



EXECUTIVE OFFICER'S REPORT
 September 1, 2021 – September 30, 2021

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State and Regional

1. Personnel Report – *Sandra Lopez*

New Hires – None

Vacancies

- Environmental Program Manager I (Supervisor), Compliance and Planning Division, South Lake Tahoe. The incumbent manages the Division consisting of the following technical programs: Basin Planning & Assessment, Surface Water Ambient Monitoring Program, Non-Point Source, Forestry/Dredge & Fill, Lake Tahoe Total Maximum Daily Load (TMDL), and Regional Monitoring/Climate Change coordination.
- Water Resource Control Engineer, Planning and Assessment Unit, South Lake Tahoe. This position will be responsible for conducting investigations to determine the cause of water quality impairments and developing implementation plans to address these impairments. The position will also work on Basin Plan amendments.
- Environmental Scientist, Non-Point Source Unit, South Lake Tahoe. The position involves case-handling and permitting associated with private and federal grazing allotments, golf courses, and restoration projects. Additionally, the position will involve Non-Point Source Program Management, CWA 319 Grant Selection and Management, and tribal coordination.

- Environmental Scientist, Non-Point Source Unit, South Lake Tahoe. This position will coordinate closely with interagency partners and the Tahoe Science Advisory Council to assess Lake Tahoe nearshore conditions and other factors influencing Lake Tahoe water quality and clarity, and aquatic invasive species. The incumbent will also help identify outstanding information needs for future work and coordinate applicable implementation actions, including those associated with implementation of the Lake Tahoe TMDL.
- Water Resource Control Engineer, Forestry Unit, South Lake Tahoe. This position will be focused on implementing the Water Board's elements of recent legislation (SB 901) related to increasing the pace and scale of forest fuels treatments, and also reviewing and enrolling projects under the appropriate Water Board dredge and fill permits.

Departures – None

North Lahontan Region

2. Eyes on the Lake Training – *Sabrina Rice and Brian Judge*

Staff members Sabrina Rice and Brian Judge were invited guests asked to present at the League to Save Lake Tahoe's (LTSLT) 7th annual Eyes on the Lake Training on September 21st. The purpose of the Eyes on the Lake Training is to familiarize individuals with techniques to identify aquatic invasive species within Lake Tahoe and present technologies that can prevent their spread. The recent September training focused on the marina sector and was attended by representatives from 14 Lake Tahoe marinas (both Nevada and California), and included all California marinas regulated under the Marina Permit. The training involved collaboration with League to Save Lake Tahoe, Tahoe Resource Conservation District, Tahoe Regional Planning Agency, Marine Taxonomic Services, and Lahontan Water Board Staff (Staff). During the meeting, Staff were available to answer questions marina operators had regarding their industrial stormwater permits, and to spread general awareness of Harmful Algal Blooms (HABs).

Harmful Algal Blooms

Climate change and human impacts such as nutrient inputs through stormwater runoff are causing a continuous upward trend in water temperature within Lake Tahoe. July temperatures reached a record average high of 68.7 degrees F, which is approaching a temperature threshold we have never reached before (State of the Lake Report 2021). This warming of the lake is nearing a temperature range that may be ideal for certain cyanobacteria (blue-green algae) to grow and thrive. We are not aware of HABs growing within Lake Tahoe in the past, but this year Staff responded to six suspected blooms. Though laboratory testing indicated one of six samples contained cyanobacteria cells, no samples contained toxins, which indicated that these blooms were not harmful. However, if lake temperatures continue to increase to levels ideal for HAB growth, it is important to raise the awareness of HABs and their identification in a surface water.



Figure 2.1: Photo of a bloom at Timber Cove Marina in 2021. All algae reported in 2021 looked similar but varied in size and color.

To expand the awareness of HABs, Staff presented to marina operators and Agency staff at the Eyes on the Lake Training. Staff went over the difference between algae and blue green algae, water quality and health impacts associated with HABs, and how to visually identify a potential HAB. Staff also shared a few qualitative tests individuals can perform if they see a bloom, instructions on how to report a bloom, and online resources to learn more about HABs. Engaging with marina operators to ensure HABs are identified quickly is consistent with a recommendation identified to protect the nearshore environment as outlined in the Nearshore Water Quality Protection Plan.

Information shared at the Eyes on the Lake Training was well received by the participants, and Staff have since been contacted by outside agency staff regarding future assistance with visually monitoring HABs in other areas throughout our region.

IDENTIFYING A HARMFUL ALGAL BLOOM (HAB)

This quick guide provides a visual comparison of appearance and color and odor that can be helpful in distinguishing non-toxic green algae and aquatic plants from potentially toxic cyanobacteria blooms or harmful algal blooms (HABs).

Non-toxic Algae & Plants

Cyanobacteria/HAB

APPEARANCE

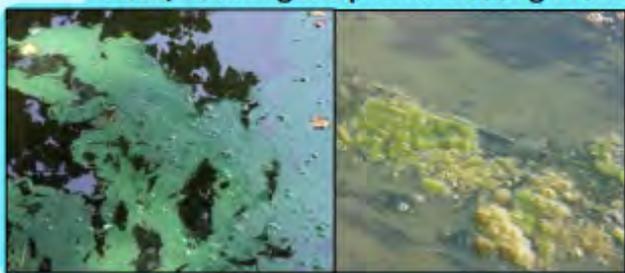
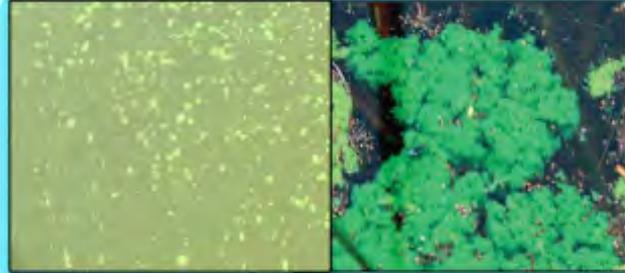
<p>Rooted Plants</p> 	<p>Paint or Soup</p> 
<p>Floating Plants</p> 	<p>Scum, Bubbling or Spit-like Floating Foam</p> 
<p>Plant-like Algae</p> 	<p>Lettuce or Chopped Grass</p> 
<p>Filamentous Algae</p> 	<div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Spires</p>  </div> <div style="width: 30%;"> <p>Mats</p>  </div> <div style="width: 30%;"> <p>Blobs</p>  </div> </div>

Figure 2.2: Image of a table dispersed to participants in the training to help them visually identify algae and plants vs. cyanobacteria.

Marina Permit

Eleven commercial marinas on the California side of Lake Tahoe are subject to the Marina Permit administered by the Water Board. The main purpose of the permit is to

protect water quality from marina operations, describe information required in annual reports, and to define the water quality monitoring and reporting plans. The permit requires marina operators to prepare and implement a marina pollution plan that includes measures to control the spread of aquatic invasive species (outreach, skimming, annual attendance at Eyes on the Lake training, in-lake plant surveys). The LTSLT assists the marina operators with meeting requirements through this training and providing forms and outreach materials. Staff inspected each marina this past summer to discuss operations and observe presence and condition of stormwater treatment facilities, spill containment supplies, and storage of hazardous materials. In general, marinas operating at Lake Tahoe are well run and are not contributing significant negative impacts to the lake.

3. West Fork Carson River Vison Project Update – *Daniel Sussman*

The West Fork Carson River flows from its headwaters in Alpine County to the Nevada state line. This upper watershed is rural in nature, with minimal development and land use dominated by recreation and open space, with residential areas and ranching present in the downstream portions of the watershed. For water quality assessments, the river is divided into three segments. All three segments are listed as impaired for various pollutants.

Segment	Pollutant
Headwaters to Hope Valley	Nitrate, Phosphorus, Sulfates, TKN
Hope Valley to Woodfords	Chloride, Nitrogen, Nitrate, Sulfates, TDS, Turbidity, Phosphorus, TKN
Woodfords to Nevada state line	Iron, Nitrogen, Nitrate, Sulfates, TDS, TKN, Turbidity, Indicator Bacteria (fecal coliform objective)

In 2007 the Carson Water Subconservancy District (CWSD)—a bi-state non-regulatory agency—authored the Carson River Watershed Adaptive Stewardship Plan, subsequently updated in 2017. The plan was accepted by the USEPA for the Nevada portion of the watershed. The CWSD plan includes recognition of the 303d listed segments within the Water Board’s jurisdiction. The focus of the plan extends beyond water quality, to issues such as floodplain management and other topics germane to the downstream, Nevada watershed.

Water Board staff will supplement the Nevada plan to create a nine-element watershed plan to address the 303d listings in California for acceptance by the USEPA. Having a USEPA accepted watershed plan allows non-governmental organizations, such as Alpine Watershed Group (AWG), to seek 319h funding for watershed restoration and pollution control projects. AWG is a vital and valued partner in this project. Already staff have conducted extensive outreach with key stakeholders and land managers in partnership with the AWG. Staff also collaborated with non-point source program staff from the State Water Board to develop a source assessment of road crossings as one widespread pollution control opportunity. Much of the work that remains will be accomplished by combining existing documents and writing additional sections; both efforts aided by collaborating with CWSD and AWG staff.

One challenge in developing the watershed plan has been staffing. This project was assigned to staff who left state service in May 2021, and the position was not successfully filled until late October. Additionally, AWG has experienced a high rate of turnover affecting ability to work on this project. Still, staff aim to complete the watershed plan by late summer 2022.

4. Bishop Creek Vision Project: Status Report – Ed Hancock

Sections of Bishop Creek, Inyo County, are polluted by fecal indicator bacteria (FIB). These sections of Bishop Creek were 303(d) Listed during the 2018 Integrated Report because of impairment of the Water Contact Recreation (REC-1) Beneficial Use. The impaired sections flow through the communities of West Bishop, the Bishop Paiute Tribe Reservation, and the City of Bishop. The impairment is situated amongst intermixed land uses including cattle grazing, urban and residential development, and rural uses. The Los Angeles Dept. of Water and Power (LADWP) is the primary landowner in the watershed and own most grazed parcels found in the vicinity of the FIB impairment. The Bishop Paiute Tribe (Paiute Tribe) owns 877 acres between West Bishop and the City of Bishop, and land uses on Tribal lands are distributed in similar fashion to the rest of the impaired area. A complex array of irrigation ditches and water conveyances run throughout the lower watershed, including on Bishop Paiute lands. There is a wealth of water quality data collected by a variety of organizations which Water Board staff are using to help address the FIB pollution issues. Addressing FIB in Bishop Creek is important because of the public health risk associated with surface waters polluted with fecal material.

To improve FIB water quality, Water Board staff are developing the [Bishop Creek Vision Project](#). A Vision Project is a water quality restoration plan that is designed to align with the United States Environmental Protection Agency's (U.S. EPA) collaborative framework for implementing the Clean Water Act (CWA) Section 303(d) program called the [Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303\(d\) Program](#) (The Vision). The Vision focuses attention on priority watersheds with known water quality problems and acknowledges a suite of flexible restoration tools beyond traditional Total Maximum Daily Loads (TMDLs). The goal of The Vision is to apply these tools in a manner which will attain water quality restoration and protection.

Drawing on The Vision framework, the Bishop Creek Vision Project is a voluntary plan (Vision Plan) developed together with stakeholders with the goal of reducing fecal pollution to Bishop Creek waters. Reducing this type of pollution will protect public health and ensure REC-1 uses are support in the creek. The completed Vision Plan will be presented to the Water Board in September 2022. Plan implementation and continued stakeholder engagement will continue through the 2020's. Staff are optimistic that the collaborative and voluntary approach to FIB water quality issues in the watershed will result in positive water quality results. However, should this approach prove ineffective, staff will pivot and address FIB pollution with a TMDL.

Data Assessment and 303(d) Listing

Certain reaches of Bishop Creek (Bishop Creek Forks, Bishop B-1 Drain) were recommended additions to the 303(d) List during the 2018 Integrated Report assessment process, which was finalized by U.S. EPA in June 2021. These reaches of Bishop Creek are listed because the REC-1 use is impaired (demonstrated by violations of an *E. coli* FIB water quality objective), and because the Lahontan regionwide fecal coliform objective is also exceeded. Water Board Surface Water Ambient Monitoring Program (SWAMP) collected data was used to support 303(d) Listing. Water Board funded studies also produced microbial source tracking (MST) data which helps staff determine and prioritize sources of FIB. Additionally, the Bishop Paiute and LADWP have produced two very effective datasets. While the Paiute and LADWP datasets were not available for the 303(d) Listing process, these data confirm FIB pollution and are

critical information when determining pollution trends and likely FIB sources in the project area.

Pollution sources

FIB, MST, and land use data reveal six predominant FIB source categories. Source categories have been prioritized as high, medium, and low.

High priority sources are those which have been determined by MST data to be primary drivers of FIB contamination in the creek *and* are sources which are known to contain a higher volume of organisms (i.e., pathogens and viruses) harmful to human health. While many organisms excrete FIB in feces, pathogenicity varies by feces type. Human waste, for example, is more likely to carry infective agents when compared with feces from wildlife, such as mule deer. High priority sources are also prioritized by the potential for control by management actions.

Medium priority sources are those which are potentially less harmful to human health (e.g., waste from goats or sheep) and are sources which MST data does not identify as primary drivers of contamination. Medium priority sources are only present sporadically in the project area when compared with high priority sources.

Low priority sources are those which are either (1) likely not harmful to human health (e.g., wildlife), (2) are difficult or impossible to control (e.g., incidental shedding during recreation activities), (3) are already regulated by other processes (e.g., leaks from sanitary sewer systems), or (4) are source categories which MST data does not identify as a major FIB pollution driver (e.g., wildlife).

Source Categories, likely contributors to those source categories, and the Vision Project priority to address those sources are described in Table 4.1.

Table 4.1: FIB pollution sources in Bishop Creek

Source Category	Source Contributors	Priority
Cattle	<ul style="list-style-type: none"> - Cattle grazing occurring on allotments owned by LADWP and leased to ranchers - Cattle grazing occurring on privately held lots 	High
Human shedding directly to creek waters	<ul style="list-style-type: none"> - Transient encampments - Incidental shedding during recreational activities 	<ul style="list-style-type: none"> - High (transient camps) - Low (incidental rec.)
Horse and other livestock (goat, sheep, chicken)	<ul style="list-style-type: none"> - Small scale horse pasture occurring in West Bishop - Small scale animal husbandry 	Medium
Pet waste	<ul style="list-style-type: none"> - Dog walking 	Medium
Sewage delivered indirectly to creek waters	<ul style="list-style-type: none"> - Leaks from private sewer laterals - Sanitary sewer overflows 	Low
Wildlife	<ul style="list-style-type: none"> - Mule deer - Beaver - Birds - Other 	Low

Based on the available data (FIB, MST, land use) indicating that certain sources of FIB adversely impact to creek waters more than others, and based on the opportunities to

control each source via management actions, the Vision Project is focused on reducing FIB originating from three source categories:

- Cattle grazing
- Human shedding directly to creek waters
- Horse and other livestock grazing
- Pet waste and other associated residential activities

The Vision Project identifies cattle as a predominant FIB source in three ways. First, MST sampling performed under a SWAMP contract found that ruminant waste was the primary source of FIB during sampling. Ruminants include cattle, as well as goats, sheep, and deer. Goat and sheep grazing are not known to occur in the watershed. A small population of mule deer is present in Bishop Creek, but the population is minor compared to that of cattle, which are the predominant ruminant species in the area. Second, *E. coli* data collected by the Paiute Tribe and LADWP show a temporal trend to FIB pollution which begins in April each year and lasts through the summer months. This period corresponds with irrigation water delivery to grazing leases in the project area. Third, the spatial trend in the Paiute and LADWP data shows that FIB often increase downstream of grazing lands during irrigation season. Because cattle grazing is a predominant source of FIB in Bishop Creek, staff have focused on working with cattle ranchers in the project area.

The Project has identified transient communities as another important source of FIB via communications with LADWP, grazing lessees, and the Bishop Paiute Tribe. Human-produced FIB have also been found in small but significant concentrations in MST monitoring. LADWP, the Paiute Tribe, and ranchers have all communicated to Water Board staff that transient communities have increased considerably in the last several years, a trend which has been exacerbated by the COVID-19 pandemic. LADWP regularly performs maintenance work on their properties to discourage transient populations. Bishop Paiute law enforcement also works to address transient issues on Tribal lands. FIB pollution from transient sources is typically a challenge to control but also represent a significant public health risk because of the human origin of this type of pollution. Because of the public health risks associated with human wastes contaminating surface waters, the Vision Project will take steps to reduce this category of pollution.

The Vision Project has also determined FIB originating from horses, small scale animal husbandry, and pets to be a driver of FIB contamination to creek waters. These types of sources present opportunities for control via installation or changes to management practices. For horses and livestock on small, private properties, targeted changes to waste management can have important reductions to FIB delivery to creek water. FIB originating from pets are likely controllable via community outreach and education. All three of these FIB sources will be targets for Water Board staff outreach and education.

Stakeholder engagement

The success of the voluntary and collaborative Vision Project hinges on stakeholder partnerships. Water Board staff have engaged a variety of stakeholder groups during project development. Such groups include the Bishop Paiute Tribe (Paiute Tribe), LADWP, and cattle ranchers operating in the project area. The Paiute Tribe are a sovereign nation and do not fall under the jurisdiction of the Water Board. The Tribe has ownership of 877 acres of land in the center of the Bishop Vision Project area and were the entity who alerted the Water Board to Bishop Creek FIB water quality issues. LADWP is the major landowner in the project area and is the landowner responsible for

administration of grazing leases found in the watershed. Cattle ranchers, many of whom lease grazing allotments from LADWP, are amongst the most familiar with land management in the project area and are a key group to help tackle the water quality issue. Water Board staff have periodically coordinated with representatives from the U.S. EPA to inform them of project progress, seek feedback, and to ensure U.S. EPA support of the Vision Plan strategy for addressing the FIB impairment in Bishop Creek.

Unique among the stakeholder groups that Water Board staff engages with are the Paiute Tribe. Besides their status as a sovereign nation, the Paiute Tribe also holds Treatment as a State (TAS) status approved by U.S. EPA. This status grants Tribes the same authority as States for specific regulatory programs of the Clean Water Act, Clean Air Act, Toxic Substances Control Act, or Safe Drinking Water Act. Such status is not universal – Tribes seeking TAS must meet certain requirements and apply for the status. The Paiute Tribe has TAS status for Clean Water Act section 303(c), which grants the Paiute Tribe the ability to set water quality standards and have them approved by the U.S. EPA. They are also eligible to receive CWA section 319(h) funds to address non-point source pollution that affects waters on Tribal lands. The Paiute Tribe hold ultimate responsibility for water quality issues on their lands, while the State is responsible for ensuring that water quality leaving California meets water quality objectives in this neighboring jurisdiction. Similarly, water leaving Paiute Tribe jurisdiction is required to meet Water Board objectives.

The Paiute Tribe and Water Board staff have developed a solid project partnership in part because of the proactive nature of the Paiute's water quality program. Under the guidance of BryAnna Vaughn, the Paiute Tribes' water quality manager, the Paiute Tribe samples multiple locations along Bishop Creek for *E. coli*, has a well-developed Water Quality Control Plan (Basin Plan), and is actively addressing water quality and other environmental issues on the tribal lands. Staff have met with BryAnna and other representatives of the Paiute Tribe on multiple occasions, both for in-person meetings, and virtually through the COVID-19 lockdowns. Water Board and Paiute Tribe staff have presented together several times – first at the National 303(d) Conference, and later at Tribal Engagement summits and other stakeholder meetings.

LADWP is a pivotal stakeholder for the Vision Project. As the major landowner in the project area administering the leases to multiple grazing allotments, LADWP are instrumental to the success of implementation measures for the project. LADWP has mobilized considerable resources to monitor Bishop Creek and continue to be active partners determined to improve and maintain water quality in the creek. As recently as May 2020, LADWP uploaded their monitoring data to the California Environmental Exchange Network (CEDEN), meaning that these data can be accessed by the public and will be used in future water quality assessments for the creek. LADWP have also deployed several early implementation measures on certain leases, such as installing riparian fencing and maintaining lands to be less attractive to transient communities.

The ranching community operating in the Bishop Creek watershed is a key partner in the success of the Vision Plan. This group has organized under the leadership of Tom Talbot, a retired veterinarian and rancher in the watershed, and Mark Lacey, a cattleman operating in Inyo and Mono Counties with a grazing operation in the project area. Many of those who operate grazing businesses in the project area have met with Water Board staff to discuss approaches to reduce FIB contamination to Bishop Creek waters. In July 2021, project staff met with several ranchers on their grazing allotments in Bishop to discuss the FIB water quality issues, operational issues specific to each lease, and to investigate potential implementation approaches for the Vision Project.

Water Board staff have also engaged and met with the representatives from the Inyo County Water Department, Inyo County Public Health Dept., City of Bishop, Eastern Sierra Community Service District, Eastern Sierra Land Trust, University of California Cooperative Extension (UCCE) Agricultural Dept., Natural Resources Conservation Service (NRCS), and the California Pacific Chapter of the Society for Rangeland Management (CalPac SRM).

During winter 2021/22, Water Board staff, NRCS, UCCE staff, and Bishop ranchers will engage in a Ranch Water Quality Short Course to assess each individual lease and develop a bespoke water quality plan for each lease designed to improve and maintain water quality in the project area.

In advance of presenting the Vision Plan to the Water Board in September 2022, staff will continue to engage with stakeholders in the project area to develop collaborative implementation strategies. Upcoming project work includes developing strategies to address the growing transient population and partnering with the Paiute Tribe to host watershed health meetings to educate the public about best practices for waste disposal from pets, small scale animal husbandry, and other residential gray water sources.

Project schedule

The completed Vision Project document will be presented to the Water Board in September 2022 and subsequently sent to the USEPA for acceptance. After the plan is accepted by the Water Board, staff are prepared for a three-year period to deploy planned implementation actions. Implementation will include efficacy monitoring, a five-year progress review, continuing adaptive management through the life of the project, and a ten-year progress review.

5. **Lahontan Water Board Response to 2021 Wildfires – *Lahontan Post-fire Response Team***

Overview of Wildfires in the Lahontan Region and Potential Water Quality Impacts

As of October 1, 2021, wildfires burned approximately 160,631 acres in the Lahontan Region in the 2021 calendar year. The fires with the largest burn acreage in the Lahontan Region were the Tamarack Fire, Dixie Fire, Beckwourth Complex, and Caldor Fire, with several other wildfires contributing to total acreage burned. The Tamarack Fire burned approximately 52,230 acres in the East Fork Carson River Hydrologic Unit (HU), West Fork Carson River HU, and the West Walker River HU and is 82% contained; the Dixie Fire burned approximately 50,899 acres in the Susanville River HU and is 94% contained; the Beckwourth Complex Burned approximately 38,197 acres in the Susanville River HU and is 98% contained; and the Caldor Fire burned approximately 9,889 acres within the Lake Tahoe HU and is 98% contained. Figure 5.1 and Figure 5.2 present the location of the major wildfires within the Lahontan Region in 2021. Figure 5.3 depicts the Caldor Fire burn severity maps within the Tahoe Basin.

Wildfires create threats to water quality and beneficial uses, both directly through landscape alteration and indirectly through actions taken to suppress a fire. These threats include, but are not limited to, the potential discharge of nutrients, sediment, and hazardous materials to surface waters; landslides and debris flows; proliferation of Harmful Algal Blooms and aquatic invasive species through increased temperature and nutrient loading; and potential impacts to municipal water supplies. Observations shared by Water Board staff from regions impacted by fires in the recent past indicate that emergency hazard reduction activities have the potential to exacerbate the water quality that wildfires create. Staff are conducting internal evaluations, guided by information

presented in post-fire reports produced by external agencies, to assess the range of threats posed by wildfires within the Lahontan Region in 2021.

Establishing a Post-Fire Response Strategy and Post-Fire Response Team

In acknowledgement of the imminent and long-term threat to water quality posed by these wildfires, Water Board staff are responding to potential post-fire water quality impacts in a collaborative manner, both internally across units and externally with partner agencies and dischargers. An internal Post-Fire Response Team, comprised of Water Board staff from multiple units in both the South Lake Tahoe and Victorville offices, was created to foster effective communication with external partners, leverage technical expertise, and to ensure that internal work to protect water quality in the post-fire environment is well coordinated. Through guidance established in the Lahontan Water Board 2021/2022 Post-Fire Response Strategy (Response Strategy), the initial efforts of the Post-Fire Response Team will be focused on permitting emergency activities, in-stream monitoring, hazardous debris removal, review of technical post-fire reports, and the identification of funding resources to assist affected stakeholders in recovery efforts that are within the Water Board's purview. Partner agencies that staff are, or anticipate, interacting with include the United States Forest Service (USFS), Tahoe Regional Planning Agency (TRPA), United States Army Corps of Engineers, California Department of Forestry and Fire Protection (CAL FIRE), California Governor's Office of Emergency Services (CalOES), California Tahoe Conservancy, Resource Conservation Districts, National Resource Conservation Service, Nevada Department of Environmental Protection, U.S. Environmental Protection Agency, El Dorado County, and the City of South Lake Tahoe.

Fire Suppression Repair Activities

As containment of wildfires increases, incident management objectives shift to include suppression repair and emergency hazard assessment and mitigation. Water Board staff are responding to threats to water quality, and permitting requirements for suppression and suppression repair activities, through close coordination with public land managers. Staff are coordinating with USFS and CAL FIRE representatives to track suppression repair activities on the Caldor Fire with the intent of providing technical guidance to those suppression repair activities identified as presenting the greatest threat to water quality. Additionally, the federal Burned Area Emergency Response (BAER) and the state Watershed Emergency Response Team (WERT) are two rapid assessment processes used to evaluate imminent post-fire threats to human life and safety, property, and critical natural or cultural resources. Water Board staff participated in the BAER and WERT process for the Caldor Fire and the Tamarack Fire.

Post-Fire Monitoring Discussion

Water Board staff are increasing water quality monitoring in the areas of the Caldor and Tamarack fires and are assessing the needs for additional monitoring related to the Dixie and Beckwourth fires. Water quality monitoring for the Caldor fire includes leveraging the existing Lake Tahoe Interagency Monitoring Program to add additional sampling frequency and analytes at stations downstream of the fire that track nutrient and sediment loading to Lake Tahoe and assisting with funding of water quality laboratory analysis to accompany TRPA funded bioassessment. Staff developed a monitoring plan for the Tamarack fire that utilizes existing SWAMP sites in addition to new sites near the town of Markleeville. The Tamarack monitoring plan has been implemented in collaboration with the Alpine Watershed Group and includes water quality monitoring as well as biological monitoring. Water quality monitoring for this project began in August 2021. The Lahontan Water Board is also contributing funding to

study the influence of wildfire smoke and ash on short and long-term water quality dynamics in Lake Tahoe.

Next Steps

Water Board staff will continue to hold internal Post-Fire Response Team meetings and coordinate externally with key stakeholders and partners through Fall 2021 and into 2022. This initial response phase to wildfires within the region will focus primarily on suppression repairs; determining post-fire monitoring needs and deploying staff and instrumentation to measure impacts from the fires; and tracking/coordinating debris removal activities where known structure loss has occurred. Staff will provide subsequent updates to the Lahontan Water Board on wildfire response within the region in future Executive Officer Reports.

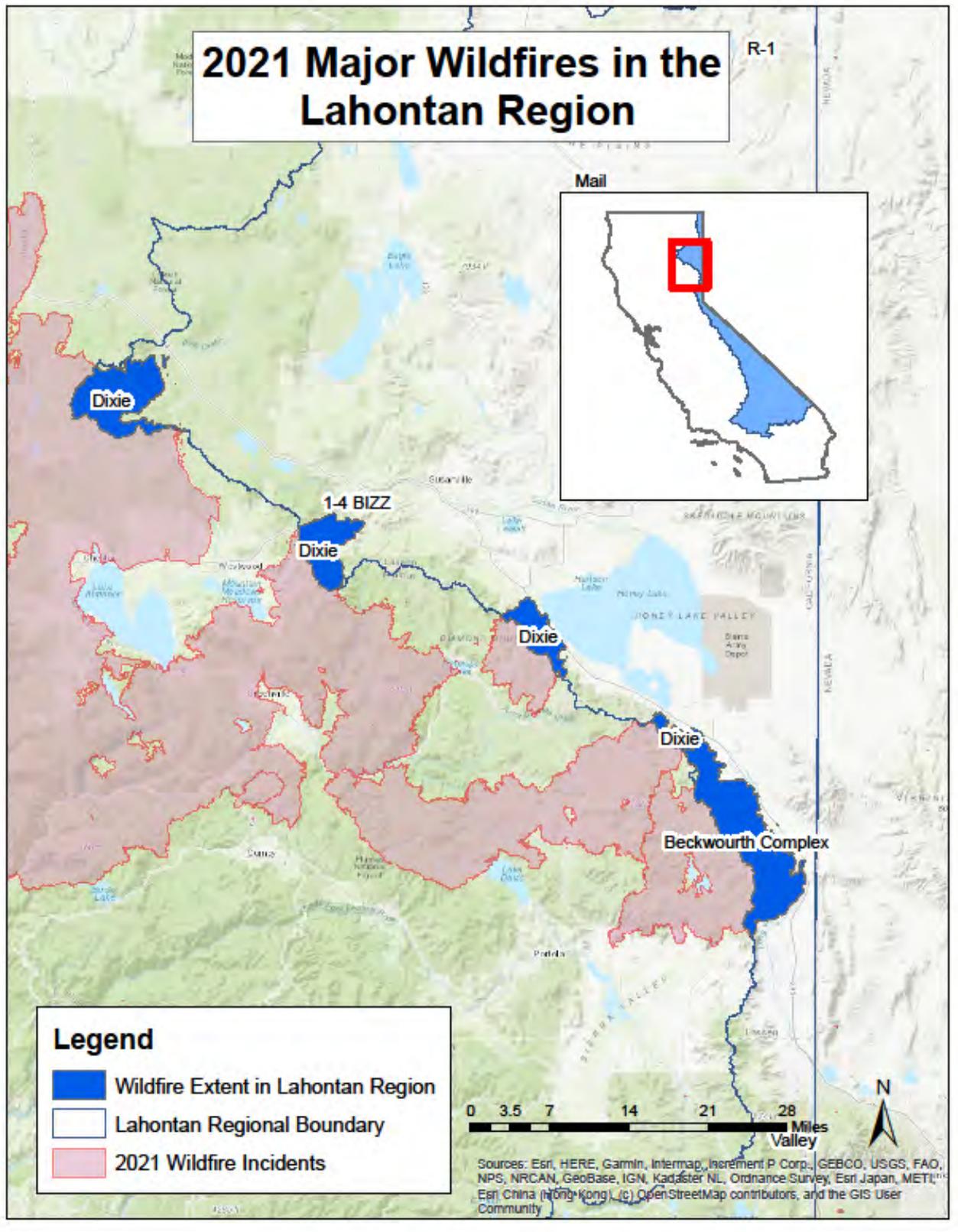


Figure 5.1 – Map of wildfires in the northern portion of the Lahontan Region in 2021

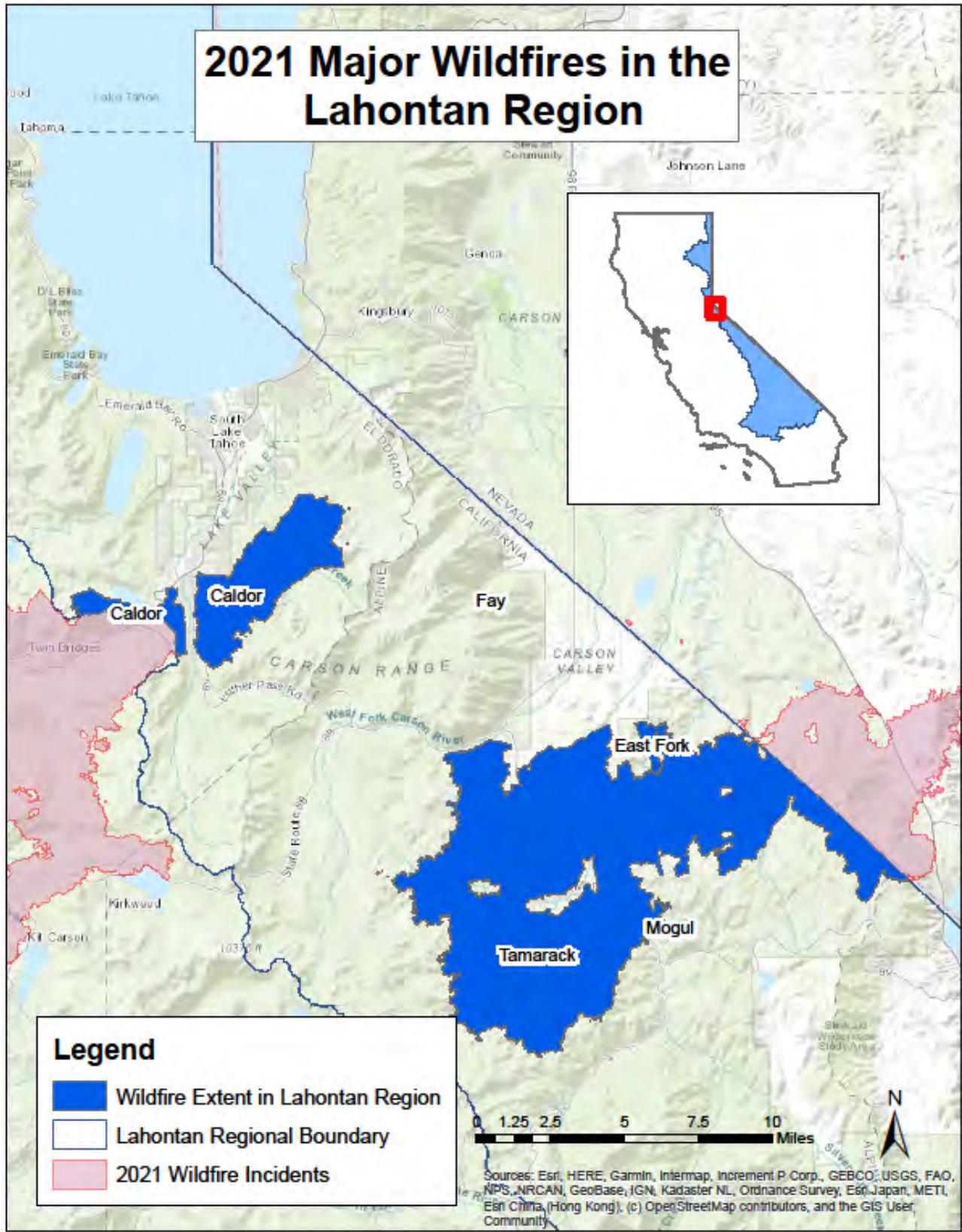


Figure 5.2 – Map of wildfires in the central portion of the Lahontan Region in 2021

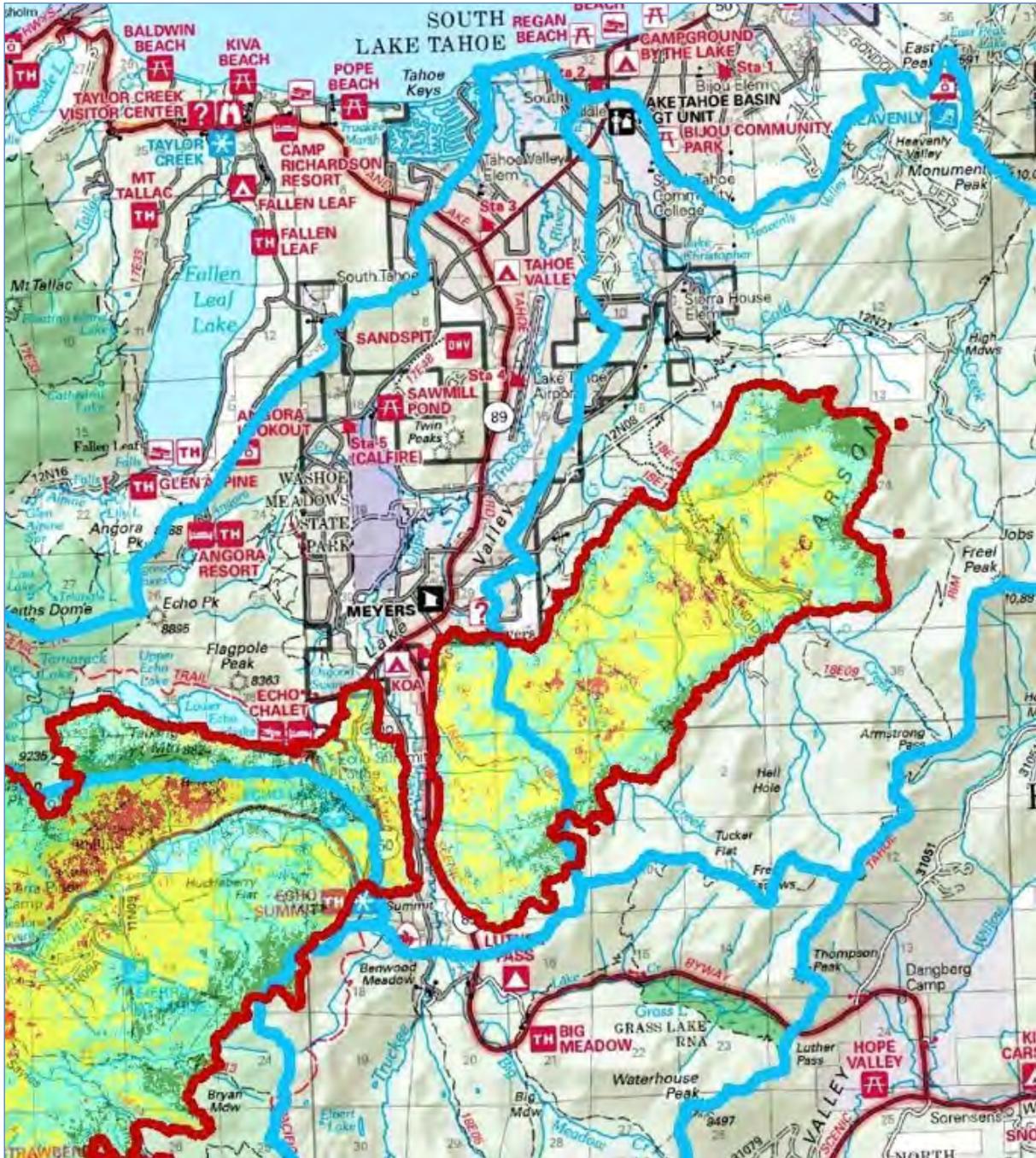


Figure 5.3. Tahoe Basin portion of the Caldor Fire Burn Severity Map.

South Lahontan Region

6. Standing Item - Barstow Perchlorate update September 2021 – Alonzo Poach
Contracting Update

On June 25, 2021, a detailed cost estimate was submitted to the Site Cleanup Subaccount Program (SCAP) at the State Water Resources Control Board. The detailed cost estimate describes the cost of a full-scale, in-situ bioremediation project to remove perchlorate in the source area soils and conduct further groundwater investigation in the Soapmine Road area of Barstow. As of September 30, 2021, the cost estimate and remedial approach have received preliminary approval from SCAP staff. SCAP approved the approach and requested Water Board staff provide some revision to the

detailed cost estimate, due to SCAP by October 15, 2021. The consultant, APTIM Incorporated, is currently working to address SCAP staff's comments and make the requested revisions to the cost estimate.

The Final Feasibility Study/work plan report can be found here:

https://documents.geotracker.waterboards.ca.gov/esi/uploads/geo_report/2878511905/T10000002830.PDF.

Plume Monitoring Update

In July 2021, Water Board staff collected 32 groundwater samples from Soapmine Road area residential supply wells and groundwater monitoring wells. Samples were analyzed by Babcock Environmental Laboratories for perchlorate. Samples collected from residential wells ranged in perchlorate concentrations from 0.44 micrograms per liter ($\mu\text{g/L}$) to 580 $\mu\text{g/L}$. Samples collected from groundwater monitoring wells ranged in perchlorate concentrations from 0.37 $\mu\text{g/L}$ /L to 1500 $\mu\text{g/L}$. Based on groundwater monitoring data collected since 2013, we estimate the perchlorate plume to be moving from 1 to 1.5 feet per day. Concentration trends generally show decreasing concentrations near the source area property and increasing trends south of Interstate Highway 15. Decreasing trends near the source area are likely attributed to dropping water levels and the soil removal action that took place in August 2011; this removal action was conducted by the United States Environmental Protection Agency and removed approximately 833 cubic yards of perchlorate-impacted soil and installed a plastic liner over impacted areas to minimize infiltration. Water levels have dropped approximately 20 feet from 2011 to present time in the source area.

Currently, 18 residential supply wells are impacted over the perchlorate maximum contaminant level of 6 $\mu\text{g/L}$. The Water Board can provide bottled water to residents who qualify based on low-income status. Currently, the Water Board provides bottled water to five residents who qualify for replacement water.

Figure 6.1 shows the updated approximate extent of the plume as of third quarter 2021. Staff is scheduled to collect approximately 50 groundwater samples in October 2021 from both residential supply wells and groundwater monitoring wells.

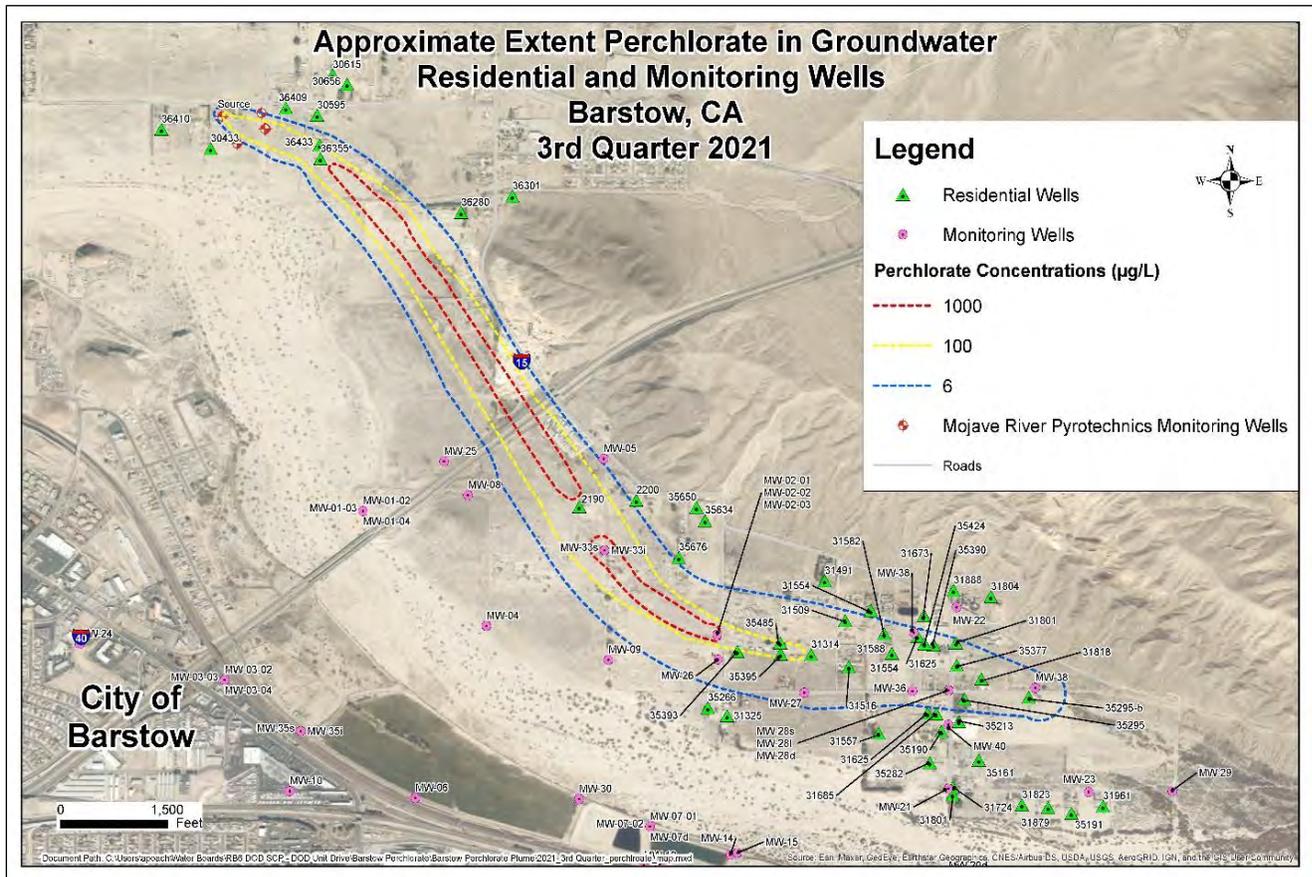


Figure 6.1: Map of the Barstow Soapmine Road area showing the delineation of the perchlorate plume at this site as of third quarter 2021.

7. Standing Item – Sanitation Districts of Los Angeles County, District No. 20 Palmdale, Groundwater Nitrate Site Clean Up Project – John Yu

This standing item describes the Sanitation Districts of Los Angeles County, District No. 20 Palmdale's (District's) continued efforts to cleanup nitrate polluted groundwater resulting from historical effluent discharges. The groundwater nitrate pollution is the result of the Facility's previous use of unlined oxidation ponds and land application of wastewater effluent. The District maintains an expansive monitoring network consisting of 36 monitoring wells, four extraction wells, and three supply wells.

Cleanup and Abatement Order

On November 12, 2003, the Water Board issued Cleanup and Abatement Order (CAO) No. R6V-2003-056 to the District requiring the following five major actions:

- 1) Plume Delineation – Elevated concentrations of nitrate in groundwater must be delineated to background levels by August 15, 2004.
- 2) Plume Containment – The District is required to achieve plume containment by September 30, 2005.
- 3) Plume Remediation – The District must implement a remediation action plan by September 15, 2005. This plan must identify proposed extraction well locations, volumes of groundwater extraction, irrigation re-use areas, types of crops for cultivation, or identify equally acceptable methods of remediation actions to achieve compliance.

- 4) Abatement – Abatement actions such as treatment plant improvements and increased acreage of land must be implemented to reduce total nitrogen in treated water that is discharged to groundwater.
- 5) Reporting – Beginning January 15, 2004, the District must submit quarterly reports until remediation actions are complete.

Nitrate Plume Delineation

The District has delineated the nitrate plume. Declining groundwater levels have caused several monitoring wells to go dry prompting the District to replace and install new wells. While the average depth to groundwater in the vicinity of the Agricultural Site varies from 330- to 498-feet below ground surface (bgs), the average rate of groundwater elevation decline varies from 2- to 6-feet per year across the site due to regional groundwater pumping for municipal and agricultural demands. Based on data collected from the District's groundwater monitoring well network, Water Board staff have identified three areas of concern (see Figure 7.1) to watch:

- Area A - Domestic supply wells to the north of Avenue M,
- Area B - Air Force Plant 42's drinking water supply well owned by Northrup-Grumman (a major aerospace manufacturer) to the west, and
- Area C - Palmdale Water District's supply well field to the southwest.

Nitrate Plume Containment

Figure 7.1 also shows that the east-west extent of the nitrate plume since 2007 has decreased, while the north-south extent of the plume appears slightly elongated. Recent interpreted data indicates that the nitrate plume distribution in 2019 is nearly the same in 2021 and the nitrate plume does not appear to be migrating downgradient. The decrease in the plume's width can be attributed to ongoing natural attenuation, actions taken by the District to eliminate the source, and, to a limited extent, nitrate reduction through groundwater extraction operations. The apparent increase in the plume's length is due to the installation of an additional monitoring well in 2014 to the north of the site closing a data gap. Because nitrate concentrations were detected at greater than the maximum contaminant level (MCL) in this well, additional monitoring wells were installed in 2017 and 2018 to fully delineate the nitrate plume in this area.

Nitrate Plume Remediation

Since 2007, the District has operated a groundwater extraction system as part of its interim cleanup strategy to remediate nitrate polluted groundwater. As shown on Table 7.1, the efficiency of the extraction system since 2017 remains steady. The average mass of nitrate removed per million gallons of water pumped was approximately 30 lbs/MG from 2017 to 2020, whereas from 2007 to 2016 it was approximately 33 lbs/MG. This suggests that the groundwater extraction system continues to operate as intended. Although total mass removal of nitrate has decreased over time, this is expected as nitrate concentrations and plume area have decreased and shifted over time, and some extraction wells have been taken off-line. Since nitrate concentrations and plume removal is stabilizing, Water Board intends to work with the District to explore transitioning from the current interim extraction strategy to a long-term remedy. One option is to consider natural processes as final solutions following the Water Board guidance on the application and implementation of a [Monitored Natural Attenuation](#) approach.

Table 7.1. Extraction performance since 2007

Year	Total volume of groundwater extracted (MG)	Total mass of nitrate removed (lbs)	Average mass of nitrate removed (lbs/MG)
2007 ^a	179	5,859	32.7
2008 ^a	156	5,580	35.8
2009 ^a	151	5,201	34.4
2010 ^a	241	7,767	32.2
2011 ^a	214	6,687	31.2
2012 ^a	171	7,524	44.0
2013 ^a	146	5,367	36.8
2014 ^a	174	5,155	29.6
2015 ^a	132	3,662	27.7
2016 ^a	113	2,718	24.1
2017 ^b	63	1,916	30.4
2018 ^b	77	2,282	29.6
2019 ^b	81	2,209	27.3
2020 ^b	77	2,365	30.7

a: Operated six extraction wells (EW-1, EW-2, EW-3, EW-4, EW-5, and EW-6)

b: Operated four extraction wells (EW-1, EW-2, EW-4, and EW-6)

Abatement

Upgrades to the District's wastewater treatment plant have been the most effective action and have produced an effluent quality with an annual average total nitrogen concentration of under 10 mg/L. Lined storage reservoirs were constructed to contain excess effluent produced during the winter; and the agricultural operation was expanded to irrigate crops at agronomic rates enabling nitrogen removal by the crops. The Water Board acknowledged these improvements by issuing revised Waste Discharge Requirements, Board Order No. R6V-2011-0012.

The District's abatement efforts include the operation of a 2,860-acre Agricultural Site with nitrogen removed by harvested fodder crops. The Agricultural Site is leased from the City of Los Angeles World Airports (LAWA).

In 2015, the Water Board allowed groundwater from the District's extraction wells to be used on the fields of a neighboring sod farmer, a tenant of LAWA.

Reporting

The District continues to submit the required quarterly and annual monitoring reports to GeoTracker in accordance with the CAO and other orders issued by the Water Board. In addition, LAWA also submits agricultural monitoring reports to document best management practices for other tenants on their property.

Groundwater Monitoring Wells Installation

On September 4, 2020, the District submitted a groundwater monitoring well plan to construct, develop, and sample two replacement wells in Area B and Area C. The locations for the replacement monitoring wells are shown on Figure 7.2 as MW20R and MW68. Construction of these two wells were completed as of July 2021. The locations were selected in response to groundwater levels falling below the well screen interval of existing monitoring wells.

The District and Water Board staff collected initial groundwater samples on August 31, 2021. Laboratory results for nitrate samples from wells MW20R and MW68 are 10 mg/L and 2.7 mg/L, respectively.

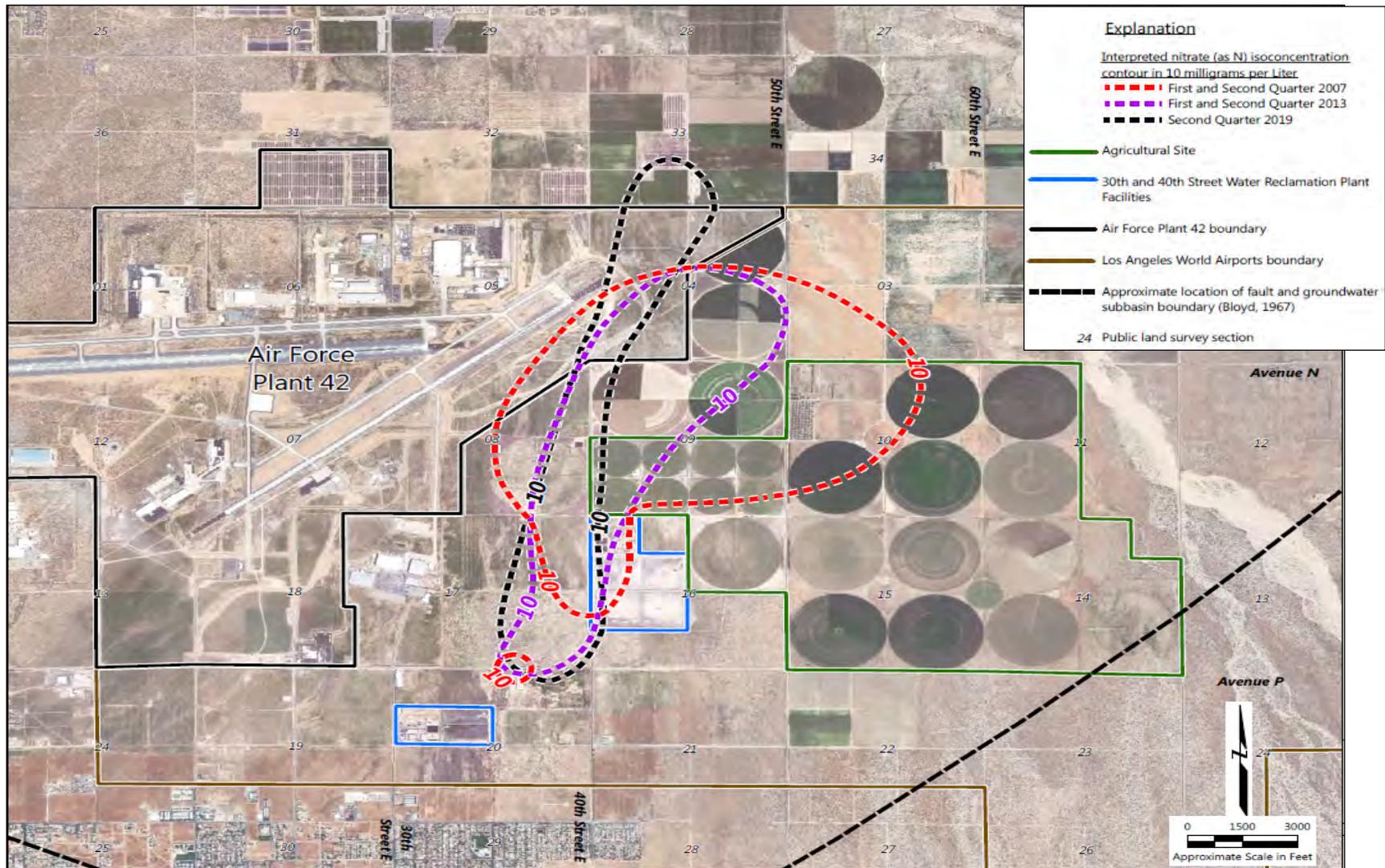


Figure 7.1: Interpreted distribution of nitrate as nitrogen in groundwater for 2007, 2013, and 2019. The size of the nitrate plume in 2021 is similar to the size of the plume in 2019, as shown in this figure.

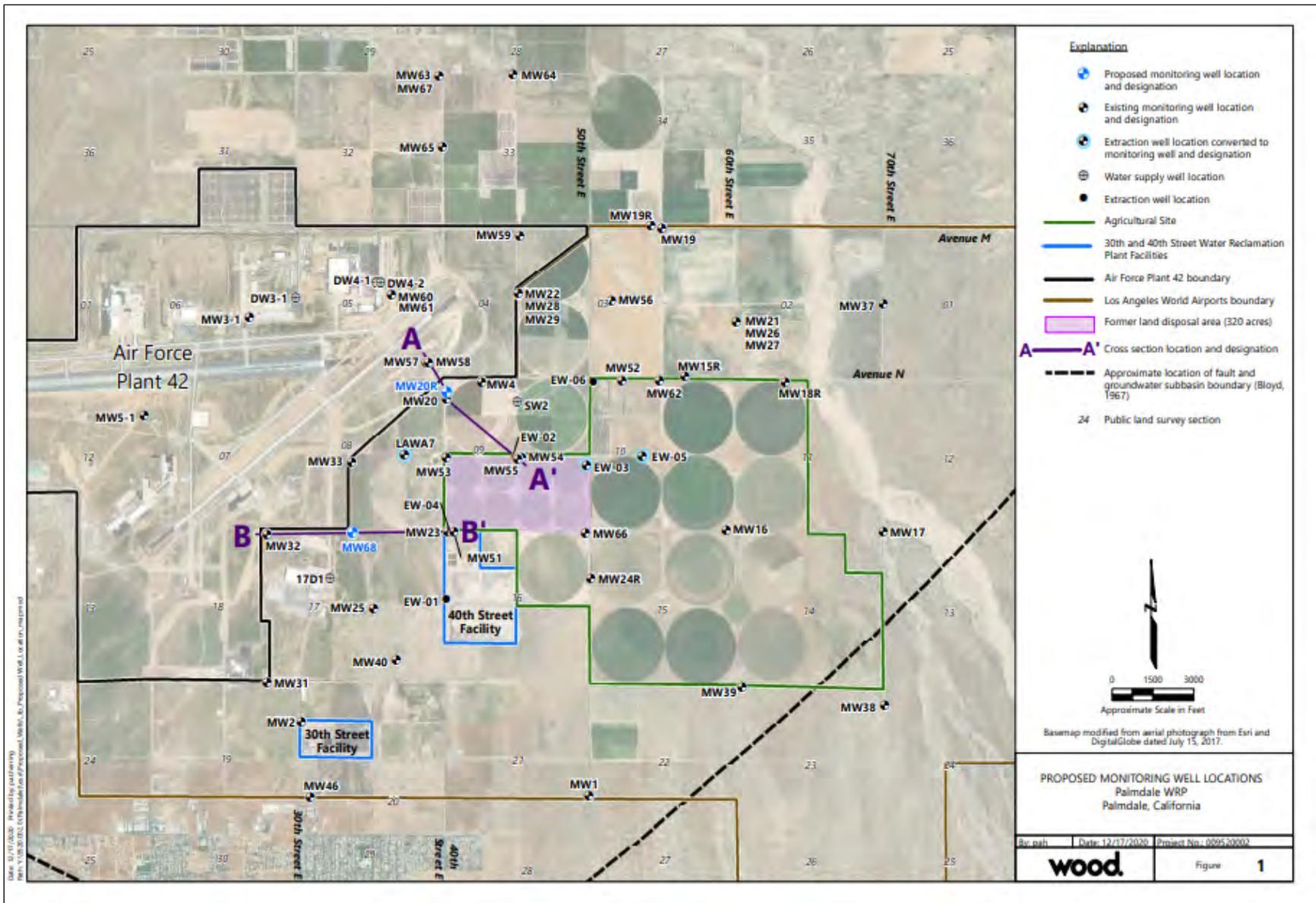


Figure 7.2: Monitoring wells MW20 and MW68 replacement well locations.