision to mean that no new or increased discharges to ONRWs and no new or increased discharge that would result in lower water quality are permitted.

### CLEAN WATER ACT

#### Section 404

The federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the CWA prohibits the discharge of fill material into waters of the United States, including wetlands,



except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and EPA. To discharge dredged or fill material into waters of the United States, including wetlands, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE. Waters of the United States are generally defined as “waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters.”

#### Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. EPA delegates water pollution control authority under CWA Section 401 to the states.

#### Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point-source discharges of pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. EPA delegates water pollution control authority under CWA Section 402 to the states, which oversee compliance.

### CALIFORNIA

#### LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

The Porter-Cologne Act created the California State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) in California. The SWRCB protects water quality by setting statewide policy, coordinating and supporting RWQCB efforts, and reviewing petitions that contest RWQCB actions. The RWQCBs issue waste discharge permits, take enforcement action against violators, and jointly administer federal and state laws related to water quality in coordination with EPA and USACE.

The Tahoe Region is located within the jurisdiction of the Lahontan RWQCB (LRWQCB). The LRWQCB Region is approximately 570 miles long, covering an area of 33,131 square miles, from the California-Oregon border to the Antelope Valley watershed in Los Angeles and San Bernardino Counties. In addition to the Tahoe Region, the Lahontan Region includes Death Valley, Mount Whitney, Owens Valley, Mono Lake, and portions of Lassen and Modoc Counties.

On the California side of the Tahoe Region, LRWQCB implements the CWA, the California Water Code (including the Porter-Cologne Act), and a variety of laws related to control of solid waste and toxic and hazardous wastes. LRWQCB has authority to set and revise water quality standards and discharge prohibitions. It issues federal permits, including NPDES permits and Section 401 water quality certifications, and state waste discharge requirements or waivers of waste discharge requirements. Its planning and permitting actions require compliance with the California Environmental Quality Act (CEQA).



Water quality standards and control measures for surface and ground waters of the Lahontan Region are contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The Basin Plan designates beneficial uses for water bodies. It establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. Chapter 5 of the Basin Plan, Water Quality Standards and Control Measures for the Lake Tahoe Basin, summarizes a variety of control measures for the protection and enhancement of Lake Tahoe.

## NEVADA

### NEVADA DIVISION OF ENVIRONMENTAL PROTECTION, BUREAU OF WATER QUALITY PLANNING

The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning (BWQP) is responsible for several water quality protection functions, including: collecting and analyzing water data, developing standards for surface waters, publishing reports, providing water quality education, and implementing programs to address surface water quality. The BWQP is divided into four branches: water quality standards, monitoring, nonpoint source pollution management, and the Lake Tahoe management program. The branches are responsible for the following duties and responsibilities:

- ▲ The Water Quality Standards Branch is responsible for developing and reviewing water quality standards; determining total maximum daily loads and wasteload allocations from point sources; and determining load allocations from non-point sources.
- ▲ The Monitoring Branch is responsible for administering the state's water quality monitoring program. This branch maintains and updates water quality data for the national water quality data base (Water Quality Exchange Network - WQX) and is responsible for preparation of Nevada's Water Quality Assessment Report, which is required under CWA Section 305(b) of the Clean Water Act (CWA).
- ▲ The Nonpoint Source (NPS) Pollution Management Program aims to control nonpoint sources of pollution in Nevada. NPS pollution results from a variety of diffuse and dispersed human activities.
- ▲ The Lake Tahoe Watershed Program unit collaborates with LRWQCB to develop the Total Maximum Daily Load for Lake Tahoe.

### LAKE TAHOE TOTAL MAXIMUM DAILY LOAD

Section 303(d) of the Clean Water Act requires states to compile a list of impaired water bodies that do not meet water quality standards and to develop a total maximum daily load (TMDL) for impaired water bodies to determine the key pollutants and contributing sources to the impairment. Lake Tahoe is one of 41,237 impaired waters in the United States listed in EPA's National Summary of Impaired Waters and TMDLs (EPA 2012). While both California and Nevada have identified Lake Tahoe as an impaired water body, the scientific basis for the impaired classification is different between the states:

- ▲ California has identified Lake Tahoe's lack of transparency as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. To comply with California's Lake Tahoe transparency standard, a 25-centimeter (10-inch) white Secchi disk would need to be visible 29.7 meters (97.4 feet) below the surface of Lake Tahoe on an average annual basis.
- ▲ Nevada has identified Lake Tahoe's lack of clarity as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. Clarity is defined as a quantitative measure of the vertical extinction of light (VEC) per meter of depth. A lower VEC reading indicates more clarity to the water. To comply with Nevada's Lake Tahoe clarity standard, a VEC of 0.08 per meter is necessary.

The science supporting the Lake Tahoe TMDL was developed collaboratively by LRWQCB and the NDEP and provides the framework for a comprehensive water quality restoration plan to address identified pollutant sources with shared goals to ultimately achieve the Lake Tahoe transparency and clarity water quality objectives (LRWQCB and NDEP 2010: p. 1-1). However, TMDLs established under CWA Section 303(d) function primarily as planning devices and are not self-executing. Each TMDL represents a goal that may be implemented by adjusting pollutant discharge requirements in individual NPDES permits or establishing nonpoint source controls. Because California and Nevada must comply with, administer, and enforce their own state laws and policies, each state has developed its own Lake Tahoe TMDL to address the impairment of Lake Tahoe as addressed in each state's Section 303(d) filings with EPA. The following items highlight the differences in implementation approaches between the two states:

- ▲ California's Lake Tahoe TMDL (dated November 2010 and approved by EPA in 2011) requires attainment of the California transparency objective for Lake Tahoe over a 65-year implementation period. Based on California law, LRWQCB has the obligation to implement and enforce the California Lake Tahoe TMDL through NPDES discharge permits (over which EPA has jurisdiction) issued to California government entities (City of South Lake Tahoe, Placer County, El Dorado County, and the California Department of Transportation).
- ▲ Nevada's Lake Tahoe TMDL (dated August 2011 and approved by EPA in 2011) is a modified version of the California Lake Tahoe TMDL. The Nevada Lake Tahoe TMDL clarifies Nevada's regulatory structure and approach to implementation and emphasizes that the proposed implementation timelines may need to be adjusted for a variety of reasons, but particularly based on the availability of future funding. NDEP's stated plan for implementing the Lake Tahoe TMDL for Washoe County and Douglas County is through Memoranda of Agreement (MOA) with each jurisdiction. MOAs are a collaborative, legally non-binding approach to implementing a TMDL. NDEP regulates the Nevada Department of Transportation and the Stateline Stormwater Association with NPDES discharge permits.

## 1997-2022 ACCOMPLISHMENTS



**198**

miles of bike and pedestrian trail constructed or improved



**836**

miles of roadway updated to reduce erosion and stormwater pollution



**107,436**

boats inspected for aquatic invasive species



**3,386**

feet of public shoreline added



**200**

acres treated to remove aquatic invasive weeds and Asian clams



**92,233**

acres of forest treated to reduce hazardous fuels



**2024 EIP Report:** [https://www.trpa.gov/wp-content/uploads/EIP\\_8pgr\\_AUG-2024\\_SU.pdf](https://www.trpa.gov/wp-content/uploads/EIP_8pgr_AUG-2024_SU.pdf)

Large-scale ecosystem restoration, aquatic invasive species prevention and control, and stormwater treatment projects play a critical role in improving Tahoe's resilience to climate change. By restoring ecosystem health and reducing the flow of pollutants and fine sediment from urban areas, EIP partners are regaining the lake's lost clarity and improving wildlife habitat and biodiversity.

With this purchase, 96 percent of the lower section of the Upper Truckee River is now in public ownership. The river drains a third of the Lake Tahoe Basin's land area and has been the largest source of clarity-harming sediment. The land purchase protects critical wetland and meadow habitat while presenting opportunities to improve climate resilience, public access, and the river corridor.



Placer County constructed the Lower Secline Water Quality Improvement Project in a neighborhood directly adjacent to Lake Tahoe. As part of the project, eroding parking areas and unpaved roads were improved to reduce the amount of sediment reaching the lake.



In 2023, divers treated over 100 acres of aquatic invasive weeds in Lake Tahoe including key sites like Emerald Bay and the Tahoe Keys. Removing invasive weeds is critical to protect water quality and maintain a healthy ecosystem. The Tahoe Regional Planning Agency is the federally-designated lead on the Aquatic Invasive Species Program in partnership with nearly 40 organizations.

2022 EIP Report: [https://www.trpa.gov/wp-content/uploads/documents/EIP\\_2022\\_Accomplishments.pdf](https://www.trpa.gov/wp-content/uploads/documents/EIP_2022_Accomplishments.pdf)

Historical EIP Annual Reports: <https://eip.laketahoeinfo.org/About/EIPOverview>

## SCIENCE, STEWARDSHIP, AND ACCOUNTABILITY

The bi-state Tahoe Science Advisory Council provides an important venue for scientists and resource managers to work together and use data to guide management decisions. EIP partners are also expanding science and nature-based stewardship programs to engage residents and visitors in protecting the environment. Pairing science and stewardship together has resulted in action on the ground to address the region's emerging threats.



### CULTIVATING ENVIRONMENTAL STEWARDS

The League to Save Lake Tahoe's July 5th "Keep Tahoe Red, White & Blue" Beach Cleanup has engaged volunteers in trash pickup and data collection for the past 11 years. In 2024, a record 789 volunteers collected only a fraction of the trash gathered the year prior, thanks to the public answering the call for better stewardship, an outpouring of volunteer support, and the new Tahoe Blue Beaches program that is raising the bar for beach management.



### MICROPLASTICS

Driven by the growing awareness of global microplastic pollution, EIP partners and the Tahoe Science Advisory Council established a work group to understand how microplastics are affecting Lake Tahoe, and what can be done. By summarizing the state of knowledge and identifying plastic pollution sources, the group is setting the foundation for both further scientific inquiry and management response.



### NEW ZEALAND MUDSNAIL RESPONSE

The strength of the EIP to quickly translate science to management actions proved invaluable when New Zealand mudsnails were discovered in the lake in September. The Tahoe Science Advisory Council quickly convened a group of regional and local experts to guide management actions. In response, the Tahoe Regional Planning Agency and Tahoe Resource Conservation District deployed lake-wide surveys and strengthened programs to inspect non-motorized watercraft such as kayaks and paddleboards.

2023-24 ACCOMPLISHMENTS 7





## WATERSHEDS AND WATER QUALITY

*lake Tahoe*

**R**estoring the region's meadows, rivers, and streams is a key part of building climate resilience. Over the past five years, EIP partners have initiated some of the largest wetland restoration projects to date. The Upper Truckee River Marsh, Taylor Tallac, and Meeks Bay Ecosystem projects aim to return the natural flow of water through historic wetlands, improve wildlife habitat, sequester carbon, and make meadows more resilient to climate change. These projects also re-establish natural water filtration to improve lake clarity.

EIP projects help to improve Lake Tahoe's famed clarity. Photo by Brent Allen, UC Davis TERC.

### WATERSHEDS AND WATER QUALITY

#### 2022 ACCOMPLISHMENTS »

- Two key Lake Tahoe tributaries, Saxon and Trout creeks, underwent improvements in 2022. Partners used innovative approaches such as beaver dam analog structures to repair stream banks and improve creek flows damaged in the Caldor Fire.
- Caltrans improved flood control in Kings Beach by replacing 14 culverts around roadways to better handle the large amount of water from extreme weather events.
- The Nevada Tahoe Resource Team repaired an eroding slope on the shore of Lake Tahoe at Cave Rock State Park through a mix of slope stabilization, revegetation, and redirecting social trails away from sensitive areas.
- Caltrans and partners secured funding to replace the Meeks Creek Bridge on Highway 89. Replacing this bridge will be an integral part of the restoration of Meeks Bay to improve fish passage and provide a bike and pedestrian crossing.

- The U.S. Fish and Wildlife Service and the Washoe Tribe of Nevada and California united to reintroduce 100,000 native Lahontan cutthroat trout to Lake Tahoe in their historic range.

#### FUTURE PRIORITIES »

- Complete the Meeks Bay Ecosystem and Mayala Waka meadow restoration projects in partnership with the Washoe Tribe of Nevada and California.
- Continue progress on Upper Truckee River watershed restoration including the California State Parks' Golf Course reach and the Tahoe Conservation Resource District's Johnson Meadow reach.
- Pursue priority acquisitions of sensitive lands, including developed properties in wetlands, to support restoration objectives in the 2012 Lake Tahoe Regional Plan.

#### PRIORITY SPOTLIGHT

##### RESTORING THE UPPER TRUCKEE RIVER WATERSHED

The Upper Truckee River is the largest tributary to Lake Tahoe, draining approximately one-third of the basin's land into the lake. The watershed is also home to the City of South Lake Tahoe and the basin's largest residential population. The watershed underwent significant changes during the 1960s from development activities, grazing, and redirecting the river channel. Over the last 25 years, partners have made progress to return it to a more natural state. Most recently, the California Tahoe Conservancy restored the lower sections of the Upper Truckee River and Marsh, revitalizing more than 250 acres of floodplain. The re-establishment of wetland conditions enhances biodiversity and helps fortify the region against the impacts of drought, flooding, and other consequences of climate change.



Photo by California Tahoe Conservancy

ENVIRONMENTAL IMPROVEMENT PROGRAM



Lines of hose staged at Heavenly's California Base during the 2021 Caldor Fire. Photo by South Tahoe Public Utility District.

### WATER INFRASTRUCTURE FOR FIRE SUPPRESSION

Many of Lake Tahoe's water systems were built more than 50 years ago and are not equipped to fight the catastrophic wildfires California and Nevada are now experiencing due to climate change. Last year, the Tahoe Water for Fire Suppression Infrastructure partnership received \$2.12 million through the Lake Tahoe Restoration Act to leverage \$13.85 million in projects that upstized waterlines, installed fire hydrants, and increased water fire flow capacity. This funding was critical to accelerate the pace and scale of project implementation to protect Tahoe communities from wildfire.

#### COMPLETED PROJECTS IN 2022 10

- South Tahoe Public Utility District Bjorn/Bowers: 5,547 linear feet of water line and 12 hydrants
- South Tahoe Public Utility District Black Barr: 7,427 linear feet of water line and 13 hydrants
- Tahoe City Public Utility District: 2,800 linear feet of waterline and 6 hydrants
- Incline Village General Improvement District Crystal Peak Road: 2,300 linear feet of waterline and 5 hydrants
- North Tahoe Public Utility District Carnelian Bay: 2,500 linear feet of waterline and 7 hydrants

#### FUTURE PRIORITIES 10

- Increase federal funding for water infrastructure projects to accelerate progress.
- Prioritize hazardous fuels reduction surrounding existing water infrastructure.



The 2021 Caldor Fire nearly devastated the Arrowhead Tank. Photo by South Tahoe Public Utility District.





## THE IMPACT OF THE LAKE TAHOE RESTORATION ACT

The Washoe Tribe of Nevada and California's *Máya Wüta* meadow restoration project highlights their integral role as stewards of Lake Tahoe. Photo by John Peltier Photography

The Lake Tahoe Restoration Act (LTRA), first passed in 2000, has played a pivotal role in protecting the Lake Tahoe Region from the increasing threats of climate change. The US Congress has appropriated \$104.7 million since the bill's reauthorization became law in late 2016, which accounts for about 27 percent of the total \$415 million authorization. This funding leverages other federal, state, local, and private funding for projects and has allowed for the strategic implementation of the highest priority projects within the Environmental Improvement Program.

Since 2016, LTRA has funded:

- 19 projects to reduce hazardous fuels.
- 6 projects to upgrade water infrastructure to fight fire.
- 27 projects to restore watersheds and improve water quality.
- 14 projects to prevent and control aquatic invasive species.

LTRA is set to expire in 2023. The proposed 10-year extension would allow partners to build on the investment and continue progress in building a sustainable future for Lake Tahoe.

### FUTURE PRIORITIES

- Extend authorization of the Lake Tahoe Restoration Act.
- Secure sustainable funding commitments to EIP program areas not identified in LTRA such as transportation, sustainable recreation and tourism, and science.
- Secure the federal share of the Regional Transportation Plan investments.
- Maintain federal appropriations for forest health, aquatic invasive species, and watershed restoration to complete key projects.

### EIP Economic Impacts

The EIP supports an average of 1,200 jobs a year. Every \$1 million in EIP spending generates \$1.6 million in economic output.

LAKE TAHOE INFO is the online information hub for the region.

Go to the EIP tracker for all EIP project information, spending, and accomplishments.

[LAKETAHOEINFO.ORG](http://LAKETAHOEINFO.ORG)



2022 ACCOMPLISHMENTS + LOOKING FORWARD



### **Tahoe Keys Lagoons Aquatic Weed Control Methods Test**

This test project was conducted 2022-2025 by the Tahoe Keys Property Owners Association to determine which combination of methods is most effective in controlling aquatic weeds within the Tahoe Keys lagoons. Visit [the project website](#) for more information. The approved use of test herbicides was rescinded in court in 2024.

### **Environmental Documents:**

[Tahoe Keys Lagoons Aquatic Weeds Control Methods Test Final EIR/EIS](#)

[Tahoe Keys Lagoons Aquatic Weeds CMT FEIR/FEIS Appendix A: Comments and Responses during Public Comment Period](#)

[Tahoe Keys Lagoons Aquatic Weeds CMT FEIR/FEIS Appendix B: Mitigation Monitoring and Reporting Program](#)

[Tahoe Keys Lagoons Aquatic Weeds CMT FEIR/FEIS Appendix C: Draft EIR/EIS](#)

[Tahoe Keys Lagoons Aquatic Weed Control Methods Test Draft EIR/EIS](#)

[Tahoe Keys Lagoons Aquatic Weed Control Methods Test – DEIR/DEIS Appendix A-H: Notice of Preparation and Public Engagement Plan for Scoping](#)

[Tahoe Keys Lagoons Aquatic Weed Control Methods Test – NOA](#)

### **Stormwater Management**

Reducing polluted stormwater runoff from urban areas and roads is a foundation of the EIP's water quality focus area. Area-wide solutions offer opportunities for the public and private sectors to partner and meet stormwater infiltration and erosion control requirements, generate funding for system maintenance, implement the Lake Tahoe Total Maximum Daily Load (TMDL) Program, and achieve other community goals.

### **Aquatic Resources**

Lake Tahoe faces a constant and serious threat from the introduction and spread of aquatic invasive species (AIS), and the popularity of boating during the COVID-19 pandemic emphasized the importance of a stable, comprehensive prevention program. TRPA leads the multi-sector AIS partnership at Lake Tahoe, and its accomplishments are the result of the collective contributions of many organizations and individuals. Multi-agency control programs are working to manage invasive species already established here, and the watercraft inspection program is keeping new invasives out of the Tahoe Region.

### **TRPA Stormwater Management Program**

<http://www.tahoebmp.org>

<https://www.epa.gov/system/files/documents/2023-03/lake-tahoe.pdf>

<https://clarity.laketahoeinfo.org/FileResource/DisplayResourceAsEmbeddedPDF/368ea518-4a49-4d65-83c2-41c42a0eea77>

*(Editor Note: The Updated TRPA Regional Plan shifts the burden of BMP compliance from individual property sites to a more regional approach to BMP Compliance. The following information is included as the current policy follows these guidelines.)*



## Lake Tahoe, California and Nevada

Stormwater Runoff Management in the Lake Tahoe Basin

### Overview

Lake Tahoe is one of the most iconic water bodies in North America. Its exceptionally clear water and distinctive blue coloring, set in mountainous terrain, make it a unique resource. Bordering both California and Nevada, Lake Tahoe is critical to many functions in the area, including drinking water, recreation and tourism, agriculture, and fisheries and wildlife habitat. California has designated Lake Tahoe as an Outstanding National Resource Water, one of two water bodies in the state to receive that protection. Nevada has designated it as a waterbody of extraordinary ecological or aesthetic value.

Unfortunately, Lake Tahoe faces some of the same water quality challenges as other water bodies. Development in the watershed has increased as tourism has become an important part of the local economy, leading to increased urbanization and more stormwater runoff. Over time, the clarity of the water has declined and algal growth has increased.

Several organizations work to protect this high-value water body. California's Lahontan Regional Water Quality Control Board (Lahontan Water Board) and the Nevada Division of Environmental Protection (NDEP)

### Watershed

Lake Tahoe, California and Nevada

### Key Water Quality Concerns

Excessive sediment and nutrients (nitrogen and phosphorus), water clarity

### Stakeholder Involvement Techniques

- Stakeholder comment process
- Public comment period on documents
- Annual public meetings
- Stakeholder involvement in implementation
- Transparent website
- Scientific advisory council

### Case Study Issues of Interest

#### Type of Point Sources



Municipal Separate Storm Sewer System Discharges



Construction Site Stormwater Discharges



Industrial Facility Stormwater Discharges

#### Type of Watershed-Based Permit or Approach



Multisource Watershed-Based Permit

#### Highlighted Approach(es)



Implementation of Total Maximum Daily Loads or Other Watershed Pollutant Reduction Goals



Coordinated Watershed Monitoring



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are the state resource agencies.<sup>1</sup> With the U.S. Congress's consent, the two states formed the Tahoe Regional Planning Agency (TRPA) through a bi-state compact, which developed (and now implements) a comprehensive plan to protect the Lake Tahoe watershed and enforce local ordinances. To address water clarity and algal issues, the states also developed total maximum daily loads (TMDLs) for fine sediment particles, nitrogen, and phosphorus. Local, state, federal, and private partners work to implement the TMDLs to achieve the mid-range and long-range water quality goals established by the TMDLs.

The states and TRPA determined early on that a watershed-based approach was the best way to overcome these challenges. By addressing water quality concerns in both states, coordinating programmatic goals, and leveraging resources, Lake Tahoe is on the path to recovery.

This case study provides an overview of the variety of programs and approaches used to protect and enhance Lake Tahoe, with a focus on the role of watershed-based permits for stormwater runoff.

## Background

The watershed-based approach to improving water quality in Lake Tahoe has multiple elements. Two of these elements form the superstructure of the various ongoing efforts and provide direction for other programs and activities.

- **TRPA and the Lake Tahoe Regional Plan.** TRPA was formed in 1969 with the charge of coordinating planning and development, regulatory enforcement, and implementation of environmental (and other) programs for the watershed. As part of this work, TRPA implements the Lake Tahoe Regional Plan, which uses an adaptive management approach and is intended to balance environmental protection and economic development. Last updated in 2022, the [Regional Plan](#) establishes environmental quality thresholds in 10 key areas, including water quality. The water quality thresholds set numeric standards for water transparency and phytoplankton productivity in the main body of the lake, as well as standards for tributaries and surface runoff. The thresholds also include non-numeric management standards for pollutant load reductions, groundwater, and aquatic invasive species. The Regional Plan addresses these thresholds by implementing restoration projects under the [Environmental Improvement Program](#) and enforcing various land use policies in the watershed (e.g., Policy WQ-2.2, which prohibits the discharge of sewage into the lake).
- **Lake Tahoe TMDLs.** California and Nevada co-developed [TMDLs](#) to address impairments in Lake Tahoe for fine sediment, phosphorus, and nitrogen, which were approved by EPA in 2011. The TMDLs established overall pollutant reductions of 65 percent, 35 percent, and 10 percent, respectively. The TMDLs also included an interim goal, known as the Clarity Challenge, of about half of the overall load reduction to improve visibility to a depth of 80 feet. The interim pollutant load reduction goals for the entire watershed would be met over 15 years, followed by a five-year monitoring period.<sup>2</sup> The TMDLs identified urban stormwater runoff as the primary source of fine sediment and outlined control measures such as land management practices, stormwater runoff source control, and treatment of runoff from roads and parking lots. California and Nevada also developed procedures to track pollutant reduction progress and adaptively manage TMDL implementation.

<sup>1</sup> The Washoe Tribe is also located in the area and has a long history of promoting water quality protection.

<sup>2</sup> The full implementation of the TMDLs is expected to take about 65 years. Setting an interim goal helps to make measurable progress while long-term improvements are made.

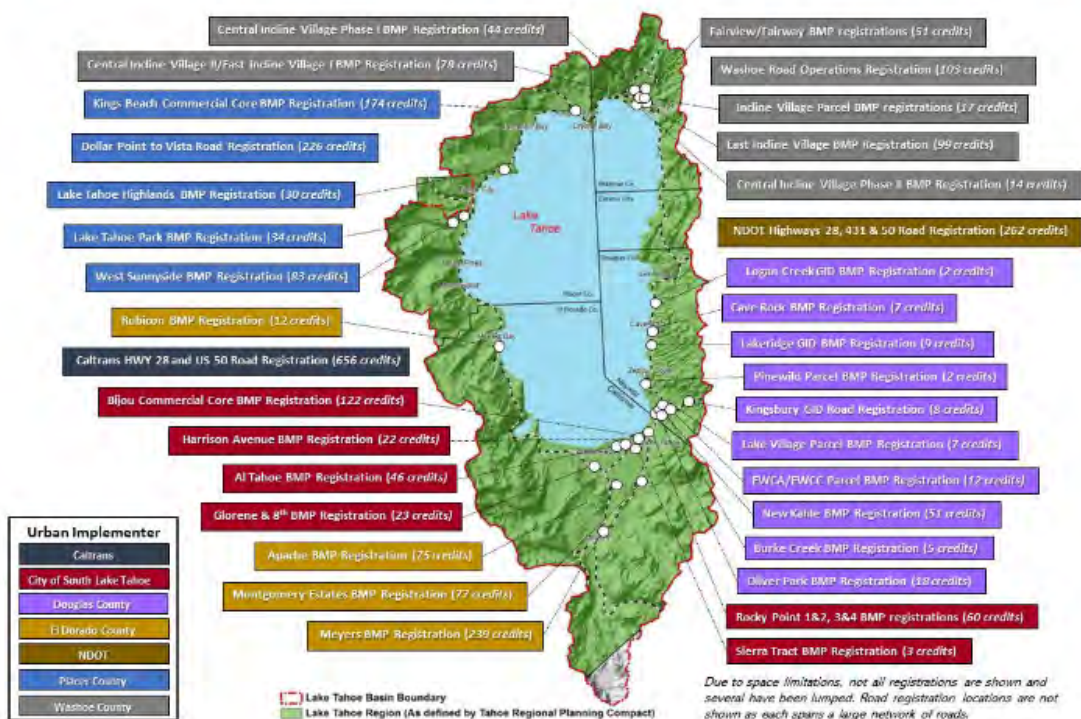


Under these elements are a number of other programs, including the National Pollutant Discharge Elimination System (NPDES) permitting program, with the goal of restoring and maintaining water quality in Lake Tahoe. California manages stormwater pollution in the Lake Tahoe watershed via three watershed-based general permits: one for municipal stormwater from the City of South Lake Tahoe and El Dorado and Placer Counties, a second for construction site runoff, and the third for stormwater from marinas. California has also issued a statewide permit for stormwater discharges from the California Department of Transportation (Caltrans) municipal separate storm sewer system (MS4). Together, these permits address the major sources of urban stormwater pollution in the watershed.

Nevada uses a different approach to address urban runoff. NDEP has developed [Interlocal Agreements \(ILAs\)](#) with the three major implementation partners in the watershed: both counties that border Lake Tahoe, as well as the Nevada Department of Transportation (NDOT). These agreements recognize partners' historic efforts to improve water quality and aim to provide a flexible and collaborative mechanism for implementing the TMDLs. NDEP is also working with California, TRPA, and EPA on specific efforts to improve water quality in the nearshore areas, which are most visible to the public and most frequently used for recreation.

Together, California and Nevada have created the [Lake Clarity Crediting Program](#), which measures the progress of the implementation of the Lake Tahoe TMDL, including tracking water quality improvements, reporting accomplishments, and assessing implementation progress and program effectiveness. A [2022 report](#) that evaluated progress against the 10-year milestones indicated that the partners were successful in achieving the 10-year load reduction goals. These efforts have largely halted the decline in water clarity, as clarity has remained relatively stable for the past 20 years.

## Crediting Program Registrations - At a Glance



Erosion from developed land in the Tahoe Basin is the biggest driver of lake clarity loss. Stormwater runoff from residential, commercial, tourist, recreation, industrial and public service projects conveys sediment and nutrients onto public roads and ultimately to Lake Tahoe. By retrofitting developed public and private parcels with erosion control measures, known as Best Management Practices (BMPs), this program keeps runoff from entering roadways. Most of the rain and snow that falls on impervious surfaces on these lands (i.e., rooftops, driveways and parking areas) runs off and flows into roadside drainage channels. This runoff then combines with stormwater from public roads to produce a large volume of water containing nitrogen, phosphorus, and fine sediment. Roadside ditches erode and when these flows enter natural stream channels, the channels also erode. Once the stability of a natural stream is disturbed, the process continues for years or even decades.

Stormwater running off disturbed land picks up soil particles from unvegetated land or bare soil. During storms, soil particles from these bare areas are washed into street gutters or storm drains. In addition, vehicles driven or parked on bare dirt compact the soil, reducing infiltration and increasing runoff. Developed lands also contribute other types of pollutants. Fertilizer applied to lawns and gardens, releases nitrogen, phosphorus, and other nutrients. When these nutrients reach the Lake, they stimulate algae growth.

BMPs are the first line of defense to reduce stormwater erosion from developed properties. Private property owners are the primary implementers of BMPs throughout the Tahoe Basin. BMPs are improvements such as infiltration trenches and drywells that infiltrate roof and driveway runoff on-site which prevent runoff from entering the public right-of-way. Revegetation of disturbed areas and stabilization of eroding slopes keep soil in place and prevents the transport of sediment and nutrients off-site. Paving dirt driveways and parking areas also helps improve water quality. Large developed properties require a higher level of BMP implementation and may include the construction of detention and infiltration facilities as well as treatment vaults.

Public entities also implement BMPs on publicly-owned properties. To accelerate BMP implementation, EIP partners are working with private property owners on neighborhood or area-wide treatment solutions. Through outreach to residents in neighborhoods where public projects are being designed, property owners have opportunities to meet their retrofit requirements and public agencies can implement more effective water quality improvement projects.

#### **Residential BMP Designer tool online**

<http://www.tahoebmp.org/BMPDesigner.aspx>

BMP Designer - Create a BMP Design for Single Family Residences

The BMP Designer allows homeowners, contractors, and consultants to create BMP designs in a friendly, self-guided web application. Specifically created with single family homes in mind, this unique tool directs the user through the BMP design process from laying out site conditions to a complete BMP plan. Users can even submit their plan for approval and help the TRPA Final Inspection by uploading photos of the work performed.

#### **U.S. Forest Service Projects and Actions – Lake Tahoe Basin**

The US Forest service maintains a database of ongoing projects. These projects include extensive erosion control and water quality improvement projects. Project details on the following items are located at:

<http://www.fs.usda.gov/projects/ltbmu/landmanagement/projects>



## USFS Tahoe Projects

Follow the links provided below to view detailed project documents. For older local projects, visit the [Projects & Plans Archive](#). Scroll down or follow this link to learn more about [Access and Travel Management Plans \(ATMs\)](#).

For current projects, visit the [Projects & Plans webpage](#).

- [Angora Hazard Tree Removal](#)
- [Angora Reforestation](#)
- [Baldwin Beach Restroom Replacement](#)
- [Baldwin Grazing Allotment Management](#)
- [Barker Pass Road Slide Repair](#)
- [Fallen Leaf Campground BMP Retrofit](#)
- [Heavenly MojoMan Challenge](#)
- [Heavenly Mountain Resort Galaxy Test Wells](#)
- [High Meadow Ecosystem Restoration](#)
- [Meadow Restoration Pilot](#)
- [Meeks Creek Meadow Ecosystem Restoration](#)
- [Meyers Weather Station Replacement](#)
- [Nevada Beach and Day Use Area BMP Retrofit](#)
- [Roundhill Pines Prospectus](#)
- [Spooner Hazardous Fuels Reduction and Healthy Forest Restoration](#)
- [William Kent Campground BMP Retrofit and Administrative Site Redevelopment](#)
- [Zephyr Cove Pier Replacement](#)
- [Angora Restoration](#)
- [Aspen Community Restoration](#)
- [Big Meadow Creek Watershed Fire Regime Restoration](#)
- [Blackwood Creek Restoration](#)
- [Burke Creek Highway 50 Crossing and Realignment Project](#)
- [CalPeco Electrical Line Upgrade Project \(FEIS\)](#)
- [Camp Richardson Corral Permit Reissuance](#)
- [Camp Richardson Resort Campground and Vehicle Circulation BMP Retrofit](#)
- [Camp Richardson Resort Permit Renewal](#)
- [Carnelian Hazardous Fuels Reduction and Healthy Forest Restoration](#)
- [Diamond Peak Ski Area Reissuance of Special Use Permit](#)
- [Emerald Fire Restoration Project](#)
- [Heavenly Mountain Resort Epic Discovery Project](#)
- [Heavenly Mountain Resort 2010 Capital Projects](#)
- [Heavenly Mountain Resort 2011 Capital Projects](#)
- [Heavenly Mountain Resort 2012 Capital Projects](#)
- [Heavenly Mountain Resort 2013 Capital Projects](#)
- [Heavenly Mountain Resort 2017 Capital Improvement Projects](#)
- [Heavenly Mountain Resort Tamarack Project](#)
- [Historic Facilities BMP Retrofit](#)
- [Homewood Mountain Resort 20-Year Ski Slope Permit](#)
- [Homewood Snowcat Tours](#)
- [Incline Fuels Reduction and Healthy Forest Restoration Project](#)
- [Incline Lake Dam Project](#)
- [Incline Management Plan](#)
- [Integrated Management and Use of Roads, Trails and Facilities](#)
- [Kingsbury Stinger Trail Reconstruction and BMP Upgrades Project](#)
- [Lahontan Cutthroat Trout Restoration in the Upper Truckee River](#)
- [Lake Tahoe Ecosystem Underburn](#)

- [Lower Truckee Riverbank Stabilization](#)
- [LTBMU Routine Road Maintenance](#)
- [LTBMU Trails Maintenance](#)
- [Meeks Bay Campground BMP Retrofit](#)
- [Meeks Bay Restoration Project](#)
- [Meeks Creek Meadow Ecosystem Restoration](#)
- [Meeks Meadow Washoe Restoration](#)
- [Meyers Landfill](#)
- [Non-Federal Lands Hazardous Fuel Reduction Projects](#)
- [NV Energy 634 Line Rebuild Project](#)
- [Ongoing Lands Projects](#)
- [Proper Food Storage Order](#)
- [Restoration of Fire Adapted Meadow Ecosystems](#)
- [Sierra Nevada Yellow-Legged Frog Restoration](#)
- [South Shore Fuel Reduction and Healthy Forest Restoration](#)
- [South Tahoe Fuel Treatment Project](#)
- [SR-28 Corridor Improvement Plan](#)
- [SR-28 Shared Use Path](#)
- [SR-89/Fanny Bridge Community Revitalization Project](#)
- [Tahoe Yellow Cress Conservation](#)
- [Taylor Creek Environmental Education/Visitor Center](#)
- [Taylor Tallac Restoration Project](#)
- [Terrestrial Non-Native Plant Species Treatment](#)
- [Truckee River First Four Mile Streambank Stabilization and Restoration](#)
- [Upper Echo Lakes Hazardous Fuels Reduction](#)
- [Upper Truckee River Reach 5 Restoration](#)
- [Valhalla Pier Erosion Control and Accessibility Retrofit](#)
- [West Shore Wildland Urban Interface Hazardous Fuels Reduction and Forest Health Project](#)
- [Zephyr Cove Pier Replacement](#)
- [Zephyr Cove Stable Upgrade](#)
- [Zephyr Point Fire Lookout Relocation](#)

## **USDA / US Forest Service - Lake Tahoe Basin Management Unit Monitoring Program Reports**

The USDA / US Forest Service Lake Tahoe Basin Management Unit (LTBMU) provides multi-year, extensive reporting on forest land projects.

For an overview of ongoing projects and reports please visit:

[https://www.fs.usda.gov/detail/ltbmu/maps-pubs/?cid=FSM9\\_046480](https://www.fs.usda.gov/detail/ltbmu/maps-pubs/?cid=FSM9_046480)

Examples are below:

[Upper Truckee River Reach 5 Effectiveness Monitoring Report - Apr. 3, 2019](#) (PDF 8,182 KB)

[Heavenly SEZ Demonstration Project Monitoring Report - Dec. 2017](#) (PDF 3,375 KB)

[Vegetation Structure Response to Channel Restoration Blackwood Creek - Dec. 2017](#) (PDF 5,517 KB)

[LTBMU Annual Soil and Water BMP Monitoring Report for FY15 - October 2016](#) (PDF 338 KB)

[LTBMU Rare Botanical Species 2015 Monitoring Report - May 1, 2016](#) (PDF 870 KB)

[Lake Tahoe Federal Grants Program Status Report 1984 - 2015](#) (PDF 1,325 KB)

[LTBMU Invasive Plant Management Report - 2015](#) (PDF 596 KB)

[Upper Truckee River Lahontan Cutthroat Trout Restoration Project Annual Report - 2015](#) (PDF 1,089 KB)

## **2020: Forest Service acquires 120 acres on Brockway Summit**

SOUTH LAKE TAHOE, Calif., Dec. 10, 2020

The USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU) is pleased to announce we have completed the purchase of a significant parcel of undeveloped land on the North Shore of Lake Tahoe. The acquisition includes two parcels that total approximately 120.4 acres on Brockway Summit that will be added to the National Forest System (NFS) of lands within the LTBMU. “We are excited to announce the completion of this long-awaited purchase,” said Deputy Forest Supervisor, Danelle D. Harrison. “By adding this parcel to the National Forest System, we can better protect the water quality, scenic and recreational resources and help preserve the quality of experience on the Tahoe Rim Trail, which is adjacent to the property.” These parcels are part of a much larger property on the north side of the ridgeline outside of the LTBMU owned by Sierra Pacific Industries and adjacent to Northstar Ski Area. All other private lands on the LTBMU side of the ridge have been previously acquired by the NFS from Sierra Pacific’s predecessors in ownership. “We wish to thank everyone whose hard work and determination contributed to this highly anticipated acquisition, and we also thank Sierra Pacific Industries for giving the Forest Service the opportunity to purchase this property,” said Lands Program Manager, Bob Rodman. In addition, our sincere thanks go out to the California Tahoe Conservancy, who were integral partners during the purchase, assisting with the appraisal and helping to keep the landowners engaged during the arduous purchase process.

The Forest Service land acquisition program initiated when Congress passed the Santini-Burton Act that directed the LTBMU to acquire environmentally sensitive lands around the Tahoe Basin to safeguard them from potential development in order to protect the water quality of Lake Tahoe. This property is one of the few remaining large properties in the Lake Tahoe Basin that was suitable for acquisition by the Forest Service.

### **The Santini-Burton Act**

[http://www.fs.usda.gov/detail/ltbmu/landmanagement/resourcemanagement/?cid=fsm9\\_046519](http://www.fs.usda.gov/detail/ltbmu/landmanagement/resourcemanagement/?cid=fsm9_046519)

Congress passed Public Law 96-586, defined as the Santini-Burton Act, on December 23, 1980. In passing the Act, Congress declared that the environmental quality of the Lake Tahoe Basin was jeopardized by overdevelopment of sensitive lands and that the unique character of the Lake Tahoe Basin is of national significance deserving further protection. The passage marked a major commitment and emphasis by the Lake Tahoe Basin Management Unit in land acquisition and watershed restoration focused on protecting and restoring the environmental quality of Lake Tahoe.

Specific provisions in the Act directed the Forest Service to:

1. acquire environmentally sensitive land
2. restore watersheds on acquired National Forest Systems lands
3. administer erosion control grants to units of local government.

The Act authorized the Forest Service to acquire, by purchase and donation, sensitive lands in the Lake Tahoe Basin. Receipts from the sale of surplus Federal land in the Las Vegas area, to be advanced through the Land and Water Conservation Fund, were earmarked for the purchases. Properties eligible for purchase under the Act are wetlands, stream environment zones, or steep and fragile lands. The first acquisition recorded in October 1982. To date, over 3,500 parcels (or Urban Lots) totaling 13,000 acres valued at \$105 million have been acquired under the authority of the

Santini Burton Act. Some significant acquisitions include more than half a mile of lakefront and acreage at Secret Harbor, approximately 300 feet of beachfront on the south shore, and several large acreage parcels adjacent to existing National Forest System lands in the Kingsbury area.

A Map of Santini-Burton Purchase lots in the Tahoe Basin is available at:  
[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5371156.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5371156.pdf)

A provision of the Santini-Burton Act authorized a sum equal to 15 percent of the acquisition dollars for erosion control grants to local governments. Allocations to the five local jurisdictions are proportionate to the acres acquired under the Act. Over \$16 million have been appropriated for these grants, funding in whole or in part over 80 water quality improvement projects.

### **LTBMU Forest Plan**

[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd507523.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd507523.pdf)

Purpose: The purpose of this Land Management Plan—also known as the Forest Plan—is to provide strategic guidance to the Lake Tahoe Basin Management Unit (LTBMU) for forest management over approximately the next 15 years. This plan guides the restoration or maintenance of the health of the land, to promote a sustainable flow of uses, benefits, products, services, and visitor opportunities. The plan provides a framework for informed decision making, while guiding resource management programs, practices, uses, and projects. It does not include specific project and activity decisions. Those decisions are made separately, after more detailed analysis and public involvement. The Forest Plan is adaptive in that it can be amended when appropriate, to update the management direction based on new knowledge and information. The Forest Plan is strategic in nature and does not attempt to prescribe detailed management direction to cover every possible situation. While all components necessary for resource protection and restoration are included, the plan also provides flexibility needed for the responsible official to respond to uncertain or unknown future events and conditions such as fires, floods, climate change, changing economies, and social changes that may be important to consider at the time decisions are made for projects or activities.

### **Tahoe RCD Stormwater Monitoring Programs**

<https://tahoercd.org/our-work/stormwater-program/>

Tahoe RCD manages the Regional Stormwater Monitoring Program (RSWMP). RSWMP monitors urban stormwater runoff entering the lake for nutrients and sediments. Most pollutants come from urban areas, especially roads. There are seven jurisdictions around the lake that must comply with regulations established to reduce pollutant loading to the lake.

The goal of RSWMP is to ensure that the seven jurisdictions are meeting regulatory requirements. Data collected by RSWMP can be used to assesses the cumulative effect of environmental improvement projects and better management practices on stormwater quality.

Monitoring stormwater runoff at specific sites over the long-term evaluates whether everything the jurisdictions have done to decrease pollutants to the lake is having the desired effect.

The Lake Tahoe “Total Maximum Daily Load” (TMDL) identifies fine sediment particles (FSP) as the largest single contributor to Lake Tahoe’s clarity loss. These particles are mainly carried by stormwater runoff coming off our urban environment. Lake Tahoe’s distinction as an Outstanding Natural Resource by the federal government means that the governing jurisdictions surrounding Lake Tahoe must strive

to undo the damage to the Lake's clarity that has taken place over the last century and provide evidence to support that their restoration actions are having positive effects.

The Tahoe RCD Stormwater Monitoring Program is leading the scientific monitoring of stormwater runoff at eight locations around the Lake Tahoe Basin. Not only do we measure the pollutant loads reaching Lake Tahoe through the stormwater pipes you may have seen; we also monitor the performance of public water quality projects, such as infiltration basins and stormwater filtration vaults. With the data, we can determine the effectiveness of these types of stormwater treatment actions. Stormwater monitoring is a necessary strategy for truly understanding whether our collective actions are helping restore Lake Tahoe. Since monitoring results are only as good as the data collected, Tahoe RCD developed the Regional Stormwater Monitoring Program in the Lake Tahoe Basin. It outlines protocols for consistent data collection, management, analysis and reporting of stormwater monitoring data. Now that this is in place, it's easy to make "apples to apples" comparisons of water quality data collected around the lake. Tahoe RCD analyzes the data and publishes the results in an annual report, aiding the jurisdictions in collectively reaching the goals of the Lake Tahoe TMDL and helping them make informed management and treatment decisions to reverse Lake Tahoe's clarity loss. ([View the Tahoe RCD Annual Stormwater Monitoring Report and other publications](#)).

**Implementers' Monitoring Program (IMP) Component of the Regional Storm Water Monitoring Program (RSWMP)**

<https://tahoercd.org/wp-content/uploads/2023/03/IMP-Monitoring-Plan-Update-2023-Final.pdf>

The Lake Tahoe Total Maximum Daily Load (TMDL) is a comprehensive, long-term plan to reverse the decline in deep-water transparency of Lake Tahoe and restore mid-lake clarity to the 1967-1971 level of 29.7 meters (97.4 feet). TMDL science suggests that up to two thirds of the decrease in clarity is attributable to fine sediment particles (FSP, <16 µm in diameter), and that the urbanized areas, roadways in particular, account for approximately 72% of FSP that eventually enter the lake (Lahontan and NDEP 2010).

Following the adoption of the TMDL in August 2011, the Lahontan Regional Water Quality Control Board approved a Municipal National Pollutant Discharge Elimination System (NPDES) permit (NPDES NO. CAG616001 Updated Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater/Urban Runoff Discharges from El Dorado County, Placer County, the City of South Lake Tahoe, and the California Department of Transportation within the Lake Tahoe Hydrologic Unit, Order No. R6T 2011-101A) on December 6, 2011, and later amended on October 12, 2012. The permit was updated and renewed on March 9, 2017, Order No. R6T 2017-0010, and again on September 27, 2022, Order No. R6T-2022-0046. In May 2013, the Nevada Division of Environmental Protection (NDEP) signed Interlocal Agreements with the local Nevada jurisdictions. Requirements of the Nevada Interlocal Agreements are similar to the NPDES permit.

The California NPDES permit and the Nevada Interlocal Agreements require jurisdictions in the Lake Tahoe Basin to take measures to decrease pollutant loading from stormwater runoff in urbanized areas. Local jurisdictions must implement pollutant controls to decrease FSP and nutrient inputs, and must monitor and evaluate select urban catchment outfalls and Best Management Practices (BMPs) for flow volumes and sediment and nutrient loads in order to earn credits under the Lake



Clarity Crediting Program (Crediting Program). While monitoring data is not used to assess credits earned under the Crediting Program for implementing effective pollutant controls, it provides empirical data that (1) assesses nutrient and sediment loading in chosen catchments, (2) evaluate BMP effectiveness at chosen BMPs, (3) inform assumptions used to estimate runoff volumes and pollutant loads modeled with the Pollutant Load Reduction Model (PLRMv2.1).

The Implementers' Monitoring Program (IMP) is a partnership established in 2013 between the Tahoe Resource Conservation District, the Nevada Tahoe Conservation District, El Dorado County, Placer County, the City of South Lake Tahoe, the California Department of Transportation, Douglas County, Washoe County, and the Nevada Department of Transportation developed to collectively fulfill California permit requirements and Nevada Interlocal Agreement commitments. IMP was established prior to the development of RSWMP but has since fallen under its umbrella.

This document outlines a monitoring plan that aligns with the protocols recommended in the Tahoe Regional Stormwater Monitoring Program Framework and Implementation Guidance Document (RSWMP FIG) completed in March 2015 (Tahoe RCD et al 2015) and updated in October 2017 (Tahoe RCD 2017). The RSWMP FIG was developed primarily to achieve compliance with the requirements described in Attachment C, sections IIIA and IIIB of the California permit and the stormwater monitoring commitments in the Nevada Interlocal Agreements, as well as establish long-term urban status and trends monitoring sites in the Tahoe Basin. Submitted to the Lahontan Regional Water Quality Control Board and the Nevada Division of Environmental Protection on April 30, 2013. Funds for this project are provided by the USDA Forest Service Lake Tahoe Basin Management Unit through the Southern Nevada Public Lands Management Act and the Department of Conservation for a Watershed Coordinator.

#### **Watershed Management Guidebook Published Jan. 2013**

<http://tahoercd.org/wp-content/uploads/2013/03/TIP-WEB-version-FINAL.pdf>

A publication by Integrated Environmental Restoration Services, Inc. Produced in collaboration with the Lahontan Regional Water Quality Control Board and the Tahoe Resource Conservation District. The *Watershed Management Guidebook* presents a set of principles and practices for managing disturbed watersheds. It has been developed based on years of practice to help link initial project plan to actual outcomes in watershed projects. The Guidebook does not provide all the answers or completely prescriptive approaches. Instead, it offers tools to help achieve greater alignment between intentions and outcomes. There is a growing recognition that relying solely on mathematical models to help us manage dynamic watersheds and their complex processes is not practical. By assessing outcomes and embracing the uncertainty inherent in managing watersheds, we can produce not only high quality results but we can continue to add to our knowledge base and improve future projects. This Guidebook was created to share a process that has been evolving for over 20 years and that has produced surprising results. This process has achieved results by valuing direct assessment over expert opinion, embracing unexpected outcomes, and in the process, building relationships and a common language among participants at every level in watershed management efforts.

## **Nevada Tahoe Conservation District (NTCD) Best Management Practices Retrofit Program**

<http://ntcd.org>

Nevada Tahoe Conservation District's (NTCD) Best Management Practices (BMP) Retrofit Program is part of the nationwide Backyard Conservation Program. The BCP is designed to educate private homeowners about simple, inexpensive conservation measures they can utilize in their own backyards. The Backyard Conservation Program is a joint effort of the Wildlife Habitat Council, the National Association of Conservation Districts, and the Natural Resources Conservation Service. The Conservation Districts in the Tahoe Basin are recognized throughout the country for progressive Backyard Conservation Programs.

The Nevada Tahoe Conservation District's BMP Program works primarily with single-family residences located on the Nevada side of the Lake Tahoe Basin, providing homeowners with information on how to control erosion and infiltrate stormwater runoff on their properties in compliance with the Tahoe Regional Planning Agency's (TRPA) BMP Ordinance. The Conservation District's have worked hard to maintain a close relationship with the local fire districts and the TRPA in order to develop a consistent message regarding BMP implementation and Fire Defensible Space practices. Nevada Tahoe Conservation District staff also works closely with the Natural Resources Conservation Service (NRCS), who provides engineering oversight, technical expertise and guidance with BMP designs.

Other programs and projects at the NTCD include: storm water management assessment, BMP asset inventory, a street sweeper effectiveness study, stream restoration projects, biologic base water quality improvement, water quality monitoring, forest health projects and outreach, biomass utilization and coordination; watershed storm water management planning.

**Tahoe Resource Conservation District (Tahoe RCD / TRCD) Watershed Resources Programs** [www.TahoeRCD.org](http://www.TahoeRCD.org)

Tahoe RCD's Watershed Resources Program manages large erosion control and revegetation projects and also educates property owners on conservation landscaping practices for the California side of the lake.

**Johnson Meadows Acquisition**

TWSA provided 10 dog waste stations for this location. In 2018, the Johnson Meadows property on the Upper Truckee River (South Tahoe) was purchased. Johnson Meadow is situated in the heart of the city of South Lake Tahoe, El Dorado County, California. It is located within the Upper Truckee River watershed, the largest watershed in the Lake Tahoe Basin, draining over 56 square miles and providing some of the most significant wet meadow floodplain habitat in the entire Sierra Nevada.



<https://tahoercd.org/home/programsand-projects-link-page/johnson-meadow/>

Tahoe RCD recently acquired title to approximately 206 acres comprising the Johnson Meadow property in order to provide continuous public ownership of the lower nine miles of the Upper Truckee River (UTR) before the river enters Lake Tahoe. This nine-mile reach of the UTR is centered downstream of property owned by the City of South Lake Tahoe and California Department of Parks and Recreation (Washoe Meadows State Park) and upstream of the Upper Truckee Marsh, owned by the California Tahoe Conservancy. Johnson Meadow is situated in the floodplain of the UTR and was the largest privately-owned meadow in the Tahoe Basin.

Acquisition of Johnson Meadow is a critical step in restoring the UTR watershed, and this river reach contains significant wildlife habitat, including river, riparian, meadow, and upland habitat areas. Acquisition was made possible through funding from California Tahoe Conservancy, California Department of Fish and Wildlife and the Tahoe Fund. The purpose of this land purchase is to provide

ecosystem and watershed protection benefits through preservation, management, and future restoration of meadow, riparian, aquatic and upland habitats in Johnson Meadow.

### **Best Management Practices (BMP) Retrofit Program**

Tahoe Resource Conservation District's (Tahoe RCD or TRCD) Best Management Practices (BMP) Retrofit Program is also part of the nationwide Backyard Conservation Program. This program parallels the NTCD program, but works primarily with single-family residences located on the California side of the Lake Tahoe Basin, providing homeowners with information on how to control erosion and infiltrate stormwater runoff on their properties in compliance with the Tahoe Regional Planning Agency's (TRPA) BMP Ordinance.

### **Biological Resources Program**

Tahoe RCD's Biological Resources Program consists of the Terrestrial Invasive Weed and Aquatic Invasive Species Programs. Through these programs, TRCS participates in the Lake Tahoe Aquatic Invasive Species Coordination Committee and the Lake Tahoe Basin Weed Coordinating Group. These groups are comprised of diverse agencies and community members dedicated to protecting the Lake Tahoe Basin from invasive species through education, research, prevention, early detection, survey and control. Our Aquatic Invasive Species (AIS) Program implements Lake Tahoe's mandatory Watercraft Inspection Program, Truckee Regional AIS Prevention Program (TRAISPP), and Lake Tahoe's Survey and Control Program. The Lake Tahoe Watercraft Inspection Program, prevents the introduction of AIS such as Quagga and Zebra mussels into the Tahoe Basin. With funding from the Truckee River Fund, TRAISPP implemented a pilot Watercraft Inspection Program in 2010, in the lower Truckee River watershed. Our Survey and Control Program includes projects aimed at controlling AIS currently in Lake Tahoe.

### **Watercraft Inspection Sub-Program Highlights**

Tahoe RCD coordinates Lake Tahoe's Watercraft Inspection Program by providing qualified inspectors at public launch facilities, technical support for private launches, trainings, and decontamination of watercraft. The Watercraft Inspection Program was implemented in 2008. Details are also provided in previous chapter (Watershed Activities).

### **Other Tahoe RCD Projects:**

**Community Watershed Partnerships (CWP)** <https://tahoercd.org/wp-content/uploads/2015/11/Tahoe-Valley-Meyers-CWP-Report-FULL.pdf> One of the newest projects focused on community watershed protection is the Community Watershed Partnership (CWP) a holistic conservation initiative which engages locals, land managers and agencies in neighborhoods throughout the Lake Tahoe Basin. Funded by a grant from NRCS, Community Watershed Partnership is a holistic conservation process which takes place at the community scale. Montgomery Estates in South Lake Tahoe is the first neighborhood targeted through this pilot program. Residents are encouraged to provide input on current and planned conservation projects in their own neighborhood. Expected outcomes include enhanced recreational opportunities, defensible space, wildlife habitat, water quality.

### **Angora Community Demonstration Garden**

With our partner agencies and the Tahoe community, Tahoe RCD has re-vegetated a property burned in the Angora Fire to create a demonstration garden. The garden is located at 1383 Mt. Olympia Circle in South Lake Tahoe. The garden includes examples of Tahoe native and adapted vegetation, defensible space, water conservation, and erosion control practices specific to properties in the Angora Burn area. Additionally, the garden features irrigation techniques and a variety of composts and mulches.

### **Angora Forest Stewardship Project**

With funding from the National Forest Foundation, Tahoe RCD partnered with the Nevada Tahoe Conservation District and the US Forest Service to organize over 1,000 South Tahoe community members and students to plant more than 7,000 tree seedlings during the spring of 2009 on urban USFS lots in the Angora burn area. The majority of the trees planted were Jeffrey and Sugar pines and Incense cedars. Additionally, community groups and local homeowners have adopted lots and are performing on-going maintenance and monitoring of the trees. Prior to the spring tree planting, the Tahoe RCD, US Forest Service, and partner agencies developed and implemented an interdisciplinary forest health curriculum for all Lake Tahoe unified elementary schools. The curriculum was based on the Project Learning Tree curriculum and reached over 1,700 students in grades K-5.

### **Brockway Erosion Control Project**

With funding received from the California Department of Transportation, Tahoe RCD conducted revegetation and slope stabilization work along the Highway 267 corridor over Brockway summit. The goal of the Brockway Summit Cal Trans Project is to reduce the overall contribution of fine sediments and nutrients entering Lake Tahoe from the Highway 267 corridor. Revegetation and slope stabilization practices are being implemented, thus improving the overall scenic quality of the area. TRCD worked with CalTrans and Integrated Environmental Restoration Services (IERS) on project design and installation. To date, approximately 50,000 square feet of bare, eroding slopes have been treated within the project area, and over 2000 plants, trees and shrubs have been planted.

### **Homewood Erosion Control Project**

With funding from the Department of Water Resources, Tahoe RCD developed a public-private partnership to implement erosion control and water quality improvement practices at Homewood Mountain Resort to achieve pollutant load reductions within the Homewood Creek Watershed. The goal of this program is to make this the first watershed in the Lake Tahoe Basin to achieve the Lake Tahoe Total Maximum Daily Load (TMDL) Clarity Challenge of a 32% reduction in fine sediment loading. Through the Homewood Erosion Control Project and partnership with Homewood Mountain Resort (JMA Ventures) important improvements to Tahoe's water quality have been made. The restoration activities conducted through this project help to reduce non-point source pollutant loading in Homewood and Madden Creeks, which rank among the leading sources of upland erosion in the Tahoe Basin, contributing fine sediments and nutrients into Lake Tahoe. Erosion control and water quality improvements have been completed on over 125,000 square feet of disturbed bare soil within the Homewood property.

### **Tahoe Yellow Cress Conservation Program**

<https://tahoeyellowcress.org/>

[https://www.fs.usda.gov/wildflowers/Rare\\_Plants/conservation/success/rorippa\\_subumbellata\\_recovery.shtml](https://www.fs.usda.gov/wildflowers/Rare_Plants/conservation/success/rorippa_subumbellata_recovery.shtml)

Tahoe yellow cress (*Rorippa subumbellata* Roll.) is a rare plant that only occurs on the shores of Lake Tahoe in California and Nevada. The species is listed as endangered by the State of California and as critically endangered in Nevada. The U.S. Fish and Wildlife Service identified Tahoe yellow cress as a candidate species for listing in 1999 under the Endangered Species Act of 1973, as amended. The Tahoe Regional Planning Agency also protects this species under its Code of Ordinances and Goals and Policies.

### **South Tahoe Environmental Education Coalition (STEEC) School Programs**

<http://steec.org>

A not-for-profit, collaborative network of local agencies and organizations dedicated to bringing high quality environmental education programs to all North and South Tahoe students in grades K-12. LTEEC/STEEC has



joined hundreds of Lake Tahoe volunteer educators and reached thousands of Tahoe Basin elementary students annually.

**LRWQCB Load Reduction Planning Tool** / Lake Tahoe Watershed, Nevada & California  
<http://tahoebmp.org/BMPHandbook.aspx>

The Pollutant Load Reduction Model (PLRM) is designed for evaluating and comparing pollutant load reduction alternatives for storm water quality improvement projects in the Tahoe Basin. The PLRM uses publicly available software and source code to provide users with complete access to the tools developed. The PLRM is intended to be practical for application by users possessing a basic understanding of hydrology, water quality, and water resources modeling.

The purpose of this document is to provide a step-by-step methodology for estimating and comparing potential water quality pollutant loads from redevelopment projects under both existing conditions and proposed redeveloped conditions in the Lake Tahoe Basin on a parcel or multiple parcel scale. This Load Reduction Planning Tool (LRPT) methodology can be used as a planning tool to estimate changes in potential water quality pollutant loading associated with the proposed redevelopment projects. The LRPT could be used early in the planning process by planners, developers and/or regulators to identify alternatives and design modifications that could be made to the redevelopment project to reduce pollutant loads generated from the site. This methodology is applicable to a much smaller spatial scale than the [Pollutant Load Reduction Model \(PLRM\)](#) and it is not intended to replace PLRM or other water quality planning tools approved by Lahontan Regional Water Quality Control Board (RWQCB), the Tahoe Regional Planning Agency (TRPA), or the Nevada Division of Environmental Protection (NDEP).

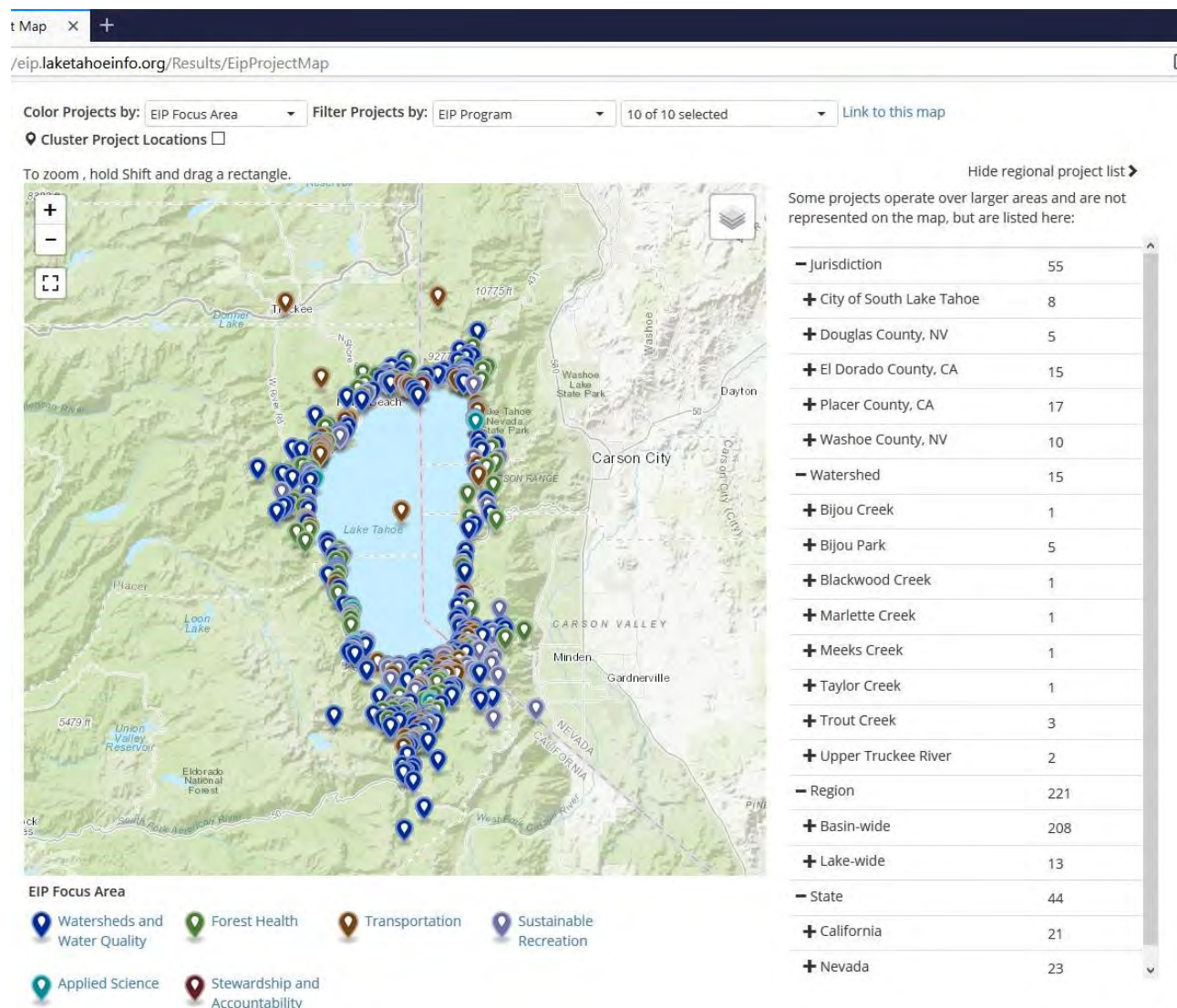
The Pollutant Load Reduction Model is part of a multi-stakeholder effort to provide technical tools for project planners, funders, implementers, and regulators to work collaboratively to minimize the deleterious effects of urban storm water on the remarkable clarity of Lake Tahoe, a keystone in the ecological and economic health of the Lake Tahoe Basin. This project is pursuant Section 234 of the Water Resources Development Act of 1996 (PL 104-303) which provides for coordinated interagency efforts in the pursuit of water quality and watershed planning.

### **Regional EIP/ CIP Projects**

Hundreds of large and small scale projects have been completed. CIP/EIP infrastructure projects include: storm drains, storm water collection and retention systems; street curbs, gutters, sidewalks, lighting, pavement; bike paths, land and stream restoration, revegetation projects, public access improvements and ADA retrofits. The EIP Project Tracker is an online user-friendly database that displays information about projects with interactive maps, charts, and photos.

### **TWSA Member Agency CIP Projects:**

This section has been moved to Chapter 5 - Description of Water Supply



The following information provides links to projects by jurisdiction.

**Nevada Department of Transportation (NDOT) road improvement projects in the Tahoe Basin:**

<https://www.nevadadot.com/projects-programs/road-projects/lake-tahoe-environmental-improvement>

**California Department of Transportation (CalTrans) Projects**

<https://dot.ca.gov/caltrans-near-me/district-3/d3-projects>

**El Dorado County (CA) Department of Transportation (DOT)**

<https://www.eldoradocounty.ca.gov/Land-Use/Transportation>

**Placer County (CA) Environmental Improvement Program (EIP)  
Placer County Tahoe Basin Projects**

<https://www.placer.ca.gov/8374/County-Projects-in-Tahoe>

### **Douglas County (NV) Environmental Improvement Program (EIP)**

Douglas County projects are listed in detail in the master EIP list provided at <https://eip.laketahoeinfo.org/Results/EipProjectMap>

### **Washoe County (NV) Environmental Improvement Program (EIP)**

These projects are listed in detail in the master EIP list provided at <https://eip.laketahoeinfo.org/Results/EipProjectMap>

Washoe County Public Works has a continuing effort to construct erosion control and water quality improvements within county right-of-way in order to reduce sediment and nutrient loads in stormwater runoff that reaches Lake Tahoe. The improvements have included timber retaining walls, block walls, curb and gutter, storm drain pipe, detention/infiltration basins, sediment traps, rock lined ditches, check dams, plants and vegetation. The projects are funded by Washoe County Water Quality Mitigation funds which are collected by the Tahoe Regional Planning Agency, (TRPA), federal grants, state bonds and local funds.

### **City of South Lake Tahoe CIP**

<https://cityofslt.us/2350/Capital-Improvement-Program-CIP>

The Engineering Department is responsible for implementation of the City's adopted Capital Improvement Program (CIP), which consists of a variety of projects to construct, maintain, rehabilitate the City's infrastructure, facilities, and specialized equipment.

### **Lake Tahoe Basin Prosperity Plan**

<http://tahoeprosperity.org>

The Lake Tahoe Basin Prosperity Plan (LTBPP) is a regional collaboration effort to develop a Basin-wide economic prosperity strategy. The region includes all land that sheds water into the Lake Tahoe Basin in California and Nevada. The LTBPP will result in an action plan to create a more resilient economy that enhances environmental quality and ensures an improved standard of living for all residents. The Plan will provide a framework for a competitive regional strategy that recognizes local differences, leverages the distinct attributes of all communities throughout the Basin, and enables local governments, institutions, and businesses to work as partners in revitalizing the Basin economy.

### **United States Environmental Protection Agency (US EPA) Activities**

<https://www.epa.gov/lake-tahoe>

US EPA Region 9 has provided more than \$31 million since 1997, to promote water quality efforts in and around the lake. Several years ago, the EPA placed a full-time staff person in Tahoe to work with the community and local agencies to coordinate ongoing watershed projects in the area. The EPA supports a variety of watershed projects in an effort to reduce sediment and pollutants from flowing into the lake.

### **U.S. EPA approves TMDL collaborative bi-state plan (August 2011)**

<http://yosemite.epa.gov/opa/admpress.nsf/2dd7f669225439b78525735900400c31/54821f7aaa6df567852578ee00629305>





U.S. Environmental Protection Agency  
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Water Division  
August 2019

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## 23 Years of Investing in a Clear, Healthy Lake Tahoe

Lake Tahoe is an EPA Priority Watershed, in part because of its iconic clarity and beauty. But climate change and human disturbance of the watershed threaten this national treasure. Lake clarity recovered from the impacts of extensive logging in the 19th century, but rapid, unregulated development following the 1960 Winter Olympics again increased fine sediment and nutrients flowing into the lake. Between 1968 and 1997, annual average clarity fell dramatically from around 100 feet to 64 feet (Figure 1).

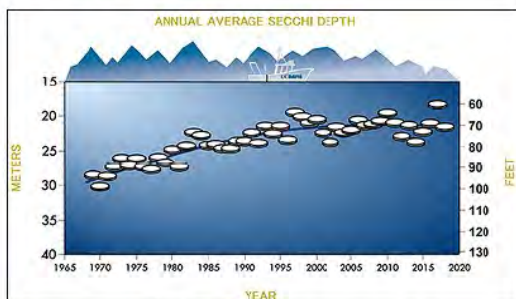


Figure 1. Source: UC Davis TERC ([terc.ucdavis.edu](http://terc.ucdavis.edu))

A new era of ecosystem and watershed restoration began in 1997 with the visit of President Clinton to Lake Tahoe, where he helped launch the [Environmental Improvement Program](#). This \$2.3 billion effort has helped achieve Tahoe Basin improvements for air and water quality, soil conservation, forest health, wildlife and fisheries, and scenic and recreational resources. The decline in annual average lake clarity halted in recent years, with 2018 seeing a rebound to 70.9 feet after 2017's extreme winter and the worst annual average Secchi depth ever recorded: 60.4 feet. Past improvements may be attributed in part to local management of urban runoff guided by innovative decision-making tools. Continued progress as we face growing challenges

of climate change, like increasing tree mortality, forest fires, warmer lake temperatures and proliferation of invasive species, will require constant vigilance and dedicated resources.

### What Is EPA Doing to Protect Lake Tahoe?

EPA has been charged with protection of the Tahoe Basin ever since Section 114 of the 1972 Clean Water Act required implementation of a study to "...preserve the fragile ecology of Lake Tahoe." EPA's involvement accelerated sharply after the 1997 Presidential Forum, where President Clinton announced a number of air- and water-quality goals, as well as a full-time, on-site EPA Lake Tahoe Basin Coordinator. Since then, EPA has invested over \$47 million, including \$9 million for a lake clarity restoration plan, known as a Total Maximum Daily Load (TMDL). EPA also oversees implementation of the Clean Water Act, Safe Drinking Water Act, Clean Air Act and other statutory requirements by our partner agencies in California and Nevada, and by local partners.

### What Is the Lake Tahoe Total Maximum Daily Load (TMDL) and What Does It Do?

The Lake Tahoe TMDL is the centerpiece of efforts to reverse the decline in the lake's deep-water clarity and restore it to historic levels. The TMDL and its Implementation Plan were adopted by California and Nevada, and approved by EPA in 2011 following a 10-year, \$10 million development effort funded by state and federal agencies. Both the scientific research and stakeholder input that underpin the final restoration plan are among the most advanced ever applied to a TMDL in the Clean Water Act's 47-year history. Key elements include:

- **Understanding Pollutant Sources:** Quantified relative amounts of fine sediment, phosphorus and nitrogen inputs to Lake Tahoe from major pollutant sources including urban and forest stormwater runoff, stream channel erosion, and atmospheric deposition.



- **Targeting Load Reductions:** Calculated needed load reductions for the largest pollutant sources in order to achieve the interim “Clarity Challenge” target of 78 feet by 2026 and the long-term TMDL numeric clarity goal of 97 feet by 2076 (Figure 2).

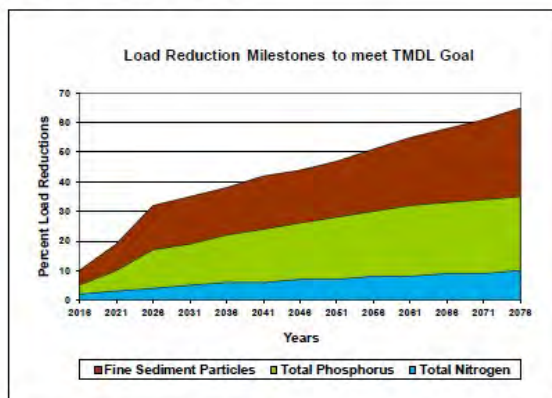


Figure 2. Source: U.S. EPA

- **Creating and Implementing a Strategy:** Developed a strategy to achieve pollutant load reductions through many possible actions, including improved roadway operations and maintenance, targeted street sweeping programs, infiltration basins to capture and treat urban stormwater, stabilization and revegetation of eroding slopes, removal of impervious cover and restoration of soil infiltration, and numerous non-urban source control and reduction measures, including reconnecting streams with their floodplains.
- **Tracking and Reporting Results:** The TMDL included development of the **Lake Clarity Crediting Program** ([clarity.laketahoeinfo.org](http://clarity.laketahoeinfo.org)), an innovative, comprehensive accounting system that measures the amount of key urban stormwater pollutants entering the lake and sets load reduction targets, or “Lake Clarity Credits,” that city, county and highway agencies must achieve. The program enables greater transparency and accountability for expenditures on water quality improvement projects and is a model for other urban stormwater programs confronting similar issues. Adaptive TMDL Management System procedures enable TMDL program managers to report on accomplishments, better identify and respond to challenges,

and make adjustments to ensure that the TMDL is working. Results show that the TMDL achieved 2016 fine sediment load reduction goals and currently is on track to achieve the 2021 milestone of 21% load reductions.

#### What Are EPA's Priorities for Lake Tahoe?

EPA will continue to work with our federal, state and local partners, and the Washoe Tribe to support the TMDL planning and implementation needed to restore deep water clarity, improve nearshore water quality, and protect Lake Tahoe as a drinking water source. EPA will continue to support projects with multiple and sustainable benefits, especially to improve watershed resilience to the effects of climate change. We will also continue to invest in applying and improving scientific tools to predict and measure project benefits.

#### What Can YOU Do to Protect Lake Tahoe?

Visit the Tahoe Regional Planning Agency website and find “10 WAYS TO SAVE LAKE TAHOE” ([www.trpa.org/get-involved/10-ways-to-save-lake-tahoe](http://www.trpa.org/get-involved/10-ways-to-save-lake-tahoe))



#### For more information:

Jacques Landy, U.S. EPA  
Lake Tahoe Basin Coordinator  
Tel: (775) 589-5248  
Email: [landy.jacques@epa.gov](mailto:landy.jacques@epa.gov)

Learn more about the activities of EPA and partner agencies at EPA's Lake Tahoe website at

[www.epa.gov/lake-tahoe](http://www.epa.gov/lake-tahoe)



### **Online Interface = Clarity Tracker**

<https://clarity.laketahoeinfo.org/Results/Index>

The Lake Clarity Tracker is the central hub for information related to the Lake Tahoe TMDL Program. The [About](#) page provides an overview of the Lake Tahoe TMDL and the TMDL Management System. The [Results](#) pages provide the status of pollutant load reduction accomplishments for various source categories. The [Resources](#) pages include technical information and resources related to results tracking and reporting as well as documents related to program management and operations.

The Lake Clarity Tracker and the Lake Tahoe Info Stormwater Tools are sponsored by the [Lahontan Regional Water Quality Control Board](#) and the [Nevada Division of Environmental Protection](#).

### **For more information about Clean Water Act TMDLs, please visit:**

<http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/>

### **For more information about California's TMDL for Lake Tahoe, please visit:**

[http://www.waterboards.ca.gov/lahontan/water\\_issues/programs/tmdl/lake\\_tahoe/index.shtml](http://www.waterboards.ca.gov/lahontan/water_issues/programs/tmdl/lake_tahoe/index.shtml)

### **For more information about Nevada's TMDL for Lake Tahoe, please visit:**

<http://www.epa.gov/region9/water/tmdl/nevada.html> and <http://ndep.nv.gov/bwqp/tahoe.htm>

### **Lake Tahoe Water Pollution Control Plan (TMDL):**

[http://ndep.nv.gov/bwqp/file/lccp\\_handbook\\_v099.pdf](http://ndep.nv.gov/bwqp/file/lccp_handbook_v099.pdf)

### **Additional information can be found in the:**

[Lake Tahoe Total Maximum Daily Load Technical \(Tech\) Report](http://ndep.nv.gov/bwqp/tahoe.htm) <http://ndep.nv.gov/bwqp/tahoe.htm>

The United States Environmental Protection Agency (US EPA) Lahontan Regional Water Quality Control Board (LRWQB) and Nevada Division of Environmental Protection (NDEP) have been working together collaborating with numerous other federal, state and local entities to develop a water quality plan (known as the Lake Tahoe Total Maximum Daily Load (TMDL). The plan will identify the sources of pollution and specify reductions in sediment and nutrients that are necessary to [restore the lake's clarity](#).

The State of Nevada has designated Lake Tahoe as a [Water of Extraordinary Aesthetic or Ecologic Value](#). However, NDEP was forced to list the waterbody on its [303\(d\) List of Impaired Waterbodies](#) due to exceedances in the [clarity standard](#). In addition, monitoring conducted over the last 40 years has indicated a steady trend of loss in the Lake's transparency.

The Lake Tahoe TMDL is a scientific effort at the forefront of the campaign to return Lake Tahoe water clarity to historic levels. The scale of the TMDL effort signifies the importance of this national treasure; to date the TMDL Program has involved research by nearly 200 scientists and engineers and more than a \$10 million investment by the federal government and the states of Nevada and California as well as eight years of cooperation and participation by Tahoe resource management agencies, local governments and the public.

The analysis indicates that the primary pollutants controlling clarity are fine sediment particles and the nutrients phosphorous and nitrogen. Fine sediment particles (FSP) cloud the water while nutrients fuel

algal growth. Although each affects the distance that light is able to penetrate into the water column, the analysis indicates FSP, particularly those less than 16 micrometers, appear to be more important than nutrients due to their light scattering effect. The vast majority of FSP entering the Lake are derived from the urban area. Modeling results suggest that a 65% reduction in FSP, accompanied by reductions in nitrogen and phosphorous, are necessary to restore historic clarity within Lake Tahoe.

Phase 3, the current phase, represents the transition from the science-based policy formation phases to the implementation and performance evaluation phase. In this phase the recommended strategy will be implemented by local government agencies, as well as state, regional and federal regulatory and land management agencies through their respective programs. Load reduction requirements will be established based on allocations contained in the TMDL document.

Progress toward meeting the Clarity Challenge will be assessed through the TMDL Management System, a program intended to define the process and protocols by which consistent methods and tools are used to quantitatively estimate and track the amount of load reductions achieved through specific actions on the ground. In addition, monitoring programs are a key part of evaluating progress.

### **Lake Clarity Crediting Program**

<https://www.enviroaccounting.com/TahoeTMDL/Program/Display/ForUrbanJurisdictions>

The Lake Clarity Tracker is the central hub for information related to the Lake Tahoe TMDL Program. The [About](#) page provides an overview of the Lake Tahoe TMDL and the TMDL Management System. The [Results](#) pages provide the status of pollutant load reduction accomplishments for various source categories. The [Resources](#) pages include technical information and resources related to results tracking and reporting as well as documents related to program management and operations. The Lake Clarity Tracker and the Lake Tahoe Info Stormwater Tools are sponsored by the [Lahontan Regional Water Quality Control Board](#) and the [Nevada Division of Environmental Protection](#).

The Crediting Program encourages the use of the following approved tools:

- The Pollutant Load Reduction Model is the standard load reduction estimation tool, which integrates load reductions achieved through combinations of source control practices and treatment BMPs in a catchment. The beta-version of the PLRM is now available on TIIMS.
- The Best Management Practice Maintenance Rapid Assessment Methodology (BMP RAM) is the standardized rapid inspection protocol to assess and report the functional condition of treatment BMPs. Results will inform jurisdictions when treatment BMPs are in need of maintenance.
- The Road Rapid Assessment Methodology (Road RAM) is the standardized rapid inspection protocol to assess and report on the pollutant potential of roadways. Results can be used to inform a number of water quality management questions, including the implementation of actions and strategies to control pollutants from roadways and protect downslope water quality; relative effectiveness of roadway operations practices, and relative maintenance needs of jurisdictions. Please contact Jason Kuchnicki to request access to the database.
- The TMDL Accounting and Tracking Tool (A&T Tool) is the central credit accounting system. It stores information related to catchment schedules and inspection results and generates reports showing the credits awarded each year for specific catchments and urban jurisdictions. The A&T Tool also tracks and reports load reductions at all scales from specific catchments to the overall basin. The A&T Tool is available for use by urban stormwater jurisdiction staff. Please contact Jason Kuchnicki for instructions and to request access.

NDEP and the Lahontan Water Board initiated the Crediting Program Support Services project, through which local governments and transportation agencies tested and trained the protocols, tools and methods described in the Handbook on a non-regulatory basis.

## 10 Years of TMDL Tracking: Clarity Report 2022

<https://clarity.laketahoeinfo.org/Home/ProgramManagement>

### Overview

Lake Tahoe, nestled in the Sierra Nevada, is known around the world for its striking blue waters. The lake earned the namesake “Jewel of the Sierra” due to its remarkably clean waters, which allow sunlight to reach much greater depths than other bodies of water. A half-century ago, annual water clarity levels averaged over 97 feet. At the turn of the century, one-third of Lake Tahoe’s renowned water clarity was lost, threatening its important role as a world-class tourist destination, an unparalleled opportunity for sustainable outdoor recreation, and a vital source of clean drinking water.

To reverse the impact on water clarity at Lake Tahoe, state agencies from both California and Nevada – the Lahontan Regional Water Quality Control Board (Lahontan Water Board) and Nevada Division of Environmental Protection (NDEP) – worked together to develop a plan based on best-available science to:

- Better understand the causes of water clarity loss;
- Identify sources of pollutants entering the lake and determine how much they need to be reduced to restore historic water clarity levels; and
- Develop a workable, cost-effective strategy to do so.

The plan, known as the Lake Tahoe Total Maximum Daily Load (TMDL), was developed by both agencies and approved by the U.S. Environmental Protection Agency in 2011.

Since then, the Lake Tahoe TMDL Program has provided oversight of implementation efforts to reduce pollutant loads into the lake. The Lahontan Water Board and NDEP, working closely with implementing partners, release an annual performance report to track accomplishments, evaluate progress and effectiveness, and adaptively manage the program to incorporate the latest and best-available science and information.

The 2022 TMDL Performance Report highlights the program’s commitment to restoring Lake Tahoe’s water clarity. This year’s report includes findings and accomplishments for 2021, which also

marks the ten-year milestone for program implementation. In light of this milestone, this year’s TMDL Performance Report is more comprehensive than previous years’, encapsulating the past decade’s important and meaningful successes.

The report is organized by and assesses the last ten-years of progress for the two pollutant source types. The first, urban upland sources, includes runoff from roads and other development. The second, non-urban sources, includes stormwater runoff from forestlands, erosion from streams, and atmospheric pollution. Highlights follow each of these sections. The first provides examples of important projects and actions taken to reduce urban stormwater pollutant loads to the lake. Due to the increasing threat of wildfire impacts, the second highlight looks at restoration work completed for the Angora Fire and studies launched to investigate water quality impacts of the 2021 wildfires. Finally, the report looks ahead to ongoing and future science efforts to further understand recent clarity trends and emerging conditions that may be altering the lake.

For a closer look at the TMDL Program and data provided in this report, view the Lake Clarity Tracker at [clarity.laketahoeinfo.org](https://clarity.laketahoeinfo.org).

#### Summary of Lake Tahoe TMDL Key Findings

Lake Tahoe’s water clarity decline is due to an increase in fine sediment particles (FSP) and free-floating algae. FSP scatter light, while algae absorb it. Both reduce the amount of light that penetrates through the water column, reducing clarity.

To restore Lake Tahoe’s historic water clarity, FSP loads need to be reduced by 65%. Nitrogen and phosphorus, which increase algae levels, also need to be reduced by 10% and 35%, respectively. This is expected to take 65 years.

To reach a water clarity goal of 78 feet by 2031, the program must achieve roughly half of these load reductions. This interim goal is referred to as the Clarity Challenge.

found that addressing urban stormwater is the best way to control FSP pollution and achieve the program’s load reduction goals.

The Lake Tahoe TMDL Program established the [Lake Clarity Crediting Program](#) to encourage its Urban Implementing Partners to reduce urban stormwater pollutant loads, demonstrate the ongoing effectiveness of pollutant controls, and assess progress toward load reduction milestones. Urban Implementers use a water quality model called the Pollutant Load Reduction Model (PLRM) to estimate the benefit of pollutant controls they implement. Controls are then registered within the [Lake Tahoe Info Stormwater Tools](#) accounting system.

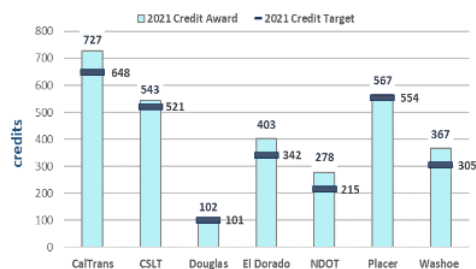
Each year, lake clarity credits are awarded to Urban Implementers if pollutant controls are maintained in proper functioning condition. Credits help track overall progress in reducing FSP loads into the lake. One credit is equivalent to an FSP reduction of 200 lbs/year. In 2021, the credit target translated to a 21% FSP load reduction from 2004 baseline levels.

#### TMDL URBAN IMPLEMENTING PARTNERS

California Department of Transportation (Caltrans)  
City of South Lake Tahoe (CSLT)  
Douglas County  
El Dorado County  
Nevada Department of Transportation (NDOT)  
Placer County  
Washoe County

For 2021, there were 45 active registrations in the Stormwater Tools system. Registrations include a variety of pollutant controls, including road operations, stormwater treatment Best Management Practices (BMPs), and parcel based BMPs. In total, 2,987 credits were awarded to Urban Implementers, all who exceeded their individual 2021 credit targets. Credits awarded equate to nearly 600,000 lbs/year of FSPs diverted from Lake Tahoe. This is a 23% reduction from 2004 baseline levels, helping the Lake Tahoe TMDL Program surpass its 2021 FSP reduction goal of 21%.

#### 2021 CREDIT TARGETS AND AWARDS



The program’s 2021 targets for nitrogen and phosphorous load reductions were 14% each. Pollutant controls reduced nitrogen loads by over 4,500 lbs/year and phosphorus loads by close to 1,700 lbs/year, a 13% and 18% reduction, respectively. While the program fell just short



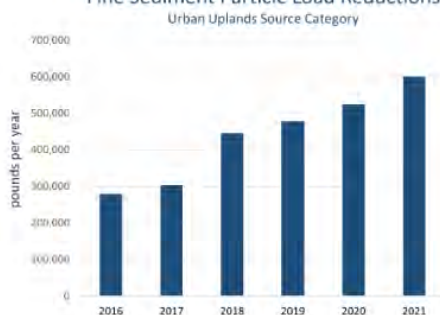
of its nitrogen target, significant atmospheric reductions achieved for this constituent have likely offset this shortcoming (see Atmospheric Deposition section under Non-Urban Source Categories).

Other programmatic accomplishments through 2021 include:

- Coordinated efforts related to regulatory compliance, determined stormwater project funding priorities, and fulfilled Lake Tahoe Restoration Act reporting obligations through the Stormwater Quality Improvement Committee
- Regional Stormwater Monitoring Program implementation and annual report development
- Lake Clarity Crediting Program streamlining, tool enhancement, and updated user reference manuals
- NDEP and Nevada Urban Implementers executed new five-year interlocal agreements for the 2022-2026 term
- Lahontan Water Board worked with California Urban Implementers to update municipal stormwater permits.

Looking forward, Urban Implementers continue to plan and implement water quality improvements at Lake Tahoe to meet future load reduction targets. Planned projects and actions are specified in stormwater reports submitted annually to NDEP or the Lahontan Water Board.

### Fine Sediment Particle Load Reductions



### Nutrient Load Reductions



### Angora Fire Restoration Key Accomplishments

- 672 acres total acres reforested, including 38 acres planted by community stewardship project
- 44 acres of aspen/meadow restoration
- 1,400 acres treated to reduce/thin fuels
- Established wildlife habitat management zones to protect native species
- 4,000 linear feet of stream channel restored/enhanced along Angora Creek and Seneca Pond
- Trails and roads relocated outside stream zones and upgraded with stormwater controls to minimize water quality impacts
- Established permanent monitoring plots to assess the effectiveness of restoration and mitigation efforts

vegetation, and abating noxious weeds. These projects began in the months after the Angora Fire broke out and continued through 2016. Post-fire water quality monitoring showed that nutrients and turbidity increased above pre-fire levels. Wet meadow areas downstream of the burned area, along with erosion control efforts and below average precipitation reduced impacts from the fire. Within five years, water quality had recovered to pre-fire levels.

### Caldor Fire Restoration

The Caldor Fire burned nearly 10,000 acres within the Tahoe basin. Less than 5% of the burn area was high severity where soils will be especially susceptible to erosion and high surface run-off during rainstorms if left unmitigated. The fire burned upstream of, and within, the Upper Truckee River and Trout Creek watersheds. Upper Truckee River and meadow restoration downstream are expected to moderate sediment and nutrient impacts to Lake Tahoe. LTBMU began work to repair areas disturbed by fire suppression efforts as soon as conditions allowed. This included installing natural features to reduce stormwater runoff, covering soil disturbance with brush to mimic natural conditions, and cleaning debris from stream crossings. LTBMU will treat approximately 1,500 acres in the Tahoe Basin, reducing fuels along roads and near homes. Long term restoration of the burn area will include many strategies developed to address the Angora Fire.



Left: Harvester thinning trees in surviving forest to improve health and reduce fuels.

Right: Students planting trees during Angora Reforestation Stewardship project, April 2009



Left: Angora Creek after Angora Fire, prior to rehabilitation.

Right: Post-fire rehabilitation of Angora Creek.



## 2021 Decision Record Memo

<https://clarity.laketahoeinfo.org/FileResource/DisplayResourceAsEmbeddedPDF/5f70b9c4-732c-499f-a6c5-60ccf2ddbc16>

## 2021 Decision Record Memo

February 2022

Each year Lake Tahoe Total Maximum Daily Load (TMDL) Program Managers meet with Lahontan Regional Water Quality Control Board (Lahontan Water Board) and Nevada Division of Environmental Protection (NDEP) Executives to review TMDL Program operations and discuss emerging issues, program priorities and future direction.

At this Program Review Meeting, TMDL Program Managers (1) present key findings and program adjustment recommendations described by the *Findings & Recommendations Memo*; (2) review priority actions and objectives for the upcoming year outlined in the *TMDL Annual Strategy*; and (3) discuss other relevant information and stakeholder input gathered during the calendar year. The *Decision Record Memo* documents outcomes and executive decisions resulting from the Program Review Meeting.

### Summary

A virtual *Program Review Meeting* was held on November 17, 2021 with Lahontan Water Board Assistant Executive Officer, Ben Letton; NDEP Deputy Administrator, Jennifer Carr; and TMDL Program Managers Mary Fiore-Wagner (Lahontan Water Board) and Jason Kuchnicki (NDEP). During the meeting, TMDL Program Managers summarized 2021 calendar year activities and reviewed drafts of the *2021 Findings & Recommendations Memo* and *2022 TMDL Annual Strategy*. Drafts of these documents were distributed to stakeholders for a three-week review period on December 22, 2021. TMDL Program Managers shared stakeholder feedback received in response to the draft documents with executives via email.

This 2021 *Decision Record Memo* documents two primary decisions by TMDL executives:

- 1) Acceptance of all recommendations put forward in the *2021 Findings and Recommendations Memo* with minor content revision from the draft.
- 2) The TMDL Executives supported and adopted the *2022 TMDL Annual Strategy*.

### Decisions

#### Item 1: 2021 Findings and Recommendations Memo

**Context:** Adopting well-supported adjustment recommendations based on new information is key to the TMDL Program's adaptive management process. The annual *Findings & Recommendations Memo* describes actionable recommendations to adjust the TMDL Program, including management strategies and guiding policies. TMDL Program Managers circulate the draft memo to interested stakeholders, then present recommendations and associated feedback to TMDL Executives for discussion and approval at the annual *Program Review Meeting*.

**Decision:** TMDL Executives approved the *2021 Findings & Recommendation Memo* with minor content revisions from the draft. All proposed recommendations were supported. New recommendations from 2021 are summarized below.

2021 Decision Record Memo

Page 1

**Recommendation 2021-1:** Major changes to permits and agreements are not warranted.

TMDL Executives agreed that major changes to other permit and agreement elements, such as the stormwater monitoring program, Lake Clarity Crediting Program (LCCP) policies or methods, and reporting requirements are not recommended. Upcoming and planned Tahoe Advisory Science Council (Science Council) investigations may inform program adaptive management for the next permit/agreement renewal in 2026/2027.

**Recommendation 2021-2:** Investigate smoke and ash impacts on Lake Tahoe clarity resulting from the 2021 wildfires.

TMDL Executives agreed that the unprecedented duration and extent of the 2021 wildfires presented a unique opportunity to better understand the extent to which smoke and ash influence short and long-term water quality dynamics in Lake Tahoe, and that the *Wildfire Smoke Impacts to Lake Tahoe's Water Quality* project will help provide a mechanistic understanding of the influence of smoke and ash that can be included in future annual clarity evaluations.

**Recommendation 2021-3:** Monitor water quality to understand wildfire and suppression repair, recovery, and restoration activities' impacts on Lake Tahoe clarity resulting from the Caldor Fire.

TMDL Executives agreed the *Alignment of Lake Tahoe Interagency Monitoring Program to Monitor Impacts of the Caldor Firework* project is essential to understanding the extent and duration for which these disturbances result in increased pollutant loads delivered to Lake Tahoe.

**Recommendation 2021-4:** Investigate fuels treatment effectiveness to determine the extent to which Lake Tahoe vegetation management practices reduced Caldor Fire impacts.

TMDL Executives agreed that an in-field evaluation is needed to confirm that Lake Tahoe basin fuels treatments were effective in achieving their intended objectives. And that findings from the *Caldor Fire Fuels Treatment Effectiveness Surveys* project will help guide future vegetation management work in the basin and adjacent regions and help justify the expenditure of public monies on these efforts.

**Recommendation 2021-5:** Ensure non-urban implementing partners track and report disturbed area resulting from the Caldor Fire in their 2021 reporting of TMDL Performance Measures.

TMDL Executives agreed with the expectation that non-urban implementers will quantify and report the resulting acres of disturbed areas created as well as efforts to mitigate potential impacts on water quality.

**Recommendation 2021-6:** Continue efforts to control fine sediment and nutrient inputs to the lake.

TMDL Executives acknowledged the findings from the *Data Synthesis and Analysis* project support continuing efforts to control fine sediment and nutrient inputs to the lake and that TMDL Agencies should continue to engage with the Science Council on ongoing efforts to better understand the relative importance of other factors controlling lake clarity.

#### Item 2: 2022 Annual Strategy

**Context:** The *TMDL Annual Strategy* is a short document prepared by TMDL Program Managers that informs the prioritization of day-to-day activities and TMDL Program messaging for the year. It includes a long-term goal, 5-year milestone objectives, annual objectives and current themes. The *TMDL Annual Strategy* is reviewed and finalized by TMDL Executives at the annual *Program Review Meeting* and is subsequently published on the Lake Clarity Tracker.

**Decision:** TMDL Executives approved the *2022 TMDL Annual Strategy* with no content revisions from the draft that was circulated to stakeholders for feedback.

Decision Record Memo 2021

Page 2

## 2020 Lake Tahoe Clarity Report Trends Holding but Threats Remain

<https://www.ucdavis.edu/news/2020-lake-tahoe-clarity-report>

<https://www.tahoesciencecouncil.org/7/>

July 08, 2021

Lake Tahoe's water clarity measurements, which are indicators of the health of the watershed, averaged 62.9 feet through 2020, the UC Davis Tahoe Environmental Research Center and the Tahoe Regional Planning Agency announced today. Lake Tahoe's clarity peaked in February 2020 when it was deeper than 80 feet. It was at its lowest in mid-May when it measured at slightly more than 50 feet. These readings were within the average range of the last decade. Average clarity in 2020 was just slightly better than the previous year's average of 62.7 feet. Clarity has been measured by UC Davis researchers since the 1960s as the depth to which a 10-inch white disk, called a Secchi disk, remains visible when lowered through the



water. Because lake clarity measurements vary from day to day and year to year, managers and scientists remain focused on long-term trends as an indicator of the lake's health.

Measurements show Lake Tahoe's annual clarity has plateaued over the past 20 years. Despite this progress, summer clarity continues to decline by over a half-foot per year. "While there is a good understanding of how fine clay particles and tiny algal cells reduce clarity, the biggest challenges are in reducing their presence in the surface water," said Geoffrey Schladow, director of the UC Davis Tahoe Environmental Research Center. "Here climate change, and in particular the warming of the surface water, is exerting an undue influence." The clarity of Lake Tahoe's cobalt blue waters tends to peak during the wintertime. (Brant Allen/UC Davis TERC) A recent review of clarity data by the [Tahoe Science Advisory Council](#) reaffirmed the understanding of main drivers of clarity loss. The council commissioned a panel of scientists from regional academic and government research institutions, which concluded that fine sediment particles and algae continue to be the dominant variables affecting Tahoe's clarity. They recommended that water quality agencies continue to focus on reducing fine sediment and nutrient loads.

Past UC Davis research and the [council's report](#) pointed to several other factors affecting Tahoe's famed clarity. Climate change is altering precipitation and snowmelt patterns and increasing the temperature of the lake and impeding deep lake mixing. Such mixing in late winter can bring cold, clear water up from deep in the lake, which improves clarity. In 2020, the mixing was extremely shallow and contributed to the lack of improvement. "Adaptive management is crucial when confronting evolving threats like climate change, invasive species, and expanding visitation rates in the Tahoe Basin, but it is an approach that requires targeted data to assess response to changing conditions and management actions," said Alan Heyvaert, past Tahoe Science Advisory Council co-chair and Desert Research Institute associate research professor. "This council report demonstrates the value of continued investment and innovation in sustained monitoring and assessment at Tahoe."

#### **Nevada Division of Environmental Protection**

##### **Best Management Practice Maintenance / Rapid Assessment Methodology (BMP RAM)**

<http://lands.nv.gov/docs/LTLPreports/Stormwater%20Best%20Management%20Practices/Stormwater%20System%20Operation%20and%20Maintenance%20Handbook.pdf>

The BMP RAM is a simple, repeatable field observation and data management tool that can assist Lake Tahoe natural resource managers in determining the relative condition of urban stormwater treatment BMPs. The primary purpose of the BMP RAM is to inform the user of the relative urgency of water quality maintenance for Treatment BMPs. The BMP RAM evaluations, therefore, do not specifically address or consider the quality of the design of a particular Treatment BMP relative to others. Rather, the BMP RAM provides a practical, consistent and reliable tool to track the condition of a particular Treatment BMP relative to its observed condition at the time of installation or immediately following complete maintenance.

Three items are available for download on the website. The Technical Document contains background information describing how the tool works and the rationale for tool development choices. The User Manual describes the specific protocols to create a Treatment BMP Inventory, conduct field observations, and interact with the database. The Database is the tool used to house and manage data and calculate RAM scores. Microsoft Access and familiarity with the Technical Document and User Manual are required to operate the database.

### **Nevada Division of State Lands (NDSL)**

Nevada State Lands permits buoy, piers, break walls and other structures within Lake Tahoe, itself, and in the near shore. TWSA receives copies of permit applications (new and renewal) for water provider comments relative to these structures and uses.

The Nevada Division of State Lands operates the Nevada Land Bank, which performs several functions on the Nevada side of the Lake Tahoe Basin. It receives fund distributions from the [Tahoe Regional Planning Agency](#) ("TRPA") from fees TRPA collects for excess land coverage on developed land parcels in the Tahoe Basin, in accordance with TRPA's regulations. Land coverage consists of impervious or disturbed soils, on lands of various classes of environmental sensitivity, that can have a detrimental affect on the Tahoe Basin environment and Lake Tahoe water quality. The fees received are used by the Land Bank to purchase, restore and permanently retire coverage, preserving land in its natural state.

### **Nevada Tahoe License Plate Program**

<http://www.tahoefund.org/ways-to-give/buy-a-tahoe-license-plate>

The State of Nevada collects fees for special Lake Tahoe license plates. The fees go into a dedicated Lake Tahoe fund, which is administered by the Division of State Lands. These funds are used for projects and programs to preserve or restore the natural environment of the Lake Tahoe Basin. This program is completely separate from the Tahoe Science Program and SNPLMA funding. However, both programs use a competitive review process and help to fulfill the mission of restoring Lake Tahoe through the EIP.

Nevada and California Lake Tahoe license plates benefit conservation and recreation projects in the basin. On behalf of the California Tahoe Conservancy, the Tahoe Fund coordinates the very successful Plates for Powder winter license program. Over 96% of the funds from purchase and renewal fees for Lake Tahoe License plates are used to build, maintain and protect the trails, water quality, wildlife and forest health of the Lake Tahoe basin.

To learn more about how your support helps keep Tahoe beautiful or to learn about specific [conservation](#), [recreation](#) and [watershed restoration](#) projects, visit the [California Tahoe Conservancy](#) and the [Nevada Division of State Lands](#).

### **California Tahoe Conservancy**

<http://tahoe.ca.gov>

The California Tahoe Conservancy was created in 1984 to restore and sustain a balance between the natural and the human environment and between public and private uses at Lake Tahoe. Successful partnerships are integral to protecting Lake Tahoe's unique environment. The Conservancy participates in and supports a range of partnerships with Federal, State, regional, local non-profit and academic agencies and organizations. The mission of the California Tahoe Conservancy is to lead California's efforts to restore and enhance the extraordinary natural and recreational resources of the Lake Tahoe Basin.

### **Construction Complete for Upper Truckee Marsh Restoration**

#### **Tahoe's Largest Ever Wetland Restoration Wraps Up After Three Years of Work**

<https://tahoe.ca.gov/construction-complete-for-upper-truckee-marsh-restoration/?fbclid=IwAR1qPaDIefXw3gBONcX5hlcZeasTgfGpKWFTwODP4jgR4MGXPq1SFWo8MLA>

**11/14/22 - South Lake Tahoe, Calif.**—Major construction is complete for the multi-year Upper

Truckee Marsh Restoration project, Lake Tahoe’s largest ever wetland restoration, announced the California Tahoe Conservancy. The Conservancy has completed steps to repair damage caused by 20th century development, restoring and enhancing hundreds of acres of wetland habitat. A new trail offers improved access for all to experience and enjoy the Lake’s shoreline. “As the largest wetland restoration project in the Lake Tahoe Basin, this is a remarkable accomplishment,” said California Natural Resources Secretary Wade Crowfoot. “Restoring this wetland will help keep Tahoe waters clean, provide great habitat for fish and wildlife, and be one more beautiful place we can all visit.”

Begun in June 2020, key features of the project include:

- New stream channels in the center of the Marsh will divert some of the Upper Truckee River’s water when river levels are high. The channels spread water across more than 200 acres of wetland that had been left dry when developers straightened the river decades ago.
- 12 acres of new wetlands replace an area that developers dredged and filled in the 1950s and 60s for a never-completed condominium complex. During high flows, the river will spread out over 70,000 new wetland plants. These new wetlands will provide critical wildlife habitat and filter pollutants before entering Lake Tahoe.
- A new trail to Lake Tahoe that skirts around the 12 acres of new wetlands, with a hardened, unpaved surface. The fully accessible shared-use trail runs approximately a half mile from the east end of Venice Drive to a beach at the Lake.

“It’s so exciting to see this project completed, despite the disruptions of the pandemic and wildfire evacuations, along with the challenges any project this size would face,” said El Dorado County Supervisor and Conservancy Board Chair Sue Novasel. “I’m grateful to our partners who helped us keep this project on track, and look forward to seeing the benefits of the restoration for years to come.”

The Conservancy designed the restoration to produce multiple benefits for wildlife, climate resilience, and equitable public access. The restoration makes the wetland habitat more resilient to droughts and extreme storms that are increasingly common under climate change. Functioning wetlands act as a natural filter for water, trapping fine sediments that would otherwise flow into Lake Tahoe. Healthy wetlands also store more



carbon than impaired wetlands. The Conservancy will monitor the project to track how the restoration acts as a nature-based solution to climate change. Returning river flows to the Marsh enriches native fish and bird habitat, fostering biodiversity. The new trail's hardened surface, composed of native decomposed granite, makes it easier for people using wheelchairs, strollers, and bicycles to access the Marsh and shoreline.

No restoration project ever truly ends. The Conservancy will continue work in the coming years to establish new wetland plants, monitor the project area, and maintain the restoration elements and new trail. In addition, the Conservancy expects to return in the future for further restoration across the 560 acres of wetlands that make up the Marsh. The Conservancy and its partners also continue to advance complementary restoration projects upstream along the Upper Truckee River, which is the largest tributary to Lake Tahoe.

The Conservancy is grateful to its funding and project partners. Funders include the California Wildlife Conservation Board, California Department of Fish and Wildlife, USDA Forest Service, U.S. Army Corps of Engineers, Bureau of Reclamation, the Lahontan Regional Water Quality Control Board, and the U.S. Geologic Survey. Other key partners include the California Department of General Services, Washoe Tribe of Nevada and California, Meyers Earthwork Inc., Northwest Hydraulic Consultants Inc., Western Botanical Services Inc., Tahoe Regional Planning Agency, and Tahoe Resource Conservation District.

The Upper Truckee Marsh Restoration is part of the Lake Tahoe Environmental Improvement Program, a partnership working to achieve the Tahoe region's environmental goals.

**Media Contact:** Chris Carney, Communications Director, [chris.carney@tahoe.ca.gov](mailto:chris.carney@tahoe.ca.gov), 530-307-0447.

**Media Resources:** [See photo gallery and videos.](#)

#### **California License Plate Program**

<http://www.tahoefund.org/ways-to-give/buy-a-tahoe-license-plate/>

The California Tahoe Conservancy administers Tahoe projects with funding generated by California's Lake Tahoe license plate program.

#### **League to Save Lake Tahoe**

<http://www.keeptahoeblue.org/our-work/>



The League's core focus is to protect Lake Tahoe's inspiring water clarity. Efforts include researching development plans and projects to ensure these projects comply with rules to protect Lake Tahoe. The League also works to secure funding for river and watershed restoration and conduct outreach about the environmental challenges facing Lake Tahoe. The League has three primary program areas: Advocacy & Monitoring, Legislative Advocacy and Outreach & Education.



530.541.5388  
KEEPTAHOEBLUE.ORG  
@KEEPTAHOEBLUE



## TAHOE BLUE CREW

Our Tahoe Blue Crew program empowers and supports the community to conduct cleanups that protect Lake Tahoe. We help volunteers adopt areas impacted by litter in the Tahoe-Truckee region, provide equipment, and train them to collect litter data that drives the League's work to advocate for pollution solutions. A Blue Crew can be a local or visitor, individual or group who commits to conducting at least three cleanups at their adopted site each year. For those whose free time is scarce, they can still get involved as a #TahoeBlueGooder by removing the litter they find and reporting it using the free Citizen Science Tahoe web app.

In 2022, League staff welcomed a range of organizations and businesses to the Tahoe Blue Crew family, including the Washoe Tribe of NV and CA, Whole Foods Market, Holiday Inn Club Vacations Tahoe Ridge, Joe's Sports Bar, Creekside Charter School, Homewood HOA, and Bally's. Our most unique new Blue Crew is led by the BEBOT, a solar and battery-powered, beach-cleaning robot that sifts beach sands to remove tiny pieces of trash. 2022 was the BEBOT's pilot test year.



### 2022 BY THE NUMBERS

6,836	864	316
Pounds of trash removed	Volunteers	Cleanups conducted

### 2023 GOALS

- Strengthen the Blue Crew community by hosting meetup events and announcing cleanups on social media so Crews can support each other's efforts.
- Bring a second BEBOT to Tahoe and expand the technology's use to clean entire beaches on a recurring basis.





**Eyes on the Lake** is the League's newest volunteer program helping to prevent the spread of aquatic invasive plants in Tahoe's waters. Volunteers learn how to identify plants in the classroom and in the field. Help protect the Lake while you play. **Pipe Keepers** is a volunteer-based, water quality monitoring program that examines the turbidity (clarity) of the water being released from storm drains into Lake Tahoe and braved the elements to collect water samples, take photos, and raise awareness about neighborhood storm drains impacts on lake and river waters.

#### **Volunteer Beach Cleanups / Tahoe Blue Crews**

[https://volunteer.keeptahoeblue.org/agency/detail/?agency\\_id=147943](https://volunteer.keeptahoeblue.org/agency/detail/?agency_id=147943)

Volunteer cleanups are some of the League's most visible and impactful community engagement activities. Litter cleanups and graffiti removal events are coordinated year round. Litter harms the Tahoe ecosystem by spreading bacteria, clogging storm drains, leaching chemicals, marring our pristine outdoors, and harming wildlife. Community cleanups like those conducted by the Blue Crew reduce litter, protect our ecosystem, raise awareness, and build environmental stewardship.

**Issues seen at July 4 at Zephyr Shoals Beach in 2023 resulted in a new managed concession being instituted to prevent further damages.**

<https://mynews4.com/news/local/big-changes-coming-to-lake-tahoe-beaches-after-trashy-fourth-of-july-festivities>

The Forest Service announced Zephyr Shoals will be managed by a concession beginning this fall for the first time ever. With a concessionaire managing the day-to-day operations, the public will continue to have access but can expect major changes like managed parking, enhanced trash management, sanitation services and increased staffing. [A record-breaking 8,559 pounds of trash](#) was cleared from Tahoe beaches the day after Fourth of July. Zephyr Shoals was by far the most impacted of the six cleanup sites. Currently, the site is far from any permanent trash cans, dumpsters or toilets. 6,279 pounds of litter, the equivalent of a 3/4 ton pickup truck, was piled all over the narrow strip of sand and in between bushes and trees in the forest nearby. The area is regularly cleaned by the Tahoe Regional Planning Agency's "Tahoe Blue Crew," a volunteer program offered by the League.



### Tahoe Cigarette Butt Disposal Project

TWSA has partnered with the League on the Tahoe Cigarette Butt Disposal Project. 250 metal bins, obtained from a grant by Keep America Beautiful, are being installed lake-wide in 2019-23.

<https://www.keeptahoeblue.org/news/pressreleases/250-cigarette-butt-collection-canistersto-be-installed-at-lake-tahoe>

### Tahoe Science Consortium (TSC)

<http://tahoescience.org>

The EPA helped to establish and is currently supporting the activities of a consortium of Lake Tahoe Basin scientists. The Tahoe Science Consortium promotes integration among the many current and future scientific projects in the basin, prioritizing future research informed by a comprehensive science plan, creating an environment that promotes the contributions of the best available science, and emphasizing close cooperation with land and resource managers to facilitate the transfer of information in an effective manner.

### ArkStorm@Tahoe Project

<http://tahoescience.org/arkstorm-project>

In 2018, TWSA staff served on an “Arkstorm – Lessons Learned” panel at the Nevada Water Resources Association, Fall Symposium. Organizers discussed the winter of 2016-17 as a ‘light version’ test period for emergency

preparations and response during future ArkStorms. An *ArkStorm @ Tahoe Preparedness Workshop* was held at the September 12, 2013 TWSA Board meeting. The TWSA members and other agency representatives spent 3 hours to discuss the operations of water and sewer supply systems during a potential long-term storm event. The exercise is designed to address potential social and ecological impacts of extreme winter storm events in the Lake Tahoe region. What is an ArkStorm? Atmospheric rivers (ARs) are large flows of water vapor that typically occur in fall and winter, bringing huge amounts of moisture over the Pacific to the U.S. West Coast. Landfalling ARs are storm events with the potential to deliver extreme amounts of precipitation to the West Coast, including California and Nevada, over a just a few days. The name “ArkStorm” was coined to describe large AR storm sequences, which, for instance, can produce precipitation in California that in places can exceed totals experienced only once every several hundred to 1,000 years. Scientists with the U.S. Geological Survey (USGS) Multi Hazards Demonstration Project (MHDP) designed a scientifically-plausible winter ArkStorm scenario for California emergency managers, stitching together historical AR storms from 1969 and 1986, separated by only 4 days. This hypothetical ArkStorm would rival but not exceed the intense California winter storms of 1861 and 1862 that left the Central Valley of California flooded and the state’s economy destroyed. It was designed to exceed any single storm in the 20th Century. On March 14, 2014, a Tabletop Exercise (TTX) was held at the Regional Emergency Operations Center (REOC), Reno, NV.



## **Integrated Science Plan for the Lake Tahoe Basin: Conceptual Framework and Research Strategies**

<http://www.tahoescience.org/wp-content/uploads/2010/11/Science-Plan-Intro1.pdf> edited by

Zachary P. Hymanson and Michael W. Collopy

An integrated science plan was developed to identify and refine contemporary science information needs for the Lake Tahoe basin ecosystem. The research priorities are reviewed and revised regularly to ensure they reflect the changing information needs and evolving priorities of agencies charged with the welfare of the Lake Tahoe basin.

The main objectives were to describe a conceptual framework for an integrated science program, and to develop research strategies addressing key uncertainties and information gaps that challenge government agencies in the theme areas of:

- (1) air quality,
- (2) water quality,
- (3) soil conservation,
- (4) ecology and biodiversity, and
- (5) social sciences.

## **Southern Nevada Public Land Management Act (SNPLMA) (Public Law 105-263)**

<http://www.blm.gov/nv/st/en/snplma.html>

The Southern Nevada Public Land Management Act (SNPLMA) became law in October 1998. It allows the Bureau of Land Management to sell public land within a specific boundary around Las Vegas, Nevada. The revenue derived from land sales is split between the State of Nevada General Education Fund (5%), the Southern Nevada Water Authority (10%), and a special account available to the Secretary of the Interior for:

- Parks, Trails, and Natural Areas
- Capital Improvements
- Conservation Initiatives
- Multi-Species Habitat Conservation Plan (MSHCP)
- Environmentally Sensitive Land Acquisitions
- Hazardous Fuels Reduction and Wildfire Prevention
- Eastern Nevada Landscape Restoration Project
- Lake Tahoe Restoration Projects

## **Tahoe Science Projects supported by SNPLMA**

The US Forest Service Pacific Southwest Research Station (PSW) receives funding through the [Southern Nevada Public Lands Management Act](#) (SNPLMA) to conduct science to inform efforts to restore Lake Tahoe and its watershed, as authorized in the Lake Tahoe Restoration Act. PSW assumed responsibility of SNPLMA for sponsoring science projects. The PSW Station established a competitive grant award program with a rigorous [peer review process](#) coordinated by the Tahoe Science Consortium, a collection of universities and agencies with active research programs at Lake Tahoe.

A database of the many projects funded at Tahoe is available at:

[https://www.fs.fed.us/psw/partnerships/tahoescience/browse\\_projects.shtml](https://www.fs.fed.us/psw/partnerships/tahoescience/browse_projects.shtml)

### **Lake Tahoe Interagency Monitoring Program (LTIMP)**

This program was consolidated into the TRPA EIP program database. The formation of this program resulted from a series of meetings, beginning in 1978, initiated by the University of CA, including state and federal agencies. It was apparent that a strong environmental monitoring program was necessary to accommodate the needs of the various agencies concerned with land-use planning and regulation. The University's basic research program alone could not provide the expanded water quality data requirements in the Tahoe basin. As a result of these discussions LTIMP was formally established in 1979 to collect water/air quality information necessary to support the extensive regulatory/research activities in the basin.

### **Lake Tahoe Geographic Response Plan (LTGRP) 2014 Update**

[http://www.epaossc.org/site/doc\\_list.aspx?site\\_id=2261](http://www.epaossc.org/site/doc_list.aspx?site_id=2261)

[http://ndep.nv.gov/bca/response\\_plan/ltgrp\\_summary\\_0308.pdf](http://ndep.nv.gov/bca/response_plan/ltgrp_summary_0308.pdf)

This plan details interagency protocol and instruction for site response in the event of a major spill at Lake Tahoe. Incidences with unreported spills in the Edgewood, Burke, and McFaul watersheds led to a discussion with Nevada Bureau of Corrective Actions regarding the spill notification process in August of 2004. As a result, TWSA participated with the US Environmental Protection Agency and other Lake Tahoe Basin agencies in the development of the Lake Tahoe Geographic Response Plan. The Plan defines spill reporting and spill response procedures. In September 2007, the report was issued. In 2014, the plan was updated. The TWSA participates in the ongoing development of the Lake Tahoe Geographic Response Plan (LTGRP), which establishes the policies, responsibilities, and procedures required to protect life, environment, and property from the effects of hazardous materials incidents. This plan establishes the emergency response organization for hazardous materials incidents occurring within the Lake Tahoe watershed. The plan is generally intended to be used for oil spills or chemical releases that impact or could potentially impact drainages entering Lake Tahoe, Lake Tahoe itself, and its outflow at the Truckee River. Plan coverage is for El Dorado, Placer Counties, California; Douglas, Washoe Counties, and Carson City, Nevada. The LTGRP is the principal guide for agencies within the Lake Tahoe watershed, its incorporated cities, and other local government entities in mitigating hazardous materials emergencies. This plan is consistent with federal, state, and local laws and is intended to facilitate multi-agency and multi-jurisdictional coordination, particularly among local, state, and federal agencies, in hazardous materials emergencies.

### **TWSA/USACE Risk Assessment Model Projects 2014/2008**

[https://www.yourtahoeplace.com/uploads/pdf-public-works/Schladow\\_Risk\\_Assessment\\_Phase\\_2\\_Final\\_Report\\_Jun\\_2014\\_FINAL.pdf](https://www.yourtahoeplace.com/uploads/pdf-public-works/Schladow_Risk_Assessment_Phase_2_Final_Report_Jun_2014_FINAL.pdf)

Phase 1 was completed in October 2008. Included is the 2008 project is a spreadsheet based tool that is to be utilized by the purveyors to analyze potential risk from shorezone development.

In spring 2013, NDEP contracted with Tahoe Science Consortium on updates to the Lake Tahoe Risk Assessment model; with potential upgrades to include new current data collected by TERC, analysis of increased risk from two potential new beach recreation areas in the southeastern corner of Lake Tahoe; and the increased safety of pathogen destruction from purveyor's additional treatment processes required by LT2. Phase 2 was completed June 2014.

## **Lake Tahoe Wastewater Infrastructure Partnership (LTWIP)**

Presently inactive, 2007 saw the formation of a parallel organization to the TWSA, the Lake Tahoe Wastewater Infrastructure Partnership (LTWIP). The groups' purpose is to develop, implement and maintain effective operation, maintenance and capital replacement programs to meet state-of-the-art industry standards, satisfy State and Federal requirements, and advocate for the protection of Lake Tahoe as an outstanding National water body.

Members include Douglas County Sewer Improvement District No. 1 (DCSID), Incline Village General Improvement District (IVGID), Kingsbury General Improvement District (KGID), North Tahoe Public Utility District (NTPUD), Round Hill General Improvement District (RHGID), South Tahoe Public Utility District (STPUD), Tahoe Douglas District (TDD) and Tahoe City Public Utility District (TCPUD).

Each of the Parties owns and operates a public sewer collection and/or treatment system within the Lake Tahoe Basin. These sewer systems could negatively impact the surface waters of Lake Tahoe upon failure or spillage. The Parties recognize the environmental sensitivity of the Lake Tahoe Basin, and the extraordinary responsibilities placed on their organizations as a result of their operation and maintenance of these sewage systems. Common standards and practices, and project prioritization are key steps to meeting those responsibilities.

The US Army Corp of Engineers (USACOE) had executed a Project Management Plan for Technical Assistance – Lake Tahoe Watershed Restoration with LTWIP, which included technical assistance related to the identification of sewer system defects, project identification, project prioritization, and application of consistent engineering standards for the execution of a wastewater capital replacement program within the Lake Tahoe Basin. This scope of work was completed and an additional task was added to assist the agencies with the preparation and completion of Sewer System Management Plans to meet California State Water Resources Control Board requirements under the Sanitary Sewer Overflow Reduction Plan.

This new California regulation required all sewer agencies in California to develop and implement a sewer system management plan (SSMP). The SSMP documents the agency's program to properly operate and maintain its sanitary sewer system. Each SSMP is required to address the following elements: Goals, Organization, Legal Authority, Operation and Maintenance Program, Design and Performance Provisions, Overflow Emergency Response Plan, Fats, Oils, and Grease (FOG) Control Program, System Evaluation and Capacity Assurance Plan, Monitoring, Measurement, and Program Modifications, SSMP Program Audits, and Communication Program.

The TRPA is adopting a similar requirement for a SSMP in the update of the Regional Plan. The plans completed as described above will meet this new requirement. The language included in the TRPA Regional Plan Update approved in 2012 is as follows:

### **60.1.6. Spill Control**

All persons handling, transporting, using, or storing toxic or hazardous substances shall comply with the applicable requirements of state and federal law regarding spill prevention, reporting, recovery, and clean-up. Sewage collection, conveyance, and treatment districts shall have sewage spill contingency, prevention, and detection plans approved by the state agency of appropriate jurisdiction and submitted to TRPA for review and approval within three years of the effective date of the Regional Plan.



### **A. Cooperative Sewage Spill Plans**

Sewage collection, conveyance, and treatment districts may join together to develop cooperative plans, provided that the plans clearly identify those agencies covered by the plan, are agreed to by each agency, and are consistent with applicable state and federal laws.

### **B. Sewage Spill Plan Criteria**

Sewage spill contingency, prevention, and detection plans shall comply with the criteria set forth by the state agencies of appropriate jurisdiction and TRPA. Such plans shall include provisions for detecting and eliminating sewage exfiltration and stormwater infiltration from sewer lines and facilities.

The Public Utility member agencies of the LTWIP and of TWSA have completed a new standardized Memorandum of Understanding (MOU) with the TRPA that regulates routine activities in the Lake Tahoe Basin. The existing MOU's were outdated and inconsistent among the Public Utilities.

The new MOU lists the activities that are exempt or qualified exempt from obtaining a TRPA permit which are broader than the list in the TRPA Code of Ordinances. The new MOU includes performance based standards for exempt and qualified exempt activities rather than prescriptive standards, where possible. This listing of activities allows the agencies to complete a wide range of projects and daily operations and maintenance activities without having to pull special permits. It still requires the agencies to follow all Best Management Practices, Land Coverage program rules, and other requirements such as seasonal restrictions.

A future task is that the special districts should be able to electronically report their activities to TRPA on-line, through the TRPA website, with a password unique to their organization. They should also be able to attach PDFs with their reporting forms for construction drawings and related information. An alternative to the current TRPA "QE stamp" will be developed for the special districts to use as evidence to building departments, etc. Reporting is currently done by the agency and is available for review by TRPA upon request.

To assure reliable sewer operations and avoid significant economic and environmental costs associated with inadequate operation and maintenance of these systems, the Parties desire to improve their practices and standards, implement state of the art asset management concepts, and comply with additional requirements.

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