EXECUTIVE OFFICER'S REPORT
July 1, 2021 – July 31, 2021

Contents

State and Regional

1. Personnel Report – *Sandra Lopez*

New Hires

- Andrew Robinson, Environmental Scientist, Land Disposal Unit, Victorville. This position will provide regulatory oversight of dredge and fill permitting and compliance of Caltrans projects regionwide.

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.
- Water Resource Control Engineer, Regulatory and Enforcement Unit, South Lake Tahoe. The position will provide support for Wastewater and NPDES permitting work.

- 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.

Departures

- Christopher Spellman, Scientific Aid, Cleanup/Site Investigation Enforcement, South Lake Tahoe.

North Lahontan Region

2. Standing Item - Leviathan Mine, Alpine County – *Leviathan Unit*

Water Board staff continues coordinating with United States Environmental Protection Agency (USEPA), Atlantic Richfield Company (AR), and project stakeholders (including the Washoe Tribe of Nevada and California, Nevada Division of Environmental Protection, and the United States Forest Service) for the completion of current and proposed work at Leviathan Mine.

Leviathan Mine Background

Leviathan Mine is an inactive mine located on the eastern slope of the Sierra Nevada Mountains in Alpine County, California. The mine is approximately six miles east of Markleeville, California and five miles west of Topaz Lake, Nevada. Historical mining activities at Leviathan Mine included underground and open pit extraction of sulfur-rich ore. These activities resulted in the exposure of naturally occurring sulfide minerals to air and water. This exposure triggers a series of chemical reactions that causes the local groundwater to become acidic and metal-rich. The discharge of the acidic and metal rich groundwater out of the ground is referred to Acid Mine Drainage (AMD). At Leviathan Mine, AMD discharges from an old mine tunnel and then seeps at several locations within the mine property. When AMD enters local surface water bodies, it adversely affects water quality, which, in turn, affects algae, insect, and fish growth, and damages the in-stream habitat.

The State of California acquired Leviathan Mine in the early 1980s to address water quality problems caused by historical mining. Since acquiring the mine property and on behalf of the State of California, the Water Board has implemented several projects to abate adverse impacts caused by the discharge of AMD from the mine to local surface water bodies. In 1985, the Water Board completed construction of a pollution abatement project at Leviathan Mine to address specific problem areas. This project included the construction of AMD storage and evaporation ponds. These ponds remain an important

component in the Water Board's ongoing program to prevent the discharge of untreated AMD from the mine site.

In 1999 the Water Board assembled a Pond Water Treatment (PWT) system on the northeast corner of one of the evaporation ponds (Pond 1) and tested a process that neutralizes AMD and significantly reduces the concentrations of metals in the AMD. The Water Board has continued to operate this same treatment system during the summer months from 2000 through 2021. The typical Water Board field season at Leviathan Mine runs from mid-June through mid-October.

On May 11, 2000, USEPA placed Leviathan Mine on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List, thus making Leviathan Mine a federal Superfund site.

Atlantic Richfield Company (AR) has been directed by the USEPA to operate two additional treatment plants at Leviathan Mine that treat water from other AMD sources.

Early Final Remedial Action

Under CERCLA, Early Final Remedial Actions (EFRA) can be implemented as a means to achieve significant risk reduction, address immediate risks to human health and the environment, or to control migration of contamination before the sitewide Remedial Investigation/Feasibility Study is completed. For the last 18 months, Water Board staff has been coordinating with USEPA and AR on the development of an EFRA that would implement year-round capture and treatment of the five main sources of AMD at the mine site. The discussions between USEPA, AR, and Water Board staff regarding the EFRA are ongoing. A milestone in the EFRA process is the preparation of a Focused Feasibility Study. Under CERCLA, the Focused Feasibility Study is intended to document the objectives of the EFRA, identify the Applicable, or Relevant and Appropriate Requirements (ARARs), identify and screen technologies, and evaluate alternatives. AR was to make available to the project stakeholders a draft Focused Feasibility Study for the EFRA by March 31, 2021, however that document was not submitted and is now expected during the summer of 2021. Project stakeholders include, but are not limited to, the following parties: Water Board, Washoe Tribe of Nevada and California, United States Forest Service, and the Nevada Division of Environmental Protection.

2020 Pilot-Scale Testing for the EFRA: During the 2020 field season, and in support of the Focused Feasibility Study for the EFRA, AR completed field pilot-scale testing of a particular process for the treatment of AMD known as High Density Sludge (HDS) Treatment. HDS Treatment has had great success throughout the world for the treatment of AMD for metal removal and pH adjustment but has not been successfully demonstrated at Leviathan Mine for the combined treatment of the five main AMD sources that are to be addressed by the EFRA. It should be noted, AR does operate a full-scale HDS Treatment at Leviathan Mine for the treatment of the AMD from two of the five main sources at the site, but that system was unable to successfully treat a combination of the five main sources of AMD at the site during a full-scale demonstration test conducted in 2017.

Similar to the simple lime treatment process provided by the Water Board's PWT system, the HDS process involves the controlled mixing of AMD and lime to raise pH and to cause metals to precipitate out; however, the HDS process differs from simple lime treatment by continuously recycling a portion of the AMD/lime mixture back into the treatment process. This recycling process has been shown to improve metals removal and to generate sludge with higher density.

Water Board staff observed AR's pilot plant operations, and AR conducted weekly meetings to update interested parties including USEPA and the Water Board, on the progress of the testing. AR previously expected to issue a draft report of findings on the pilot-scale testing in January of 2021, however the final report for the pilot-scale testing is now expected to be submitted after the draft Focused Feasibility Study for the EFRA. Findings of the pilot-scale testing will be of critical importance to the Water Board as it will likely shape the direction of future water treatment efforts at the mine. Under the *Leviathan Mine Site Work and Cost Allocation Settlement Agreement*, the Water Board and AR will share the costs for design, construction, and operation/maintenance of Remedial Actions at the site, such as those contemplated by the EFRA (i.e., year-round capture and treatment of the five main sources of AMD at the site). Although the costs for design, construction, and operation/maintenance are shared, the work falls 100 percent on the Water Board. Water Board staff has begun strategizing for future Budget Change Proposals to cover upcoming design and construction activities to implement the EFRA.

Development of Potential Effluent Limits for EFRA: Water Board staff are evaluating potential effluent limits for a treatment system implemented as part of the EFRA to provide year-round capture and treatment of the five main sources of AMD at the mine. These effluent limits are being developed using the effluent data from the Water Board's PWT system, AR's existing HDS Treatment Plant, and AR's recently completed pilot-scale testing. The State Implementation Plan (SIP) is a State Water Board policy that applies to discharges of toxic pollutants into the inland surface waters of California subject to regulation under the State's Porter-Cologne Water Quality Control Act and the federal Clean Water Act. The SIP establishes a standardized approach for permitting discharges of toxic pollutants to non-ocean water surface waters in a manner that promotes statewide consistency.

As part of the Leviathan Mine Superfund cleanup managed by USEPA, the Water Board has identified the SIP as a substantive state law requirement, also known as an ARAR. The use of the SIP to develop effluent limitations will provide substantive compliance with state law as well as the federal Clean Water Act and associated National Pollutant Discharge Elimination System (NPDES) regulations for the proposed discharge. In addition, Water Board staff utilize flow and water quality data from Upper Leviathan Creek to ensure compliance with the State and Federal Anti-Degradation policies. In this case, establishing effluent limitations may allow degradation up to the applicable water quality objective or objectives and still provide for the reasonable protection of beneficial uses in compliance with state and federal law. In pertinent part, the State's Anti-Degradation Policy notes that the existing high quality of water will be maintained until it has been demonstrated that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial

use of such water, and will not result in water quality less than prescribed in State Board and Water Board policies. The State's Anti-Degradation Policy also requires that for any activity that produces or may produce a waste or increased volume, or concentration of waste, and which discharge or proposes to discharge to high quality waters, will be required to meet waste discharge requirements that will result in the best practicable treatment or control of the discharge necessary to assure that (1) a pollution or nuisance will not occur; and (2) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Sitewide Remedial Investigation and Feasibility Study

Groundwater Report: On May 14, 2020, AR submitted to the Water Board an evaluation of groundwater conditions for Leviathan Mine. The evaluation puts forth a conceptual groundwater model based upon various data from the site. Following initial input from USEPA and Water Board staff, AR issued a revised draft of the groundwater evaluation on August 19, 2020. Water Board staff met with representatives from AR and the USEPA on October 19, 2020, to discuss the revised draft of the groundwater evaluation. In response to items discussed during the October 19, 2020, meeting, and follow-up discussions between Water Board staff and USEPA, AR issued a second revised draft on January 11, 2021.

Water Board staff working with State Water Board Division of Administrative Services staff secured a contract with the Desert Research Institute (DRI) to assist Water Board staff in reviewing AR's groundwater evaluation. DRI representatives prepared comments on the August 19, 2020, and January 11, 2021, revised groundwater evaluations. The Water Board and DRI presented their collective comments and recommendations to the USEPA and AR in May 2021. At this time those comments have not yet been addressed. Thorough documentation of groundwater conditions at the site and the development of a representative conceptual model will be critical components to the sitewide Remedial Investigation and Feasibility Study, and the Focused Feasibility Study for the EFRA.

Settlement Agreement Activities

Water Board staff has continued its efforts to review quarterly cost reports submitted by AR for Remedial Investigation and Feasibility Study activities AR has conducted. Since the time of Water Board staff's last EO's Report in January 2021, Water Board staff has reviewed AR's cost reports and additional information through the fourth quarter of 2020. Issues remain with AR's cost reports for the fourth quarter of 2020, but staff anticipates these issues will be satisfactorily resolved. Staff's review of AR's Remedial Investigation/Feasibility Study costs will continue for the next several years and is a critical element of a complex cost-sharing and accounting system established by the *Leviathan Mine Site Work and Cost Allocation Settlement Agreement* between the Water Board and AR. The Settlement Agreement provides that for every dollar AR spends for Remedial Investigation/Feasibility Study work over $11 million, AR is to receive a 40-cent credit from the Water Board towards the amount AR will have to pay for construction of the final Remedial Action for Leviathan Mine. Through the third quarter of 2020, Water Board staff and AR have come to agreement that AR has

spent $54 million in Remedial Investigation/Feasibility Study costs, putting the credit due to AR for Remedial Action construction costs at approximately $17 million.

Water Board Work Activities for 2021 Field Season

As part of annual field season preparation activities, Water Board staff prepared and submitted the following documents:

- 2021 Work Plan for Leviathan Mine to USEPA.
- Updated Health and Safety Plan for Leviathan Mine with assistance from the State Water Board's Health and Safety Office to USEPA.
- Updated Annual Road Use Plan to the United States Forest Service.

Working under a contract agreement administered on the Water Board's behalf by the California Department of General Services (DGS), AECOM mobilized to the mine site in late June 2021 and commenced assembly of the Water Board's PWT system as well as the disposal of sludge generated by the treatment process. Pond Water Treatment and site maintenance activities are expected to run into September 2021.

Also, during the 2021 field season, on behalf of the Water Board, a consultant will be investigating the structural stability of the concrete channel that carries Leviathan Creek through the mine property. The Water Board constructed this ½-mile long (approx.) concrete channel in 1984. In recent years, Water Board staff has noted areas in which the concrete needs to be repaired. The subject investigation is intended to further evaluate the condition of the concrete and to develop appropriate corrective measures. A report on the findings of this evaluation is expected to be delivered to the Water Board in the fall of 2021.

Water Board staff is also coordinating with DGS on a contract for the construction of various site improvements near the evaporation pond system that will improve site conditions for the implementation of spring treatment, when necessary. This project was advertised for construction bids during the spring of 2021. Unfortunately, DGS did not receive enough bids to award the contract. DGS intends to re-advertise this project for construction during the fall of 2021, or early spring of 2022. These improvements will include regrading/resurfacing of the service road to the area where spring treatment activities are conducted, and construction of a concrete pad to provide a stable service for placing spring treatment equipment. Water Board staff expects completion of project construction by the fall of 2022.

Water Board staff is also coordinating with DGS on a future contract for the design of upgrades to the existing Water Board PWT system. Construction of the upgrades will occur under future contracts in upcoming years.

Tamarack Wildfire

On July 16, 2021, high winds caused a wildfire that started in the Mokelumne Wilderness, to begin spreading rapidly. The Water Board's contractor, AECOM, working at the PWT system, evacuated the mine property when evacuation orders were given for Markleeville, CA on the evening of July 16th. By the morning of July 17, 2021, the fire had reached Markleeville and continued to spread northwest towards Leviathan Mine. Water Board staff monitored the wildfire by attending virtual operations briefings hosted by the Incident Management Team. Water Board staff

were also in contact with USEPA personnel who were coordinating with Incident Command. Fire crews did remove a small amount of vegetation onsite where additional space was needed around buildings and structures to prepare should the wildfire reach the mine property.

The wildfire advanced to within approximately one-half mile north-northwest of the mine property and at times was to the west, north, and east of the property. On August 2, 2021, the USEPA provided the Water Board with permission from the Incident Management Team to safely access the mine, at which time Water Board personnel discovered no impacts to the mine property. As of August 5, 2021, the Tamarack wildfire had burned approximately 69,000 acres and was 78 percent contained, with full containment in the vicinity of Leviathan Mine. Pond water treatment operations are expected to resume on August 9, 2021. During the two weeks while the mine property was evacuated, the AMD sources captured and treated by the Water Board were conveyed to the pond system and did not impact Leviathan Creek. Fire crews remain active in the area looking for hot spots.

South Lahontan Region

3. **Former George Air Force Base, Victorville, San Bernardino County Record of Decision Amendment, Operable Unit 3, Landfill Site Lf044** – *Linda Stone*

The Air Force proposed changing the selected remedy for the former George Air Force Base landfill site, LF044, from land use controls to clean closure through removal and offsite disposal of waste and impacted soil. The remedy of land use controls was selected for Site LF044 in a 1998 Record of Decision (ROD). The Air Force submitted an Amendment to the ROD to document the change in remedy to clean closure without restrictions. Michael Plaziak, Executive Officer, signed the ROD Amendment on July 29, 2021. The ROD Amendment has been sent to the U.S. Environmental Protection Agency for their approval and signature.

The 1.7-acre landfill site is located in the east-central portion of the former base property, at the base of a steep gully that contains an ephemeral wash. The wash discharges to the Mojave River approximately 0.4 mile downgradient of LF044 at a location that is approximately 1 mile south of the Victor Valley Wastewater Reclamation Authority's treatment facility. There is no documentation of the type or quantity of waste disposed at this site. Visible surface debris consisted primarily of construction debris (i.e., concrete, drywall, metal, and wood). Based on groundwater monitoring, the site has not impacted underlying groundwater, which is over 100 feet below ground surface at the site.

Because of the uncertainty regarding the landfill contents, cleanup goals in the proposed ROD Amendment included a broad range of analytes, including volatile organic compounds, semi-volatile organic compounds, dioxins/furans, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons, and metals. The cleanup goals are based on human and ecological risk and threats to groundwater and surface water (i.e., Mojave River).

The Air Force implemented removal and offsite disposal of waste and impacted soil in July of 2020, prior to finalization of the ROD Amendment and the Remedial Action Work

Plan. The implementation of the remedial action prior to regulatory approval of these documents is inconsistent with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. Water Board staff have consistently communicated to the Air Force the risk that its early actions may not satisfy all regulatory requirements, including California Code of Regulations, title 27, requirements for clean closure of landfills. Once the ROD Amendment receives regulatory approval, the Air Force must provide documentation in the Remedial Action Closure Report that adequately demonstrates all the requirements in the approved ROD Amendment have been met. If the regulators determine the requirements have not been adequately met, additional actions would be necessary to achieve site closure with no restrictions.

4. **Lake Arrowhead Community Services District Conducts Dye Tracer Study at Lake Arrowhead** – *Sergio Alonso*

A Dye Tracer Study (Study) was conducted at Lake Arrowhead during December 2019 and results were reported in mid-2021.

In 2010, a similar study was conducted in the Tahoe Keys. To allow the studies to proceed in collecting valuable one-time data and ensure regulatory oversight, in both cases the Executive Officer issued Water Code section 13267 investigatory letters requiring a final data report to be submitted. For the Lake Arrowhead Study, the COVID virus interrupted data analysis after collection, resulting in a one-year delay in submitting a final report to satisfy the requirement.

The purpose of the project was data collection to develop and calibrate a computer model evaluating internal lake mixing effects. The project will also be used to develop guidance for water utilities as they study surface water augmentation of reservoirs by incorporating treated wastewater for indirect potable reuse. The Study was made possible with the cooperation and grant funding of the US Bureau of Reclamation, the University of Nevada, Las Vegas (UNLV), Water Quality Solutions (WQS), the Lake Arrowhead Community Services District (LACSD), and the Arrowhead Lake Association (ALA). This cooperation allowed UNLV to conduct a tracer study and develop a hydrodynamic modeling guidance manual that could be used at other sites nationwide where lake modeling is appropriate.

UNLV first prepared a bathymetry model of Lake Arrowhead showing lakebed elevation contours forming the boundary of the study area (Figure 1). The Study took place between December 2 and 7, 2019, at Lake Arrowhead. Rhodamine Water Tracer (RWT) and sucralose, an artificial sweetener, were used as tracers and injected into the lake (Figure 2). The two tracers are mixed with the lake water at depths of 10 meters when pumped through a diffuser.

Once mixed with lake water, the RWT was measured and tracked as it spread across the lake. RWT monitoring showed that the tracer masses moved rapidly across the lake reservoir within two days. Samples of water containing the sucralose tracer were withdrawn from the lake at designated target depths and analyzed. By the end of the Study period, the RWT and sucralose concentrations had dissipated, returning the lake to background concentrations for these constituents.

The Study results were used to calibrate a three-dimensional hydrodynamic computer model to simulate dilution, diffusion of the tracers in lake water, and assimilation of a hypothetical recycled water influent into the lake. UNLV developed a hydrodynamic model to compute dilutions and tracer travel times for Lake Arrowhead. Additionally, UNLV created a guidance manual for their computer model describing how to use that model in future study applications. The model results were provided to LACSD.

The guidance manual includes recommendations to help water utilities plan and develop their own tracer studies for their respective reservoirs. Some recommendations include the creation of a tracking system to manage all data files created during a tracer study to be retrievable for future review, respond to regulator and stakeholder information requests, and in research for future modeling studies. An archive of technical memoranda and public communications should be archived for future use in other tracer and modeling tests. The model is *not* a one-size-fits-all and will need to be reconfigured and run again based on local conditions and regulations.

These studies are increasingly important as droughts continue to occur and more utilities attempt to augment their drinking water reservoirs with advanced treated recycled water. They will also be helpful in modeling the mixing and dispersion of reuse water in similar locations or in the development of improved models. As water reuse becomes a larger component of water resource planning, the use of these types of models may become more prominent.

LACSD has no immediate plans for an indirect potable reuse project discharging treated wastewater into Lake Arrowhead. Historically, the community has discussed such a project. The results of the Study provide foundational data on mixing effects within Lake Arrowhead and could support a future indirect potable reuse project.

Further studies continue. This summer LACSD, in a cost-sharing partnership with the US Bureau of Reclamation, will study groundwater at the former hillside disposal ponds north of Lake Arrowhead. A one-time test will be conducted injecting a tracer into groundwater to evaluate whether it is feasible to consider indirect potable reuse by groundwater augmentation (percolation).

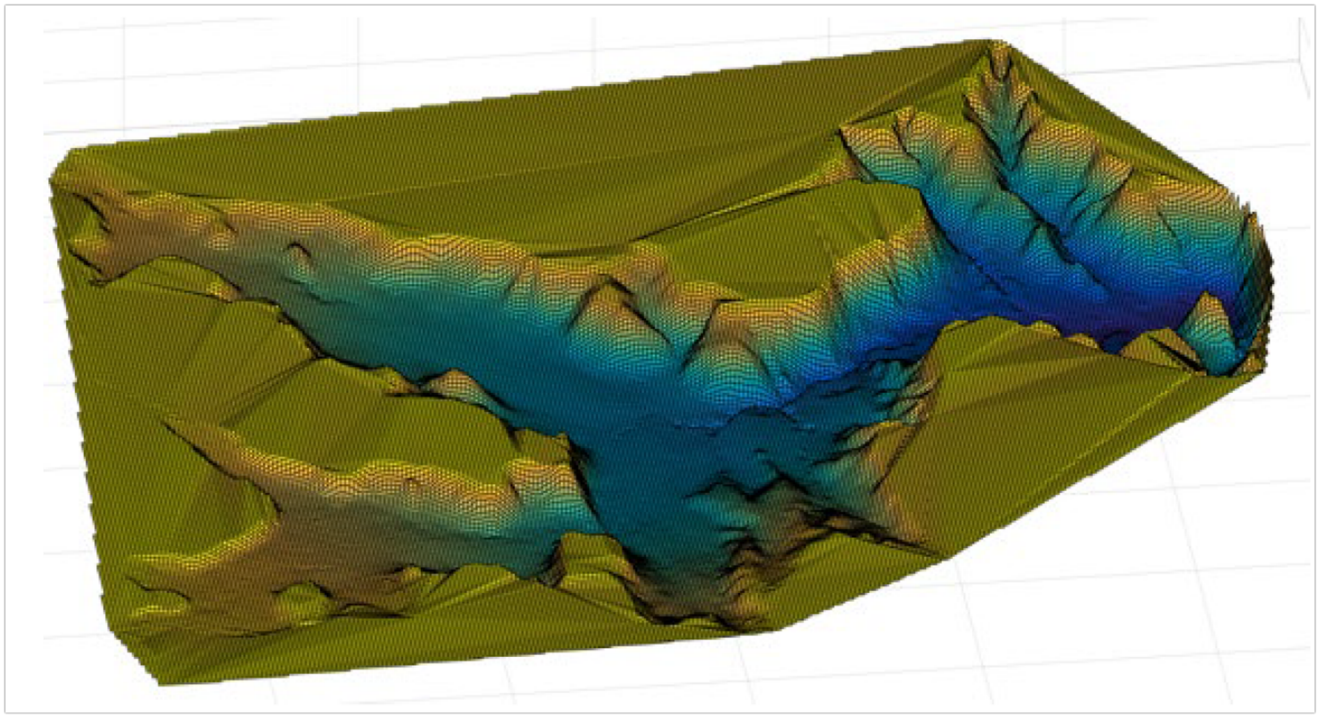

Figure 4.1 – Computer model of Lake Arrowhead bathymetry showing subsurface lakebed elevation contours. This was a necessary step to establish the computer model domain.

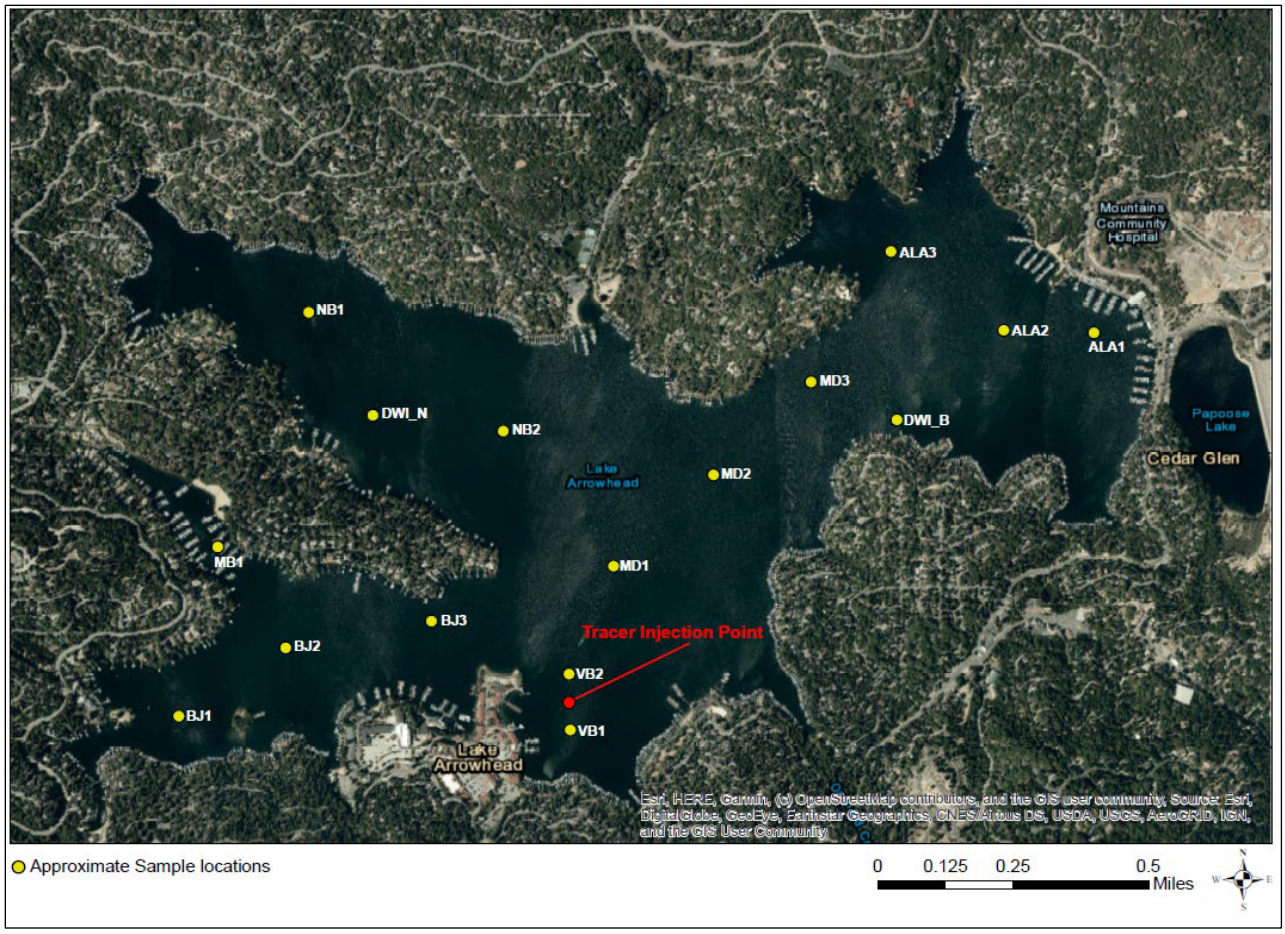

Figure 4.2 – Map of Lake Arrowhead showing the tracer injection location (red) and data collection points (yellow).

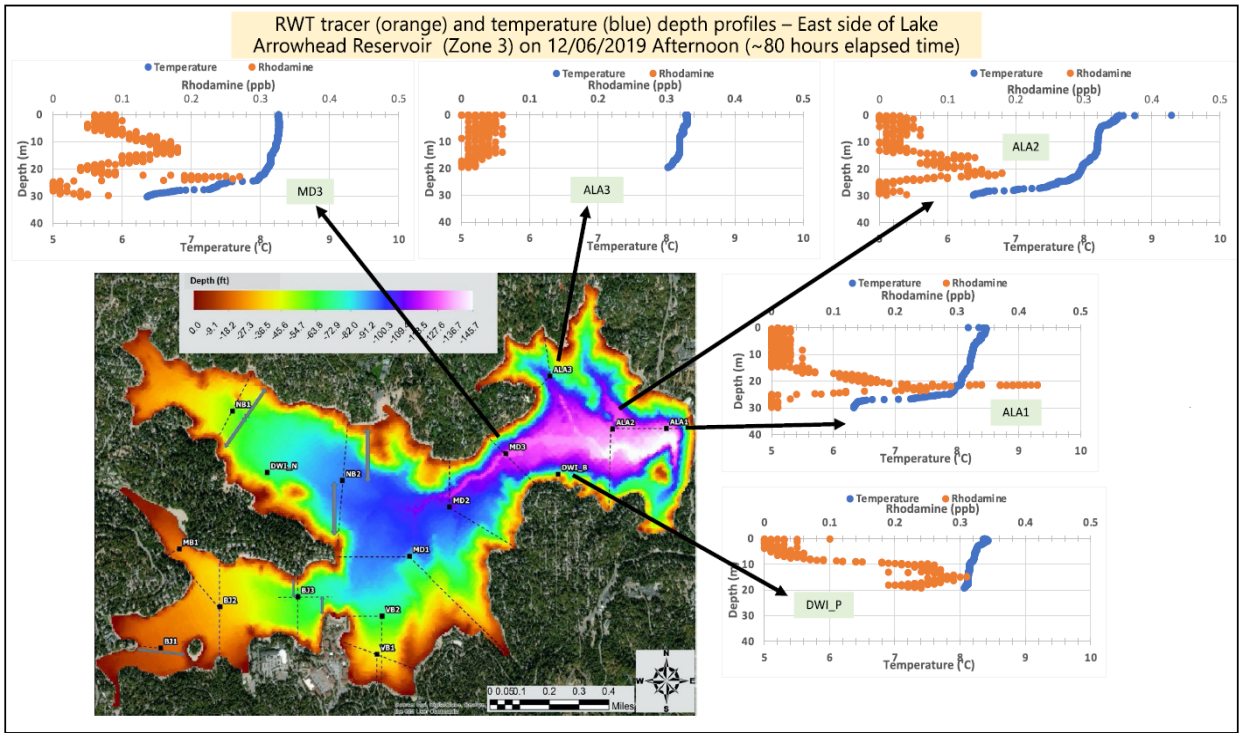

Figure 4.3 – Map of Lake Arrowhead showing lake bottom contours (brown shallowest to white deepest). This figure plots the results of RWT tracer concentrations versus depth along with temperature. Temperatures decrease with increasing depth. RWT tracer concentrations generally increased with depth along the thermocline separating warmer from colder lake water until dissipating over time. This computer model could be used to understand how introduction of recycled water would be mixed into lake waters.