

# 2023 WATER QUALITY ANNUAL REPORT

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Central Arizona Water Conservation District  
Water Transmission



# YOUR WATER

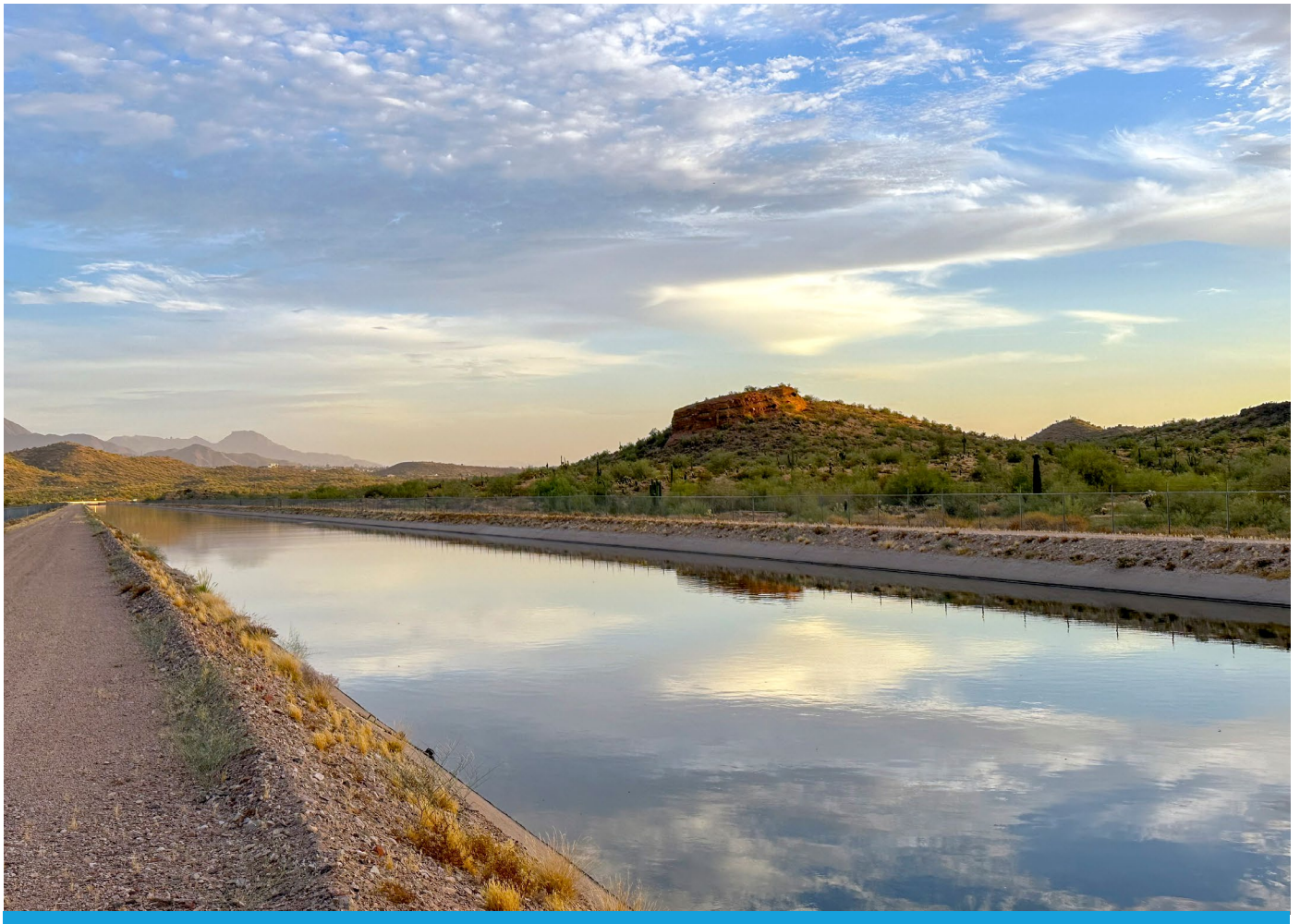
Central Arizona Project (CAP) reliably delivers Colorado River water from Lake Havasu, located on Arizona’s western border, to central and southern Arizona. The total CAP system is 336 miles long and consists of open canals, inverted siphon pipelines, tunnels, pumping plants, check structures, turnouts, and the Lake Pleasant storage reservoir.

The CAP system provides a means for nearly 1.5 million acre feet (MAF) of Arizona’s Colorado River allotment (totaling 2.8 MAF) to be delivered to the most populous areas of the state and reduce the use of groundwater for municipalities, agriculture, and other activities.

Central Arizona Water Conservation District (CAWCD), with more than 80 long-term stakeholders, is Arizona’s largest supplier of renewable water. Stakeholders are categorized in three distinct user groups: municipal and industrial (M&I), agricultural, and tribal. They use CAP’s Colorado River water to operate businesses, water crops, and maintain households, all of which are critical to the quality of life in Arizona.

***“When the well is dry, we learn the worth of water.”***

***- Benjamin Franklin***



# CAP WATER SOURCES

CAWCD does not provide potable water directly to the public, but supplies raw, untreated Colorado River water to its various stakeholders. The primary CAP intakes are at the southern-most portion of Lake Havasu, at a depth of approximately 24 feet.

Lake Pleasant is CAP's 10,000 surface-acre storage reservoir and is located just north of Phoenix. The reservoir is strategically utilized based on demand, while taking advantage of the lowest power rates possible. In general, Colorado River water is pumped into Lake Pleasant from October to May, and water is drawn from the reservoir during summer months. Therefore, depending on the time of year, CAP stakeholders may receive water that solely originates from the Colorado River, or a blend of water from the river and Lake Pleasant.

Each of these sources presents its own unique challenges. The surface waters are exposed to various watershed-related events and activities, such as stormwater runoff, treated wastewater discharge, recreation, wildlife, algal blooms, and other factors that may affect water quality.

While agricultural stakeholders may directly utilize raw CAP water, municipal and industrial stakeholders filter, disinfect, and apply other necessary treatments to the water before it is delivered through distribution systems for domestic use.



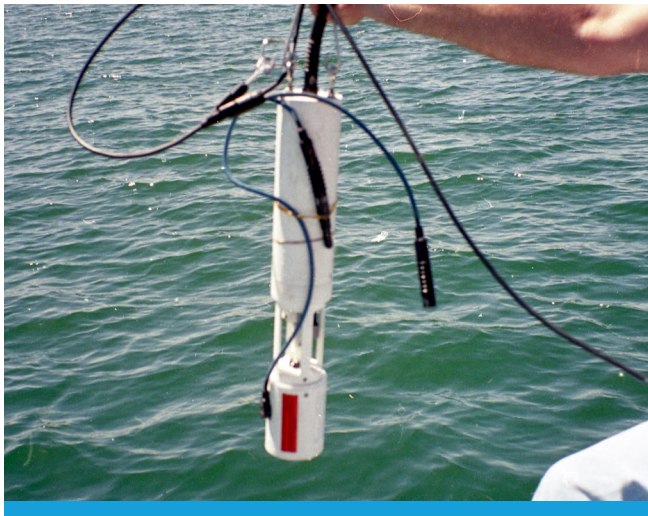
# CAP HISTORICAL WATER QUALITY

From 1985 to 1995, the United States Bureau of Reclamation (USBR) and CAWCD cooperated with the United States Geological Survey (USGS) to implement a water quality sampling program. USGS collected monthly and quarterly grab samples at three sites in the CAP system and tested more than 50 parameters. Historical CAP water quality data can be viewed by entering “CAP Canal” as the Site Name on the USGS Water Quality website:

[Historic Water Quality Data](#)

In 1996, CAWCD took over the water quality sampling program and customized it based on recommendations from stakeholders. Since that time, the program has continued to expand to include additional sites and parameters. CAWCD produces Annual Water Quality reports which summarize water quality measured in the canal throughout the calendar year. Reports from the past five years are available on CAP’s AquaPortal website ([CAP AquaPortal – Annual Reports](#)).

Reports from 1996–2018 reports are available upon request.



# CAP BASELINE WATER QUALITY PROGRAM

## MISSION

In 2019, the Water Quality Program re-focused its efforts to better meet the needs of stakeholders, and in doing so, created a Mission Statement and goals that provide a direction for moving forward:

*The Water Quality Program (Program) provides information and recommendations to CAP Operations and Maintenance to help maintain the quality of CAP water; the Program ensures that Non-Project sources comply with established standards; the Program supports the overall goal of its Municipal Stakeholders by providing a broad understanding of raw water quality conditions; and the Program supports all other Stakeholder groups by providing valuable water quality information that helps to achieve their individual goals.*

The Program has implemented a monitoring approach that consists of both continuous (real-time) measurements and monthly/semi-annual grab samples. Sampled constituents align with the [Non-Project Water Guidance Document](#), but also include additional constituents that may be of public interest.

A comprehensive database management system is utilized to store historical and current water quality data, and a user-friendly website known as AquaPortal has been created to make the data available to the public ([CAP AquaPortal](#)).

## CONTINUOUS MEASUREMENTS

CAWCD monitors basic water quality in near real-time at two locations along the canal; CAP Headquarters (7th Street) and at the Roosevelt Water Conservation District turnout in Mesa, AZ. Both stations utilize a Hydrolab DS5X multiparameter meter to measure temperature, conductivity, pH, TDS, and dissolved oxygen. Meters are calibrated and maintained monthly to provide

reasonably accurate data. Data is uploaded from each water quality meter every 15 minutes and displayed on [AquaPortal - Current Conditions](#).

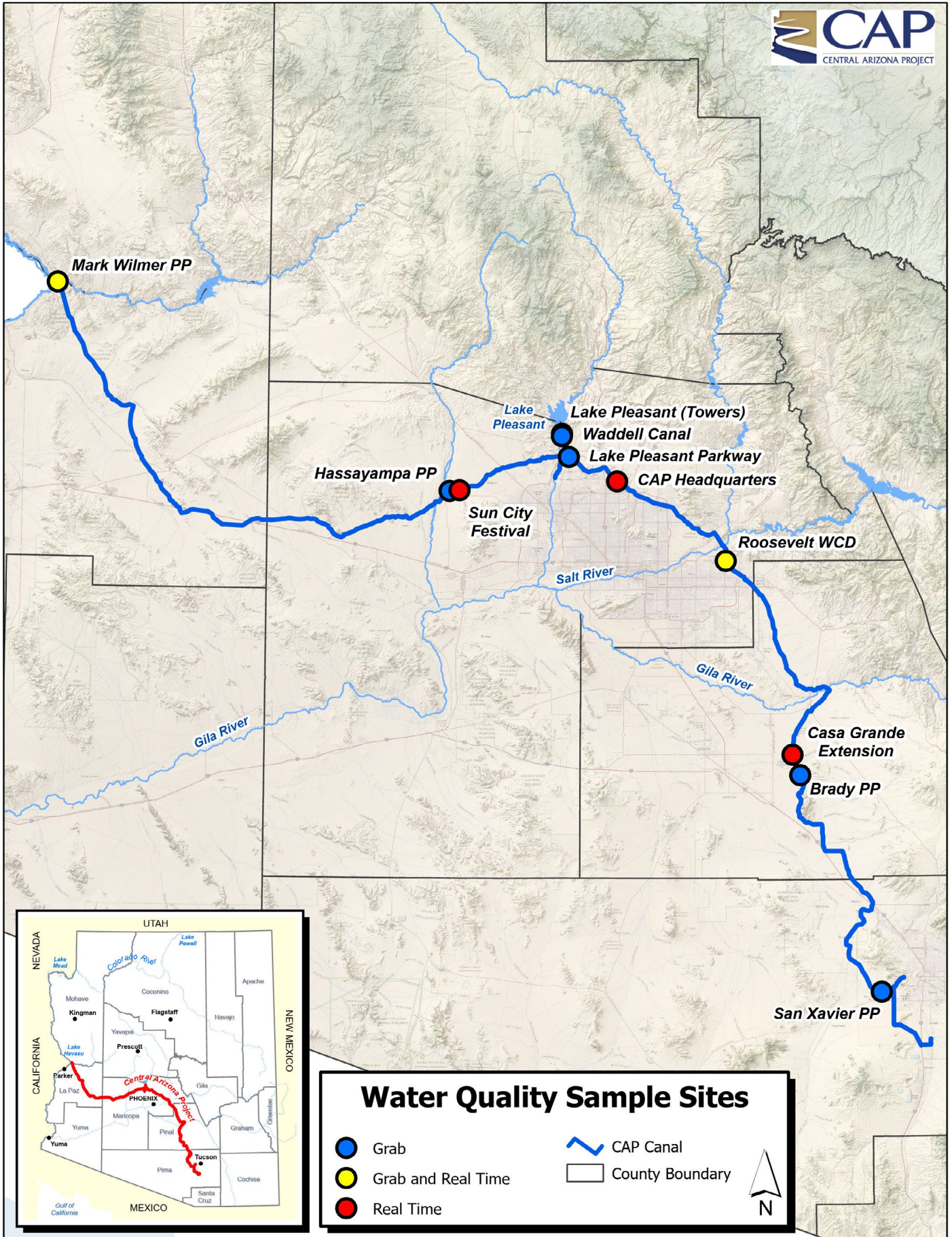
Real-time turbidity sensors are currently installed at five permanent locations, including Mark Wilmer Pumping Plant, Sun City Festival, CAP Headquarters, Roosevelt Water Conservation District Turnout, and the Casa Grande Extension Turnout (see map on Page 6). These sensors upload data every hour to [AquaPortal - Current Conditions](#).



## GRAB SAMPLES

Monthly grab samples are collected at seven locations (see map on page 6). Each monthly sample includes testing for 47 water quality “priority constituents” (as listed in Table A-1 of the Guidance Document), as well as 12 additional constituents. Semi-annual samples are collected from four sites (see map on page 6). Semi-annual samples include the monthly constituents, 183 contaminants listed in Table A-2 of the Guidance Document, and approximately 85 additional contaminants.

CAWCD contracts with State of Arizona licensed laboratories to perform the water quality analyses. Verified results for priority constituents are posted on [AquaPortal - Data Set](#). Results for the remaining constituents, which are not commonly detected in the CAP system, are available upon request.



# 2023 MONITORING RESULTS

Although the CAP system is not regulated as a Water of the United States, CAWCD tests for a wide range of constituents to inform stakeholders of the quality of water that they are receiving. As previously mentioned, the CAWCD baseline monitoring program aligns with the [Guidance Document](#) for Introducing Non-Project Water. The Guidance Document identifies 47 priority constituents with Introduction and Delivery standards (Table A-1) and nearly 185 additional contaminants that should not be introduced (Table A-2).

Similar to 2022, the third-party laboratory used by CAP was in a transitional state and utilized a number of subcontracted (licensed) laboratories for various analyses through the first half of 2023. Although there is confidence in the test results, subcontracted laboratories reported varying MRL's, so comparisons of results to previous years are more difficult to interpret (see Table on pages 8-9).

The 2023 average values of several naturally occurring metals (Aluminum, Barium, Lead, Manganese, Molybdenum, Potassium, and Vanadium) were more than 10% higher in 2023 than the 5-year average (2018-2022). Additionally, bromide, chloride, nitrate, and turbidity were all more than 10% higher than the 5-year average. Increases in several of these constituents are likely related to reduced flows in the Colorado River basin (and subsequently the CAP System), as contaminants and sediments tend to accumulate in slower moving water. Despite these modest increases, water quality in the CAP continues to be considered "high quality surface water".

There were occasional spikes in various other priority constituents which were likely related to CAP Operations. For example, sediments are re-suspended when pumps are cycled off and on, which can cause metals and other constituents that bind to those sediments to be detected in the water column. A complete table of priority constituent values measured monthly at each sample site is included in Appendix A.

Of the 183 constituents listed in Table A-2 of the Guidance Document, just five were detected in the CAP system in 2023. Those contaminants are listed in the table on Page 10, followed by a short description of the contaminant and its potential source.

The contracted laboratories also include nearly 100 additional contaminants and naturally occurring substances in semi-annual analyses. These substances are not included in the Guidance Document, but can be detected with the applied testing methods. In 2023, there were five natural substances detected (cyanotoxins, minerals, and nutrients), but no synthetic substances detected (see list below). Each of these constituents was detected at very low levels and only sporadically throughout the system.



## Detected Constituents not included in Table A-2

### Natural Substances

#### Cyanotoxins

- Cylindrospermopsin

#### Minerals

- Magnesium
- Silica

#### Nutrients

- Orthophosphate as P
- Orthophosphate as PO4

# SYSTEM-WIDE RANGES AND AVERAGES

## 2023 Summary of Priority Constituents

Constituent	Units	MRL <sup>1</sup>	2023 Range	2023 Average	CAP 5-Yr Average (2018-2022)
<b>Field Measurements</b>					
Dissolved Oxygen	mg/L		1.74 - 12.11	8.97	9.21
pH	Units		7.05 - 8.79	8.10	8.05
Specific Conductance <sup>2</sup>	µS/cm		847 - 1133	1015.96	925.59
Temperature	°F		51.9 - 87.6	67.37	66.93
<b>Laboratory Results</b>					
Alkalinity	mg/L	2	93 - 140	124.90	124.56
Aluminum (Dissolved)	mg/L	2, 20	ND - 35	7.54	9.81
Aluminum (Total)	µg/L	2, 10, 20	ND - 1300	105.26	84.31
Ammonia Nitrogen	mg/L	0.03, 0.1	ND - 0.33	0.04	0.04
Antimony (Total)	µg/L	1	Non-Detect	Non-Detect	Non-Detect
Arsenic (Total)	µg/L	1	1.8 - 4.6	2.94	2.68
Barium (Total)	µg/L	2	100 - 170	127.11	116.65
Beryllium (Total)	µg/L	0.3, 1	Non-Detect	Non-Detect	Non-Detect
Boron (Total)	mg/L	0.025, 0.05	0.12-0.16	0.14	0.13
Bromide	µg/L	5, 10	85 - 120	99.82	81.85
Cadmium (Total)	µg/L	0.5	Non-Detect	Non-Detect	Non-Detect
Calcium (Total)	mg/L	0.1, 1	53 - 110	69.73	70.18
Chloride	mg/L	1, 2.5, 10, 20	20 - 140	106.84	92.49
Chromium (Total)	µg/L	0.9, 1	ND - 2.1	0.64	0.60
Cobalt (Total)	µg/L	2	Non-Detect	Non-Detect	1.01
Copper (Dissolved)	µg/L	1, 2	ND - 2.1	1.09	1.04
Fluoride	mg/L	0.05	0.31 - 0.47	0.36	0.33
Gross Alpha	pCi/L	0.39	1.8 - 9.3	3.75	3.26
Gross Beta	pCi/L	2.8	ND - 10.5	6.75	5.19
Hexavalent Chromium	µg/L	0.02	ND - 0.061	0.02	0.05
Iron (Dissolved)	mg/L	0.01	ND - 0.31	0.01	0.01
Lead (Total)	µg/L	0.5	ND - 2	0.31	0.28
Manganese (Total)	µg/L	2	ND - 54	8.04	6.48

<sup>1</sup> MRL's varied in 2023, as the primary laboratory used by CAP utilized a number of satellite laboratories

<sup>2</sup> Not included as part of the 10/26/20 DRAFT Guidance Document



# RANGES AND AVERAGES (CONTINUED)

Constituent	Units	MRL	2023 Range	2023 Average	CAP 5-Yr Average (2017-2021)
<b>Laboratory Results (cont.)</b>					
Mercury	µg/L	0.2	Non-Detect	Non-Detect	Non-Detect
Molybdenum (Total)	ug/L	2	4.3 - 5.8	5.00	4.57
Nickel (Total)	µg/L	1, 5	ND - 3.3	2.14	2.44
Nitrate	mg/L	0.1, 0.25	ND - 0.51	0.17	0.10
Nitrite	mg/L	0.1, 0.25	Non-Detect	Non-Detect	0.04
Perchlorate	µg/L	0.5, 2	ND - 2.1	1.13	1.36
Potassium (Total)	mg/L	0.2, 1	4.3 - 6.5	5.63	4.91
Radium 226/228	pCi/L	0.1	ND - 2.6	0.37	0.90
Selenium (Total)	µg/L	2, 5	ND - 2.2	1.97	2.42
Silver (Total)	µg/L	0.5	Non-Detect	Non-Detect	Non-Detect
Sodium (Total)	mg/L	1	81 - 120	96.13	88.82
Strontium (Total)	mg/L	0.01, 2	0.9 - 1.3	1.09	1.03
Sulfate	mg/L	1.3, 25, 50	190 - 270	230.84	220.11
Thallium (Total)	µg/L	0.3, 1	Non-Detect	Non-Detect	Non-Detect
Total Dissolved Solids	mg/L	10, 20	550 - 720	641.98	594.23
Total Organic Carbon	mg/L	0.2, 0.3, 0.4, 0.5	2 - 4.4	3.19	3.33
Total Phosphorus as P	mg/L	0.02, 0.05	ND - 0.29	0.02	0.02
Turbidity	NTU	0.1	0.2 - 26	2.46	1.84
Uranium	µg/L	1	3.8 - 5.2	4.35	4.04
Vanadium (Total)	µg/L	2, 3	ND - 5.1	2.37	2.00
Zinc (Total)	µg/L	5, 20	Non-Detect	Non-Detect	Non-Detect

# DETECTED CONTAMINANTS TABLE

Constituent	Location	Month	Value	Units	MRL	Source of Contamination
<b>2,4-D</b>						<b>Agricultural/Residential runoff</b>
	San Xavier	May	3.8	µg/L	0.1	
	San Xavier	Nov	0.22	µg/L	0.1	
<b>Perfluorooctanoic acid (PFOA)</b>						<b>Industrial processes</b>
	Lake Pleasant Parkway	Nov	2.2	ng/L	2	
	San Xavier	Nov	2.0	ng/L	2	
<b>Ethylene Glycol</b>						<b>Pollutant (anti-freeze)</b>
	Lake Pleasant Parkway	May	7.2	mg/L	5	
<b>E. coli (Present)</b>						<b>Fecal transfer</b>
	All Sites	May, November				
<b>Total Coliform</b>						<b>Occurs naturally, Fecal transfer</b>
	All Sites	May, November				



# DESCRIPTION OF DETECTED CONTAMINANTS

## REGULATED CONTAMINANTS

**2,4-D** is one of the most common weed killers in the U.S. It was developed in the 1940's and is widely used in agriculture, as well as a backyard lawn treatment. It attacks the roots and leaves of weeds by making plant cells grow out of control. Although it was once thought to be safe, it is now considered a possible human carcinogen. It is an EPA regulated contaminant, but was detected in low levels at only one location in 2023. Because 2,4-D was only detected in the southern part of the system (San Xavier Pumping Plant), it likely entered the system through agricultural runoff.

## UNREGULATED CONTAMINANTS

**PERFLUOROOCCTANOIC ACID (PFOA)** is a xenobiotic (foreign to an ecological system) and an environmental contaminant. It is part of the PFAS group that are man-made chemicals used in a variety of industries around the globe. Recently, PFAS have been identified as causing adverse human health effects. PFOA is used in products that resist sticking, heat, water, stains, and grease. Some of those products include Teflon, stain-resistant carpeting, water-repellent clothing, cardboard packaging, and foam fire extinguishant. In 2023, PFOA was detected in very small amounts at Lake Pleasant Parkway and San Xavier Pumping Plant in November.

**ETHYLENE GLYCOL** is mainly used for two purposes, as a raw material in the manufacture of polyester fibers and for antifreeze formulations. It is an odorless, colorless, flammable, viscous liquid. It was detected at Lake Pleasant Parkway in May and is likely a product of recreational boating upstream in Lake Pleasant.

## MICROBIOLOGY

**E.COLI** is a bacterium commonly found in the intestines of humans and animals. It typically does not cause harm to humans, although some strains can cause illness. It is most easily transferred through fecal matter. Detections at Lake Havasu, Lake Pleasant, and Lake Pleasant Parkway suggest that the reservoirs are a source of contamination, while detection at San Xavier may be related to runoff from areas holding livestock.

**TOTAL COLIFORM** is a measurement of the coliform bacteria in a water source. Coliform bacteria occur naturally in soils, water, vegetation, and in the intestines of warm-blooded organisms. Most are harmless to humans, although some micro-organisms can cause illnesses. Due to the widespread distribution of coliform bacteria, detections in surface water samples are expected.



# LAKE PLEASANT OPERATIONS

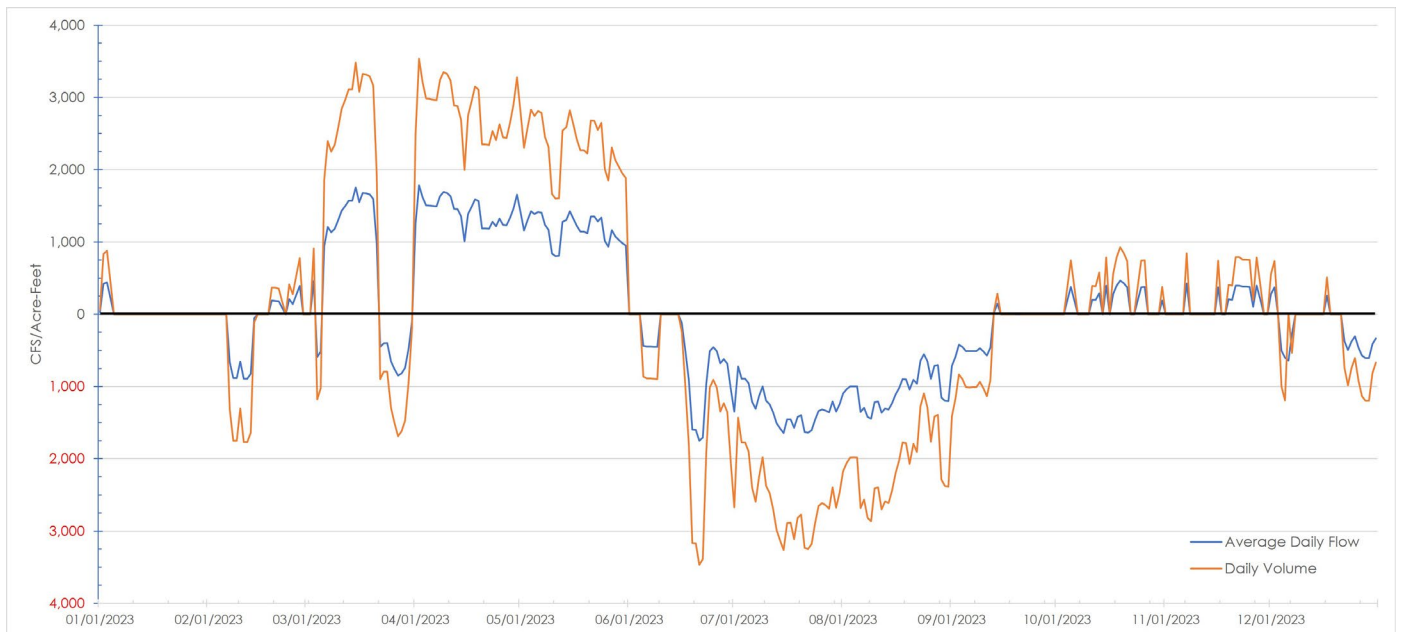
The CAP System utilizes Lake Pleasant as a seasonal pump-storage reservoir. During a typical year, Colorado River water is pumped into the reservoir from October to May when water demands and electricity costs are lower. During the summer, when water demands and electricity costs are higher, water is released from the reservoir for customer deliveries. These annual water level fluctuations may be modified based on required maintenance of the system, as well as stakeholder demand, which can vary based on rainfall and air temperature.

In 2023, typical pumping and releasing (generating) during spring was interrupted by a 7-day shut down at Mark Wilmer Pumping Plant in late March. This was in response to flood release flows from Alamo Lake that caused extremely high turbidity. Water was released from Lake Pleasant during this period to meet customer demand. Even with reduced pumping in spring, fall pumping was relatively low due to the reduced supply and conservation measures implemented by various stakeholders. As a result, lower volumes of water were released from the lake during fall.

As in the previous two years, a more gradual transition from Lake Pleasant to Colorado River water was employed in early September to minimize impacts caused by the re-suspension of sediments. This approach has been effective in reducing downstream turbidity and total organic carbon levels during the fall.

Overall, the lake experienced a less severe “swing” between high and low water levels than in previous years (i.e. more water remained in the lake). The high water level of 1,696.39 occurred on June 1st, while the low water level of 1,664.94 occurred on January 1st. The 31.45-foot elevation change was similar to 2022, but nearly 18% lower than the average change over the last 5 years. Additionally, the annual average water elevation in 2023 was nearly four feet lower than the 2019–2022 average elevation.

2023 Lake Pleasant Operations	
Average Water Elevation	1,676.71 (ft)
Highest Water Elevation (06/01/23)	1,696.39 (ft)
Lowest Water Elevation (01/01/23)	1,664.94 (ft)
Change in Elevation:	31.45 (ft)



Lake Pleasant average daily inflow/outflow (cfs) and volume (acre-feet). Positive levels represent when water is pumped into Lake Pleasant from the CAP (pumping), while negative values represent when water is discharged from Lake Pleasant into the CAP canal (generating).

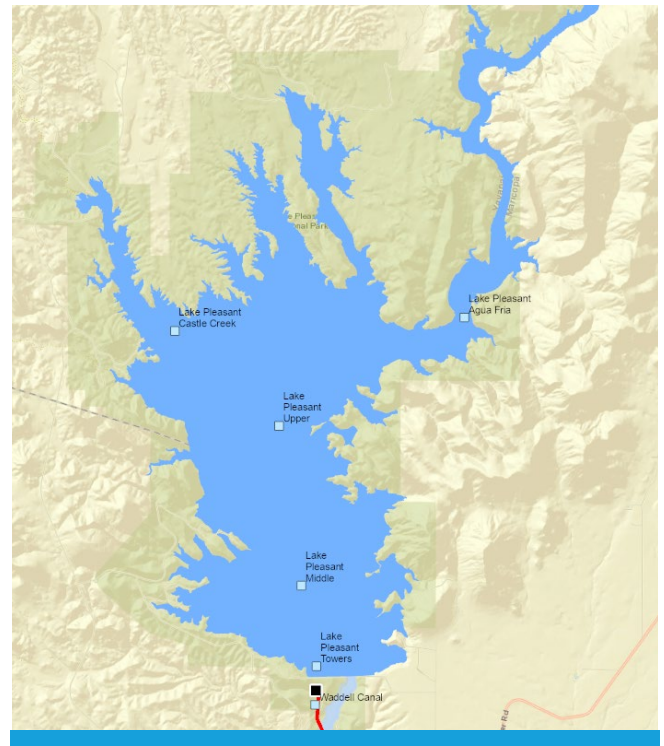
# LAKE PLEASANT WATER QUALITY

From 1996–2022, CAP sampled water quality every quarter at a single site near the intake towers at Waddell Dam, and included Table A-1 and Table A-2 constituents. Sampling at the Towers was continued in 2023, but on a semi-annual basis (see Appendix A).

In addition to the semi-annual sampling, three sites (Towers, Middle, and Upper; see map on right) were sampled each month in 2023. Depending on the time of year, samples were collected from 1–3 depths (epilimnion, metalimnion, hypolimnion) and were analyzed for 16 nutrient-related constituents (see Appendix A). These samples allow for CAP to use water quality modeling to gain a better understanding of the nutrient dynamics in the lake and how they affect the canal. Vertical profiles were also measured at each of these three sites, as well as two additional sites in the Agua Fria River and Castle Creek.

There were few noticeable patterns in water quality constituents at Lake Pleasant throughout the year:

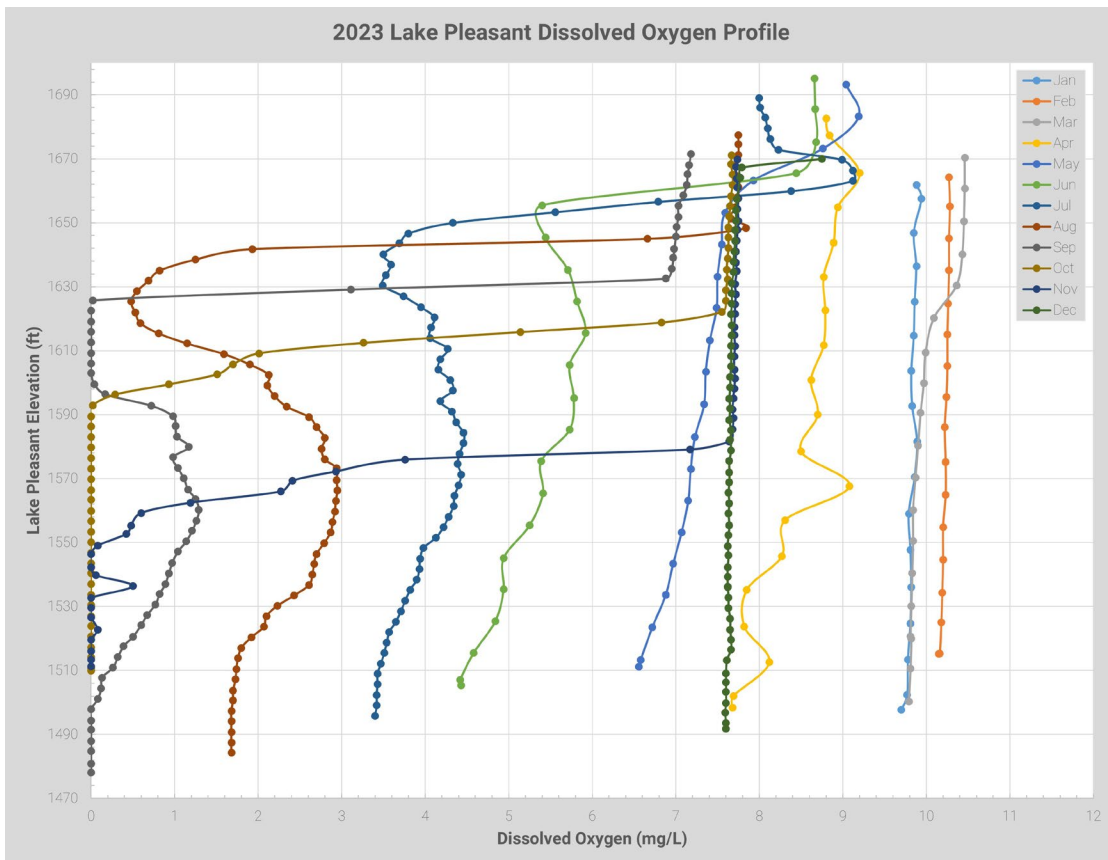
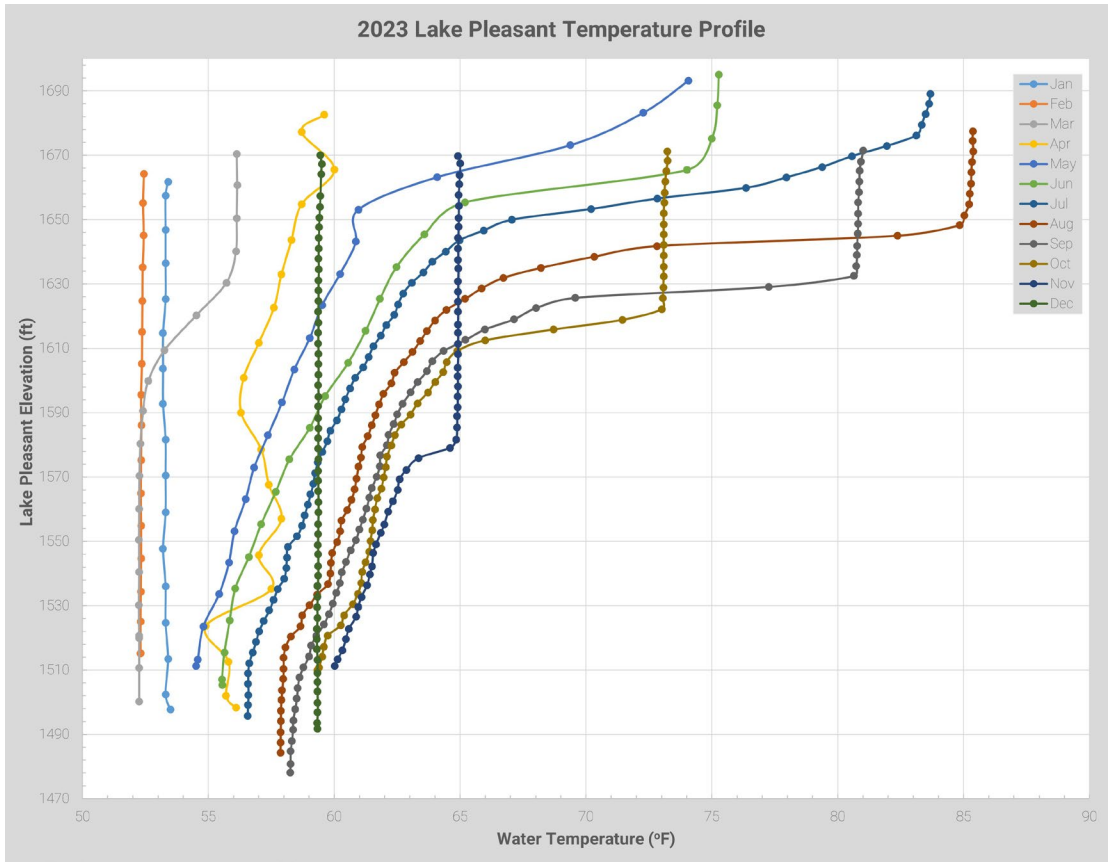
- Ammonia Nitrogen was highest at all sites from September through December, but low overall.
- Dissolved Organic Carbon was similar at all sites, but highest in the epilimnetic samples during summer months.



- Nitrates, nitrites, and phosphorus were rarely detected in samples.
- Total Dissolved Solids (TDS) ranged from 540 to 650 mg/L and was highly variable at all sites and depths.
- Secchi depths (visibility into the water column) were nearly the same at the three lake sites, but was noticeably lower near the Towers in October and November when pumping from the canal had stopped.

In May, the lake began to stratify at about 25 feet below the water surface. The thermocline continued to move to lower depths throughout the summer months, eventually reaching about 90 feet in November (see monthly profiles, Page 14). In December, the cooler air temperatures allowed the lake to completely mix (no thermocline). The prolonged thermocline created an oxygen deficit (0 mg/L) at about 46 feet below the surface in September and moved downward in the water column through November.

# LP TOWERS MONTHLY PROFILES

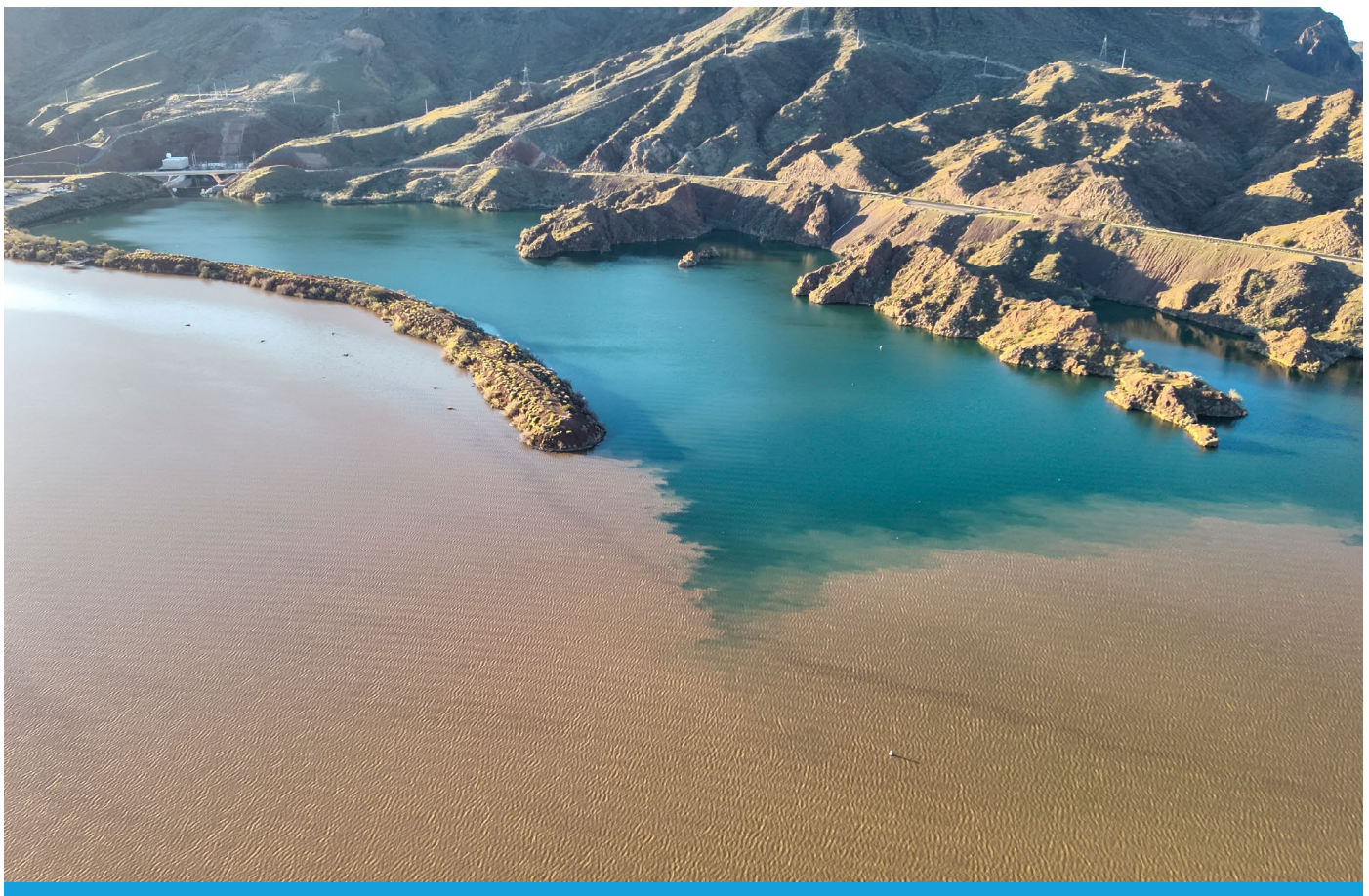


# ALAMO DAM RELEASES

Releases from Alamo Dam often create a degradation of water quality in both the Bill Williams River and in the southernmost portions of Lake Havasu. Due to the proximity of the CAP intakes to the Bill Williams River, this degradation of water quality can have significant impacts to the CAP system and its stakeholders. During past events, the increase in suspended sediments transported into the CAP System has resulted in increased maintenance to critical infrastructure, clogging of recharge basins, and an increase in costs related to operational changes. For CAP stakeholders, past high flow events have led to increased maintenance frequency and costs, as well as increases in treatment costs related to high turbidity, total organic carbon (TOC) and alkalinity.

Much of the State of Arizona received above average precipitation in the Spring of 2023. Heavy runoff into Alamo Lake caused water levels to rise rapidly in March and April, creating the need for the US Army Corps of Engineers (Corps) to release water from the lake.

The magnitude and duration of water releases from the dam can have varying effects on CAP water quality. In 2023, the Corps worked closely with CAP, and a number of State and Federal agencies, to develop a release hydrograph that would achieve the desired result of lowering water levels in Alamo while minimizing downstream impacts. Due to the high volume of water in the lake, it was necessary to achieve high flows for a short period and extend the release until a sufficient amount of water was discharged.



However, continued precipitation after the initial release created the need to adjust discharge rates and duration while the release was in progress. Weekly coordination meetings in the early portions of the release allowed the Corps to modify releases based on data and feedback from stakeholders.

As expected, the flood release significantly impacted water quality in Lake Havasu and at the CAP intakes. Turbidity reached 1,000 NTU at the mouth of the Bill Williams, Total Organic Carbon (TOC) was measured in excess of 8 mg/L, and there was significant debris brought into the lake. CAP responded by curtailing pumping at Mark Wilmer Pumping Plant for over seven days, which successfully reduced the water quality impacts to CAP and downstream water users. Although CAP experienced some direct and indirect impacts from the release (e.g. increased maintenance to filters and strainers, increased algae growth), and Municipal treatment plants modified treatment processes to meet drinking water standards, the monitoring and pumping modifications largely protected CAP and its stakeholders from the initial surge of sediment and debris.

### **Water Control Manual**

The Corps, who constructed and operate Alamo Dam, continue to work on an update to their Water Control Manual. The Manual details the operation of Alamo Dam, specifies frequency of dam maintenance, and outlines conditions for releases of water from the dam. Release of the DRAFT manual has been delayed for several years, but is expected to be available for public comment at some point in 2024, with a final release date later in the year.







# SALINITY CONTROL PROGRAM

The Colorado River provides domestic and industrial water to approximately 27 million people in the western United States and is used to irrigate approximately 4 million acres of land. However, salinity levels in the river water have historically been high, which can reduce crop yields, limit the choice of crops that can be grown, make the land unsuitable for agricultural purposes, and kill riparian vegetation.

In 1975, the seven Colorado River Basin states adopted a salinity standard for the Colorado River. That standard, which was approved by the EPA, is composed of numeric criteria for total dissolved solids (TDS) and a plan of implementation to meet the criteria. Since the program's implementation, salinity in the river has been reduced by approximately 100 mg/L. For CAP stakeholders, this translates to approximately 220,000 tons of salt that did not enter the CAP service area.

CAWCD participates with Arizona and the other Basin States and Federal Agencies in the implementation of the Program. CAWCD also works with the Colorado River Basin Salinity Control Forum and the Forum's technical workgroup to address funding and other issues associated with program implementation.

# GROUNDWATER RECHARGE

CAWCD has developed and currently operates six recharge projects:

1. Pima Mine Road Recharge Project
2. Lower Santa Cruz Recharge Project
3. Agua Fria Recharge Project
4. Hieroglyphic Mountain Recharge Project
5. Tonopah Desert Recharge Project
6. Superstition Mountains Recharge Project

The Tucson Active Management Area (AMA) recharge facilities have a cumulative operational capacity of 58,500 acre-feet per year and include the Pima Mine Road and Lower Santa Cruz Recharge Projects. In the Phoenix AMA, there are four facilities: the Tonopah Desert, Hieroglyphic Mountains, Agua Fria, and Superstition Mountains Recharge Projects, with a combined annual operational capacity of 233,000 acre-feet.

A portion of the permitting process and regulatory compliance for these projects requires periodic water quality monitoring. The sampling results are compiled into an annual report, which is a matter of public record and is submitted to the Arizona Department of Water Resources. Copies of the reports, or portions of the reports, are available by contacting:

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# APPENDIX A. WATER QUALITY TABLES

# LAKE HAVASU 2023 (MARK WILMER PUMPING PLANT)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	9.66	10.48	10.34	9.97	8.26	7.8		6.82	7.94	6.74	8.97	9.02
pH	Units	7.55	8.11	8.24	7.76	8.19	8.54	8.52	7.32	8.25	8.05	7.93	7.99
Conductivity	us/cm	973	1017	1042	1003	1035	1026.1	1043	1133	1131	1119	1115	1094
Temperature	degF	56.5	53.1	58.7	61	72.6	79.02	85.8	80.1	79	74	65.5	60.4

<b>Primary Analytes</b>													
Alkalinity	mg/L	130	130	130	140	140	140	120	130	130	120	130	130
Aluminum (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	35	ND	ND	ND
Aluminum (Total)	ug/L	37	86	53	280	190	42	ND	170	69	220	160	100
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	0.13	ND	0.042	ND	ND
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2.4	2.4	2.5	3.3	2.9	2.3	2.9	2.8	2.9	2.3	2.3	2.6
Barium (Total)	ug/L	120	120	130	130	130	130	140	140	140	150	150	160
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	130	130	130	150	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.15
Bromide	ug/L	89	99	97	96	110	110	100	99	100	97	110	110
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	73	75	75	78	74	75	66	71	74	75	74	77
Chloride	mg/L	100	ND	100	100	100	110	110	110	120	120	120	120
Chromium (Total)	ug/L	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.3	1.2	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	0.33	0.32	0.35	0.36	0.39	0.38	0.37	0.34	0.35	0.35	0.34	0.36
Gross Alpha	pCi/L	4.1	3.2		2.9	4.1	4.7		3.6	4.1	4.8	3.9	4.5
Gross Beta	pCi/L	7.9	7.7		7.5	10.5	5.7		6.3	7.8	6.9	ND	6.9
Hexavalent Chromium	ug/L	0.039	0.026	0.04	0.041	0.035	0.031	0.027	ND	ND	ND	ND	ND
Iron (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	3.3	5.7	4.4	11	10	5.2	7.3	19	9.2	13	8.6	6.8
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.3	4.8	5.1	5.2	4.9	4.8	5.1	4.7	5.1	5	5.3	5.8
Nickel (Total)	ug/L	1.5	1.1	1.2	1.8	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate	mg/L	0.21	0.35	0.4	0.51	0.3	0.26	ND	ND	0.23	ND	0.3	0.32

# LAKE HAVASU 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	1.1	1.6	2.1	2.1	ND	ND	ND	ND	ND	ND	ND	ND
Potassium (Total)	mg/L	5.3	5.7	6	6.3	5.5	5.6	4.9	5.3	5.4	5.4	5.5	5.7
Radium 226/228	pCi/L	ND							ND	ND	ND	ND	ND
Selenium (Total)	ug/L	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	100	95	96	110	96	100	93	98	100	98	98	100
Strontium (Total)	mg/L	1.1	1.1	1.2	1.1	1.1	1.2	1.1	1.1	1.2	1.2	1.1	1.2
Sulfate	mg/L	220	250	220	220	220	230	250	250	250	250	260	250
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	650	680	680	640	650	670	680	660	680	670	670	680
Total Organic Carbon	mg/L	2.3	2	2	2.5	4.3	4.1	3	3	3	3	2.9	2.8
Total Phosphorus	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	1.3	3.1	1.6	4.5	4.8	1.3	1.1	4.4	0.85	3.7	2.7	2
Uranium	ug/L	4.1	4.4	4.5	4.4	4.5	4.3	4.2	4.5	3.9	4.5	4.7	5.2
Vanadium (Total)	ug/L	2.6	2.7	2.7	3.2	ND	3.5	ND	ND	ND	ND	4	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

# HASSAYAMPA PUMPING PLANT 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	10.73	10.89	9.86	11.34	9.08	9.94	10.72	8.35		7.89	9.43	10.08
pH	Units	8.15	7.76	8.14	8.31	8.25	8.47	8.55	8.58		8.16	8.79	7.94
Conductivity	us/cm	964	970	1039	940	1018	1076	911	1008		1119	1080	1086
Temperature	degF	54.5	55.9	57	65.1	74.7	80.3	83.4	86.2		74.5	62.82	58.7

<b>Primary Analytes</b>													
Alkalinity	mg/L	130	130	140	140	130	130	110	100	110	130	130	130
Aluminum (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aluminum (Total)	ug/L	6.3	8.2	1300	450	87	ND	ND	ND	4.5	35	ND	ND
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.067	ND
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2.3	2.4	3.1	3.9	2.8	2.5	2.4	2.5	2.7	2.8	2.1	2.2
Barium (Total)	ug/L	110	120	170	120	130	120	130	120	140	150	150	150
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	130	130	140	150	0.15	0.15	0.15	0.15	0.12	0.14	0.14	0.14
Bromide	ug/L	87	94	94	98	100	110	100	100	100	100	100	110
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	71	72	110	76	75	69	69	61	60	71	74	71
Chloride	mg/L	100	100	100	94	110	110	120	140	120	120	120	120
Chromium (Total)	ug/L	1.2	2.1	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.9	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	0.31	0.35	0.34	0.4	0.38	0.42	0.4	0.38	0.35	0.34	0.36	0.36
Gross Alpha	pCi/L	3.3	1.8	4.2	2.9		2.6	3.3	3.3	4.8	4.9	4.3	4.1
Gross Beta	pCi/L	7.3	9.6	7.7	8.8		8.2	4.6	6	7.3	7.9	ND	5.6
Hexavalent Chromium	ug/L	0.038	0.031	0.04	0.041	0.029	0.034	0.023	0.023	ND	ND	ND	ND
Iron (Dissolved)	mg/L	0.013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	2	0.58	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	ND	ND	54	15	4.9	ND	2.2	10	ND	3.2	ND	ND
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.4	4.7	5	5.1	5.1	5.1	5.1	4.5	4.7	4.7	5.4	5.7
Nickel (Total)	ug/L	1.5	1.2	3.1	2.3	ND	ND	ND	ND	1.1	ND	ND	ND
Nitrate	mg/L	0.16	0.18	0.39	0.28	ND	ND	ND	ND	ND	0.26	0.25	0.27
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	1	1.1	1.9	1.8	ND	ND	ND	ND	ND	ND	ND	ND

# HASSAYAMPA 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.5	5.6	6.4	6.4	5.6	5.4	5.6	5.5	5	5.2	5.6	5.3
Radium 226/228	pCi/L								0.4	1.4	0.6	ND	ND
Selenium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	91	100	100	88	99	94	100	100	90	95	99	95
Strontium (Total)	mg/L	1.1	1.1	1.3	1.0	1.1	1.1	1.2	1.1	1	1.1	1.1	1.1
Sulfate	mg/L	220	230	220	200	220	220	250	270	260	260	250	250
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	650	690	670	600	650	640	670	650	590	710	670	660
Total Organic Carbon	mg/L	2.4	2.3		3.2	3.8	3.6	3.3	4.4	3.2	3.2	3	2.9
Total Phosphorus	mg/L	ND	ND	0.29	0.051	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.35	0.25	22	9.7	0.95	0.3	0.25	0.65	0.35	0.8	0.35	0.35
Uranium	ug/L	4.1	4.2	4.8	4.2	4.4	4	4.2	3.9	4.2	4.6	4.8	5
Vanadium (Total)	ug/L	2.4	2.8	5.1	4	ND	ND	ND	ND	2.4	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	6.1	ND	ND	ND	ND	ND	ND	ND	ND	ND



# WADDELL PUMPING PLANT 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	10.38	10.15	9.94	12.11	9.03	5.52	4.23	3.02	1.74	8.57	9.49	7.45
pH	Units	7.95	8.47	8.16	8.36	8.3	7.98	7.79	7.88	7.22	8.16	8.03	7.9
Conductivity	us/cm	921	983	1030	933	988	932	847	930	958	1113	1109	1011
Temperature	degF	57.7	53.8	59.1	66.5	77	59.5	58.5	59.2	61.2	74.2	63.2	61.4

<b>Primary Analytes</b>													
Alkalinity	mg/L	130	130	140	140	130	130	120	130	130	120	120	130
Aluminum (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aluminum (Total)	ug/L	3.8	17	670	750	67	76	51	40	10	25	ND	63
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.089	0.048
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	3	3.9	3.2	4	2.7	3.7	4.3	3.8	4	3.3	2.4	4.6
Barium (Total)	ug/L	110	110	140	130	130	110	100	110	110	140	150	110
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	130	140	130	150	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Bromide	ug/L	93	110	94	96	100	98	97	100	100	100	100	120
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	69	67	83	78	74	64	63	61	74	71	71	63
Chloride	mg/L	100	98	110	94	110	91	91	93	95	120	120	100
Chromium (Total)	ug/L	1.4	1.8	1.1	0.99	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	2	1.7	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	0.34	0.36	0.34	0.41	0.36	0.36	0.39	0.35	0.36	0.36	0.34	0.37
Gross Alpha	pCi/L	4.3	3	2.5	3.2	3.4	3.8	3.1	3.4	2.9	4.9	3.5	3.9
Gross Beta	pCi/L	8.2	9	8.1	7.6	6.7	6.9	7.5	5.8	7.2	6.5	3.9	6.1
Hexavalent Chromium	ug/L	0.05	ND	0.035	0.041	0.032	0.021	ND	0.024	ND	ND	ND	ND
Iron (Dissolved)	mg/L	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	1.3	1.2	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	4.8	3.1	32	34	3.5	13	11	11	38	20	4.6	22
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.7	5	4.8	5.2	5.2	4.7	4.7	4.6	4.5	4.8	5.2	5.4
Nickel (Total)	ug/L	1.1	1.3	2.6	2.6	ND	ND	ND	ND	1.2	ND	ND	ND
Nitrate	mg/L	0.12	ND	0.42	0.25	0.27	ND	ND	ND	0.23	ND	0.22	ND
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	0.75	0.33	1.9	1.8	ND	ND	ND	ND	ND	ND	ND	ND

# WADDELL 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.5	6.1	5.9	6.5	5.5	5.4	5.2	5.1	5.9	5.6	5.5	5.5
Radium 226/228	pCi/L								0.7	ND	0.8	ND	ND
Selenium (Total)	ug/L	ND	ND	2.2	2	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	98	99	96	92	98	87	87	85	99	100	97	91
Strontium (Total)	mg/L	1.1	1.0	1.2	1.0	1.2	0.98	0.97	0.99	1.1	1.1	1.1	1
Sulfate	mg/L	220	230	240	200	230	210	210	210	200	250	260	220
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	630	630	660	600	630	590	620	550	570	650	690	610
Total Organic Carbon	mg/L	2.4	2.7		3.5	3.4	3.8	3.8	3.8	3.5	3.1	3	3.6
Total Phosphorus	mg/L	ND	ND	0.081	0.055	ND	0.022	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.4	0.6	26	12	1	2	1.2	0.75	0.4	0.4	0.55	0.9
Uranium	ug/L	4.2	4.2	4.7	4.3	4.5	3.9	4	3.9	3.9	4.1	4.7	4.5
Vanadium (Total)	ug/L	2.8	3.3	4.3	5	3	ND	3.2	ND	2.7	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

# LAKE PLEASANT PARKWAY 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	10.52	11.07	9.9	12.07	9.54			4.69	8.73	8.81	9.58	7.2
pH	Units	8.29	8.24	8.22	8.52	8.43	8.28	7.42	7.05	8.27	8.02	8.14	7.78
Conductivity	us/cm	971	992	1036	961	1014	1072	916	956	1119	1113	1111	994
Temperature	degF	54.2	51.9	60.1	66	75.9	77.4	66.9	61.8	79.6	72.5	62.1	61.8

<b>Primary Analytes</b>													
Alkalinity	mg/L	120	130	130		130	130	120	130	120	120	130	130
Aluminum (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25	ND
Aluminum (Total)	ug/L	6.8	5.4	770	300	66	27	82	93	2.8	21	ND	34
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	0.33	0.056	ND	ND	0.056	0.042
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2.4	2.2	2.7	3.6	2.6	2.5	4.1	4.2	2.7	2.7	1.9	4.3
Barium (Total)	ug/L	110	120	140	120	130	130	110	110	140	160	150	120
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	120	130	160	150	0.15	0.15	0.13	0.14	0.16	0.15	0.15	0.15
Bromide	ug/L	86	87	86	100	100	100	99	100	100	99	100	120
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	71	72	83	75	74	72	58	65	80	77	75	65
Chloride	mg/L	100	100	100	97	100	100	95	99	120	110	120	96
Chromium (Total)	ug/L	1.2	1.5	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.9	2.1	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	0.31	0.35	0.33		0.38	0.4	0.36	0.34	0.35	0.35	0.34	0.38
Gross Alpha	pCi/L	3.5	3.6	3.9			3.3	3.3	3.9		6	3.6	3.9
Gross Beta	pCi/L	5.9	6.5				6.4	7.5	7.5		8.4	4.2	7.8
Hexavalent Chromium	ug/L	0.035	0.035	0.029	0.039	0.034	0.034	ND	ND	ND	ND	ND	ND
Iron (Dissolved)	mg/L	ND	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	ND	ND	28	10	3	4	9.7	12	2.3	2.1	ND	11
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.4	4.6	4.8	5.3	4.9	5.1	5	5.2	5	5.3	5.3	5.4
Nickel (Total)	ug/L	1.5	1.1	2.2	3.3	ND	ND	ND	ND	1	ND	ND	ND
Nitrate	mg/L	0.16	0.16	0.43	0.27	ND	ND	ND	0.19	ND	0.19	0.27	ND
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	1	1.1	2.1	1.9	ND	ND	ND	ND	ND	ND	ND	ND

# LAKE PLEASANT PARKWAY 2023 (CONT)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.5	5.5	6.3	6.3	5.4	5.6	4.3	5.2	6.3	5.7	5.7	5.4
Radium 226/228	pCi/L							ND	ND		2.6	ND	ND
Selenium (Total)	ug/L	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	100	93	99	100	97	99	81	87	120	100	100	91
Strontium (Total)	mg/L	1.1	1.1	1.2	1.0	1.1	1.1	0.9	0.98	1.3	1.2	1.2	1
Sulfate	mg/L	220	230	230	210	220	220	210	210	260	250	250	210
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	640	670	670	620	640	670	600	580	660	690	680	600
Total Organic Carbon	mg/L	2.4	2.5	2	3.1	4.2	3.3	3.5	3.7	3.4	2.9	3	3.7
Total Phosphorus	mg/L	ND	ND	0.054		0.076	ND	0.021	ND	ND	ND	ND	ND
Turbidity	NTU	0.25	0.25	14	6.5	1.1	0.6	0.8	0.85	0.4	1.1	0.35	1.1
Uranium	ug/L	4	4.3	4.5	4.3	4.7	4.3	4.1	4.3	4.4	4.9	4.7	4.1
Vanadium (Total)	ug/L	2.3	2.5	3.8	3.6	3.1	ND	3.8	3.3	2.6	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

# ROOSEVELT WCD 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	10.59	10.56	10.23	11.02	9.11	8.69	10.88	7.47	7.17	8.09	9.84	10.14
pH	Units	8.08	8.05	8.12	8.53	8.13	8.43	8.51	7.14	7.72	8	7.96	8.1
Conductivity	us/cm	926	964	1024	948	990	978	954	961	1043	1119	1108	1102
Temperature	degF	55.7	53.5	57.8	67.3	76.2	70.1	70.4	68.9	77.2	75.8	64.4	57.4

<b>Primary Analytes</b>													
Alkalinity	mg/L	120	130	130	140	130	130	120	120	120	130	120	130
Aluminum (Dissolved)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aluminum (Total)	ug/L	4	12	91	340	200	40	22	22	11	ND	ND	ND
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	0.03	ND	ND	0.044	0.14
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2.5	3.7	2.4	4	2.6	3.1	3.6	4.3	3.3	3.2	1.8	2.3
Barium (Total)	ug/L	120	110	120	120	120	110	110	110	120	160	150	150
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	160	130	130	150	0.15	0.14	0.15	0.12	0.13	0.12	0.14	0.13
Bromide	ug/L	94	93	93	110	100	100	96	99	100	100	100	110
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	70	67	73	74	74	64	66	60	59	75	68	63
Chloride	mg/L	99	99	100	95	100	98	100	100	110	120	120	120
Chromium (Total)	ug/L	1.1	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.8	1.5	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	0.33	0.36	0.33	0.4	0.46	0.39	0.34	0.36	0.36	0.34	0.32	0.37
Gross Alpha	pCi/L	2.6	3.7	3.7	2.9		3.4	3.2	2.9	2.9	4.3	4	4.3
Gross Beta	pCi/L	9	9.5	7.3	9.2		7.8	5.2	4.8	5.2	7.7	3.1	6.9
Hexavalent Chromium	ug/L	0.036	ND	0.032	0.044	0.035	ND	0.023	ND	ND	ND	ND	ND
Iron (Dissolved)	mg/L	ND	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.034
Lead (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	ND	2.4	4.8	10	7.6	3.4	4.7	6.6	6.9	4.4	2.6	12
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.5	4.8	5	5.2	4.8	4.6	4.9	5.3	4.8	5.5	5.2	5.5
Nickel (Total)	ug/L	1.5	1.2	1.2	2	ND	ND	ND	ND	1.2	ND	ND	ND
Nitrate	mg/L	0.13	ND	0.25	0.27	ND	0.12	ND	ND	ND	0.2	0.18	ND
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	1	0.31	1.5	1.9	2.1	ND	ND	ND	ND	ND	ND	ND

# ROOSEVELT WCD 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.5	6	5.8	6.4	5.6	5.3	5.5	4.8	4.9	5.8	5.4	6.1
Radium 226/228	pCi/L								ND	ND	0.5	ND	ND
Selenium (Total)	ug/L	ND	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	97	100	94	92	97	90	95	83	87	100	98	86
Strontium (Total)	mg/L	1.1	1.0	1.1	1.0	1.1	1	1.1	0.93	1	1.2	1.1	1
Sulfate	mg/L	220	230	220	200	220	210	220	210	240	260	260	250
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	630	ND	650	600	640	610	620	570	640	700	670	700
Total Organic Carbon	mg/L	2.4	2.8	2.2	3.3	3.6	3.6	3.9	3.9	3.6	3.3	3	3
Total Phosphorus	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.3	0.45	4.1	11	0.95	0.9	0.6	1	0.85	0.4	0.2	0.35
Uranium	ug/L	4.2	4.2	4.5	4.3	4.1	4	4.2	4.4	4.1	4.5	4.7	4.6
Vanadium (Total)	ug/L	2.4	3	2.5	3.8	ND	ND	ND	3	2.6	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

# BRADY PUMPING PLANT 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	9.63	10.08	9.57	8.43	8.1	8.88		8.85	9.84	9.73	9.71	10.51
pH	Units	8.39	8.21	8.29	8.05	8.17	8.52	8.27	7.11	8.26	8.12	7.65	8.11
Conductivity	us/cm	955	945	1015	979	976	976	929	1016	1036	1089	1075	1082
Temperature	degF	55.5	58.4	63.5	70.7	79.2	80.93	79.8	82.1	80.6	76.2	63.5	57.5

<b>Primary Analytes</b>													
Alkalinity	mg/L	120	130	130	130	130	120	120	120	110	120	110	110
Aluminum (Dissolved)	mg/L	ND		ND	ND	ND	ND	ND		ND	ND	ND	ND
Aluminum (Total)	ug/L	99	89	88	84	39	32	ND	11	ND	33	29	38
Ammonia Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	0.032	ND	0.037	0.11	0.067
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2.6	3.3	2.2	3	3.1	2.5	3.9	3.8	3.5	3	2.2	1.8
Barium (Total)	ug/L	120	110	120	120	120	130	110	110	120	150	140	140
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	140	140	130	140	0.15	0.15	0.14	0.12	0.14	0.16	0.15	0.16
Bromide	ug/L	85	98	87	100	100	100	97	100	100	98	100	98
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	68	65	73	70	70	70	63	58	71	71	65	73
Chloride	mg/L	100	100	100	97	100	110	93	96	110	120	120	120
Chromium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.9		ND	1.2	ND	ND	ND		ND	ND	ND	ND
Fluoride	mg/L	0.32	0.34	0.35	0.4	0.47	0.39	0.37	0.38	0.36	0.34	0.35	0.36
Gross Alpha	pCi/L	3.4	3.3	4.4	3.2	3.3	3.9	3	3.6	3.1	4.4	3.5	4.2
Gross Beta	pCi/L	7.3	8.3	6.9	7.5	9.3	5	4.8	7.3	4.2	6.5	4.1	8.1
Hexavalent Chromium	ug/L	0.051	0.043	0.049	0.038	0.038	0.025	ND	ND	ND	ND	ND	ND
Iron (Dissolved)	mg/L	0.011		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	5.6	4.3	4.8	5.4	4.1	2.5	3.3	5.3	4.7	3.9	4.1	4.1
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.5	5.2	4.8	5.1	5	5	4.8	4.6	5.1	5.5	5.3	5.4
Nickel (Total)	ug/L	1.4	1	1.6	1.5	ND	ND	ND	1.5	ND	ND	ND	ND
Nitrate	mg/L	0.12	ND	0.34	0.23	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	0.95	0.3	1.7	1.9	ND	ND	ND	ND	ND	ND	ND	ND

# BRADY 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.2	6.1	5.8	6	5.6	5.7	5.4	5	6.2	5.8	6	6.2
Radium 226/228	pCi/L							ND	ND	1.7	0.6	ND	ND
Selenium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	89	100	95	92	97	99	88	86	110	110	100	110
Strontium (Total)	mg/L	1.0	1.0	1.1	1.1	1.1	1.1	1	0.96	1.2	1.2	1.2	1.3
Sulfate	mg/L	210	230	230	210	220	230	210	210	240	260	260	260
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	620	650	650	610	640	660	580	590	620	690	680	650
Total Organic Carbon	mg/L	2.3	2.5	2.2	2.9	3.7	3.5	4	3.8	3.8	3.2	3.1	3.2
Total Phosphorus	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	2.6	2.4	2.9	2.8	1.8	0.8	0.65	0.35	1.2	0.85	1.1	1.6
Uranium	ug/L	4.2	4.4	4.4	4.5	4.1	4.4	3.9	3.8	3.9	4.6	4.6	5
Vanadium (Total)	ug/L	2.3	2.9	2.4	3.5	ND	ND	ND	2.8	ND	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND



# SAN XAVIER PUMPING PLANT 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Field Measurements</b>													
Dissolved Oxygen	mg/L	9.29	9.52	8.94	7.94	8.49	8.74		6.46	8.11	8.14	9.47	9.53
pH	Units	8.16	8.15	8.21	7.78	8.32	8.68	8.35	7.44	8.26	8.19	8.03	7.99
Conductivity	us/cm	920	963	1037	940	985	1046	955	968	1057	1112	1122	1077
Temperature	degF	55.8	57.6	61.5	70.5	75	77.9	87.6	79.5	77.5	71.4	59	55.6

<b>Primary Analytes</b>													
Alkalinity	mg/L	120	130	130	140	130	110	110	110	110	99	100	93
Aluminum (Dissolved)	mg/L	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	
Aluminum (Total)	ug/L	67	59	200	100	62	73	44	100	140	60	ND	29
Ammonia Nitrogen	mg/L	0.13	0.19	ND	ND	ND	ND	ND	0.042	ND	0.036	0.055	ND
Antimony (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (Total)	ug/L	2	2.2	2.4	3.1	3.1	2.5	3.5	3.5	3.6	2.7	2.3	1.9
Barium (Total)	ug/L	110	110	120	110	120	120	120	120	130	150	140	130
Beryllium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (Total)	mg/L	140	140	130	150	0.15	0.15	0.13	0.13	0.14	0.15	0.16	0.15
Bromide	ug/L	88	96	91	110	110	110	100	97	110	110	110	110
Cadmium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (Total)	mg/L	66	67	72	67	67	60	55	53	68	64	66	59
Chloride	mg/L	100	110	110	93	110	110	100	98	110	130	130	130
Chromium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	ug/L	1.7		ND	1.3	ND	ND	ND	ND	ND	ND	ND	#N/A
Fluoride	mg/L	0.32	0.33	0.34	0.43	0.47	0.41	0.36	0.35	0.36	0.35	0.36	0.36
Gross Alpha	pCi/L	3.8	3.7	4.4	4	3	4.6	3.9	9.3	3.6	3.2	4.6	4.2
Gross Beta	pCi/L	7.7	5.6	10.3	6	6.1	5.9	5.2	7.3	8.3	5.3	2.9	7.8
Hexavalent Chromium	ug/L	0.061	0.036	0.036	0.039	0.033	0.023	ND	0.02	ND	0.022	ND	0.025
Iron (Dissolved)	mg/L	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese (Total)	ug/L	4.7	4	7.1	4.4	6.3	7	6.9	11	9.7	6.7	3.5	3.6
Mercury	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (Total)	ug/L	4.5	5.2	4.8	5.4	5.1	5.1	5.1	4.9	5.4	5.5	5.6	5.5
Nickel (Total)	ug/L	1.3	1	1.7	1.5	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate	mg/L	0.13	ND	0.23	0.16	ND	ND	ND	ND	ND	ND	ND	ND
Nitrite	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perchlorate	ug/L	0.88	0.4	1.4	1.6	ND	ND	ND	ND	ND	ND	ND	ND

# SAN XAVIER 2023 (CONTINUED)

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potassium (Total)	mg/L	5.2	5.9	5.8	6.1	5.6	5.4	4.6	4.9	6.4	5.7	6.2	6.2
Radium 226/228	pCi/L							ND	1	1.2	ND	0.6	ND
Selenium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Total)	mg/L	86	94	95	88	96	97	86	81	110	100	110	110
Strontium (Total)	mg/L	1.0	1.0	1.0	1.0	1.1	1	0.92	0.9	1.2	1.1	1.2	1.2
Sulfate	mg/L	210	220	230	190	220	230	220	210	250	260	270	270
Thallium (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Dissolved Solids	mg/L	630	650	ND	590	630	630	630	570	620	670	720	660
Total Organic Carbon	mg/L	2.3	2.5	2.2	3.2	4.1	3.8	3.7	3.8	4.2	3.4	3.5	3.5
Total Phosphorus	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	1.5	2	6.2	2.6	1.5	2	2.2	1.5	2.8	1.4	1	0.8
Uranium	ug/L	4.3	4.4	4.4	4.5	4.2	4.3	4.4	4.1	4.3	4.6	4.9	5
Vanadium (Total)	ug/L	2	2.2	2.8	3.7	3	ND	4	3.3	3.1	ND	ND	ND
Zinc (Total)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

# LAKE PLEASANT TOWERS 2023

Constituent	Units	Feb	Nov
<b>Primary Analytes</b>			
Alkalinity	mg/L	130	130
Aluminum (Dissolved)	mg/L	ND	ND
Aluminum (Total)	ug/L	11	ND
Ammonia Nitrogen	mg/L	ND	ND
Antimony (Total)	ug/L	ND	ND
Arsenic (Total)	ug/L	4	4.1
Barium (Total)	ug/L	110	110
Beryllium (Total)	ug/L	ND	ND
Boron (Total)	mg/L	130	0.14
Bromide	ug/L	97	120
Cadmium (Total)	ug/L	ND	ND
Calcium (Total)	mg/L	67	59
Chloride	mg/L	100	100
Chromium (Total)	ug/L	1.3	ND
Cobalt (Total)	ug/L	ND	ND
Copper (Dissolved)	ug/L	1.3	ND
Fluoride	mg/L	0.37	0.35
Gross Alpha	pCi/L	4.4	4.3
Gross Beta	pCi/L	4.5	2.9
Hexavalent Chromium	ug/L	ND	ND
Iron (Dissolved)	mg/L	ND	ND
Lead (Total)	ug/L	ND	ND

Constituent	Units	Feb	Nov
<b>Primary Analytes (cont.)</b>			
Manganese (Total)	ug/L	3.4	11
Mercury	ug/L	ND	ND
Molybdenum (Total)	ug/L	4.9	5.1
Nickel (Total)	ug/L	1.2	ND
Nitrate	mg/L	ND	ND
Nitrite	mg/L	ND	ND
Perchlorate	ug/L	0.31	ND
Potassium (Total)	mg/L	6	5.4
Radium 226/228	pCi/L		ND
Selenium (Total)	ug/L	ND	ND
Silver (Total)	ug/L	ND	ND
Sodium (Total)	mg/L	93	88
Strontium (Total)	mg/L	1000	0.96
Sulfate	mg/L	230	220
Thallium (Total)	ug/L	ND	ND
Total Dissolved Solids	mg/L	630	600
Total Organic Carbon	mg/L	2.8	3.9
Total Phosphorus	mg/L	ND	ND
Turbidity	NTU	0.6	0.55
Uranium	ug/L	4.1	4.2
Vanadium (Total)	ug/L	3.1	3
Zinc (Total)	ug/L	ND	ND

# LAKE PLEASANT (TOWERS) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Epilimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	ND		
Dissolved Organic Carbon	mg/L					4.3	4.4	4.4	4.3	4.5	4.3		
Kjeldahl Nitrogen	mg/L					0.36	0.2	0.17	0.32	0.24	0.27		
Nitrate	mg/L					ND	ND	ND	ND	ND	ND		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		
Orthophosphate as P	mg/L					ND	ND	ND	ND	ND	ND		
Secchi disk	ft							18	8.7	7.4	8.05	9.25	19.75
Silica	mg/L					2.7	3.7	3.6	4.5	4.5	4.7		
Total Dissolved Solids (TDS)	mg/L					590	610	600	610	560	600		
Total Organic Carbon	mg/L					4.7	4.2	4.4	4.6	4.5	4.3		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		
<b>Metalimnion</b>													
Alkalinity	mg/L		130									130	130
Ammonia Nitrogen	mg/L		ND	ND	ND	ND	ND	ND	0.044	ND	ND	ND	0.081
Dissolved Organic Carbon	mg/L		2.6	2.6	3.1	3.7	3.7	4	3.8	4.4	3.9	4	3.7
Kjeldahl Nitrogen	mg/L			0.32	0.41	0.23	0.16	0.24	0.24	0.25	0.2	0.14	0.29
Nitrate	mg/L		ND		0.14	ND	0.15	ND	ND	ND	0.19	ND	ND
Nitrite	mg/L		ND	ND	0.014	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate Nitrite as N	mg/L		ND	ND	0.15							ND	ND
Orthophosphate as P	mg/L		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Orthophosphate as PO4	mg/L		ND	ND	ND							ND	ND
Silica	mg/L		6.3	6	7.1	6.7	5.6	4.7	6	4.5	6.3	5.4	6.2
Total Dissolved Solids (TDS)	mg/L		630	630	600	600	610	580	580	600	600	600	590
Total Organic Carbon	mg/L		2.8	2.6	3.1	4	3.7	4.1	3.9	4.5	4	3.9	3.6
Total phosphorus as P	mg/L		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus as PO4	mg/L											ND	ND
Total Suspended Solids (TSS)	mg/L		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>Hypolimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	0.05		
Dissolved Organic Carbon	mg/L					3.8	3.7	3.5	3.5	3.5	3.5		
Kjeldahl Nitrogen	mg/L					0.21	0.15	0.2	0.21	0.17	0.21		
Nitrate	mg/L					ND	ND	ND	ND	0.13	0.13		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		
Orthophosphate as P	mg/L					ND	ND	ND	ND	0.011	ND		

# LAKE PLEASANT (TOWERS) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Hypolimnion (cont.)</b>													
Silica	mg/L					6.1	6	6	7.1	7.3	27		
Total Dissolved Solids (TDS)	mg/L					610	620	590	590	550	600		
Total Organic Carbon	mg/L					4.1	3.7	3.6	3.6	3.5	3.6		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		

# LAKE PLEASANT (MIDDLE) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Epilimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	ND		
Dissolved Organic Carbon	mg/L					4.3	4.2	4.5	4.3	4.4	4.3		
Kjeldahl Nitrogen	mg/L					0.25	0.2	0.2	0.15	0.28	0.26		
Nitrate	mg/L					ND	ND	ND	ND	ND	ND		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		
Orthophosphate as P	mg/L					ND	ND	ND	ND	ND	ND		
Secchi disk	ft							20.8	8.2	7.3	8.05	16.95	19.7
Silica	mg/L					2.9	3.7	3.6	4	4.4	4.7		
Total Dissolved Solids (TDS)	mg/L					580	600	590	580	580	600		
Total Organic Carbon	mg/L					4.7	4.2	4.4	4.6	4.5	4.2		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		
<b>Metalimnion</b>													
Alkalinity	mg/L		130										130
Ammonia Nitrogen	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	0.083
Dissolved Organic Carbon	mg/L		2.7	2.6		3.8	3.8	4.2	4	4.5	4.3	3.9	3.7
Kjeldahl Nitrogen	mg/L			0.56		0.19	0.25	0.22	0.14	0.24	0.29	0.27	0.25
Nitrate	mg/L		ND			ND	ND	ND	ND	ND	ND	ND	ND
Nitrite	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
Nitrate Nitrite as N	mg/L		ND	ND								ND	ND
Orthophosphate as P	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
Orthophosphate as PO4	mg/L		ND	ND								ND	ND
Silica	mg/L		6.3	6		5.8	3.5	4	4.8	4.4	4.7	5.5	6.3
Total Dissolved Solids (TDS)	mg/L		620	630		610	610	600	570	580	590	600	600
Total Organic Carbon	mg/L		2.7	2.7		4.1	3.7	4.3	4.4	4.4	4.1	3.8	3.6
Total phosphorus as P	mg/L		ND	ND		ND	0.03	ND	ND	ND	ND	ND	ND
Total Phosphorus as PO4	mg/L											ND	ND
Total Suspended Solids (TSS)	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
<b>Hypolimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	0.047		
Dissolved Organic Carbon	mg/L					3.8	3.7	3.5	3.5	3.5	3.6		
Kjeldahl Nitrogen	mg/L					0.19	0.15	0.17	0.2	0.17	0.21		
Nitrate	mg/L					ND	ND	ND	ND	0.13	ND		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		

# LAKE PLEASANT (MIDDLE) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Hypolimnion (cont.)</b>													
Orthophosphate as P	mg/L					ND	ND	ND	ND	ND	ND		
Silica	mg/L					6.3	5.8	6.1	6.8	7.3	6.9		
Total Dissolved Solids (TDS)	mg/L					590	620	600	580	560	600		
Total Organic Carbon	mg/L					4	3.8	3.6	4	3.5	3.4		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		

# LAKE PLEASANT (UPPER) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Epilimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	ND		
Dissolved Organic Carbon	mg/L					4.2	4.2	4.4	4.3	4.4	4.3		
Kjeldahl Nitrogen	mg/L					0.66	0.19	0.26	0.33	0.27	0.27		
Nitrate	mg/L					ND	ND	ND	ND	ND	ND		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		
Orthophosphate as P	mg/L					ND	ND	ND	ND	ND	ND		
Secchi disk	ft							18.6	6.9	7.9	9.05	10.25	
Silica	mg/L					3	3.6	3.9	4	4.5	4.9		
Total Dissolved Solids (TDS)	mg/L					580	620	620	570	560	630		
Total Organic Carbon	mg/L					4.6	4.3	4.5	4.6	4.5	4.3		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		
<b>Metalimnion</b>													
Alkalinity	mg/L		130										130
Ammonia Nitrogen	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	0.099	ND
Dissolved Organic Carbon	mg/L		2.7	2.8		3.9	3.8	3.9	4.1	4	4.3	3.9	3.8
Kjeldahl Nitrogen	mg/L			0.24		0.38	0.2	0.21	0.23	0.16	0.24	0.12	0.31
Nitrate	mg/L		ND			ND	0.14	ND	ND	ND	ND	ND	ND
Nitrite	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
Nitrate Nitrite as N	mg/L		ND	ND								ND	ND
Orthophosphate as P	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
Orthophosphate as PO4	mg/L		ND	ND								ND	ND
Silica	mg/L		6.4	6.4		5.2	5.6	5.1	4.6	4.9	4.7	5.5	6.3
Total Dissolved Solids (TDS)	mg/L		650	610		600	610	570	560	580	610	600	600
Total Organic Carbon	mg/L		2.9	2.9		4.3	3.9	4	4.5	3.5	4.3	3.8	3.7
Total phosphorus as P	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus as PO4	mg/L											ND	ND
Total Suspended Solids (TSS)	mg/L		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
<b>Hypolimnion</b>													
Ammonia Nitrogen	mg/L					ND	ND	ND	ND	ND	0.064		
Dissolved Organic Carbon	mg/L					3.9	3.8	3.5	3.5	3.5	3.6		
Kjeldahl Nitrogen	mg/L					0.26	0.25	0.11	0.21	0.26	0.23		
Nitrate	mg/L					ND	0.18	ND	ND	0.14	ND		
Nitrite	mg/L					ND	ND	ND	ND	ND	ND		



# LAKE PLEASANT (UPPER) NUTRIENTS 2023

Constituent	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Hypolimnion (cont.)</b>													
Orthophosphate as P	mg/L					ND	ND	ND	ND	ND	ND		
Silica	mg/L					5.2	5.4	5.9	7	6.8	6.8		
Total Dissolved Solids (TDS)	mg/L					600	610	590	540	560	580		
Total Organic Carbon	mg/L					4.1	3.9	3.5	3.7	4.1	3.6		
Total phosphorus as P	mg/L					ND	ND	ND	ND	ND	ND		
Total Suspended Solids (TSS)	mg/L					ND	ND	ND	ND	ND	ND		