2019 Water Quality Report

U.S. Army Corps of Engineers
Saint Louis District

Mark Twain Lake Water Quality Conditions: 2014-2019

December 2020

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Prepared for

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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 USACEs 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 2018 water quality report compiled by the Missouri Department of Natural Resources (MDNR) has listed the following impairments: Middle Fork Salt River impaired for total suspended solids and dissolved oxygen, South Fork Salt River as impaired for dissolved oxygen, Black Creek Tributary to the North Fork Salt River as impaired for E. coli, North Fork Salt River and Mark Twain Lake as impaired for mercury, and the Salt River below the dam as impaired for mercury and dissolved oxygen.

Water quality sampling in 2019 revealed the following concerns at Mark Twain Lake: dissolved oxygen, Atrazine, total suspended solids, 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 hilly 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 (CEMVS) of United States Army Corps of Engineers (USACE) has implemented a Water Quality Management Plan (WQMP) as part of the operation and maintenance activities associated with managing USACEs' 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 2019, as well as baseline data collected from 2014-2018. 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.

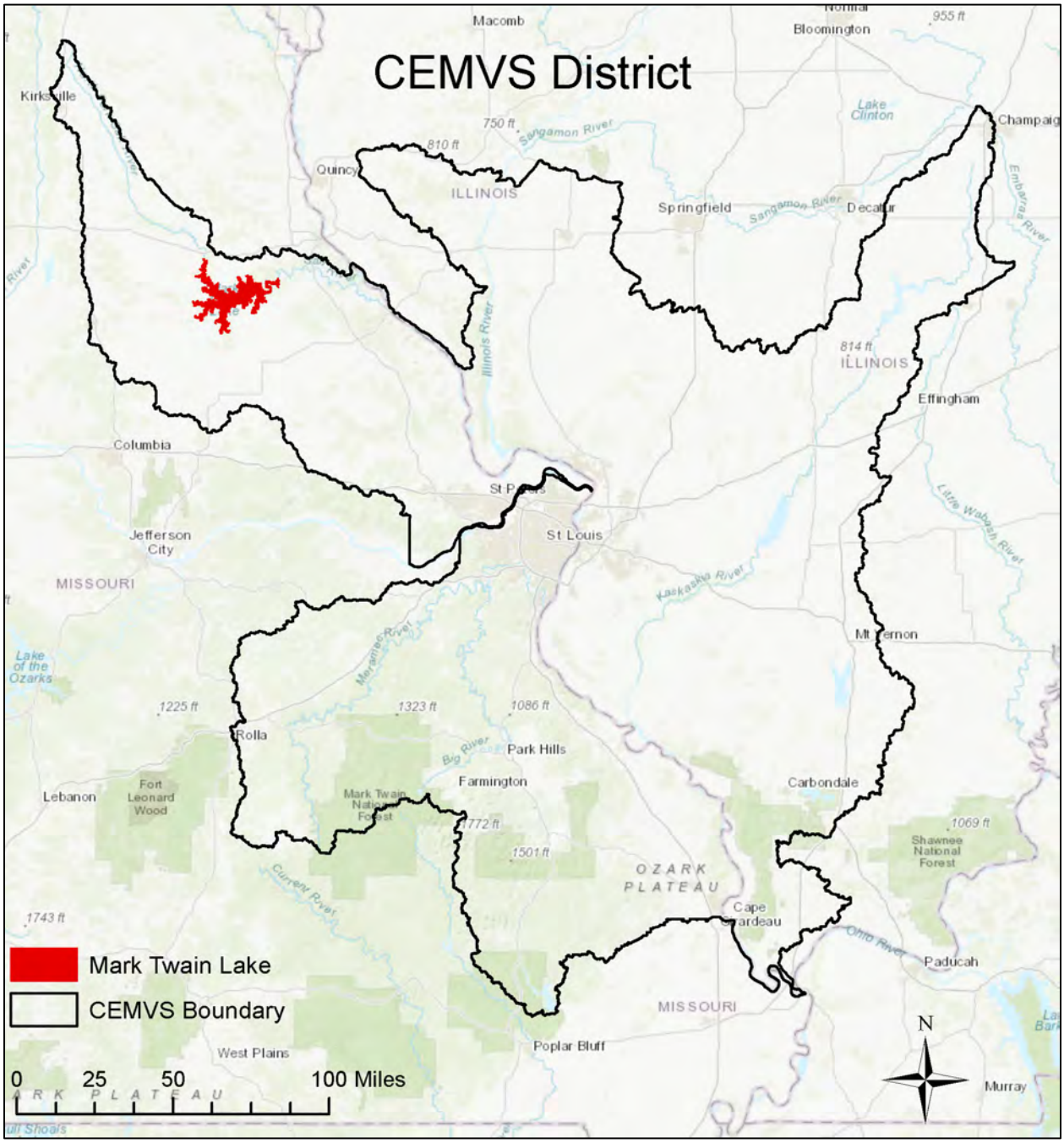


Figure 1. CEMVS District and Mark Twain Lake

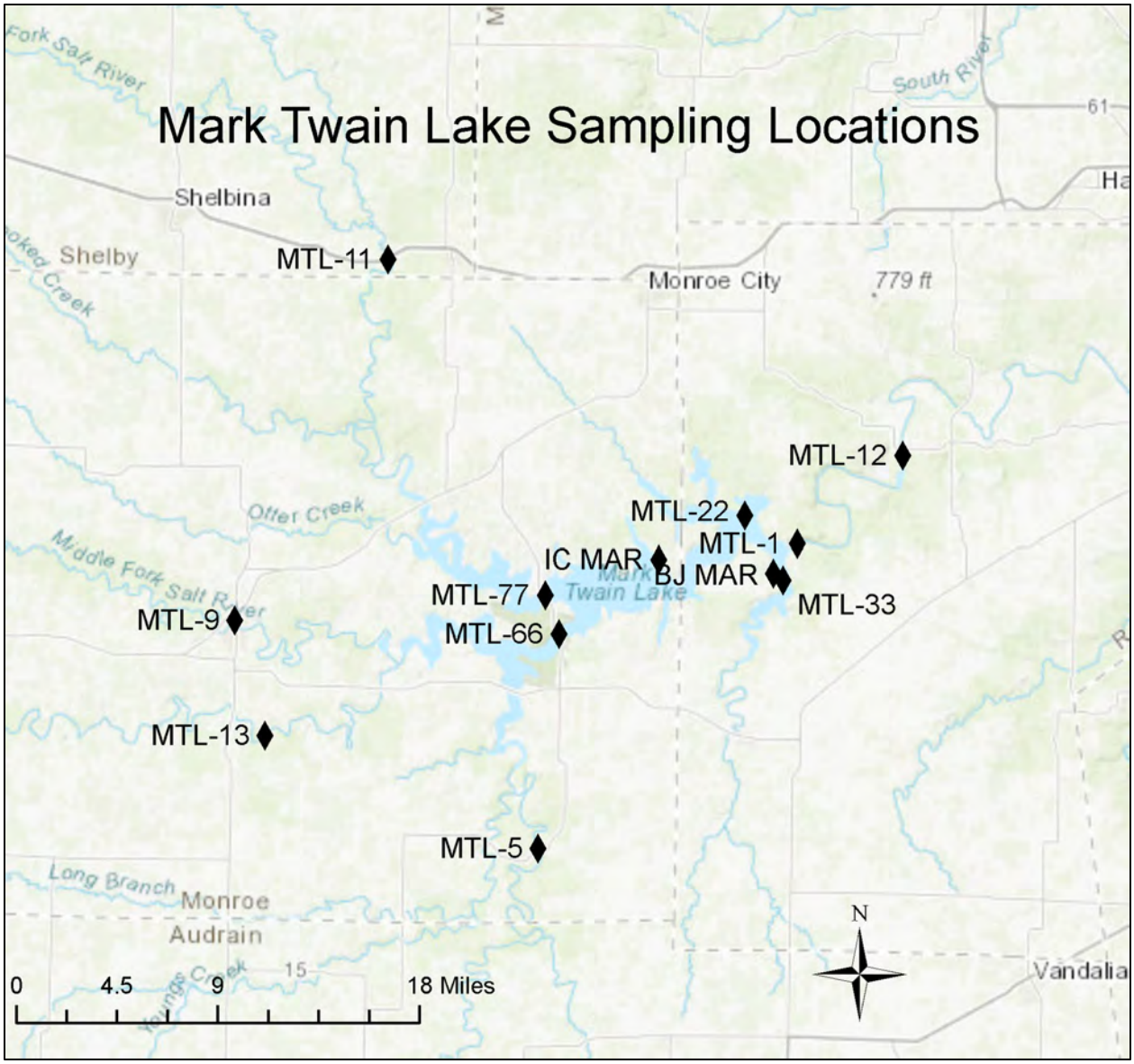


Figure 2. Water Quality (WQ) Sampling Locations in 2019 at Mark Twain Lake

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	-91.9024
	TRIB	MTL-13	39.431077	-91.981933
Main Reservoir Surface	RS	MTL-22	39.540296	-91.672235
	RS	MTL-33	39.50815	-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 from 2019 on were taken from the profiler location in front of the dam (39.525714°, -91.647466°).

METHODS AND ANALYSIS: WATER QUALITY

Data Collection and Historical Reference Data

During 2019, water quality samples were collected and analyzed for 13 locations during four separate sampling events (n=52; 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.

For the purpose of this report, historical reference data refers to water quality data collected during the previous five years (2014-2018). 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 corresponding 95% confidence levels for the geometric mean. 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. Water temperature criteria for warm water bodies in Illinois is within 2.8°C of the seasonal norm.

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.

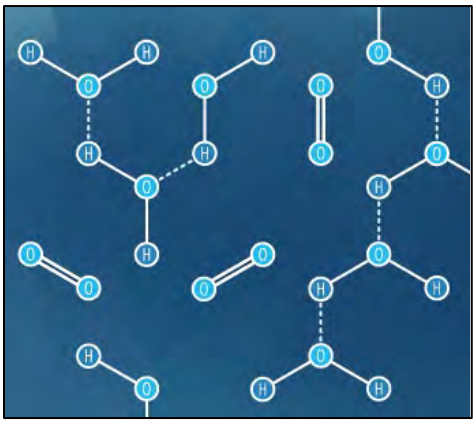


Figure 1: Dissolved oxygen (O_2) vs oxygen bonded in water (H_2O).

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 Illinois 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 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 Illinois 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 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. Illinois Environmental Protection Agency (EPA) recommends that TSS not exceed 116 mg/L for streams and 12 mg/L for lakes. Illinois does not currently have a standard criteria 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, were 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. Illinois has set criteria standards 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

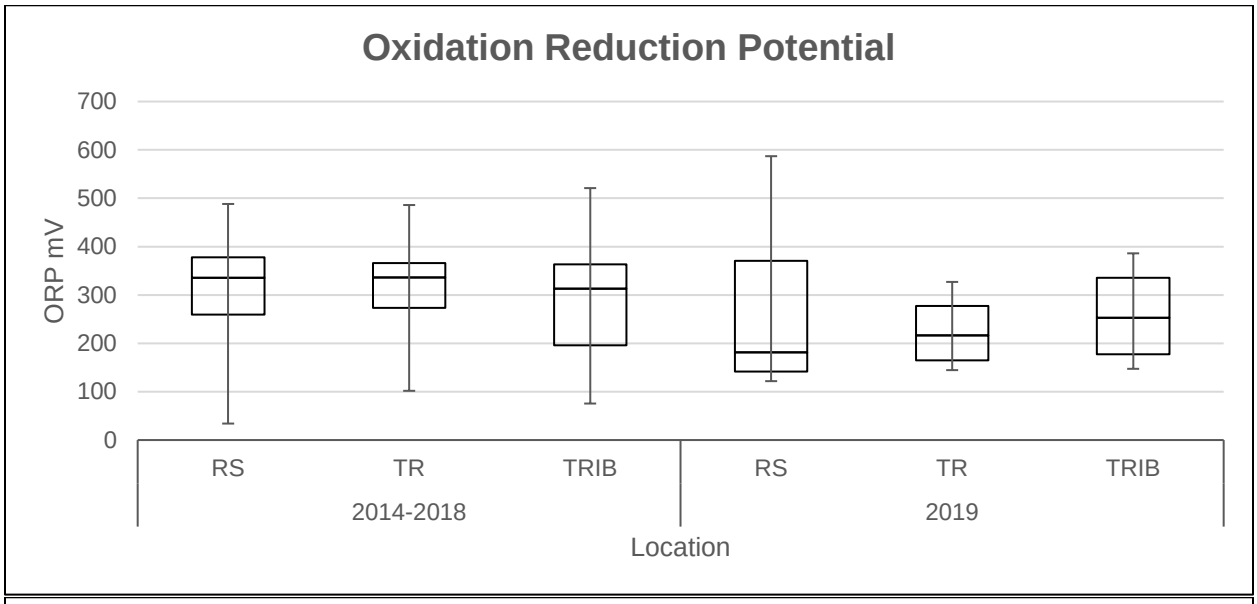
Table 2: Metrics, Methods, and Water Quality Criteria Used for Evaluating Water Quality

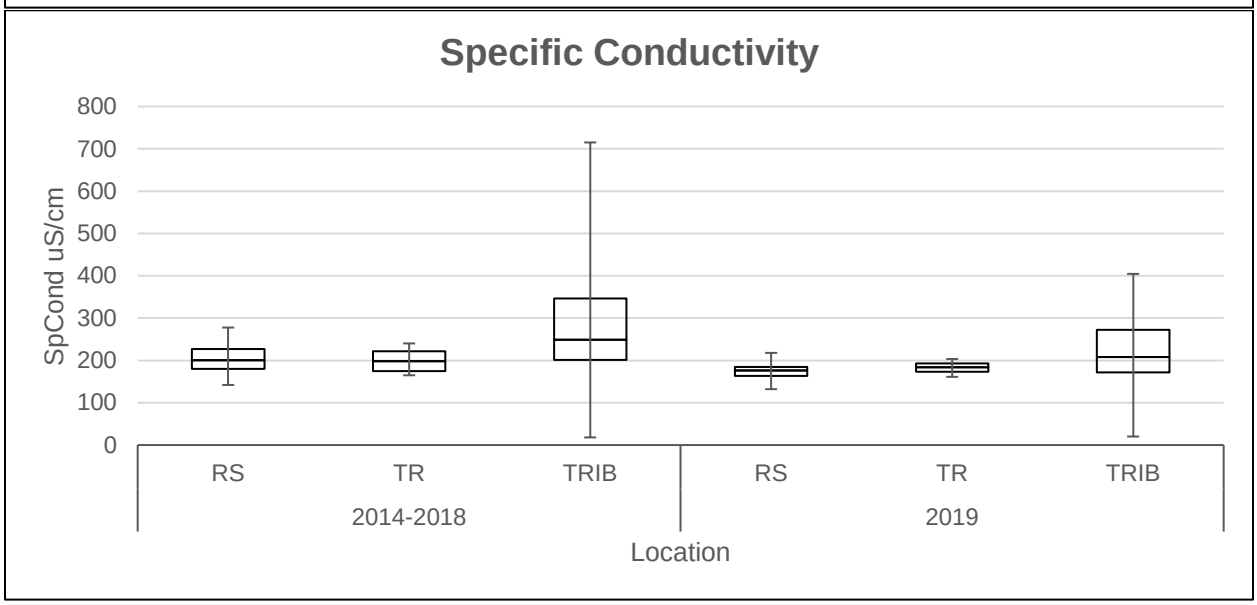
Metric	Abbreviation	Analysis Method	Water Quality Criteria	Source
Alachlor		EPA Method 8270C	< 2ug/L DWS	Missouri DNR
Ammonia Nitrogen	NH_3	EPA Method 350.1	pH & temp dependent	Missouri DNR
Atrazine	Atrazine	EPA Method 8270C	3 ug/L DWS	Missouri DNR
Bacteria: E. Coliform	E Col	EPA Method 1604	WBC: 206 cfu/100mL, SCR: <1,134 cfu/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*
Total Manganese	TMn	EPA Method 6010C	< 0.05 mg/L	Missouri DNR

Metric	Abbreviation	Analysis Method	Water Quality Criteria	Source
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
Total Suspended Solids	TSS	EPA Method 160.2	< 116 mg/L: streams or <12 mg/L: lakes	-----
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. SCR is secondary contact recreation. USEPA* refers to the Federal EPA reference nutrient conditions for level III ecoregion 72 lakes and rivers.*

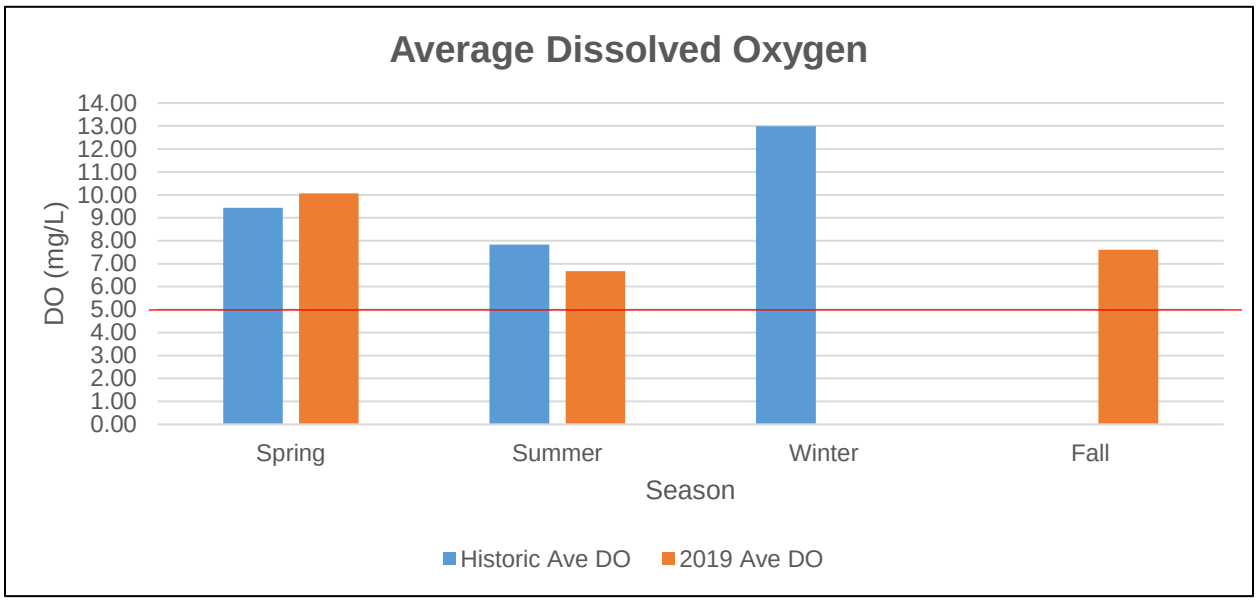
RESULTS AND SUMMARY STATISTICS: WATER QUALITY





		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
SpCond	RS	204.17	200.55	70	7.26	177.16	176.50	22	8.98
	TR	198.96	198.40	16	13.01	182.88	183.55	4	28.66
	TRIB	290.50	249.00	80	30.61	222.74	208.30	20	41.76
ORP	RS	315.36	335.50	70	27.65	256.30	181.40	22	71.81
	TR	312.71	336.50	16	55.33	226.13	216.45	4	133.06
	TRIB	285.28	313.00	80	24.61	250.59	253.05	20	38.39

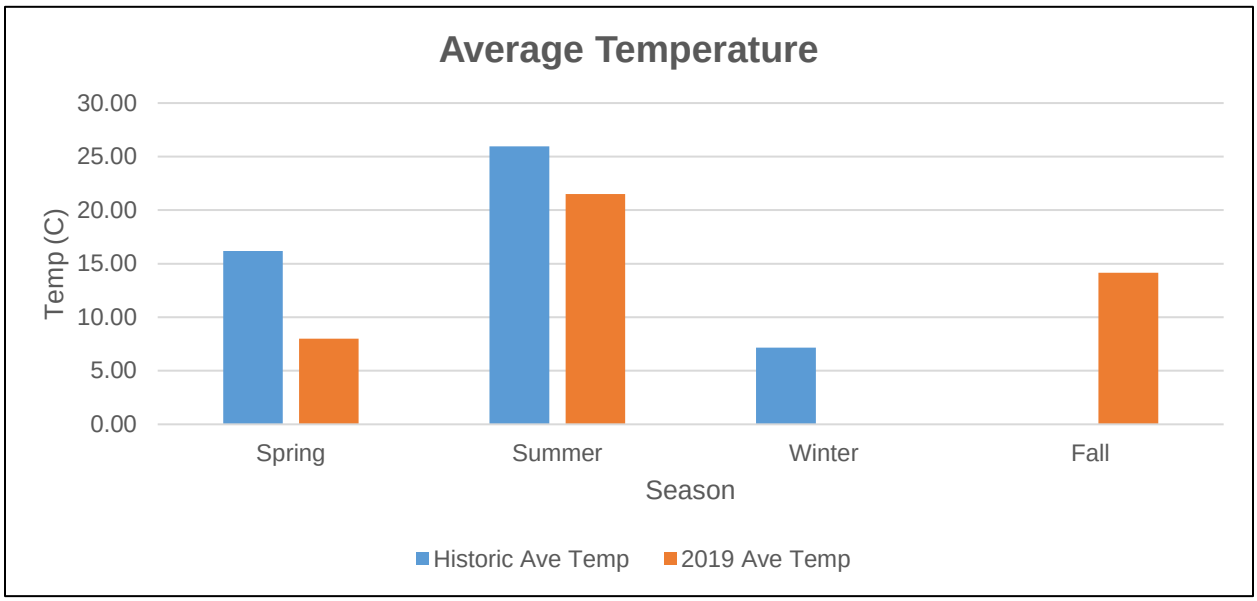
**This report does not acknowledge a water quality criteria for SpCond or ORP.*



Red line placed at the 5 mg/L level.

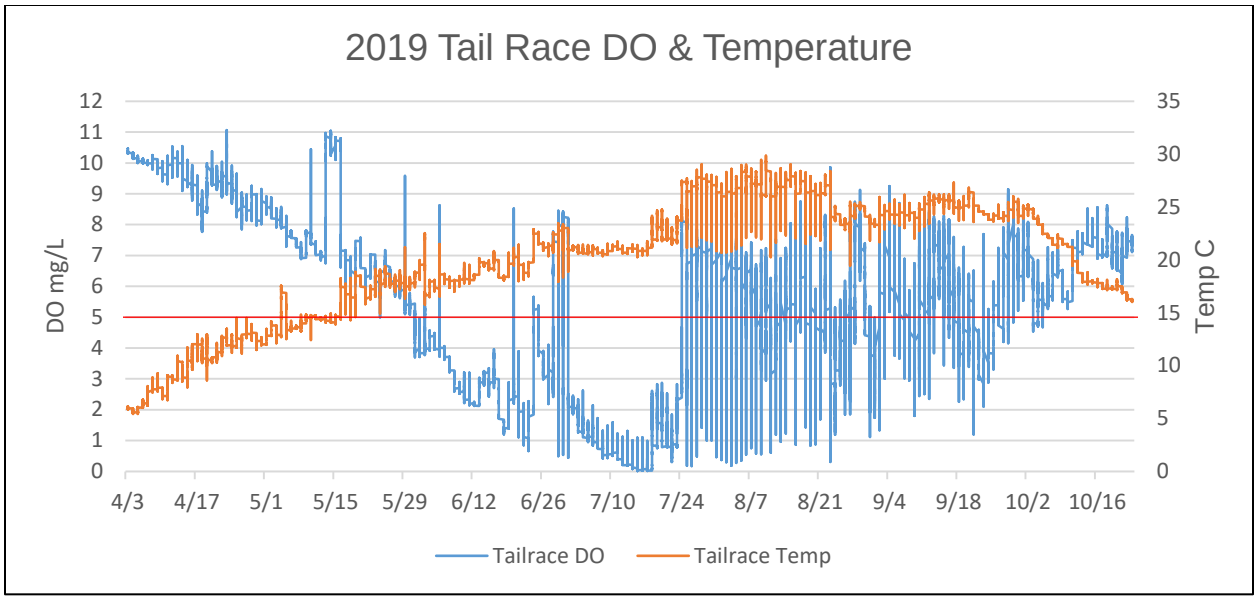
		Historical Reference 2014-2018				2019			
Season	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Spring	RS	9.81	9.81	20	0.55	9.63	9.52	4	1.18
	TR	10.76	10.20	4	2.11	10.18	10.18	1	
	TRIB	8.75	8.47	19	0.74	10.40	10.32	5	0.34
Summer	RS	7.34	7.22	42	0.31	6.99	6.80	12	0.91
	TR	7.82	7.91	10	0.81	7.25	7.25	2	20.90
	TRIB	8.25	7.62	50	0.59	7.18	7.28	10	0.51
Fall	RS					6.96	6.92	6	0.32
	TR					8.44	8.44	1	
	TRIB					9.66	9.61	5	1.50
Winter	RS	12.55	12.67	8	0.40				
	TR	13.32	13.32	2	2.73				
	TRIB	13.27	13.14	10	1.07				

** During the four sampling events only one DO reading was recorded below the standard. On August 28, 2019 DO was recorded at 4.91 mg/L at MTL-66.*

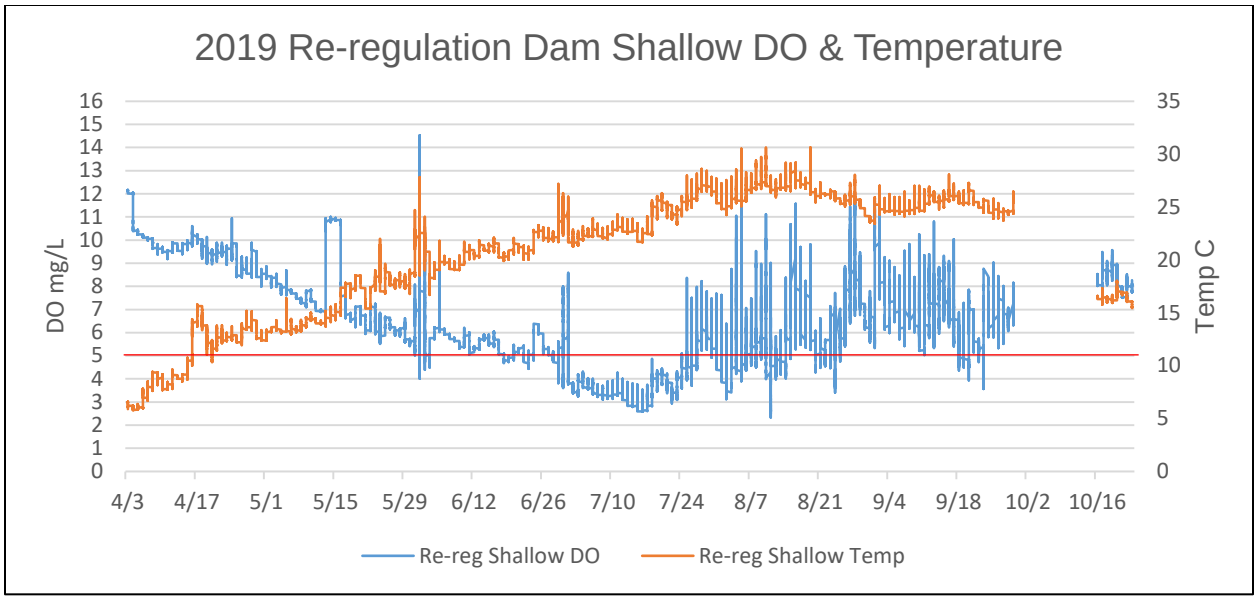


		Historical Reference 2014-2018				2019			
Season	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Spring	RS	15.64	16.75	20	1.67	7.88	7.90	4	1.99
	TR	13.46	13.73	4	3.09	6.10	6.10	1	
	TRIB	17.29	18.26	20	1.93	8.48	8.50	5	1.84
Summer	RS	26.42	26.40	42	0.68	23.01	23.30	12	1.42
	TR	24.61	25.71	10	2.34	20.59	20.59	2	48.42
	TRIB	25.83	25.76	50	1.06	21.83	22.02	10	1.68
Fall	RS					15.46	15.56	6	0.49
	TR					16.00	16.00	1	
	TRIB					12.40	11.56	5	2.09
Winter	RS	6.07	6.08	8	1.55				
	TR	5.83	5.83	2	16.17				
	TRIB	8.32	8.51	10	2.35				

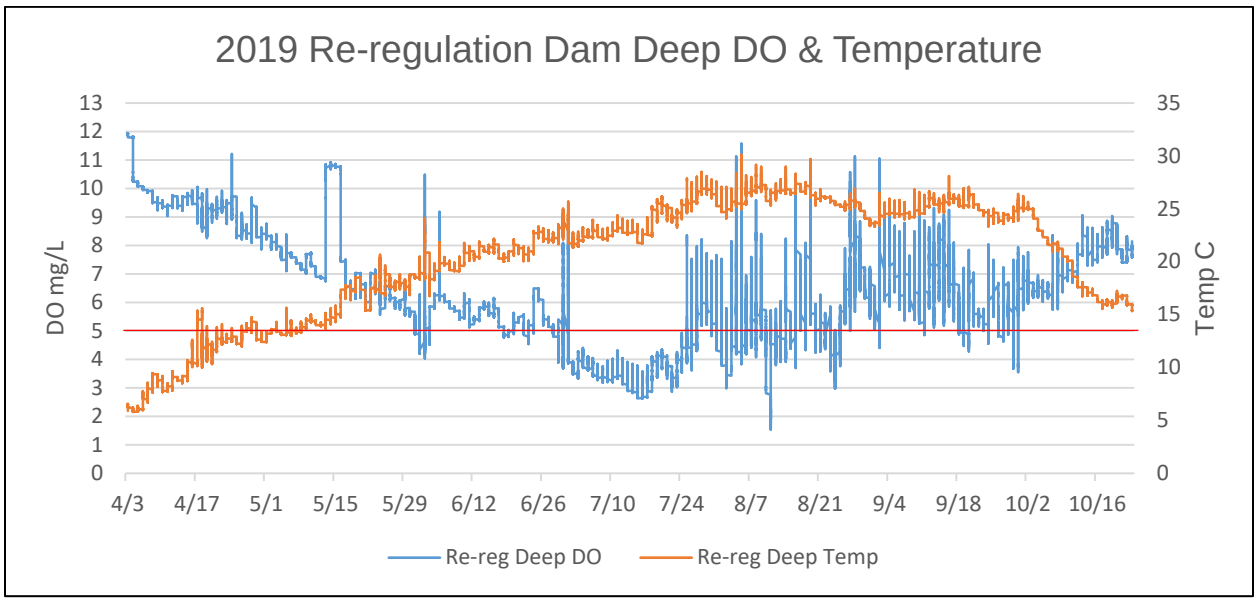
** All recorded surface temperatures in 2019 were within the acceptable range when compared to the historical data.*



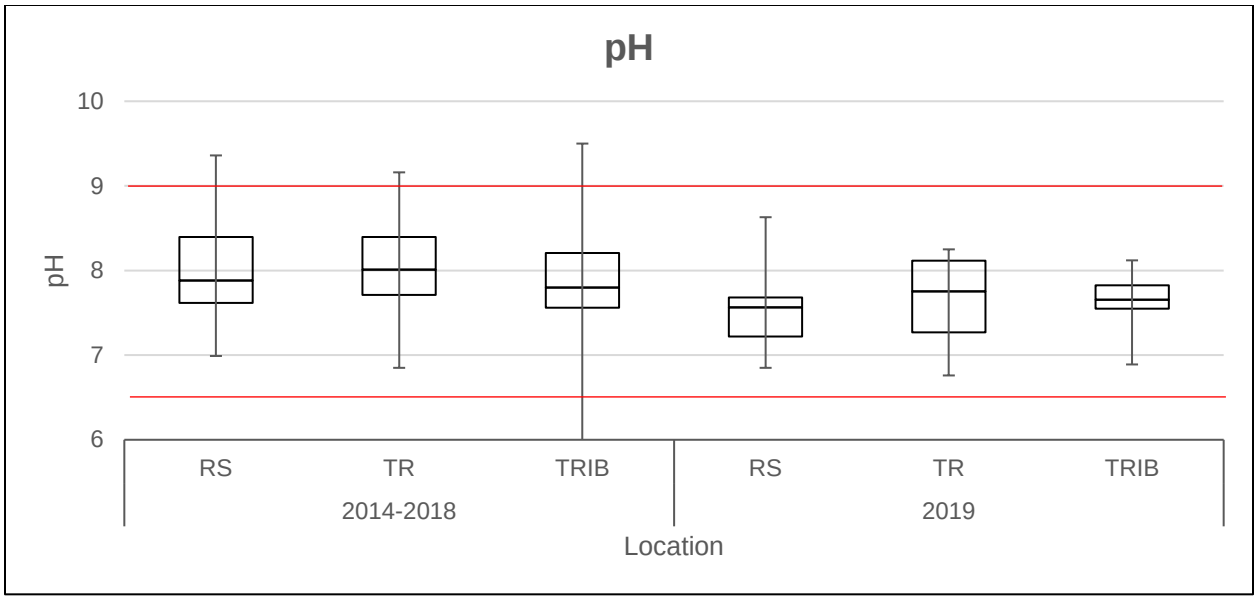
**Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.*



**Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.*



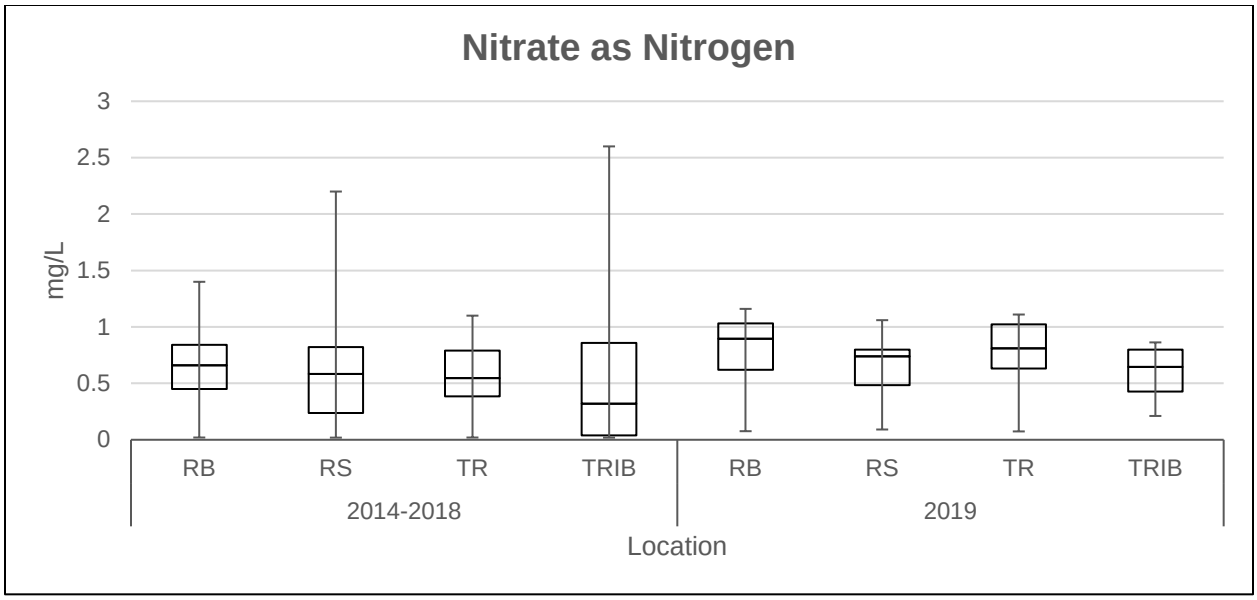
**Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.*

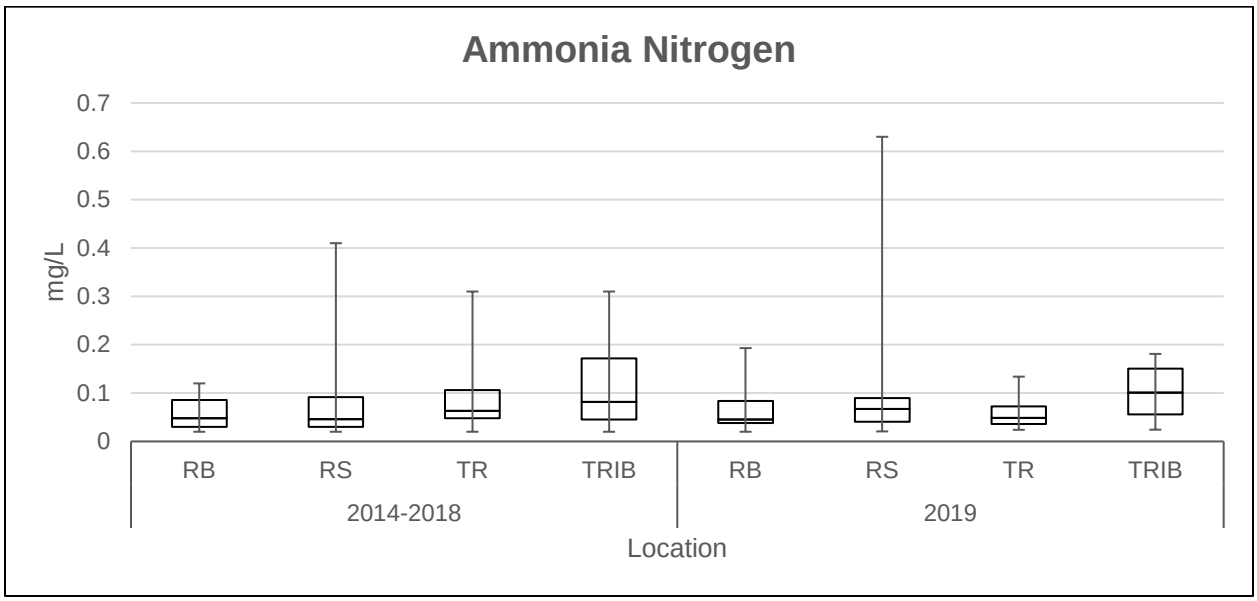


**Red lines indicate the upper and lower water quality criteria standards (between 6.5 and 9).*

		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
pH	RS	7.99	7.88	64	0.14	7.56	7.57	22	0.20
	TR	8.01	8.01	16	0.34	7.63	7.76	4	1.08
	TRIB	7.82	7.80	80	0.16	7.66	7.66	20	0.14

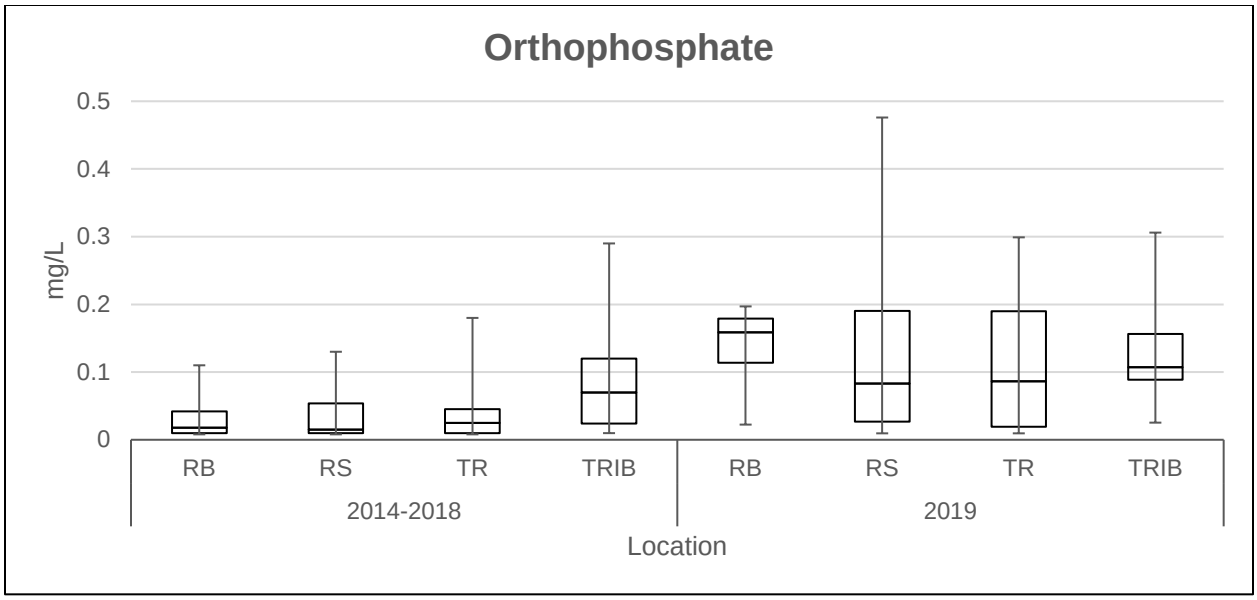
**All pH readings were within the water quality standard during 2019.*

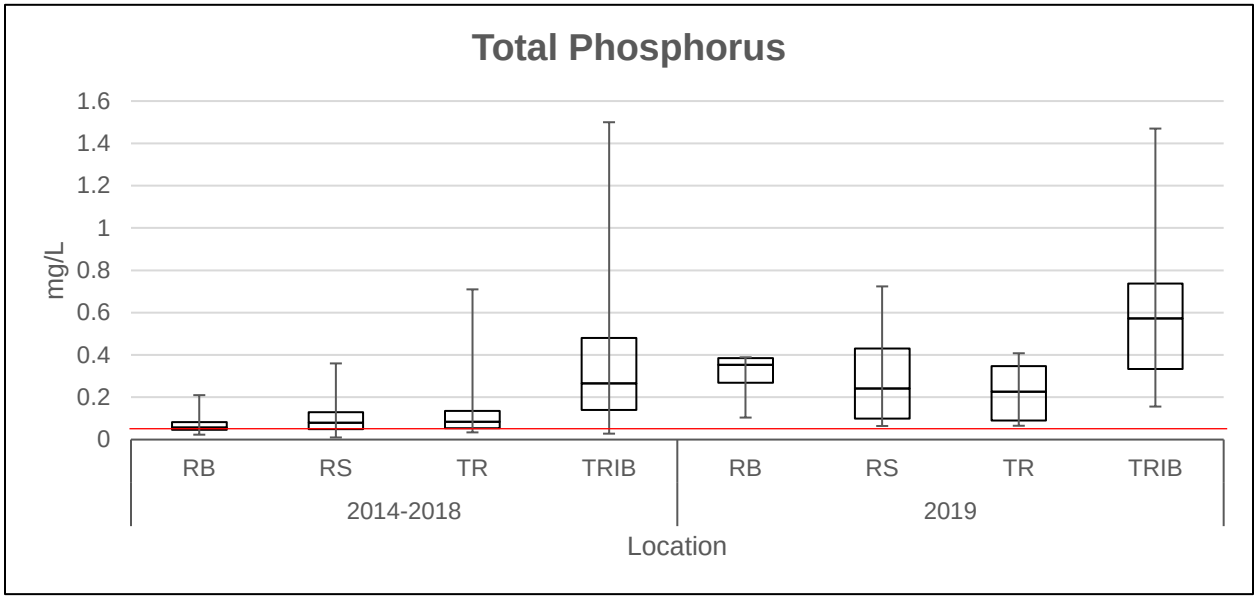




		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
NO3N	RB	0.62	0.66	17	0.20	0.76	0.89	4	0.76
	RS	0.61	0.58	68	0.11	0.64	0.74	16	0.15
	TR	0.54	0.55	34	0.10	0.72	0.81	8	0.34
	TRIB	0.59	0.32	65	0.17	0.61	0.65	16	0.11
NH3N	RB	0.06	0.05	17	0.02	0.08	0.05	4	0.13
	RS	0.07	0.05	68	0.02	0.13	0.07	16	0.09
	TR	0.09	0.06	34	0.02	0.06	0.05	8	0.03
	TRIB	0.11	0.08	65	0.02	0.10	0.10	16	0.03

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

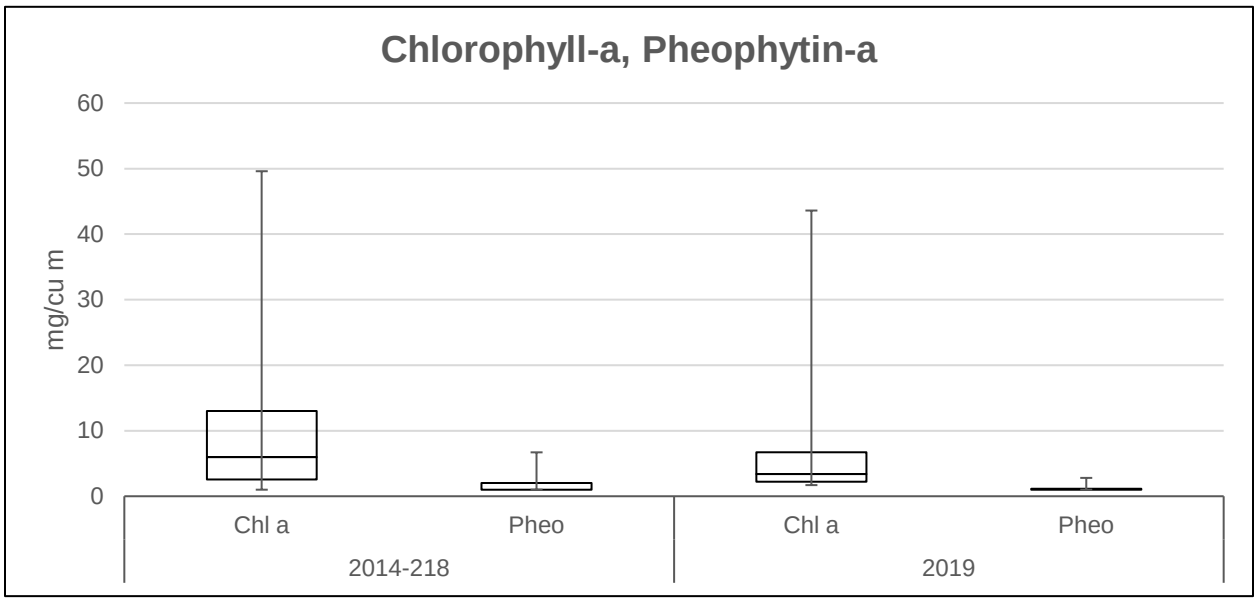




**Red line indicates the water quality standard of 0.049 mg/L.*

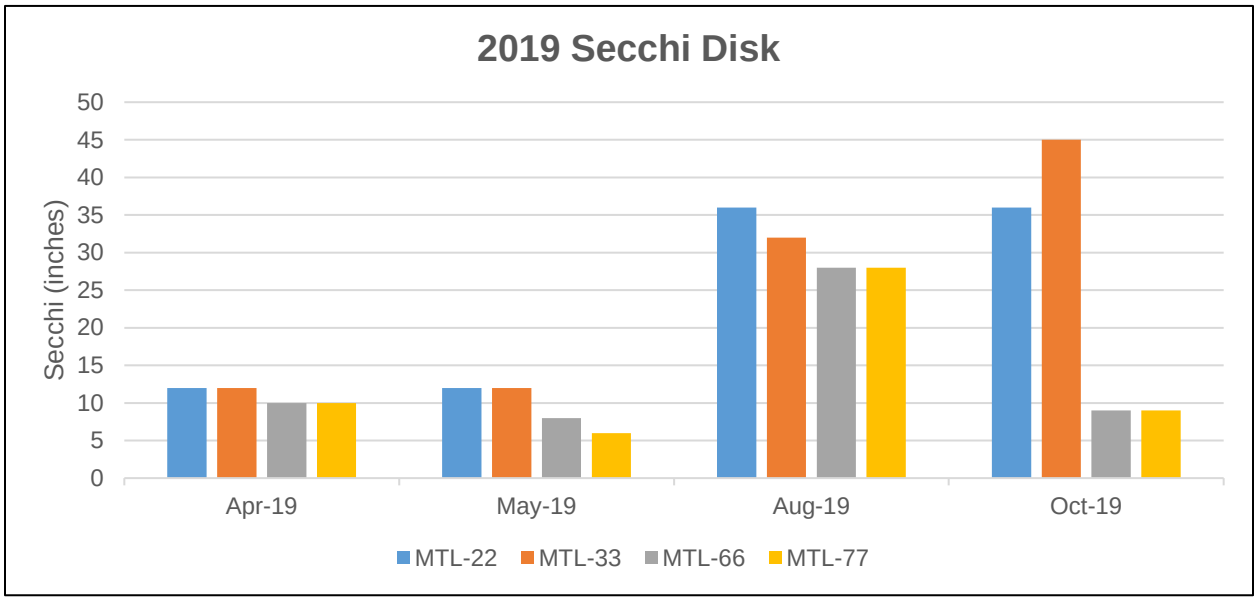
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Ortho	RB	0.03	0.02	17	0.01	0.13	0.16	4	0.12
	RS	0.03	0.02	68	0.01	0.14	0.08	16	0.07
	TR	0.04	0.03	34	0.01	0.12	0.09	8	0.10
	TRIB	0.08	0.07	65	0.02	0.13	0.11	16	0.04
TP	RB	0.08	0.06	17	0.03	0.30	0.35	4	0.21
	RS	0.10	0.08	68	0.02	0.29	0.24	16	0.11
	TR	0.12	0.08	34	0.04	0.23	0.23	8	0.12
	TRIB	0.36	0.27	65	0.08	0.64	0.57	16	0.20

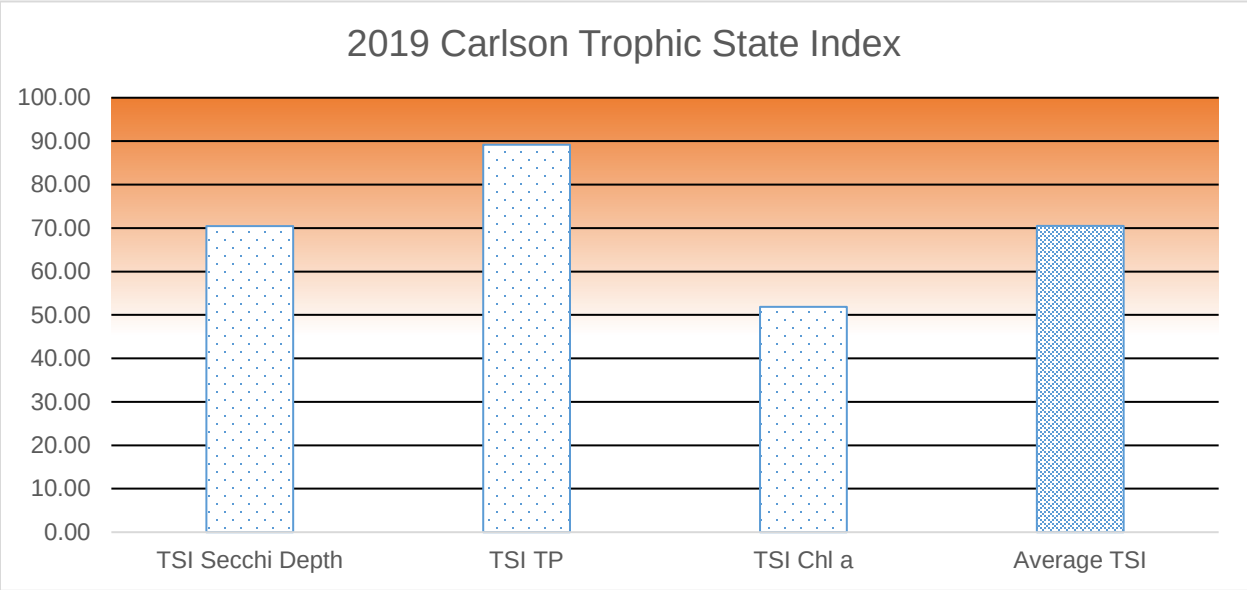
**Total phosphorus exceeded the geometric mean screening value of 0.049 mg/L as well as at all locations. This study does not acknowledge a water quality criteria for orthophosphate.*



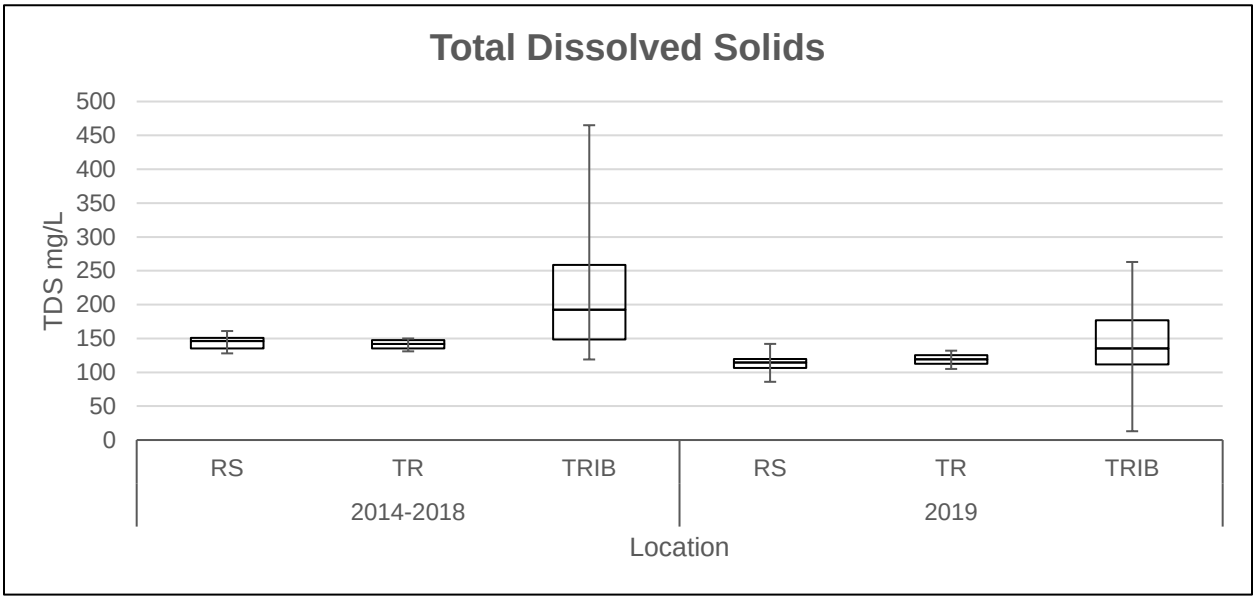
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0 %)	Mean	Median	Count	CL(95.0 %)
Chl a	RS	9.08	6.00	67	2.25	8.74	3.40	16	6.46
Pheo a	RS	1.95	2.00	67	0.25	1.21	1.00	16	0.25

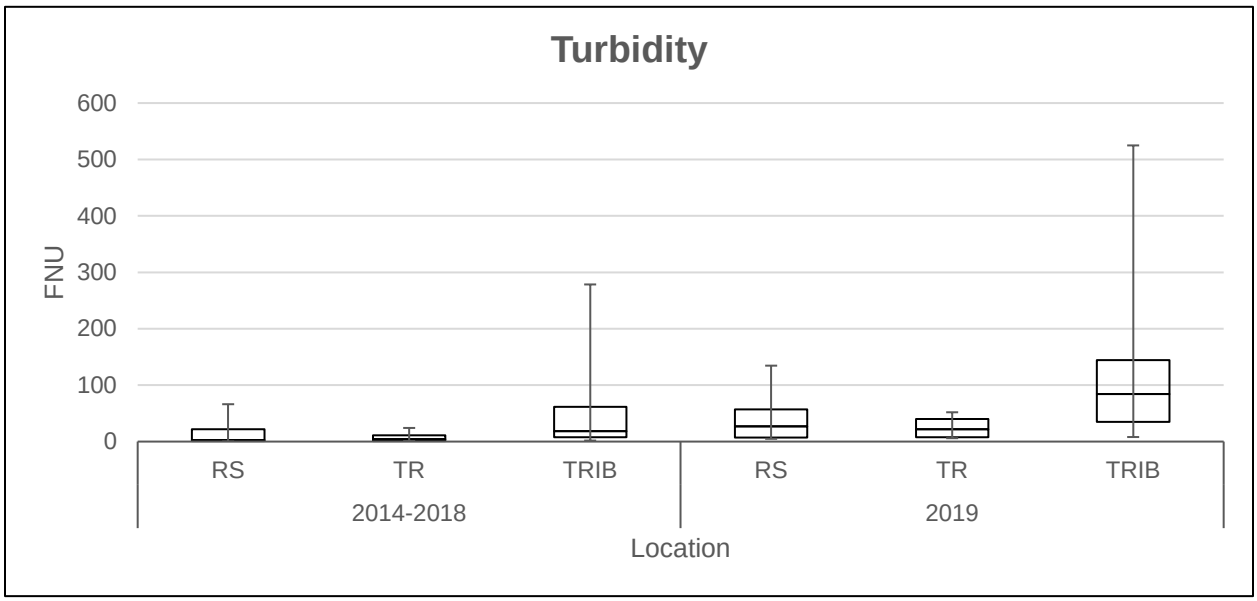
**Based on the geometric mean, neither the criterion (30 mg/cu m) nor the screening value (18 mg/cu m) were exceeded in 2019.*





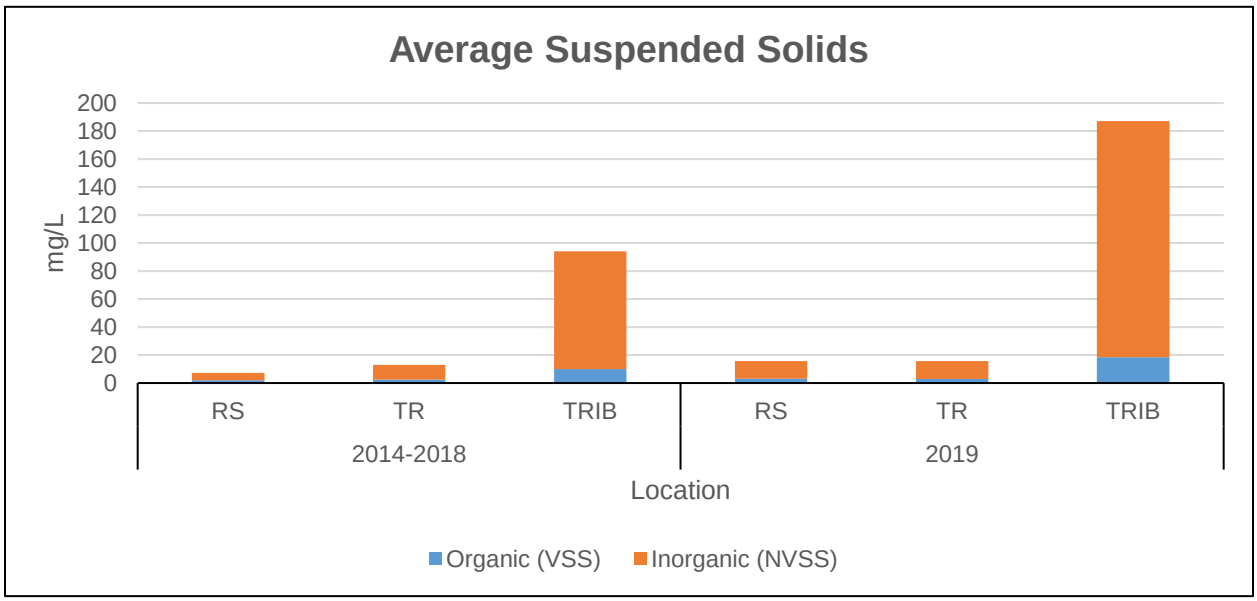
<40 = Oligotrophic __ 40-60 = Mesotrophic __ 60-70 = Eutrophic __ >70 Hypereutrophic





		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
FNU	RS	14.35	2.82	18	10.13	37.54	27.03	22	16.08
	TR	8.30	4.07	4	17.45	25.57	22.15	4	35.43
	TRIB	54.16	18.68	20	35.95	116.89	84.30	20	58.67
TDS	RS	144.11	146.00	18	4.82	115.14	114.50	22	5.81
	TR	141.25	142.00	4	14.02	118.75	119.00	4	18.30
	TRIB	222.85	192.50	20	45.78	144.75	135.50	20	27.13

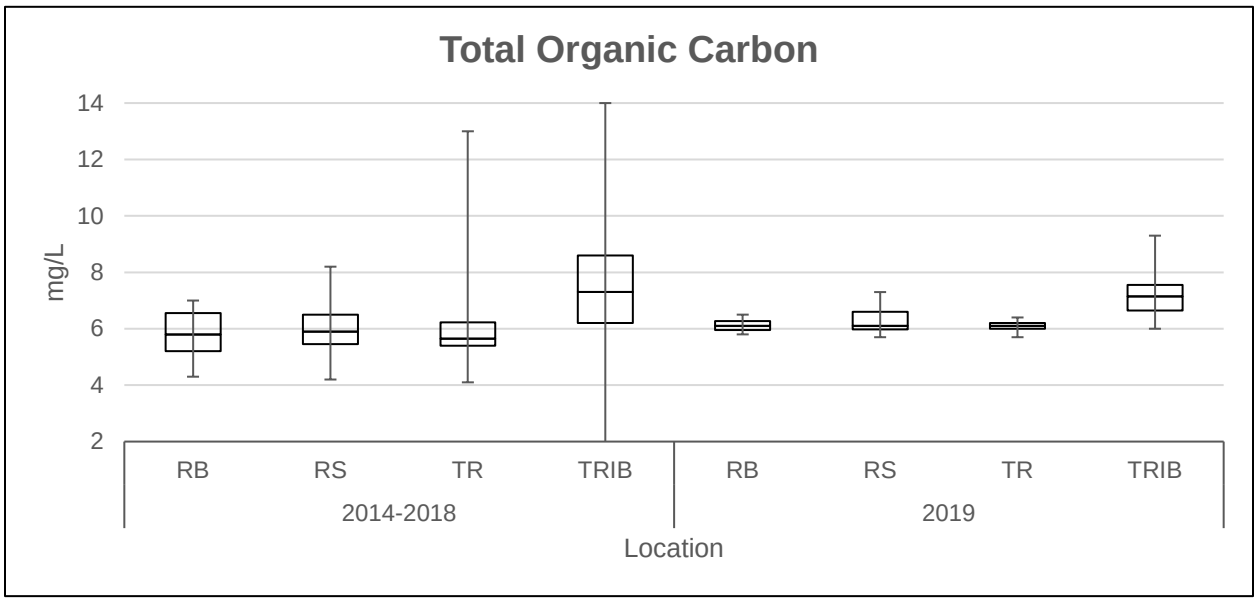
* *The TDS criterion (250 mg/L) was exceeded once on October 23, 2019 at MTL-5. All other observations were within the referenced water quality standard during 2019.*



**Reference total suspended solids standard is 116 mg/L for streams and 12 mg/L for lakes.*

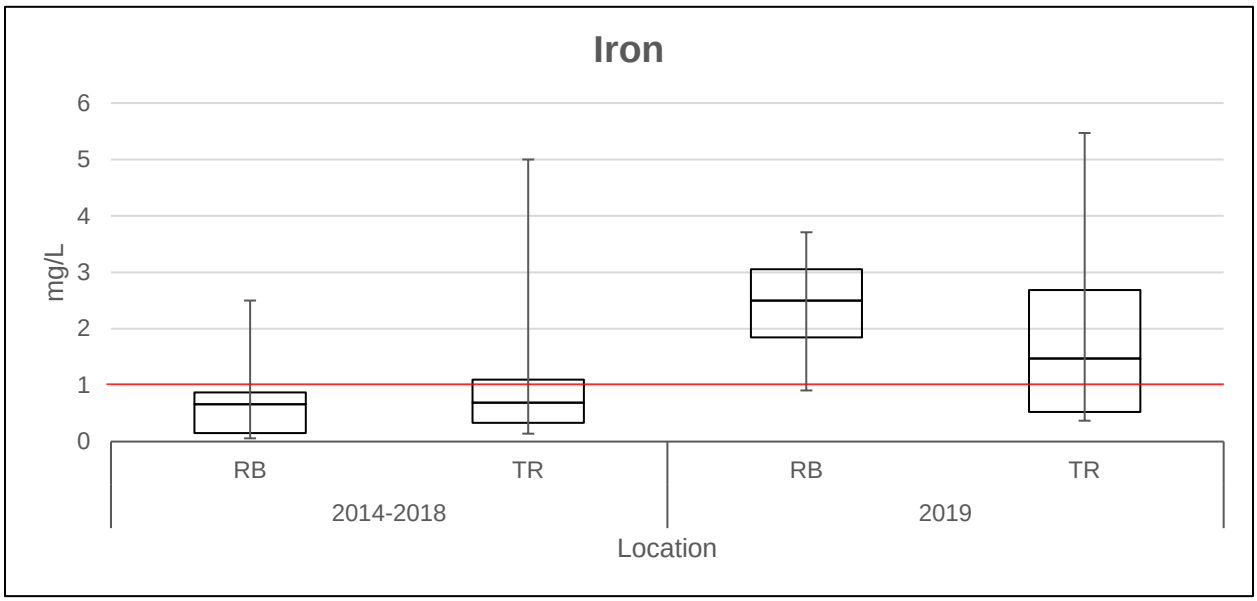
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
TSS	RS	7.14	5.73	67	1.66	15.77	8.60	16	9.53
	TR	12.91	8.65	34	6.42	15.60	8.07	8	18.61
	TRIB	94.19	24.90	65	41.90	187.21	77.65	16	145.08
VSS	RS	2.00	2.00	67	0.17	3.07	2.75	16	0.95
	TR	2.55	2.12	34	0.54	2.97	1.64	8	1.91
	TRIB	9.98	5.00	65	3.18	18.54	10.35	16	12.77
NVSS	RS	5.14	3.60	67	1.57	12.70	5.54	16	8.76
	TR	10.36	6.19	34	5.92	12.62	6.60	8	17.09
	TRIB	84.20	21.25	65	38.79	168.67	67.30	16	132.35

**In 2019 the TSS stream standard (116 mg/L) was exceeded in the tributaries in April, May, and August, while the TSS lake standard (12 mg/L) was exceeded multiple times in the lake in April, May, and October.*

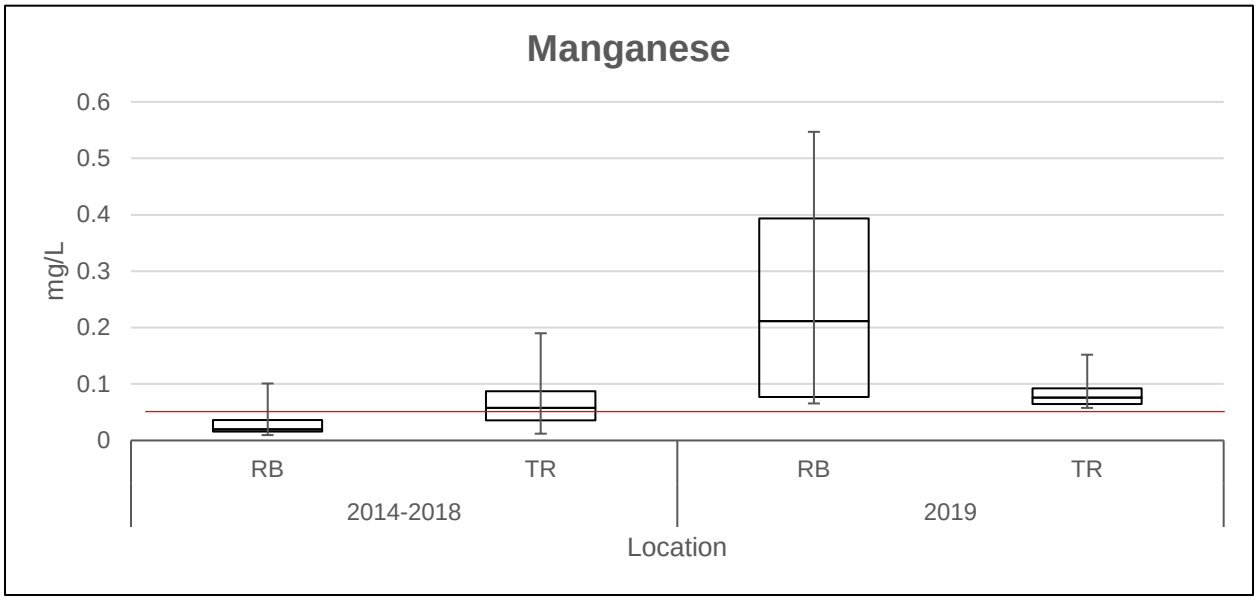


	Historical Reference 2014-2018				2019			
Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
RB	5.78	5.80	18	0.43	6.13	6.10	4	0.48
RS	5.93	5.90	67	0.20	6.27	6.10	16	0.23
TR	5.87	5.65	34	0.53	6.09	6.10	8	0.17
TRIB	7.47	7.30	65	0.49	7.18	7.15	16	0.46

**This study does not recognize a water quality criteria for TOC.*



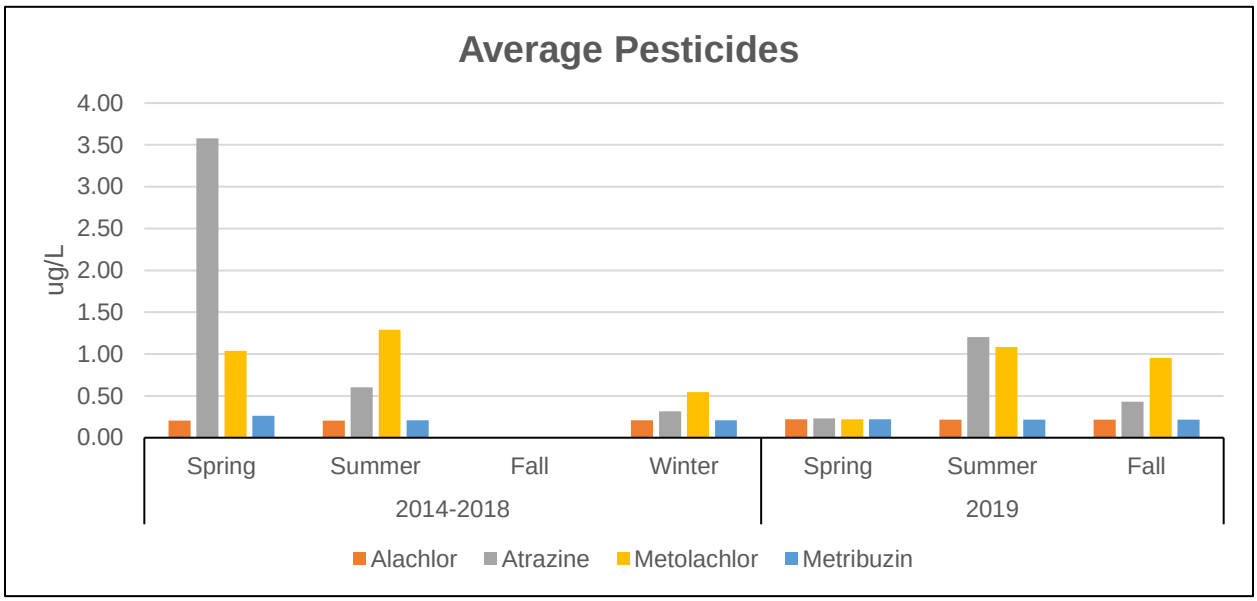
**Red line indicates the water quality standard of 1 mg/L.*



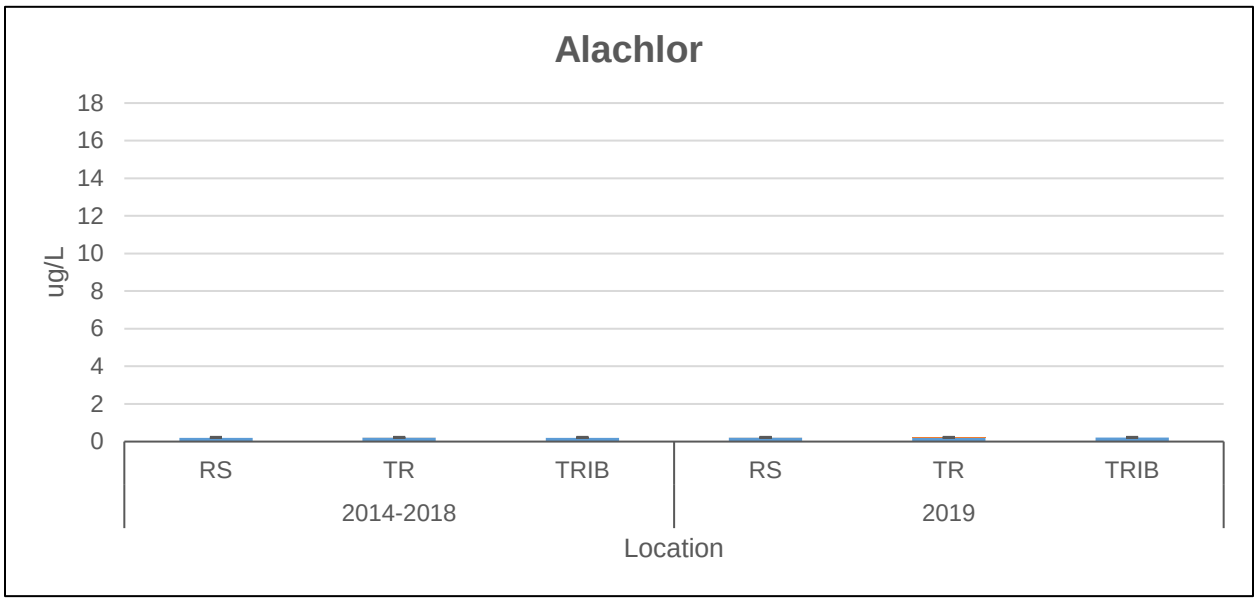
**Red line indicates the standard for manganese of 0.05 mg/L.*

		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Iron	RB	0.81	0.66	17	0.40	2.40	2.50	4	1.88
	TR	0.95	0.69	34	0.33	1.97	1.47	8	1.55
Mang	RB	0.03	0.02	17	0.01	0.26	0.21	4	0.37
	TR	0.07	0.06	34	0.02	0.09	0.08	8	0.03

**In 2019 iron 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 criterion 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.*

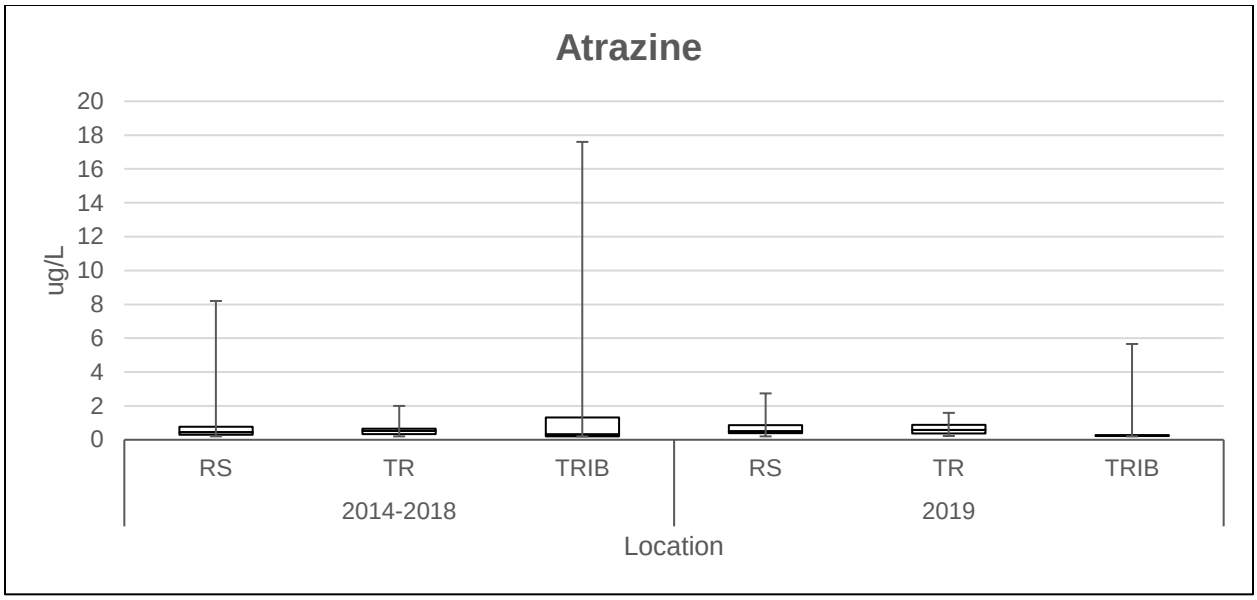


**Of the eight pesticides tested, only the above four were reported above detection levels for the period 2014-2019.*



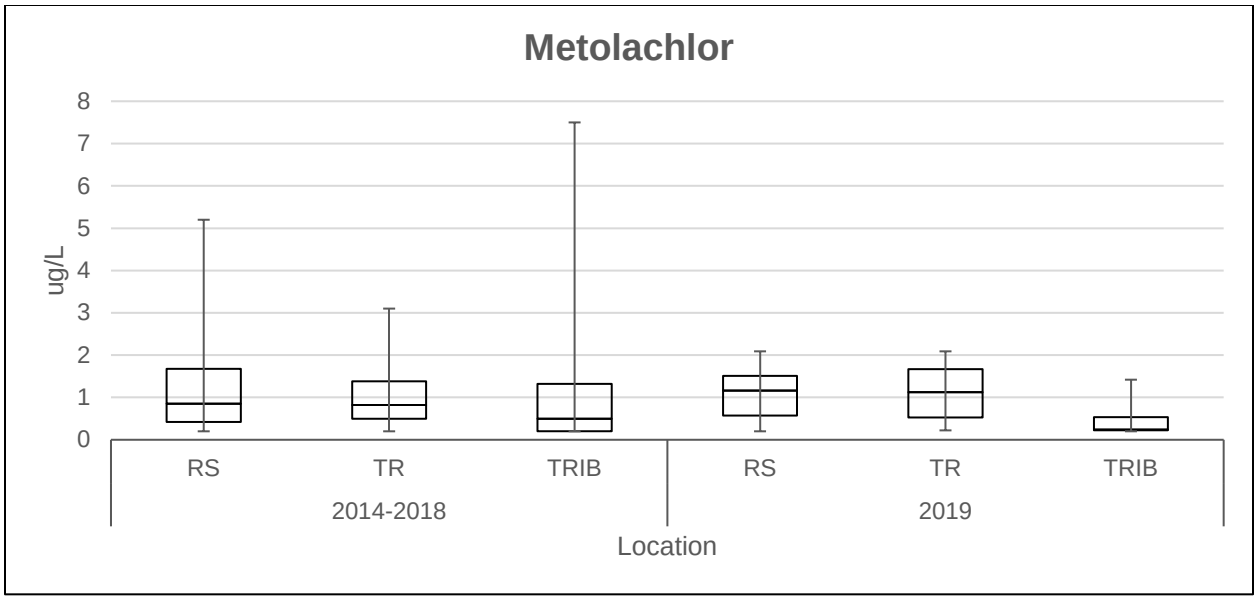
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0 %)	Mean	Median	Count	CL(95.0 %)
Alachlor	RS	0.20	0.20	65	0.00	0.21	0.20	16	0.01
	TR	0.21	0.20	34	0.00	0.22	0.22	8	0.01
	TRIB	0.21	0.20	65	0.00	0.22	0.22	16	0.01

**The criterion of 2 ug/L for Alachlor was not exceeded in 2019 as all observations were under the detection limit..*



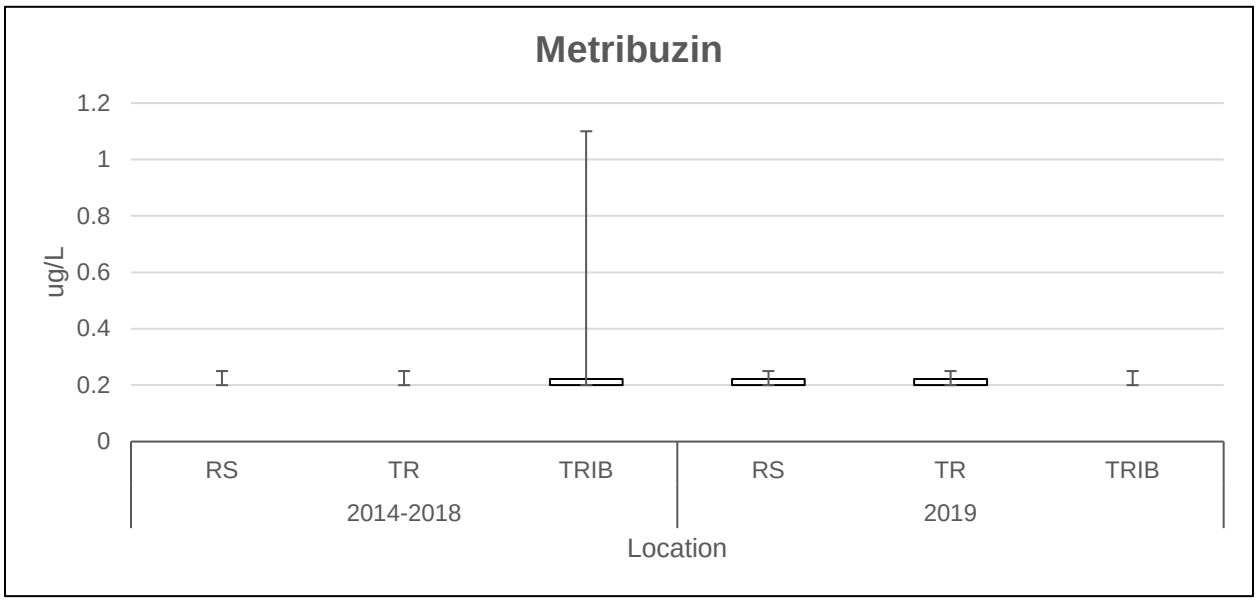
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0 %)	Mean	Median	Count	CL(95.0 %)
Atrazine	RS	0.70	0.45	65	0.28	0.82	0.51	16	0.41
	TR	0.57	0.52	34	0.13	0.72	0.58	8	0.43
	TRIB	2.60	0.32	63	1.20	0.73	0.22	16	0.74

**The criterion of 3 ug/L for Atrazine was exceeded once at MTL-5 in 2019.*



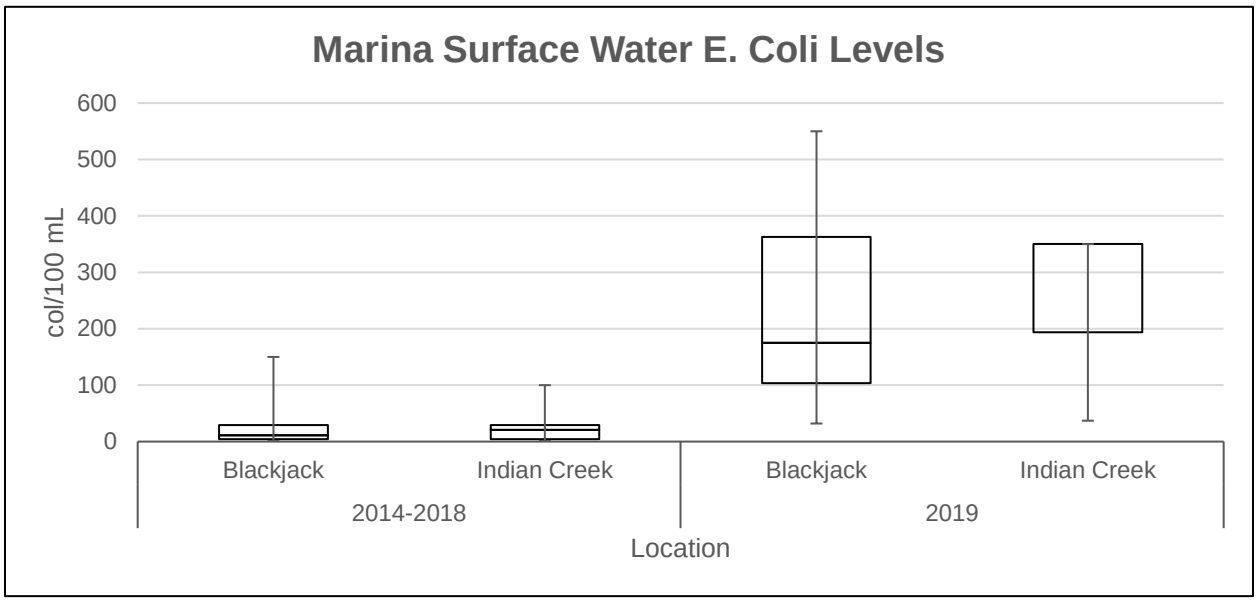
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0 %)	Mean	Median	Count	CL(95.0 %)
Metolachlor	RS	1.11	0.85	65	0.23	1.09	1.17	16	0.36
	TR	1.00	0.83	34	0.25	1.10	1.13	8	0.61
	TRIB	1.23	0.50	65	0.40	0.45	0.24	16	0.19

**The criterion of 70 ug/L for Metolachlor was not exceeded in 2019.*



		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Metribuzin	RS	0.20	0.20	65	0.00	0.21	0.20	16	0.01
	TR	0.20	0.20	34	0.00	0.22	0.22	8	0.01
	TRIB	0.25	0.20	65	0.04	0.22	0.22	16	0.01

**The criterion of 100 ug/L for Metribuzin was not exceeded in 2019.*



**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 2014-2018				2019			
Marina Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Blackjack	29.42	11.00	12	27.99	252.33	175.00	3	664.55
Indian Creek	29.08	20.50	12	22.50	245.67	350.00	3	448.91

**Marina bacteria levels did not exceed the water quality standard in 2019.*

2019 Swimming Beach Bacteria Levels (E. Coli MPN / 100mL)

	Mark Twain State Park Public Beach Sample Location			
	Right	Duplicate	Left	Geometric Mean
5/20/2019	10.9	14.6	10.8	11.98
6/10/2019	52	16.1	14.6	23.04
6/17/2019	35.5		9.7	18.56
6/24/2019	461.1		>2419.6	>1056.26
7/1/2019	24.6		172.2	65.09
7/8/2019	27.9	47.3	37.3	36.65
7/15/2019	20.9		3	7.92
7/22/2019	5.2		15.3	8.92
7/29/2019	77.1		118.7	95.66
8/5/2019	<1	<1	<1	<1
8/12/2019	298.7		133.4	199.62
8/19/2019	2		1	1.41
8/26/2019	33.6		48	40.16

**Beach bacteria levels exceeded the reference water quality criterion once on June 24, 2019.*

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 2019 did not deviate far from conditions observed during the reference period (2014-2018); nevertheless, concerns regarding DO, Atrazine, TSS, Fe, Mn, and TP were evident. In addition, estimated TSI levels were indicative of a hyper eutrophic system.

During the four sampling events in 2019, DO was recorded below 5 mg/L one time in August at site MTL-66 (4.91 mg/L) in the upper lake. 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. 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 address this issue.

Pesticides are commonly used throughout much of the agricultural landscape that the Salt River flows. Of the eight pesticides tested, only Alachlor, Atrazine, Metolachlor, and Metribuzin were detected between 2014 and 2019. Of those four, only Atrazine was found to exceed the criteria. In 2019 the Atrazine drinking water standard (3 ug/L) was exceeded once with a level of 5.66 ug/L at MTL-5 on May 29. Atrazine levels were recorded over the standard multiple times in the tributaries historically. The 2019 Atrazine average (0.62 ug/L) is lower than the historic Atrazine average (1.50 ug/L). 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.

Total solids can affect water quality by increasing temperature through the absorption of sunlight by suspended particles in the water column, and consequently reduce DO. Total solids are also strongly correlated with water clarity and the presence of Macrophytes. Missouri has no numeric water quality criteria for total suspended solids. USACE uses a reference standard (IL EPA) as well as historical comparison. In 2019 the TSS reference stream standard (116 mg/L) was exceeded in the tributaries in April, May, and August, while the TSS lake standard (12 mg/L) was exceeded multiple times in April, May, and October. Historical TSS levels are similar to the 2019 results with the following exception. Average TSS 2019 levels in the tributaries(187.21 mg/L) are much higher than the historical tributary average (94.19 mg/L). This is likely due to the sampling events in 2019 occurring after rain events.

Living organisms require trace amounts of metals, but excessive levels can be harmful. TFe exceeded the criterion of 1 mg/L near the lake bottom in front of and downstream of Cannon dam as well as below the Re-regulation dam. The average TFe levels in 2019 were significantly higher than historical (2014-2018) 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 2019 exceeded the criterion above and below Cannon dam as well as below the Re-regulation dam. 2019 TMn levels are significantly higher then 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 for several years. In 2019 the TP criterion was exceeded at all locations with a geometric mean across all sites of 0.29 mg/L, which is an increase when compared to the historical geometric mean of 0.12 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.

Although there were individual instances of the CHL_a screening value and criterion being exceeded, the geometric mean was not exceeded. The 2019 average CHL_a level (8.74 mg/cm^3) was not significantly different compared to the historical average (9.08 mg/cm^3). CHL_a is an indicator of the abundance of phytoplankton. Any water environment with a level recorded above 25 mg/cm^3 is considered to be eutrophic (nutrient enrichment increases algal and plant growth and negative effects). The 2019 TSI level, an average of the individual trophic state indexes for secchi depth, CHL_a, and TP, for Mark Twain Lake was 70.5. Mark Twain Lake is considered hyper-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.

Swimming beach bacteria levels exceeded the criterion one time in 2019 on June 24 at Mark Twain State Park Public Beach, but the sample immediately following was low. All remaining parameters evaluated during the 2019 water quality monitoring effort were within designated criteria or within historical reference norms.

MONITORING PROGRAM RECOMMENDATIONS

The 2018 water quality report compiled by the Missouri Department of Natural Resources (MDNR) has listed the following impairments: Middle Fork Salt River impaired for total suspended solids and dissolved oxygen, South Fork Salt River as impaired for dissolved oxygen, Black Creek Tributary to the North Fork Salt River as impaired for E. coli, North Fork Salt River and Mark Twain Lake as impaired for mercury, and the Salt River below the dam as impaired for mercury and dissolved oxygen. 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 hypereutrophic status of Mark Twain Lake it is recommended that Nitrite (NO_2) and Total Kjeldahl Nitrogen (TKN) be added to the monitoring program. Doing so would allow CEMVS to evaluate Total Nitrogen (TN), which 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 hypereutrophic status of Mark Twain Lake, it is imperative that sampling remain at a minimum of four events per year.

WORKS CITED

Carlson, R. E. (1977). A Trophic State Index for Lakes1. Limnology and Oceanography, 22(2), 361-369.

USACE. (2018). Engineering and Design: Water Quality Management. USACE ER 1110-2-8154. Washington D.C.

USACE. (1987). Engineering and Design: Reservoir Water Quality Analysis. USACE ER 1110-2-1201. Washington D.C.

IEPA. (2018). https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx

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)
4/2/2019	1	0.6	10.18	7.44	171.9	6.1	203.3	132	36.1
4/2/2019	11	0.5	10.12	7.65	196.6	10.1	210.1	137	238.7
4/2/2019	12	0.9	10.66	7.32	293.4	6.1	206.5	134	36.3
4/2/2019	22	0.5	10.58	7.56	213.9	6.4	196.7	128	32.9
4/2/2019	22	1.0	10.58	7.52	214.9	6.4	196.7	128	31.6
4/2/2019	22	2.0	10.57	7.52	215.0	6.4	196.7	128	33.2
4/2/2019	22	3.1	10.52	7.44	219.0	6.2	196.9	128	31.9
4/2/2019	22	4.3	10.49	7.43	220.3	6.1	196.8	128	32.7
4/2/2019	22	5.0	10.47	7.41	221.2	6.0	196.9	128	32.7
4/2/2019	22	6.1	10.43	7.37	223.5	5.7	196.5	128	33.3
4/2/2019	22	7.1	10.38	7.35	224.9	5.6	196.9	128	32.9
4/2/2019	22	8.1	10.35	7.37	224.1	5.5	197.3	128	34.7
4/2/2019	22	9.4	10.34	7.32	226.9	5.4	197.6	128	33.6
4/2/2019	22	10.8	10.32	7.34	226.3	5.3	197.8	129	36.2
4/2/2019	22	11.3	10.31	7.38	224.4	5.3	197.8	129	33.5
4/2/2019	22	12.4	10.30	7.32	225.0	5.3	197.8	129	34.1
4/2/2019	22	13.4	10.29	7.30	228.8	5.3	197.8	129	34.7
4/2/2019	22	14.3	10.27	7.46	220.6	5.3	197.8	129	35.2
4/2/2019	22	16.7	10.24	7.34	227.6	5.2	198.0	129	36.2
4/2/2019	33	0.4	9.53	7.48	199.0	7.4	214.3	139	47.8
4/2/2019	33	1.0	9.55	7.50	198.7	7.3	214.4	139	48.6
4/2/2019	33	1.0	9.83	7.47	199.8	7.4	214.2	139	50.2
4/2/2019	66	1.1	8.90	7.56	208.3	9.3	217.8	142	65.7
4/2/2019	66	2.1	8.87	7.52	208.6	9.2	217.9	142	69.0
4/2/2019	66	3.2	8.81	7.49	210.1	8.9	217.5	141	82.6
4/2/2019	66	4.0	8.79	7.44	212.5	8.9	217.2	141	72.8
4/2/2019	66	5.0	8.77	7.43	213.0	8.8	216.9	141	79.8
4/2/2019	66	6.2	8.77	7.42	213.4	8.8	215.7	140	69.3
4/2/2019	66	7.0	8.77	7.41	213.8	8.7	214.1	139	70.8
4/2/2019	66	8.1	8.84	7.39	214.4	7.9	203.4	132	66.1
4/2/2019	66	9.3	9.03	7.34	215.6	7.1	196.5	128	63.0
4/2/2019	66	10.1	9.06	7.33	215.8	7.1	196.5	128	64.9
4/2/2019	66	11.1	8.98	7.31	216.8	7.1	195.8	127	62.7
4/2/2019	66	12.2	8.90	7.29	218.0	7.0	195.4	127	62.0
4/2/2019	66	13.1	8.73	7.28	208.8	7.0	196.1	127	305.3
4/2/2019	77	1.1	9.21	7.57	198.0	8.4	209.6	136	68.5
4/2/2019	77	2.1	9.16	7.51	198.3	8.4	210.0	137	66.7
4/2/2019	77	3.0	9.13	7.49	198.7	8.3	210.1	137	74.8
4/2/2019	77	4.0	9.09	7.46	198.9	8.2	210.2	137	68.1
4/2/2019	77	5.2	9.14	7.44	200.0	7.7	206.3	134	81.2
4/2/2019	77	6.1	9.18	7.42	200.6	7.3	202.3	132	60.0
4/2/2019	77	7.1	9.24	7.41	201.3	7.0	200.4	130	61.9

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
4/2/2019	77	8.1	9.45	7.40	202.7	6.1	195.0	127	52.6
4/2/2019	77	9.0	9.44	7.38	203.8	6.0	194.4	126	48.8
4/2/2019	77	9.5	9.40	7.38	203.7	6.1	195.1	127	56.6
4/2/2019	77	10.1	9.43	7.37	204.2	6.0	194.3	126	54.0
4/2/2019	77	11.1	9.42	7.38	203.8	6.0	194.2	126	44.9
4/2/2019	77	12.1	9.39	7.38	204.5	5.9	194.0	126	50.1
4/2/2019	77	13.0	9.36	7.37	204.9	5.9	194.0	126	50.1
4/2/2019	77	14.0	8.53	7.36	149.3	5.9	194.1	126	63.9
4/3/2019	5	1.2	10.32	7.81	149.4	9.2	264.3	172	66.1
4/3/2019	9	0.8	10.18	7.69	191.1	8.5	252.7	164	147.2
4/3/2019	13	1.1	10.71	7.87	147.3	8.5	295.4	192	57.1
5/29/2019	1	0.3	5.60	6.76	327.0	16.8	189.9	123	52.0
5/29/2019	5	0.7	7.17	7.57	335.0	22.4	249.7	162	143.8
5/29/2019	9	0.5	6.36	7.35	336.8	20.7	122.7	80	279.9
5/29/2019	11	0.0	6.24	7.34	338.6	21.1	20.1	13	237.8
5/29/2019	12	0.6	7.65	6.89	386.1	17.6	172.5	112	84.4
5/29/2019	13	0.0	7.39	7.61	351.1	19.9	149.4	97	524.9
5/29/2019	22	1.0	6.95	7.09	422.6	21.7	180.5	117	55.3
5/29/2019	22	2.3	6.92	7.04	425.8	21.7	180.6	117	58.5
5/29/2019	22	3.0	6.87	7.00	427.4	21.6	181.1	118	54.9
5/29/2019	22	4.1	6.32	6.87	433.4	20.0	182.2	118	54.9
5/29/2019	22	5.0	6.04	6.79	437.1	19.3	182.8	119	57.9
5/29/2019	22	5.6	6.10	7.22	408.4	18.8	184.1	120	58.2
5/29/2019	22	6.1	5.83	6.75	438.5	18.7	183.6	119	56.5
5/29/2019	22	7.0	5.51	6.74	439.2	17.5	185.2	120	47.1
5/29/2019	22	7.9	5.20	6.71	440.8	16.5	186.3	121	50.2
5/29/2019	22	9.1	5.03	6.61	445.5	16.2	186.3	121	51.5
5/29/2019	22	10.1	4.87	6.55	448.4	15.9	185.9	121	53.7
5/29/2019	22	11.1	4.64	6.51	450.0	15.6	186.3	121	54.7
5/29/2019	22	12.1	3.88	6.50	450.7	14.2	191.6	125	48.9
5/29/2019	22	12.8	3.67	6.49	450.9	13.7	192.3	125	51.0
5/29/2019	22	15.0	3.40	6.53	449.4	12.2	195.7	127	46.7
5/29/2019	22	16.0	3.42	6.60	445.6	12.0	196.5	128	42.6
5/29/2019	22	17.0	3.30	6.66	442.0	11.5	196.9	128	41.4
5/29/2019	22	18.1	3.13	6.71	439.9	10.6	199.3	130	39.5
5/29/2019	22	19.5	3.04	6.83	434.4	10.1	201.6	131	38.1
5/29/2019	33	0.0	6.76	7.14	450.6	22.1	179.4	117	57.1
5/29/2019	33	1.0	6.65	7.12	451.1	21.2	177.7	115	56.8
5/29/2019	33	2.0	6.54	7.09	452.9	20.4	181.4	118	55.8
5/29/2019	33	3.1	6.30	7.02	456.8	19.7	182.7	119	55.5
5/29/2019	33	4.1	6.18	6.93	461.0	19.3	182.9	119	55.6
5/29/2019	33	5.1	6.12	6.89	463.5	19.1	182.8	119	54.6

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
5/29/2019	33	6.1	5.83	6.80	467.4	18.6	182.4	119	56.4
5/29/2019	33	7.1	5.55	6.67	474.0	17.4	184.5	120	57.7
5/29/2019	33	8.1	5.46	6.62	476.6	17.2	184.9	120	55.3
5/29/2019	33	9.1	5.09	6.53	480.1	16.7	185.7	121	57.3
5/29/2019	33	10.0	4.69	6.49	481.5	16.2	184.0	120	55.0
5/29/2019	33	11.3	4.24	6.42	483.5	15.8	183.6	119	52.9
5/29/2019	33	12.1	4.22	6.39	484.8	15.2	187.6	122	53.4
5/29/2019	33	12.9	3.30	6.33	487.1	14.2	187.1	122	58.3
5/29/2019	33	14.3	2.83	6.27	488.0	13.3	178.7	116	62.1
5/29/2019	33	15.2	2.77	6.24	489.1	12.4	189.5	123	59.2
5/29/2019	66	0.0	5.88	7.02	559.6	20.9	166.3	108	99.7
5/29/2019	66	1.1	5.58	6.90	562.1	20.4	156.3	102	112.1
5/29/2019	66	2.1	5.50	6.81	564.4	20.3	157.3	102	102.3
5/29/2019	66	3.0	5.46	6.78	563.6	20.2	158.7	103	94.8
5/29/2019	66	3.1	5.43	6.76	563.9	20.2	158.5	103	104.7
5/29/2019	66	4.1	5.47	6.74	562.6	20.2	159.5	104	107.3
5/29/2019	66	5.1	5.44	6.73	561.6	20.2	162.0	105	104.5
5/29/2019	66	6.1	5.37	6.71	560.6	20.1	164.3	107	103.3
5/29/2019	66	7.0	5.39	6.68	561.9	20.0	169.6	110	83.0
5/29/2019	66	8.0	3.95	6.58	565.7	16.9	181.9	118	70.5
5/29/2019	66	9.1	3.56	6.47	569.4	16.3	182.7	119	71.2
5/29/2019	66	10.2	3.11	6.41	572.1	15.9	182.4	119	70.3
5/29/2019	66	11.0	2.82	6.34	573.6	15.4	180.3	117	88.6
5/29/2019	66	12.1	2.44	6.28	570.8	15.1	181.7	118	84.5
5/29/2019	66	13.2	2.20	6.24	564.0	14.9	183.8	119	82.0
5/29/2019	66	14.2	1.82	6.22	554.7	14.5	185.8	121	87.2
5/29/2019	66	15.2	1.11	6.19	541.0	14.1	188.8	123	78.3
5/29/2019	66	16.0	0.38	6.16	530.7	12.8	197.0	128	62.8
5/29/2019	77	0.1	5.27	6.98	586.4	21.2	130.9	85	125.8
5/29/2019	77	1.1	5.24	6.85	587.0	21.0	132.1	86	134.6
5/29/2019	77	2.1	5.22	6.80	585.4	21.0	132.7	86	133.3
5/29/2019	77	3.0	5.19	6.74	589.0	20.9	135.7	88	144.8
5/29/2019	77	4.1	5.18	6.71	588.6	20.9	136.5	89	119.5
5/29/2019	77	5.0	5.16	6.68	588.9	20.8	137.5	89	129.9
5/29/2019	77	6.1	5.12	6.68	588.5	20.8	137.6	89	149.4
5/29/2019	77	7.2	4.51	6.62	588.2	19.7	143.9	94	122.6
5/29/2019	77	8.1	4.32	6.56	588.7	19.3	144.9	94	133.3
5/29/2019	77	9.1	3.91	6.49	591.3	18.2	148.5	97	133.1
5/29/2019	77	10.3	3.44	6.41	592.1	16.6	152.7	99	132.4
5/29/2019	77	11.1	3.25	6.35	591.7	15.9	156.4	102	133.9
5/29/2019	77	12.0	3.23	6.32	592.4	15.8	157.3	102	129.0
5/29/2019	77	13.2	2.91	6.29	587.9	15.3	160.6	104	109.2

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
5/29/2019	77	14.1	2.79	6.27	584.4	15.1	161.9	105	120.7
5/29/2019	77	15.3	1.77	6.23	571.1	14.0	175.1	114	122.5
5/29/2019	BJ MAR	0.0	6.98	7.41	503.6	22.7	176.0	114	56.8
5/29/2019	BJ MAR	1.2	6.70	7.16	510.2	20.5	177.6	115	56.9
5/29/2019	BJ MAR	7.3	5.73	6.49	487.5	17.8	184.0	120	53.0
5/29/2019	BJ MAR	13.9	3.27	6.66	487.6	12.4	194.4	126	50.3
5/29/2019	IC MAR	0.0	6.72	7.33	504.1	21.0	181.7	118	62.0
5/29/2019	IC MAR	1.1	6.65	7.14	506.4	20.6	181.3	118	61.1
5/29/2019	IC MAR	9.0	5.06	6.85	518.9	16.6	182.2	118	65.5
5/29/2019	IC MAR	13.6	3.09	6.49	379.4	13.7	191.0	124	136.8
8/28/2019	1	1.0	8.89	8.25	261.0	24.4	161.1	105	8.2
8/28/2019	5	0.5	7.46	7.56	358.4	22.8	144.3	94	84.2
8/28/2019	9	0.3	6.76	7.65	266.9	22.5	200.3	130	102.9
8/28/2019	11	0.5	6.60	7.52	268.5	23.1	223.4	145	134.0
8/28/2019	12	0.5	8.57	8.11	239.2	26.6	170.6	111	10.0
8/28/2019	13	0.4	7.62	7.66	301.5	21.6	195.5	127	85.8
8/28/2019	22	0.0	8.77	8.47	192.7	25.1	158.2	103	4.9
8/28/2019	22	0.4	8.69	8.46	192.8	25.1	158.3	103	4.9
8/28/2019	22	1.0	8.57	8.46	191.6	25.1	158.4	103	4.9
8/28/2019	22	2.1	8.50	8.43	191.8	25.1	158.3	103	4.9
8/28/2019	22	3.1	8.46	8.42	191.8	25.1	158.3	103	4.7
8/28/2019	22	4.1	8.40	8.41	190.9	25.0	158.3	103	4.9
8/28/2019	22	5.1	8.32	8.39	190.9	25.0	158.3	103	4.9
8/28/2019	22	6.1	8.26	8.35	190.3	25.0	158.3	103	4.9
8/28/2019	22	7.1	8.08	8.31	190.3	24.9	158.4	103	5.1
8/28/2019	22	8.1	8.09	8.29	190.0	24.9	158.3	103	5.9
8/28/2019	22	9.0	0.80	7.99	189.4	21.5	166.2	108	38.2
8/28/2019	22	10.0	0.44	7.90	187.7	17.2	185.9	121	57.8
8/28/2019	22	11.1	0.28	7.75	183.5	15.9	188.9	123	52.2
8/28/2019	22	12.1	0.23	7.66	183.0	14.0	193.8	126	46.2
8/28/2019	33	0.3	10.14	8.75	129.4	25.8	158.0	103	5.1
8/28/2019	33	1.0	9.44	8.63	135.4	25.4	158.2	103	4.9
8/28/2019	33	2.0	8.76	8.50	139.7	25.2	158.4	103	4.8
8/28/2019	33	3.1	8.34	8.36	142.6	25.1	158.6	103	4.8
8/28/2019	33	4.0	8.10	8.28	145.2	25.1	158.6	103	4.9
8/28/2019	33	5.2	7.96	8.23	145.9	25.1	158.8	103	4.8
8/28/2019	33	6.3	6.58	8.03	148.2	25.0	159.1	103	5.3
8/28/2019	33	7.2	4.95	7.89	146.4	24.7	159.8	104	6.4
8/28/2019	33	8.2	1.76	7.69	143.3	24.2	161.0	105	12.7
8/28/2019	33	9.0	0.37	7.56	138.8	21.9	167.0	109	37.1
8/28/2019	33	10.1	0.20	7.47	135.4	17.0	194.3	126	72.0
8/28/2019	33	11.2	0.16	7.45	134.0	14.5	193.8	126	49.3

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
8/28/2019	33	12.1	0.13	7.28	139.0	13.4	197.7	129	46.5
8/28/2019	66	0.1	5.11	7.52	123.5	25.2	165.7	108	13.2
8/28/2019	66	1.1	4.91	7.55	121.8	25.1	165.5	108	13.7
8/28/2019	66	2.1	4.48	7.52	123.2	24.9	165.4	108	15.1
8/28/2019	66	3.1	4.47	7.50	125.0	24.9	165.4	108	14.9
8/28/2019	66	4.1	4.25	7.48	126.8	24.8	165.5	108	15.7
8/28/2019	66	5.1	4.19	7.49	126.9	24.8	165.4	107	15.5
8/28/2019	66	6.1	4.22	7.46	129.6	24.7	165.5	108	14.6
8/28/2019	66	7.2	1.00	7.37	116.8	23.4	176.6	115	29.3
8/28/2019	66	8.0	0.44	7.28	-23.5	18.4	212.4	138	86.6
8/28/2019	66	9.1	0.24	7.26	-46.7	15.2	216.2	141	89.3
8/28/2019	66	9.9	0.17	7.23	-62.5	14.6	225.0	146	84.8
8/28/2019	66	10.7	0.14	7.19	-73.0	13.4	237.6	154	128.5
8/28/2019	77	0.1	5.15	7.49	126.1	25.2	165.7	108	13.3
8/28/2019	77	0.6	7.27	7.84	131.7	25.0	169.6	110	11.1
8/28/2019	77	1.2	7.24	7.84	136.0	25.0	169.6	110	11.4
8/28/2019	77	2.0	6.86	7.81	142.6	24.8	169.4	110	10.6
8/28/2019	77	3.1	6.42	7.73	148.7	24.7	169.4	110	10.3
8/28/2019	77	4.1	6.15	7.55	161.0	24.6	169.1	110	10.4
8/28/2019	77	5.2	5.99	7.44	168.4	24.5	168.9	110	10.5
8/28/2019	77	6.1	5.38	7.35	173.1	24.2	168.0	109	11.5
8/28/2019	77	7.0	0.64	7.13	117.6	22.8	171.8	112	22.9
8/28/2019	77	8.2	0.29	6.95	28.7	18.9	185.1	120	61.9
8/28/2019	77	9.5	0.12	6.75	-0.2	17.2	193.8	126	70.4
8/28/2019	BJ MAR	0.0	9.61	8.00	126.5	25.5	157.9	103	4.7
8/28/2019	BJ MAR	0.4	9.08	8.23	133.5	25.2	158.1	103	5.3
8/28/2019	BJ MAR	6.1	7.09	7.90	148.4	24.8	158.8	103	5.7
8/28/2019	BJ MAR	10.3	1.09	7.76	138.1	17.6	186.1	121	162.3
8/28/2019	IC MAR	0.5	6.90	7.68	171.2	24.9	163.1	106	6.5
8/28/2019	IC MAR	4.6	6.48	7.63	174.8	24.6	162.6	106	8.4
8/28/2019	IC MAR	9.4	1.39	7.48	126.6	19.3	181.1	118	62.5
10/23/2019	1	1.0	8.44	8.07	144.6	16.0	177.2	115	6.0
10/23/2019	5	0.3	11.37	8.12	158.9	12.3	404.5	263	8.1
10/23/2019	5	0.3	11.37	8.12	158.9	12.3	404.5	263	8.1
10/23/2019	9	0.2	8.73	7.79	173.1	11.6	297.8	194	36.6
10/23/2019	9	0.2	8.73	7.79	173.1	11.6	297.8	194	36.6
10/23/2019	11	0.5	9.60	7.93	153.7	11.5	352.7	229	35.1
10/23/2019	11	0.5	9.60	7.93	153.7	11.5	352.7	229	35.1
10/23/2019	11	0.5	9.61	7.93	154.0	11.5	352.7	229	31.9
10/23/2019	11	0.5	9.61	7.93	154.0	11.5	352.7	229	31.9
10/23/2019	12	0.5	8.36	7.81	178.7	15.3	175.6	114	8.2
10/23/2019	13	0.2	10.25	7.90	187.2	11.3	346.7	225	20.0

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
10/23/2019	13	0.2	10.25	7.90	187.2	11.3	346.7	225	20.0
10/24/2019	22	0.2	7.39	7.66	130.7	15.9	175.1	114	6.5
10/24/2019	22	0.2	7.39	7.66	130.7	15.9	175.1	114	6.5
10/24/2019	22	1.1	7.20	7.61	152.3	15.9	175.4	114	6.5
10/24/2019	22	1.1	7.20	7.61	152.3	15.9	175.4	114	6.5
10/24/2019	22	2.0	7.17	7.59	161.0	15.9	175.4	114	6.7
10/24/2019	22	2.0	7.17	7.59	161.0	15.9	175.4	114	6.7
10/24/2019	22	3.1	7.15	7.57	166.7	15.9	175.5	114	6.8
10/24/2019	22	3.1	7.15	7.57	166.7	15.9	175.5	114	6.8
10/24/2019	22	4.1	7.13	7.51	172.5	15.9	175.4	114	6.6
10/24/2019	22	4.1	7.13	7.51	172.5	15.9	175.4	114	6.6
10/24/2019	22	5.1	7.12	7.52	174.5	15.9	175.5	114	6.4
10/24/2019	22	5.1	7.12	7.52	174.5	15.9	175.5	114	6.4
10/24/2019	22	6.1	7.11	7.51	176.8	15.9	175.4	114	6.4
10/24/2019	22	6.1	7.11	7.51	176.8	15.9	175.4	114	6.4
10/24/2019	22	7.0	7.09	7.50	178.2	15.9	175.4	114	6.4
10/24/2019	22	7.0	7.09	7.50	178.2	15.9	175.4	114	6.4
10/24/2019	22	8.1	7.06	7.47	181.4	15.9	175.5	114	6.5
10/24/2019	22	8.1	7.06	7.47	181.4	15.9	175.5	114	6.5
10/24/2019	22	9.0	7.05	7.46	182.6	15.9	175.3	114	6.9
10/24/2019	22	9.0	7.05	7.46	182.6	15.9	175.3	114	6.9
10/24/2019	22	10.2	6.95	7.45	184.3	15.9	175.9	114	6.8
10/24/2019	22	10.2	6.95	7.45	184.3	15.9	175.9	114	6.8
10/24/2019	22	11.2	6.42	7.42	186.3	15.7	177.3	115	10.6
10/24/2019	22	11.2	6.42	7.42	186.3	15.7	177.3	115	10.6
10/24/2019	22	12.1	5.94	7.37	188.1	15.6	178.2	116	11.4
10/24/2019	22	12.1	5.94	7.37	188.1	15.6	178.2	116	11.4
10/24/2019	22	13.1	5.06	7.32	190.1	15.3	181.3	118	14.4
10/24/2019	22	13.1	5.06	7.32	190.1	15.3	181.3	118	14.4
10/24/2019	22	14.0	1.01	7.21	192.0	14.2	196.1	127	30.2
10/24/2019	22	14.0	1.01	7.21	192.0	14.2	196.1	127	30.2
10/24/2019	22	14.6	0.51	7.15	191.0	13.6	202.8	132	34.9
10/24/2019	22	14.6	0.51	7.15	191.0	13.6	202.8	132	34.9
10/24/2019	22	15.4	0.39	7.10	181.0	13.1	206.6	134	39.2
10/24/2019	22	15.4	0.39	7.10	181.0	13.1	206.6	134	39.2
10/24/2019	33	0.2	6.88	7.69	131.4	15.9	175.2	114	7.4
10/24/2019	33	0.2	6.88	7.69	131.4	15.9	175.2	114	7.4
10/24/2019	33	1.0	6.68	7.60	140.8	15.9	175.4	114	7.4
10/24/2019	33	1.0	6.68	7.60	140.8	15.9	175.4	114	7.4
10/24/2019	33	1.7	6.59	7.77	119.7	15.9	175.5	114	7.2
10/24/2019	33	1.7	6.59	7.77	119.7	15.9	175.5	114	7.2
10/24/2019	33	2.1	6.58	7.75	130.6	15.9	175.4	114	7.1

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
10/24/2019	33	2.1	6.58	7.75	130.6	15.9	175.4	114	7.1
10/24/2019	33	3.1	6.58	7.73	135.4	15.9	175.6	114	7.7
10/24/2019	33	3.1	6.58	7.73	135.4	15.9	175.6	114	7.7
10/24/2019	33	3.1	6.56	7.72	138.2	15.9	175.4	114	7.6
10/24/2019	33	3.1	6.56	7.72	138.2	15.9	175.4	114	7.6
10/24/2019	33	4.1	6.53	7.72	141.1	15.9	175.4	114	7.4
10/24/2019	33	4.1	6.53	7.72	141.1	15.9	175.4	114	7.4
10/24/2019	33	5.0	6.53	7.71	142.5	15.9	175.5	114	7.3
10/24/2019	33	5.0	6.53	7.71	142.5	15.9	175.5	114	7.3
10/24/2019	33	6.0	6.53	7.69	145.8	15.9	175.6	114	7.7
10/24/2019	33	6.0	6.53	7.69	145.8	15.9	175.6	114	7.7
10/24/2019	33	7.0	6.61	7.62	153.5	15.9	175.4	114	7.4
10/24/2019	33	7.0	6.61	7.62	153.5	15.9	175.4	114	7.4
10/24/2019	33	8.1	6.62	7.67	151.4	15.9	175.4	114	7.1
10/24/2019	33	8.1	6.62	7.67	151.4	15.9	175.4	114	7.1
10/24/2019	33	9.1	6.63	7.65	154.3	15.9	175.3	114	7.0
10/24/2019	33	9.1	6.63	7.65	154.3	15.9	175.3	114	7.0
10/24/2019	33	10.3	6.65	7.65	155.1	15.8	175.3	114	7.0
10/24/2019	33	10.3	6.65	7.65	155.1	15.8	175.3	114	7.0
10/24/2019	33	11.1	6.65	7.65	156.4	15.8	175.3	114	7.0
10/24/2019	33	11.1	6.65	7.65	156.4	15.8	175.3	114	7.0
10/24/2019	33	12.0	6.66	7.64	158.6	15.8	175.3	114	7.1
10/24/2019	33	12.0	6.66	7.64	158.6	15.8	175.3	114	7.1
10/24/2019	33	13.3	6.63	7.59	162.7	15.8	175.3	114	7.6
10/24/2019	33	13.3	6.63	7.59	162.7	15.8	175.3	114	7.6
10/24/2019	33	14.1	6.33	7.59	162.7	15.8	175.9	114	9.0
10/24/2019	33	14.1	6.33	7.59	162.7	15.8	175.9	114	9.0
10/24/2019	33	15.0	5.35	7.55	164.0	15.8	176.9	115	9.8
10/24/2019	33	15.0	5.35	7.55	164.0	15.8	176.9	115	9.8
10/24/2019	33	15.8	1.12	7.34	43.1	12.7	210.1	137	57.3
10/24/2019	33	15.8	1.12	7.34	43.1	12.7	210.1	137	57.3
10/24/2019	33	16.0	0.52	7.23	23.2	12.2	217.3	141	63.6
10/24/2019	33	16.0	0.52	7.23	23.2	12.2	217.3	141	63.6
10/24/2019	66	0.2	7.05	7.74	122.7	14.9	186.6	121	24.5
10/24/2019	66	0.2	7.05	7.74	122.7	14.9	186.6	121	24.5
10/24/2019	66	1.0	6.98	7.72	128.3	15.0	186.7	121	24.6
10/24/2019	66	1.0	6.98	7.72	128.3	15.0	186.7	121	24.6
10/24/2019	66	2.0	6.96	7.69	132.3	15.0	186.7	121	24.8
10/24/2019	66	2.0	6.96	7.69	132.3	15.0	186.7	121	24.8
10/24/2019	66	3.1	6.95	7.65	137.4	15.0	186.6	121	24.8
10/24/2019	66	3.1	6.95	7.65	137.4	15.0	186.6	121	24.8
10/24/2019	66	4.0	6.93	7.64	141.4	15.0	186.6	121	23.4

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
10/24/2019	66	4.0	6.93	7.64	141.4	15.0	186.6	121	23.4
10/24/2019	66	5.2	6.93	7.60	145.0	15.0	186.7	121	23.9
10/24/2019	66	5.2	6.93	7.60	145.0	15.0	186.7	121	23.9
10/24/2019	66	6.0	6.91	7.59	146.8	15.0	186.7	121	23.7
10/24/2019	66	6.0	6.91	7.59	146.8	15.0	186.7	121	23.7
10/24/2019	66	7.1	6.89	7.58	148.1	15.0	186.8	121	24.0
10/24/2019	66	7.1	6.89	7.58	148.1	15.0	186.8	121	24.0
10/24/2019	66	8.2	6.88	7.56	150.6	15.0	186.7	121	23.0
10/24/2019	66	8.2	6.88	7.56	150.6	15.0	186.7	121	23.0
10/24/2019	66	9.0	6.88	7.57	151.2	15.0	186.7	121	24.3
10/24/2019	66	9.0	6.88	7.57	151.2	15.0	186.7	121	24.3
10/24/2019	66	10.0	6.87	7.57	152.6	15.0	186.7	121	24.5
10/24/2019	66	10.0	6.87	7.57	152.6	15.0	186.7	121	24.5
10/24/2019	66	10.9	6.86	7.56	153.2	15.0	186.7	121	24.2
10/24/2019	66	10.9	6.86	7.56	153.2	15.0	186.7	121	24.2
10/24/2019	77	0.2	6.90	7.73	165.9	14.9	184.7	120	28.4
10/24/2019	77	0.2	6.90	7.73	165.9	14.9	184.7	120	28.4
10/24/2019	77	1.1	6.86	7.68	167.2	14.9	184.9	120	29.5
10/24/2019	77	1.1	6.86	7.68	167.2	14.9	184.9	120	29.5
10/24/2019	77	2.1	6.84	7.68	165.4	14.9	185.0	120	29.7
10/24/2019	77	2.1	6.84	7.68	165.4	14.9	185.0	120	29.7
10/24/2019	77	3.1	6.84	7.69	164.7	14.9	184.9	120	28.5
10/24/2019	77	3.1	6.84	7.69	164.7	14.9	184.9	120	28.5
10/24/2019	77	4.0	6.84	7.73	161.7	14.9	185.0	120	28.5
10/24/2019	77	4.0	6.84	7.73	161.7	14.9	185.0	120	28.5
10/24/2019	77	5.1	6.83	7.72	162.3	14.9	184.9	120	27.6
10/24/2019	77	5.1	6.83	7.72	162.3	14.9	184.9	120	27.6
10/24/2019	77	6.1	6.82	7.68	165.3	14.9	184.9	120	28.0
10/24/2019	77	6.1	6.82	7.68	165.3	14.9	184.9	120	28.0
10/24/2019	77	7.1	6.82	7.63	168.0	14.9	184.9	120	30.0
10/24/2019	77	7.1	6.82	7.63	168.0	14.9	184.9	120	30.0
10/24/2019	77	7.9	6.81	7.63	169.1	14.9	185.0	120	32.5
10/24/2019	77	7.9	6.81	7.63	169.1	14.9	185.0	120	32.5
10/24/2019	77	9.1	6.81	7.65	168.9	14.9	185.0	120	29.5
10/24/2019	77	9.1	6.81	7.65	168.9	14.9	185.0	120	29.5
10/24/2019	77	10.1	6.81	7.62	171.1	14.9	185.0	120	30.5
10/24/2019	77	10.1	6.81	7.62	171.1	14.9	185.0	120	30.5
10/24/2019	77	11.0	6.79	7.60	173.4	14.9	185.2	120	29.0
10/24/2019	77	11.0	6.79	7.60	173.4	14.9	185.2	120	29.0
10/24/2019	BJ MAR	1.0	6.63	7.57	154.9	15.8	175.2	114	7.4
10/24/2019	BJ MAR	1.0	6.63	7.57	154.9	15.8	175.2	114	7.4
10/24/2019	BJ MAR	2.4	6.58	7.56	155.5	15.8	175.3	114	7.7

Date	Site	Depth (m)	DO (mg/L)	pH	ORP (mV)	Temp (°C)	Sp Cond (µS/cm)	TDS (mg/L)	Turbidity (FNU)
10/24/2019	BJ MAR	2.4	6.58	7.56	155.5	15.8	175.3	114	7.7
10/24/2019	BJ MAR	5.0	6.53	7.56	152.3	15.8	175.3	114	8.5
10/24/2019	BJ MAR	5.0	6.53	7.56	152.3	15.8	175.3	114	8.5
10/24/2019	IC MAR	1.1	7.43	7.40	145.2	15.3	183.3	119	11.3
10/24/2019	IC MAR	1.1	7.43	7.40	145.2	15.3	183.3	119	11.3
10/24/2019	IC MAR	3.5	7.38	7.29	144.0	15.3	183.3	119	11.2
10/24/2019	IC MAR	3.5	7.38	7.29	144.0	15.3	183.3	119	11.2
10/24/2019	IC MAR	7.5	7.56	7.33	133.4	15.2	182.8	119	11.8
10/24/2019	IC MAR	7.5	7.56	7.33	133.4	15.2	182.8	119	11.8

APPENDIX B: LABORATORY DATA

ARDL Inc.
Environmental | Analytical | Management | Safety

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Customer Name: SLCOE **Date: 5/3/19**

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

Samples Received at ARDL: 4/4/19 **ARDL Report No.: 8469**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	4/02/19	8469-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	4/03/19	8469-02	NP Pesticides, Metals(1), Inorganics(2)
MTL-13	4/03/19	8469-03	NP Pesticides, Metals(1), Inorganics(2)
MTL-9	4/03/19	8469-04	NP Pesticides, Metals(1), Inorganics(2)
MTL-11	4/02/19	8469-05	NP Pesticides, Metals(1), Inorganics(2)
MTL-12	4/02/19	8469-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	4/02/19	8469-07	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-22-0	4/02/19	8469-08	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-22-15	4/02/19	8469-09	Metals(1), Inorganics(2)
MTL-33-0	4/02/19	8469-10	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-66-0	4/02/19	8469-11	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-77-0	4/02/19	8469-12	NP Pesticides, Metals(1), Inorganics(2)(3)

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

Mislabeling noted on the chain of custody between samples MTL-33 and MTL-77 was corrected at sample log-in.

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.

CONTINUING CALIBRATION

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

MATRIX SPIKE

The matrix spike and matrix spike duplicate met recovery criteria.

DUPLICATE

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

INTERNAL STANDARD

All internal standard criteria were met.

SURROGATE

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 within acceptable limits.

LABORATORY CONTROL SAMPLE

Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE

Percent recovery of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for iron and total phosphorus.

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, with the exception of chlorophyll-a and pheophytin-a, which was within ± the reporting limit and therefore acceptable.

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.

CASE NARRATIVE (Continued)

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 8469

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

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410905
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1252	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	69%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-01
Field ID: MTL-1
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1252

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	2.38	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
(a) Manganese	0.00400	0.00500		0.0609	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
Ammonia Nitrogen	0.0200	0.0300		0.0538	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.82	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100	J	0.328	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.299	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	1.33	1.33		7.73	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.50	1.0		6.2	MG/L	NONE	415.1	NA	04/19/19	04304502

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410908
Sample Date:	04/03/2019	Received Date:	04/04/2019
Sample Time:	0852	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	61%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008469-02 Sampling Loc'n: MARK TWAIN LAKE Matrix: WATER
Field ID: MTL-5 Sampling Date: 04/03/2019 Moisture: NA
Received: 04/04/2019 Sampling Time: 0852

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.062	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.736	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		0.477	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.131	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	2.70	2.70		39.2	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	2.70	2.70		4.59	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.50	1.0		7.4	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410909
Sample Date:	04/03/2019	Received Date:	04/04/2019
Sample Time:	0820	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	73%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-03
Field ID: MTL-13
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/03/2019
Sampling Time: 0820

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		0.0796	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.588	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		0.342	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.0921	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	2.0	2.00		37.8	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	2.0	2.00		4.4	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		6.9	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410910
Sample Date:	04/03/2019	Received Date:	04/04/2019
Sample Time:	0756	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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		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	59%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-04
Field ID: MTL-9
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/03/2019
Sampling Time: 0756

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		0.17	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.646	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		0.626	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.11	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	7.94	7.94		117	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	7.94	7.94		11.9	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		7.8	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410911
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1640	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	60%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008469-05 Sampling Loc'n: MARK TWAIN LAKE Matrix: WATER
Field ID: MTL-11 Sampling Date: 04/02/2019 Moisture: NA
Received: 04/04/2019 Sampling Time: 1640

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.108	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.644	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		1.47	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.116	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	17.2	17.2		409	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	17.2	17.2		32.8	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410912
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1200	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-06
Field ID: MTL-12
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1200

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		2.35	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
(a) Manganese	0.00400	0.00500		0.0654	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
Ammonia Nitrogen	0.0200	0.0300		0.116	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		1.03	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		0.408	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.262	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	1.67	1.67		10.5	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	1.67	1.67		ND	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410913
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1540	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	81%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-07
Field ID: MTL-15-0
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1540

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		0.481	MG/L	NONE	350.1	NA	04/08/19	04114463
Chlorophyll-a, Correcte	1.0	1.00		5.4	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.642	MG/L	NONE	GREEN	NA	04/12/19	04154479
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Phosphorus	0.00800	0.0100		1.4	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.327	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	4.0	4.00		28.0	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410914
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1330	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	64%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-08
Field ID: MTL-22-0
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1330

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		0.0414	MG/L	NONE	350.1	NA	04/08/19	04114463
Chlorophyll-a, Correcte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.718	MG/L	NONE	GREEN	NA	04/12/19	04154479
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Phosphorus	0.00800	0.0100		0.31	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.171	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	1.33	1.33		5.47	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		5.7	MG/L	NONE	415.1	NA	04/19/19	04304502

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-09
Field ID: MTL-22-15
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1335

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		2.16	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
(a) Manganese	0.00400	0.00500		0.0656	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	04/08/19	04114463
Nitrate as Nitrogen	0.0190	0.0200		0.988	MG/L	NONE	GREEN	NA	04/12/19	04154479
Phosphorus	0.00800	0.0100		0.324	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.173	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	1.33	1.33		6.4	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		5.8	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410915
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1405	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	0.350		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	ND		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	69%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-10
Field ID: MTL-33-0
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1405

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		0.0923	MG/L	NONE	350.1	NA	04/08/19	04114463
Chlorophyll-a, Correcte	1.0	1.00		2.7	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.759	MG/L	NONE	GREEN	NA	04/12/19	04154479
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Phosphorus	0.00800	0.0100		0.496	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.309	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	2.0	2.00		17.2	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	2.0	2.00		2.2	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		6.9	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410916
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1515	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	ND		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	ND		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	55%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-11
Field ID: MTL-66-0
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1515

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		0.494	MG/L	NONE	350.1	NA	04/08/19	04114463
Chlorophyll-a, Correcte	1.0	1.00		5.6	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.62	MG/L	NONE	GREEN	NA	04/12/19	04154479
Pheophytin-a	1.0	1.00		1.1	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Phosphorus	0.00800	0.0100		0.598	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.34	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	2.0	2.00		26.6	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	2.0	2.00		3.2	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008469 Report Date: 04/11/2019

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.:	008469-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0410917
Sample Date:	04/02/2019	Received Date:	04/04/2019
Sample Time:	1545	Prep. Date:	04/08/2019
Matrix:	WATER	Analysis Date:	04/10/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	ND		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	ND		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	62%

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: 008469 Report Date: 05/01/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008469-12
Field ID: MTL-77-0
Received: 04/04/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 04/02/2019
Sampling Time: 1545

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		0.63	MG/L	NONE	350.1	NA	04/08/19	04114463
Chlorophyll-a, Correcte	1.0	1.00		2.0	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.514	MG/L	NONE	GREEN	NA	04/12/19	04154479
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468
Phosphorus	0.00800	0.0100		0.724	MG/L	365.2	365.2	04/08/19	04/09/19	04114464
Phosphorus, -ortho	0.00800	0.0100		0.476	MG/L	NONE	365.2	NA	04/04/19	04084456
Solids, Total Suspended	2.50	2.50		22.5	MG/L	NONE	160.2	NA	04/04/19	04124470
Solids, Volatile Suspen	2.50	2.50		2.75	MG/L	NONE	160.4	NA	04/04/19	04124471
Total Organic Carbon	0.500	1.00		6.6	MG/L	NONE	415.1	NA	04/19/19	04304502

(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: 008469 Report Date: 04/11/2019

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.:	008469-01B1
Desc/Location:	NA	Lab Filename:	E0410903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	04/08/2019
Matrix:	QC Material	Analysis Date:	04/10/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11037
% 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	95%

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: 008469 Report Date: 05/01/2019

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	04/10/19	04/10/19	P7190	008468-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	04/10/19	04/10/19	P7190	008468-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	04/08/19	04114463	008469-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468	008469-11B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	04/12/19	04154479	008469-02B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19	04114468	008469-11B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	04/08/19	04/09/19	04114464	008469-01B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	04/04/19	04084456	008469-07B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	04/04/19	04124470	008469-12B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	04/04/19	04124471	008469-12B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	04/19/19	04304502	008469-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008469

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008469 Report Date: 04/11/2019

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

Matrix: QC Material QC Batch: B11037 Prep. Date: 04/08/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 04/10/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	2.44	4	61	--	--	--	30-130	--	--
Atrazine	2.97	4	74	--	--	--	30-130	--	--
Metribuzin	3.11	4	78	--	--	--	30-130	--	--
Alachlor	3.15	4	79	--	--	--	30-130	--	--
Metolachlor	3.36	4	84	--	--	--	30-130	--	--
Chlorpyrifos	2.95	4	74	--	--	--	30-130	--	--
Cyanazine	3.67	4	92	--	--	--	30-130	--	--
Pendimethalin	3.27	4	82	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	82.5	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008469-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008469

Report Date: 05/01/2019

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	4.8	5.0	95	--	--	--	87-115	--	P7190	008468-01C1
(a) Manganese	0.75	0.75	100	--	--	--	90-114	--	P7190	008468-01C1
Ammonia Nitrogen	0.91	1.0	91	--	--	--	80-120	--	04114463	008469-01C1
Nitrate as Nitrogen	1.0	1.0	103	--	--	--	80-120	--	04154479	008469-02C1
Phosphorus	0.63	0.67	95	--	--	--	80-120	--	04114464	008469-01C1
Phosphorus, -ortho	0.10	0.10	103	--	--	--	80-120	--	04084456	008469-07C1
Total Organic Carbon	19.4	20.0	97	19.4	20.0	97	80-120	97	04304502	008469-01C1

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

(a) DOD and/or NELAC Accredited Analyte

Inorganic LCS Results for 008469

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008469 Report Date: 04/11/2019

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

Field ID: MTL-1 Prep. Date: 04/08/2019 ARDL Lab No.: 008469-01
Desc/Location: MARK TWAIN LAKE Amount Used: 900 mL Lab Filename:
Sample Date: 04/02/2019 % Moisture: NA Received Date: 04/04/2019
Sample Time: 1252 QC Batch: B11037 Analysis Date: 04/10/2019
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	2.6	4.44	58.5	2.51	4.44	56.5	30-130	3.5	30
Atrazine	ND	3.03	4.44	68.3	2.96	4.44	66.5	30-130	2.6	30
Metribuzin	ND	3.12	4.44	70.3	3.06	4.44	68.8	30-130	2.2	30
Alachlor	ND	2.99	4.44	67.3	2.99	4.44	67.3	30-130	0	30
Metolachlor	ND	3.21	4.44	72.3	3.18	4.44	71.5	30-130	1	30
Chlorpyrifos	ND	2.69	4.44	60.5	2.66	4.44	59.8	30-130	1.2	30
Cyanazine	ND	3.7	4.44	83.3	3.6	4.44	81	30-130	2.7	30
Pendimethalin	ND	2.89	4.44	65	2.83	4.44	63.8	30-130	1.9	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	67	66	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008469-01, 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: 008469

Report Date: 05/01/2019

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	2.4	3.6	1.0	125 *	3.4	1.0	102	87-115	6	20	P7190	008469-01MS
(a) Manganese	WATER	0.061	0.58	0.50	103	0.58	0.50	105	90-114	1	20	P7190	008469-01MS
Ammonia Nitrogen	WATER	0.054	2.3	2.0	110	2.2	2.0	106	75-125	4	20	04114463	008469-01MS
Nitrate as Nitrogen	WATER	0.74	1.6	1.0	90	1.7	1.0	97	75-125	4	20	04154479	008469-02MS
Phosphorus	WATER	0.33	1.6	0.83	150 *	1.4	0.83	125	75-125	14	20	04114464	008469-01MS
Phosphorus, -ortho	WATER	0.33	0.42	0.10	91	0.43	0.10	99	75-125	2	20	04084456	008469-07MS

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 008469

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008469 Report Date: 05/01/2019

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	5.6	4.5	--	MG/CU.M.	22*	--	04114468	008469-11D1
Pheophytin-a	1.1	2.2	--	MG/CU.M.	67*	--	04114468	008469-11D1
Solids, Total Suspended	22.5	21.5	--	MG/L	5	--	04124470	008469-12D1
Solids, Volatile Suspend	2.8	2.5	--	MG/L	10	--	04124471	008469-12D1

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions.
(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008469

[redacted]

Sample Receipt Information

Including as appropriate:

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

8469

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) Greeling and Schepker

SAMPLE NUMBER	DATE 2019	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	*TOC, T-PO4	O-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	4-2	1252		X		X		X	X	X	X	X		X						X	
MTL-5	4-3	0852		X		X		X	X	X	X									X	
MTL-13	4-3	0820		X		X		X	X	X	X									X	
MTL-9	4-3	0756		X		X		X	X	X	X									X	
MTL-11	4-2	1640		X		X		X	X	X	X									X	
MTL-12	4-2	1200		X		X		X	X	X	X	X								X	
MTL-15-0	4-2	1540		X		X	X	X	X	X	X									X	
MTL-22-0	4-2	1330		X		X	X	X	X	X	X									X	
MTL-22-15	4-2	1335		X		X		X	X	X		X								X	
MTL-33-0	4-2	1405		X		X	X	X	X	X	X									X	
MTL-66-0	4-2	1515		X		X	X	X	X	X	X									X	
MTL-77-0	4-2	1545		X		X	X	X	X	X	X									X	

	Date	Time		
Relinquished by: (Signature)	4-3	1200	Received by: (Signature)	
Relinquished by: (Signature)	4/3/19	2005	Received by: (Signature)	
Received for Laboratory by: (Signature)	4/4/19	0530	Shipping Ticket No.	

REMARKS/SPECIAL INSTRUCTIONS:
*Preserved with H_2SO_4
#Preserved with HNO_3
For Report Bottles labeled MTL-33 are from site MTL-77 & vice versa.
BG 1430 4/3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

DSD 5/6/19

ARDL #: 8469

Cooler # 1 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake

Date Received: 4-3-19 by RKD

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 4-4-19 (Signature) DS Cochrum

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

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

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? ..... 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. 0.3 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 4-4-19 (Signature) DS Cochrum

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 #: Walkin	Area #:
By: dlc	By:
On: 4-4-19	On:

Chain-of-Custody # N/A

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8469

Cooler # 2 of 3

Number of Coolers in Shipment: 3

Project: MARK TWAIN LAKE

Date Received: 4-3-19 by RKD

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 4-4-19 (Signature) DK Cochrum

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

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

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? ..... 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
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 4-4-19 (Signature) DK Cochrum

10. Describe type of packing in cooler: bubble 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 #: Walkin	Area #:
By: dlc	By:
On: 4-4-19	On:

Chain-of-Custody # N/A

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8469 Cooler # 3 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 4-3-19 by RKB

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 4-4-19 (Signature) DSLachenmeier

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

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

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? ..... 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. 0.7 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 4-4-19 (Signature) DSLachenmeier

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 #: Walkin	Area #
By: dlc	By
On: 4-4-19	On

Chain-of-Custody # N/A

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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: 7/9/19**

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

Samples Received at ARDL: 5/30/19 **ARDL Report No.: 8481**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	5/29/19	8481-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	5/29/19	8481-02	NP Pesticides, Inorganics(2)
MTL-13	5/29/19	8481-03	NP Pesticides, Inorganics(2)
MTL-9	5/29/19	8481-04	NP Pesticides, Inorganics(2)
MTL-11	5/29/19	8481-05	NP Pesticides, Inorganics(2)
MTL-12	5/29/19	8481-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	5/29/19	8481-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	5/29/19	8481-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	5/29/19	8481-09	Metals(1), Inorganics(2)
MTL-33-0	5/29/19	8481-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	5/29/19	8481-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	5/29/19	8481-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	5/29/19	8481-13	E. Coli
BJ MARINA	5/29/19	8481-14	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.

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

PREPARATION BLANK
The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE
The LCS analyses met recovery criteria.

MATRIX SPIKE
Atrazine recovery was outside limits (30-130%) in the MS at 18.5% All other parameters met recovery criteria.

CASE NARRATIVE (Continued)

DUPLICATE
Duplicate analyses are reported as MS/MSD. The following parameters exceed the 30% RPD limit: Atrazine at 43.6%; Metribuzin at 46.4%; and Cyanazine at 43.6%. RPD of all other duplicate analyses met criteria.

INTERNAL STANDARD
All internal standard criteria were met.

SURROGATE
All surrogate recovery criteria were met.

INORGANIC FRACTION

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

Nitrate analysis was performed slightly outside holding time due to instrumentation repairs. These results have been flagged appropriately.

PREPARATION BLANK
Results of the preparation blanks were within acceptable limits.

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

MATRIX SPIKE
Percent recovery of all matrix spikes and matrix spike duplicates.

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, with the exception of chlorophyll-a, which was within ± the reporting limit and therefore acceptable. RPD on all duplicate analyses were within control limits.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates compound was analyzed for but not detected.

X - Sample preparation and/or analysis was performed outside of holding time requirements.

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 for

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 8481

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604905
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1336	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.41		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	0.630		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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-01
Field ID: MTL-1
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1336

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		3.60	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
(a) Manganese	0.00400	0.00500		0.0577	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
Ammonia Nitrogen	0.0200	0.0300		0.058	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	1.11	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.335	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.166	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	1.33	1.33		5.73	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-01, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604908
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1245	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	5.66		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	1.00		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	55%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-02
Field ID: MTL-5
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1245

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		0.181	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	0.863	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.687	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.306	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	6.67	6.67		78.0	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	6.67	6.67		10.7	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-02, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604909
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1200	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.93		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	0.725		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	55%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-03
Field ID: MTL-13
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
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		0.157	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	0.833	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		1.3	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.184	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	33.3	33.3		1060	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	33.3	33.3		96.7	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		9.3	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604910
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1124	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.21		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	0.711		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	55%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-04
Field ID: MTL-9
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1124

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		0.135	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	0.446	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.0160	0.0200		0.888	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.104	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	33.3	33.3		480	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	33.3	33.3		43.3	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		8.3	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-04, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604911
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1040	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	0.333		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	0.478		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	48%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-05
Field ID: MTL-11
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1040

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	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	0.211	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.683	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.148	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	20.0	20.0		242	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	20.0	20.0		26.0	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-05, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604912
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	0928	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.59		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	0.775		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	65%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-06
Field ID: MTL-12
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 0928

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		5.47	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
(a) Manganese	0.00400	0.00500		0.112	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
Ammonia Nitrogen	0.0200	0.0300		0.134	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	1.02	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.383	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.153	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	6.67	6.67		70.0	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	6.67	6.67		7.33	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.4	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-06, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604913
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1105	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	2.85		UG/L	1
Metribuzin	0.200	0.200	0.240		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	1.68		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	66%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-07
Field ID: MTL-15-0
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1105

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		0.108	MG/L	NONE	350.1	NA	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.4	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Nitrate as Nitrogen	0.019	0.020	X	0.883	MG/L	NONE	GREEN	NA	07/01/19	07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Phosphorus	0.00800	0.0100		0.461	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.143	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	4.0	4.00		31.2	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		7.1	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604914
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1418	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.71		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	0.811		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	56%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-08
Field ID: MTL-22-0
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1418

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		0.0887	MG/L	NONE	350.1	NA	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.8	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Nitrate as Nitrogen	0.019	0.020	X	1.06	MG/L	NONE	GREEN	NA	07/01/19	07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Phosphorus	0.00800	0.0100		0.379	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.189	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	1.33	1.33		5.2	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-09
Field ID: MTL-22-15
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1418

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		3.71	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
(a) Manganese	0.00400	0.00500		0.0811	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
Ammonia Nitrogen	0.0200	0.0300		0.0437	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	X	1.16	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.383	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.197	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	1.33	1.33		12.3	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	1.33	1.33		1.87	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.2	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-09, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604915
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1315	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	2.08		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	1.04		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	66%

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: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-10
Field ID: MTL-33-0
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
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		0.0393	MG/L	NONE	350.1	NA	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.8	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Nitrate as Nitrogen	0.019	0.020	X	1.01	MG/L	NONE	GREEN	NA	07/01/19	07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Phosphorus	0.00800	0.0100		0.353	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.195	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	1.33	1.33		7.2	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.4	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-10, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604916
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1045	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	2.74		UG/L	1
Metribuzin	0.222	0.222	0.233		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	1.63		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.

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-11
Field ID: MTL-66-0
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1045

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		0.0813	MG/L	NONE	350.1	NA	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.7	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Nitrate as Nitrogen	0.019	0.020	X	0.865	MG/L	NONE	GREEN	NA	07/01/19	07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Phosphorus	0.00800	0.0100		0.409	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.156	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	1.33	1.33		25.6	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	1.33	1.33		3.07	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.6	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-11, Inorganic Analyses

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

Lab Report No: 008481 Report Date: 06/06/2019

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.:	008481-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0604917
Sample Date:	05/29/2019	Received Date:	05/29/2019
Sample Time:	1025	Prep. Date:	06/03/2019
Matrix:	WATER	Analysis Date:	06/04/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	1.52		UG/L	1
Metribuzin	0.200	0.200	0.200		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	1.36		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.

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

Lab Report No: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-12
Field ID: MTL-77-0
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1025

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	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		3.0	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Nitrate as Nitrogen	0.019	0.020	X	0.595	MG/L	NONE	GREEN	NA	07/01/19	07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617
Phosphorus	0.00800	0.0100		0.526	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.125	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	6.67	6.67		76.0	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	6.67	6.67		8.67	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		6.6	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-13
Field ID: IC MARINA
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1127

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		350	COL/100 ML	NONE	1604	NA	05/29/19	06034603

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008481 Report Date: 07/09/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008481-14
Field ID: BJ MARINA
Received: 05/29/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 05/29/2019
Sampling Time: 1259

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		550	COL/100 ML	NONE	1604	NA	05/29/19	06034603

(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: 008481 Report Date: 06/06/2019

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.:	008481-01B1
Desc/Location:	NA	Lab Filename:	E0604903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	06/03/2019
Matrix:	QC Material	Analysis Date:	06/04/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11057
% 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	68%

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: 008481 Report Date: 07/09/2019

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	06/06/19	06/12/19	P7210	008481-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	06/06/19	06/12/19	P7210	008481-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	06/03/19	06054619	008481-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617	008481-11B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	05/29/19	06034603	008481-13B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	07/01/19	07084677	008481-01B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19	06054617	008481-11B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	06/10/19	06/11/19	06134638	008481-04B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	05/30/19	06054618	008481-02B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	06/03/19	06054623	008481-06B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	06/03/19	06054624	008481-06B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	06/10/19	06174645	008481-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008481

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008481 Report Date: 06/06/2019

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

Matrix: QC Material QC Batch: B11057 Prep. Date: 06/03/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 06/04/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	2.59	4	65	--	--	--	30-130	--	--
Atrazine	2.24	4	56	--	--	--	30-130	--	--
Metribuzin	2.37	4	59	--	--	--	30-130	--	--
Alachlor	2.18	4	55	--	--	--	30-130	--	--
Metolachlor	2.57	4	64	--	--	--	30-130	--	--
Chlorpyrifos	2.28	4	57	--	--	--	30-130	--	--
Cyanazine	2.83	4	71	--	--	--	30-130	--	--
Pendimethalin	2.69	4	67	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	66.3	--	30-130

(a) DOD-QSM Accredited Analyte.
'*' indicates a recovery outside of standard limits.
Spike Blanks for 008481-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008481

Report Date: 07/09/2019

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	5.1	5.0	102	--	--	--	87-115	--	P7210	008481-01C1
(a) Manganese	0.80	0.75	106	--	--	--	90-114	--	P7210	008481-01C1
Ammonia Nitrogen	0.94	1.0	94	--	--	--	80-120	--	06054619	008481-01C1
Nitrate as Nitrogen	1.0	1.0	100	--	--	--	80-120	--	07084677	008481-01C1
Phosphorus	0.65	0.67	97	--	--	--	80-120	--	06134638	008481-04C1
Phosphorus, -ortho	0.099	0.10	99	--	--	--	80-120	--	06054618	008481-02C1
Total Organic Carbon	9.0	10.0	90	--	--	--	76-120	--	06174645	008481-01C1

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

(a) DOD and/or NELAC Accredited Analyte

Inorganic LCS Results for 008481

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008481 Report Date: 06/06/2019

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

Field ID: MTL-1 Prep. Date: 06/03/2019 ARDL Lab No.: 008481-01
Desc/Location: MARK TWAIN LAKE Amount Used: 1000 mL Lab Filename:
Sample Date: 05/29/2019 % Moisture: NA Received Date: 05/29/2019
Sample Time: 1336 QC Batch: B11057 Analysis Date: 06/04/2019
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	1.75	4	43.8	2.09	4	52.3	30-130	17.7	30
Atrazine	1.41	2.15	4	18.5 *	3.35	4	48.5	30-130	43.6 *	30
Metribuzin	ND	1.39	4	34.8	2.23	4	55.8	30-130	46.4 *	30
Alachlor	ND	1.37	4	34.3	1.79	4	44.8	30-130	26.6	30
Metolachlor	0.630	2.04	4	35.3	2.67	4	51	30-130	26.8	30
Chlorpyrifos	ND	1.54	4	38.5	1.84	4	46	30-130	17.8	30
Cyanazine	ND	1.65	4	41.3	2.57	4	64.3	30-130	43.6 *	30
Pendimethalin	ND	1.78	4	44.5	2.12	4	53	30-130	17.4	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	45	54	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008481-01, 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: 008481

Report Date: 07/09/2019

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	3.6	4.6	1.0	96	4.6	1.0	95	87-115	0	20	P7210	008481-01MS
(a) Manganese	WATER	0.058	0.58	0.50	105	0.58	0.50	105	90-114	0	20	P7210	008481-01MS
Ammonia Nitrogen	WATER	0.058	2.2	2.0	109	2.2	2.0	106	75-125	3	20	06054619	008481-01MS
Nitrate as Nitrogen	WATER	1.1	2.0	1.0	85	1.9	1.0	84	75-125	1	20	07084677	008481-01MS
Phosphorus	WATER	0.89	1.8	0.83	115	1.9	0.83	118	75-125	1	20	06134638	008481-04MS
Phosphorus, -ortho	WATER	0.31	0.42	0.10	110	0.42	0.10	118	75-125	2	20	06054618	008481-02MS
Total Organic Carbon	WATER	6.0	10.4	5.0	88	10.8	5.0	96	76-120	4	20	06174645	008481-01MS

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 008481

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008481 Report Date: 07/09/2019

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	1.7	1.1	--	MG/CU.M.	43*	--	06054617	008481-11D1
Pheophytin-a	ND	0	--	MG/CU.M.	NC	--	06054617	008481-11D1
Solids, Total Suspended	70.0	68.0	--	MG/L	3	--	06054623	008481-06D1
Solids, Volatile Suspend	7.3	7.3	--	MG/L	0	--	06054624	008481-06D1

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions.
(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008481

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8481

ARDL, Inc.

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

8481

CHAIN OF CUSTODY RECORD

PROJECT: Mark Twain Lake

SAMPLERS: (Signature) Rodgers Greeling Archeski

SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	*TOC, T-PO4	O-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	5/29/19	1336		X		X		X	X	X	X	X		X		X	
MTL-5	5/29/19	1245		X		X		X	X	X	X					X	
MTL-13	5/29/19	1200		X		X		X	X	X	X					X	
MTL-9	5/29/19	1124		X		X		X	X	X	X					X	
MTL-11	5/29/19	1040		X		X		X	X	X	X					X	
MTL-12	5/29/19	0928		X		X		X	X	X	X	X				X	
MTL-15-0	5/29/19	1105		X		X	X	X	X	X	X					X	
MTL-22-0	5/29/19	1418		X		X	X	X	X	X	X					X	
MTL-22-15	5/29/19	1418		X		X		X	X	X		X				X	
MTL-33-0	5/29/19	1315		X		X	X	X	X	X	X					X	
MTL-66-0	5/29/19	1045		X		X	X	X	X	X	X					X	
MTL-77-0	5/29/19	1025		X		X	X	X	X	X	X					X	
IC MARINA	5/29/19	1127		X									X			X	
BJ MARINA	5/29/19	1259		X									X			X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	5/29/19	1739	[signature]
Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	~~5/29/19~~	~~1739~~	[signature] 5/29/19 @ 1855
Received for Laboratory by: (Signature)	Date	Time	Shipping Ticket No.
[signature]	5/30/19	0545	

dlc 5/30/19

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8481 Cooler # 3 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 5-29-19 key drop

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 5-29-19 (Signature) DLCafferty

1. Did cooler come with a shipping slip (airbill, etc.)? dlc 5/30/19 (YES) NO
   If YES, enter carrier name and airbill number here: Courier
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? 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. 1.9 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 5-30-19 (Signature) DLCashman

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 #: Walker	Area #:
By: dlc	By:
On: 5-30-19	On:

Chain-of-Custody # N/A

M:\ADMIN\FORMS\COOLER RECEIPT REPORT.doc Rev. 02/22/17

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8481

Cooler # 1 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake

Date Received: 5-29-19 Fed Ex

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 5-29-19 (Signature) dlc for Jgp

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

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

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? ..... 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
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 5-30-19 (Signature) DL Cochrum

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 #: Walkin	Area #:
By: dlc	By:
On: 5/30/19	On:

Chain-of-Custody # N/A

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8481

Cooler # 2 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake

Date Received: 5-29-19 Lap vaj

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 5-29-19 (Signature) dlo for Jsp

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

   If YES, enter carrier name and airbill number here: Couriers

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? ..... 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: 5-30-19 (Signature) DHackum

10. Describe type of packing in cooler: bags, 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 #: Walker	Area #:
By: dlo	By:
On: 5-30-19	On:

Chain-of-Custody # N/A

M:\ADMIN\FORMS\COOLER RECEIPT REPORT.doc Rev. 02/22/17

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: 9/23/19**

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

Samples Received at ARDL: 8/28/19 **ARDL Report No.: 8513**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	8/28/19	8513-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	8/28/19	8513-02	NP Pesticides, Inorganics(2)
MTL-13	8/28/19	8513-03	NP Pesticides, Inorganics(2)
MTL-9	8/28/19	8513-04	NP Pesticides, Inorganics(2)
MTL-11	8/28/19	8513-05	NP Pesticides, Inorganics(2)
MTL-12	8/28/19	8513-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	8/28/19	8513-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	8/28/19	8513-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	8/28/19	8513-09	Metals(1), Inorganics(2)
MTL-33-0	8/28/19	8513-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	8/28/19	8513-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	8/28/19	8513-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	8/28/19	8513-13	E. Coli
BJ MARINA	8/28/19	8513-14	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.

CONTINUING CALIBRATION
The continuing calibration verification (CCV) passed criteria for all analytes. The closing 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 STANDARD
All internal standard criteria were met.

SURROGATE
All surrogate recovery criteria were met.

INORGANIC FRACTION

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

Nitrate was analyzed by Ion Chromatography using Method 300.0 due to instrument status. Samples were analyzed within holding times.

PREPARATION BLANK
Results of the preparation blanks were within acceptable limits.

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

MATRIX SPIKE
Percent recovery of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for iron and manganese.

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, except pheophytin-a, however the results were within ± detection limit, therefore acceptable.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates compound 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

[redacted]

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 8513

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917905
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.520		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	2.09		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	90%

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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-01
Field ID: MTL-1
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1512

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	0.401	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
(a) Manganese	0.00400	0.00500	J	0.0860	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
Ammonia Nitrogen	0.0200	0.0300	J	0.024	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.0858	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100	J	0.0095	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		5.2	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917908
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	ND		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	ND		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	71%

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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-02
Field ID: MTL-5
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1152

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		0.101	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.583	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.199	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	6.67	6.67		39.3	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	6.67	6.67		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.5	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-02, Inorganic Analyses

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917909
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	ND		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	ND		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	74%

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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-03
Field ID: MTL-13
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1235

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		0.0804	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.54	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.181	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	6.67	6.67		77.3	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	6.67	6.67		10.0	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		7.1	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917910
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	ND		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	0.420		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	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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-04
Field ID: MTL-9
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1318

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		0.101	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		1.04	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0899	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	6.67	6.67		213	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	6.67	6.67		20.0	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.7	0MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917911
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.467		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.

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-05
Field ID: MTL-11
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1406

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		0.161	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.562	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0847	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	10.0	10.0		119	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	10.0	10.0		15.0	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.4	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917912
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.430		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	1.70		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	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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-06
Field ID: MTL-12
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1605

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		0.566	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
(a) Manganese	0.00400	0.00500		0.152	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
Ammonia Nitrogen	0.0200	0.0300		0.0433	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.125	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0199	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		14.4	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		5.2	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-06, Inorganic Analyses

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917913
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.500		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	1.42		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	86%

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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-07
Field ID: MTL-15-0
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
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		0.0459	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		7.4	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.129	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0277	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		6.4	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	09/09/19	09174894

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Sample 008513-07, Inorganic Analyses

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917914
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.510		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	2.09		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	88%

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

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-08
Field ID: MTL-22-0
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1345

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		0.0759	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		28.1	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		1.7	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.0642	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100	J	0.0095	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	2.50	2.50		5.0	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	2.50	2.50		2.75	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	09/09/19	09174894

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-09
Field ID: MTL-22-15
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1345

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		2.84	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
(a) Manganese	0.00400	0.00500		0.547	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
Ammonia Nitrogen	0.0200	0.0300		0.193	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Phosphorus	0.00800	0.0100		0.389	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.144	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		21.2	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.5	MG/L	NONE	415.1	NA	09/09/19	09174894

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917915
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.510		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	2.01		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	83%

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

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-10
Field ID: MTL-33-0
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1307

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		0.0415	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		43.6	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		2.8	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.0772	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0406	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		6.0	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	09/09/19	09174894

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917916
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.470		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	1.29		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	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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-11
Field ID: MTL-66-0
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1215

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		0.0557	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		10.0	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.125	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0277	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		8.0	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		5.9	MG/L	NONE	415.1	NA	09/09/19	09174894

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E0917917
Sample Date:	08/28/2019	Received Date:	08/28/2019
Sample Time:	1512	Prep. Date:	08/30/2019
Matrix:	WATER	Analysis Date:	09/17/2019
Amount Used:	800 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	0.613		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	2.04		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	80%

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: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-12
Field ID: MTL-77-0
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1152

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		0.0867	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		22.7	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		1.5	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.107	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.0251	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	4.0	4.00		9.2	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	09/10/19	09174895

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Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-13
Field ID: IC MARINA
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1135

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		37.0	COL/100 ML	NONE	1604	NA	08/28/19	09054854

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Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/23/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008513-14
Field ID: BJ MARINA
Received: 08/28/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 08/28/2019
Sampling Time: 1250

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		32.0	COL/100 ML	NONE	1604	NA	08/28/19	09054854

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METHOD BLANK REPORT

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

Lab Report No: 008513 Report Date: 09/18/2019

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.:	008513-01B1
Desc/Location:	NA	Lab Filename:	E0917903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	08/30/2019
Matrix:	QC Material	Analysis Date:	09/17/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11092
% 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	85%

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: 008513 Report Date: 09/23/2019

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	09/05/19	09/12/19	P7262	008513-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	09/05/19	09/12/19	P7262	008513-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	09/03/19	09054855	008513-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882	008513-08B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	08/28/19	09054854	008513-13B1
Nitrate as Nitrogen	0.80	1.0	ND	MG/L	NONE	300.0	NA	08/29/19	09054856	008513-01B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882	008513-08B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	09/12/19	09/13/19	09174893	008515-01B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	08/29/19	09034844	008513-01B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	09/03/19	09054849	008513-03B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	09/03/19	09054850	008513-03B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/09/19	09174894	008513-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/10/19	09174895	008513-12B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008513

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008513 Report Date: 09/18/2019

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

Matrix: QC Material QC Batch: B11092 Prep. Date: 08/30/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 09/17/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.59	4	90	--	--	--	30-130	--	--
Atrazine	2.99	4	75	--	--	--	30-130	--	--
Metribuzin	2.89	4	72	--	--	--	30-130	--	--
Alachlor	3.2	4	80	--	--	--	30-130	--	--
Metolachlor	3.52	4	88	--	--	--	30-130	--	--
Chlorpyrifos	3.17	4	79	--	--	--	30-130	--	--
Cyanazine	3.52	4	88	--	--	--	30-130	--	--
Pendimethalin	3.62	4	91	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	83.3	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008513-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008513 Report Date: 09/23/2019

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	4.6	5.0	91	--	--	--	87-115	--	P7262	008513-01C1
(a) Manganese	0.73	0.75	97	--	--	--	90-114	--	P7262	008513-01C1
Ammonia Nitrogen	1.0	1.0	101	--	--	--	80-120	--	09054855	008513-01C1
Nitrate as Nitrogen	13.2	14.0	94	--	--	--	80-120	--	09054856	008513-01C1
Phosphorus	0.65	0.67	98	--	--	--	80-120	--	09174893	008515-01C1
Phosphorus, -ortho	0.11	0.10	105	--	--	--	80-120	--	09034844	008513-01C1
Total Organic Carbon	9.3	10.0	93	--	--	--	76-120	--	09174894	008513-01C1
Total Organic Carbon	9.3	10.0	93	--	--	--	76-120	--	09174895	008513-12C1

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: 008513 Report Date: 09/18/2019

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

Field ID:	MTL-1	Prep. Date:	08/30/2019	ARDL Lab No.:	008513-01
Desc/Location:	MARK TWAIN LAKE	Amount Used:	1000 mL	Lab Filename:	
Sample Date:	08/28/2019	% Moisture:	NA	Received Date:	08/28/2019
Sample Time:	1512	QC Batch:	B11092	Analysis Date:	09/17/2019
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	3.61	4	90.3	3.53	4	88.3	30-130	2.2	30
Atrazine	0.520	3.67	4	78.8	3.47	4	73.8	30-130	5.6	30
Metribuzin	ND	3.25	4	81.3	3.11	4	77.8	30-130	4.4	30
Alachlor	ND	3.29	4	82.3	2.93	4	73.3	30-130	11.6	30
Metolachlor	2.09	5.49	4	85	5.19	4	77.5	30-130	5.6	30
Chlorpyrifos	ND	3.16	4	79	2.9	4	72.5	30-130	8.6	30
Cyanazine	ND	3.86	4	96.5	3.66	4	91.5	30-130	5.3	30
Pendimethalin	ND	3.63	4	90.8	3.55	4	88.8	30-130	2.2	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	84	82	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008513-01, 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: 008513

Report Date: 09/23/2019

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	0.40	1.2	1.0	76 *	1.4	1.0	96	87-115	16	20	P7262	008513-01MS
(a) Manganese	WATER	0.086	0.51	0.50	86 *	0.59	0.50	100	90-114	13	20	P7262	008513-01MS
Ammonia Nitrogen	WATER	J 0.024	2.1	2.0	102	2.1	2.0	102	75-125	0	20	09054855	008513-01MS
Nitrate as Nitrogen	WATER	ND	7.0	8.0	87	7.0	8.0	88	75-125	0	20	09054856	008513-01MS
Phosphorus	WATER	0.13	0.95	0.83	99	0.96	0.83	101	75-125	1	20	09174893	008513-11MS
Phosphorus, -ortho	WATER	J 0.0095	0.10	0.10	95	0.11	0.10	98	75-125	3	20	09034844	008513-01MS
Total Organic Carbon	WATER	6.0	10.5	5.0	90	10.8	5.0	96	76-120	3	20	09174894	008513-01MS

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 008513

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008513 Report Date: 09/23/2019

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	28.1	29.0	--	MG/CU.M.	3	--	09134882	008513-08D1
Pheophytin-a	1.7	2.7	--	MG/CU.M.	45*	--	09134882	008513-08D1
Solids, Total Suspended	77.3	76.0	--	MG/L	2	--	09054849	008513-03D1
Solids, Volatile Suspend	10.0	9.3	--	MG/L	7	--	09054850	008513-03D1

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions.
(a) DOD and/or NELAC Accredited Analyte

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8513

ARDL, Inc.

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

8513

CHAIN OF CUSTODY RECORD

PROJECT: Mark Twain Lake

SAMPLERS: (Signature) B. Breeling, T. Schepker, R. Archieski

SAMPLE NUMBER	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	TSS, TVSS	Chloro/Pheo	*TOC, T-PO4	O-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
	8-28																
MTL-1		1512		x		X		X	X	X	X	X		X		X	
MTL-5		1152		x		X		X	X	X	X					X	
MTL-13		1235		x		X		X	X	X	X					X	
MTL-9		1318		x		X		X	X	X	X					X	
MTL-11		1406		x		X		X	X	X	X					X	
MTL-12		1605		x		X		X	X	X	X	X				X	
MTL-15-0		1100		x		X	X	X	X	X	X					X	
MTL-22-0		1345		x		X	X	X	X	X	X					X	
MTL-22-15		1345		x		X		X	X	X		X				X	
MTL-33-0		1307		x		X	X	X	X	X	X					X	
MTL-66-0		1215		x		X	X	X	X	X	X					X	
MTL-77-0		1152		x		X	X	X	X	X	X					X	
IC MARINA		1135		x									X			X	
BJ MARINA		1250		x									X			X	

	Date	Time		
Relinquished by: (Signature)	8/28/19	1910	Received by: (Signature)	
Relinquished by: (Signature)	8/28/19	2040	Received by: (Signature)	
Received for Laboratory by: (Signature)	8/28/19	2040	Shipping Ticket No.	

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8513 Cooler # 1 of 3

Number of Coolers in Shipment: 3

Project: Mark Swain Lake Date Received: 8-28-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8-28-19 (Signature) DSLachrum

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

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

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? ..... 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. 1.2 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 8-29-19 (Signature) DSLachrum

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 #: walkin	Area #:
By: dlc	By:
On: 8-29-19	On:

Chain-of-Custody # N/A

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8513 Cooler # 2 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 8-28-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8-28-19 (Signature) DK Cochrum

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

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

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? ..... 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. 1.5 C Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 8-29-19 (Signature) DK Cochrum

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 #: Walkin	Area #:
By: dlc	By:
On: 8-29-19	On:

Chain-of-Custody # NA

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8513 Cooler # 3 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 8-28-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8/28/19 (Signature) DKCachrum

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

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

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? ..... 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. 1.1 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 8-29-19 (Signature) DKCachrum

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 #: breakin	Area #:
By: dlc	By:
On: 8-29-19	On:

Chain-of-Custody # N/A

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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: 11/14/19**

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

Samples Received at ARDL: 10/24/19 **ARDL Report No.: 8565**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
MTL-1	10/23/19	8565-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	10/23/19	8565-02	NP Pesticides, Inorganics(2)
MTL-13	10/23/19	8565-03	NP Pesticides, Inorganics(2)
MTL-9	10/23/19	8565-04	NP Pesticides, Inorganics(2)
MTL-11	10/23/19	8565-05	NP Pesticides, Inorganics(2)
MTL-12	10/23/19	8565-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	10/23/19	8565-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	10/24/19	8565-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	10/24/19	8565-09	Metals(1), Inorganics(2)
MTL-33-0	10/24/19	8565-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	10/24/19	8565-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	10/24/19	8565-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	10/24/19	8565-13	E. Coli
BJ MARINA	10/24/19	8565-14	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.

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

PREPARATION BLANK
The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE
The LCS analyses met recovery criteria.

CASE NARRATIVE (Continued)

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

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

INTERNAL STANDARD
All internal standard criteria were met.

SURROGATE
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 within acceptable limits.

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

MATRIX SPIKE
Percent recovery of all matrix spikes and matrix spike duplicates were within control limits.

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 compound 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 8565

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-01
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028922
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1600	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.644		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	1.48		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	93%

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: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-01
Field ID: MTL-1
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
Sampling Time: 1600

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		0.370	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0.00500		0.0719	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0.0300		0.0395	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.128	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.0653	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0172	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	1.33	1.33		2.8	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		5.7	MG/L	NONE	415.1	NA	11/04/19	TA464729

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-01, Inorganic Analyses

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-02
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028925
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1305	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	1.42		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.

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-02
Field ID: MTL-5
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
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	J	0.0251	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.369	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.156	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0773	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	1.33	1.33		4.53	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	11/04/19	TA464729

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-03
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028926
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1215	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	78%

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

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-03
Field ID: MTL-13
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
Sampling Time: 1215

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		0.0386	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.633	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.259	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0956	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.50	2.50		12.8	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.50	2.50		2.75	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		7.2	MG/L	NONE	415.1	NA	11/04/19	TA464729

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-04
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028927
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1155	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	65%

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

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-04
Field ID: MTL-9
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
Sampling Time: 1155

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		0.0355	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.287	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.306	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0564	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	3.33	3.33		15.7	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	3.33	3.33		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		7.7	MG/L	NONE	415.1	NA	11/04/19	TA464729

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-04, Inorganic Analyses

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-05
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028928
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1117	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	72%

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

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Mt. Vernon, Illinois 62864

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-05
Field ID: MTL-11
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
Sampling Time: 1117

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	0.0243	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.357	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.293	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0253	MG/L	NONE	365.2	NA	10/24/19	11055034
Solids, Total Suspended	4.0	4.00		50.8	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	4.0	4.00		7.2	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.7	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC.
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Mt. Vernon, Illinois 62864

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-06
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028929
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	1345	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.700		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	1.66		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	98%

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

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008565-06 Sampling Loc'n: MARK TWAIN LAKE Matrix: WATER
Field ID: MTL-12 Sampling Date: 10/23/2019 Moisture: NA
Received: 10/24/2019 Sampling Time: 1345

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.594	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0.00500		0.0800	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0.0300	J	0.0269	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.074	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.0911	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0198	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	1.33	1.33		8.4	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	1.33	1.33		1.6	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.2	MG/L	NONE	415.1	NA	11/07/19	TA465045

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Mt. Vernon, Illinois 62864

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-07
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028930
Sample Date:	10/23/2019	Received Date:	10/24/2019
Sample Time:	0900	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.544		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	1.02		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	89%

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: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-07
Field ID: MTL-15-0
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/23/2019
Sampling Time: 0900

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		0.0601	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		2.7	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.305	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.156	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0306	MG/L	NONE	365.2	NA	10/24/19	11055034
Solids, Total Suspended	2.50	2.50		15.8	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.50	2.50		2.5	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	11/07/19	TA465045

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Mt. Vernon, Illinois 62864

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-08
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028931
Sample Date:	10/24/2019	Received Date:	10/24/2019
Sample Time:	1200	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.656		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	1.47		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.

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-08
Field ID: MTL-22-0
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
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	J	0.0207	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		4.1	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.091	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		1.3	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.0653	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0198	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.0	2.00		3.2	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.0	2.00		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		5.9	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008565-09 Sampling Loc'n: MARK TWAIN LAKE Matrix: WATER
Field ID: MTL-22-15 Sampling Date: 10/24/2019 Moisture: NA
Received: 10/24/2019 Sampling Time: 1200

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.906	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0.00500		0.342	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0.0300		0.0473	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.076	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0.0100		0.104	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0224	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.50	2.50		6.75	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.50	2.50		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-10
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028932
Sample Date:	10/24/2019	Received Date:	10/24/2019
Sample Time:	1105	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.550		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	1.33		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	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: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-10
Field ID: MTL-33-0
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
Sampling Time: 1105

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		0.0377	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		3.6	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.103	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.0653	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0224	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.0	2.00		4.0	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.0	2.00		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		5.9	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-11
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028933
Sample Date:	10/24/2019	Received Date:	10/24/2019
Sample Time:	0830	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.410		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	0.690		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	80%

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: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-11
Field ID: MTL-66-0
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
Sampling Time: 0830

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		0.0588	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		2.3	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.391	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.173	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0276	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.50	2.50		13.5	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.50	2.50		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.2	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 10/30/2019

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.:	008565-12
Desc/Location:	MARK TWAIN LAKE	Lab Filename:	E1028934
Sample Date:	10/24/2019	Received Date:	10/24/2019
Sample Time:	0818	Prep. Date:	10/25/2019
Matrix:	WATER	Analysis Date:	10/28/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	0.444		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	0.822		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	71%

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: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-12
Field ID: MTL-77-0
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
Sampling Time: 0818

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		0.0395	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.341	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.164	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0276	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	4.0	4.00		17.6	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-13
Field ID: IC MARINA
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
Sampling Time: 0936

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		350	COL/100 ML	NONE	1604	NA	10/24/19	10285012

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008565 Report Date: 11/14/2019

Project Name: MARK TWAIN LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008565-14
Field ID: BJ MARINA
Received: 10/24/2019

Sampling Loc'n: MARK TWAIN LAKE
Sampling Date: 10/24/2019
Sampling Time: 1128

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		175	COL/100 ML	NONE	1604	NA	10/24/19	10285012

(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: 008565 Report Date: 10/30/2019

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.:	008565-01B1
Desc/Location:	NA	Lab Filename:	E1028920
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	10/25/2019
Matrix:	QC Material	Analysis Date:	10/28/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11133
% 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	94%

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: 008565 Report Date: 11/14/2019

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	10/28/19	11/01/19	P7291	008565-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	10/28/19	11/01/19	P7291	008565-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	10/29/19	11055038	008565-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040	008565-11B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	10/24/19	10285012	008565-13B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	11/01/19	11055027	008565-01B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040	008565-11B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	11/08/19	11/08/19	11125046	008565-02B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	10/24/19	11055034	008565-07B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	10/25/19	11055035	008565-01B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	10/28/19	11055036	008565-03B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	10/28/19	11055037	008565-03B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	11/04/19	TA464729	008565-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	11/07/19	TA465045	008565-05B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008565

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008565 Report Date: 10/30/2019

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

Matrix: QC Material QC Batch: B11133 Prep. Date: 10/25/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 10/28/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	2.68	4	67	--	--	--	30-130	--	--
Atrazine	3.19	4	80	--	--	--	30-130	--	--
Metribuzin	3.32	4	83	--	--	--	30-130	--	--
Alachlor	3.31	4	83	--	--	--	30-130	--	--
Metolachlor	3.58	4	90	--	--	--	30-130	--	--
Chlorpyrifos	3.2	4	80	--	--	--	30-130	--	--
Cyanazine	4	4	100	--	--	--	30-130	--	--
Pendimethalin	3.57	4	89	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	92.3	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008565-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008565 Report Date: 11/14/2019

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	5.1	5.0	101	--	--	--	87-115	--	P7291	008565-01C1
(a) Manganese	0.78	0.75	104	--	--	--	90-114	--	P7291	008565-01C1
Ammonia Nitrogen	1.0	1.0	101	--	--	--	80-120	--	11055038	008565-01C1
Nitrate as Nitrogen	1.0	1.0	103	--	--	--	80-120	--	11055027	008565-01C1
Phosphorus	0.64	0.67	96	--	--	--	80-120	--	11125046	008565-02C1
Phosphorus, -ortho	0.1	0.10	100	--	--	--	80-120	--	11055034	008565-07C1
Phosphorus, -ortho	0.090	0.10	90	--	--	--	80-120	--	11055035	008565-01C1
Total Organic Carbon	10.7	10.0	107	--	--	--	76-120	--	TA464729	008565-01C1
Total Organic Carbon	10.7	10.0	107	--	--	--	76-120	--	TA465045	008565-05C1

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

(a) DOD and/or NELAC Accredited Analyte

Inorganic LCS Results for 008565

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008565 Report Date: 10/30/2019

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

Field ID:	MTL-1	Prep. Date:	10/25/2019	ARDL Lab No.:	008565-01
Desc/Location:	MARK TWAIN LAKE	Amount Used:	900 mL	Lab Filename:	
Sample Date:	10/23/2019	% Moisture:	NA	Received Date:	10/24/2019
Sample Time:	1600	QC Batch:	B11133	Analysis Date:	10/28/2019
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	3.3	4.44	74.3	3.89	4.44	87.5	30-130	16.4	30
Atrazine	0.644	3.92	4.44	73.8	4.37	4.44	83.8	30-130	10.7	30
Metribuzin	ND	3.52	4.44	79.3	3.92	4.44	88.3	30-130	10.7	30
Alachlor	ND	3.4	4.44	76.5	3.78	4.44	85	30-130	10.5	30
Metolachlor	1.48	5.14	4.44	82.5	5.62	4.44	93.3	30-130	8.9	30
Chlorpyrifos	ND	3.16	4.44	71	3.72	4.44	83.8	30-130	16.5	30
Cyanazine	ND	4.07	4.44	91.5	4.58	4.44	103	30-130	11.8	30
Pendimethalin	ND	3.49	4.44	78.5	4.12	4.44	92.8	30-130	16.6	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	86	95	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008565-01, 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: 008565 Report Date: 11/14/2019

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	0.37	1.5	1.0	111	1.5	1.0	112	87-115	1	20	P7291	008565-01MS
(a) Manganese	WATER	0.072	0.60	0.50	105	0.60	0.50	107	90-114	1	20	P7291	008565-01MS
Ammonia Nitrogen	WATER	0.040	2.1	2.0	102	2.1	2.0	105	75-125	3	20	11055038	008565-01MS
Nitrate as Nitrogen	WATER	0.13	0.89	1.0	76	0.88	1.0	75	75-125	1	20	11055027	008565-01MS
Phosphorus	WATER	0.16	1.0	0.83	105	1.0	0.83	106	75-125	1	20	11125046	008565-02MS
Phosphorus, -ortho	WATER	0.017	0.12	0.10	99	0.12	0.10	105	75-125	5	20	11055035	008565-01MS
Total Organic Carbon	WATER	5.7	10.5	5.0	96	10.5	5.0	96	76-120	0	20	TA464729	008565-01MS
Total Organic Carbon	WATER	6.7	11.4	5.0	94	11.7	5.0	100	76-120	3	20	TA465045	008565-05MS

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 008565

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008565 Report Date: 11/14/2019

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	2.3	2.8	--	MG/CU.M.	20	--	11055040	008565-11D1
Pheophytin-a	ND	0	--	MG/CU.M.	NC	--	11055040	008565-11D1
Solids, Total Suspended	12.8	12.0	--	MG/L	6	--	11055036	008565-03D1
Solids, Volatile Suspend	2.8	2.5	--	MG/L	10	--	11055037	008565-03D1

(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008565

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8565

8565

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	O-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	4-23	1606		x	10	X		X	X	X	X	X		X		X	
2	MTL-5	4-23	1305		x	10	X		X	X	X	X					X	
3	MTL-13	4-23	1215		x	10	X		X	X	X	X					X	
4	MTL-9	4-23	1155		x	10	X		X	X	X	X					X	
5	MTL-11	4-23	1117		x	10	X		X	X	X	X					X	
6	MTL-12	4-23	1345		x	10	X		X	X	X	X	X				X	
7	MTL-15-0	4-23	0900		x	10	X	X	X	X	X	X					X	
8	MTL-22-0	4-24	1206		x	10	X	X	X	X	X	X					X	
9	MTL-22-15	4-24	1206		x	10	X		X	X	X		X				X	
10	MTL-33-0	4-24	1105		x	10	X	X	X	X	X	X					X	
11	MTL-66-0	4-24	830		x	10	X	X	X	X	X	X					X	
12	MTL-77-0	4-24	818		x	10	X	X	X	X	X	X					X	
13	IC MARINA	4-24	0936		x	10								X			X	
14	BJ MARINA	4-24	1128		x	10								X			X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	10/24	1600	
Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	10/24/19	1728	
Received for Laboratory by: (Signature)	Date	Time	Shipping Ticket No.
	10/25/19	0530	

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8565 Cooler # 1 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 10-24-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10-24-19 (Signature) DKackmann

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

   If YES, enter carrier name and airbill number here: Couriers

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? ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? dlc 10-25-19 ..... 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. 0.3 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-25-19 (Signature) DKackmann

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) dlc 10-25-19

Comments and/or Corrective Action:
b) Corrections + white outs not initialed or dated
(By: Signature) dlc Date: 10-25-19

Sample Transfer	
Fraction: alf	Fraction:
Area #: Wallin	Area #:
By: dlc	By:
On: 10/25/19	On:

Chain-of-Custody # NA

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8565 Cooler # 2 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 10-24-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10-24-19 (Signature) DLackey

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

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

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? ..... 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. 2.9 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-25-19 (Signature) DLackey

10. Describe type of packing in cooler: bubble

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:
6) Corrections + Write overs not initialed or dated.
(By: Signature) dle Date: 10/25/19

Sample Transfer	
Fraction: all	Fraction:
Area #: Walker	Area #:
By: dle	By:
On: 10-25-19	On:

Chain-of-Custody # NA

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8565 Cooler # 3 of 3

Number of Coolers in Shipment: 3

Project: Mark Twain Lake Date Received: 10-24-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10-24-19 (Signature) DKackrum

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

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

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? ..... 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
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-25-19 (Signature) DKackrum

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:
b) Corrections + additions not initialed or dated
(By: Signature) dlc Date: 10-25-19

Sample Transfer	
Fraction: all	Fraction:
Area #: Wilkin	Area #:
By: dlc	By:
On: 10/25/19	On:

Chain-of-Custody # NA