

LAKE TAHOE TMDL PROGRAM 2023 PERFORMANCE REPORT

Guiding Efforts to Restore Lake Tahoe's Historic Clarity

Background

Lake Tahoe's loss of historic water clarity threatens its important role as a world-class tourist destination, an unparalleled opportunity for sustainable outdoor recreation, and a vital source of clean drinking water. The Lahontan Water Board and Nevada Division of Environmental Protection (NDEP) developed the Lake Tahoe Total Maximum Daily Load (TMDL) based on the best available science to guide efforts to reduce pollutants going into Lake Tahoe so that people may once again see to depths of nearly 100 ft.

To evaluate progress over a shorter timeframe, the 2011 Lake Tahoe TMDL Report set a Clarity Challenge target of 78 feet of clarity by 2031. Annual and multi-year pollutant load reduction goals have been established to help assess progress toward achieving the Clarity Challenge. Pollutants of concern include fine sediment particles (FSP), which scatter and reduce light from penetrating the water column, and the nutrients nitrogen and phosphorus which feed algal growth.

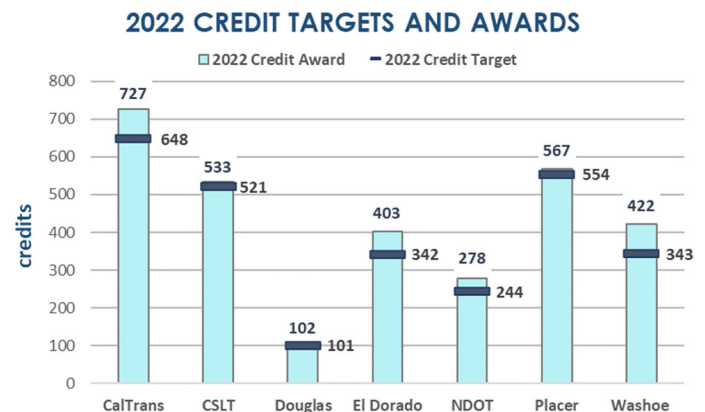
NDEP and Lahontan Water Board work together to track accomplishments, evaluate implementation progress and program effectiveness, and incorporate and respond to the latest science and information. As part of this adaptive management and continuous improvement system, the two agencies work closely with implementing partners to produce the annual Performance Report. This 2023 TMDL Performance Report highlights implementation accomplishments as of 2022, honoring the program's commitment to transparently track, report, and assess progress. For a closer look at the TMDL Program and data provided in this report, view the Lake Clarity Tracker at clarity.laketahoeinfo.org.

Urban Uplands Source Category

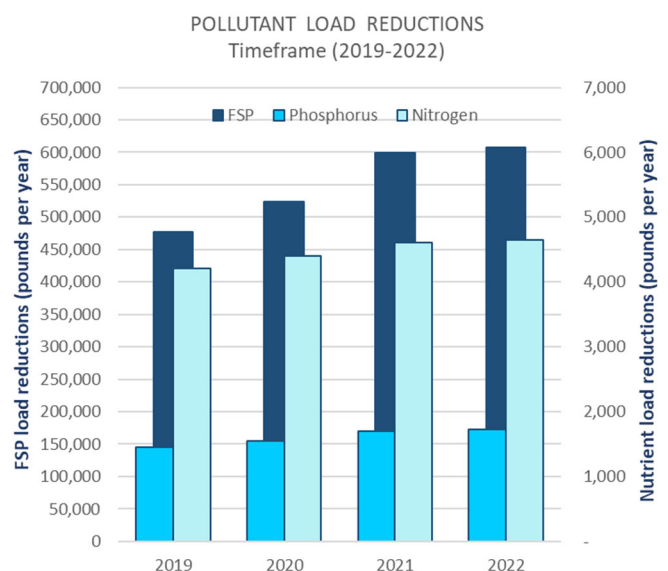
TMDL research shows FSP loads in urban stormwater must be reduced by one-third to meet the Clarity Challenge. Managing urban uplands is the greatest opportunity to control FSP pollution, as runoff from roads and other urban land uses accounts for over 70 percent of total FSP loading to the lake. Urban Implementing Partners – including the California and Nevada Departments of Transportation (CalTrans, NDOT); City of South Lake Tahoe (CSLT); and Douglas, El Dorado, Placer, and Washoe Counties – carry out controls such as roadway operations and maintenance, stormwater treatment facility construction and maintenance, and parcel-based best management practices (BMPs). These measures are registered through a comprehensive accounting system known as the [Lake Clarity Crediting Program \(LCCP\)](#).

Accomplishments

NDEP and the Lahontan Water Board award program credits to implementation partners that show ongoing effectiveness of controls. Credit awards are verified annually and compared against established targets, ensuring continued progress toward TMDL load reduction goals.



As of 2022, there were 45 active registrations in the [Stormwater Tools](#) platform. Thanks to these implementation partners, all urban uplands clarity credit targets were exceeded in 2022. In total, 3,032 credits were awarded to Urban Implementing Partners, far exceeding the target of 2,753. Because one credit is equivalent to 200 lbs./year of FSP reduced, FSP load reduction in 2022 reached nearly 608,000 lbs./year. Pollutant controls are also estimated to have reduced nitrogen loads by around 4,650 lbs./year, and phosphorus loads by 1,720 lbs./year.



Non-Urban Source Categories

Forest uplands, stream channel erosion, and atmospheric deposition contribute just over one-quarter of the total FSP loading to Lake Tahoe. Non-urban sources also make up a significant percentage of the nitrogen and phosphorus loading (71 and 43 percent, respectively). Thus, actions taken by local, state, and federal land and natural resource management agencies to improve water quality are integral to helping achieve TMDL goals.

Pollutant load reductions from non-urban sources are not measured like urban upland sources; instead, load reductions are tracked and assessed using a set of activity-based performance measures. Performance measures are compared against priority implementation actions in the TMDL Program to determine if progress is being made over time.

Accomplishments

The TMDL strategy to reduce pollutants from atmospheric deposition calls for controls to limit dust from roadways, parking lots, and construction sites in the Lake Tahoe Basin. In 2022, around 7,800 miles of streets were swept; 13 non-compliant wood stoves were removed or replaced; and 1.5 miles of pedestrian and bicycle routes were constructed. The strategy also relies on the Tahoe Regional Planning Agency's (TRPA) air quality and transportation management plan to reduce nitrogen deposition from vehicle emissions. The plan's accomplishments are summarized in the [TRPA 2022 Annual Report](#).

The TMDL strategy to reduce pollutants from forestlands is to control stormwater runoff from paved and unpaved roads, disturbed areas, and public facilities. To that end, five upland facilities were retrofitted for stormwater controls in 2022; 1.7 miles of forest roads were decommissioned or retrofitted; 26 acres of disturbed area were restored, enhanced, or created; all the dozer lines and fire breaks constructed during the Caldor Fire have been stabilized; and forest partners continue to regularly inspect their road networks and perform maintenance as needed.

The TMDL Program prioritizes channel restoration and enhancement of the Upper Truckee River, Blackwood Creek, and Ward Creek. These three systems make up the vast majority of FSP loading from stream bed and bank erosion in the Basin. Over 12,000 linear feet of channel have been enhanced or restored in 2022, mostly in the Upper Truckee River watershed.



Looking Forward

In 2022, Lake Tahoe's annual average clarity was around 72 feet, almost 11 feet deeper than 2021. While these numbers are promising, they should be tempered by the context that long-term trends are seen as a more representative metric of Lake health than year-to-year variation. Despite recent declines in clarity, Lake Tahoe's long-term water clarity trend continues to indicate stabilization.

Several complex factors may have affected lake clarity in 2022. Since 2017 annual precipitation has been at or below average (except 2019), thus delivering relatively less pollutants to the lake. There has also been evidence of ecological shifts in algae and zooplankton in recent years, which may warrant future scientific research. The Caldor Fire – which burned over 220,000 acres near Lake Tahoe in fall 2021 – may impact water quality on the scale of 3-5 years or longer. However, research completed found that the increases in smoke and ash particles resulting from deposition directly to the lake, were short-lived.

With the changing conditions within multiple potential influences on clarity, the TMDL Program is important to protect water quality through pollution prevention. Lake Tahoe may be vulnerable to impacts from wildfires and smoke, which means that reducing fine sediment particles and nutrients is essential to the lake's ecological health and clarity. While there is uncertainty surrounding in-lake processes, scientists and agencies agree that the TMDL Program and associated pollutant reductions are fundamental to protecting Lake Tahoe's water quality.

Agencies are working to respond to current uncertainties in lake processes by initiating multiple collaborative efforts with the Tahoe Science Advisory Council (Science Council), which is made up of Lake Tahoe science experts from universities and research institutes. The agencies will engage with the Science Council to:

- (1) Review recent lake clarity conditions
- (2) Evaluate and update lake monitoring approach
- (3) Identify information gaps and needs

Findings are expected to improve monitoring efforts and provide insights that will contribute to updating the Lake Clarity Model. Findings are also expected to guide future research, monitoring, and policy improvements. In August 2022, scientists informed agencies on the progress made in updating the Lake Clarity Model, providing recommendations and listed knowledge gaps. In the second half of 2023, a select team of Science Council experts will develop a Science Findings and Recommendations Report that will contribute an in-depth examination of data associated with clarity. This report will guide research and monitoring projects, helping improve system understanding and inform future management decisions.