2021 Water Quality Report

U.S. Army Corps of Engineers
Saint Louis District

Mark Twain Lake Water Quality Conditions: 1984-2021

December 2022

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Prepared for

United States Army Corps of Engineers
Saint Louis District
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EXECUTIVE SUMMARY

The United States Army Corps of Engineers' (USACE) commitment to environmental compliance and protection of estuaries, rivers, lakes, and navigable waters arises from the national policy and directives expressed in Federal Statutes, Executive Orders, and internal regulations. These regulations were designed to minimize pollution, maximize recreation, protect aesthetics, preserve natural resources, and promote the comprehensive planning and use of water bodies to enhance the public interest rather than private gain. Therefore, USACE, in the design, construction, management, operation, and maintenance of its facilities, will exert leadership within existing authorities and appropriations in the nationwide effort to protect, enhance, and sustain the quality of the nation's resources. It is USACE policy to comply with requirements of the Clean Water Act and not to degrade existing water quality conditions to the maximum extent that is practicable, consistent with project authorities, Federal legal and regulatory requirements, the public interest, and water control manuals.

The United States Army Corps of Engineers, Saint Louis District (CEMVS), implemented a water quality monitoring program during the 1970s to evaluate how its civil projects may be affecting water resources. Data collected from this effort serves as an invaluable tool for evaluating the significance of annual water quality measurements and tracking long-term trends. Water quality data is provided to the Missouri Department of Natural Resources and the Illinois Environmental Protection Agency to be used as a screening mechanism for the Missouri and Illinois Water Quality Report, which is required every two years by the Clean Water Act Sections 303(d) and 305(b).

The National Water Quality Inventory Report to Congress (305(b) report) is the primary vehicle for informing law makers and the public about general water quality conditions in the United States. This document characterizes our water quality, identifies widespread water quality problems of national significance, and describes various programs implemented to restore and protect our waters. The 2020 water quality report compiled by the Missouri Department of Natural Resources (MDNR) listed the following impairments: Middle Fork Salt River impaired for dissolved oxygen, South Fork Salt River impaired for dissolved oxygen and pH, Black Creek Tributary to the North Fork Salt River impaired for E. coli, North Fork Salt River and Mark Twain Lake impaired for mercury, and the Salt River below the dam impaired for mercury and dissolved oxygen. Additionally, MDNR has listed Mark Twain Lake as eutrophic.

Water quality sampling in 2021 revealed the following concerns at Mark Twain Lake: dissolved oxygen, Atrazine, chlorophyll-a, iron, manganese, and total phosphorus.

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INTRODUCTION

The Mark Twain Lake watershed is comprised of 2,318 square miles with an additional 29 square miles draining into the re-regulation pool. The North Fork of the Salt River is the major drainage channel, draining 626 square miles (27% of the drainage area). The North Fork is 88.0 miles in length, has an average gradient of 4.5 feet per mile and has a maximum elevation of approximately 1,000 feet. The Middle Fork, Elk Fork and South Fork of the Salt River are the other major tributaries to Mark Twain Lake. The Middle Fork drains 356 square miles (15%), is 65.4 miles in length, has an average gradient of 5.1 feet per mile, and has a maximum elevation of approximately 940 feet. The Elk Fork drains 262 square miles (11%), is 34.8 miles in length, has an average gradient of 7.9 feet per mile, and has a maximum elevation of approximately 880 feet. The South Fork drains 298 square miles (13%), is 38.0 miles in length, has an average gradient of 7.2 feet per mile, and has a maximum elevation of 880 feet. Combined, the North Fork, Middle Fork, Elk Fork and South Fork drain a total of 1,542 square miles, which is 66% of the Mark Twain Lake watershed.

The Mark Twain Lake watershed is a gently undulating plain in the upstream portion and it becomes more rolling and hillier in the downstream reaches. High rock bluffs border the streams at various locations. The river valleys are characterized by fairly narrow, tortuous courses interspersed by areas of widened bottomlands. Hickory and oak groves are scattered among crop and grazing lands. Strip mining in the South Fork watershed may produce acid runoff. Several clay pits in the southwestern portion of the Mark Twain Lake watershed account for some colloidal suspension, which increases the turbidity of the lake.

Clarence Cannon Dam and Mark Twain Lake are located on the Salt River in northeastern Missouri, generally in Monroe and Ralls Counties. The main dam site is located in Ralls County at mile 63.0 on the Salt River, approximately 12 miles southeast of Monroe City, Missouri. A re-regulation dam is located approximately 9.5 miles downstream from the main dam site. The project area is served on the north by U.S. Highway 24, and on the south by State Highway 154. State Highway 107 bisects the project area from north to south, and provides a major reservoir crossing near Florida, Missouri. State Highway J crosses the main dam and is the primary north-south transportation corridor on the eastern side of the lake.

Several areas have been developed at Mark Twain Lake for the visiting public to enjoy a variety of outdoor recreational experiences. The most common activities engaged in are fishing, boating, water-skiing, sailing, camping, picnicking, swimming, and hunting. Developed facilities available at the lake include a visitor center, four campgrounds, three group camping areas, five picnic areas, 21 boat launching areas, five nature trails, two marinas, and three beaches. Hunting and fishing opportunities are available on all Corps of Engineers lands and waters except where restricted and posted due to recreational development or safety.

Mark Twain Lake is managed and operated by the CEMVS for the authorized purposes of flood risk management in the Salt River Basin, hydroelectric power generation, water supply, fish and wildlife conservation, recreation, and incidental navigation. The lake serves as a heavy recreational usage lake. The land surrounding the lake is used predominately for agriculture. Agricultural runoff and municipal wastewater treatment facilities are the primary potential source of pollution into the Mark Twain Lake watershed. Additional sources are marinas, recreational watercraft discharges and wildlife fecal material runoff.

Water quality is of paramount importance for sustaining ecological integrity and services provided by Mark Twain Lake. Water quality is influenced by a range of both point and nonpoint pollution sources, which may include natural processes, industrial and municipal effluents, and surface runoff from agricultural arenas.

The Saint Louis District of the United States Army Corps of Engineers has implemented a Water Quality Management Plan (WQMP) as part of the operation and maintenance activities associated with managing USACE civil works projects throughout the District which includes, among other reservoirs and rivers, the Mark Twain Lake and watershed. The WQMP addresses surface water quality management issues and adheres to the guidance and requirements specified by Clean Water Act (CWA), as well as the self-imposed Engineering Regulation (ER) 1110-2-8154, “Water Quality and Environmental Management for USACE Civil Works Projects” (USACE, 2018). Water quality monitoring is implemented to fulfill five primary objectives that drive the CEMVS WQMP:

1) Establish baseline conditions, identify significant water quality trends, and document problems and accomplishments.
2) Ensure that surface water quality, as affected by CEMVS projects, is suitable for project purposes, existing water uses, public health and safety, and in compliance with applicable state and federal water quality standards.
3) Provide support to water control, project operations, and navigation for regulations and modifications.
4) Investigate special problems, design and implement modifications, and improve water management procedures
5) Establish and maintain strong working partnerships and collaborations with appropriate entities within and outside USACE regarding water quality.

This report is intended to document and assess water quality conditions occurring at Mark Twain Lake. The report describes conditions observed in 2021, as well as baseline data collected from 1984-2020. Additional historical data are available upon request.

MARK TWAIN LAKE WQMP COVERAGE

The WQMP for Mark Twain Lake includes water samples taken at the following locations: major tributaries (MTL-5, MTL-9, MTL-11, MTL-13), main body of the lake (MTL-22, MTL-33, MTL-66, MTL-77, Indian Creek Marina and Blackjack Marina), and just downstream of the dam (MTL-1 and MTL-12). See figures 1 and 2, and Table 1 for a site map and site coordinates.

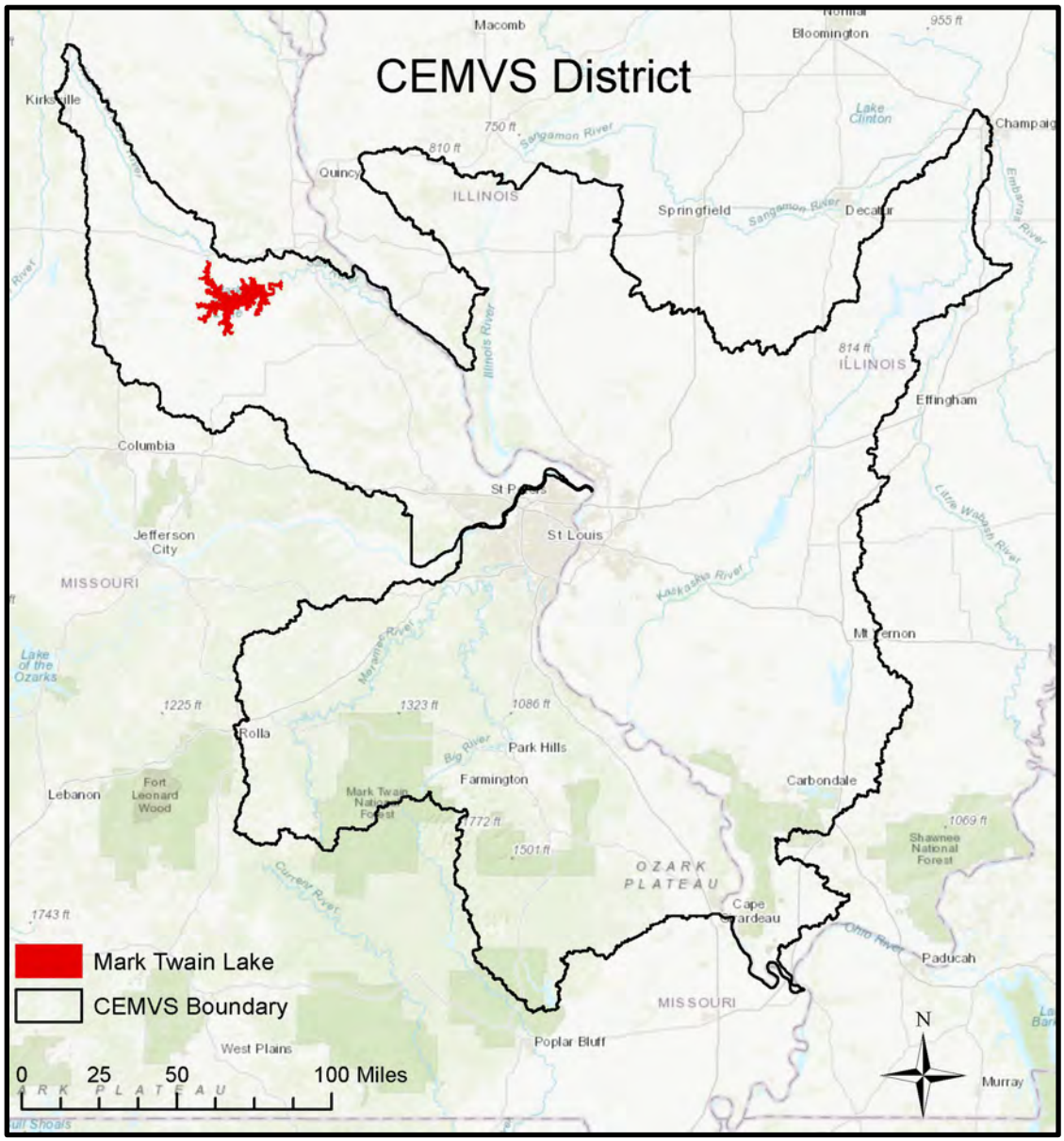


Figure 1. CEMVS District and Mark Twain Lake

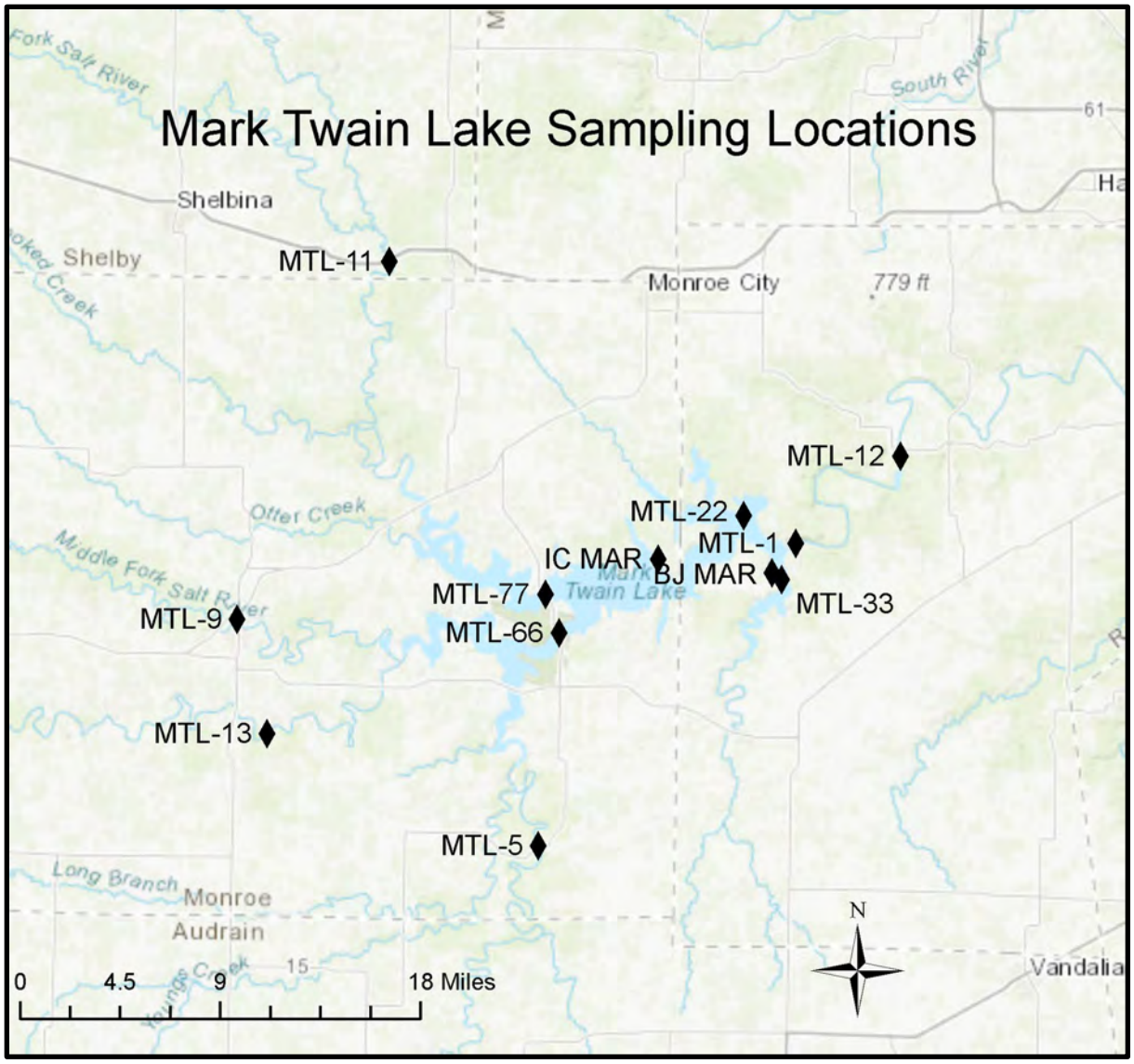


Figure 2. Water Quality (WQ) Sampling Locations in 2021 at Mark Twain Lake

Sample Location Summary Table

Table 1: Sample Location Summary and Geographic Location (NAD 1983)

Sample Location Type	Abbreviation	Site Name	Latitude	Longitude
Major Tributary	TRIB	MTL-5	39.374579	-91.805621
	TRIB	MTL-9	39.488315	-92.001401
	TRIB	MTL-11	39.667697	-91.902400
	TRIB	MTL-13	39.431077	-91.981933
Main Reservoir Surface	RS	MTL-22	39.525360	-91.648120
	RS	MTL-33	39.508150	-91.647435
	RS	MTL-66	39.481451	-91.792267
	RS	MTL-77	39.500849	-91.801118
	RS	MTL-IC MAR	39.518418	-91.727866
	RS	MTL-BJ MAR	39.511730	-91.653858
Reservoir Benthic	RB	MTL-22-15	39.540296	-91.672235
Tail Race (below main dam)	TR	MTL-1	39.526495	-91.638336
Tail Race (below re-regulation dam)	TR	MTL-12	39.570112	-91.570442

Samples at Marinas are not always taken in the exact same location. All MTL-22 and MTL-22-15 samples prior to 2019 were taken from the previous location (39.540296°, -91.672235°).

METHODS AND ANALYSIS: WATER QUALITY

Data Collection and Historical Reference Data

During 2021, water quality samples were collected and analyzed for 13 locations during three separate sampling events (n=39; Table 1). One duplicate sample was also collected during each sampling event for quality control purposes. Samples were collected from the upper one meter of the water column, preserved, and transported to the Applied Research and Development Laboratory (ARDL) in Mount Vernon, Illinois for analysis.

Real-time water quality monitoring is accomplished with multi-parameter sondes (YSI EXOII) placed on the downstream structure of the turbine bay at Clarence Cannon Dam and the upstream side of the re-regulation dam. A profiling water quality monitoring station is installed in the lake just upstream of Clarence Cannon Dam for real-time data collection. The parameters include but are not limited to the following: dissolved oxygen, temperature, specific conductivity, pH, and turbidity.

For the purpose of this report, historical reference data refers to water quality data collected during previous years ranging as far back as 1984 (parameter dependent). Historical reference data are intended to represent the current condition of Mark Twain Lake.

Statistical Summary and Comparison to Applicable Water Quality Standards

Statistical analyses were performed on water quality monitoring data collected for 13 locations, and classified as TRIB (n= 4), RS (n=6), RB (n=1), and TR (n=2). Descriptive statistics were calculated to describe central tendencies and boxplots created to illustrate comparisons between groups. Monitoring results were compared to applicable water quality standard criteria established by the appropriate state agencies pursuant to the Federal Clean Water Act. If a state water quality standard criteria was not available, recommended criteria from the literature were considered.

Seasonal data are classified as: Winter (December 01 - March 14), Spring (March 15 – May 31), Summer (June 1 – September 15), Fall (September 16 – November 30).

Quality Assurance

The United States Army Corps of Engineers, Saint Louis District quality assurance procedures considers two primary focus areas: (1) those that involve laboratory analysis of samples, and (2) those concerning the collection and processing of the water samples in the field.

Since 2012, ARDL has analyzed water quality samples for CEMVS. Their quality assurance program includes the use of quality control charts, check standards, field and in-house matrix spikes, laboratory blanks and performance evaluation samples. In

addition, one blind duplicate sample is submitted for at least every 20 samples, or, in this case, every sampling event (one event/day at Mark Twain Lake has 13 samples and one duplicate).

Internal checks are also used for field sampling. This includes adherence to operating procedures for data collection and periodic evaluation of sampling personnel. Field sampling equipment and multimeters are calibrated/serviced in accordance with factory recommendations.

Water Quality Parameters and Criteria

Parameters used to characterize water quality have been generally accepted criteria for assessing aquatic life and human health include:

Temperature (Temp) is important because it controls several aspects of water quality. Colder water holds more dissolved oxygen which is required by aquatic organisms. Plants grow more rapidly and use more oxygen in warmer water. Decomposition of organic matter which uses oxygen is accelerated in warmer water. Temperature can also determine the availability of toxic compounds such as ammonia. Since aquatic organisms are cold blooded, water temperature regulates their metabolism and ability to survive. The number and kinds of organisms that are found in streams or lakes is directly related to temperature. Certain organisms require a specific temperature range, such as Salmonids, which require water temperatures below 20°C. The temperature standard in Missouri is less than a rise of 2.77°C above normal seasonal temperature or less than 32.22°C.

Dissolved Oxygen (DO) refers to the measurement of free oxygen molecules (O_2) that are not bonded to any other elements; thus, oxygen bonded in water (H_2O) would not be considered in a measurement of dissolved oxygen. Oxygen is dissolved in surface waters through interactions with the atmosphere and as a waste product of photosynthesis ($CO_2 + H_2O$ (CH_2O) + O_2) from phytoplankton and aquatic vegetation. Additional factors influencing DO include temperature, pressure, and salinity.

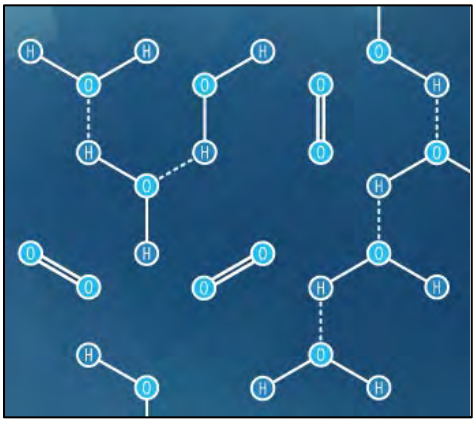


Figure 1: Dissolved oxygen (O_2) vs oxygen bonded in water (H_2O).

Dissolved oxygen is required for most aquatic life including fish, invertebrates, bacteria, and plants. Fish and invertebrates utilize DO for respiration through gills and cutaneous breathing, and plants require dissolved oxygen for respiration when photosynthesis is not possible. Smaller microbes and bacteria utilize DO for decomposition of organic materials, a process essential for nutrient cycling. Bottom feeders such as worms and mussels can persist when DO is ≥1mg/L, while most inland fish species require a minimum DO of 4mg/L. The DO water quality criteria for Missouri is ≥5mg/L.

Potential of Hydrogen (pH) is a measure of how acidic or basic water is. Potential of Hydrogen is reported on a logarithmic scale ranging from 0 – 14, with 7.0 being neutral. As pH increases from 7.0, water increases in alkalinity, whereas a decrease from 7.0 indicates an increase in acidity. Since pH is measured on a logarithmic scale, every one-unit change in pH indicates a 10-fold change in acidity; thus, a pH of 6.0 is ten times more acidic than a pH of 7.0 and a pH of 4.0 would be one-thousand times more acidic than a pH of 7.0.

The pH of water varies considerably beyond the local level. Natural variation in bedrock and soil composition through which water moves has been reported as one of the most influential factors. Additional factors include decomposition of organic materials, acidity of local precipitation, discharge of effluents and chemicals, and mining operations.

Most freshwater streams and rivers have a natural pH ranging from 6 to 8. As pH approaches 5 (acidic), less tolerant fish and aquatic invertebrate assemblages may be extirpated, and a pH below 4.5 would be without most desired aquatic life. Conversely, when pH exceeds 9.5 (alkaline), aquatic fish and invertebrates begin to rapidly decrease and beyond 10, fish become extirpated. The pH water quality criteria for Missouri ranges from 6.5 – 9.0.

Conductivity is a measure of water's ability to conduct electrical current. In its purist form, water has a *near* neutral charge, indicating that it is an inefficient conductor of electrical current. Thus, the ability to carry electrical current is driven by water soluble ions (atoms and molecules with a charge) such as salts and other inorganic materials. Conductivity is also influenced by water temperature; as temperature increases, conductivity increases. For this reason, conductivity is commonly reported as Specific Conductivity (SpCond), which is the measurement of conductivity at 25 degrees Celsius.

Conductivity in streams and rivers is affected by the geology of the area. Streams running through granite tend to have lower conductivity due to granite being composed of inert material; materials that do not ionize or dissolve into ionic compounds in water. Conversely, streams that run through areas of limestone or clay soils tend to have higher conductivity readings because of the presence of materials that ionize. Conductivity is useful as a general measure of water quality. A stream tends to have a relatively constant range of conductivity that, once established, can be used as a baseline. Significant changes, either increases or decreases, might indicate a source of pollution has been introduced into the water. The pollution source could be a treatment plant, which raises the conductivity, or an oil spill, which would lower the conductivity. In general, there are no water quality criteria for SpCond. The District threshold of 500 µS/cm (microsiemens per centimeter) is a rule of thumb value that is often associated with some form of biological impairment.

Oxidation Reduction Potential (ORP) is a measurement of the net status of all the oxidation and reduction reactions in a given water sample. Oxidation involves an

exchange of electrons between 2 atoms. The atom that loses an electron is oxidized and the one that gains an electron is reduced. Oxidation reduction potential sensors measure the electrochemical potential between the solution and a reference electrode. Readings are expressed in millivolts. Positive readings indicate increased oxidizing potential and negative readings increased reduction. Oxidation reduction potential values are used much like pH values to determine water quality. While pH readings characterize the state of a system relative to the receiving or donating hydrogen ions (base or acid), ORP readings characterize the relative state of losing or gaining electrons. Generally, ORP readings above 400mV are harmful to aquatic life; however, ORP is a non-specific measurement, which is a reflection of a combination of effects of all the dissolved materials in the water. Therefore, the measurement of ORP in relatively clean water has only limited utility unless a predominant redox-active material is known to be present.

Total Suspended Solids (TSS) concentrations, which cause the photosynthetic activity to be reduced by more than 10% from the seasonably established norm, can have a detrimental effect on aquatic life. Soil particles, organic material, and other debris comprise suspended solids in the water column. **Turbidity (FNU)** measurements are inverse to suspended solid measurements. As TSS increases, the FNU or water transparency decreases. Total suspended solids can be an important indicator of the type and degree of FNU. Total Suspended Solids measurements represent a combination of **Volatile Suspended Solids (VSS)**, which consist of organic material, and **Nonvolatile Suspended Solids (NVSS)**, which is comprised of inorganic mineral particles in the water. In order to more accurately determine the types and amounts of suspended solids, VSS are analyzed. Volatile suspended solid concentration represents the organic portion of the total suspended solids. Organic material often includes plankton, and additional plant and animal debris present in water. Total VSS indicates the presence of organics in suspension; and, therefore, show additional demand levels of oxygen. Missouri does not currently have a standard criterion for NVSS or VSS.

Total Organic Carbon (TOC) is a measure of the amount of organic carbon in a water body. In addition to natural organic substances, TOC includes insecticides and herbicides, as well as domestic and industrial waste. Industrial waste effluent may include carbon-containing compounds with various toxicity levels. Further, a high organic content means an increase in the growth of microorganisms which contribute to the depletion of oxygen supplies.

Currently, there are no state or federal water quality standard criteria set for TOC. Because carbon occurs naturally, its concentration varies based on physical and chemical attributes in a watershed; thus, this study relies on historical reference conditions to identify unfavorable conditions.

Metals Iron (TFe) and Manganese (TMn) (T=total) are nutrients for both plants and animals. Living organisms require trace amounts of metals. However, excessive amounts can be harmful to the organism. Heavy metals exist in surface waters in three

forms: colloidal, particulate, and dissolved. Water chemistry determines the rate of adsorption and desorption of metals to and from sediment. Metals are desorbed from the sediment if the water experiences increases in salinity, decreases in redox potential, or decreases in pH. Metals in surface waters can be from natural or human sources. Metal levels in surface water may pose a health risk to humans and the environment.

Pesticides are commonly used throughout much of the agricultural landscape that the Big Muddy River flows. This study considers one insecticide and seven herbicides. Atrazine and Alachlor herbicides are commonly used agricultural chemicals which can be readily transported by rainfall runoff. Both compounds are suspected of causing cancer; and therefore, are monitored for the protection of human and aquatic health. Herbicides which are pesticides used to kill vegetation are the most widely used and sampled. Two of the most widely used herbicides are Atrazine and Alachlor. Atrazine is a preemergence or postemergence herbicide use to control broadleaf weeds and annual grasses. Atrazine is most commonly detected in ground and surface water due to its wide use, and its ability to persist in soil and move in water. Alachlor is a Restricted Use Pesticide (RUP) due to the potential to contaminate groundwater. The water quality standards for the pesticides sampled are located in Table 2.

Nitrogen occurs naturally in water through several forms including nitrogen (N2), nitrite (NO2-N), nitrate (NO3-N), ammonia (NH3), and ammonium (NH4). Nitrates are the most commonly reported form of nitrogen and may have a meaningful influence on a water body's trophic status. Algae and other plants use NO3-N as a food source, thus excess levels of NO3-N can promote increases in algae production and hypereutrophic conditions.

In general, NO3-N does not have a *direct* effect on fish or aquatic insects. Missouri has set the standard for NO3-N to 10 mg/L to accommodate safe drinking waters for human and livestock; however, this threshold likely exceeds the concentration that is appropriate for assessing ecosystem health.

Total Ammonia Nitrogen (TAN) includes NH3 and NH4. Total ammonia nitrogen is a colorless gas with a strong pungent odor. Ammonia occurs naturally and is a biological requirement for aquatic life, however elevated concentrations can be toxic to freshwater organisms. Unnatural sources of ammonia include, accidental releases of ammonia rich fertilizer, effluent from sewage treatment plants, improper disposal of ammonia products, and livestock waste.

Toxic concentrations for freshwater organisms range from 0.53 – 22.8 mg/L, and are strongly dependent on both pH and temperature. In general, an increase in pH and/or temperature corresponds with an increase in toxicity. Additional information in regards to the relationship between pH, temperature, and ammonia, as it relates to toxicity, can be reviewed in Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater (USEPA 2013).

Total Phosphorus (TP) is analyzed as phosphorus and has been monitored due to the potential for uptake by nuisance algae. Levels of phosphate can indicate the potential for rapid growth of algae (algae bloom) which can cause serious oxygen depletion during the algae decay process. Phosphorous is typically the limiting nutrient in a water body; therefore, any addition of phosphorous to the ecosystem stimulates the growth of plants and algae. Phosphorous is delivered to lakes and streams by way of runoff from agricultural fields and urban environments. Other sources of phosphorous are anaerobic decomposition of organic matter, leaking sewer systems, and point source pollution. The general standard for phosphorous in lake water is 0.05 mg/L. Dissolved phosphorous, also called **Orthophosphate (PO_4-P)** is generally found in much smaller concentrations than total phosphorous and is readily available for algal uptake. Orthophosphate concentrations in a water body vary widely over short periods of time as plants take it up and release it.

Chlorophyll a (CHL_a) is a measure of the amount of algae growing in a waterbody, and therefore can be used to classify trophic status. Although algae are a natural part of freshwater ecosystems, too much algae can cause aesthetic problems such as green scums and bad odors and can result in decreased levels of DO.

Pheophytin a (PHEO a) is a natural degradation product or digestion of CHL_a. The ratio of PHEO_a to CHL_a can provide an indication of the decline or growth in eukaryotic algae and cyanobacteria populations.

Trophic Status is determined using a modified **Trophic State Index (TSI)**, as described by Carlson (1977). Trophic State Index is calculated from secchi-depth transparency, total phosphorus, and chlorophyll-a measurements. Values for these three parameters are converted to an index number ranging from 0-100 according to the following equations:

TSI (Seechi Depth) = 10(6 - (ln SD/ln 2))
TSI (Chlorophyll-*a*) = TSI(Chl) = 10(6 - ((2.04 - 0.68 ln Chl)/ln 2))
TSI (Total Phosphorus) = TSI(TP) = 10(6 – (ln (48/TP)/ln 2))

where ln indicates the Natural Logarithm

A TSI average value, calculated as the average of the three individually determined TSI metrics, is used as an overall indicator of a water body's trophic state. The relationship between TSI and trophic condition is defined as follows:

TSI	Trophic Condition
0-40	Oligotrophic
40-60	Mesotrophic
60-70	Eutrophic
70-100	Hypereutrophic

Laboratory Methods and Water Quality Criteria Summary Table

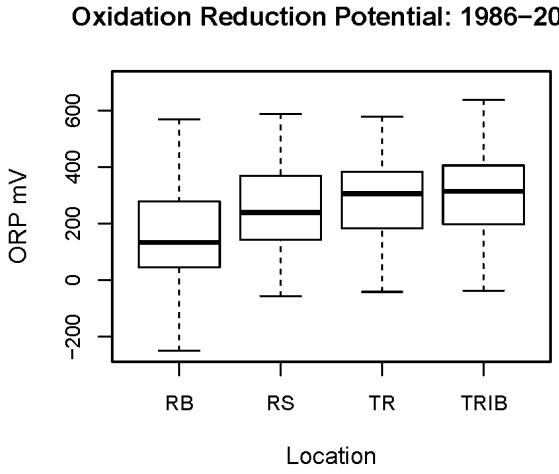
Table 2: Metrics, Methods, and Water Quality Criteria Used for Evaluating Water Quality

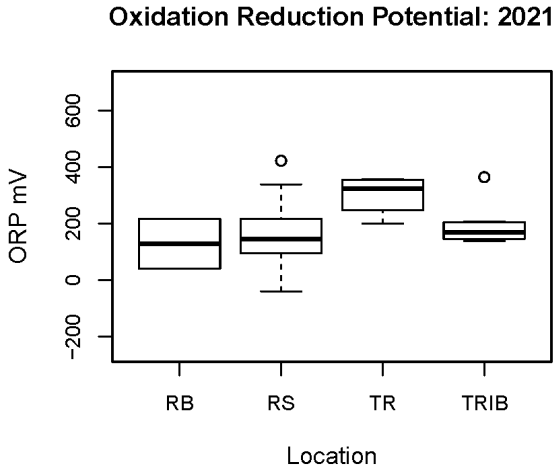
Metric	Abbreviation	Analysis Method	Water Quality Criteria	Source
Alachlor		EPA Method 8270C	< 2ug/L DWS	Missouri DNR
Ammonia Nitrogen	NH_3	EPA Method 350.1	pH & temp dependent	Missouri DNR
Atrazine	Atrazine	EPA Method 8270C	3 ug/L DWS	Missouri DNR
Bacteria: E. Coliform	E Col	EPA Method 1604	WBC-A: 126, WBC-B: 206, SCR: <1,134 cfu/100mL, DSB: 190 mpn/100ml (geometric mean)	Missouri DNR
Chlorophyll a (1)	Chl_a	SM Method 10200H	Criteria: <30 ug/L, or screening value: <18 ug/L with any other eutrophication impacts	Missouri DNR
Chlorophyll a (2)	Chl_a	SM Method 10200H	< 25mg/cm^3 (Eutrophic Upper Limit)	Carlson 1977
Chlorpyrifos		EPA Method 8270C	< .041 ug/L: chronic or 0.083: acute aquatic life, 20 ug/L DWS	Missouri DNR
Depth	Depth	Multiparameter Meter	Measurements reported at ~1 meter	-----
Dissolved Oxygen	DO	Multiparameter Meter	Greater than 5.0mg/L	Missouri DNR
Metolachlor		EPA Method 8270C	70 ug/L DWS	Missouri DNR
Metribuzin		EPA Method 8270C	100 ug/L DWS	Missouri DNR
Nitrate as Nitrogen	NO_3	Green Method	< 10 mg/L	Missouri DNR
Non-Volatile Suspended Solids	NVSS	TSS - VSS	-----	-----
Orthophosphate	Ortho	EPA Method 365.2	-----	-----
Pheophytin a	Phpy_a	SM Method 10200H	-----	-----
Potential of Hydrogen	pH	Multiparameter Meter	Range: 6.5 – 9.0pH 4-day average	Missouri DNR
Secchi Disk	SD	-----	1.093 meters	USEPA*
Specific Conductivity	SpCond	Multiparameter Meter	500 uS/cm	-----
Temperature	Temp	Multiparameter Meter	Less than rise of 2.77…°C above normal seasonal temp. or above 32.22…°C	Missouri DNR
Total Dissolved Solids	TDS	Multiparameter Meter	<250 mg/L	USEPA*

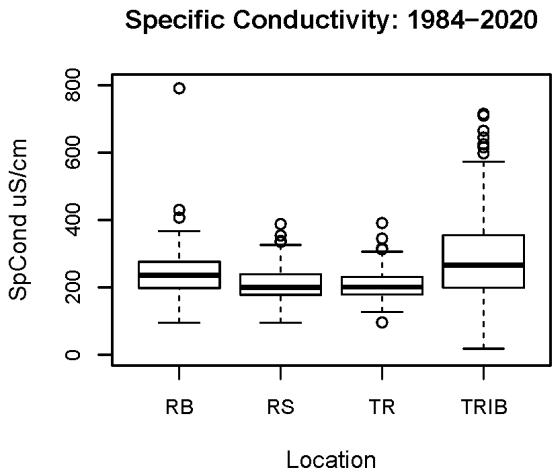
Metric	Abbreviation	Analysis Method	Water Quality Criteria	Source
Total Manganese	TMn	EPA Method 6010C	< 0.05 mg/L	Missouri DNR
Total Organic Carbon	TOC	EPA Method 415.1	-----	-----
Total Iron	TFe	EPA Method 6010C	< 1 mg/L	Missouri DNR
Total Phosphorus	TP	EPA Method 365.2	Screening value: <0.049 mg/L, with any other eutrophication impacts	Missouri DNR
Trifluralin		EPA Method 8270C	< 5 ug/L: DWS	Missouri DNR
Turbidity	Turb	Multiparameter Meter	-----	-----
Volatile Suspended Solids	VSS	EPA Method 160.4	-----	-----

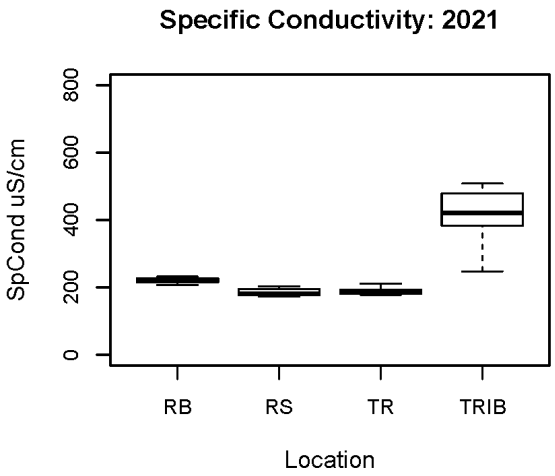
**1 mg/L is equivalent to 1 drop in two bathtubs and 1 ug/L is equivalent to 1 drop in an Olympic size swimming pool. PWS is public water supply. DWS is drinking water standard. WBC is whole body contact recreation (WBC-A is designated swimming, WBC-B recreation). SCR is secondary contact recreation. DSB is designated swimming beach. The DSB advisory of 190 MPN/100 mL is the level MDNR will post signs notifying visitors that swimming is not recommended. USEPA* refers to the Federal EPA reference nutrient conditions for level III ecoregion 72 lakes and rivers.*

RESULTS AND SUMMARY STATISTICS: WATER QUALITY



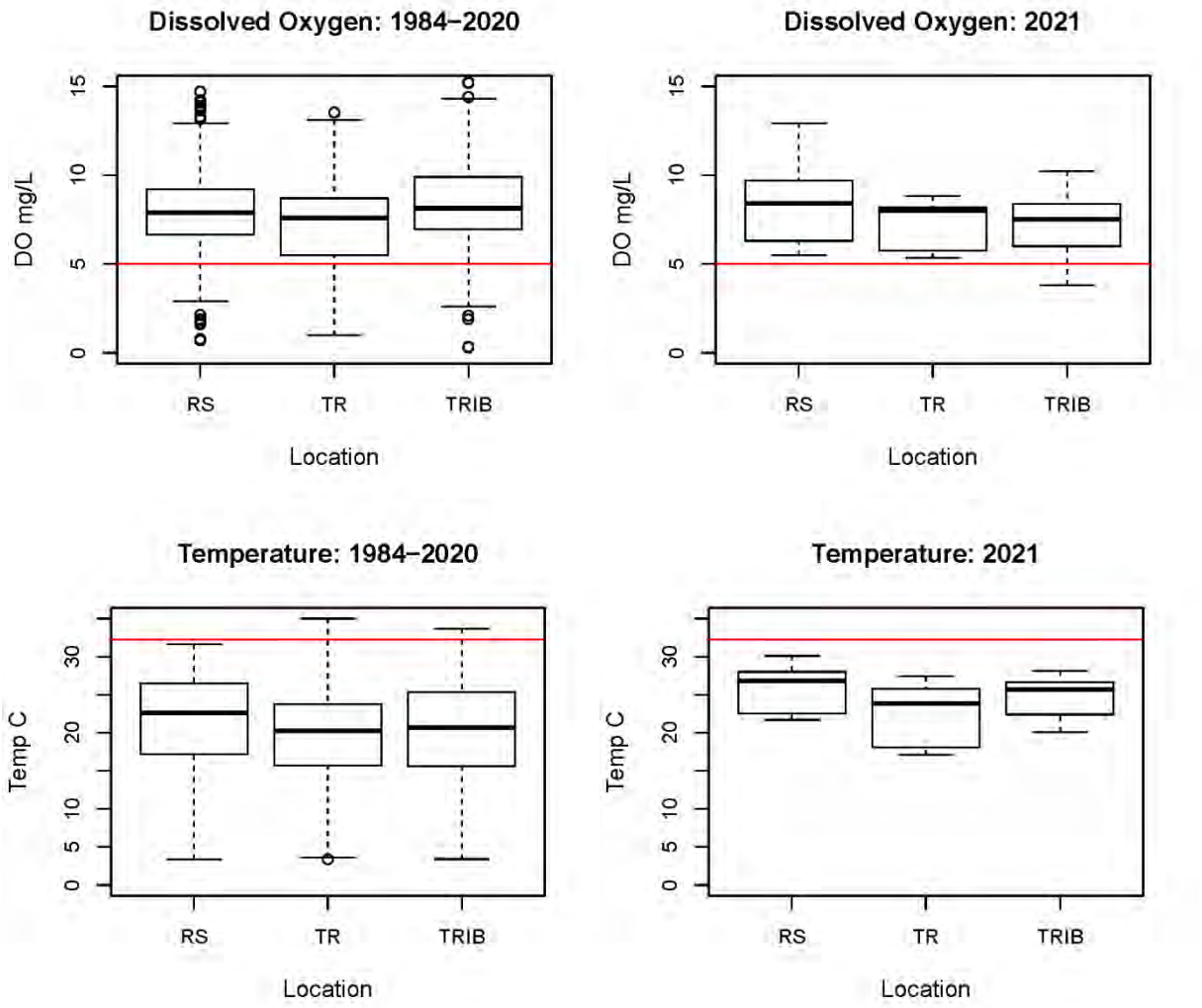






	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
ORP	RB	159.03	133.00	248	128.75	128.75	2
	RS	255.17	239.00	464	168.32	145.15	12
	TR	286.52	305.50	118	300.75	323.00	4
	TRIB	297.25	314.00	411	193.04	169.00	8
SpCond	RB	238.56	236.00	341	220.53	222.50	3
	RS	208.88	200.00	550	184.90	180.65	18
	TR	207.93	200.50	134	188.75	184.55	6
	TRIB	288.24	266.00	431	415.71	420.70	12

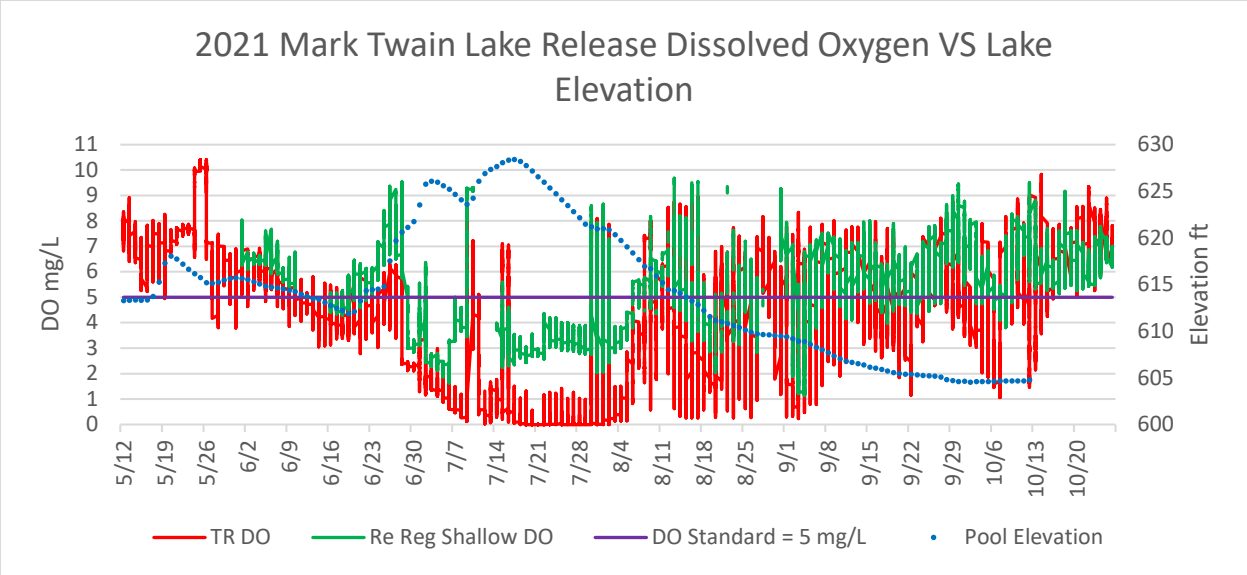
**This report does not acknowledge a water quality criteria for SpCond or ORP.*



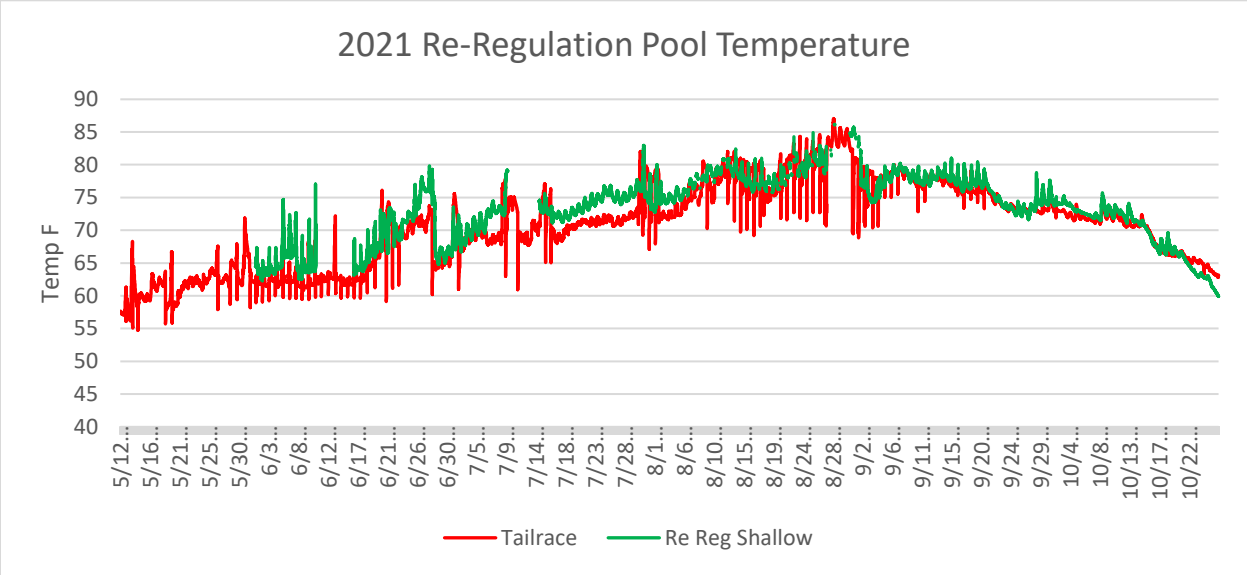
Red line placed at the 5 mg/L level for DO and 32.22 C for temperature.

	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
DO	RS	8.00	7.90	575	8.47	8.43	18
	TR	7.48	7.60	143	7.36	8.02	6
	TRIB	8.41	8.14	445	7.39	7.52	12
Temp	RS	21.14	22.60	574	25.82	26.80	18
	TR	19.05	20.28	143	22.68	23.85	6
	TRIB	19.93	20.70	445	24.64	25.65	12

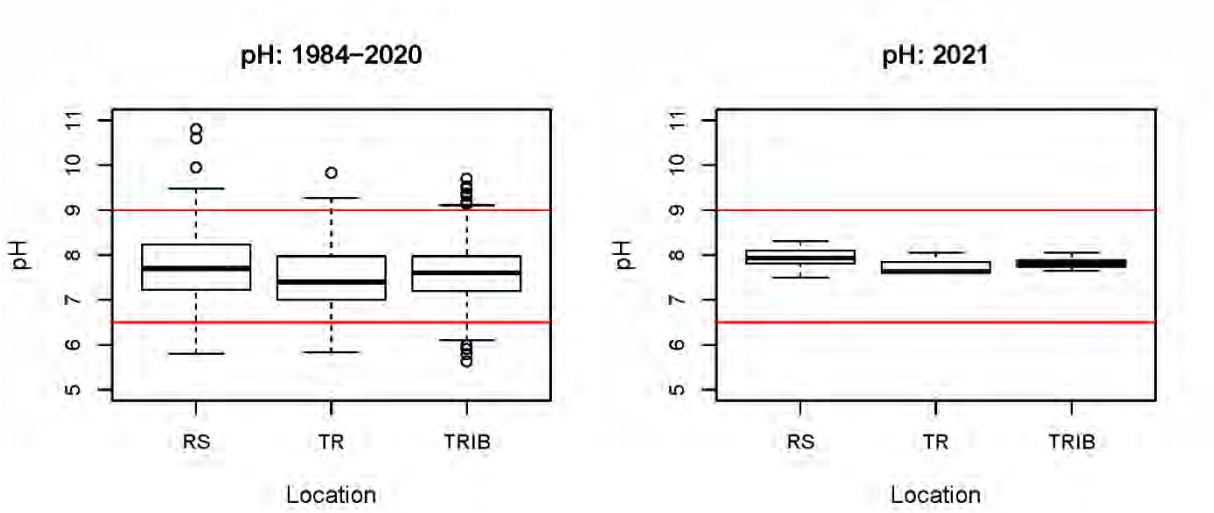
** During the three sampling events only one DO reading was recorded below the standard in June at MTL-9 with a concentration of 3.8 mg/L. The standard of 32.22 C was not exceeded in 2021.*



**Data recorded by multi-parameter sonde at Cannon Dam tailrace and re-regulation dam. Purple line placed at the standard of 5 mg/L level. DO measurements fell below the standard at Cannon Dam ~ 51% and at the re-regulation dam ~ 44% of the observations.*



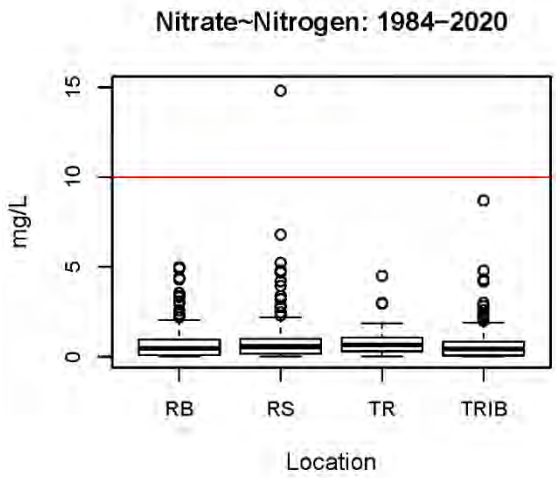
**Temperature data recorded by multi-parameter sonde at Cannon Dam tailrace and re-regulation dam.*

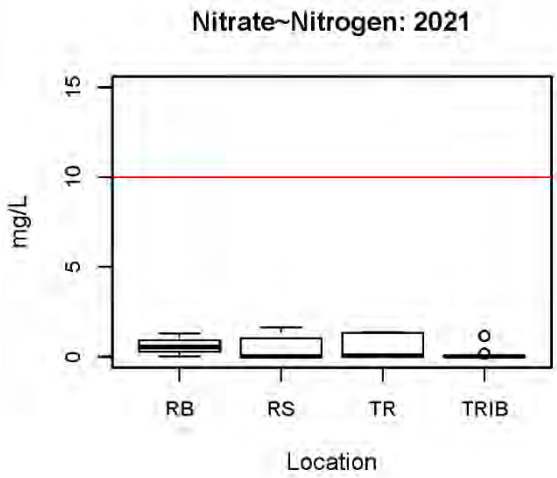


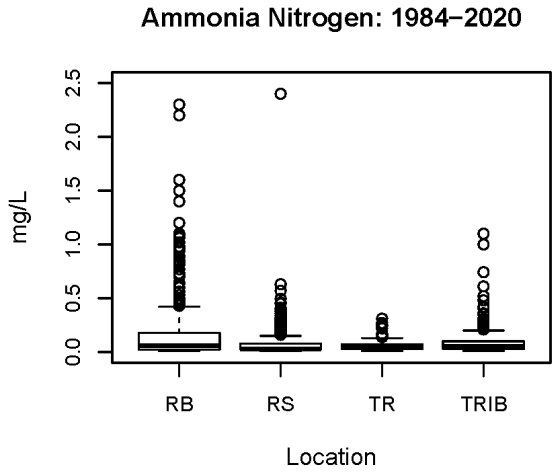
**Red lines indicate the upper and lower water quality criteria standards (between 6.5 and 9).*

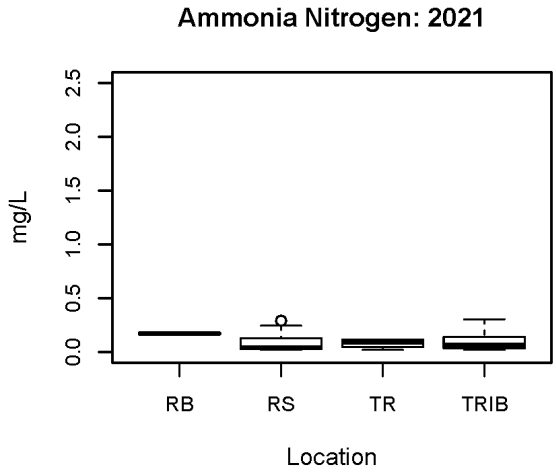
	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
pH	RS	7.76	7.70	563	7.93	7.93	12
	TR	7.47	7.40	141	7.73	7.63	4
	TRIB	7.63	7.60	442	7.82	7.81	8

**All pH readings were within the water quality standard during 2021.*



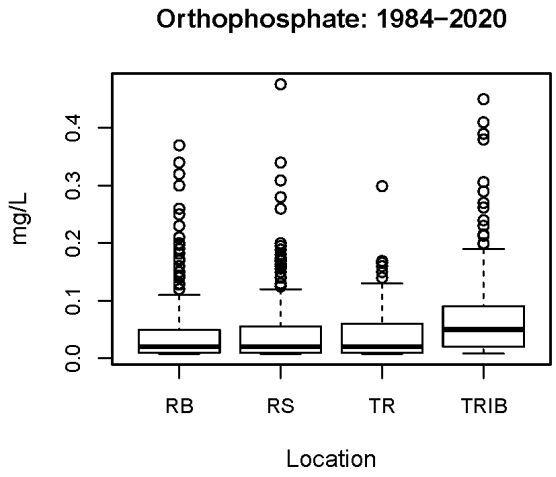


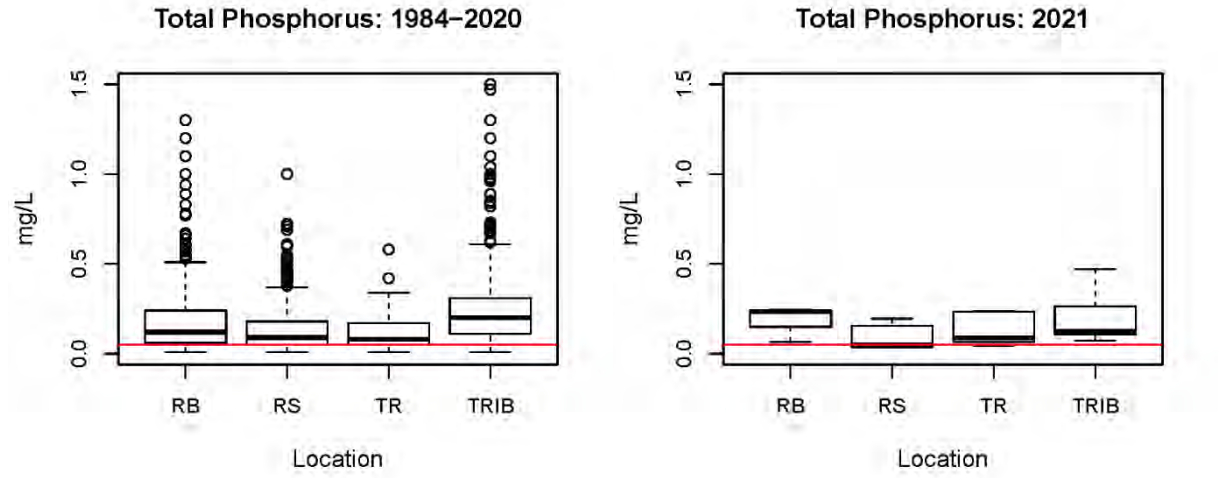




	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
NO3-N	RB	0.65	0.47	355	0.63	0.56	3
	RS	0.72	0.56	542	0.46	0.03	12
	TR	0.74	0.67	141	0.47	0.05	6
	TRIB	0.60	0.43	478	0.14	0.03	12
NH3N	RB	0.18	0.06	359	0.17	0.17	3
	RS	0.07	0.03	565	0.09	0.04	12
	TR	0.06	0.04	148	0.08	0.09	6
	TRIB	0.09	0.05	510	0.10	0.06	12

**All observations of nitrate and ammonia nitrogen were within the water quality standard during 2021.*

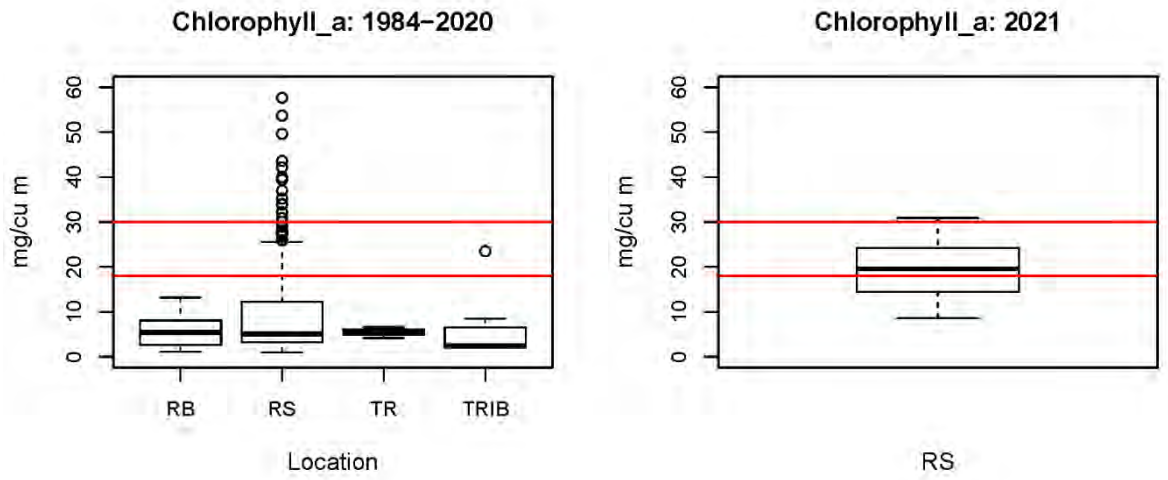




**Red line indicates the TP water quality screening value of 0.049 mg/L.*

	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
PO4	RB	0.04	0.02	362	----	----	----
	RS	0.04	0.02	571	----	----	----
	TR	0.04	0.02	150	----	----	----
	TRIB	0.06	0.05	513	----	----	----
TP	RB	0.18	0.12	360	0.18	0.23	3
	RS	0.14	0.09	575	0.09	0.05	12
	TR	0.12	0.08	150	0.13	0.09	6
	TRIB	0.26	0.20	514	0.19	0.12	12

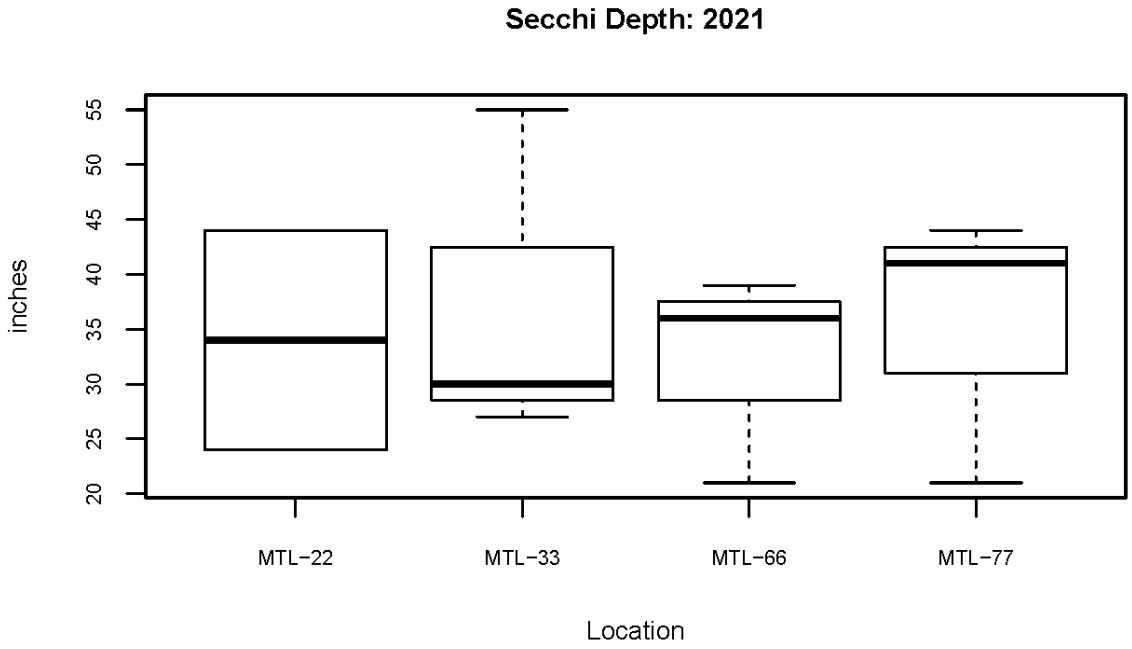
**TP exceeded the screening value of 0.049 mg/L at all locations. This study does not acknowledge a water quality standard for PO4. PO4 was not sampled in 2021.*

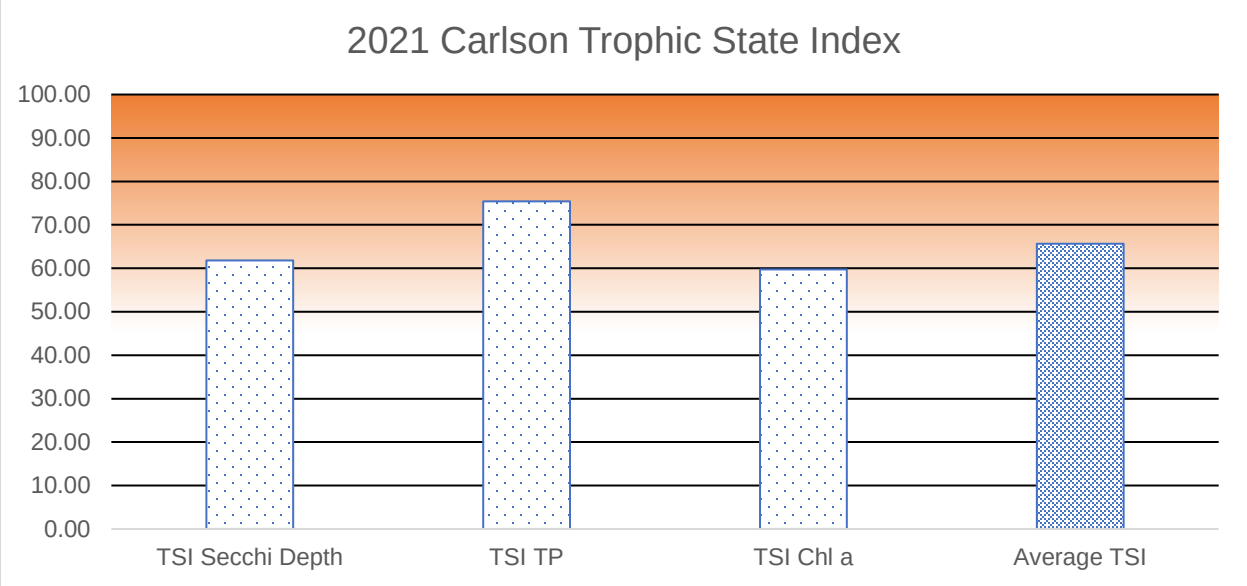


**Red lines indicate the screening value of 18 and criterion of 30 mg/cu m.*

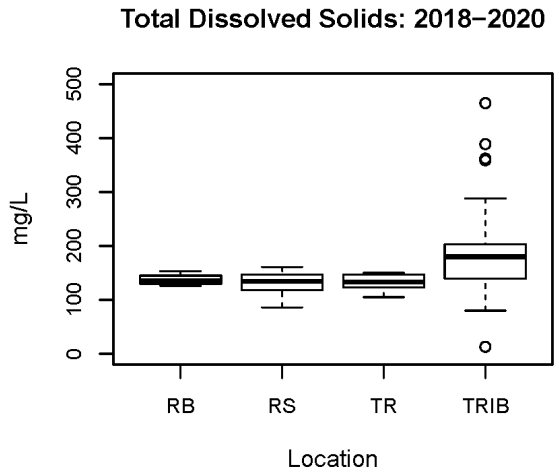
	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
Chl_a	RB	5.71	5.40	24	----	----	----
	RS	8.69	5.00	461	19.48	19.55	12
	TR	5.47	5.60	3	----	----	----
	TRIB	5.94	2.45	8	----	----	----

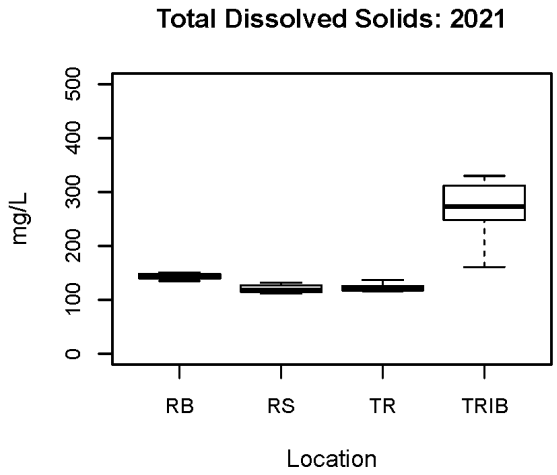
**The criterion was exceeded once while the screening value was exceeded multiple times, however, based on the geometric mean of 18.45 mg/cu m, only the screening value (18 mg/cu m) was exceeded in 2021. Since 2014, chlorophyll-a samples have only been taken from the lake surface.*

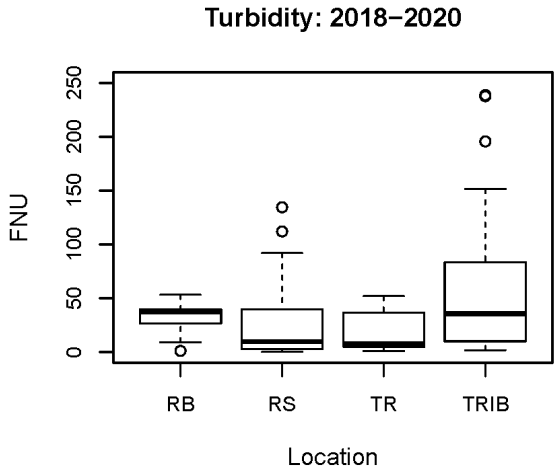


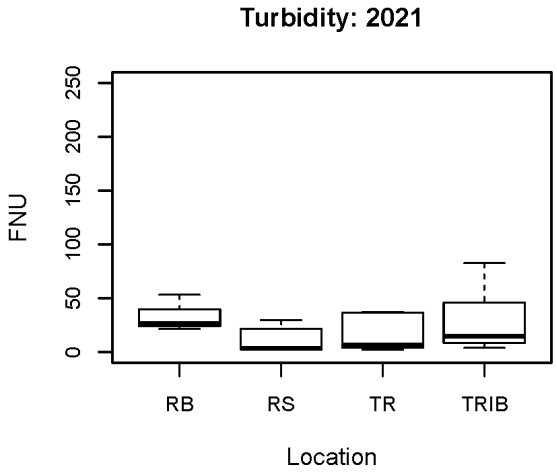


<40 = Oligotrophic __ 40-60 = Mesotrophic __ 60-70 = Eutrophic __ >70 Hypereutrophic



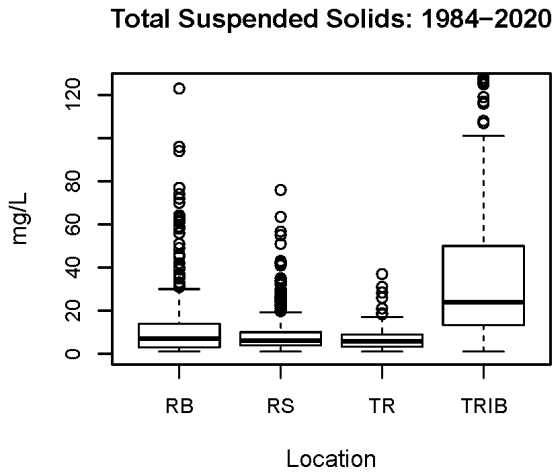


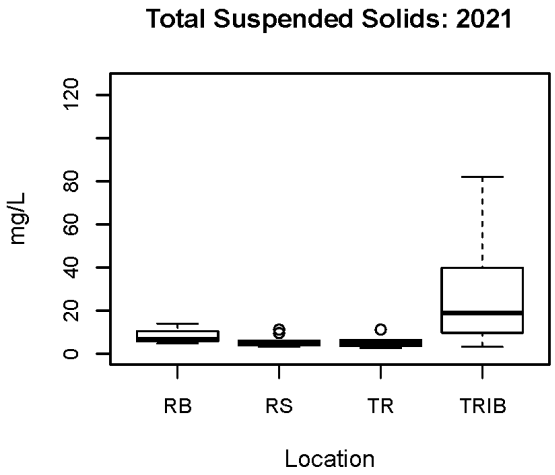




	Historical Reference 2018-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
TDS	RB	137.36	135.00	11	143.67	145.00	3
	RS	132.40	134.50	60	120.17	117.50	18
	TR	132.30	133.50	10	122.83	120.00	6
	TRIB	186.06	180.00	53	270.25	273.50	12
FNU	RB	33.03	37.84	11	33.75	26.73	3
	RS	28.34	15.38	60	10.25	3.32	18
	TR	18.60	9.32	10	15.58	6.62	6
	TRIB	64.84	36.71	52	27.63	14.76	12

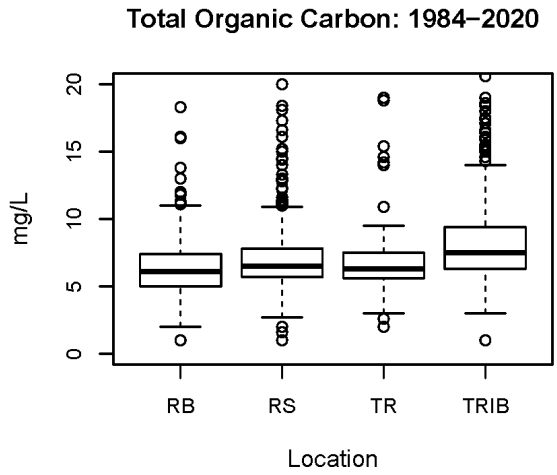
* *All TDS observations were below the standard in 2021. This study does not recognize a standard for turbidity.*

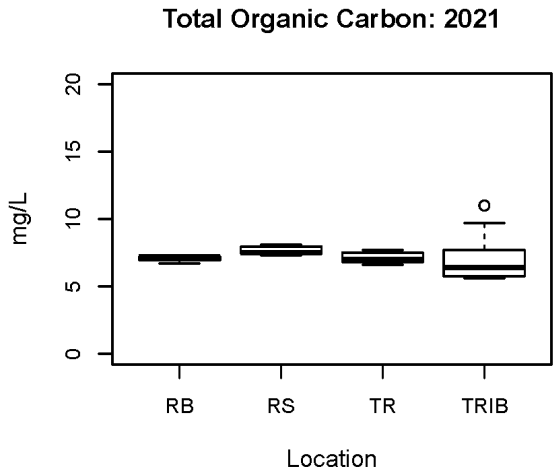




	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
TSS	RB	12.73	7.00	346	8.53	6.80	3
	RS	8.48	6.00	574	5.53	4.80	12
	TR	7.26	5.85	150	5.65	5.00	6
	TRIB	69.08	24.00	517	28.00	18.80	12

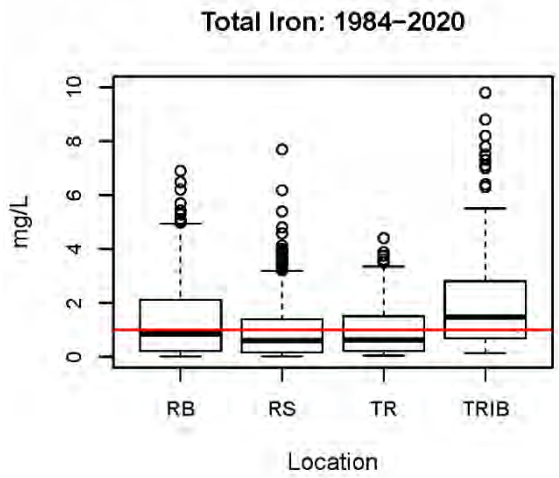
** This study does not recognize a standard for TSS*

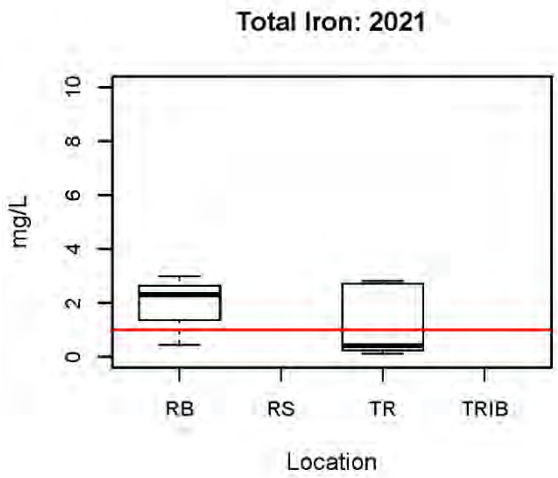




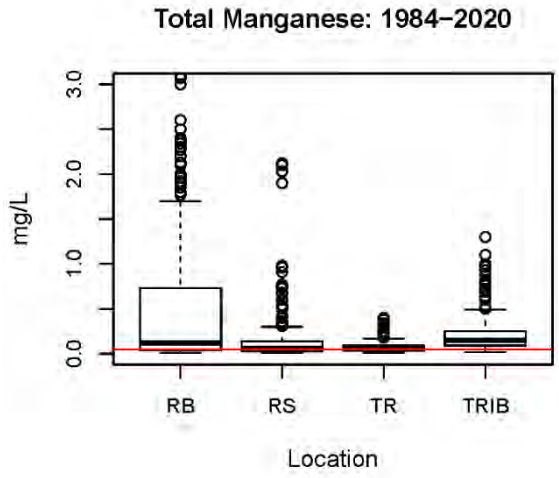
	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
TOC	RB	6.53	6.10	363	7.03	7.20	3
	RS	6.92	6.50	577	7.65	7.50	12
	TR	6.77	6.30	151	7.10	7.00	6
	TRIB	8.44	7.50	517	7.04	6.40	12

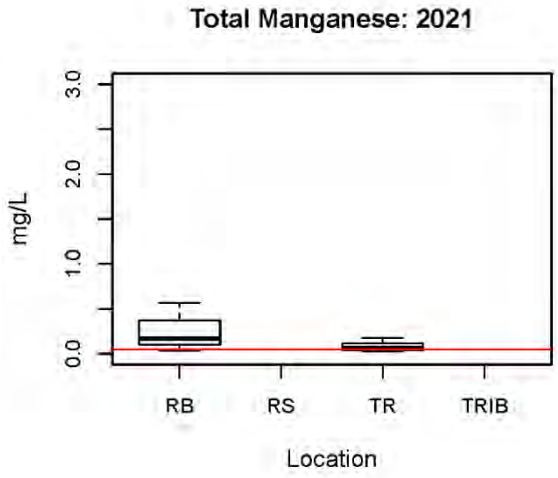
**This study does not recognize a standard for TOC.*





**Red line indicates the water quality standard of 1 mg/L.*

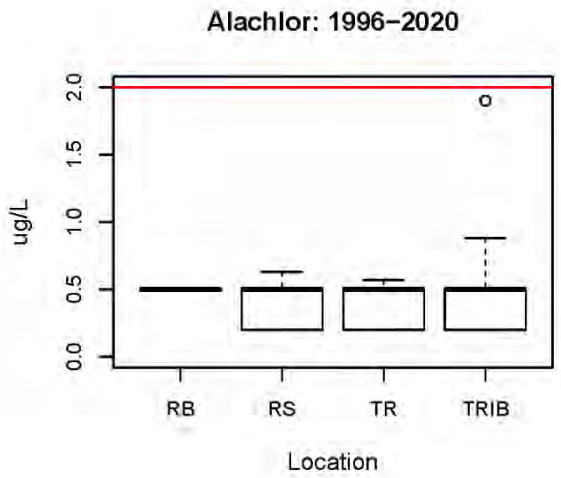


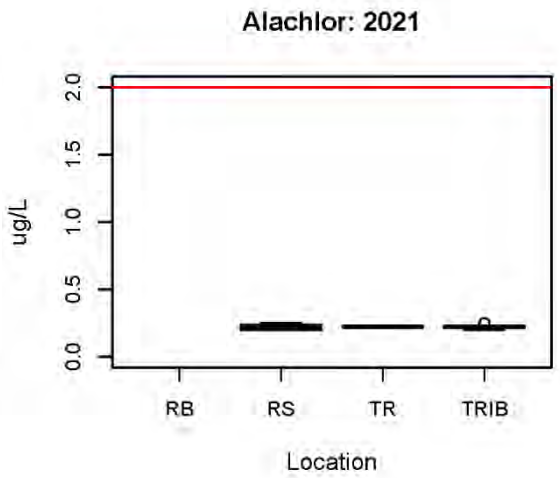


**Red line indicates the standard for manganese of 0.05 mg/L.*

	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
TFe	RB	1.37	0.85	357	1.91	2.30	3
	RS	1.05	0.60	288	----	----	----
	TR	1.02	0.63	144	1.12	0.41	6
	TRIB	2.61	1.48	214	----	----	----
TMn	RB	0.71	0.12	358	0.26	0.17	3
	RS	0.15	0.06	288	----	----	----
	TR	0.08	0.05	144	0.08	0.06	6
	TRIB	0.22	0.15	214	----	----	----

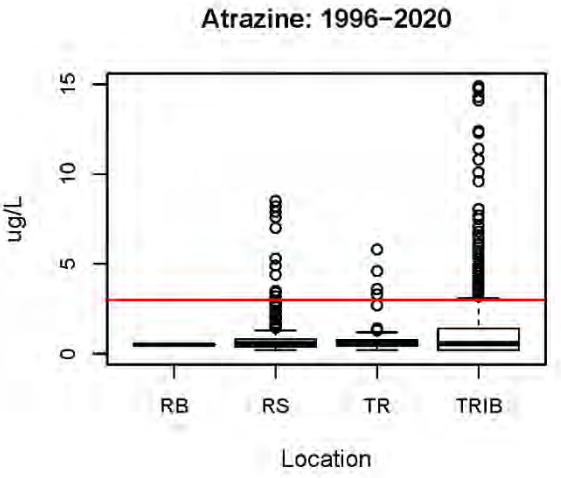
**In 2021 Fe exceeded the standard of 1 mg/L near the lake bottom in front of the dam as well as in the discharges of both the main dam and re-regulation dam. Manganese exceeded the standard of 0.05 mg/L at every sampling event in front of the dam and in the discharges of both the main dam and re-regulation dam.*

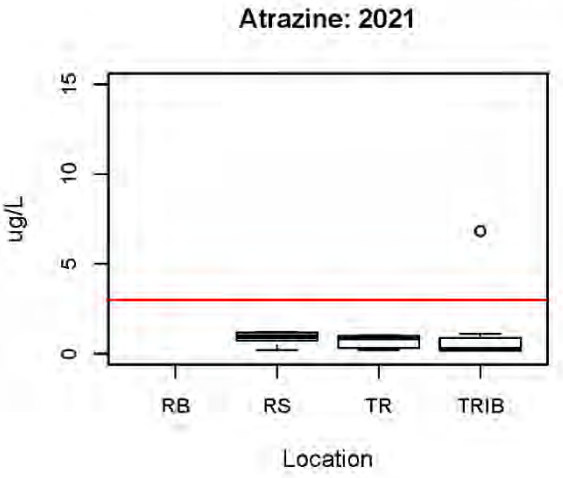




	Historical Reference 1996-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
Alachlor	RB	0.50	0.50	5	----	----	----
	RS	0.37	0.50	301	0.22	0.22	12
	TR	0.37	0.50	79	0.22	0.22	6
	TRIB	0.37	0.50	368	0.22	0.22	12

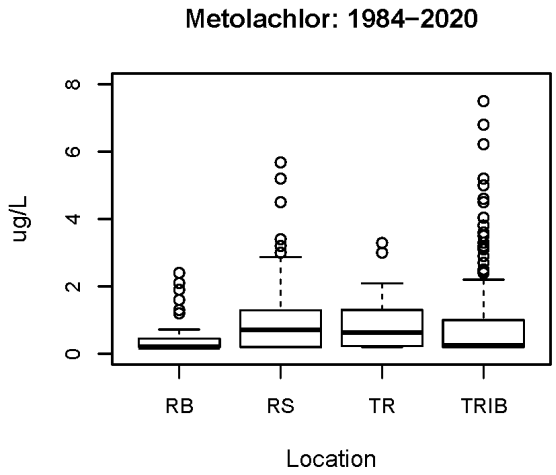
**The criterion of 2 ug/L for Alachlor was not exceeded in 2021 as all observations were under the detection limit.*

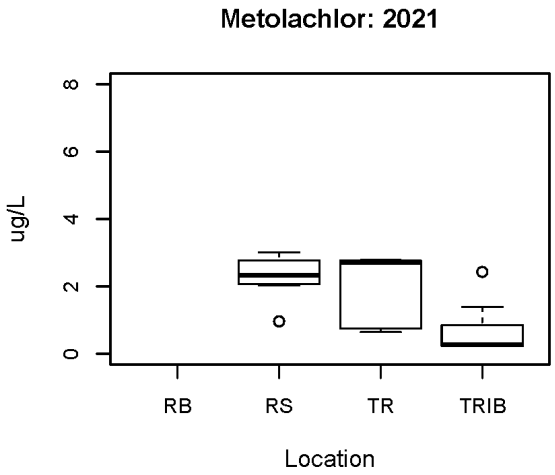




	Historical Reference 1996-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
Atrazine	RB	0.50	0.50	5	----	----	----
	RS	0.86	0.56	301	0.88	0.95	12
	TR	0.79	0.56	79	0.73	0.89	6
	TRIB	1.82	0.56	366	0.97	0.24	12

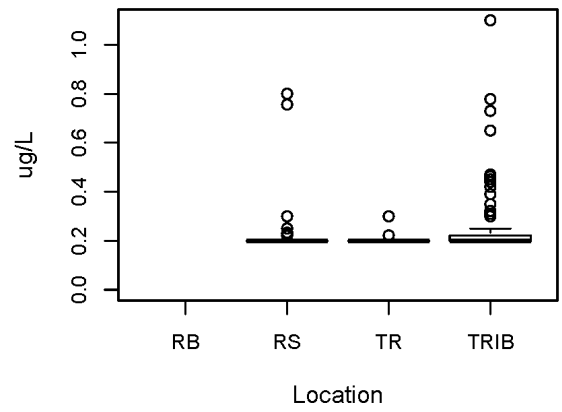
**The standard of 3 ug/L for Atrazine was exceeded once at MTL-9 in 2021.*

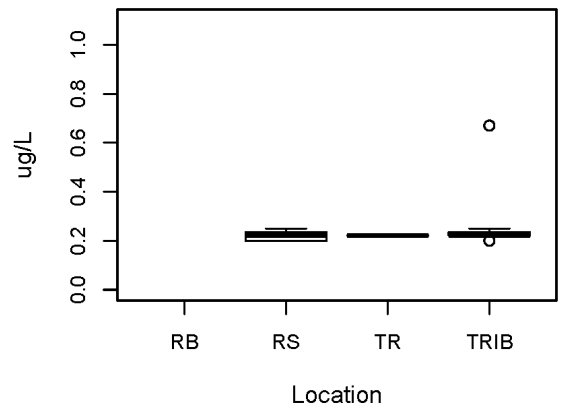




	Historical Reference 1984-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
Metolachlor	RB	0.52	0.20	32	----	----	----
	RS	0.92	0.71	181	2.25	2.33	12
	TR	0.89	0.63	43	2.06	2.72	6
	TRIB	0.88	0.24	188	0.64	0.26	12

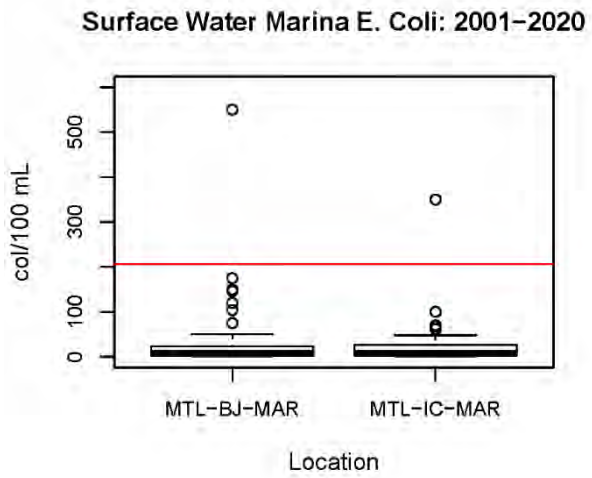
**The standard of 70 ug/L for Metolachlor was not exceeded in 2021.*

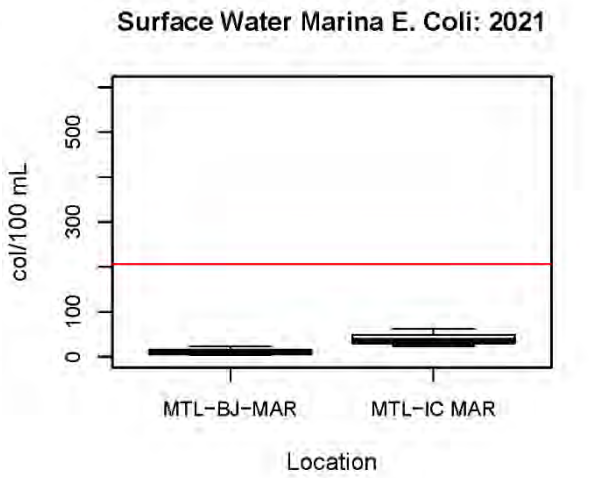




	Historical Reference 2007-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
Metribuzin	RB	----	----	----	----	----	----
	RS	0.22	0.20	146	0.22	0.22	12
	TR	0.21	0.20	37	0.22	0.22	6
	TRIB	0.23	0.20	180	0.26	0.22	12

**The standard of 100 ug/L for Metribuzin was not exceeded in 2021.*





**Whole body contact recreation standard is geometric mean of <206 cfu/100mL. Secondary body contact recreation standard is geometric mean of <1,134 cfu/100mL.*

	Historical Reference 2001-2020				2021		
	Location	Mean	Median	n	Mean	Median	n
E col	MTL-BJ-MAR	35.79	9.00	48	12.00	9.00	3
	MTL-IC-MAR	60.04	10.00	49	40.67	36.00	3

**Marina bacteria levels did not exceed the water quality standard in 2021.*

2021 Mark Twain Lake Swimming Beach Bacteria Levels (E. Coli / 100 mL)

Date	Spalding East	Spalding West	Indian Creek
5/4/2021	0	20	0
5/11/2021	1	1	1
5/23/2021	10	10	40
6/1/2021	0	0	0
6/7/2021	0	0	0
6/14/2021	10	10	10
Beaches Closed Due to High Water			
8/2/2021	180	20	10
8/9/2021	5	5	5
8/15/2021	10	10	10
8/23/2021	20	5	5
8/30/2021	0	0	0

**Beach bacteria levels did not exceed the standard during 2021.*

DISCUSSION: WATER QUALITY

Water quality metrics assessed by CEMVS can be sporadic and highly variable from year to year, thus long-term data collection using consistent and comparable methodology is critical to identify trends or patterns. In general, conditions observed during 2021 did not deviate far from conditions observed during the reference period (1984-2020); nevertheless, concerns regarding DO, Atrazine, Fe, Mn, TP, and Chl-a were evident. In addition, estimated TSI levels were indicative of a eutrophic system.

During the three sampling events in 2021, DO was recorded below 5 mg/L one time in June at site MTL-9 (4.91 mg/L) in the middle fork of the Salt River. DO readings are taken daily at the Cannon Dam tailrace and at the Re-regulation Dam to monitor conditions in the re-regulation pool and the discharge into the lower Salt River. As with previous years, there were many instances of DO falling under 5 mg/L once the lake stratified and during times of power generation. Approximately 51% and 44% of DO observations were below 5 mg/L at Cannon Dam and the Re-regulation Dam, respectively. Most of these low DO observations occurred during the period June through August when the lake was experiencing a significant high-water event. When the lake stratifies and conditions allow, surface water is spilled through the tainter gates to mix with the anoxic water coming through the turbines to improve the downstream conditions. DO and temperature readings are monitored daily and there is a weekly coordination meeting that occurs between the USACE, state of Missouri, and Southwestern Power Administration to manage this issue.

Pesticides are commonly used throughout much of the agricultural landscape that the Salt River flows. Of the eight pesticides tested, only Atrazine, Metolachlor, and Metribuzin were detected during 2021. Of those three, only Atrazine was found to exceed the criteria. In 2021 the Atrazine drinking water standard (3 ug/L) was exceeded once with a level of 6.83 ug/L at MTL-9 on June 10. Atrazine levels were recorded over the standard frequently in the lake, tailrace, and tributaries historically. The 2021 Atrazine means are similar to the historic Atrazine means. Atrazine and Alachlor herbicides are commonly used agricultural chemicals which can be readily transported by rainfall runoff. Both compounds are suspected of causing cancer; and therefore, were monitored for the protection of human and aquatic health. Atrazine is most commonly detected in ground and surface water due to its wide use, and its ability to persist in soil and move in water. Low levels of pesticides have historically been observed in the tailrace.

Living organisms require trace amounts of metals, but excessive levels can be harmful. TFe exceeded the criterion of 1 mg/L in June near the lake bottom in front of and downstream of Cannon dam as well as below the Re-regulation dam. The mean TFe levels in 2021 were greater than historical levels. Iron cycling is a function of oxidation-reduction processes. Elevated levels of iron near the bottom of a lake is not immediately detrimental to the overall lake system. Iron oxidizes relatively rapidly (minutes to hours);

therefore, any iron released through the discharge should be oxidized in a short period of time. However, the high TFe levels observed downstream of both dams may indicate an upward trend. Similarly, TMn in 2021 exceeded the criterion above and below Cannon dam as well as below the Re-regulation dam. Mean 2021 TMn levels were less than historical levels. Historically, TMn has also exceeded the criterion multiple times in the above and below Cannon dam and below the Re-regulation dam. Future monitoring is imperative to document potential trends.

TP levels have surpassed the criterion of 0.049 mg/L for several years. In 2021 the TP screening value was exceeded at all locations with a mean across all sites of 0.140 mg/L, which is less than the historical mean of 0.215 mg/L. Phosphorus is a limiting nutrient for primary producers (algae and plants) due to its relatively low amount in the environment. Higher inputs of TP and NO3-N into the lake contribute to a highly productive environment which stimulates algal growth that can lead to blooms that deplete the oxygen levels during die off. In addition, blooms can sometimes contain toxins which may be harmful to humans and wildlife.

The screening value of 18 ug/L was exceeded multiple times at various lake locations while the criterion of 30 ug/L was exceeded once in the lake. The 2021 mean CHL_a level (19.48 ug/L) was significantly greater than the historical mean (8.84 ug/L). The 2021 samples were taken in June and September which would bias the Chl_a levels somewhat high in comparison due to more algal activity in the warmer seasons. The historical data includes a significant number of samples being taken in the fall and winter months. However, MDNR nutrient screening threshold criteria apply to the period of May through September. Therefore, the 2021 observations are relevant. Chl_a is an indicator of the abundance of phytoplankton. Any water environment with a level recorded above 25 ug/L is considered to be eutrophic (nutrient enrichment increases algal and plant growth and negative effects). The 2021 TSI level, an average of the individual trophic state indexes for secchi depth, CHL_a, and TP, for Mark Twain Lake was 65.65. Mark Twain Lake is considered eutrophic based on this TSI level. This does not necessarily mean the water quality is poor, but that its trophic level indicates nutrient levels are abundant, which can support an abundance of plants and algae. Long term monitoring and analyses are important to assess changes over time.

MONITORING PROGRAM RECOMMENDATIONS

The 2020 water quality report compiled by the Missouri Department of Natural Resources (MDNR) listed the following impairments: Middle Fork Salt River impaired for dissolved oxygen, South Fork Salt River impaired for dissolved oxygen and pH, Black Creek Tributary to the North Fork Salt River impaired for E. coli, North Fork Salt River and Mark Twain Lake impaired for mercury, and the Salt River below the dam impaired for mercury and dissolved oxygen. Additionally, MDNR has listed Mark Twain Lake as eutrophic. In order to better understand and monitor these impairments the following additional monitoring is recommended: bacteria and mercury at site MTL-11 and mercury at sites MTL-22, MTL-33, MTL-66, MTL-77, MTL-1, and MTL-12.

In accordance with EM-1110-2-1201, benthic sediment samples should be taken to monitor and assess potential impacts to aquatic and human health. Sediment sampling and analyses occurred at Mark Twain Lake in 2018, and prior to that in 2007. During these last analyses multiple exceedances over the recommended criteria were observed. Identifying trends over time is much more achievable with more consistent data. Contaminated sediments may have negative impacts on ecological processes. It is recommended, if possible, to sample and analyze for sediment metals and nutrients, as well as grain size analyses yearly or every two years.

Given the eutrophic status of Mark Twain Lake it is recommended that Total Nitrogen (TN) be added to the monitoring program. TN is a strong indicator of trophic status and is used by the state of Missouri to capture all lakes trophic status included in the 305(b) report. Similarly, it would strengthen the monitoring program to add CHL_a to every sample site. Currently CHL_a is only sampled at the lake sites and not the tributaries or lake discharge. This would allow for a trophic status comparison between the tributaries, lake, and discharge.

According to the Missouri State Code of Regulations 10CSR20-7.031, the parameters TP, TN, and CHL_a must be sampled a minimum of four times per year in order to calculate a geometric mean to be compared to the state's ecoregion criteria thresholds. Thus, given the eutrophic status of Mark Twain Lake, it is imperative that sampling remain at a minimum of four events per year.

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APPENDIX A: FIELD DATA

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)	Secchi (in)
6/10/2021	MTL-1	0.5	5.35	NA	NA	17.1	193.5	126	37.3	
6/10/2021	MTL-11	0.4	8.30	NA	NA	27.3	493.7	321	16.7	
6/10/2021	MTL-12	0.7	8.07	NA	NA	18.1	211.3	137	36.7	
6/10/2021	MTL-13	0.4	9.90	NA	NA	28.1	508.1	330	3.8	
6/10/2021	MTL-22	1.1	11.51	NA	NA	25.5	195.1	127	21.9	24
6/10/2021	MTL-22	2.2	7.75	NA	NA	23.8	198.0	129	23.7	
6/10/2021	MTL-22	3.0	6.33	NA	NA	21.9	196.6	128	27.6	
6/10/2021	MTL-22	4.1	5.73	NA	NA	19.8	194.6	127	31.6	
6/10/2021	MTL-22	5.2	5.47	NA	NA	18.8	196.3	128	32.3	
6/10/2021	MTL-22	6.1	5.59	NA	NA	18.3	193.6	126	34.9	
6/10/2021	MTL-22	7.1	5.32	NA	NA	17.5	192.3	125	40.3	
6/10/2021	MTL-22	8.2	5.26	NA	NA	16.3	190.5	124	40.4	
6/10/2021	MTL-22	9.1	5.20	NA	NA	15.6	188.4	122	42.1	
6/10/2021	MTL-22	10.1	4.99	NA	NA	15.1	188.1	122	42.4	
6/10/2021	MTL-22	11.2	4.61	NA	NA	14.2	188.8	123	44.9	
6/10/2021	MTL-22	12.1	4.35	NA	NA	13.4	191.9	125	41.0	
6/10/2021	MTL-22	13.1	4.27	NA	NA	12.4	197.2	128	35.7	
6/10/2021	MTL-22	14.2	4.29	NA	NA	11.7	200.9	131	31.8	
6/10/2021	MTL-22	15.4	4.30	NA	NA	10.8	205.4	134	27.7	
6/10/2021	MTL-22	16.2	4.27	NA	NA	10.5	207.0	135	26.7	
6/10/2021	MTL-33	1.1	12.93	NA	NA	26.4	195.9	127	21.5	27
6/10/2021	MTL-33	2.0	9.14	NA	NA	24.4	199.0	129	22.2	
6/10/2021	MTL-33	3.1	6.70	NA	NA	22.6	199.6	130	25.5	
6/10/2021	MTL-33	4.3	4.98	NA	NA	19.0	200.0	130	33.5	
6/10/2021	MTL-33	5.3	4.91	NA	NA	18.6	200.0	130	34.2	
6/10/2021	MTL-33	6.1	5.26	NA	NA	18.2	196.1	127	34.0	
6/10/2021	MTL-33	7.0	5.23	NA	NA	17.7	194.3	126	34.9	
6/10/2021	MTL-33	8.2	5.14	NA	NA	16.6	194.0	126	36.3	
6/10/2021	MTL-33	9.2	5.15	NA	NA	15.7	190.1	124	40.1	
6/10/2021	MTL-33	10.3	4.45	NA	NA	14.8	195.1	127	37.7	
6/10/2021	MTL-33	11.1	4.50	NA	NA	14.2	192.2	125	40.0	
6/10/2021	MTL-33	12.1	4.43	NA	NA	13.7	192.2	125	38.9	
6/10/2021	MTL-33	13.1	4.21	NA	NA	12.7	197.2	128	37.3	
6/10/2021	MTL-33	14.1	3.69	NA	NA	12.0	201.2	131	30.7	
6/10/2021	MTL-33	15.3	3.57	NA	NA	10.8	207.3	135	27.1	
6/10/2021	MTL-33	16.3	3.50	NA	NA	10.4	208.0	135	26.6	
6/10/2021	MTL-33	17.0	3.10	NA	NA	9.9	210.2	137	25.5	
6/10/2021	MTL-33	18.1	3.03	NA	NA	9.7	210.8	137	25.3	
6/10/2021	MTL-5	1.0	10.22	NA	NA	25.7	384.2	250	47.7	
6/10/2021	MTL-66	1.1	9.71	NA	NA	28.3	201.7	131	28.1	21
6/10/2021	MTL-66	2.0	8.78	NA	NA	26.0	201.2	131	29.2	
6/10/2021	MTL-66	3.1	7.75	NA	NA	24.4	202.5	132	31.1	

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)	Secchi (in)
6/10/2021	MTL-66	4.1	6.17	NA	NA	21.4	203.7	132	33.9	
6/10/2021	MTL-66	5.1	4.71	NA	NA	19.4	202.1	131	38.0	
6/10/2021	MTL-66	6.2	4.09	NA	NA	18.3	200.7	130	41.4	
6/10/2021	MTL-66	7.2	2.74	NA	NA	17.6	202.3	131	45.5	
6/10/2021	MTL-66	8.3	1.23	NA	NA	16.6	202.3	131	48.9	
6/10/2021	MTL-66	9.1	1.41	NA	NA	16.0	198.6	129	52.8	
6/10/2021	MTL-66	10.1	0.82	NA	NA	15.3	197.2	128	55.7	
6/10/2021	MTL-66	11.2	0.72	NA	NA	14.5	195.3	127	63.5	
6/10/2021	MTL-66	12.3	0.66	NA	NA	14.2	195.2	127	64.7	
6/10/2021	MTL-77	0.9	9.86	NA	NA	29.1	203.2	132	29.7	21
6/10/2021	MTL-77	2.0	7.84	NA	NA	25.0	205.2	133	32.1	
6/10/2021	MTL-77	3.1	6.71	NA	NA	23.0	205.4	134	34.2	
6/10/2021	MTL-77	4.1	3.76	NA	NA	19.2	211.2	137	39.1	
6/10/2021	MTL-77	5.1	4.35	NA	NA	18.1	201.4	131	41.2	
6/10/2021	MTL-77	6.1	3.83	NA	NA	17.9	202.4	132	42.4	
6/10/2021	MTL-77	7.0	3.57	NA	NA	17.5	201.4	131	44.2	
6/10/2021	MTL-77	8.1	3.14	NA	NA	17.0	200.3	130	43.7	
6/10/2021	MTL-77	9.1	3.09	NA	NA	16.8	199.0	129	46.4	
6/10/2021	MTL-77	10.1	3.09	NA	NA	15.7	195.1	127	55.5	
6/10/2021	MTL-77	11.1	1.76	NA	NA	15.1	197.4	128	55.9	
6/10/2021	MTL-77	12.3	0.92	NA	NA	13.9	196.2	128	61.9	
6/10/2021	MTL-77	13.1	0.46	NA	NA	12.9	197.6	128	69.9	
6/10/2021	MTL-9	0.4	3.82	NA	NA	24.8	247.5	161	72.5	
6/10/2021	MTL-BJ-MAR	1.2	12.84	NA	NA	30.1	197.1	128	20.9	
6/10/2021	MTL-BJ-MAR	7.6	5.25	NA	NA	17.4	193.5	126	36.2	
6/10/2021	MTL-BJ-MAR	14.7	4.05	NA	NA	12.2	199.6	130	38.0	
6/10/2021	MTL-IC MAR	1.0	8.13	NA	NA	25.4	199.1	129	28.8	
6/10/2021	MTL-IC MAR	6.4	4.82	NA	NA	18.0	196.0	127	43.8	
6/10/2021	MTL-IC MAR	11.3	3.00	NA	NA	14.1	190.8	124	68.6	
9/1/2021	MTL-1	1.0	7.97	7.6	293.2	25.8	177.8	116	5.9	
9/1/2021	MTL-11	0.3	6.03	7.7	156.2	26.0	446.1	290	16.6	
9/1/2021	MTL-12	0.5	5.75	7.6	356.7	27.4	180.8	118	7.4	
9/1/2021	MTL-13	0.0	7.65	7.9	150.0	25.8	344.3	224	8.3	
9/1/2021	MTL-22	1.0	5.75	8.0	208.6	27.2	176.0	114	2.1	
9/1/2021	MTL-22	2.1	4.77	7.7	213.8	26.9	177.2	115	2.3	
9/1/2021	MTL-22	3.0	2.16	7.3	226.2	26.5	178.4	116	3.5	
9/1/2021	MTL-22	4.1	0.91	7.2	210.1	26.0	179.5	117	3.8	
9/1/2021	MTL-22	5.1	0.64	7.1	44.6	25.0	179.5	117	6.2	
9/1/2021	MTL-22	6.1	0.50	7.0	-24.6	23.5	170.4	111	13.0	
9/1/2021	MTL-22	7.1	0.41	7.0	-55.0	21.1	169.0	110	21.9	
9/1/2021	MTL-22	8.1	0.36	7.0	-36.6	19.1	179.6	117	27.5	
9/1/2021	MTL-22	9.0	0.33	7.0	-16.6	16.8	202.9	132	30.4	

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)	Secchi (in)
9/1/2021	MTL-22	10.0	0.29	7.0	-2.7	14.5	209.2	136	33.0	
9/1/2021	MTL-22	11.1	0.27	7.0	3.8	13.2	208.9	136	31.5	
9/1/2021	MTL-22	12.0	0.25	7.0	8.9	12.0	210.4	137	28.7	
9/1/2021	MTL-22	13.0	0.24	7.0	15.2	11.2	212.4	138	25.5	
9/1/2021	MTL-22	14.1	0.22	6.9	25.9	10.6	215.4	140	22.5	
9/1/2021	MTL-22	15.0	0.21	6.9	32.8	10.2	217.8	142	21.6	
9/1/2021	MTL-22	16.1	0.20	6.9	39.9	9.6	222.5	145	21.4	
9/1/2021	MTL-33	1.1	6.30	8.0	109.0	27.5	179.5	117	2.4	30
9/1/2021	MTL-33	2.3	5.67	7.9	114.3	27.2	178.6	116	2.4	
9/1/2021	MTL-33	3.0	5.30	7.8	118.6	27.1	178.3	116	2.4	
9/1/2021	MTL-33	5.1	0.74	7.1	-66.9	24.7	184.8	120	10.8	
9/1/2021	MTL-33	6.2	0.57	7.1	-70.9	22.6	173.4	113	16.2	
9/1/2021	MTL-33	7.0	0.48	7.0	-74.9	21.6	174.7	114	19.4	
9/1/2021	MTL-33	8.1	0.42	7.0	-63.3	18.9	183.7	119	25.9	
9/1/2021	MTL-33	9.1	0.39	7.0	-48.7	16.7	203.2	132	28.6	
9/1/2021	MTL-33	10.3	0.36	7.0	-38.3	14.2	212.6	138	28.4	
9/1/2021	MTL-33	11.2	0.34	7.0	-33.4	13.3	212.6	138	27.0	
9/1/2021	MTL-33	12.1	0.31	7.0	-25.9	11.9	214.1	139	24.8	
9/1/2021	MTL-33	13.1	0.30	7.0	-22.7	11.1	216.4	141	22.8	
9/1/2021	MTL-33	14.2	0.29	7.0	-16.6	10.2	220.7	143	19.7	
9/1/2021	MTL-33	15.2	0.27	7.0	-11.7	9.6	224.7	146	18.8	
9/1/2021	MTL-5	0.0	7.38	8.1	138.3	27.4	465.1	302	82.5	
9/1/2021	MTL-66	1.1	5.94	7.7	131.6	27.4	172.7	112	3.9	39
9/1/2021	MTL-66	2.2	5.38	7.6	135.5	27.1	173.0	112	3.9	
9/1/2021	MTL-66	3.1	5.21	7.6	137.5	27.1	173.1	112	3.7	
9/1/2021	MTL-66	4.1	5.11	7.5	139.9	27.1	173.1	112	3.6	
9/1/2021	MTL-66	5.1	3.62	7.3	147.5	26.9	174.4	113	5.2	
9/1/2021	MTL-66	6.1	2.32	7.2	101.9	26.5	176.6	115	9.4	
9/1/2021	MTL-66	7.2	0.53	7.1	-114.0	23.3	196.1	127	52.4	
9/1/2021	MTL-66	8.1	0.41	7.0	-125.3	21.7	203.7	132	56.4	
9/1/2021	MTL-66	9.2	0.34	7.1	-136.8	20.0	208.6	136	49.3	
9/1/2021	MTL-66	10.0	0.29	7.1	-141.6	16.0	246.9	160	22.5	
9/1/2021	MTL-77	1.3	7.10	8.1	82.9	28.1	173.4	113	3.1	41
9/1/2021	MTL-77	2.3	6.24	7.8	96.6	27.9	173.6	113	3.4	
9/1/2021	MTL-77	3.2	5.83	7.7	104.0	27.8	173.6	113	3.7	
9/1/2021	MTL-77	4.2	5.64	7.7	107.1	27.7	173.6	113	3.8	
9/1/2021	MTL-77	5.1	4.20	7.4	113.9	27.5	174.0	113	5.6	
9/1/2021	MTL-77	6.2	0.59	7.1	-69.6	25.4	178.6	116	20.0	
9/1/2021	MTL-77	7.1	0.45	7.0	-105.4	23.2	182.5	119	44.1	
9/1/2021	MTL-77	8.1	0.39	7.0	-114.4	21.8	179.2	117	42.8	
9/1/2021	MTL-77	9.1	0.36	7.0	-120.2	19.7	192.5	125	49.4	
9/1/2021	MTL-77	10.2	0.33	7.1	-126.3	17.1	221.4	144	52.0	

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)	Secchi (in)
9/1/2021	MTL-77	11.1	0.32	7.1	-129.8	14.2	244.2	159	52.4	
9/1/2021	MTL-77	12.0	0.29	7.1	-131.5	13.3	247.7	161	52.7	
9/1/2021	MTL-9	0.0	5.76	7.8	143.0	25.6	380.6	247	12.9	
9/1/2021	MTL-BJ-MAR	1.1	6.00	8.3	-39.2	28.0	177.6	115	2.6	
9/1/2021	MTL-BJ-MAR	6.1	0.76	7.1	-64.0	22.7	175.7	114	20.6	
9/1/2021	MTL-BJ-MAR	11.5	1.13	7.2	-45.9	12.9	213.6	139	32.2	
9/1/2021	MTL-IC MAR	0.8	5.50	7.8	50.5	27.5	172.1	112	3.5	
9/1/2021	MTL-IC MAR	4.1	3.22	7.4	25.4	26.6	172.0	112	8.7	
9/1/2021	MTL-IC MAR	8.2	1.03	7.1	-94.5	21.5	170.9	111	31.5	
9/29/2021	MTL-1	0.6	8.84	8.1	352.8	23.4	185.6	121	2.2	
9/29/2021	MTL-11	0.3	8.48	7.8	207.3	23.3	441.5	287	11.0	
9/29/2021	MTL-12	0.1	8.20	7.6	200.3	24.3	183.5	119	4.1	
9/29/2021	MTL-13	0.6	7.10	7.8	181.8	20.1	399.9	260	6.6	
9/29/2021	MTL-22	1.0	9.25	8.1	225.8	22.5	179.0	116	2.1	44
9/29/2021	MTL-22	2.0	8.67	8.0	223.9	22.1	179.1	116	2.0	
9/29/2021	MTL-22	3.0	8.22	7.9	225.2	22.0	179.2	116	2.0	
9/29/2021	MTL-22	4.1	7.73	7.7	226.9	21.9	179.0	116	2.1	
9/29/2021	MTL-22	5.0	7.76	7.7	227.1	21.9	179.7	117	2.0	
9/29/2021	MTL-22	6.0	7.15	7.6	224.4	21.8	180.2	117	3.4	
9/29/2021	MTL-22	7.0	6.14	7.6	224.3	21.4	180.9	118	3.8	
9/29/2021	MTL-22	8.0	5.15	7.4	225.2	20.8	183.3	119	5.3	
9/29/2021	MTL-22	9.0	2.60	7.3	226.1	19.5	190.2	124	10.2	
9/29/2021	MTL-22	10.0	1.00	7.2	231.0	13.9	213.8	139	27.4	
9/29/2021	MTL-22	11.0	0.69	7.1	231.4	12.2	216.1	140	28.5	
9/29/2021	MTL-22	12.0	0.59	7.1	230.4	11.3	219.1	142	27.0	
9/29/2021	MTL-22	13.0	0.53	7.1	229.4	10.8	221.2	144	27.3	
9/29/2021	MTL-22	14.0	0.49	7.0	228.3	10.1	225.9	147	33.2	
9/29/2021	MTL-22	15.0	0.46	7.0	223.5	9.8	229.5	149	37.9	
9/29/2021	MTL-22	16.0	0.38	7.0	-48.4	9.5	234.3	152	54.7	
9/29/2021	MTL-22	16.0	0.44	7.0	217.6	9.6	232.1	151	53.2	
9/29/2021	MTL-33	1.1	8.30	7.8	199.7	22.5	180.9	118	2.0	55
9/29/2021	MTL-33	2.2	6.82	7.6	193.5	21.9	181.2	118	2.0	
9/29/2021	MTL-33	3.1	6.65	7.5	191.7	21.9	181.6	118	2.1	
9/29/2021	MTL-33	4.0	6.52	7.5	182.2	21.8	181.7	118	2.3	
9/29/2021	MTL-33	5.1	6.47	7.5	179.5	21.8	181.7	118	2.4	
9/29/2021	MTL-33	6.1	6.19	7.5	176.5	21.8	182.7	119	2.4	
9/29/2021	MTL-33	7.2	5.05	7.4	172.8	21.2	184.3	120	3.9	
9/29/2021	MTL-33	8.1	2.98	7.3	171.0	20.6	188.5	122	5.9	
9/29/2021	MTL-33	9.1	0.67	7.1	171.3	18.8	195.9	127	11.9	
9/29/2021	MTL-33	10.0	0.52	7.1	172.5	14.1	216.1	140	28.1	
9/29/2021	MTL-33	11.1	0.47	7.0	171.9	11.7	218.8	142	27.5	
9/29/2021	MTL-33	12.3	0.43	7.0	170.4	10.9	221.7	144	27.6	

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)	Secchi (in)
9/29/2021	MTL-33	13.1	0.41	7.0	169.8	10.5	226.7	147	29.5	
9/29/2021	MTL-33	14.3	0.36	6.9	169.2	9.7	232.9	151	33.3	
9/29/2021	MTL-33	15.2	0.35	6.9	168.3	9.6	234.8	153	36.0	
9/29/2021	MTL-33	16.2	0.35	6.9	168.3	9.4	237.3	154	38.7	
9/29/2021	MTL-5	0.8	5.97	7.7	364.1	20.1	384.4	250	44.5	
9/29/2021	MTL-66	1.1	6.59	7.5	338.8	21.7	184.1	120	3.8	36
9/29/2021	MTL-66	2.2	5.94	7.4	327.4	21.5	183.2	119	3.3	
9/29/2021	MTL-66	3.2	5.37	7.4	316.4	21.4	184.3	120	5.1	
9/29/2021	MTL-66	4.2	4.65	7.3	311.4	21.4	188.4	122	5.9	
9/29/2021	MTL-66	5.1	4.40	7.3	304.4	21.4	189.3	123	5.9	
9/29/2021	MTL-66	5.1	4.35	7.3	299.0	21.4	189.2	123	5.8	
9/29/2021	MTL-66	6.1	4.16	7.3	291.7	21.3	190.3	124	6.0	
9/29/2021	MTL-66	7.2	3.61	7.2	288.0	21.1	191.7	125	8.2	
9/29/2021	MTL-66	7.2	3.56	7.2	286.4	21.1	191.8	125	8.2	
9/29/2021	MTL-66	8.3	1.64	7.2	281.9	20.6	195.2	127	11.2	
9/29/2021	MTL-66	9.2	0.53	7.0	-48.4	16.7	236.7	154	46.2	
9/29/2021	MTL-66	10.1	0.43	7.0	-91.4	13.4	262.8	171	46.2	
9/29/2021	MTL-77	1.0	9.63	8.1	137.4	22.5	180.9	118	2.9	44
9/29/2021	MTL-77	2.0	8.17	7.8	144.6	22.0	181.8	118	2.8	
9/29/2021	MTL-77	3.1	6.31	7.5	147.3	21.5	182.2	118	3.0	
9/29/2021	MTL-77	4.1	5.89	7.4	146.9	21.3	184.8	120	4.1	
9/29/2021	MTL-77	4.4	5.85	7.4	146.6	21.3	184.5	120	4.0	
9/29/2021	MTL-77	5.1	5.70	7.3	147.5	21.3	185.3	120	4.3	
9/29/2021	MTL-77	6.1	5.62	7.4	145.6	21.2	185.6	121	4.8	
9/29/2021	MTL-77	7.2	5.21	7.3	145.9	21.1	187.4	122	5.7	
9/29/2021	MTL-77	8.2	4.53	7.3	146.2	21.0	189.0	123	6.4	
9/29/2021	MTL-77	9.1	0.70	7.0	4.2	18.6	209.6	136	22.6	
9/29/2021	MTL-77	10.0	0.51	7.0	-69.0	14.8	253.1	165	56.1	
9/29/2021	MTL-77	11.1	0.46	7.0	-88.5	13.0	263.1	171	71.6	
9/29/2021	MTL-9	0.7	8.07	7.8	203.6	21.5	493.1	321	8.5	
9/29/2021	MTL-BJ-MAR	1.1	8.55	7.8	152.9	22.6	180.4	117	2.2	
9/29/2021	MTL-BJ-MAR	4.1	5.97	7.3	16.5	21.9	180.7	117	4.9	
9/29/2021	MTL-BJ-MAR	9.4	1.14	7.2	-38.0	15.3	213.4	139	38.2	
9/29/2021	MTL-IC MAR	1.1	8.57	7.9	421.8	22.4	179.5	117	3.2	
9/29/2021	MTL-IC MAR	4.1	6.15	7.4	84.9	21.6	179.6	117	4.9	
9/29/2021	MTL-IC MAR	8.2	4.37	7.4	40.8	20.6	184.0	120	13.1	

APPENDIX B: LABORATORY DATA

ARDL Inc.
Environmental | Analytical | Management | Safety

PO Box 1566
400 Aviation Drive
Mt. Vernon, IL 62864
618-244-3235
www.ardlinc.com

Customer Name: SLCOE **Date: 6/30/21**

Project Name: Mark Twain Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 6/10/21 **ARDL Report No.: 8710**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	6/10/21	8710-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	6/10/21	8710-02	NP Pesticides, Metals(1), Inorganics(2)
MTL-13	6/10/21	8710-03	NP Pesticides, Metals(1), Inorganics(2)
MTL-9	6/10/21	8710-04	NP Pesticides, Metals(1), Inorganics(2)
MTL-11	6/10/21	8710-05	NP Pesticides, Metals(1), Inorganics(2)
MTL-12	6/10/21	8710-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	6/10/21	8710-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	6/10/21	8710-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	6/10/21	8710-09	Metals(1), Inorganics(2)
MTL-33-0	6/10/21	8710-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	6/10/21	8710-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	6/10/21	8710-12	NP Pesticides, Metals(1), Inorganics(2)(3)
IC MARINA	6/10/21	8710-13	NP Pesticides, Inorganics(2), E Coli
BJ MARINA	6/10/21	8710-14	NP Pesticides, Inorganics(2), E Coli

(1) Including iron and manganese.
(2) Including ammonia, nitrate, orthophosphate, total phosphorus, TOC, TSS and TVSS.
(3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION – METHOD 8270-SIM

HOLDING TIME
Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION
The initial calibration passed criteria. The ICV passed criteria.

CONTINUING CALIBRATION
The continuing calibration verification (CCV) passed criteria for all analytes.

PREPARATION BLANK
The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE
The LCS analyses met recovery criteria.

MATRIX SPIKE
The matrix spike and matrix spike duplicate met recovery criteria.

CASE NARRATIVE (Continued)

DUPLICATE
Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARDS
All internal standard criteria were met.

SURROGATES
All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

PREPARATION BLANK
Results of the preparation blanks were undetected.

LABORATORY CONTROL SAMPLE
Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE
Percent recoveries of all matrix spikes and matrix spike duplicates were within control limits, except 2 of 2 for ammonia and iron. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE
All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS and TVSS.
RPD on all duplicate analyses were within control limits.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected.

J - Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson
Technical Services Manager

Sample & QC Results

Including as appropriate:

- Field Sample Results
- Batch QC
  - Prep Blank
  - LCS/Spike Blank
- Matrix QC
  - MS/MSD
  - Sample Duplicate

ARDL Data Package 8710

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-1	ARDL Lab No.:	008710-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615105
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1500	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.756		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	78%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-01
Field ID: MTL-1
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1500

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500	J	2.72	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
(a) Manganese	0.00400	0.00500		0.0251	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
Ammonia Nitrogen	0.0200	0.0300	J	0.113	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0380	0.0400		1.37	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.234	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	2.0	2.00		3.6	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	2.0	2.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		6.8	MG/L	NONE	415.1	NA	06/22/21	06245980

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-5	ARDL Lab No.:	008710-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615108
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1430	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	1.11		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.43		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	76%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-02
Field ID: MTL-5
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1430

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.137	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0190	0.0200		0.174	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.113	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		10.8	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		7.2	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		11.0	MG/L	NONE	415.1	NA	06/22/21	06245980

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-13	ARDL Lab No.:	008710-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615109
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1145	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.910		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	0.850		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	78%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-03
Field ID: MTL-13
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1145

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.122	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.0744	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		8.0	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		6.9	MG/L	NONE	415.1	NA	06/22/21	06245980

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-9	ARDL Lab No.:	008710-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615110
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1100	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	6.83		UG/L	1
Metribuzin	0.200	0.200	0.670		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	1.39		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	82%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-04
Field ID: MTL-9
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1100

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.304	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0190	0.0200		1.16	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.355	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	10.0	10.0		45.0	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	10.0	10.0		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		9.7	MG/L	NONE	415.1	NA	06/22/21	06245980

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-11	ARDL Lab No.:	008710-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615111
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1230	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.830		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	0.860		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	81%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-05
Field ID: MTL-11
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1230

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.148	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.20	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		34.8	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		6.8	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	06/22/21	06245980

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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-12	ARDL Lab No.:	008710-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615112
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1000	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.311		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.644		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	72%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-06
Field ID: MTL-12
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1000

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		2.82	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
(a) Manganese	0.00400	0.00500		0.0512	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
Ammonia Nitrogen	0.0200	0.0300		0.115	MG/L	NONE	350.1	NA	06/16/21	06165960
Nitrate as Nitrogen	0.0190	0.0200		1.33	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.239	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	2.50	2.50		6.5	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	2.50	2.50		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		6.9	MG/L	NONE	415.1	NA	06/22/21	06245980

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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-15-0	ARDL Lab No.:	008710-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615113
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1100	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	0.289		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	3.26		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	92%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-07
Field ID: MTL-15-0
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1100

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.13	MG/L	NONE	350.1	NA	06/16/21	06165960
Chlorophyll-a, Correcte	1.0	1.00		10.9	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Nitrate as Nitrogen	0.0190	0.0200		1.68	MG/L	NONE	GREEN	NA	06/11/21	06225973
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Phosphorus	0.00800	0.0100		0.208	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		6.0	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	06/22/21	06245980

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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-22-0	ARDL Lab No.:	008710-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615114
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1320	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.980		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	0.960		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	70%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-08
Field ID: MTL-22-0
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1320

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.118	MG/L	NONE	350.1	NA	06/16/21	06165960
Chlorophyll-a, Correcte	1.0	1.00		24.4	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Nitrate as Nitrogen	0.0190	0.0200		1.04	MG/L	NONE	GREEN	NA	06/11/21	06225973
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Phosphorus	0.00800	0.0100		0.161	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		11.2	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	06/23/21	06245980

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-09
Field ID: MTL-22-15
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1320

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		2.99	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
(a) Manganese	0.00400	0.00500		0.0378	MG/L	3010A	6010C	06/15/21	06/18/21	P7529
Ammonia Nitrogen	0.0200	0.0300		0.172	MG/L	NONE	350.1	NA	06/16/21	06175963
Nitrate as Nitrogen	0.0190	0.0200		1.31	MG/L	NONE	GREEN	NA	06/11/21	06225973
Phosphorus	0.00800	0.0100		0.234	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		6.8	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		6.7	MG/L	NONE	415.1	NA	06/23/21	06245980

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Sample 008710-09, Inorganic Analyses

ARDL, INC.
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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-33-0	ARDL Lab No.:	008710-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615115
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1230	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	1.00		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.967		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	63%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-10
Field ID: MTL-33-0
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1230

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.133	MG/L	NONE	350.1	NA	06/16/21	06175963
Chlorophyll-a, Correcte	1.0	1.00		20.0	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Nitrate as Nitrogen	0.0190	0.0200		0.998	MG/L	NONE	GREEN	NA	06/11/21	06225973
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Phosphorus	0.00800	0.0100		0.152	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		9.6	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	06/23/21	06245980

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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-66-0	ARDL Lab No.:	008710-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615116
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1130	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.14		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	76%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-11
Field ID: MTL-66-0
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1130

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.245	MG/L	NONE	350.1	NA	06/16/21	06175963
Chlorophyll-a, Correcte	1.0	1.00		12.7	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Nitrate as Nitrogen	0.0190	0.0200		1.61	MG/L	NONE	GREEN	NA	06/11/21	06225973
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Phosphorus	0.00800	0.0100		0.195	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		6.0	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	06/23/21	06245980

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Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-77-0	ARDL Lab No.:	008710-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0615117
Sample Date:	06/10/2021	Received Date:	06/10/2021
Sample Time:	1100	Prep. Date:	06/14/2021
Matrix:	WATER	Analysis Date:	06/15/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.34		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	66%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-12
Field ID: MTL-77-0
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1100

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.291	MG/L	NONE	350.1	NA	06/16/21	06175963
Chlorophyll-a, Correcte	1.0	1.00		8.6	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Nitrate as Nitrogen	0.0190	0.0200		1.64	MG/L	NONE	GREEN	NA	06/11/21	06225973
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953
Phosphorus	0.00800	0.0100		0.195	MG/L	365.2	365.2	06/14/21	06/16/21	06175965
Solids, Total Suspended	4.0	4.00		6.0	MG/L	NONE	160.2	NA	06/11/21	06165954
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	06/11/21	06165955
Total Organic Carbon	0.500	1.00		7.4	MG/L	NONE	415.1	NA	06/23/21	06245980

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Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-13
Field ID: IC MARINA
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1045

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.0	1.00		36.0	COL/100 ML	NONE	1604	NA	06/10/21	06175962

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008710-14
Field ID: BJ MARINA
Received: 06/10/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 06/10/2021
Sampling Time: 1310

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.0	1.00		4.0	COL/100 ML	NONE	1604	NA	06/10/21	06175962

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT

ARDL, Inc. 400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name:	MARK TWAIN LAKE	Analysis:	NP PESTICIDES (8270SIM-MOD)
Project No.:		Analytical Method:	8270C
NELAC Certified - IL100308		Prep Method:	3510C

Field ID:	NA	ARDL Lab No.:	008710-01B1
Desc/Location:	NA	Lab Filename:	E0615103
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	06/14/2021
Matrix:	QC Material	Analysis Date:	06/15/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11353
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units
Trifluralin	0.200	0.200	ND		UG/L
Atrazine	0.200	0.200	ND		UG/L
Metribuzin	0.200	0.200	ND		UG/L
Alachlor	0.200	0.200	ND		UG/L
Metolachlor	0.200	0.200	ND		UG/L
Chlorpyrifos	0.200	0.200	ND		UG/L
Cyanazine	0.200	0.200	ND		UG/L
Pendimethalin	0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	101%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

BLANK SUMMARY REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LOD	LOQ	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	ND	MG/L	3010A	6010C	06/15/21	06/18/21	P7529	008710-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	06/15/21	06/18/21	P7529	008710-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	06/16/21	06175963	008710-09B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	06/16/21	06165960	008710-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953	008710-10B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	06/11/21	06225973	008710-01B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	06/11/21	06/14/21	06165953	008710-10B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	06/14/21	06/16/21	06175965	008706-03B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	06/11/21	06165954	008710-04B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	06/11/21	06165955	008710-04B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	06/22/21	06245980	008710-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008710

BLANK SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Matrix: QC Material QC Batch: B11353 Prep. Date: 06/14/2021
Amount Used: 1000 mL Level: LOW Analysis Date: 06/15/2021

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.71	4	93	--	--	--	30-130	--	--
Atrazine	3.59	4	90	--	--	--	30-130	--	--
Metribuzin	3.6	4	90	--	--	--	30-130	--	--
Alachlor	3.67	4	92	--	--	--	30-130	--	--
Metolachlor	3.55	4	89	--	--	--	30-130	--	--
Chlorpyrifos	3.43	4	86	--	--	--	30-130	--	--
Cyanazine	3.85	4	96	--	--	--	30-130	--	--
Pendimethalin	3.84	4	96	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	97.3	--	30-130

(a) DOD-QSM Accredited Analyte.
'*' indicates a recovery outside of standard limits.
Spike Blanks for 008710-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
(a) Iron	5.6	5.0	112	--	--	--	87-115	--	P7529	008710-01C1
(a) Manganese	0.84	0.75	112	--	--	--	90-114	--	P7529	008710-01C1
Ammonia Nitrogen	1.1	1.0	108	--	--	--	80-120	--	06165960	008710-01C1
Ammonia Nitrogen	1.1	1.0	108	--	--	--	80-120	--	06175963	008710-09C1
Nitrate as Nitrogen	0.99	1.0	99	--	--	--	80-120	--	06225973	008710-01C1
Phosphorus	0.64	0.67	96	--	--	--	80-120	--	06175965	008706-03C1
Total Organic Carbon	19.5	20.0	98	--	--	--	76-120	--	06245980	008710-01C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

(a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/21/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Field ID:	MTL-1	Prep. Date:	06/14/2021	ARDL Lab No.:	008710-01
Desc/Location:	MARK TWAIN LAKE	Amount Used:	900 mL	Lab Filename:	
Sample Date:	06/10/2021	% Moisture:	NA	Received Date:	06/10/2021
Sample Time:	1500	QC Batch:	B11353	Analysis Date:	06/15/2021
Matrix:	WATER	Level:	LOW		

Parameter	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit
Trifluralin	ND	3.92	4.44	88.3	3.26	4.44	73.3	30-130	18.6	30
Atrazine	ND	3.88	4.44	87.3	3.47	4.44	78	30-130	11.2	30
Metribuzin	ND	3.8	4.44	85.5	3.38	4.44	76	30-130	11.8	30
Alachlor	ND	3.57	4.44	80.3	3.08	4.44	69.3	30-130	14.7	30
Metolachlor	0.756	4.34	4.44	80.8	3.82	4.44	69	30-130	12.8	30
Chlorpyrifos	ND	3.4	4.44	76.5	2.89	4.44	65	30-130	16.3	30
Cyanazine	ND	3.97	4.44	89.3	3.6	4.44	81	30-130	9.7	30
Pendimethalin	ND	3.74	4.44	84.3	3.16	4.44	71	30-130	17.1	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	92	77	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008710-01, NP PESTICIDES (8270SIM-MOD)

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
(a) Iron	WATER	2.7	4.0	1.0	124 *	4.2	1.0	147 *	87-115	6	20	P7529	008710-01MS
(a) Manganese	WATER	0.025	0.57	0.50	108	0.59	0.50	112	90-114	3	20	P7529	008710-01MS
Ammonia Nitrogen	WATER	0.11	2.7	2.0	128 *	2.7	2.0	131 *	75-125	2	20	06165960	008710-01MS
Nitrate as Nitrogen	WATER	1.4	2.4	1.0	100	2.4	1.0	106	75-125	3	20	06225973	008710-01MS
Phosphorus	WATER	0.11	0.94	0.83	100	0.96	0.83	102	75-125	2	20	06175965	008710-02MS
Total Organic Carbon	WATER	6.8	12.3	5.0	110	12.1	5.0	106	76-120	2	20	06245980	008710-01MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

(a) DOD and/or NELAC Accredited Analyte.

Inorganic Matrix Spikes for 008710

SAMPLE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008710 Report Date: 06/30/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Chlorophyll-a, Corrected	20.0	19.1	--	MG/CU.M.	5	--	06165953	008710-10D1
Pheophytin-a	ND	0	--	MG/CU.M.	NC	--	06165953	008710-10D1
Solids, Total Suspended	45.0	44.0	--	MG/L	2	--	06165954	008710-04D1
Solids, Volatile Suspend	10.0	10.0	--	MG/L	0	--	06165955	008710-04D1

(a) DOD and/or NELAC Accredited Analyte

[redacted]

Sample Receipt Information

Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package 8710

8710

ARDL, Inc.

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

CHAIN OF CUSTODY RECORD

PROJECT: Mark Twain Lake

SAMPLERS: (Signature)

	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	* TOC, T-PO4	*NO3-N, NH3-N	NP Pest	#T.Fe, T.Mn	E. coli	MS/MSD	REMARKS OR SAMPLE LOCATION	PRESERVATION ICED	PRESERVATION SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
1	MTL-1	6/10/21	1300		x		X		X	X	X	X		X			X	
2	MTL-5	6/10/21	1430		x		X		X	X	X						X	
3	MTL-13	6/10/21	1145		x		X		X	X	X						X	
4	MTL-9	6/10/21	1100		x		X		X	X	X						X	
5	MTL-11	6/10/21	1230		x		X		X	X	X						X	
6	MTL-12	6/10/21	1000		x		X		X	X	X	X					X	
7	MTL-15-0	6/10/21	1100		x		X	X	X	X	X						X	
8	MTL-22-0	6/10/21	1320		x		X	X	X	X	X						X	
9	MTL-22-15	6/10/21	1320		x		X		X	X		X					X	
10	MTL-33-0	6/10/21	1230		x		X	X	X	X	X						X	
11	MTL-66-0	6/10/21	1130		x		X	X	X	X	X						X	
12	MTL-77-0	6/10/21	1130		x		X	X	X	X	X						X	
13	IC MARINA	6/10/21	1045		x								X	X			X	
14	BJ MARINA	6/10/21	1310		x								X	X			X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Kalee Rapp	6/10/21	1805	Valerie Jenkins
Relinquished by: (Signature) Valerie Jenkins	Date 6/10/21	Time 1935	Received by: (Signature)
Received for Laboratory by: (Signature) AST	Date 6/10/21	Time 1950	Shipping Ticket No.

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8710 Cooler # 1 Red

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 06/10/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 06/10/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)

   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES____ NO ✓ Observed Cooler Temp. 0.6 C (sample Temp)
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 06/11/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice

11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were sample labels complete? ..... (YES) NO

14. Did all sample labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... (YES) NO N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 06/11/2021	On:

Chain-of-Custody # _____

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8710 Cooler # 2 Red

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 06/10/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 06/10/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)

   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES____ NO✓ Observed Cooler Temp. 0.9 °C (Sample Temp) Correction factor 0.0 °C

B. **LOG-IN PHASE:** Date samples were logged-in: 06/11/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice

11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were sample labels complete? ..... (YES) NO

14. Did all sample labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... (YES) NO N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 06/11/2021	On:

Chain-of-Custody # _____

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8710 Cooler # 1 Blue

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 06/10/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 06/10/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)
   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie
2. Were custody seals on outside of cooler? ..... YES (NO) N/A
   How many and where? ____, Seal Date: ____, Seal Name: ____
3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES ____ NO ✓ Observed Cooler Temp. 1.4 C (Sample Temp)
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 06/11/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice
11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were sample labels complete? ..... (YES) NO
14. Did all sample labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... (YES) NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #: ____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-in	Area #:
By: DCB	By:
On: 06/11/2021	On:

Chain-of-Custody # ____

ARDL Inc.
Environmental | Analytical | Management | Safety

PO Box 1566
400 Aviation Drive
Mt. Vernon, IL 62864
618-244-3235
www.ardlinc.com

Customer Name: SLCOE **Date: 10/12/21**

Project Name: Mark Twain Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 9/1/21 **ARDL Report No.: 8823**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	9/01/21	8823-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	9/01/21	8823-02	NP Pesticides, Inorganics(2)
MTL-13	9/01/21	8823-03	NP Pesticides, Inorganics(2)
MTL-9	9/01/21	8823-04	NP Pesticides, Inorganics(2)
MTL-11	9/01/21	8823-05	NP Pesticides, Inorganics(2)
MTL-12	9/01/21	8823-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	9/01/21	8823-07	NP Pesticides, Inorganics(2)
MTL-22-0	9/01/21	8823-08	NP Pesticides, Inorganics(2)
MTL-22-15	9/01/21	8823-09	Metals(1), Inorganics(2)
MTL-33-0	9/01/21	8823-10	NP Pesticides, Inorganics(2)
MTL-66-0	9/01/21	8823-11	NP Pesticides, Inorganics(2)
MTL-77-0	9/01/21	8823-12	NP Pesticides, Inorganics(2)
IC MARINA	9/01/21	8823-13	E. Coli
BJ MARINA	9/01/21	8823-14	E. Coli

(1) Including iron and manganese.
(2) Including ammonia, nitrate, total phosphorus, TOC, TSS and TVSS.
(3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION – METHOD 8270-SIM

HOLDING TIME
Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION
The initial calibration passed criteria. The ICV passed criteria.

CONTINUING CALIBRATION
The continuing calibration verification (CCV) passed criteria for all analytes.

PREPARATION BLANK
The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE
The LCS analyses met recovery criteria.

MATRIX SPIKE
The matrix spike and matrix spike duplicate met recovery criteria.

CASE NARRATIVE (Continued)

DUPLICATE
Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARDS
All internal standard criteria were met.

SURROGATES
All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

PREPARATION BLANK
Results of the preparation blanks were undetected.

LABORATORY CONTROL SAMPLE
Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE
Percent recoveries of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for nitrate. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE
All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS and TVSS.
RPD on all duplicate analyses were within control limits.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

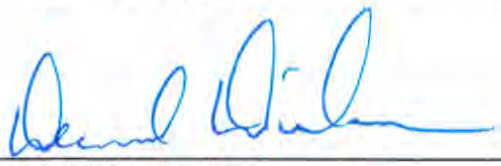
ND - Indicates parameter was analyzed for but not detected.

J - Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.



Dean S. Dickerson
Technical Services Manager

Sample & QC Results

Including as appropriate:

- Field Sample Results
- Batch QC
  - Prep Blank
  - LCS/Spike Blank
- Matrix QC
  - MS/MSD
  - Sample Duplicate

ARDL Data Package 8823

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-1	ARDL Lab No.:	008823-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903105
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1050	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.856		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.74		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	68%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-01
Field ID: MTL-1
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1050

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.250	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
(a) Manganese	0.00400	0.00500		0.119	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		0.025	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.0787	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		5.6	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.500	1.00		6.6	MG/L	NONE	415.1	NA	09/12/21	09246334

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ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-5	ARDL Lab No.:	008823-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903108
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1229	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	ND		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	57%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-02
Field ID: MTL-5
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1229

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0687	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200	J	ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.472	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	6.67	6.67		82.0	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	6.67	6.67		13.3	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		5.7	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-13	ARDL Lab No.:	008823-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903109
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1159	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.422		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	77%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-03
Field ID: MTL-13
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1159

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	J	0.0278	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		0.064	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.105	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	2.00	2.00		8.6	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	2.00	2.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		7.9	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-9	ARDL Lab No.:	008823-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903110
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1059	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.278		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	74%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-04
Field ID: MTL-9
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1059

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		0.025	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.126	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		19.2	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		5.6	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-11	ARDL Lab No.:	008823-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903111
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1017	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	ND		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	74%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-05
Field ID: MTL-11
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1017

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.17	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	6.67	6.67		33.3	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	6.67	6.67		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		5.9	MG/L	NONE	415.1	NA	09/12/21	09246334

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ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-12	ARDL Lab No.:	008823-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903112
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1000	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.933		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.70		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	73%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-06
Field ID: MTL-12
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1000

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.579	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
(a) Manganese	0.00400	0.00500		0.175	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
Ammonia Nitrogen	0.0200	0.0300		0.0455	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		0.020	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.096	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		11.2	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		7.7	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-15-0	ARDL Lab No.:	008823-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903113
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1315	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.780		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	2.11		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	61%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-07
Field ID: MTL-15-0
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1315

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Chlorophyll-a, Correcte	1.00	1.00		20.0	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Pheophytin-a	1.00	1.00		1.6	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Phosphorus	0.00800	0.0100		0.0441	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		4.8	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		8.0	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

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400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-22-0	ARDL Lab No.:	008823-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903114
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1200	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.620		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	2.03		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	53%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

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400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-08
Field ID: MTL-22-0
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1200

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Chlorophyll-a, Correcte	1.00	1.00		23.6	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Nitrate as Nitrogen	0.0190	0.0200		0.035	MG/L	NONE	GREEN	NA	09/21/21	09306361
Pheophytin-a	1.00	1.00		1.8	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Phosphorus	0.00800	0.0100		0.0355	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		ND	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		8.0	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-09
Field ID: MTL-22-15
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1215

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		2.30	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
(a) Manganese	0.00400	0.00500		0.569	MG/L	3010A	6010C	09/15/21	09/21/21	P7616
Ammonia Nitrogen	0.0200	0.0300		0.184	MG/L	NONE	350.1	NA	09/14/21	09166290
Nitrate as Nitrogen	0.0190	0.0200		0.556	MG/L	NONE	GREEN	NA	09/21/21	09306361
Phosphorus	0.00800	0.0100		0.247	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		14.0	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		7.2	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-33-0	ARDL Lab No.:	008823-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903115
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1359	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.910		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	2.73		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	77%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-10
Field ID: MTL-33-0
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1359

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Chlorophyll-a, Correcte	1.00	1.00		24.0	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Pheophytin-a	1.00	1.00		1.5	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Phosphorus	0.00800	0.0100		0.0398	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		4.4	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		4.0	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		8.0	MG/L	NONE	415.1	NA	09/12/21	09246334

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-66-0	ARDL Lab No.:	008823-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903116
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1300	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.878		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.31		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	63%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-11
Field ID: MTL-66-0
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1300

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	09/14/21	09166290
Chlorophyll-a, Correcte	1.00	1.00		19.1	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Pheophytin-a	1.00	1.00		3.8	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Phosphorus	0.00800	0.0100		0.0484	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		4.8	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		8.1	MG/L	NONE	415.1	NA	09/12/21	09246335

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-77-0	ARDL Lab No.:	008823-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0903117
Sample Date:	09/01/2021	Received Date:	09/01/2021
Sample Time:	1326	Prep. Date:	09/02/2021
Matrix:	WATER	Analysis Date:	09/03/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.830		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	2.10		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	67%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-12
Field ID: MTL-77-0
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1326

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0396	MG/L	NONE	350.1	NA	09/14/21	09166290
Chlorophyll-a, Correcte	1.00	1.00		15.4	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	09/21/21	09306361
Pheophytin-a	1.00	1.00		3.6	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349
Phosphorus	0.00800	0.0100		0.0441	MG/L	365.2	365.2	09/23/21	09/24/21	09296347
Solids, Total Suspended	4.00	4.00		4.8	MG/L	NONE	160.2	NA	09/07/21	09146271
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	09/07/21	09146274
Total Organic Carbon	0.50	1.0		7.9	MG/L	NONE	415.1	NA	09/12/21	09246335

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-13
Field ID: IC MARINA
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1243

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.00	1.00		24.0	COL/100 ML	NONE	1604	NA	09/01/21	09036223

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 10/08/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008823-14
Field ID: BJ-MARINA
Received: 09/01/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/01/2021
Sampling Time: 1705

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.00	1.00		9.0	COL/100 ML	NONE	1604	NA	09/01/21	09036223

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT

ARDL, Inc. 400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name:	MARK TWAIN LAKE	Analysis:	NP PESTICIDES (8270SIM-MOD)
Project No.:		Analytical Method:	8270C
NELAC Certified - IL100308		Prep Method:	3510C

Field ID:	NA	ARDL Lab No.:	008823-01B1
Desc/Location:	NA	Lab Filename:	E0903103
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	09/02/2021
Matrix:	QC Material	Analysis Date:	09/03/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11393
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units
Trifluralin	0.200	0.200	ND		UG/L
Atrazine	0.200	0.200	ND		UG/L
Metribuzin	0.200	0.200	ND		UG/L
Alachlor	0.200	0.200	ND		UG/L
Metolachlor	0.200	0.200	ND		UG/L
Chlorpyrifos	0.200	0.200	ND		UG/L
Cyanazine	0.200	0.200	ND		UG/L
Pendimethalin	0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	69%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

BLANK SUMMARY REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LOD	LOQ	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	ND	MG/L	3010A	6010C	09/15/21	09/21/21	P7616	008823-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	09/15/21	09/21/21	P7616	008823-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	09/14/21	09166290	008823-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349	008823-07B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	09/21/21	09306361	008823-02B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	09/02/21	09/27/21	09296349	008823-07B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	09/23/21	09/24/21	09296347	008823-03B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	09/07/21	09146271	008823-01B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	09/07/21	09146274	008823-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/12/21	09246334	008823-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/12/21	09246335	008823-11B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008823

BLANK SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Matrix: QC Material QC Batch: B11393 Prep. Date: 09/02/2021
Amount Used: 1000 mL Level: LOW Analysis Date: 09/03/2021

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.38	4	85	--	--	--	30-130	--	--
Atrazine	3.49	4	87	--	--	--	30-130	--	--
Metribuzin	3.55	4	89	--	--	--	30-130	--	--
Alachlor	3.7	4	93	--	--	--	30-130	--	--
Metolachlor	3.41	4	85	--	--	--	30-130	--	--
Chlorpyrifos	3.3	4	83	--	--	--	30-130	--	--
Cyanazine	3.76	4	94	--	--	--	30-130	--	--
Pendimethalin	3.57	4	89	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	77.5	--	30-130

(a) DOD-QSM Accredited Analyte.
'*' indicates a recovery outside of standard limits.
Spike Blanks for 008823-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
(a) Iron	5.0	5.0	100	--	--	--	87-115	--	P7616	008823-01C1
(a) Manganese	0.78	0.75	104	--	--	--	90-114	--	P7616	008823-01C1
Ammonia Nitrogen	0.97	1.0	97	--	--	--	80-120	--	09166290	008823-01C1
Nitrate as Nitrogen	0.94	1.0	94	--	--	--	80-120	--	09306361	008823-02C1
Phosphorus	0.68	0.67	101	--	--	--	80-120	--	09296347	008823-03C1
Total Organic Carbon	20.4	20.0	102	--	--	--	76-120	--	09246334	008823-01C1
Total Organic Carbon	20.8	20.0	104	--	--	--	76-120	--	09246335	008823-11C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

(a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 09/08/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Field ID:	MTL-1	Prep. Date:	09/02/2021	ARDL Lab No.:	008823-01
Desc/Location:	MARK TWAIN LAKE	Amount Used:	900 mL	Lab Filename:	
Sample Date:	09/01/2021	% Moisture:	NA	Received Date:	09/01/2021
Sample Time:	1050	QC Batch:	B11393	Analysis Date:	09/03/2021
Matrix:	WATER	Level:	LOW		

Parameter	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit
Trifluralin	ND	3.63	4.44	81.8	3.36	4.44	75.5	30-130	7.9	30
Atrazine	0.856	4.37	4.44	79	4.09	4.44	72.8	30-130	6.6	30
Metribuzin	ND	3.67	4.44	82.5	3.37	4.44	75.8	30-130	8.5	30
Alachlor	ND	3.76	4.44	84.5	3.66	4.44	82.3	30-130	2.7	30
Metolachlor	2.74	6.03	4.44	74	5.86	4.44	70	30-130	3	30
Chlorpyrifos	ND	3.14	4.44	70.8	2.99	4.44	67.3	30-130	5.1	30
Cyanazine	ND	3.74	4.44	84.3	3.43	4.44	77.3	30-130	8.7	30
Pendimethalin	ND	3.48	4.44	78.3	3.26	4.44	73.3	30-130	6.6	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	67	64	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008823-01, NP PESTICIDES (8270SIM-MOD)

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
(a) Iron	WATER	0.25	1.2	1.0	99	1.3	1.0	100	87-115	1	20	P7616	008823-01MS
(a) Manganese	WATER	0.12	0.62	0.50	100	0.63	0.50	102	90-114	2	20	P7616	008823-01MS
Ammonia Nitrogen	WATER	ND	2.1	2.0	103	2.1	2.0	105	75-125	2	20	09166290	008823-01MS
Nitrate as Nitrogen	WATER	ND	0.76	1.0	76	0.74	1.0	74 *	75-125	2	20	09306361	008823-02MS
Phosphorus	WATER	0.11	0.96	0.83	103	0.97	0.83	105	75-125	2	20	09296347	008823-03MS
Total Organic Carbon	WATER	6.6	11.8	5.0	104	11.7	5.0	102	76-120	1	20	09246334	008823-01MS
Total Organic Carbon	WATER	8.1	13.1	5.0	100	13.1	5.0	100	76-120	0	20	09246335	008823-11MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

(a) DOD and/or NELAC Accredited Analyte.

Inorganic Matrix Spikes for 008823

SAMPLE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008823 Report Date: 10/07/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Chlorophyll-a, Corrected	20.0	20.0	--	MG/CU.M.	0	--	09296349	008823-07D1
Pheophytin-a	1.6	1.6	--	MG/CU.M.	0	--	09296349	008823-07D1
Solids, Total Suspended	5.6	5.6	--	MG/L	0	--	09146271	008823-01D1
Solids, Volatile Suspend	ND	ND	--	MG/L	NC	--	09146274	008823-01D1

(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008823

Sample Receipt Information

Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package 8823

ARDL, Inc. P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

8823

CHAIN OF CUSTODY RECORD

PROJECT
Mark Twain Lake

SAMPLERS: (Signature)
B. Greeling, R. Arcbecki, Travis Schupker

SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	*TOC, T-PO4	*NO3-N, NH3-N	NP Pest	#T.Fe; T.Mn	E. coli	MS/MSD	REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
MTL-1	9/1/21	1050		x		X		X	X	X	X		X		X	
MTL-5		1229		x		X		X	X	X					X	
MTL-13		1159		x		X		X	X	X					X	
MTL-9		1059		x		X		X	X	X					X	
MTL-11		1017		x		X		X	X	X					X	
MTL-12		1000		x		X		X	X	X	X				X	
MTL-15-0		1315		x		X	X	X	X	X					X	
MTL-22-0		1200		x		X	X	X	X	X					X	
MTL-22-15		1215		x		X		X	X		X				X	
MTL-33-0		1359		x		X	X	X	X	X					X	
MTL-66-0		1300		x		X	X	X	X	X					X	
MTL-77-0		1326		x		X	X	X	X	X					X	
IC MARINA		1243		x								X	X		X	
BJ MARINA		1705		x								X	X		X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	9/1/21	1710	Valerie Jenkins
Relinquished by: (Signature) Valerie Jenkins	9/1/21	1840	Received by: (Signature)
Received for Laboratory by: (Signature) [signature]	9/1/21	1840	Shipping Ticket No.

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: ____________

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8823

Cooler # Blue 1

Number of Coolers in Shipment: 3

Project: Mark Twain Lake

Date Received: 09/01/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/02/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)

   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie

2. Were custody seals on outside of cooler? ..... YES NO (N/A)

   How many and where? ____, Seal Date: ____, Seal Name: ____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES ____ NO ✓ Observed Cooler Temp. 1.0 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/02/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice

11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were sample labels complete? ..... (YES) NO

14. Did all sample labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... (YES) NO N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #: ____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/02/2021	On:

Chain-of-Custody # ____

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8823 Cooler # Blue 2

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 09/01/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/02/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)

   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie

2. Were custody seals on outside of cooler? ..... YES NO (N/A)

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES____ NO✓ Observed Cooler Temp. 1.7 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/02/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice

11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were sample labels complete? ..... (YES) NO

14. Did all sample labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... (YES) NO N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/02/2021	On:

Chain-of-Custody # _____

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8823 Cooler # Red 1

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 09/01/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/02/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)
   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie
2. Were custody seals on outside of cooler? ..... YES NO (N/A)
   How many and where? ____, Seal Date: ____, Seal Name: ____
3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES____ NO✓ Observed Cooler Temp. 0.8 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/02/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice
11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were sample labels complete? ..... (YES) NO
14. Did all sample labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... (YES) NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #: ____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/02/2021	On:

Chain-of-Custody # ____

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ARDL Inc.
Environmental | Analytical | Management | Safety

PO Box 1566
400 Aviation Drive
Mt. Vernon, IL 62864
618-244-3235
www.ardlinc.com

Customer Name: SLCOE **Date: 11/3/21**

Project Name: Mark Twain Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 9/29/21 **ARDL Report No.: 8870**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	9/29/21	8870-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	9/29/21	8870-02	NP Pesticides, Inorganics(2)
MTL-13	9/29/21	8870-03	NP Pesticides, Inorganics(2)
MTL-9	9/29/21	8870-04	NP Pesticides, Inorganics(2)
MTL-11	9/29/21	8870-05	NP Pesticides, Inorganics(2)
MTL-12	9/29/21	8870-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	9/29/21	8870-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	9/29/21	8870-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	9/29/21	8870-09	Metals(1), Inorganics(2)
MTL-33-0	9/29/21	8870-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	9/29/21	8870-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	9/29/21	8870-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	9/29/21	8870-13	E. Coli
BJ MARINA	9/29/21	8870-14	E. Coli

(1) Including iron and manganese.
(2) Including ammonia, nitrate, total phosphorus, TOC, TSS and TVSS.
(3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION – METHOD 8270-SIM

HOLDING TIME
Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION
The initial calibration passed criteria. The ICV passed criteria.

CONTINUING CALIBRATION
The continuing calibration verification (CCV) passed criteria for all analytes.

PREPARATION BLANK
The blank met acceptance criteria.

CASE NARRATIVE (Continued)

LABORATORY CONTROL SAMPLE
The LCS analyses met recovery criteria, except as noted below:

Analyte	LCS	Recovery Limit
Alachlor	149%	30-130%
Metolachlor	131%	30-130%
Cyanazine	141%	30-130%
Pendimethalin	134%	30-130%

The associated sample results are flagged with a 'Q' qualifier as appropriate. Metolachlor may be biased high in the reported results.

MATRIX SPIKE
The matrix spike and matrix spike duplicate met recovery criteria, except as noted below:

Analyte	MSD Recovery	Recovery Limit
Alachlor	136.8%	30-130%

The parent sample results are flagged with a 'J' qualifier as appropriate.

DUPLICATE
Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARDS
All internal standard criteria were met.

SURROGATES
All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

PREPARATION BLANK
Results of the preparation blanks were undetected.

LABORATORY CONTROL SAMPLE
Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE
Percent recoveries of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for nitrate. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE
All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS and TVSS.
RPD on all duplicate analyses were within control limits.

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected.

J - Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson
Technical Services Manager

Sample & QC Results

Including as appropriate:

- Field Sample Results
- Batch QC
  - Prep Blank
  - LCS/Spike Blank
- Matrix QC
  - MS/MSD
  - Sample Duplicate

ARDL Data Package 8870

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 10/19/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-1	ARDL Lab No.:	008870-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008105
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1420	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.989		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND	J	UG/L	1
Metolachlor	0.222	0.222	2.76	Q	UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	85%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DoD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-01
Field ID: MTL-1
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1420

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.107	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
(a) Manganese	0.00400	0.00500		0.0425	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
Ammonia Nitrogen	0.0200	0.0300		0.0829	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		0.047	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.0441	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		2.6	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		ND	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	10/15/21	10196426

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-5	ARDL Lab No.:	008870-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008108
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1015	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	0.400		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	ND	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	83%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-02
Field ID: MTL-5
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1015

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.244	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.019	0.020	J	0.061	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.329	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	6.67	6.67		58.7	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	6.67	6.67		9.33	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		5.8	MG/L	NONE	415.1	NA	10/16/21	10196426

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name:	MARK TWAIN LAKE
Project No.:	
NELAC Certified - IL100308	
Analysis:	NP PESTICIDES (8270SIM-MOD)
Analytical Method:	8270C
Prep Method:	3510C

Field ID:	MTL-13	ARDL Lab No.:	008870-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008109
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1055	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	ND		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	ND	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	87%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-03
Field ID: MTL-13
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1055

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0591	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		0.028	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.083	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		3.2	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		6.2	MG/L	NONE	415.1	NA	10/16/21	10196426

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-9	ARDL Lab No.:	008870-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008110
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1130	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.244	Q	UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	84%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-04
Field ID: MTL-9
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1130

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0564	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		0.030	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.122	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		18.4	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	4.00	4.00		4.0	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		6.6	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-11	ARDL Lab No.:	008870-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008111
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1210	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	ND		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	ND	Q	UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	92%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-05
Field ID: MTL-11
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1210

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0373	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.109	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		14.0	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		5.7	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-12	ARDL Lab No.:	008870-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008112
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1258	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	1.04		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.78	Q	UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	94%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-06
Field ID: MTL-12
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1258

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.239	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
(a) Manganese	0.00400	0.00500		0.0770	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
Ammonia Nitrogen	0.0200	0.0300		0.0995	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		0.057	MG/L	NONE	GREEN	NA	10/07/21	10126400
Phosphorus	0.00800	0.0100		0.0657	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		4.4	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		ND	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.1	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-15-0	ARDL Lab No.:	008870-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008113
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1128	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	1.23		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	2.75	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	85%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-07
Field ID: MTL-15-0
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1128

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0624	MG/L	NONE	350.1	NA	10/05/21	10066389
Chlorophyll-a, Correcte	1.00	1.00		20.9	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Nitrate as Nitrogen	0.0190	0.0200		0.032	MG/L	NONE	GREEN	NA	10/08/21	10126415
Pheophytin-a	1.00	1.00		4.5	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Phosphorus	0.00800	0.0100		0.0484	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		3.4	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		2.4	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-22-0	ARDL Lab No.:	008870-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008114
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1222	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	1.23		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	3.01	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	82%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-08
Field ID: MTL-22-0
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1222

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0412	MG/L	NONE	350.1	NA	10/05/21	10066389
Chlorophyll-a, Correcte	1.00	1.00		17.0	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/08/21	10126415
Pheophytin-a	1.00	1.00		2.4	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Phosphorus	0.00800	0.0100		0.0355	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		3.2	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		2.4	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-09
Field ID: MTL-22-15
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1231

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.438	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
(a) Manganese	0.00400	0.00500		0.171	MG/L	3010A	6010C	10/20/21	10/21/21	P7677
Ammonia Nitrogen	0.0200	0.0300		0.159	MG/L	NONE	350.1	NA	10/05/21	10066389
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/08/21	10126415
Phosphorus	0.00800	0.0100		0.0657	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		4.8	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	4.00	4.00		ND	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.2	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-33-0	ARDL Lab No.:	008870-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008115
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1305	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	1.18		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	3.01	Q	UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	91%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-10
Field ID: MTL-33-0
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1305

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0368	MG/L	NONE	350.1	NA	10/05/21	10066389
Chlorophyll-a, Correcte	1.00	1.00		13.6	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/08/21	10126415
Pheophytin-a	1.00	1.00		3.5	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Phosphorus	0.00800	0.0100		0.0355	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		3.4	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		2.0	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-66-0	ARDL Lab No.:	008870-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008116
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1055	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	1.21		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	2.61	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	90%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

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Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-11
Field ID: MTL-66-0
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1055

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0505	MG/L	NONE	350.1	NA	10/05/21	10066389
Chlorophyll-a, Correcte	1.00	1.00		30.9	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Nitrate as Nitrogen	0.0190	0.0200		0.109	MG/L	NONE	GREEN	NA	10/08/21	10126415
Pheophytin-a	1.00	1.00		2.2	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Phosphorus	0.00800	0.0100		0.070	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		5.2	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		2.8	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.8	MG/L	NONE	415.1	NA	10/16/21	10196426

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Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	MTL-77-0	ARDL Lab No.:	008870-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1008117
Sample Date:	09/29/2021	Received Date:	09/29/2021
Sample Time:	1113	Prep. Date:	09/30/2021
Matrix:	WATER	Analysis Date:	10/08/2021
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.250	0.250	ND		UG/L	1
Atrazine	0.250	0.250	1.23		UG/L	1
Metribuzin	0.250	0.250	ND		UG/L	1
Alachlor	0.250	0.250	ND		UG/L	1
Metolachlor	0.250	0.250	2.80	Q	UG/L	1
Chlorpyrifos	0.250	0.250	ND		UG/L	1
Cyanazine	0.250	0.250	ND		UG/L	1
Pendimethalin	0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	84%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-12
Field ID: MTL-77-0
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1113

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0391	MG/L	NONE	350.1	NA	10/05/21	10066389
Chlorophyll-a, Correcte	1.00	1.00		24.5	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Nitrate as Nitrogen	0.0190	0.0200		0.029	MG/L	NONE	GREEN	NA	10/08/21	10126415
Pheophytin-a	1.00	1.00		2.2	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399
Phosphorus	0.00800	0.0100		0.0527	MG/L	365.2	365.2	10/07/21	10/08/21	10126414
Solids, Total Suspended	1.0	1.0		3.8	MG/L	NONE	160.2	NA	10/04/21	10076394
Solids, Volatile Suspen	2.00	2.00		2.4	MG/L	NONE	160.4	NA	10/04/21	10076395
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	10/16/21	10196426

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-13
Field ID: IC MARINA
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1031

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.00	1.00		62.0	COL/100 ML	NONE	1604	NA	09/29/21	10016370

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008870-14
Field ID: BJ MARINA
Received: 09/29/2021

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 09/29/2021
Sampling Time: 1317

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.00	1.00		23.0	COL/100 ML	NONE	1604	NA	09/29/21	10016370

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT

ARDL, Inc. 400 Aviation Drive; P.O. Box 1566
Mt. Vernon, Illinois 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD)
Project No.: Analytical Method: 8270C
NELAC Certified - IL100308 Prep Method: 3510C

Field ID:	NA	ARDL Lab No.:	008870-01B1
Desc/Location:	NA	Lab Filename:	E1008103
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	09/30/2021
Matrix:	QC Material	Analysis Date:	10/08/2021
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11425
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units
Trifluralin	0.200	0.200	ND		UG/L
Atrazine	0.200	0.200	ND		UG/L
Metribuzin	0.200	0.200	ND		UG/L
Alachlor	0.200	0.200	ND		UG/L
Metolachlor	0.200	0.200	ND		UG/L
Chlorpyrifos	0.200	0.200	ND		UG/L
Cyanazine	0.200	0.200	ND		UG/L
Pendimethalin	0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	112%

Surrogate recoveries marked with '*' indicates they are outside standard limits.

(a) DOD-QSM Accredited Analyte.

BLANK SUMMARY REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LOD	LOQ	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	ND	MG/L	3010A	6010C	10/20/21	10/21/21	P7677	008870-06B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	10/20/21	10/21/21	P7677	008870-06B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	10/05/21	10066389	008870-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399	008870-07B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	10/08/21	10126415	008870-07B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	10/07/21	10126400	008870-02B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	09/30/21	10/07/21	10116399	008870-07B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	10/07/21	10/08/21	10126414	008870-03B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	10/04/21	10076394	008870-02B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	10/04/21	10076395	008870-02B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	10/15/21	10196426	008870-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008870

BLANK SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Matrix: QC Material QC Batch: B11425 Prep. Date: 09/30/2021
Amount Used: 1000 mL Level: LOW Analysis Date: 10/08/2021

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	4.67	4	117	--	--	--	30-130	--	--
Atrazine	5.05	4	126	--	--	--	30-130	--	--
Metribuzin	5.13	4	128	--	--	--	30-130	--	--
Alachlor	5.97	4	149 *	--	--	--	30-130	--	--
Metolachlor	5.23	4	131 *	--	--	--	30-130	--	--
Chlorpyrifos	4.98	4	125	--	--	--	30-130	--	--
Cyanazine	5.64	4	141 *	--	--	--	30-130	--	--
Pendimethalin	5.34	4	134 *	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	105.3	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008870-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
(a) Iron	5.0	5.0	101	--	--	--	87-115	--	P7677	008870-06C1
(a) Manganese	0.78	0.75	104	--	--	--	90-114	--	P7677	008870-06C1
Ammonia Nitrogen	1.0	1.0	104	--	--	--	80-120	--	10066389	008870-01C1
Nitrate as Nitrogen	0.94	1.0	94	--	--	--	80-120	--	10126400	008870-02C1
Nitrate as Nitrogen	0.90	1.0	90	--	--	--	80-120	--	10126415	008870-07C1
Phosphorus	0.67	0.67	100	--	--	--	80-120	--	10126414	008870-03C1
Total Organic Carbon	20.5	20.0	103	--	--	--	85-115	--	10196426	008870-01C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

(a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 10/12/2021

Project Name: MARK TWAIN LAKE Analysis: NP PESTICIDES (8270SIM-MOD) Analytical Method: 8270C
Project No.: Prep Method: 3510C

Field ID: MTL-1 Prep. Date: 09/30/2021 ARDL Lab No.: 008870-01
Desc/Location: MARK TWAIN LAKE Amount Used: 900 mL Lab Filename:
Sample Date: 09/29/2021 % Moisture: NA Received Date: 09/29/2021
Sample Time: 1420 QC Batch: B11425 Analysis Date: 10/08/2021
Matrix: WATER Level: LOW

Parameter	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit
Trifluralin	ND	4.64	4.44	104.5	5.56	4.44	125	30-130	17.9	30
Atrazine	0.989	5.13	4.44	93.3	6.21	4.44	117.5	30-130	19	30
Metribuzin	ND	4.32	4.44	97.3	5.27	4.44	118.5	30-130	19.7	30
Alachlor	ND	5.13	4.44	115.5	6.08	4.44	136.8 *	30-130	16.8	30
Metolachlor	2.76	6.96	4.44	94.5	8.17	4.44	121.8	30-130	16	30
Chlorpyrifos	ND	4.32	4.44	97.3	5.01	4.44	112.8	30-130	14.8	30
Cyanazine	ND	4.74	4.44	106.8	5.64	4.44	127	30-130	17.3	30
Pendimethalin	ND	4.63	4.44	104.3	5.48	4.44	123.3	30-130	16.7	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	79	94	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008870-01, NP PESTICIDES (8270SIM-MOD)

MATRIX SPIKE/SPIKE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
(a) Iron	WATER	0.24	1.2	1.0	98	1.2	1.0	96	87-115	2	20	P7677	008870-06MS
(a) Manganese	WATER	0.077	0.58	0.50	100	0.57	0.50	99	90-114	1	20	P7677	008870-06MS
Ammonia Nitrogen	WATER	0.083	2.0	2.0	96	2.0	2.0	96	75-125	0	20	10066389	008870-01MS
Nitrate as Nitrogen	WATER	0.061	0.80	1.0	74 *	0.86	1.0	80	75-125	7	20	10126400	008870-02MS
Phosphorus	WATER	0.083	0.90	0.83	98	0.93	0.83	103	75-125	4	20	10126414	008870-03MS
Total Organic Carbon	WATER	7.5	13.0	5.0	110	12.9	5.0	108	76-117	1	20	10196426	008870-01MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

(a) DOD and/or NELAC Accredited Analyte.

Inorganic Matrix Spikes for 008870

SAMPLE DUPLICATE REPORT

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864

Lab Report No: 008870 Report Date: 11/03/2021

Project Name: MARK TWAIN LAKE NELAC Certified - IL100308

Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Chlorophyll-a, Corrected	20.9	20.9	--	MG/CU.M.	0	--	10116399	008870-07D1
Pheophytin-a	4.5	4.5	--	MG/CU.M.	0	--	10116399	008870-07D1
Solids, Total Suspended	58.7	58.7	--	MG/L	0	--	10076394	008870-02D1
Solids, Volatile Suspend	9.3	9.3	--	MG/L	0	--	10076395	008870-02D1

(a) DOD and/or NELAC Accredited Analyte

Sample Receipt Information

Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL, Inc.

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 Fax

8870

CHAIN OF CUSTODY RECORD

PROJECT: Mark Twain Lake

SAMPLERS: (Signature) Rick Archuleta, Adam Rockwell, Ben Cornelius

	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	*TOC, T-PO4	*NO3-N, NH3-N	NP Pest	#T.Fe, T.Mn	E. coli	MS/MSD					REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
1	MTL-1	9/29/21	1420		X		X		X	X	X	X		X						X	
2	MTL-5		1015		X		X		X	X	X									X	
3	MTL-13		1055		X		X		X	X	X									X	
4	MTL-9		1130		X		X		X	X	X									X	
5	MTL-11		1210		X		X		X	X	X									X	
6	MTL-12		1258		X		X		X	X	X	X								X	
7	MTL-15-0		1128		X		X	X	X	X	X									X	
8	MTL-22-0		1222		X		X	X	X	X	X									X	
9	MTL-22-15		1231		X		X		X	X		X								X	
10	MTL-33-0		1305		X		X	X	X	X	X									X	
11	MTL-66-0		1055		X		X	X	X	X	X									X	
12	MTL-77-0		1113		X		X	X	X	X	X									X	
13	IC MARINA		1031		X								X	X						X	
14	BJ MARINA		1317		X								X	X						X	

	Date	Time	
Relinquished by: (Signature)	9/29/21	1742	Received by: (Signature)
Relinquished by: (Signature)	9/29/21	1919	Received by: (Signature)
Received for Laboratory by: (Signature)	9/29/21	1919	Shipping Ticket No.

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8870 Cooler # Red 1

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 09/29/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/29/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)
   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie
2. Were custody seals on outside of cooler? ..... YES NO (N/A)
   How many and where? _____, Seal Date: _____, Seal Name: _____
3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES_____ NO ✓ Observed Cooler Temp. 0.2 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/30/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice
11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were sample labels complete? ..... (YES) NO
14. Did all sample labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... (YES) NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/30/2021	On:

Chain-of-Custody # _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8870 Cooler # Blue 1

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 09/29/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/29/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)
   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie
2. Were custody seals on outside of cooler? ..... YES NO (N/A)
   How many and where? _____, Seal Date: _____, Seal Name: _____
3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES____ NO✓ Observed Cooler Temp. 2.4 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/30/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice
11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were sample labels complete? ..... (YES) NO
14. Did all sample labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... (YES) NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/30/2021	On:

Chain-of-Custody # _____

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8870 Cooler # Blue 2

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 09/29/2021

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 09/29/2021 (Signature) DCB

1. Did cooler come with a shipping slip (airbill, etc.)? ..... YES (NO)

   If YES, enter carrier name and airbill number here: ARDL Courier - Valerie

2. Were custody seals on outside of cooler? ..... YES NO (N/A)

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (NA)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag? Hand delivered ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES_____ NO✓ Observed Cooler Temp. 0.4 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 09/30/2021 (Signature) DCB

10. Describe type of packing in cooler: Loose Ice

11. Were all samples sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all containers arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were sample labels complete? ..... (YES) NO

14. Did all sample labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... (YES) NO N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:
(By: Signature) Date:

Sample Transfer	
Fraction: All	Fraction:
Area #: Walk-In	Area #:
By: DCB	By:
On: 09/30/2021	On:

Chain-of-Custody # _____

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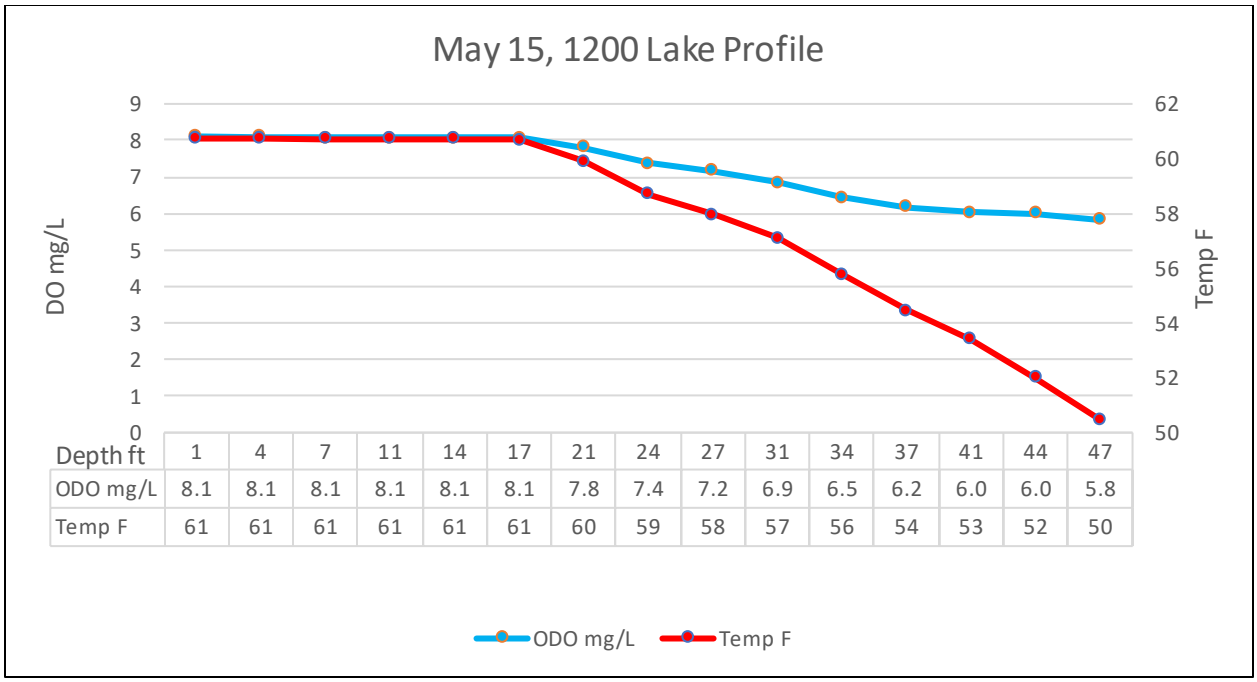
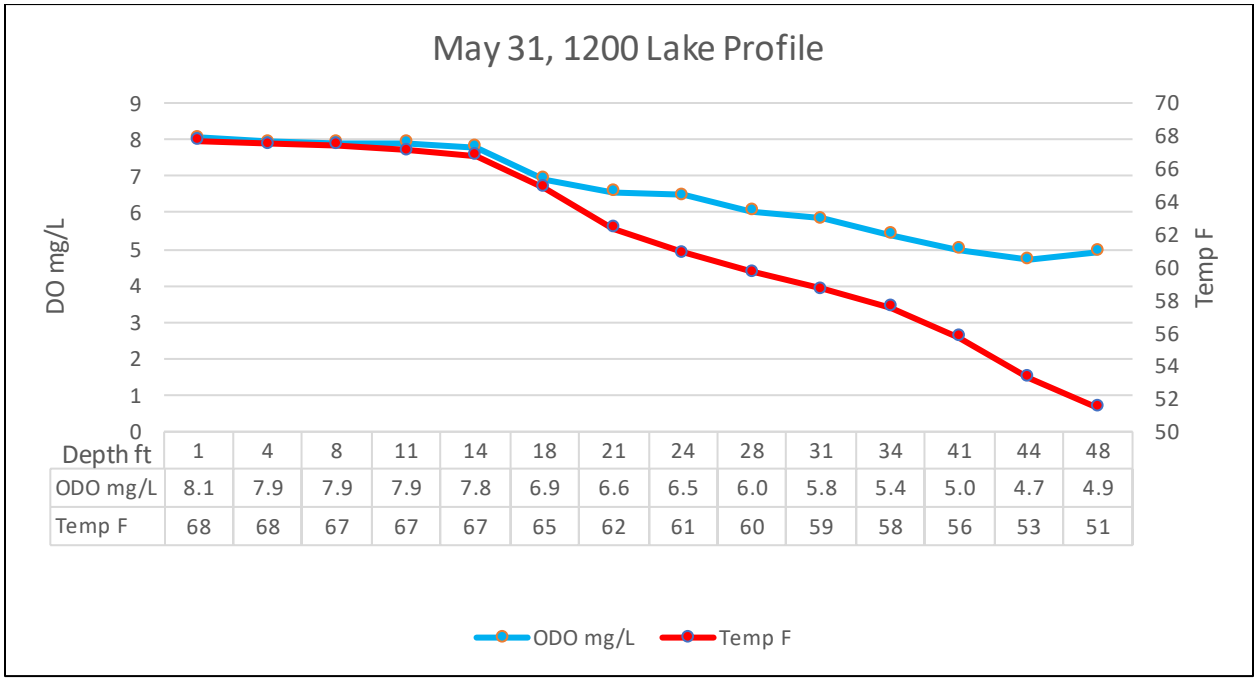
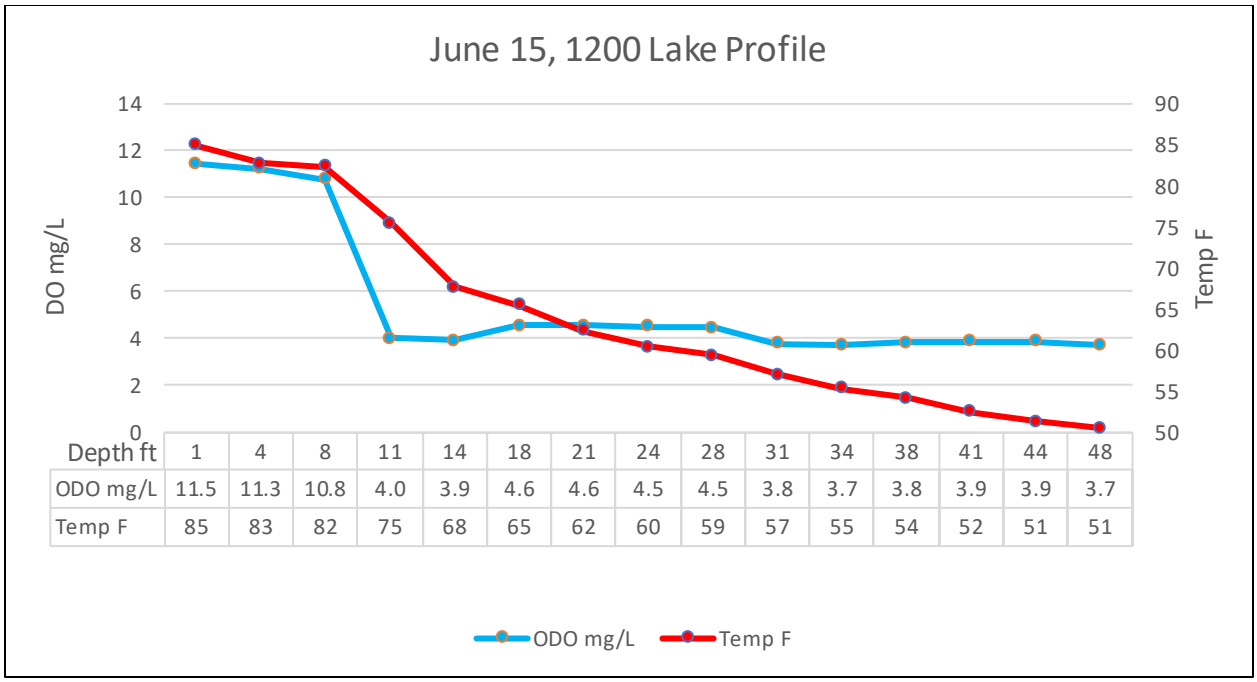
APPENDIX C: 2021 MARK TWAIN LAKE DO AND TEMP PROFILES



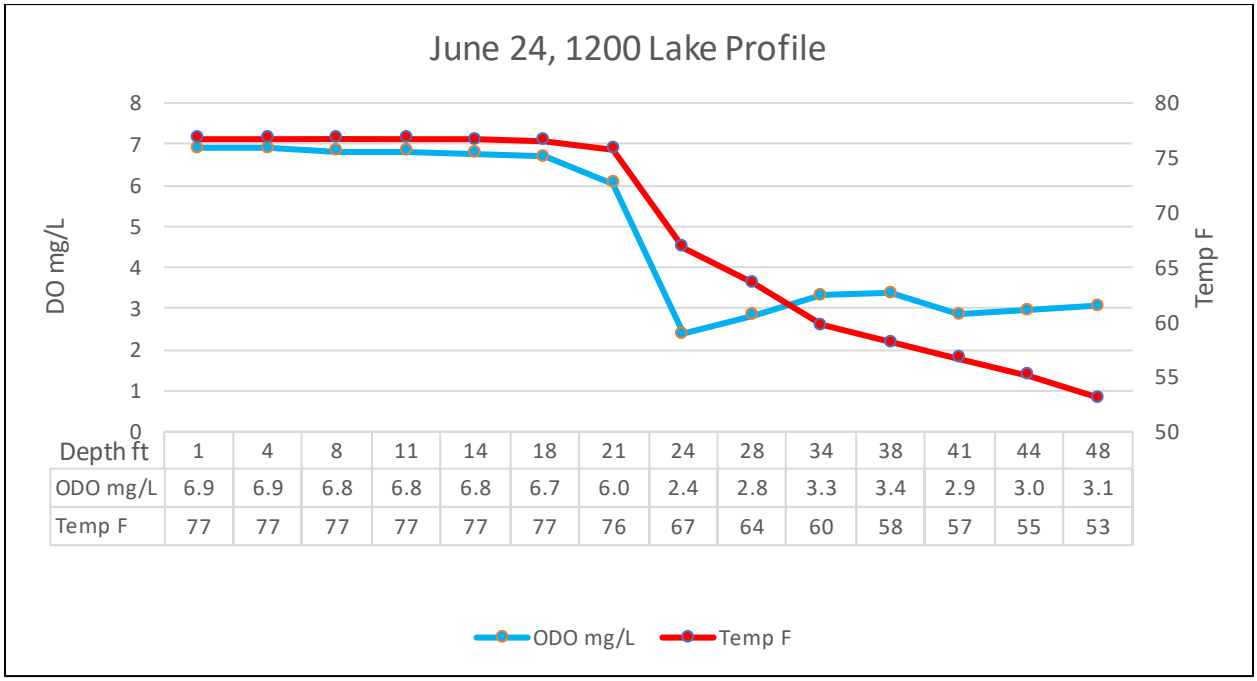
Depth ft	1	4	7	11	14	17	21	24	27	31	34	37	41	44	47
ODO mg/L	8.1	8.1	8.1	8.1	8.1	8.1	7.8	7.4	7.2	6.9	6.5	6.2	6.0	6.0	5.8
Temp F	61	61	61	61	61	61	60	59	58	57	56	54	53	52	50



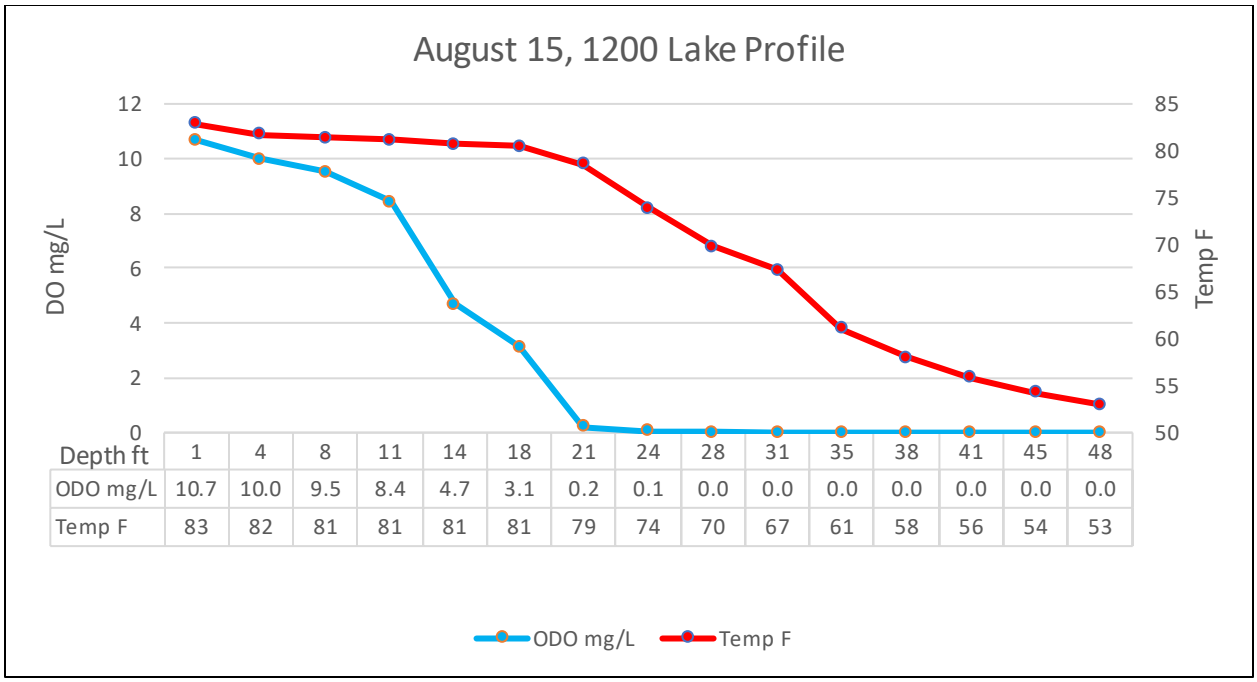
Depth ft	1	4	8	11	14	18	21	24	28	31	34	41	44	48
ODO mg/L	8.1	7.9	7.9	7.9	7.8	6.9	6.6	6.5	6.0	5.8	5.4	5.0	4.7	4.9
Temp F	68	68	67	67	67	65	62	61	60	59	58	56	53	51



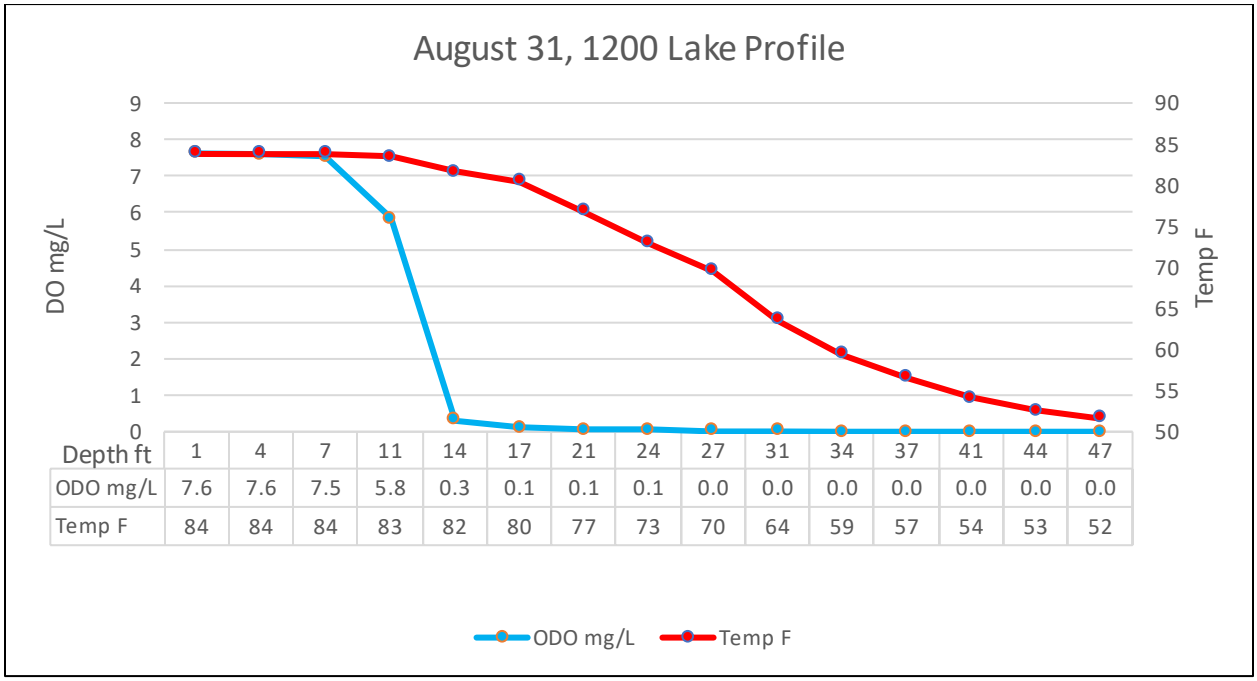
Depth ft	1	4	8	11	14	18	21	24	28	31	34	38	41	44	48
ODO mg/L	11.5	11.3	10.8	4.0	3.9	4.6	4.6	4.5	4.5	3.8	3.7	3.8	3.9	3.9	3.7
Temp F	85	83	82	75	68	65	62	60	59	57	55	54	52	51	51



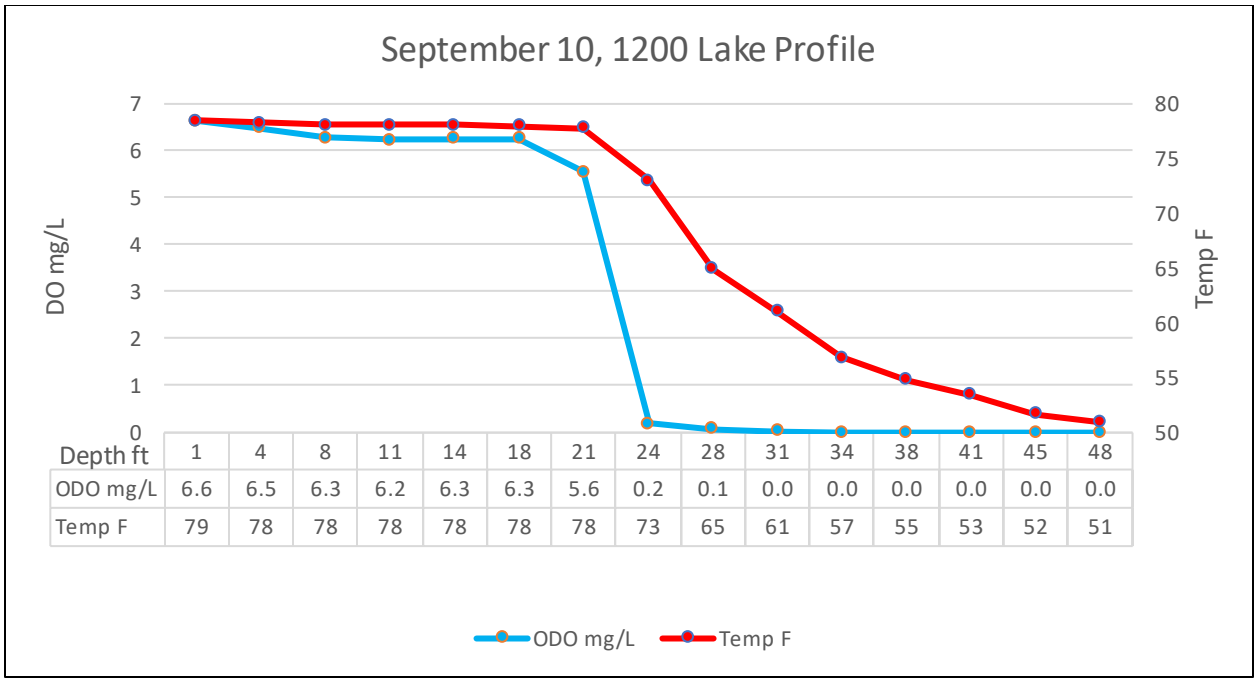
Depth ft	1	4	8	11	14	18	21	24	28	34	38	41	44	48
ODO mg/L	6.9	6.9	6.8	6.8	6.8	6.7	6.0	2.4	2.8	3.3	3.4	2.9	3.0	3.1
Temp F	77	77	77	77	77	77	76	67	64	60	58	57	55	53



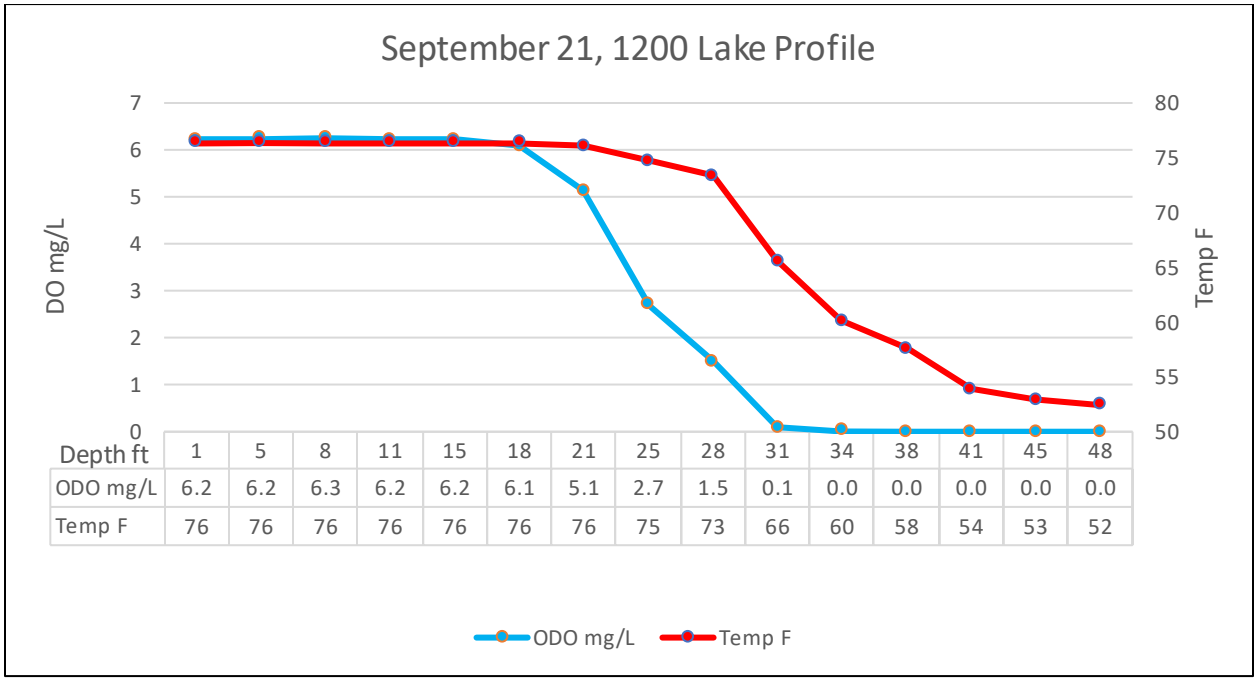
Depth ft	1	4	8	11	14	18	21	24	28	31	35	38	41	45	48
ODO mg/L	10.7	10.0	9.5	8.4	4.7	3.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temp F	83	82	81	81	81	81	79	74	70	67	61	58	56	54	53



Depth ft	1	4	7	11	14	17	21	24	27	31	34	37	41	44	47
ODO mg/L	7.6	7.6	7.5	5.8	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temp F	84	84	84	83	82	80	77	73	70	64	59	57	54	53	52



Depth ft	1	4	8	11	14	18	21	24	28	31	34	38	41	45	48
ODO mg/L	6.6	6.5	6.3	6.2	6.3	6.3	5.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Temp F	79	78	78	78	78	78	78	73	65	61	57	55	53	52	51



Depth ft	1	5	8	11	15	18	21	25	28	31	34	38	41	45	48
ODO mg/L	6.2	6.2	6.3	6.2	6.2	6.1	5.1	2.7	1.5	0.1	0.0	0.0	0.0	0.0	0.0
Temp F	76	76	76	76	76	76	76	75	73	66	60	58	54	53	52