



# ANNUAL MONITORING REPORT

TAHOE REGIONAL PLANNING AGENCY



March 2018

# TRPA Annual Monitoring Report - 2017

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**Overview:** This report summarizes the monitoring conducted by the Tahoe Regional Planning Agency (TRPA) in 2017. The Bi-State Compact directs TRPA to establish environmental goals for the Tahoe Basin (threshold standards) and TRPA and its partners monitor progress towards those goals. TRPA and its partners produce the threshold evaluation report every four years to provide a snapshot of the overall environmental health in the Region. Like project work in Tahoe, monitoring is a collaborative effort of the many partners in the Region. The agency funds other monitoring work completed by partners (e.g. lake clarity), and helps partners coordinate monitoring work in the Tahoe Basin. The findings of those monitoring programs are summarized elsewhere. This report focuses on the monitoring work done by the two TRPA staff dedicated to monitoring in 2017. All monitoring programs described in this report use widely accepted monitoring protocols and have Basin-wide perspective. Additional detail on monitoring programs including details on methodologies and findings from previous years is available at <https://monitoring.laketahoeinfo.org>

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## STREAM MONITORING (BIOASSESSMENT)

**About:** TRPA began monitoring stream habitat and water quality in 2009. Healthy streams are critical to a healthy watershed. To measure the health of the basin’s streams, TRPA uses bioassessment, a method that collects benthic macroinvertebrates (BMI) and stream habitat data to obtain a stream health rating. BMI are insects such as mayflies and stoneflies that spend most of their lives in a stream. They are highly sensitive to water quality pollution like stormwater runoff and watershed degradation such as erosion, and are therefore a good indicator of healthy streams. TRPA monitors 20 randomly selected “status” sites every year to obtain an overall picture of the basin’s streams, and monitors 20 repeat sites every four years (80 repeat sites total) to obtain long-term “trend” data on the health of Tahoe’s streams. All stream data is available at <https://monitoring.laketahoeinfo.org>

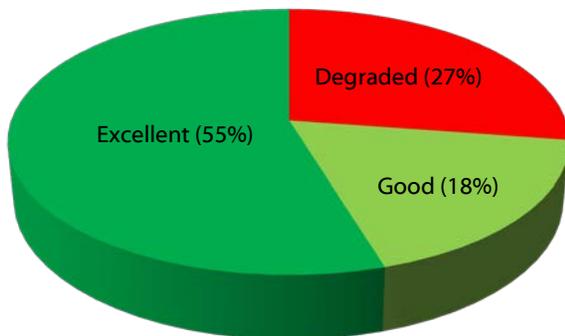


*Severe erosion along North Zephyr Creek on Tahoe’s east shore in 2016.*

**Results:** Since 2009, TRPA has sampled 128 random “status” stream sites. Of these sites, 27 percent are likely impacted by some sort of water quality pollution and/or watershed degradation, and 73 percent are healthy. Trend data on 80 stream sites that have been re-sampled two to three times since 2009 show Tahoe’s streams have maintained consistent health, where degraded streams have remained degraded and healthy streams have remained healthy. The water quality benefits of restoration projects often take many years before showing up in the data, so no changes were expected during the relatively short sampling period.

There are a few exceptions where restoration is producing improved results, which are described below.

*Tahoe Basin stream health (based on 128 samples taken from 2009-2017)*



*Erosion along Trout Creek in South Lake Tahoe.*

### Key Findings:

- The largest number of degraded stream sites are on the Upper Truckee River between Meyers and its confluence with Lake Tahoe. The majority of degradation in these areas comes from past land use practices such as grazing and floodplain development.

- A large number of degraded stream sites are located in the Incline Village area. These streams mostly display the impacts of stormwater runoff, with large areas of bank erosion and depleted macroinvertebrate communities.
- Two of Lake Tahoe’s largest tributaries, Ward Creek and Blackwood Creek, are generally healthy after extensive restoration work in the last 20 years. However, some small sections still show signs of heavy erosion.
- The Environmental Improvement Program (EIP) is investing stream restoration resources primarily in areas where TRPA monitoring data shows the most degradation, indicating resources are being put towards the correct areas.
- A number of small streams on the east and west shores, and in Incline Village, were identified as severely degraded. These streams are potential targets for smaller scale restoration projects.



*Large scale erosion on the Upper Truckee River in South Lake Tahoe. Restoration on this section of river should continue to be a top priority of the Environmental Improvement Program.*

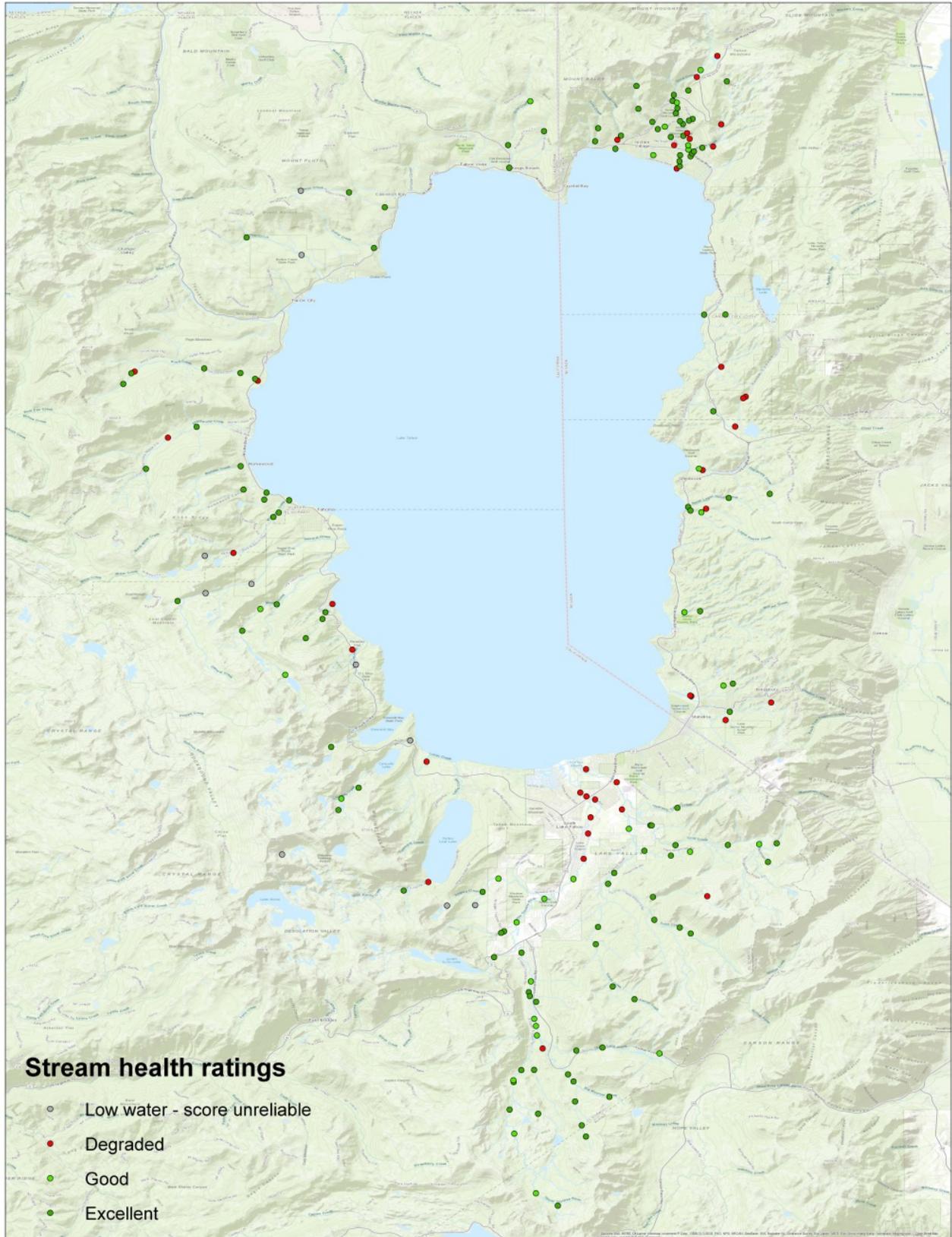
**California Stream Condition Index (CSCI):**

The CSCI was developed by California Fish and Wildlife and California State Water Boards in 2015 to assess the condition of California’s streams. It uses macroinvertebrate data from over 600 pristine streams in California to set goals for healthy stream biology. The macroinvertebrates collected by TRPA are analyzed by a lab and compared against these pristine streams. The result is a biotic condition “score” from zero to one telling us how healthy our streams are.

- Streams that were restored in the last 10 years like Blackwood Creek, Third/Incline creeks, and parts of the Upper Truckee River, show strong biological health, indicating restoration projects have been mostly successful. Reach Five (Sunset Stables) of the Upper Truckee River is an example of this, where TRPA monitoring shows the percent of eroded banks decreased from around 50 percent to five percent, and areas dominated by silty substrate declined from 35 percent to five percent.



*The Upper Truckee River (Reach Five) was restored in 2016. In the before picture (left), bank erosion was prevalent and the river was not connected to its floodplain; in the after picture (right), the river was reconnected to its floodplain and shows little erosion.*



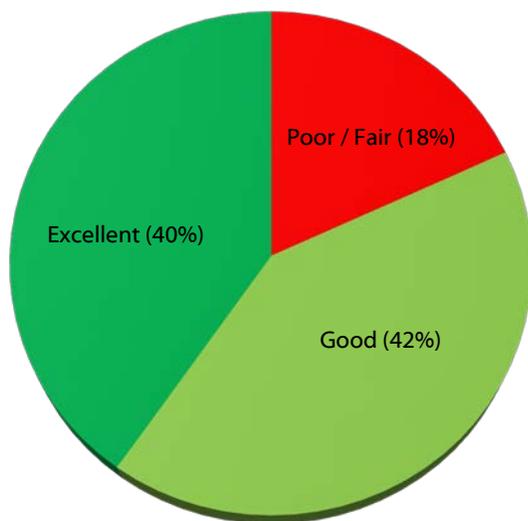
## STREAM ENVIRONMENT ZONE (SEZ) MONITORING

**About:** TRPA began a pilot monitoring program for SEZ in 2016 using the California Rapid Assessment Method (CRAM). As opposed to TRPA’s stream bioassessment monitoring program, which only assesses permanent streams, the SEZ monitoring program assesses all wetlands, meadows, streams, and riparian areas in the Tahoe Basin. CRAM is a wetland monitoring method that measures wetland buffer and surrounding landscape, hydrology, physical structure, and biotic structure to give an overall "score" of wetland function. All data for Tahoe can be found at <https://www.ecoatlas.org>, where it can also be compared to data from other regions around the State of California.



*An old ditch channelizes water and prevents it from flooding into the surrounding meadow in Bijou, South Lake Tahoe.*

*Tahoe Basin SEZ health (based on 80 samples taken in 2016-2017)*



**Results:** 80 SEZs have been sampled since 2016. Of these, 18 percent are in degraded condition and 82 percent in good or excellent condition. Since monitoring only began in 2016, long-term trend data is not yet available.

### Key Findings:

- Current EIP project locations align well with monitoring areas identified as degraded.
- Degraded SEZs are largely found in the urbanized areas of South Lake

Tahoe, however, degraded SEZs were also found in areas outside of most human influence. This indicates legacy land-uses such as logging and grazing are still impacting SEZs.

- Old roads and railroads, fill, invasive weeds, channelization for development, and historic grazing impacts are the main factors influencing SEZ health found through monitoring.
- Some old SEZ restoration projects are not functioning successfully, suggesting some SEZ restoration approaches / policies need to be improved.

**SEZ Monitoring and Restoration grant:** In 2017, TRPA was awarded a Wetland Development Grant from the U.S. EPA to design a basin-wide SEZ monitoring and restoration prioritization plan. While the pilot SEZ monitoring program TRPA began in 2016 represents the first step in basin-wide SEZ monitoring, this grant will allow TRPA to design a monitoring program agreed on by all partners in the Basin that utilizes the latest techniques and technologies for wetland monitoring. Additionally, this plan will identify how monitoring can inform the identification and prioritization of SEZ restoration going forward.



*Top: a successful SEZ restoration project on Angora Creek in Meyers. Bottom: An unsuccessful SEZ restoration project on a meadow near Stateline.*



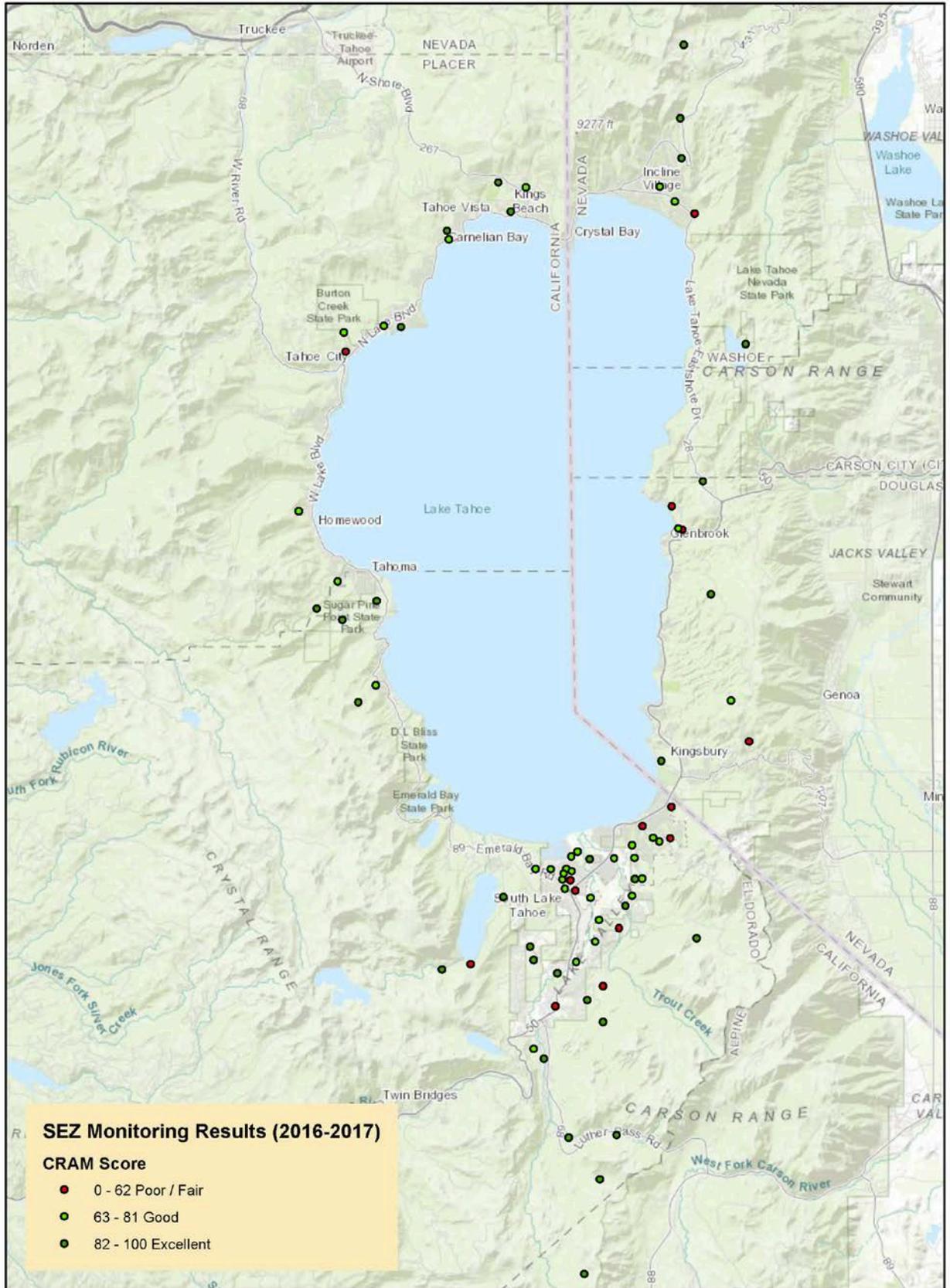
*Above: A head-cut develops in a meadow near Stateline, a sign of degraded SEZ conditions.*



*Above: Fill from an old road runs down the middle of an SEZ on Tahoe's west shore.*



*Above: Invasive Reed Canary Grass overtaking an SEZ near the Tahoe Keys in South Lake Tahoe.*

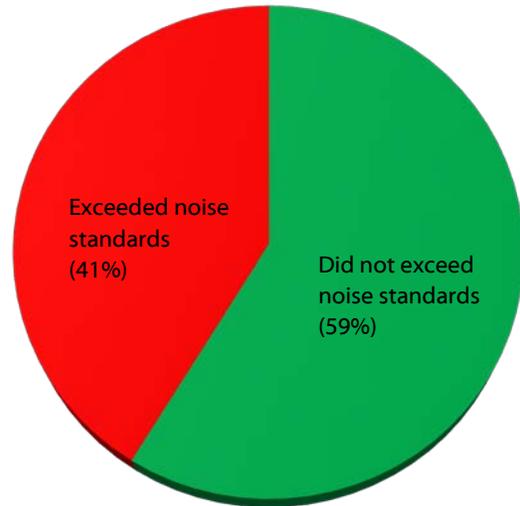


## NOISE MONITORING

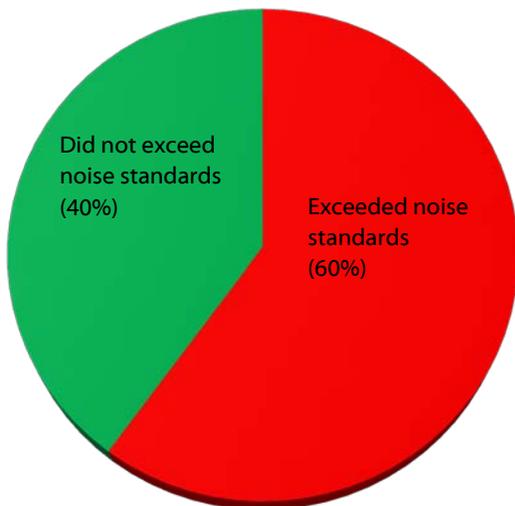
**About:** TRPA has been monitoring noise in the Tahoe Basin since 1982. Noise is monitored separately in Plan Areas, transportation corridors (highways), and shorezone areas. Noise monitors are deployed for one to three weeks during peak noise periods to determine whether each area is exceeding the adopted TRPA noise standards. All noise data can be found at <https://monitoring.laketahoeinfo.org>

**Plan Areas:** There are hundreds of Plan Areas in the Tahoe Basin, each with its own allowable noise level. TRPA monitors 140 Plan Areas over a four year reporting period, with 35 areas monitored each year. Allowable noise levels vary from 45 decibels (dB) in low-density residential areas to 65 dB in industrial areas. The

Community Noise Equivalent Level (CNEL) decibel level is used to assess noise levels. The CNEL uses a 24 hour measurement and adds penalties for noise at night and the early morning when people and wildlife are most sensitive to noise pollution. Seventy Plan Areas were monitored in the most recent monitoring period, which started in 2016. Of those plan areas, 59 percent met TRPA standards for noise while 41 percent exceeded the noise standards.



*Percent of Plan Areas in compliance with adopted noise standards (based on 70 Plan Areas monitored in 2016 - 2017)*



*Percent of transportation corridor monitoring sites in compliance with adopted noise standards (based on 15 locations monitored in 2016 - 2017)*

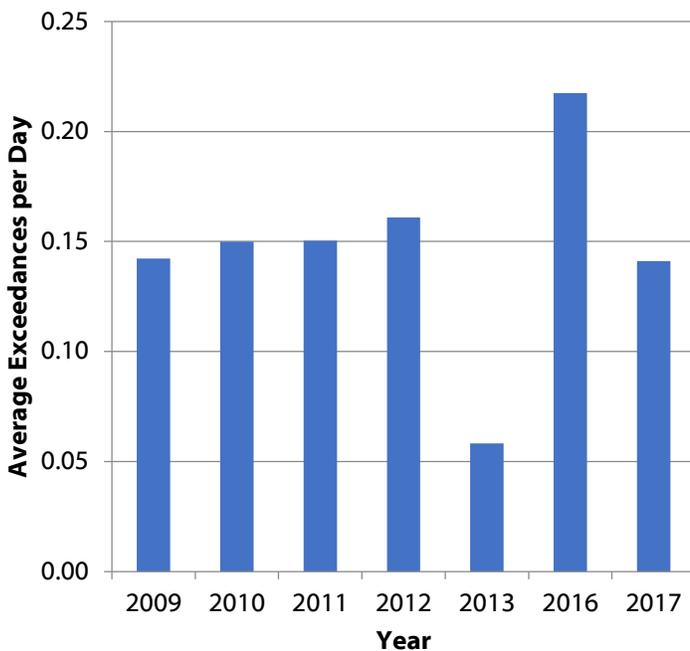
**Transportation Corridors:** Each highway in the Tahoe Basin has its own allowable noise level. TRPA monitors 30 transportation corridor sites over a four-year reporting period, with seven to eight monitored each year. Like Plan Areas, the CNEL decibel level is used to assess noise levels and determine if highway corridors are meeting TRPA noise standards. In the current monitoring period of 2016-2017, 15 transportation corridor sites were monitored. Of these, 60 percent exceeded noise standards, while 40 percent met the standards for noise.

**Shorezone:** TRPA has monitored noise from motorized watercraft in the shorezone of Lake Tahoe since 2009. There are 9-11 locations monitored for two weeks during peak boating season ( July Fourth through Labor Day). Every noise event that exceeds 75 dB is automatically recorded. All recordings are then analyzed to determine whether they came from motorized watercraft. In 2017, six of the nine monitoring sites had one or fewer exceedances during the monitoring period. A single location, Rubicon Point, accounted for 33 of the 42 total exceedances. This indicates that watercraft noise exceedances are generally a localized issue. The Rubicon Point site averaged four exceedances per day with a high of seven exceedances in one day. 2017 had the highest average exceedances per day lake-wide out of any year monitored. It appears “go-fast” cigarette boats were the main source of noise violations in 2017.

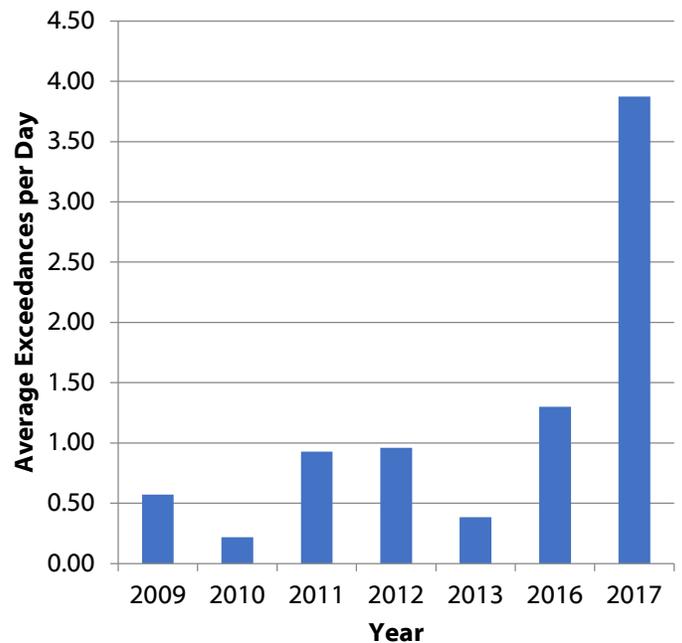


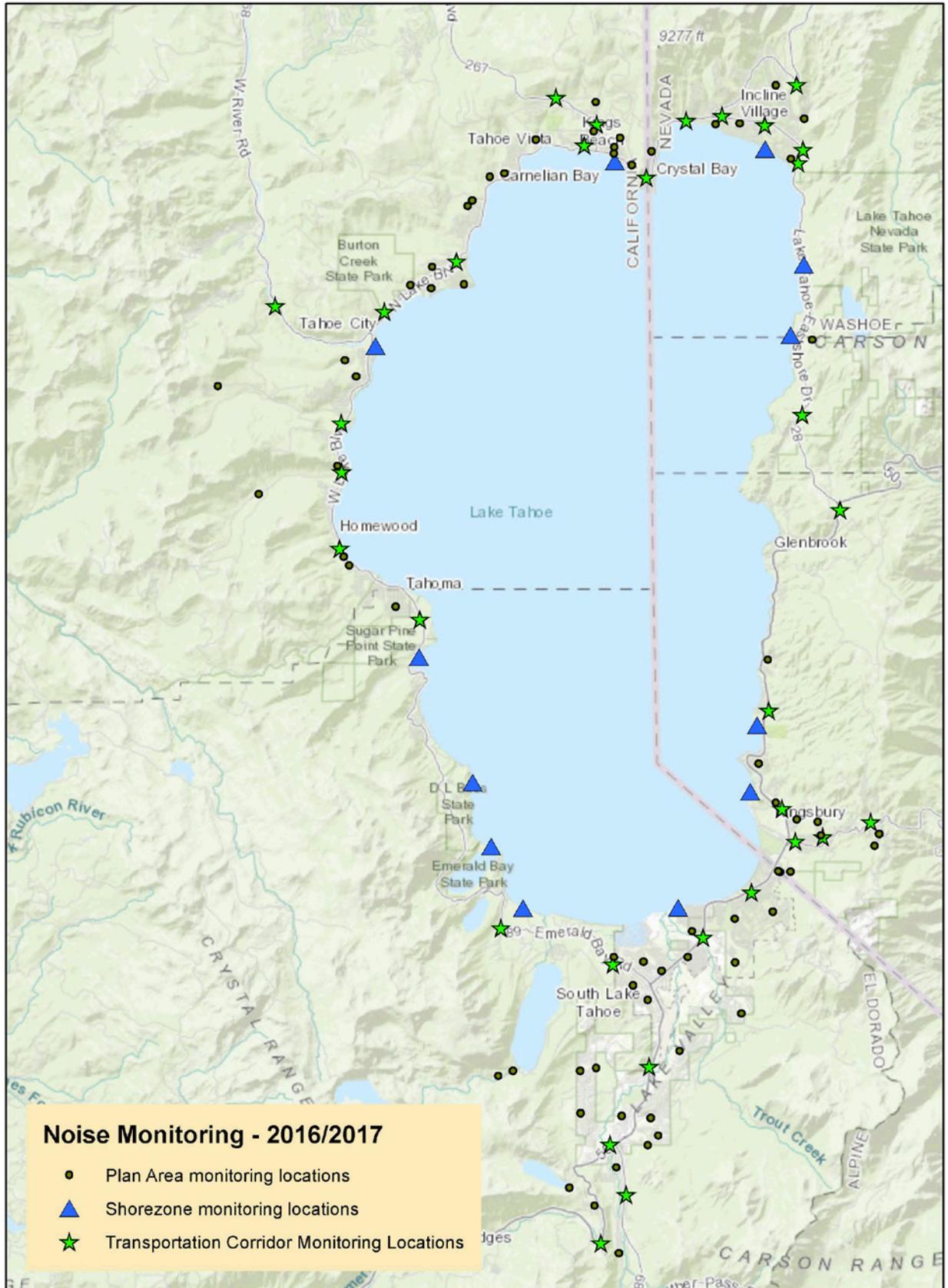
*A shorezone noise monitor deployed on Rubicon Point.*

**PEAK SEASON AVERAGE DAILY EXCEEDANCE RATE FOR WATERCRAFT (average of all sites except Rubicon)**



**PEAK SEASON AVERAGE DAILY EXCEEDANCE RATE FOR WATERCRAFT (Rubicon only)**

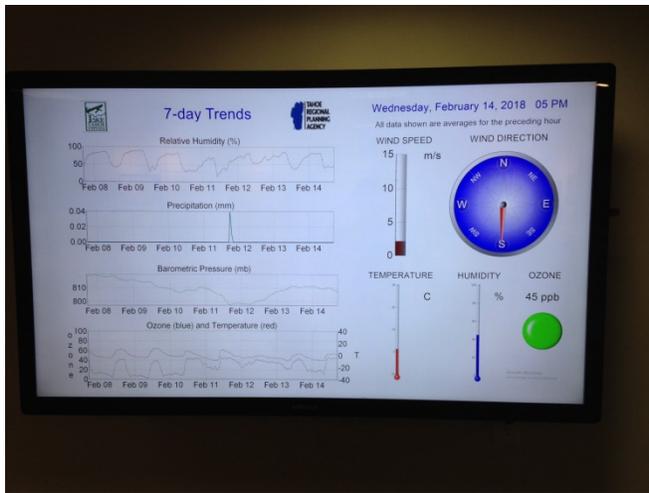




## AIR QUALITY MONITORING

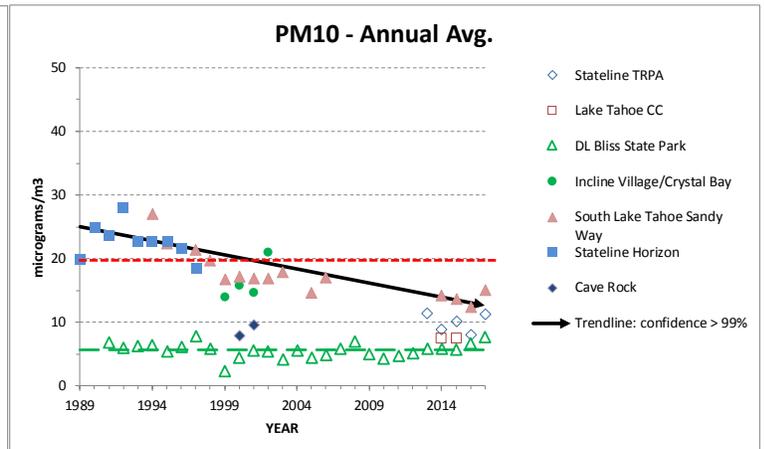
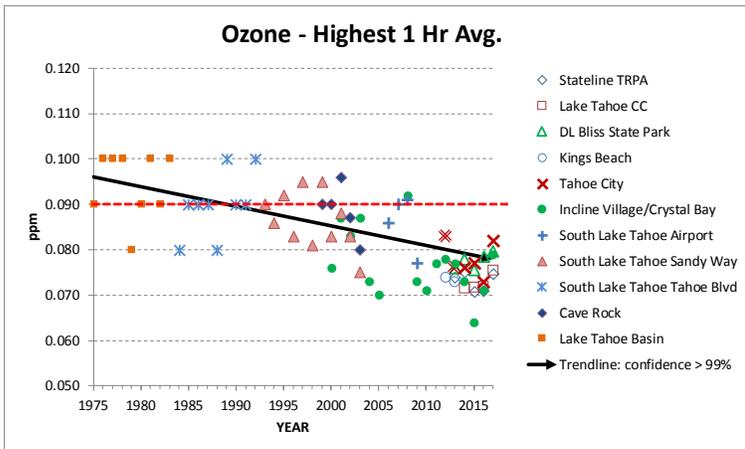


**About:** TRPA monitors air quality around the Lake Tahoe Basin using several monitoring stations operated both by TRPA and partner agencies. Particulate matter (PM), ozone, visibility, and carbon monoxide (CO) are the main constituents monitored. In 2017, TRPA worked with Lake Tahoe Community College (LTCC) to display real-time air quality data taken at the air quality station in the Commons at LTCC. This display will help students understand the real-world applications of air quality data in their atmospheric science courses.

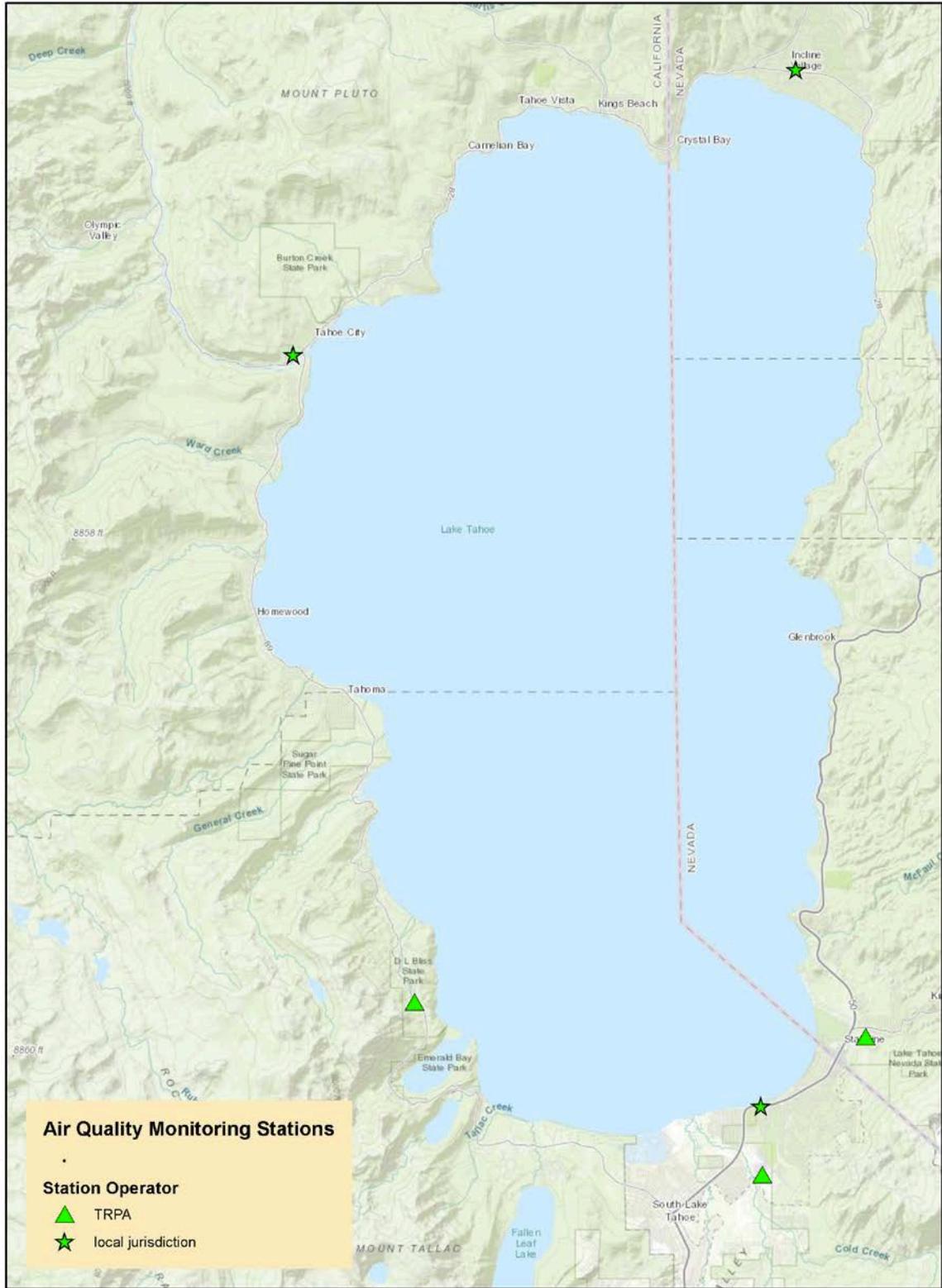


Top: TRPA air quality monitoring station at Lake Tahoe Community College. Bottom: A real-time display of air quality in the Commons of Lake Tahoe Community College.

**Results:** In 2017, air quality in the Tahoe Basin continued to show improvements in long-term trends. Carbon monoxide (CO) levels have dropped to the point where strict monitoring is no longer needed; however, TRPA still maintains a CO monitoring station that shows levels are well under national and regional standards. Ozone and particulate matter show similar trajectories, and levels have consistently decreased and are within national and regional standards.



Ozone and Particulate Matter (PM) monitoring results up to 2017 shows continued improvement across the Basin.

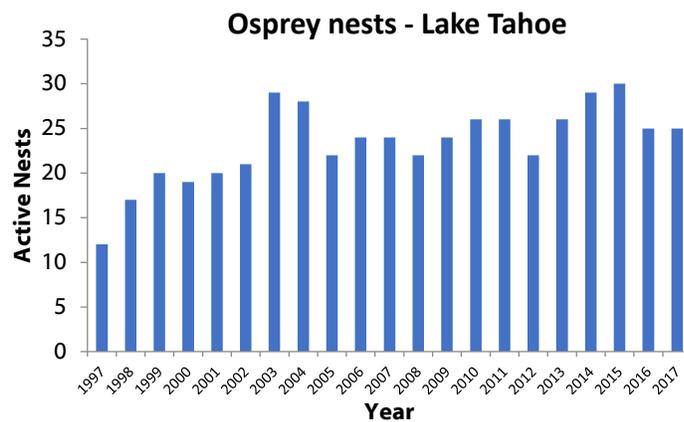


## WILDLIFE MONITORING

**About:** TRPA monitors special interest species with partners including California State Parks (CDPR), Nevada Department of Wildlife (NDOW), U.S. Forest Service (USFS), California Tahoe Conservancy (CTC), and Tahoe Institute for Natural Sciences (TINS). Ospreys, peregrine falcons, and wintering bald eagles are monitored annually by TRPA. Goshawks are monitored by CDPR and USFS, and nesting bald eagles are monitored by NDOW and CDPR.



An adult Osprey leaves its nest on Tahoe's east shore. Credit: Mark Enders, NDOW



**Osprey:** TRPA took over coordinating osprey surveys in 2012 from the U.S. Forest Service, and is joined by NDOW and CDPR in the monitoring. Three surveys are completed annually by boat along the entire shoreline of Lake Tahoe and by foot at a number of other large lakes in the basin. The number of active osprey nests has continued to increase since monitoring began

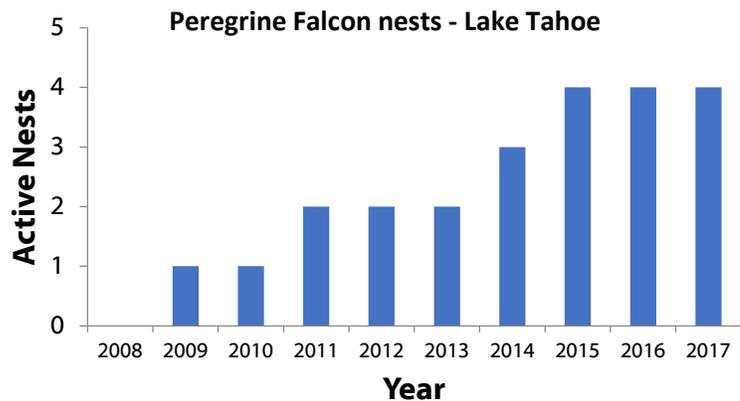
in 1997. In 2017, there were 25 total active nests with seven nests successfully fledging chicks. This low success rate is normal for Lake Tahoe. Emerald Bay, D.L. Bliss, and the undeveloped portion of Lake Tahoe's East Shore continued to be the main reproductive areas for osprey in 2017.

**Peregrine Falcon:** TRPA, in collaboration with TINS and NDOW, took over peregrine falcon surveys in 2015 from the USFS. Peregrine falcons were monitored by the USFS



Nesting Peregrine Falcons at Shakespeare Rock on Tahoe's east shore. Credit: Mark Enders, NDOW

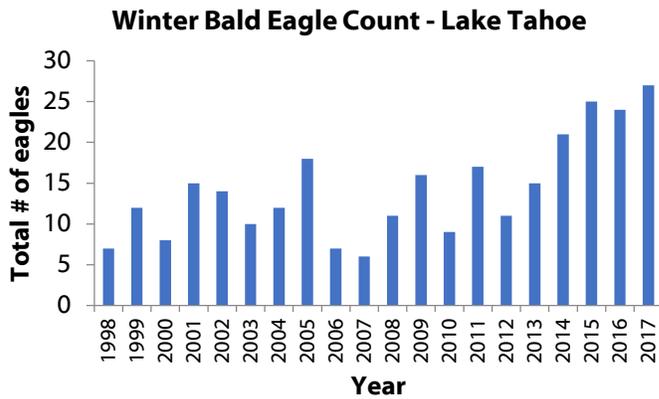
from 2009-2014. Falcon



nesting has increased dramatically from 2008 when no nests were observed to four active nests in 2017. Additionally, a new potential nest was discovered during 2017 osprey boat surveys at Eagle Rock. Because this nest is on CTC property, CTC biologists monitored and confirmed the falcon's presence but were not able to confirm nesting activity.

As climbing grows in popularity around the Tahoe Basin, interactions between climbers and nesting peregrines has increased. TRPA, NDOW, USFS, and TINS partnered with climbers in 2017 to monitor climbing impacts on nesting peregrines at Castle Rock. Preliminary findings suggest that the peregrines mostly did not appear bothered by the climbers, although they did show signs of aggression toward the many hikers and dogs in the

**Tahoe wildlife data online:** In an effort to improve customer service, TRPA put all wildlife data online at [www.TahoeOpenData.org](http://www.TahoeOpenData.org) in 2017. Beforehand, customers planning large projects in the Basin had to reach out to all the different wildlife agencies to obtain information on where sensitive species are located to avoid them during construction. TRPA worked with Basin wildlife agencies to get all this data online in one place, easing project planning.



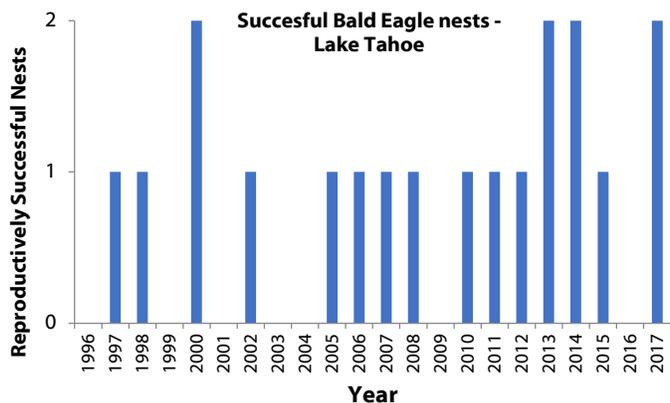
area that came close to the nest. The nest was unsuccessful, but researchers were not able to determine if the failure was related to human activity. Follow-up observations will occur in 2018 to get a better understanding of potential conflicts and how to manage increasing recreation demands while protecting sensitive wildlife.

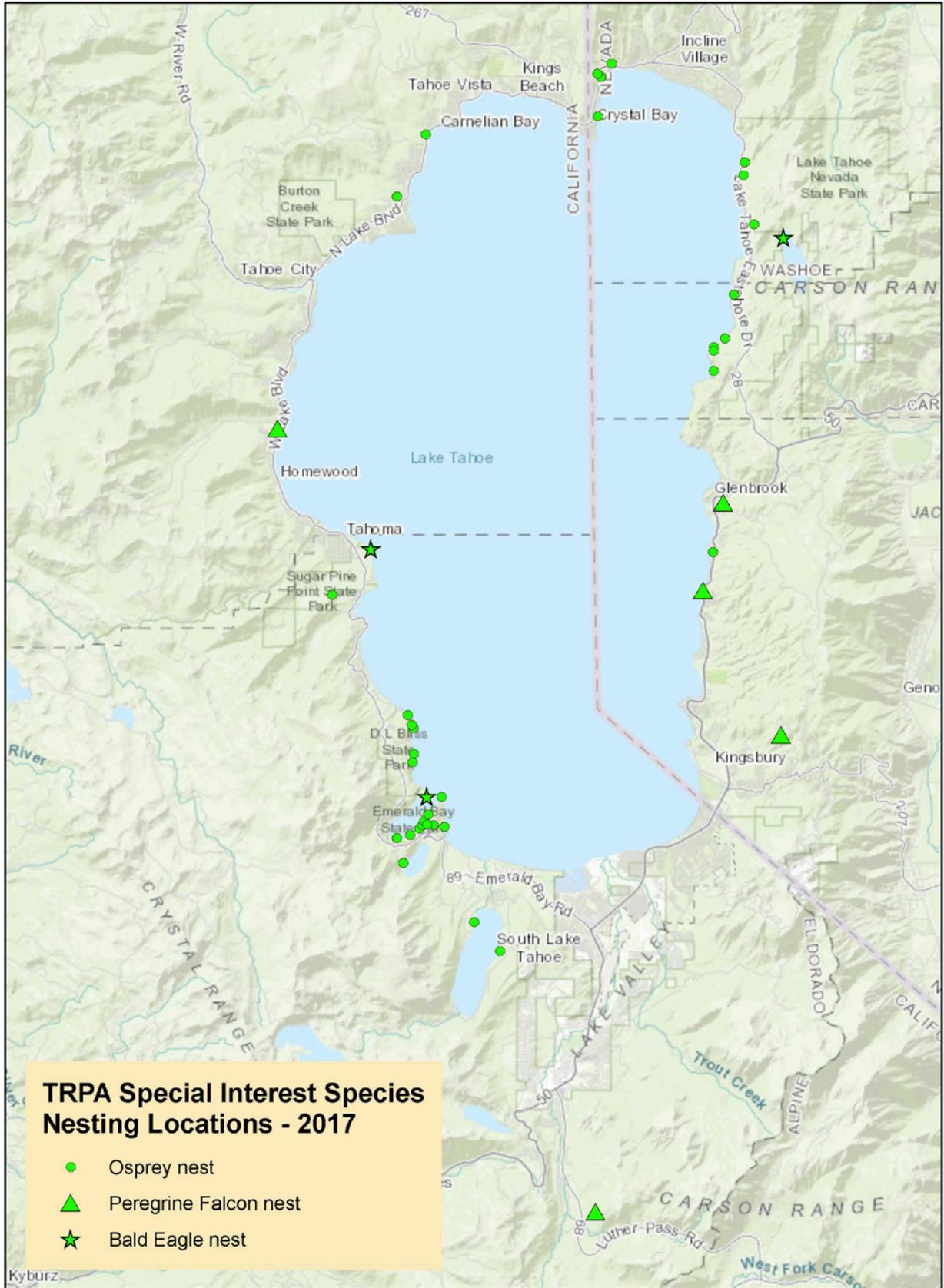
**Wintering Bald Eagle:** TRPA participates in the annual mid-winter Bald Eagle Count at Lake Tahoe led by TINS. The count has taken place since 1998. Bald eagles from colder northern areas winter in Lake Tahoe and take advantage of prime habitat and available food. In 2017, a total of 27 individuals were counted, the highest number ever recorded.

**Nesting Bald Eagle:** Nesting bald eagles are observed during osprey boat surveys. The only bald eagle nests found since monitoring began have been on Nevada State Parks and California State Parks property and have been monitored by their respective biologists. Since monitoring began in 1996, the number of successful bald eagle nests in the basin has varied between zero and two. In 2017, five juveniles were fledged from two successful nests, a highly successful year for Tahoe's bald eagles.



A third year immature Bald Eagle at Marlette Lake, on the east shore of Lake Tahoe. Credit: Mark Enders, NDOW





## BICYCLE AND PEDESTRIAN MONITORING

**About:** In 2015, as part of the update to the Active Transportation Plan, TRPA developed the Lake Tahoe Region Bicycle and Pedestrian Monitoring Protocol. Implementation began in 2015 with seasonal videos recorded and limited automated counting. In 2016, TRPA purchased automated bicycle and pedestrian counters that collect year-round data, differentiate between the two different users, and collect directional information. Through partnerships with local



A bike / pedestrian counter installed by USFS on the shared-use path by Camp Richardson.

jurisdictions, counters were installed throughout the Region on paths. Additional counters that collect bicycle travel data on bike lanes and information about the number of pedestrians walking on sidewalks are also

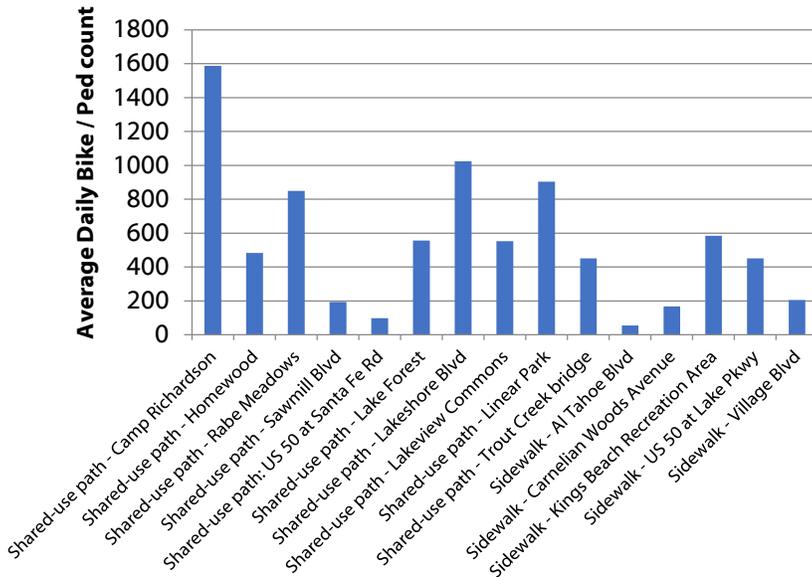


TRPA staff installs bike counters in Kings Beach.

rotated on a biennial basis by TRPA staff. By 2017, 15 counting stations were active. An additional six year-round counters are expected to be installed over the next two years. TRPA and local partners monitor bicycle and pedestrian activity to understand high use areas and trends, measure mode-split, and support infrastructure grant applications and reporting. Count information also informs policies and programs targeted to improve and support active transportation. All data can be

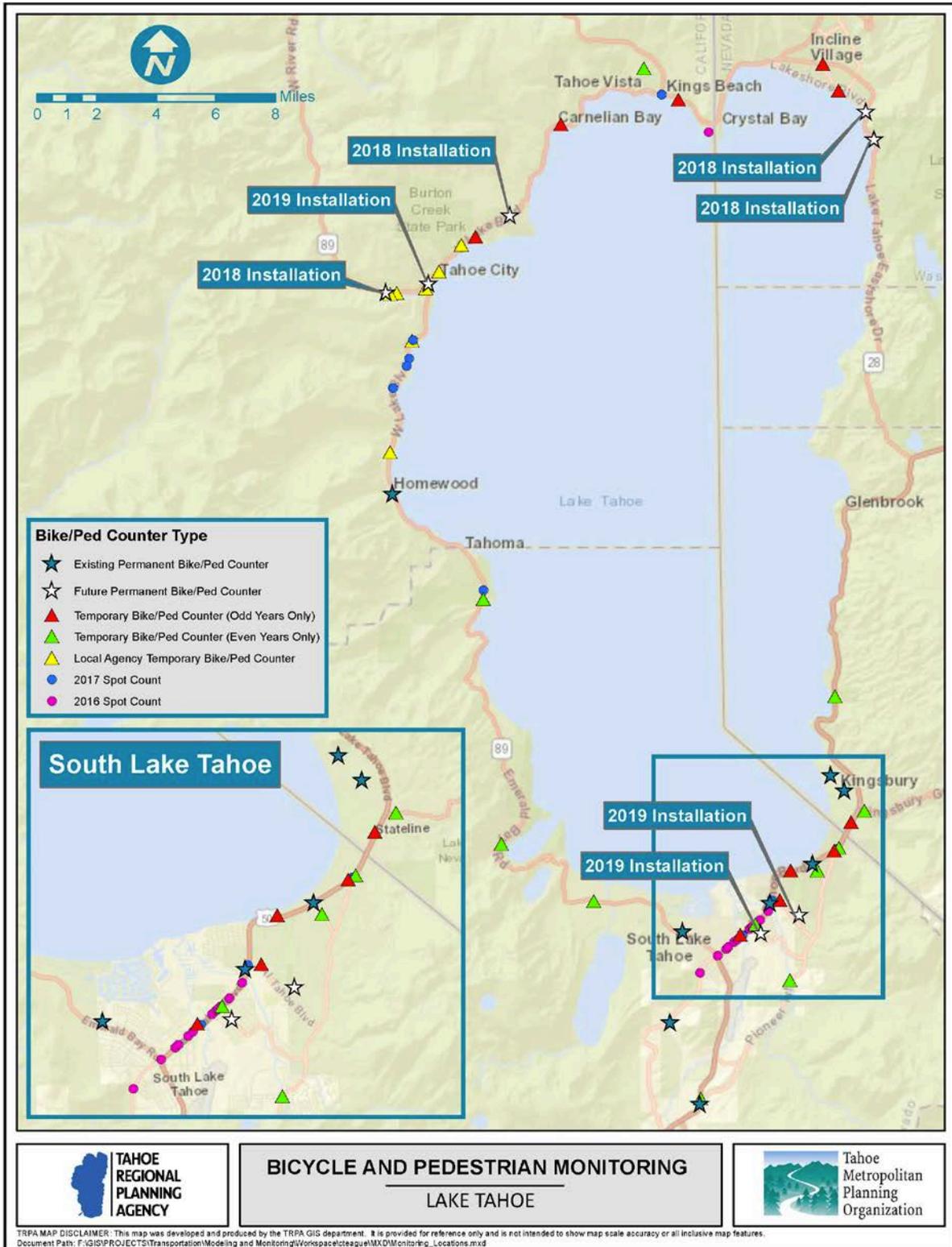
found at <https://monitoring.laketahoeinfo.org>

### Bicycle and Pedestrian Counts (peak summer: July 8th - September 4th) - Lake Tahoe



**Results:** Bicycle and pedestrian use is highest on paved paths and sidewalks. Peak summer usage is highest between July Fourth and Labor Day when averages vary from 50 trips to nearly 1,600 trips per day. The busiest day of the year, as expected, is July Fourth, when the highest daily count of nearly 5,500 trips was recorded on the north shore path near Lake Forest. 50 miles of paths and sidewalks were plowed during the winter of 2017, and data shows that people continued to use the paved paths despite the harsh weather. The busiest day of winter was New Year's Eve, when over 400

trips were counted on the Rabe Meadows path in Douglas County. Additionally, nearly 100 trips per day were taken, between December and February, on the path along Lakeview Commons in South Lake Tahoe, where the City of South Lake Tahoe kept the path plowed despite heavy snow.



## TAHOE YELLOW CRESS MONITORING

**About:** Tahoe yellow cress (TYC) is a small native plant that grows on the shoreline of Lake Tahoe and nowhere else in the world. It lives only on the sandy beaches and dunes at the ever-changing margin of the lake. As recently as 1996, this unique member of the mustard family teetered on the brink of extinction when it disappeared from beaches in Nevada and was found growing at less than 10 sites on the California side of the lake. The concerted and collaborative approach to protection and restoration by the partners in the basin is altering the trajectory for this sensitive plant. While TYC’s population is still at risk, it is stable, and was removed from the Endangered



*Tahoe yellow cress. Credit: Tom Lotshaw*

Species candidate list in 2015. TRPA participates in annual Tahoe yellow cress surveys with agency partners led by an independent botanist, Allison Stanton. In 2017, three TRPA staff participated in the field surveys and the TRPA watercraft team helped surveyors get to locations only accessible by boat. All data can be found at

<https://monitoring.laketahoeinfo.org>

**Results:** 2017 was one of wettest winters ever recorded and Lake Tahoe rose from below its natural rim to nearly its legal limit. When lake levels are high, there are fewer spaces for TYC to grow. The 2017 survey results reflect this, with only 24 sites occupied by TYC, down from 45 sites in 2016 when the lake was low. The number of occupied sites in 2017 mirrors almost exactly the number of sites occupied the last times the lake was high in 2006 and 2011. Therefore, the TYC population appears to be stable despite the high lake level.

### Tahoe Yellow Cress survey results

