Salinas Reservoir

Water Quality Monitoring Report

Water Year 2022 (October 2021 – September 2022)

San Luis Obispo County

Flood Control and

Water Conservation District

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Key Abbreviations

2° MCL	Secondary Maximum Contaminant Level
Ag	Silver
AF	Acre Foot
Al	Aluminum
As	Arsenic
Ba	Barium
Be	Beryllium
Cd	Cadmium
C	Centigrade
City	City of San Luis Obispo
CCRWQCB	Central Coast Regional Water Quality Control Board
Cr	Chromium
COUNTY	County of San Luis Obispo
WQL	County of San Luis Obispo Water Quality Lab
Cu	Copper
DSAC	Dam Safety Action Classification
DLR	Detection Limit for the purposes of Reporting
DSOD	Division of Safety of Dams
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
Fe	Iron
Ft	Foot/Feet
Hg	Mercury
In	Inch
IRRMP	Interim Risk Reduction Measure Plan
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
mg/L	milligrams per liter
Mg	Magnesium
Mn	Manganese
MPN	Most Probable Number
MTBE	methyl tertiary-butyl ether
Ni	Nickel
No/mL	Number of Organisms per milliliter
NTU	Nephelometric Turbidity Unit
Pb	Lead
SALR	Salinas Reservoir
Sb	Antimony
Se	Selenium
SLO	San Luis Obispo
SOCs	Synthetic Organic Compounds

SQRA	Semi-Quantitative Risk Assessment
SWRCB	State Water Resources Control Board
Tl	Thallium
TON	Threshold Odor Number
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
URS	URS Corporation
US ACE	United States Army Corps of Engineers
VOCs	Volatile Organic Compounds
WTP	Water Treatment Plant
WY	Water Year
Zn	Zinc

Summary

This report has been prepared for the U.S. Army Corps of Engineers (US ACE), Los Angeles District, to summarize water quality monitoring and operations of the SALR by the County of San Luis Obispo (County). The report is for Water Year 2022 (WY 2022), which spanned from October 1, 2021, through September 30, 2022.

Two invasive species native to eastern Europe, quagga and zebra mussels, successfully established in the Great Lakes in the USA in the late 1990s and were discovered in California in 2008. These mussels presented a new threat to water quality and maintenance of the Salinas Dam. In 2006, the County implemented preventative measures to reduce the possibility of introducing invasive mussels into the SALR, including public education, boat inspections, and quarantine procedures. The following rules are currently in place:

1. Only clean and dry boats can launch. Wet and/or dirty boats are denied lake access.
2. Boats leaving the reservoir can have a "clear tag" and cable installed that attaches the boat to the trailer. Returning boats that have intact clear tags and cables are not subject to the inspection.

A program has also been established for invasive mussel monitoring at the reservoir. Trained field inspectors inspect monitoring sites monthly. If suspicious organisms are discovered, then the inspector has been instructed to notify the County's Water Quality Laboratory (WQL). WQL staff will then collect and examine the organisms in question. If the WQL or Lab staff suspect the presence of mussels and are not able to positively deny their presence, the California Department of Fish and Wildlife are contacted for further investigation. If confirmed, actions are taken to protect the dam's infrastructure and prevent the further spread of mussels to other water bodies in the area.

Section 1 Background and Reservoir Description

1.1 Background

Under the Constructing Quartermaster of the United States Army built Salinas Dam in 1941 as a water conservation project to supply water to Camp San Luis Obispo and the City. The construction of the dam formed the SALR. The SALR is located approximately nine miles southeast of the community of Santa Margarita in County of San Luis Obispo, California, near the headwaters of the Salinas River. The dam and appurtenances were declared surplus by the War Department on April 14, 1947. Both the Salinas Dam and delivery system were transferred from the Army to the US ACE.

On July 11, 1947, the US ACE entered an agreement with the San Luis Obispo County Flood Control and Water Conservation District for operation and maintenance of the dam, its reservoir, and related facilities.

In 1988, the County entered a supplemental agreement to their operational lease with the US ACE of Southern Pacific Los Angeles District. The Lease No. DACW09-173-56 supplemental agreement reads:

"The lessee shall evaluate existing water quality conditions within the project and identify any water quality problems. The lessee shall establish an appropriate monitoring program, to be approved by the US ACE of Engineers, to include chemical, limnological, and bacteriological parameters. The lessee shall maintain contact with the Environmental Protection Agency and the Central Coast Regional Water Quality Control Board as to the short and long-term water quality objectives established for the river basin. The lessee shall work closely with all concerned entities to optimize reservoir operation to attain these objectives. The lessee shall keep abreast of any activity in the watershed which may cause water quality problems, such as urban development."

The County established a monitoring program using the guidelines published by the CCRWQCB in the Water Quality Control Plan, Central Coast Basin Plan.

1.2 Description

The SALR, also known as Santa Margarita Lake, was constructed in 1941. A 135-foot-high concrete arched dam forms the reservoir. Immediately following its construction, the reservoir had an estimated storage capacity of 26,000 acre-feet, a surface area of 793 acres, and a drainage area of 112 square miles. Due to naturally occurring siltation, the reservoir capacity has been reduced. The storage capacity is currently estimated to be 23,843 acre-feet with a surface area of 790 acres. The dam structure consists of two intakes with 15-foot adjustable snorkels and a fixed intake for downstream discharge. The reservoir is used as a water supply for the City Water Treatment Plant.

The reservoir captures water from a 112-square mile watershed and is fed by the Salinas River and three tributaries (Alamo Creek, Salsipuedes Creek, and Toro Creek). The Santa Margarita Recreation Area is located on the south shore of the reservoir and provides a local spot for camping, fishing, hiking, and boating. Cattle grazing occurs within the SALR watershed and in many instances grazing animals have direct access to the tributaries to the reservoir. Cattle grazing is not permitted within the Santa Margarita Lake Park and Recreational area. The County terminated grazing permits for grazing area adjacent to the reservoir. Equestrian access is allowed on the Santa Margarita Lake Regional Park trails. Thus, horse manure is a potential source of bacteriological contamination in the tributaries. Body contact recreation is not permitted at the SALR. A portion of the reservoir and shoreline extending approximately one-half mile upstream of the Salinas Dam intake structure is completely restricted from use by the public.

Water is conveyed from the SALR through 48,700 feet (9.2 miles) of 24-inch diameter reinforced concrete pipe to a 3-million-gallon reservoir at the Santa Margarita booster pumping station. The booster pumping station is located near the northerly base of Cuesta Grade adjacent to Highway 101. When the lake elevation is above 1,267 feet, the water is gravity fed from the reservoir to the booster station reservoir. When the reservoir surface

elevation falls below 1,267 feet, a pumping station at the base of the dam is utilized to pump water to the booster station. The pump station includes two horizontal centrifugal pumps capable of maintaining a rated flow of 12.4 cubic feet per second when the water surface elevation falls below 1,267 feet. From the Santa Margarita booster pumping station, three electrically driven horizontal centrifugal pumps are used to pump water through 6,810 feet of reinforced concrete pipe to the entrance of the Cuesta Tunnel portal. The Cuesta Tunnel runs 5,327 feet through the mountains near the Cuesta Grade. From the outlet portal of the tunnel, water is conveyed 5,153 feet to the City's turnout point.

Section 2 Water Quality Management Objective

SALR (Santa Margarita Lake) is operated as a primary water supply for the City of San Luis Obispo. Under an agreement with the US ACE, the County operates and maintains the dam and reservoir to ensure compliance with all Federal and State requirements. The County's overall objective is to maintain the best quality of water in the reservoir, while storing the water for domestic use. The water quality is monitored by WQL personnel and County Water Treatment Operators. Water analyses are performed by the WQL or subcontracted to other certified laboratories. The WQL is certified by the State Water Resources Control Board Environmental Laboratory Accreditation Program (SWRCB-ELAP) as an environmental testing laboratory for bacteriological and chemical analyses of water. The water is monitored to identify potential treatment requirements that may be needed to ensure compliance with applicable Federal and State water quality standards for drinking water. Present and potential uses of SALR include:

- Ground water recharge (GWR)
- Municipal and domestic water supply (MUN)
- Agricultural supply (AGR)
- Industrial service supply (IND)
- Water recreation (REC-1 and REC-2)
- Wildlife habitat (WILD)
- Cold and warm freshwater habitat (WARM and COLD)
- Spawning, reproduction, and/or early development of fish (SPWN)
- Habitat for rare, threatened, or endangered species (RARE)
- Freshwater replenishment (FRSH)
- Boat use (NAV)
- Hydropower generation (POW)
- Sport fishing (COMM)

Water quality objectives for each of the approved beneficial uses above can be found in the Regional Water Quality Control Board's Water Quality Control Plan for the Central Coast Basin and the California Administrative Code, Title 22.

Section 3 Monitoring Program

Sample collection from locations at the reservoir, its tributaries, and reservoir releases are based on the use of SALR as a municipal water supply for City.

The County has established a routine sampling schedule for organic, inorganic, general mineral, lake nutrients, bacteriological, and physical analyses at key locations.

Sample locations include the public restricted area near the intake structure, three public accessible sites on the reservoir (Eagle, Shoemaker, and Point), four inflows to the reservoir (Salinas River, Toro Creek, Alamo Creek, and Salsipuedes Creek), and the two reservoir release sites (V-Notch and the Valve to City). The V-Notch sample site is representative of the water that is released to the downstream Salinas River. The Valve to City sample site is representative of the water delivered to the City's Water Treatment Plant. Since the inflows are seasonal, analytical data for the tributaries may not be available for all sampling events.

To assess the reservoir's water quality, the County, in consultation with the City, has established a sampling and analysis program. Limnological, iron, manganese, algae, odor, turbidity, temperature, dissolved oxygen, pH, and visibility monitoring are conducted monthly at the reservoir intake structure. Monthly data are used to monitor lake turnover and seasonal fluctuations.

Additional sampling and profiling were conducted from May through September. The surface water temperature can be above 20° C during this period and there was an increased potential for nuisance algae to be present in the water. Samples were collected at ten-foot (10') intervals near the dam intake structure and at the three surface si tes located near the dam. These samples were analyzed for temperature, dissolved oxygen, lake visibility, pH, algae enumeration and identification, turbidity, and odor. The data were used to prepare water quality profiles. The profile data were evaluated to identify the intake level with the optimal water quality.

Monthly field inspections of artificial substrates deployed by County staff were performed to monitor for the presence of invasive mussels.

Quarterly samples were collected from the raw water intake, reservoir releases, and any actively flowing tributaries. The samples were analyzed for coliform bacteria, general minerals, and nutrients (nitrate, nitrite, total Kjeldahl nitrogen, and phosphate). During quarterly sampling events, County staff visually inspected the tributaries and reservoir releases were visually inspected for water flow, clarity, wildlife, bank erosion, and urban development.

Annual samples were collected in May for the analysis of trace metals and cyanide. These samples were collected from the raw water intake and the tributaries. Aluminum, arsenic,

copper, iron, manganese, and zinc were monitored more frequently at additional watershed locations. The presence of metals in the reservoir, if any, is most likely the result of erosion of natural deposits.

Every three years, raw water is analyzed for volatile organic compounds (VOCs). A sample was last collected in August 2021. No VOCs were detected. The next sample will be collected in August 2024. EPA has determined that perchlorate meets the State Drinking Water Act's criteria for regulating a contaminant. Perchlorate is analyzed annually.

Map of the sampling locations can be seen in Figure 1. A summary of the water quality monitoring schedule for the SALR is shown in Table 1.

Figure 1: SALR Sample Site Locations

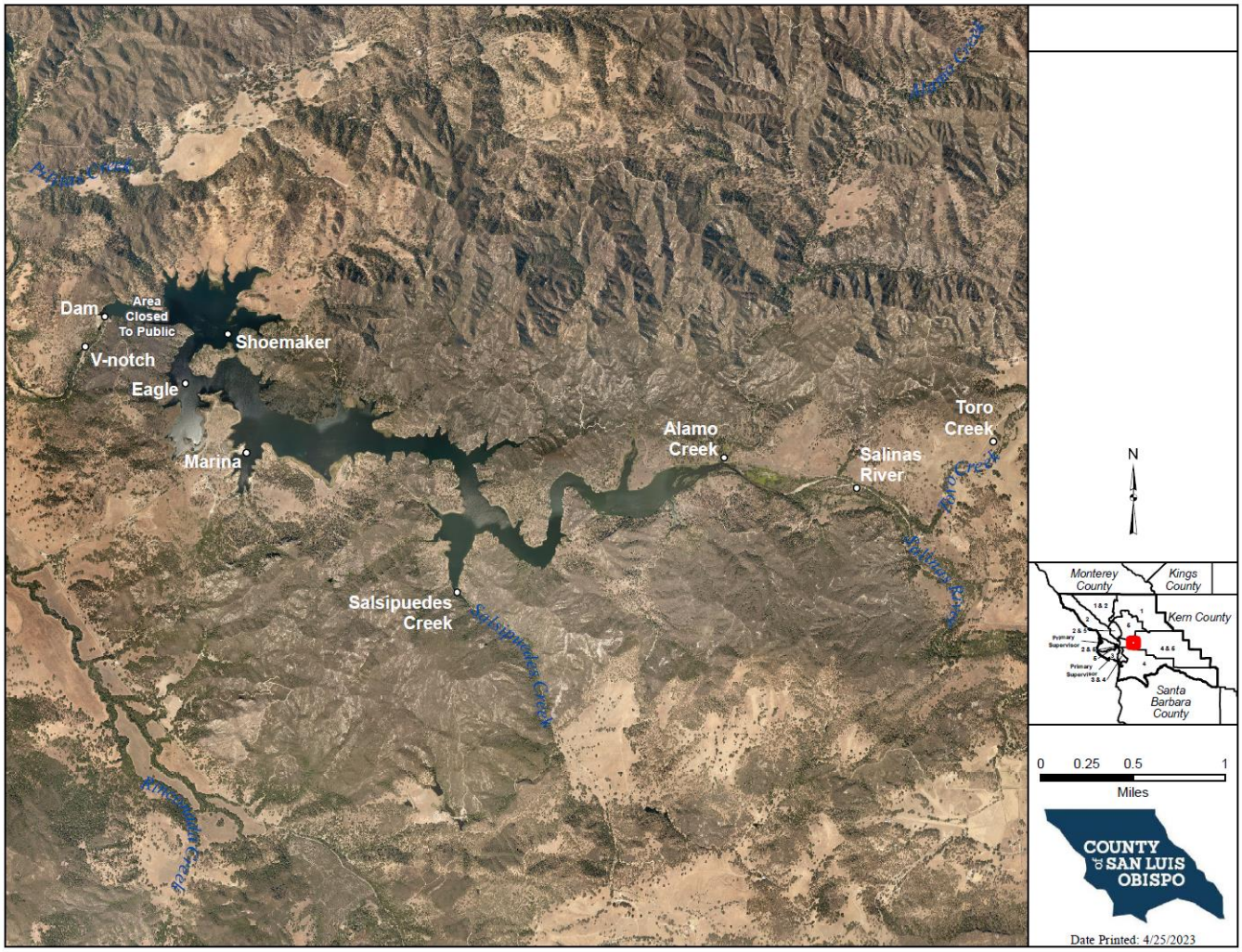


Table 1: Summary of Water Quality Monitoring for SALR

Constituent	Raw Water Intakes	Intake in Use	Reservoir Releases: Valve to City of SLO and V-Notch	Tributaries: Salinas River, Alamo Creek, Salsipuedes Creek, Toro Creek
Temperature	M	M	Q	Q
Dissolved Oxygen	M	M	-----	-----
Visibility	M	M	-----	-----
pH	SM	M	Q	Q
Algae	SM	M	-----	-----
Turbidity	SM	M	-----	-----
Odor	SM	M	-----	-----
Iron	-----	M	Q	Q
Manganese	-----	M	Q	Q
Nitrate, Nitrite	-----	Q	Q	Q
Nitrogen Compounds	-----	Q	Q	Q
Total Phosphate	-----	Q	Q	Q
Bacteriological	-----	Q	Q	Q
General Minerals	-----	Q	Q	Q
Trace Metals and Cyanide	-----	A	A	A
Perchlorate	-----	A	-----	-----
Volatile Organic Compounds (VOCs)	-----	3Y	-----	-----

Monitoring Frequency Key:

M	Monthly
SM	Seasonal Monthly
Q	Quarterly
A	Annually
3Y	Every three years (next due August 2024)

3.1 Limnological

Limnology is the study of the chemical, physical, atmospheric, and biological conditions in freshwater. The County uses limnological data as a monitoring tool to determine the seasonal variability of water quality and to determine the cause of objectionable odors or particulate matter. This data also aids in the evaluation of the possible need for algaecide treatment and the optimum treatment dosage to be used, as well as to select the intake at the SALR that will provide the best quality water. Desirable water quality is typified by sufficient dissolved oxygen levels, pH in the range of 6.5 to 8.5, low algal growth, low odor and turbidity, low bacterial growth, low iron and manganese levels, and water free of other contaminants.

Historical data shows that temperature profiles during the cooler months of November through April are relatively uniform throughout the reservoir intake depths. Limnological data has been collected with varying frequency over the years. Lake profile monitoring is done monthly throughout the year. Monthly sampling events provide County staff with the opportunity to inspect the dam intake area on a routine basis.

Thermal stratification develops in the reservoir when the surface waters warm and decreases in density during the spring and summer months. During stratification, the water separates into a warmer oxygen-rich layer, the epilimnion, found at the top of the reservoir, and a colder oxygen deficient layer, the hypolimnion, found at the lower depths of the reservoir. The layer of water that separates these two zones is called the thermocline. The thermocline at SALR was between 15 and 30 feet below the surface. Thermocline shows a rapid to moderate decrease in temperature, dissolved oxygen, and pH.

The County delivers water to the City WTP from the epilimnion. The water was delivered from a depth of 10 to 15 feet below the surface, as this was considered the best quality water. Due to the placement of valves, water released to the Salinas River is from the hypolimnion. This water tends to be low in dissolved oxygen but is naturally aerated as it is released into the river and continues to flow down the rocky streambed.

Water clarity or visibility is a commonly used measure of lake health. Visibility can be affected by algae, sediment, turbidity and/or watercolor. A Secchi disk is used to measure visibility at SALR. Visibility was moderate to poor throughout most of the year, ranging from 2.5 to 6.5 feet. Temperature, dissolved oxygen, pH, and visibility data can be found in 8.1 Limnology Data in the appendix.

3.2 Nitrogen and Total Phosphate Nutrients

Anthropogenic activities in watersheds may result in excessive plant nutrients (phosphorus and nitrogen compounds) entering a water body. Potential sources of these plant nutrients include runoff from fertilizer application and decaying organic matter. Nutrients can also be absorbed onto sediments that are transported into the water body.

Phosphorus and nitrogen compounds are monitored in water bodies to assess nutrient loading. To maintain a healthy water system and to minimize algal growth, the United States

Environmental Protection Agency (USEPA) recommends that phosphate levels be below 100 µg/L and nitrate levels below 10,000 µg/L. At the beginning of WY 2022 (10/1/21), the SALR was at 57.5% capacity and sustained a stable drawdown throughout the year and ended WY 2022 (9/30/2022) at 51.8% capacity. Nutrient levels remained relatively stable throughout the water year, hitting highs in nitrates and phosphates during peak rains of the wet weather season. Total phosphate levels at the dam intake ranged from non-detected to 170 µg/L, nitrate levels were non-detected to 220 µg/L and total nitrogen levels reached 1600 µg/L.

Summaries of nitrogen and total phosphate data are found in section 8.2 Nitrogen and Phosphate Nutrient.

3.3 Algae

Excessive nitrogen and/or phosphorus compounds in surface waters can cause algae to grow at an accelerated rate and increase the turbidity of the water and decrease the lake visibility. When the algae die off and are decomposed by bacteria, they deplete the oxygen dissolved in the water and threaten aquatic life. This process of eutrophication can result in fish kills, and clogged filters and pipelines. It can also result in complaints from consumers of poor taste and odor. A sudden large increase in algal growth is referred to as an algal bloom. The duration and amount of population growth of an individual algal bloom depends upon various environmental factors including nutrient conditions, temperature, and sunlight. Algal blooms may consist of one or several types of algae and may last a few days to several weeks or months.

The WQL is currently counting and identifying seven different algal groups. These are Blue-greens, Cryptomonads, Diatoms, Dinoflagellates, Flagellates, Goldens, and Green algae. Individual genera are identified for each group to try and understand the effects they have on the reservoir's water quality.

Algae counts vary from year to year and often have a spike in the warmer summer/fall months. For example, the total algae count in August 2022 spiked at 47,000 cells cells/mL including 46,000 cells/mL blue-green algae. Total alga counts reached a minimum in December 2021 with 3 cells/mL.

Oscillatoria is found in the shallow waters of lakes, ponds, ditches, and slow flowing rivers. Oscillatoria tends to be more prevalent in waters that are rich in organic matter during the summer when water temperatures have warmed. In addition to causing taste and odor issues, its presence can lead to clogged filters in treatment facilities. Per the World Health Organization, blue-green algae in large numbers (greater than 20,000 cells/mL) can cause deterioration in water quality and pose a threat to public health. Destruction of blue-green algae cells may release toxins into the surrounding waters, so care must be taken when treating them with chemicals for blue-green algae blooms. During WY 2022, there was no treatment of the lake to control algal growth in the reservoir. See 8.3 Algae Data at Intake in Use.

When triggered by a high total alga count, the County tests for algal toxins using an algal toxin screen test to confirm the presence of Cylindrospermopsin and/or Microcystin in a sample. If either is found to be positive, an ELISA (enzyme-linked immunosorbent assay) screen test will also be performed. During WY 2022, no algal toxins were detected throughout the reservoir.

3.4 Odor and Turbidity

Objectionable tastes and odors in domestic water supplies are often related to the occurrence of algal blooms. Odors at the "intake in use" ranged from 1 TON in October and December 2021, April 2022 to 12 TON in August 2022. Odors in the intake water were described mainly as " Earthy" throughout the year with occasional detection of " peaty," "disagreeable," and "grassy." In previous years, hydrogen sulfide was typically noted in the hypolimnion and below. Due to this consistent characteristic, odor and turbidity data collection was reduced in WY2021 to a smaller range above the usual hypolimnion, from 2 to 30 feet to better demonstrate the representative odor and turbidity qualities of the reservoir. At 30 feet, which was the depth near the hypolimnion and still in the thermocline for most of the year, hydrogen sulfide odors ranged from 1.0 to 100 TON. Turbidity ranged from 1.7 to 7.5 NTU in the "intake in use". Odor and turbidity data can be found in 8.4 Threshold Odor and Turbidity.

3.5 Hydrogen Sulfide

Hydrogen sulfide odor can be detected during the late summer and fall in the hypolimnion where conditions are anaerobic. During WY 2022, hydrogen sulfide levels were not problematic for operating personnel and did not cause any known deterioration of the dam's concrete and metal work. Since the water delivered to the City WTP is obtained from the epilimnion, potential problems associated with hydrogen sulfide are avoided.

3.6 Coliforms

Coliform (in particular, *Escherichia coli*) bacteria levels are routinely monitored as they are an indicator for potential pathogens in the watershed. Samples were collected quarterly for coliform bacteria from the intake in use, tributaries, and reservoir releases. In WY 2022, reservoir intake total coliforms ranged from 50 to 870 MPN/100mL, while *Escherichia coli* (E. coli) MPN ranged from <1 to 4.1 MPN/100mL. Salinas River was dry except for 2/8/22 when the total coliform count was 230 MPN/100mL and E. coli ranged was 15 MPN/100mL. Toro Creek was dry except on 2/8/22 when the total coliform count was 2400 and E. coli was 15 MPN/100mL. Salsipuedes and Alamo Creeks were dry all year. Coliform concentrations are usually higher in the tributaries than in the reservoir and reservoir releases. The most likely causes of this phenomenon are lower water flow, runoff within the watershed, and/or bird, and other animal contamination in the upper tributaries. The water released downstream via the V-notch had total coliform ranging from 820 to 5200 MPN/100mL and E. coli MPN ranged from 1 to 96 MPN/100mL.

Drinking water systems with surface water sources must comply with the Long-Term 2 Enhanced Surface Water Treatment Rule. The rule was established to reduce the risk of disease caused by Cryptosporidium and other microorganisms by identifying the systems at the greatest risk for source water contamination. The rule requires that samples be collected for E. coli or Cryptosporidium. As a permitted community water system treating SALR water, the City is responsible for complying with this rule. The County on the other hand, includes bacteriological analyses in its monitoring program to evaluate general water quality. Coliform data can be found in 8.5 Bacteriological Data.

3.7 Iron and Manganese

To track seasonal fluctuations during WY 2022, reservoir samples were analyzed for iron and manganese monthly from the intake in use. Manganese levels ranged from 7.4 to 120 µg/L. Iron ranged from non-detect to 66 µg/L.

Iron and manganese were monitored from the SALR tributaries and reservoir releases quarterly. The V-Notch sample site is representative of water being released to the Salinas River. Typically, this water is released from the Hypolimnion which has higher levels of iron and manganese. In WY 2022, iron from the V-notch ranged from 57 to 120 µg/L and manganese ranged from 120 to 260 µg/L.

Due to the limited seasonal flow of the watershed tributaries, quarterly samples were taken when there was measurable flow into the reservoir. Alamo and Salsipuedes Creek had no flows in WY 2022. Salinas River and Toro Creek had no flow in three out of the four sampling events in WY 2022. Analytical results for iron and manganese can be found in 8.6 Metals Data.

3.8 General Mineral

General mineral data for WY 2022 was like previous year's data. General mineral data summarized in 8.7 General Minerals.

3.9 Trace Metals and Cyanide

During WY 2022, the Intake and other monitoring sites were sampled once for cyanide and Title 22 "trace metals" Ag, Al, As, Ba, Be, Cd, Cr, Hg, Ni, Pb, Sb, Se, and Tl. The intake site was selected as a representative point within the reservoir that could be used to assess the trace metals contribution from the major creeks.

Because Al, Cu, Fe, and Mn have been detected in the past, these metals were sampled quarterly at the Intake, V-Notch, Salinas River, and Toro Creek. Alamo and Salsipuedes Creeks were dry through WY 2022. Salinas River was dry in 3 out of the 4 sampling events, Toro Creek was dry 2 out of the 4 events and V-Notch was dry only once.

During the annual sampling event for cyanide and Title 22 "trace metals", the concentration of trace metals at the Intake were found to be 2.1 µg/L of Arsenic, and 31 µg/L of Barium. All the other Title 22 metals were less than the detection limit. Iron and manganese results are discussed in 3.7 (Iron and Manganese).

Current plans are to continue the monitoring frequency outlined in Table 1: Summary of Water Quality Monitoring WY 2022 for SALR. The SALR monitoring schedule is reviewed annually and updated as needed. Metals and cyanide results are listed in 8.6 Metals Data for all Sites Monitored in WY 2022.

3.10 Volatile Organic Compounds and Synthetic Organic Compounds

The latest Volatile Organic Compounds (VOCs) were collected in August of 2022. No VOCs were detected. Based on agricultural use data and historical results, the SWRCB waived monitoring for Synthetic Organic Compounds (SOCs) for drinking water systems in this region. This waiver includes atrazine and simazine. In recognition of this vulnerability assessment, monitoring for SOCs in the SALR was discontinued. If the reservoir's vulnerability changes, the need for SOC monitoring will be re-evaluated. VOC monitoring remains on a 3-year sampling schedule. VOC, SOC, and perchlorate data from 2007 to 2021 are summarized in 8.8 VOC, SOC, and Perchlorate Data.

3.11 Perchlorate

California's perchlorate regulation for drinking water systems took effect in 2007 which established a maximum contaminant level of 0.006 mg/L (6 µg/L). EPA has determined that perchlorate meets the SDWA's criteria for a regulated contaminant. That criteria include the possibility of adverse health effects from perchlorate, the detection of perchlorate in 4% of public water systems, and the possibility to reduce the health risk in drinking water. Starting in WY 2010, the Intake has been sampled annually for perchlorate. No perchlorate was detected in 2022. Summary of data can be found in 8.8 VOC, SOC, and Perchlorate Data.

3.12 Total Organic Carbon

The City WTP requested that the monthly TOC be analyzed for one year. One sample was collected from the epilimnion and one from the hypolimnion from June 2013 through June 2014.

3.13 Per-and Polyfluoroalkyl Substances (PFAS)

PFAS are a group of chemicals produced and used for commercial and industrial purposes as well as emergency fire response. They are resistant to degradation and do not break down in the environment. On March 14, 2023, the US EPA announced proposed national primary drinking water maximum contaminant levels for six PFAS: PFOA and PFOS as individual contaminants, and PFHxS, PFNA, PFBS, and GenX as a PFAS mixture.[1] At this time, California has established nonregulatory, health based advisory levels for PFOA, PFOS, PFBS, and PFHxS. PFAS analysis has not been performed at the reservoir at this time. Once regulatory limits are established for drinking water, sampling, and analysis for PFAS will be conducted.

[1] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas.html

Section 4 Creek/Watershed Inspections

During quarterly sampling events, County staff visually inspected the tributaries and reservoir releases for water flow, clarity, wildlife, bank erosion, and urban development. An inspection checklist was completed for each location and photos were taken to help document observations. In WY 2022, the inspections did not note any negative findings. Bald and Golden eagles were sighted as well as other birds and waterfowl, deer, bear tracks, and various insects. The creeks, when flowing, remained free of garbage, and showed little visual evidence of adverse human and/or domestic animal activity.

The area surrounding the reservoir intake structure is off-limits to fishing, hiking, boating, equestrian activity, animal grazing, and other human activities. See 8.9 Creek and Watershed Checklist for an example field checklist.

Section 5 Quagga and Zebra Mussel Monitoring

5.1 Boat Inspections

The discovery of freshwater quagga mussels (Dreissena bugenisis) and zebra mussels (Dreissena polymorpha) in California waterways has prompted the County to establish a monitoring and prevention program for freshwater mussels. The presence of these mussels would present an economic and water quality threat to the beneficial uses established for the SALR.

County Ordinance 3192 authorizes County Parks personnel and/or peace officers to inspect vessels to ensure compliance with Chapter 11.04 (Lopez and Santa Margarita Lakes) of County Code, and any local, state, and federal rules, laws, and regulations, including those pertaining to the health and safety of the visiting public, and the health, safety, and sanitation of the lake.

Since March 2006, all boats entering Santa Margarita Lake have been inspected for the potential transport of invasive mussels. County staff follows standard procedures for the inspection of vessels and provides a summary of the inspection record in a monthly invasive species monitoring report. There currently are no decontamination facilities at Santa Margarita Lake. The inspection procedures are summarized as follows:

- Clear tag: Boats that have been previously inspected and determined to be free from invasive mussels are fitted with a tamper-resistant, wire-clear tag that is attached to both the boat and trailer. Returning boats with an attached clear tag have not been launched in other locations and are clear to enter without an inspection. The County coordinates clear tags between Lopez and Santa Margarita Lakes and Cachuma Lake, in Santa Barbara County.
- 30-day history: Boat owners are interviewed regarding the recent use of the vessel. All boats that have been launched in invasive mussel contaminated waters in the last 30 days are rejected and asked to voluntarily quarantine

their vessels for 30 days from the last contact with contaminated waters before entering any waters of the County.

- Inspection: County Parks staff inspect boats without clear tags. Boats will be rejected and not allowed to launch if it has any of the following:
    - Water in bilge, hull, or any compartment,
    - Water in live well or bait tank,
    - Any non-drained internal ballast system,
    - Any small amounts of the remaining water in an internal ballast system are required to be treated with bleach (see below),
    - Debris or foreign matter on the hull, motor, or trailer,
    - The boat owner refuses inspection.

Internal ballast systems: The internal ballast system common on late model wakeboard boats is not accessible and cannot be completely drained, allowing for longer survival of invasive mussel veligers. The inspection procedure automatically rejects any boat with an internal ballast system that has not been decontaminated.

5.2 Early Detection Monitoring

Three lake monitoring sites (intake log boom, park ranger's dock, and White Oak Flat boat launch dock) have been established at the SALR to detect mussels. Artificial substrates for the mussels are deployed at these monitoring locations. The substrates and other infrastructure are inspected once per month for mussels by WQ staff. If there appear to be mussels, a sample is collected for examination at the WQL. If the presence of mussels is suspected by the lab staff, the California Department of Fish and Game is contacted for further investigation. Mussels have not been detected in the SALR. An Infestation Response Plan has been developed, reviewed, and approved for use by City and County staff as needed.

A copy of the SALR Invasive Mussel Inspection Forms used in WY 2022 can be found in 8.10 Mussel Inspection Form.

Section 6 Operations

The primary purpose of the SALR Project is to provide water to the City WTP. The remainder of this report concerns the policies regarding water storage and release.

If there is a visible surface flow in the Salinas River between the dam and the confluence with the Nacimiento River, water is stored in the reservoir, except when spillway flow occurs. For most of the year, there is no visible surface flow, requiring the total inflow to SALR to be released to the downstream area. The total inflow is calculated daily from the change in reservoir surface elevation, precipitation on the reservoir surface, evaporation from the reservoir, diversion to the City, and downstream release amounts.

In WY 2022, approximately 1041 acre-feet or 339 million gallons of water were delivered to the City WTP. The volume delivered can be found in 8.11 Summary Operational Report 10/1/2021 to 9/30/2022.In WY 2022, 442 acre-feet of water were released into the Salinas River. No SALR water was discharged over the spillway during WY 2022.

Overall, the quality of SALR water remains suitable for the identified beneficial uses of the lake. The monitoring program provides adequate data for selecting the optimal intake depth for water delivery to the City's WTP and for confirming the water quality necessary for the reservoir's other beneficial uses. We anticipate the monitoring program will remain the same in WY 2023. See 8.11 Summary Operational Report 10/1/2021 to 9/30/2022.

Section 7 References

Blue-Green Algae (Cyanobacteria) Blooms, California Department of Public Health, 2009

California Regulations Related to Drinking Water, State Board Division of Drinking Water, July 16, 2015

City of San Luis Obispo Urban Water Management Plan, City of San Luis Obispo Utilities Department. December 6, 2005

Conclusion of Salinas Reservoir Expansion Study, City of San Luis Obispo Council Agenda Report, May 7, 2013

Environmental Protection Agency Long Term 2 Enhanced Surface Water Treatment Rule, 71 FR 654, January 5, 2006, Volume 71, No. 3

Invasive Mussel Early Detection Monitoring and Infestation Prevention Plan for County Flood Control and Water Conservation District Water Storage Reservoirs DRAFT document, County Department of Public Works

Periodic Inspection No 10., Semi-Quantitative Risk Assessment US Army US ACE of Engineers, October 2020

Nitrate and phosphate levels positively affect the growth of algae species found in Perry Pond, Fried, Mackie, Nothwehr, Grinnell College, 2003, Tillers, 4, 21-24

Salinas Reservoir Water Quality Monitoring Report, Water Years 2013, 2014, 2015, 2016, 2020, and 2021 County of San Luis Obispo Department of Public Works

Shaw, Byron, C. Mechenich, and L. Klessig. 1996. Understanding Lake Data. UW-Stevens Point. University of Wis. Extension.

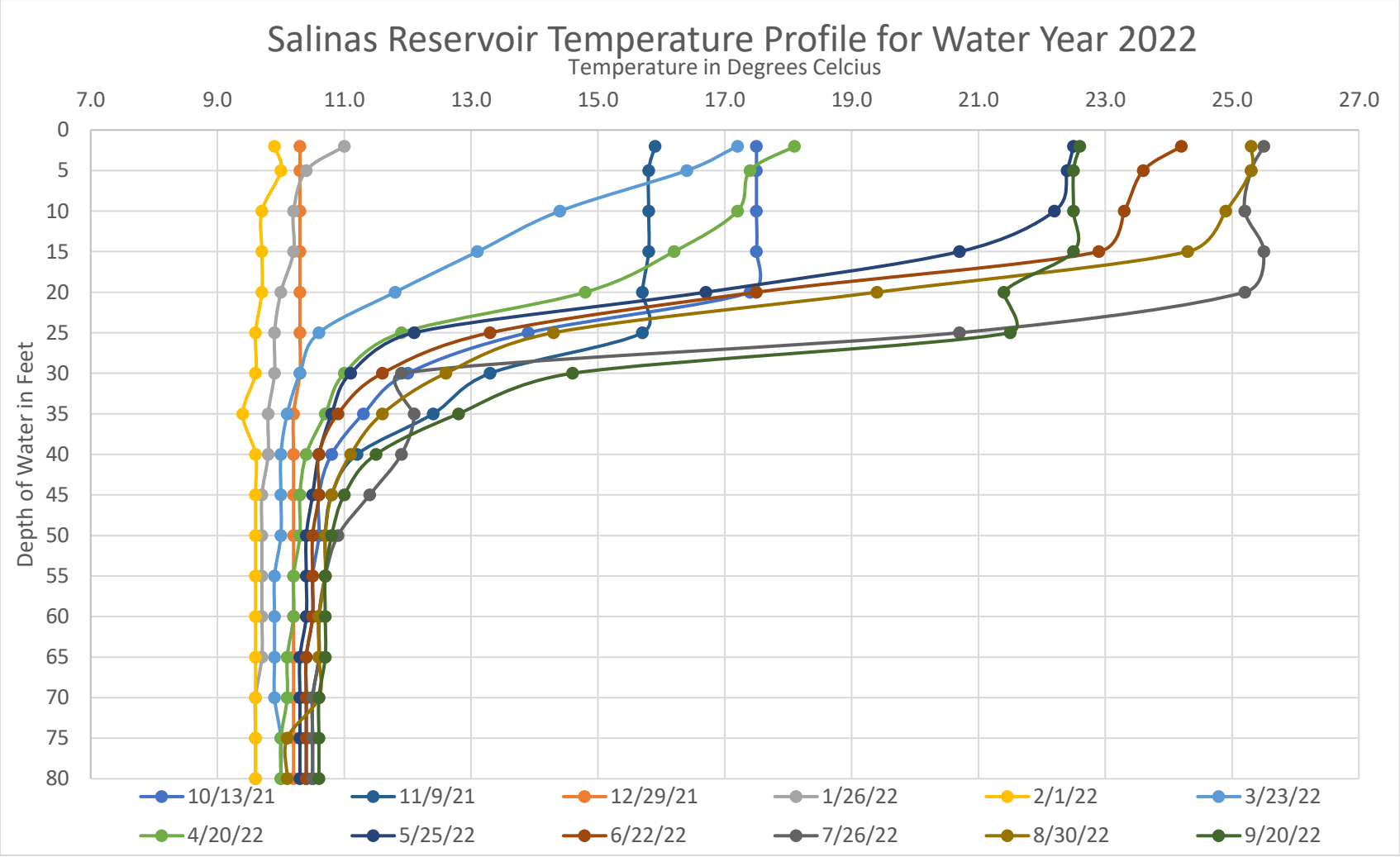
Understanding Lake Data, Shaw, Byron, C. Mechenich, and L. Klessig. UW-Stevens Point, University of Wisconsin, Extension. 1996

Water Quality Control Plan for the Central Coastal Basin, Regional Water Quality Control Board. March 2016

Section 8 Appendices

8.1 Limnology Data

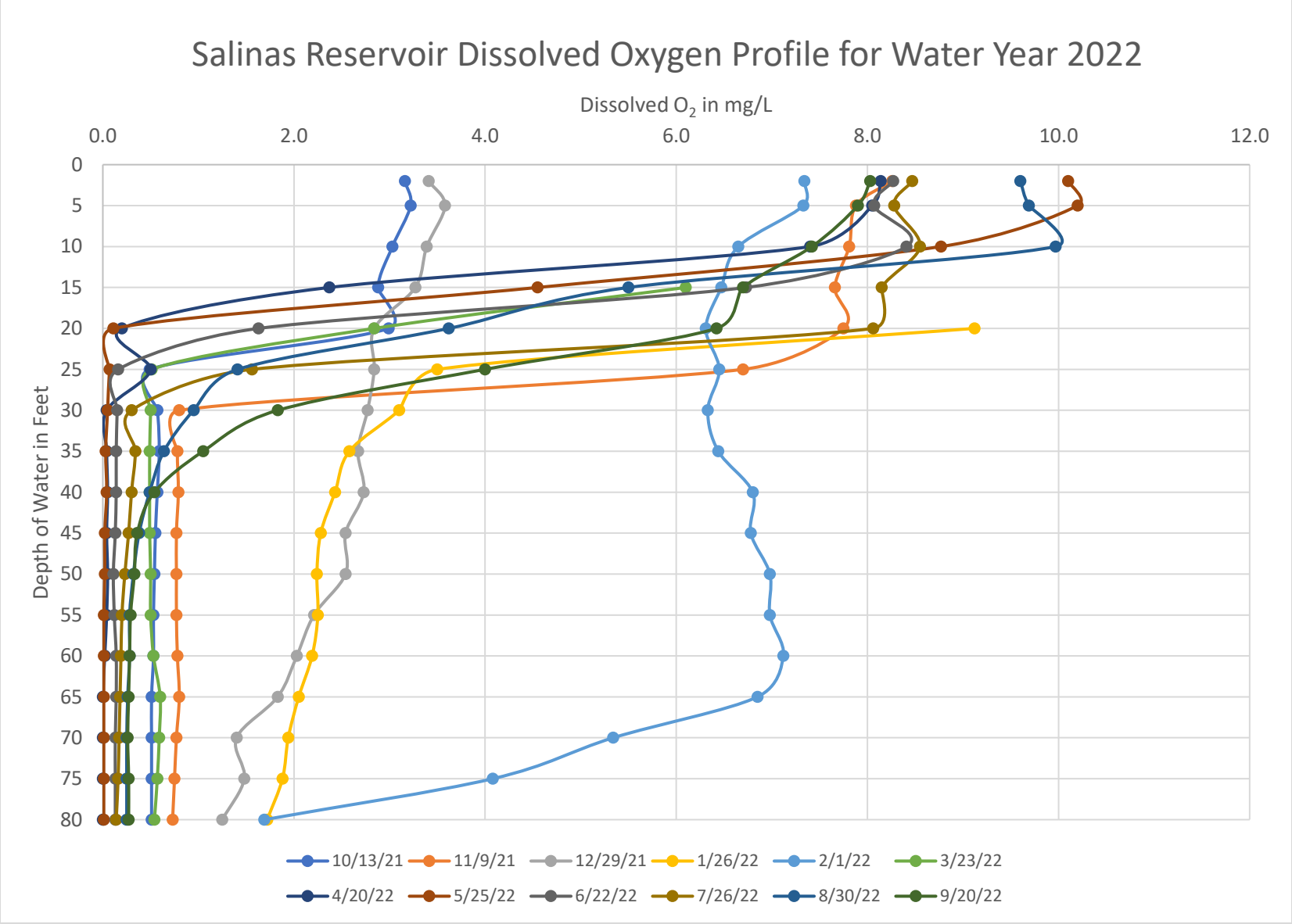
8.1.1 Temperature Profile at Intake Graph



8.1.2 Temperature Profile at Intake Data Table

Depth (ft)	2	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
10/13/21	17.5	17.5	17.5	17.5	17.4	13.9	12.0	11.3	10.8	10.6	10.6	10.5	10.5	10.4	10.4	10.4	10.4
11/9/21	15.9	15.8	15.8	15.8	15.7	15.7	13.3	12.4	11.2	10.8	10.7	10.7	10.6	10.6	10.5	10.5	10.5
12/29/21	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2
1/26/22	11.0	10.4	10.2	10.2	10.0	9.9	9.9	9.8	9.8	9.7	9.7	9.7	9.7	9.7	9.6	9.6	9.6
2/1/22	9.9	10.0	9.7	9.7	9.7	9.6	9.6	9.4	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
3/23/22	17.2	16.4	14.4	13.1	11.8	10.6	10.3	10.1	10.0	10.0	10.0	9.9	9.9	9.9	9.9	10.0	10.0
4/20/22	18.1	17.4	17.2	16.2	14.8	11.9	11.0	10.7	10.4	10.3	10.3	10.2	10.2	10.1	10.1	10.0	10.0
5/25/22	22.5	22.4	22.2	20.7	16.7	12.1	11.1	10.8	10.6	10.5	10.4	10.4	10.4	10.3	10.3	10.3	10.3
6/22/22	24.2	23.6	23.3	22.9	17.5	13.3	11.6	10.9	10.6	10.6	10.5	10.5	10.5	10.4	10.4	10.4	10.4
7/26/22	25.5	25.3	25.2	25.5	25.2	20.7	11.9	12.1	11.9	11.4	10.9	10.7	10.6	10.6	10.5	10.5	10.5
8/30/22	25.3	25.3	24.9	24.3	19.4	14.3	12.6	11.6	11.1	10.8	10.7	10.7	10.6	10.6	10.6	10.1	10.1
9/20/22	22.6	22.5	22.5	22.5	21.4	21.5	14.6	12.8	11.5	11.0	10.8	10.7	10.7	10.7	10.6	10.6	10.6

8.1.3 Oxygen Profile at Intake

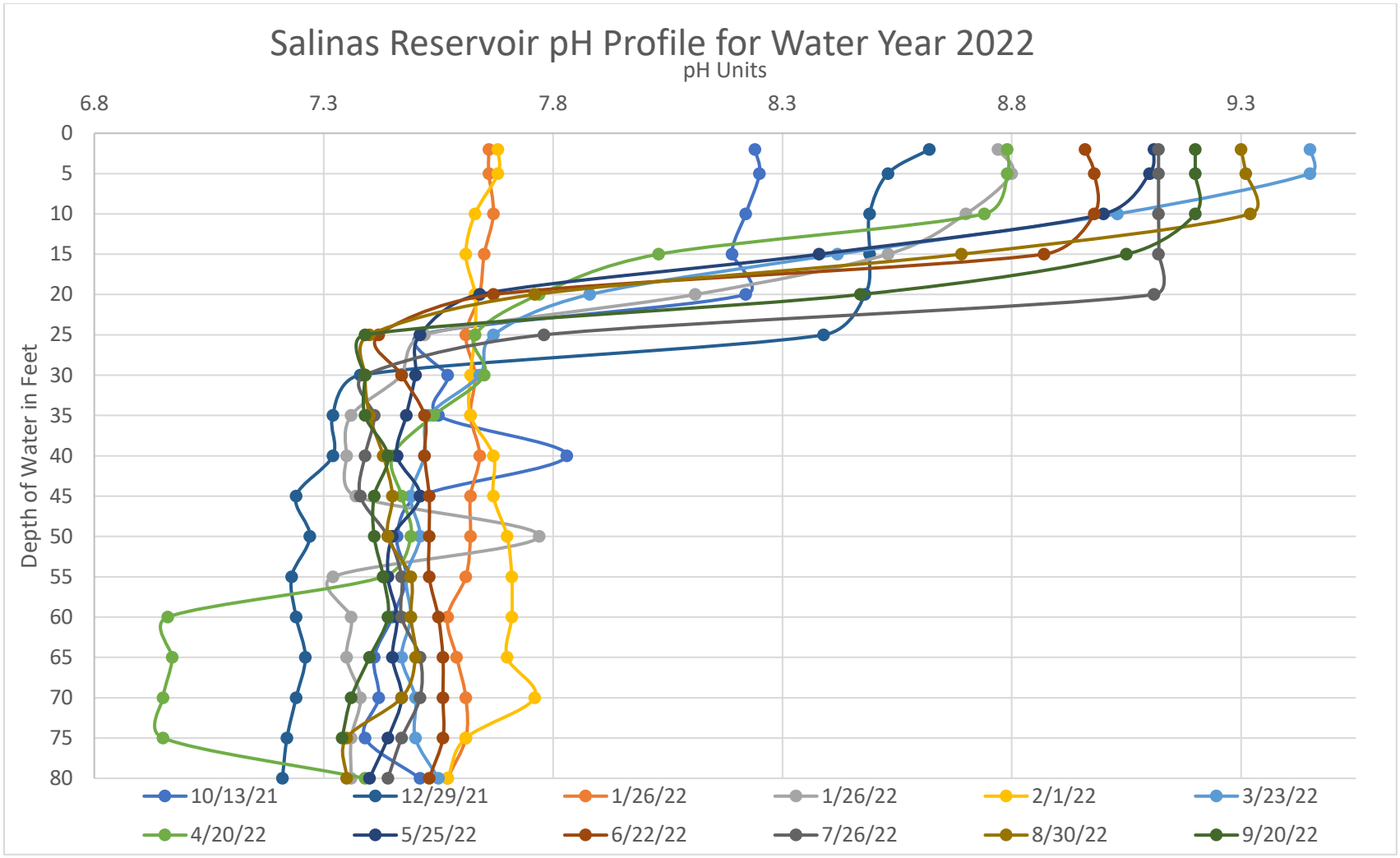


8.1.4 Oxygen Profile at Intake Data

Depth (ft)	2	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
10/13/21	3.2	3.2	3.0	2.9	3.0	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
11/9/21	8.3	7.9	7.8	7.7	7.8	6.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7
12/29/21	3.4	3.6	3.4	3.3	2.8	2.8	2.8	2.7	2.7	2.5	2.5	2.2	2.0	1.8	1.4	1.5	1.3
1/26/22	13.4*	13*	11.6*	11.6*	9.1	3.5	3.1	2.6	2.4	2.3	2.2	2.3	2.2	2.1	1.9	1.9	1.7
2/1/22	7.3	7.3	6.7	6.5	6.3	6.5	6.3	6.4	6.8	6.8	7.0	7.0	7.1	6.9	5.3	4.1	1.7
3/23/22	14.6*	16*	10.6*	6.1	2.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5
4/20/22	8.1	8.1	7.4	2.4	0.2	0.5	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
5/25/22	10.1	10.2	8.8	4.6	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/22/22	8.3	8.1	8.4	6.7	1.6	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7/26/22	8.5	8.3	8.6	8.2	8.1	1.6	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1
8/30/22	9.6	9.7	10.0	5.5	3.6	1.4	1.0	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
9/20/22	8.0	7.9	7.4	6.7	6.4	4.0	1.8	1.1	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3

*DO handheld instrument out of calibration

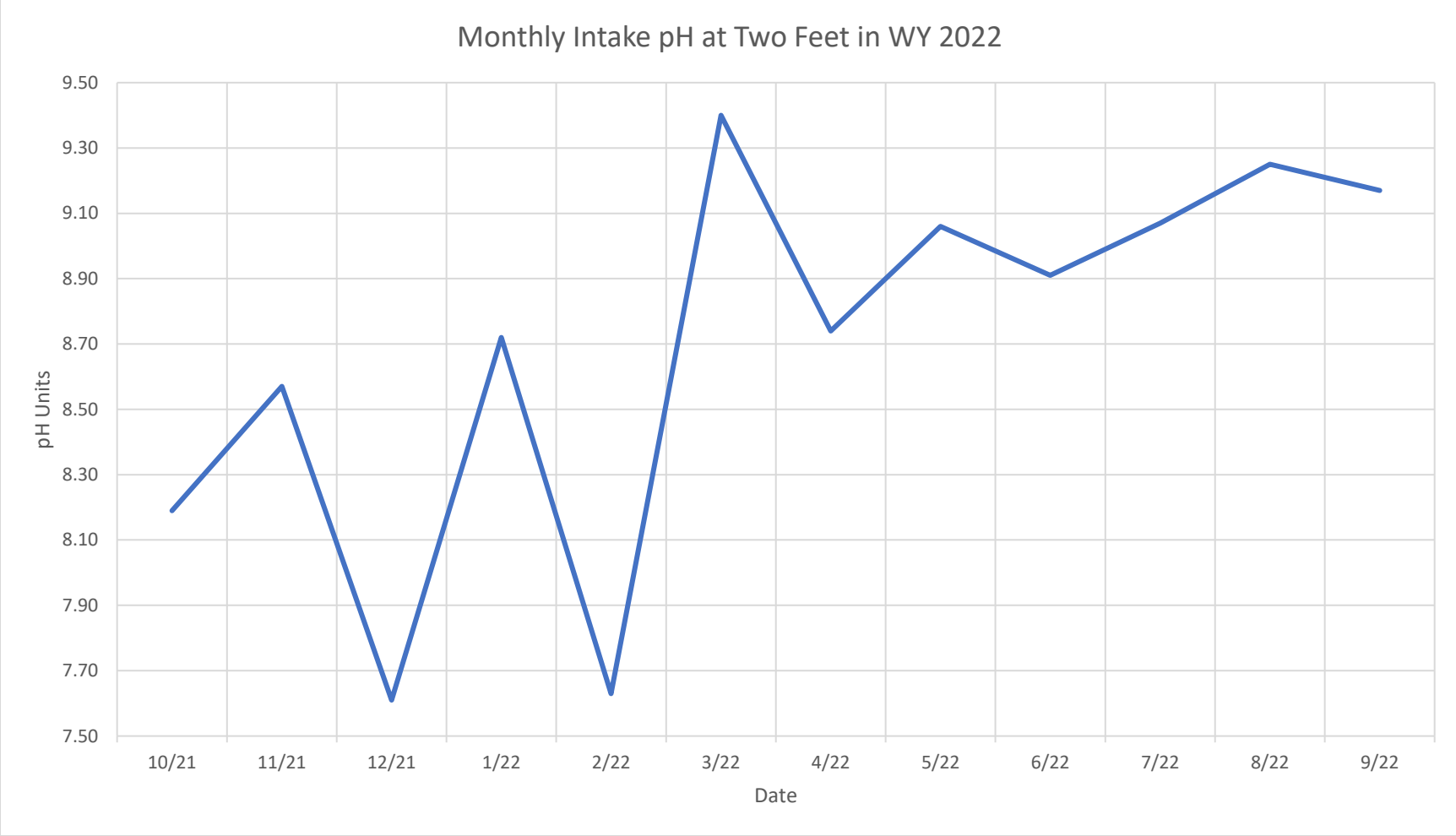
8.1.5 pH Profile at Intake



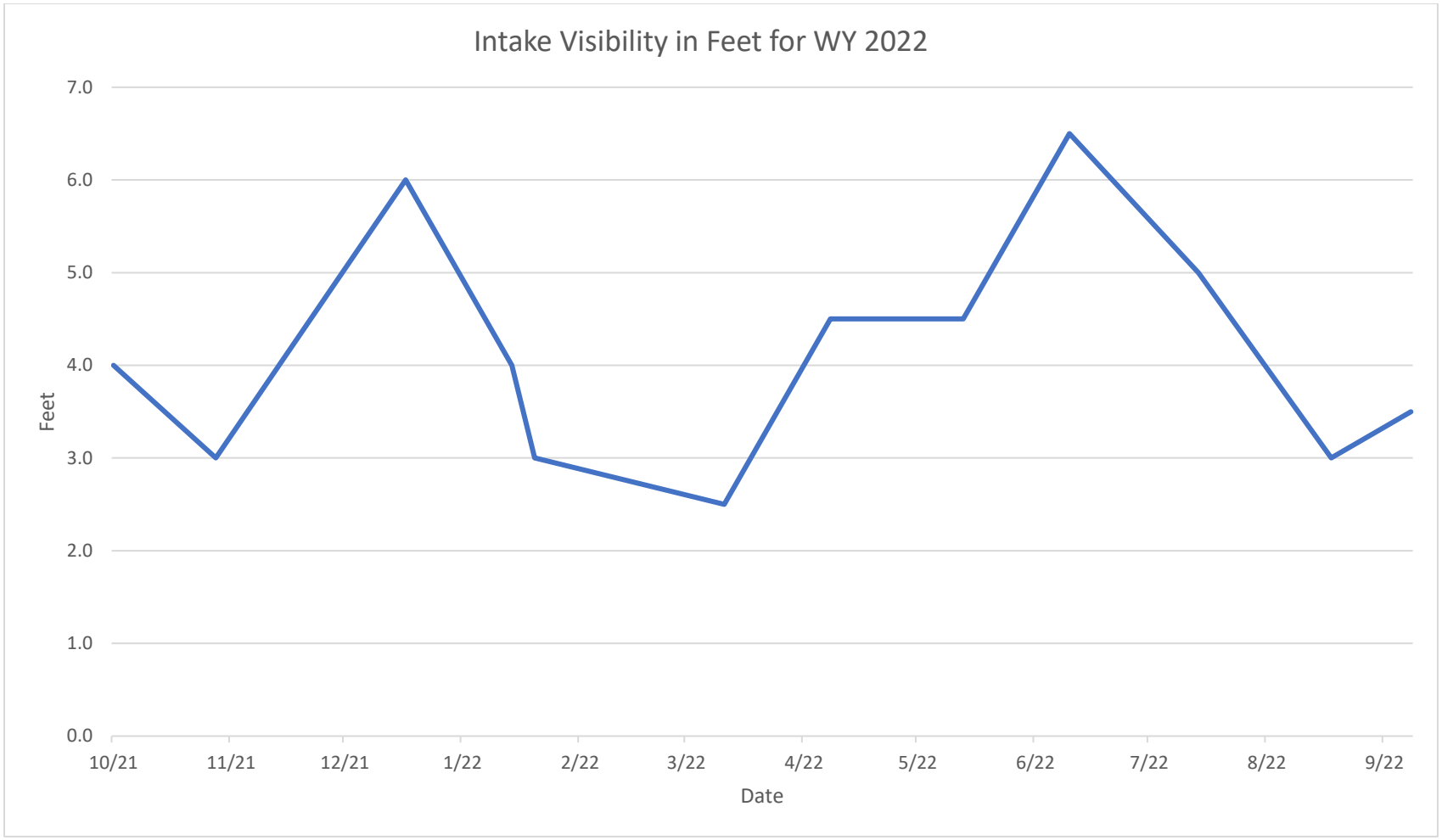
8.1.6 pH Profile at Intake Data

Depth (ft)	2	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
10/13/21	8.2	8.2	8.2	8.1	8.2	7.5	7.5	7.5	7.8	7.5	7.4	7.4	7.4	7.4	7.4	7.3	7.5
11/9/21	8.6	8.5	8.4	8.4	8.4	8.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
12/29/21	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6	7.6	7.5
1/26/22	8.7	8.8	8.7	8.5	8.1	7.5	7.4	7.3	7.3	7.3	7.7	7.3	7.3	7.3	7.3	7.3	7.3
2/1/22	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.5
3/23/22	9.4	9.4	9.0	8.4	7.8	7.6	7.6	7.5	7.5	7.4	7.5	7.4	7.4	7.4	7.5	7.5	7.5
4/20/22	8.7	8.7	8.7	8.0	7.7	7.6	7.6	7.5	7.4	7.4	7.4	7.4	6.9	6.9	6.9	6.9	7.3
5/25/22	9.1	9.1	9.0	8.3	7.6	7.5	7.5	7.4	7.4	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4
6/22/22	8.9	8.9	8.9	8.8	7.6	7.4	7.4	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
7/26/22	9.1	9.1	9.1	9.1	9.1	7.7	7.3	7.4	7.3	7.3	7.4	7.4	7.4	7.5	7.5	7.4	7.4
8/30/22	9.3	9.3	9.3	8.6	7.7	7.4	7.3	7.4	7.4	7.4	7.4	7.4	7.4	7.5	7.4	7.3	7.3
9/20/22	9.2	9.2	9.2	9.2	9.0	8.4	7.3	7.3	7.3	7.4	7.4	7.4	7.4	7.4	7.4	7.3	7.3

8.1.7 pH at Intake at Two Feet



8.1.7 Visibility at Intake



8.2 Nitrogen and Phosphate Nutrient

8.2.1 Intake/Raw Water Nutrients

Date	Nitrate as N (µg/L)	Nitrite as N (µg/L)	Nitrate + Nitrite as N (µg/L)	TKN (µg/L)	Total Nitrogen (µg/L)	Total Phosphate as P (µg/L)
Intake/Raw Water Nutrients						
11/9/2021	< 100	< 100	< 200	1000	1000	< 50
2/1/2022	220	< 100	200	1400	1600	170
5/25/2022	< 400	< 400	< 400	860	< 1000	46
8/30/2022	< 100	< 100	< 100	870	< 1000	30
Alamo Creek and Salsipuedes Creek						
11/17/2021	Dry					
2/8/2022	Dry					
5/25/2022	Dry					
8/9/2022	Dry					
Salinas River						
11/17/2021	Dry					
2/8/2022	< 100	< 100	< 200	< 200	< 1000	130
5/25/2022	Dry					
8/9/2022	Dry					
Toro Creek						
11/17/2021	170	< 100	< 200	< 200	< 1000	110
2/8/2022	110	< 100	< 200	280	< 1000	200
5/25/2022	Dry					
8/9/2022	150	< 400	< 200	1100	1300	990
V-Notch						
11/17/2021	210	< 100	200	790	< 1000	< 50
2/8/2022	290	< 100	300	790	1100	160
5/25/2022	< 400	< 400	< 800	750	< 1000	110
8/9/2022	< 100	< 400	< 200	610	< 1000	94

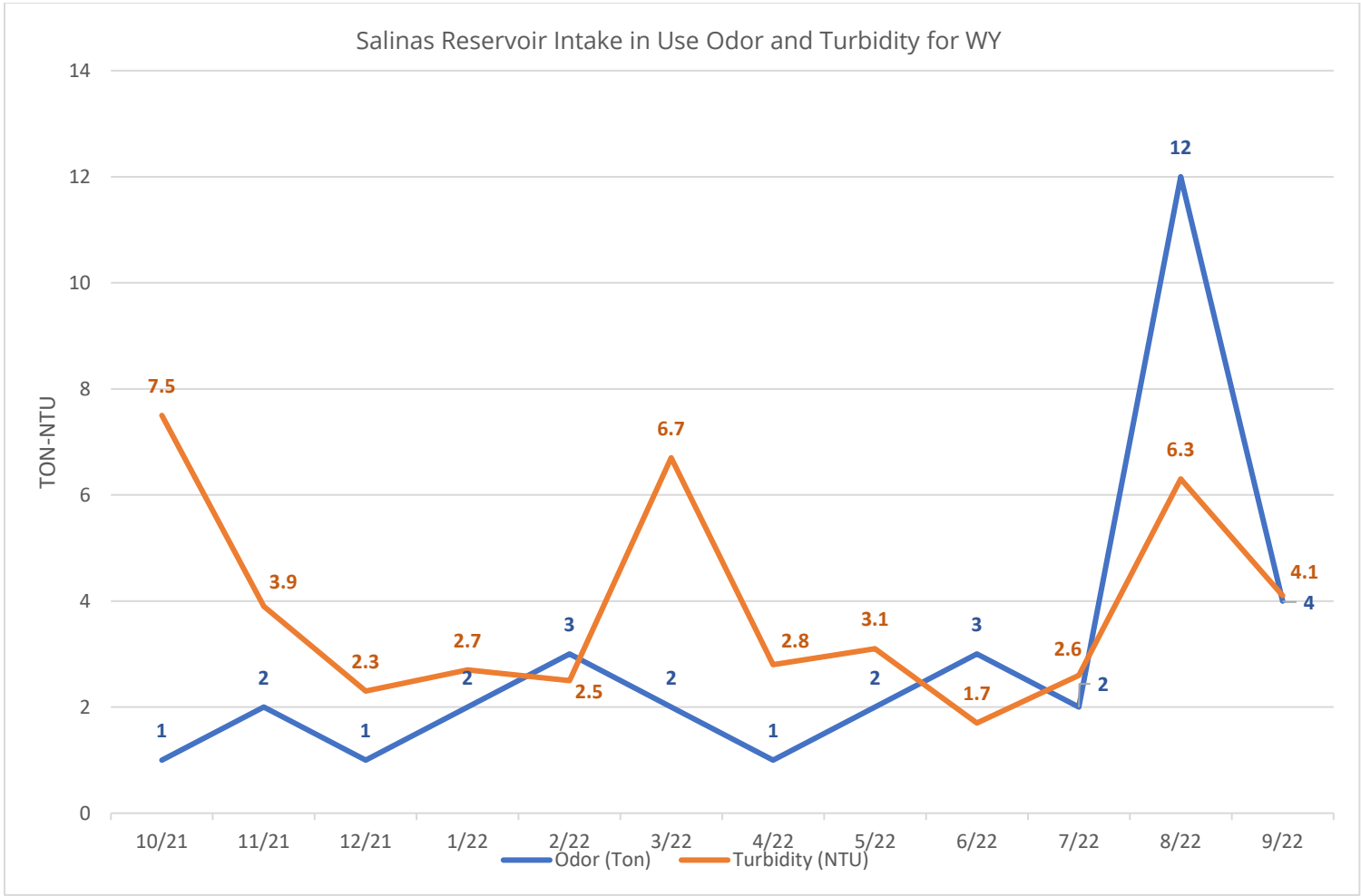
8.3 Algae Data at Intake in Use

Classification	10/13/21	11/9/21	12/29/21	1/26/22	2/1/22	3/23/22	4/20/22	5/25/22	6/22/22	7/26/22	8/30/22	9/20/22
Chlorophyta - Green	28	0	0	310	0	640	0	30	36	65	220	150
Chromophyta - Diatoms	8	3	3	420	20	550	25	130	38	20	100	57
Chrysophyta - Golden	0	0	0	0	0	25	0	0	21	0	0	0
Cryptophyta - Cryptomonads	0	0	0	520	0	390	0	0	20	0	0	0
Cyanophyta - Blue-green	0	0	0	0	0	0	0	710	680	8300	46000	24000
Euglenophyta - Flagellates	0	0	0	50	0	25	0	0	7	0	0	35
Pyrrophyta - Dinoflagellates	0	3	0	25	0	53	3	8	4	26	0	0
Calculated Total Algae Count	35	5	3	1,300	20	1,700	28	870	810	8,400	47,000	24,000

Algal Toxin	6/22/22	7/26/22	8/30/22	9/20/22
Cylindrospermopsin Screen	< 0.6	< 0.6	< 0.5	< 0.6
Microcystin Screen	< 0.8	< 0.8	< 0.8	< 0.8

8.4 Threshold Odor and Turbidity

8.4.1 Intake in Use Threshold Odor and Turbidity Graph



8.4.2 Threshold Odor Profile at Intake Data

Date	Intake 2'		Intake 10'		Intake 20'		Intake 30'		Intake 40'		Intake 50'	
	Odor	Odor Code	Odor	Odor Code	Odor	Odor Code	Odor	Odor Code	Odor	Odor Code	Odor	Odor Code
10/13/2021	1	E	1	EP	NA	NA	40	Cs	100	Cs	100	Cs
11/9/2021	2	E	2	E	2	E	100	Cs	100	Cs	2	Df
12/29/2021	2	Ep	1	Ep	1	Ep	2	Ep	2	Ep	2	Ep
1/26/2022	2	Ep	2	Ep	2	Ep	2	Ep	2	Ep	2	Ep
2/1/2022	2	E	2	E	2	E	2	E	2	E	2	E
3/23/2022	1	E	2	E	1	Df	1	Df	0	ND	0	ND
4/20/2022	1	E	2	Df	5	Df	1	P	0	ND	1	Df
5/25/2022	1	G	2	G	2	G	3	G	3	Cs	2	Cs
6/22/2022	1.4	G	2.5	G	3	G	12	Cs	12	Cs	8	Cs
7/26/2022	1.4	Df	2	Df	2	Df	15	Cs	10	Cs	30	E
8/30/2022	6	G	5	G	8	G	100	Cs	100	Cs	100	Cs
9/20/2022	2	E	4	E	4	D	100	DS	100	DS	100	DS

8.4.3 Turbidity Data at Intake in NTU

	Intake - 02'	Intake - 10'	Intake - 20'	Intake - 30'	Intake - 40'	Intake - 50'
10/13/21	3.3	7.5	3.6	2.4	2.4	2.4
11/9/21	3.7	3.9	3.3	3.4	3.0	3.4
12/29/21	2.4	2.2	2.7	3.7	3.2	2.2
1/26/22	2.7	2.8	1.9	2.2	2.6	2.8
2/1/22	2.4	2.2	2.9	2.6	3.1	3.6
3/23/22	6.0	6.7	3.5	1.7	1.6	1.0
4/20/22	2.2	2.8	1.9	0.8	1.0	0.5
5/25/22	3.7	4.2	3.7	2.8	3.1	2.0
6/22/22	1.6	1.6	1.5	4.2	3.4	1.8
7/26/22	2.6	3.6	4.1	4.4	3.5	NA
8/30/22	6.0	6.0	6.2	5.6	4.7	4.2
9/20/22	4.2	4.1	4.2	4.3	3.3	4.0

8.4.4 Turbidity Data in Lake Sections

	Eagle Section	Point Section	Shoemaker Section
10/13/21	3.2	2.8	3.5
11/9/21	7.1	3.5	5.0
12/29/21	4.9	2.4	4.1
1/26/22	2.3	2.6	1.8
2/1/22	3.1	3.2	2.9
3/23/22	4.6	5.2	4.5
4/20/22	3.3	2.6	2.9
5/25/22	3.1	4.2	3.7
6/22/22	1.6	1.6	1.8
7/26/22	2.2	3.2	2.6
8/30/22	5.4	6.3	5.7
9/20/22	3.9	4.2	4.1

8.5 Bacteriological Data

Sample Site	Date Collected	Total Coliform (MPN/100mL)	*Escherichia coli* (MPN/100mL)
Alamo and Salsipuedes Creeks	11/17/21	Dry	
	2/8/22	Dry	
	5/25/22	Dry	
	8/9/22	Dry	
SALR Intake	11/9/21	260	4.1
	2/1/22	50	< 1
	5/25/22	870	< 1
	8/30/22	580	< 1
Salinas River	11/17/21	Dry	
	2/8/22	230	15
	5/25/22	Dry	
	8/9/22	Dry	
Toro Creek	11/17/21	Dry	
	2/8/22	2400	12
	5/25/22	Dry	
	8/9/22	Dry	
V-Notch	11/17/21	920	1
	2/8/22	5200	2
	5/25/22	2600	1
	8/9/22	820	96

8.6 Metals Data

Constituent (Results in ug/L)	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Cyanide	Iron	Mercury	Manganese	Nickel	Lead	Selenium	Silver	Thallium	Zinc
Drinking Water Maximum Contaminant Level (MCL)	**1000**	**6**	**10**	**1000**	**40**	**5**	**50**	**1300**	**150**	**-----**	**2**	**-----**	**100**	**15**	**50**	**-----**	**2**	**-----**
Secondary MCL	**200**	**-----**	**-----**	**-----**	**-----**	**-----**	**-----**	**1000**	**-----**	**300**	**-----**	**50**	**-----**	**-----**	**-----**	**100**	**-----**	**5000**
Salinas River																		
2/8/22	-----	-----	-----	-----	-----	-----	-----	< 20	-----	120	-----	27	-----	-----	-----	< 10	-----	< 25
Toro Creek																		
2/8/22	-----	-----	-----	-----	-----	-----	-----	< 20	-----	640	-----	130	-----	-----	-----	< 10	-----	< 25
8/9/22	-----	-----	-----	-----	-----	-----	-----	< 20	-----	23	-----	< 10	-----	-----	-----	< 10	-----	< 10
Intake/Raw Water																		
11/9/21	-----	< 1.0	1.5	-----	-----	< 0.50	-----	-----	< 25		< 0.20	-----	-----	< 0.50	< 5.0	-----	< 1.0	-----
12/29/21	-----	-----	-----	-----	-----	-----	-----	-----	-----	66	-----	120	-----	-----	-----	-----	-----	-----
1/26/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	< 20	-----	30	-----	-----	-----	-----	-----	-----
2/1/22	< 20	< 1.0	1.2	25	< 1.0	< 1	< 10	< 20	34	26	< 0.20	100	< 10	< 0.50	< 5.0	< 10	< 1.0	< 25
3/23/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	36	-----	76	-----	-----	-----	-----	-----	-----
4/20/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	44	-----	57	-----	-----	-----	-----	-----	-----
5/25/22	25	< 1.0	1.2	24	< 1.0	< 0.5	< 1.0	< 20	< 0.025	42	< 0.20	34	< 10	< 0.5	< 5.0	< 10	< 1.0	< 25
6/22/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	29	-----	15	-----	-----	-----	-----	-----	-----
7/26/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	16	-----	14	-----	-----	-----	-----	-----	-----
8/30/22	< 20	< 1.0	2.1	15	< 1.0	< 0.50	< 1.0	< 20	< 250	< 15	< 0.20	7.4	< 10	< 0.50	< 5.0	< 10	< 1.0	< 25
9/20/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	28	-----	37	-----	-----	-----	-----	-----	-----
V-Notch																		
2/8/22	-----	-----	-----	-----	-----	-----	-----	< 20	-----	71	-----	140	-----	-----	-----	< 10	-----	< 25
5/25/22	-----	< 1.0	1.2	31	< 1.0	< 0.5	< 1.0	< 20	< 0.025	90	< 0.20	260	< 10	< 0.5	< 5.0	< 10	< 1.0	< 25
8/9/22	-----	-----	-----	-----	-----	-----	-----	< 20	-----	110	-----	250	-----	-----	-----	< 10	-----	< 10

8.7 General Minerals

Constituent →	Aggressive Index	Alkalinity as CaCO3	Bicarbonate as CaCO3	Carbonate as CaCO3	Hydroxide Alkalinity as CaCO3	Calcium	Chloride	Electrical Conductivity	Fluoride	Hardness as CaCO3	Langelier Index	Magnesium	Methylene Blue Activated Substances	Nitrate	Nitrate as Nitrogen	Nitrite as Nitrogen	Nitrate and Nitrite Combined as Nitrogen	pH	pH-Field	Sodium	Sulfate	Total Dissolved Solids	Temperature
Drinking Water Maximum Contaminant Level (MCL)								1600						45	10000	1000	10000						
Secondary MCL							250		2									6.5-8.5			250	500	
Date ↓	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	umhos/cm	mg/L	mg/L	Units	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	Units	Units	mg/L	mg/L	mg/L	°C
Salinas River																							
2/8/22	12.0	142	140	< 1	< 1	62	34	-----	0.29	300	-0.28	37	< 0.10	< 0.400	< 100	< 100	< 200	7.08	7.61	44	180	460	9.4
Toro Creek																							
11/17/21	11.8	176	180	< 1	< 1	60	33	-----	0.54	270	-0.37	29	< 0.10	0.753	170	< 100	< 200	6.99	7.37	51	150	470	12.4
2/8/22	11.5	158	160	< 1	< 1	53	45	-----	0.62	240	-0.72	27	< 0.10	0.487	110	< 100	< 200	7.17	7.61	46	180	480	10.6
8/9/22	11.3	178	180	< 1	< 1	77	34	790	1.1	320	-0.78	31	< 0.10	0.664	150	< 100	< 200	7.45	6.72	51	130	450	17.4
Intake/Raw Water																							
10/13/21	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.17	-----	-----	-----	17.5
11/9/21	12.5	144	93	51	< 1	34	15	-----	0.26	180	0.47	24	< 0.10	< 0.400	< 100	< 100	< 200	8.07	8.44	28	79	300	15.8
12/29/21	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.60	-----	-----	270	10.3
1/26/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.53	-----	-----	-----	10.2
2/1/22	11.1	145	140	< 1	< 1	34	25	-----	0.25	170	-1.1	22	< 0.10	0.974	220	< 100	200	7.05	7.56	24	73	270	9.7
3/23/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.98	-----	-----	-----	14.4
4/20/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.69	-----	-----	-----	17.2
5/25/22	12.4	122	120	6	< 1	37	23	-----	0.30	190	0.45	23	< 0.10	< 1.77	< 400	< 100	< 400	7.83	8.33	27	95	310	20.7
6/22/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8.91	-----	-----	-----	24.1
7/26/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.07	-----	-----	-----	25.5
8/30/22	13.2	114	78	36	< 1	29	20	470	0.30	180	1.3	27	< 0.10	< 0.400	< 100	< 100	< 100	8.85	9.26	32	100	330	25.3
9/20/22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.15	-----	-----	320	22.5
V-Notch																							
11/17/21	11.7	134	130	< 1	< 1	33	15	-----	0.34	180	-0.34	24	< 0.10	0.930	210	< 100	200	7.19	7.70	28	79	290	14.0
2/8/22	11.4	114	110	< 1	< 1	42	25	-----	0.36	210	-0.87	26	< 0.10	1.28	290	< 100	300	7.31	7.73	30	100	350	7.7
5/25/22	12.2	126	130	< 1	< 1	36	21	-----	0.29	180	0.14	22	< 0.10	< 0.4	< 400	< 100	< 800	7.86	8.12	24	81	290	16.5
8/9/22	10.9	119	120	< 1	< 1	34	17	530	0.63	190	-1.1	25	< 0.10	< 0.400	< 100	< 100	< 400	7.35	6.85	29	91	320	20.8

8.8 VOC, SOC, and Perchlorate Data

Constituent	Collected Date	Result	Units
Volatile Organic Compounds (VOCs) (Collected every 3 years)	8/11/2009	Not Detected	
	8/14/2012	Not Detected	
	8/28/2015	Not Detected	
	8/30/2018	Not Detected	
	9/15/2021	Not Detected	
Atrazine	2/27/2007	<0.05	ug/L
Simazine	2/27/2007	<1.0	ug/L
Benzo (a) pyrene	2/27/2007	<0.1	ug/L
Diethylhexylphthalate (DEHP)	2/27/2007	<3.0	ug/L
Di - (2-Ethylhexyl) adipate	2/27/2007	<5.0	ug/L
Hexachlorobenzene	2/27/2007	<0.5	ug/L
Hexachlorocyclopentdiene	2/27/2007	<1.0	ug/L
Molinate	2/27/2007	<2.0	ug/L
Thiobencarb	2/27/2007	<1.0	ug/L
Atrazine	8/11/2009	<0.05	ug/L
Simazine	8/11/2009	<0.05	ug/L
Perchlorate (Collected Annually)	11/13/2007	<4.0	ug/L
	5/29/2008	<4.0	ug/L
	11/10/2008	<4.0	ug/L
	5/12/2009	<4.0	ug/L
	5/13/2010	<4.0	ug/L
	5/25/2011	<4.0	ug/L
	5/2/2012	<4.0	ug/L
	5/1/2013	<4.0	ug/L
	5/13/2014	<4.0	ug/L
	5/14/2015	<1.0	ug/L
	5/19/2016	<1.0	ug/L
	5/25/2020	<1.0	ug/L
	11/15/2020	<4.0	ug/L
	5/1/2020	<0.5	ug/L
	5/24/2021	<4.0	ug/L
	8/11/2021	<0.5	ug/L
	11/9/2021	<0.5	ug/L
	2/1/2022	< 2.0	ug/L
	5/25/2022	< 0.5	ug/L
	8/30/2022	< 2.0	ug/L

8.9 Creek and Watershed Checklist

Creek/Watershed Inspection checklist

Date: _____ **Time:** _____

GPS coordinates: **N:** _____ **W:** _____

Site/Location: **SALINAS RESERVOIR –** _____

Picture/Photo documentation? **Yes / No (Remember to archive images)**

Investigator(s): _____

Routing to:

System Chemist		
Water Quality Manager	**Faith Zenker**	

Inspection items are listed below. Check the appropriate box to match observations.

I. In-stream characteristics

1. Water Flow: Present conditions: _____

☐ in channel ☐ flooding over banks ☐ dry/pooling ☐ no flow

Presence of naturally occurring organic material in stream:

Logs or large woody debris: ☐ None ☐ occasional ☐ plentiful

Leaves, twigs, root mats, etc. ☐ None ☐ occasional ☐ plentiful

2. Water odor: ☐ no water present

☐ natural/none ☐ gasoline

☐ sewage ☐ chlorine

☐ rotten egg ☐ chemical

☐ other _____

3. Water Surface: ☐ no water present

☐ clear ☐ natural oily sheen

☐ foamy ☐ oily sheen (petroleum)

☐ other _____

4. Water clarity: check all that apply (best determined by viewing water in a clear container)

☐ turbid - suspended matter in water ☐ sediment ☐ blue/green algae

☐ tannic - clear water naturally stained orange/brownish due to organic acids in water

☐ no staining / no suspended matter ☐ other (chemical discharges, dyes)

Notes on water clarity:

_____

_____

_____

_____

5. Stream bed: check all that apply

☐ stream bed can be seen ☐ sediment buildup ☐ blue/green algae growth

☐ stream bed can not be seen ☐ other types of growths

Notes on stream bed observations:

_____

6. Bank erosion:

How vegetated are the banks, looking up and down stream, for the length of your reach (circle a percentage)?

Vegetated banks Bare/Eroded Banks

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

What visual criteria did you use to assess the percentage above (check all that apply)?

☐ sediment ☐ obvious loss of soil ☐ soil covered with vegetation

☐ steep slopes (banks are U shaped) ☐ gentle slopes

☐ exposed roots ☐ no exposed roots

II. Visual Biological Survey

1. Wildlife in or around the stream: ☐ no wildlife observed

☐ amphibians ☐ waterfowl ☐ birds ☐ reptiles ☐ crustaceans

☐ domesticated / farm animals (indicate type below) ☐ insect life

Notes on wildlife:

2. Fish in the stream:

☐ none present ☐ yes, but rare ☐ yes, abundant

If present, estimate size

☐ small (1 - 2") ☐ medium (3 - 6") ☐ large (7" and above)

3. Dumping (any)

☐ none present ☐ yes, but rare ☐ yes, abundant

If dumping is present, indicate type

☐ construction material ☐ appliances ☐ other

Notes on dumping:

Additional Observations and comments:

YES	NO	Inspection item
		Sampling?

If yes, complete second page of this form which contains the Sampling checklist.

Creek/Watershed Sampling checklist

If sampling, collect for the following:
Remember to check only the items applicable to your specific site

Constituents	Type of sample	Units	Field Reading
Flow volume	estimate	gal/d	
Flow rate	estimate	gal/m	
pH	grab	pH units	
Temperature	grab	° C	
Dissolved oxygen	grab	mg/L	
Total chlorine residual	grab	mg/L	

Constituents below require samples to be collected.

Constituents	Type of sample	Collected	In-house / contract lab?
General Mineral	Grab 1LPR, 1LN		**In-house / contract lab**
TPO4-P	Grab 250mL SR		**In-house / contract lab**
TKN	Grab 250mL SR		**In-house / contract lab**
Aluminum	N		**Contract lab**
MPN-MUG-MD2	BR		**In-house**
Total suspended solids	grab		**In-house**
Settleable solids	grab		**In-house**
Total dissolved solids	grab		**In-house**
Oil and grease	grab		**Contract lab**
Color	grab		**In-house**
Turbidity	grab		**In-house**
Acute toxicity	grab		**Contract lab**
Other as specified	grab		**In-house / contract lab**

List other requested analyses:

8.10 Mussel Inspection Form

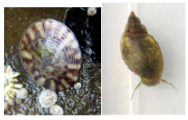
Salinas Reservoir Invasive Mussel Inspection Form

General observations/comments

Analysis Number (WQL use)	Date Time Inspector	Site	Area Inspected	Depth or Linear (ft) Inspected	Status	Observations	
		Ranger Dock	Plexiglass/Condo Concrete block Rope length Shoreline	4.2 5 5	**Are mussels present?** ___Not as far as I can tell ___Didn't inspect ☐No time; ☐Missing ___Maybe? Let's talk	Snails ☐ Midge larvae ☐ Grit/sandy substance ☐ Algae ☐	Gelatinous organism ☐ Other ☐ Describe:
		White Oak Flat	Plexiglass/Condo Concrete block Rope length Shoreline	4 8 10	**Are mussels present?** ___Not as far as I can tell ___Didn't inspect ☐No time; ☐Missing ___Maybe? Let's talk	Snails ☐ Midge larvae ☐ Grit/sandy substance ☐ Algae ☐	Gelatinous organism ☐ Other ☐ Describe:
		Log Boom (in 5 mph zone)	Plexiglass/Condo Concrete block Rope length Shoreline	3.5 8 15	**Are mussels present?** ___Not as far as I can tell ___Didn't inspect ☐No time; ☐Missing ___Maybe? Let's talk	Snails ☐ Midge larvae ☐ Grit/sandy substance ☐ Algae ☐	Gelatinous organism ☐ Other ☐ Describe:
			Plexiglass/Condo Concrete block Rope length Shoreline		**Are mussels present?** ___Not as far as I can tell ___Didn't inspect ☐No time; ☐Missing ___Maybe? Let's talk	Snails ☐ Midge larvae ☐ Grit/sandy substance ☐ Algae ☐	Gelatinous organism ☐ Other ☐ Describe:

Zebra and quagga mussels: can attach to both hard and soft surfaces - can detach from one place and move to another - prefer low light areas, especially juveniles. Juveniles can be < 1/4 inch; adults can be up to 2 inches. A hand lens is recommended for examining small organisms. Look for anything suspicious - especially a striped "D" shaped shell. **Inspection of other surfaces such as docks, buoys etc is encouraged**. Perform a tactile search in areas where visual inspection is impractical (e.g. dock flotation) - lightly run hand along surface; note observations, especially a feeling like seeds, small pebbles, or rough sandpaper.

Suspicious organisms: If you have a question or concern anything you observe, please call the Water Quality Lab (805-781-5111) for follow up.


Limpet Pond snail


Zebra mussel


P. mag


Quagga mussel


Asian clam

8.11 Summary Operational Report 10/1/2021 to 9/30/2022

Summary Salinas Reservoir Operational Report 10/1/2021 to 9/30/2022												
Month-Year	Capacity Change (AF)	Pipeline Diversion (MGD)	Pipeline Diversion (AF)	Downstream Release (AF)	Spillway Discharge (AF)	Total Discharge (AF)	Pan Reading (In)	Lake Evaporation (AF)	Precipitation (In)	Lake Precipitation (AF)	Lake Daily Outflow (AF)	Lake Inflow (AF)
Oct-21	-267.8	46.25	142.04	107.37	0.00	249.43	6.46	226.68	2.72	110.11	365.62	97.82
Nov-21	-186.7	21.37	65.59	60.65	0.00	126.22	3.27	98.96	0.19	7.68	217.50	30.80
Dec-21	1669.3	43.60	133.80	72.70	0.00	206.52	1.87	48.76	9.32	384.88	-129.57	1539.73
Jan-22	219.3	35.74	109.74	12.11	0.00	121.87	2.12	57.38	0.12	5.33	173.93	393.23
Feb-22	-90.9	16.16	49.58	154.67	0.00	204.27	3.64	100.42	0.00	0.00	304.71	213.81
Mar-22	-128.4	24.93	76.49	209.63	0.00	286.20	5.36	155.92	1.23	54.19	387.93	259.53
Apr-22	-374.5	29.91	91.78	275.92	0.00	367.70	6.95	208.86	0.49	21.27	555.25	180.75
May-22	-374.6	7.41	22.74	137.07	0.00	159.81	10.46	320.95	0.00	0.00	480.70	106.10
Jun-22	-394.8	12.57	38.57	25.17	0.00	63.71	11.82	370.92	0.00	0.00	434.58	39.78
Jul-22	-458.4	37.14	113.96	20.99	0.00	134.89	12.34	397.58	0.00	0.00	532.48	74.08
Aug-22	-502.7	37.00	113.55	68.82	0.00	182.41	13.40	447.71	0.00	0.00	630.13	127.43
Sep-22	-465.1	40.09	123.03	210.96	0.00	334.09	9.42	309.47	1.30	49.97	593.61	128.51
Totals	**-1355.30**	**352.17**	**1080.87**	**1356.06**	**0.00**	**2437.12**	**87.11**	**2743.61**	**15.37**	**633.43**	**4546.87**	**3191.57**