2019 Water Quality Report

U.S. Army Corps of Engineers
Saint Louis District

Carlyle Lake Water Quality Conditions: 2014-2019

July 2020

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Prepared for

United States Army Corps of Engineers
Saint Louis District
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EXECUTIVE SUMMARY

The United States Army Corps of Engineers (USACE) commitment to environmental compliance and protection of estuaries, rivers, lakes, and navigable waters arises from the national policy and directives expressed in Federal Statutes, Executive Orders, and internal regulations. These regulations were designed to minimize pollution, maximize recreation, protect aesthetics, preserve natural resources, and promote the comprehensive planning and use of water bodies to enhance the public interest rather than private gain; therefore, USACE, in the design, construction, management, operation, and maintenance of its facilities, will exert leadership within existing authorities and appropriations in the nationwide effort to protect, enhance, and sustain the quality of the nation's resources. It is 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. Currently the Illinois Environmental Protection Agency (IEPA, 2018) has listed Carlyle Lake as impaired for total suspended solids, total phosphorous, and mercury while the Kaskaskia River upstream from the Lake is impaired for dissolved oxygen, Atrazine, and mercury. The lists of sources for these impairments are contaminated sediments, crop production, and unknown sources. The entire Kaskaskia watershed is impaired by the above parameters as well as many others.

Water quality sampling in 2019 revealed the following minor concerns at Carlyle Lake: bacteria, iron, total suspended solids, and total phosphorus.

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INTRODUCTION

The Carlyle Lake watershed encompasses approximately 1,663 square miles and includes all or portions of Bond, Clinton, Effingham, Fayette, Marion, Shelby, and Montgomery counties. The watershed includes the Kaskaskia River between Carlyle Lake Dam and Lake Shelbyville Dam and major tributaries of the Kaskaskia River, including: Big, Richland, Robinson, Becks, Ramsey, Old Hickory, and Hurricane Creeks (respectively) and the East Fork Kaskaskia River. Agriculture is the predominant land use within the watershed. Currently, 82% of the land is used for agricultural purposes. Of that 82%, 63% is cropland and 19% grassland. Since 1978, the number of farms has decreased by 25% and the acreage tilled has decreased by only 6%. Corn and soybeans are important to the region, but producers also grow 25% of the entire state's crop of wheat. Livestock production, including dairy, swine, poultry and beef cattle is a significant industry, especially in Clinton, Randolph and Washington Counties.

Carlyle Lake is located in south central Illinois at river mile 94.2 on the Kaskaskia River, upstream from its confluence with the Mississippi River and about one-half mile upstream from the town of Carlyle, Illinois. Carlyle is located in Clinton County, approximately 50 miles east of St. Louis, Missouri. Carlyle Lake is the largest man-made lake in the state and is approximately 12 miles long and 1-3 miles wide and has approximately 24,710 acres of water surface at summer pool elevation 445.0 feet NGVD (National Geodetic Vertical Datum). There are 88 miles of shoreline and approximately 12,800 acres of public land associated with the project. The lake is situated in gently rolling land with alluvial valleys with moderately low relief. The lake provides outdoor recreation opportunities for over 2.5 million visitors annually, which generates over $80 million in visitor spending within 30- miles of the Lake. There are 41 recreation areas that include: 424 picnic sites, 726 campsites, 670 marina slips, 24 boat ramps, and 25 miles of hiking trails. The CEMVS manages and operates two large reservoirs on the Kaskaskia River, Lake Shelbyville and Carlyle Lake, as well as the 36 mile long navigable channel and lock and dam at the Kaskaskia River Project.

Carlyle Lake is managed and operated by the CEMVS for the authorized purposes of flood risk management, navigation, water supply, water quality, fish and wildlife conservation, and recreation. The lake serves as a heavy recreational usage lake. The land surrounding the lake is used predominately for agriculture. Surrounding communities have existing industrial/commercial operations and residents which discharge wastewater into municipal wastewater treatment plants that ultimately discharge treated water into the Kaskaskia River basin. Agricultural runoff and municipal wastewater treatment facilities are the primary potential source of pollution into the Carlyle 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 the Kaskaskia River and Carlyle 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 Kaskaskia River and Carlyle Lake. 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 Carlyle Lake. The report describes conditions observed in 2019, as well as baseline data collected from 2014-2018. Additional historical data are available upon request.

CARLYLE LAKE WQMP COVERAGE

The WQMP for Carlyle Lake includes water samples taken at the following locations: major tributaries (CAR-13 and CAR-12), main body of the lake (CAR-4, CAR-2, and the marinas), and just downstream of the dam (CAR-1). See figure 1 and Table 1 for a site map and site coordinates.

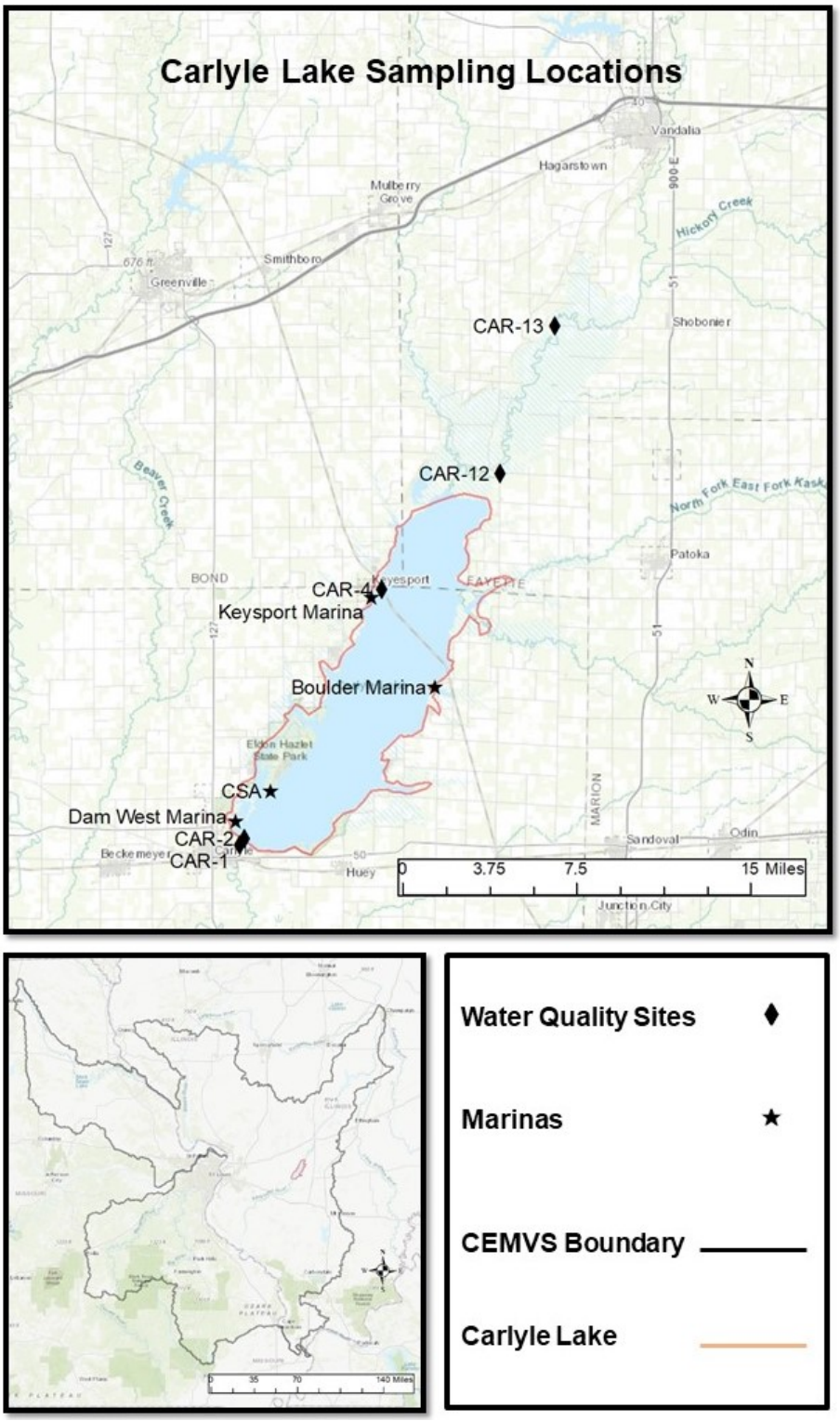


Figure 1. Water Quality (WQ) Sampling Locations in 2019 at Carlyle Lake

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	CAR-13	38.868961	-89.159605
	TRIB	CAR-12	38.868961	-89.193475
Main Reservoir Surface	RS	CAR-2	38.619492	-89.352747
	RS	CAR-4	38.740632	-89.267266
	RS	CAR-BL	38.693092	-89.234040
	RS	CAR-DW	38.627955	-89.358246
	RS	CAR-KP	38.736930	-89.273674
	RS	CAR-CSA	38.642647	-89.336805
Reservoir Benthic	RB	CAR-2-10	38.619492	-89.352747
Tail Race (below dam)	TR	CAR-1	38.616240	-89.355828

Samples at Marinas are not always taken in the exact same location. *BL=Boulder Marina, DW=Dam West Marina, KP=Keyesport Marina, CSA=Carlyle Sailing Association.*

METHODS AND ANALYSIS: WATER QUALITY

Data Collection and Historical Reference Data

During 2019, water quality samples were collected and analyzed for 10 locations during four separate sampling events (n=40; 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) at Carlyle Lake. Historical reference data are intended to represent the current condition of Carlyle Lake.

Statistical Summary and Comparison to Applicable Water Quality Standards

Statistical analyses were performed on water quality monitoring data collected for 10 locations, and classified as TRIB (n= 2), RS (n=2), RB (n=1), and TR (n=1). 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 Carlyle Lake has 6 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.

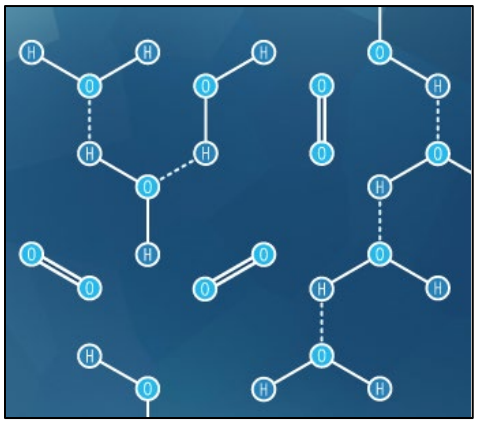


Figure 1: Dissolved oxygen (O_2) vs oxygen bonded in water (H_2O).

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 invertebrate begins 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 Kaskaskia 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
80-100	Hypereutrophic

Laboratory Methods and Water Quality Criteria Summary Table

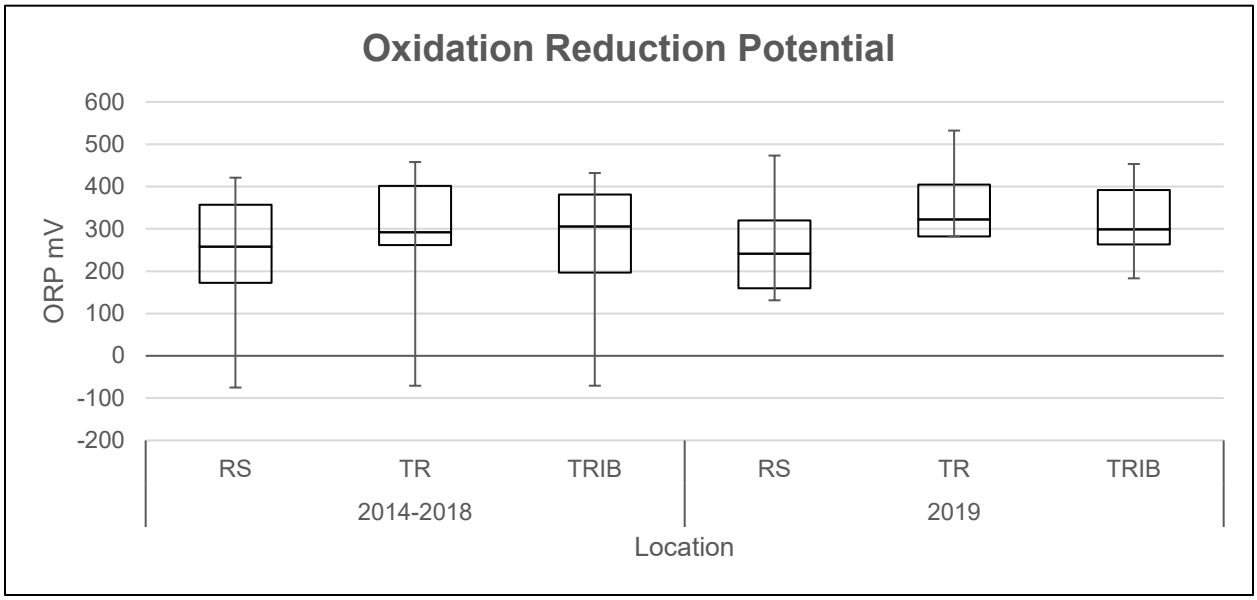
Table 2: Metrics, Methods, and Water Quality Criteria Used for Evaluating Water Quality

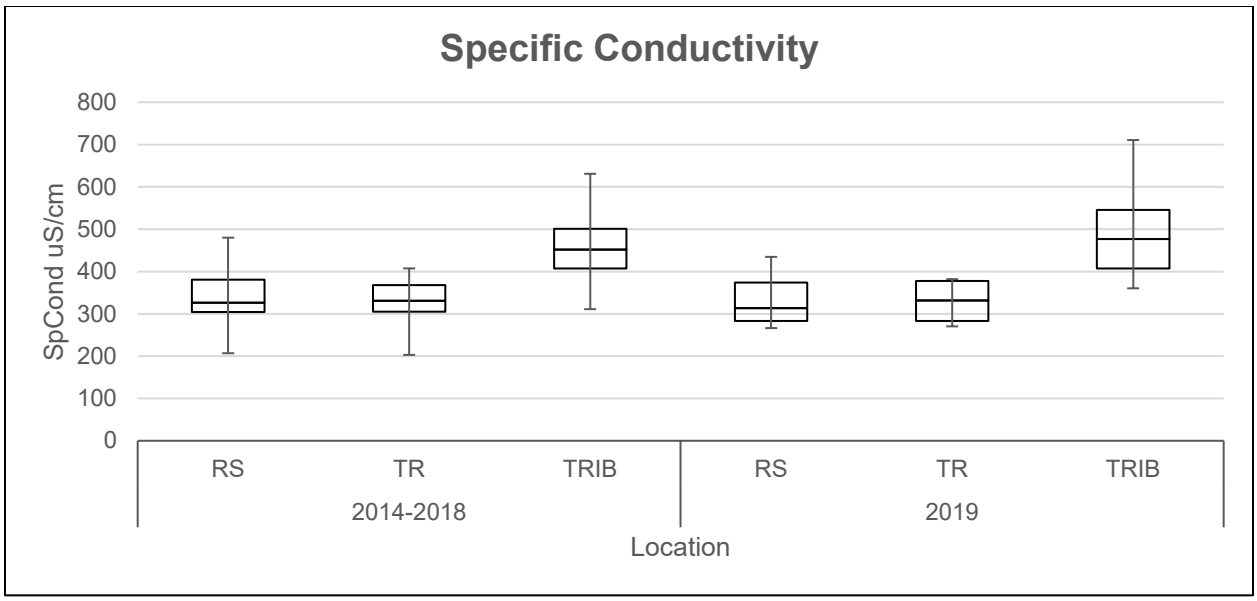
Metric	Abbreviation	Analysis Method	Water Quality Criteria	Source
Alachlor		EPA Method 8270C	< 2ug/L PWS or <1100 ug/L: aquatic life	Illinois EPA
Ammonia Nitrogen	NH_3	EPA Method 350.1	<15 mg/L	United States EPA
Atrazine	Atrazine	EPA Method 8270C	9 ug/L: Chronic or 82 ug/L: Acute or 3 ug/L DWS	Illinois EPA
Bacteria: E. Coliform	E Col	EPA Method 1604	< 235 E. Col per 100/mL for single sample	Illinois EPA
Chlorophyll a	Chl_a	SM Method 10200H	< 25mg/cm^3 (Eutrophic Upper Limit)	Carlson 1977
Chlorpyrifos		EPA Method 8270C	< .11 ug/L: aquatic life	Illinois EPA
Cyanazine		EPA Method 8270C	< 30 ug/L: chronic or < 370 ug/L acute (aquatic life)	Illinois EPA
Depth	Depth	Multiparameter Meter	Measurements reported at ~1 meter	-----
Dissolved Oxygen	DO	Multiparameter Meter	Greater than 5.0mg/L	Illinois EPA
Metolachlor		EPA Method 8270C	30.4 ug/L: Chronic or 380 ug/L: Acute	Illinois EPA
Metribuzin		EPA Method 8270C	8.4 mg/L: aquatic life or 8.3 mg/L: human health	Illinois EPA
Nitrate as Nitrogen	NO_3	Green Method	< 10 mg/L	Illinois EPA
Non-Volatile Suspended Solids	NVSS	TSS - VSS	-----	-----
Orthophosphate	Ortho	EPA Method 365.2	-----	-----
Pendmethalin		EPA Method 8270C	< 30 ug/L: chronic or < 350 ug/L acute (aquatic life)	Illinois EPA
Pheophytin a	Phpy_a	SM Method 10200H	-----	-----
Potential of Hydrogen	pH	Multiparameter Meter	Range: 6.5 – 9.0pH	Illinois EPA
Specific Conductivity	SpCond	Multiparameter Meter	500 uS/cm	-----
Temperature	Temp	Multiparameter Meter	Less than rise of 2.8°C above normal seasonal temperature	Illinois EPA
Total Dissolved Solids	TDS	Multiparameter Meter	< 500 mg/L	Illinois EPA
Total Manganese	TMn	EPA Method 6010C	< 1 mg/L	Illinois EPA

Total Organic Carbon	TOC	EPA Method 415.1	-----	-----
Total Iron	TFe	EPA Method 6010C	< 1 mg/L	Illinois EPA
Total Phosphorus	TP	EPA Method 365.2	Less than 0.05 mg/L	Illinois EPA
Total Suspended Solids	TSS	EPA Method 160.2	< 116 mg/L: streams or <12 mg/L: lakes	Illinois EPA
Trifluralin		EPA Method 8270C	< 1.1 ug/L: chronic or < 26 ug/L acute (aquatic life)	Illinois EPA
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.*

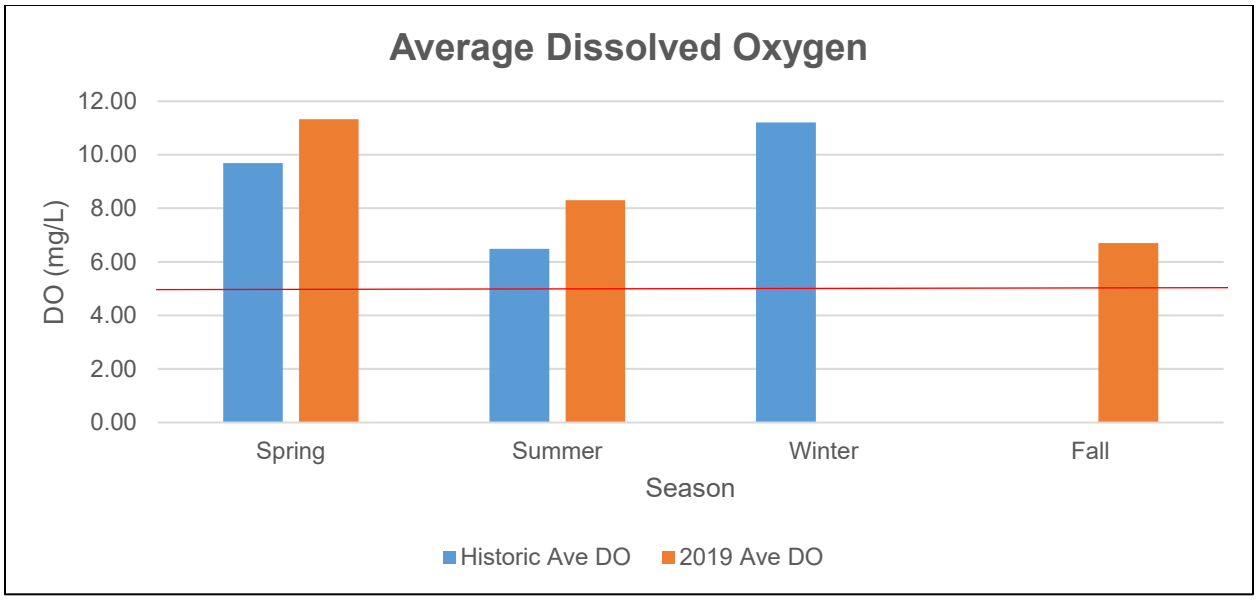
RESULTS AND SUMMARY STATISTICS: WATER QUALITY





		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
SpCond	RS	344.32	326.50	42	21.77	329.03	313.10	17	27.29
	TR	329.02	331.00	17	26.71	329.08	331.95	4	92.52
	TRIB	457.30	452.00	30	30.03	504.06	477.00	8	112.33
ORP	RS	238.07	258.00	41	42.89	260.11	241.30	17	55.29
	TR	299.32	292.00	17	73.40	364.70	322.20	4	187.55
	TRIB	278.27	305.50	30	47.93	317.98	299.10	8	79.13

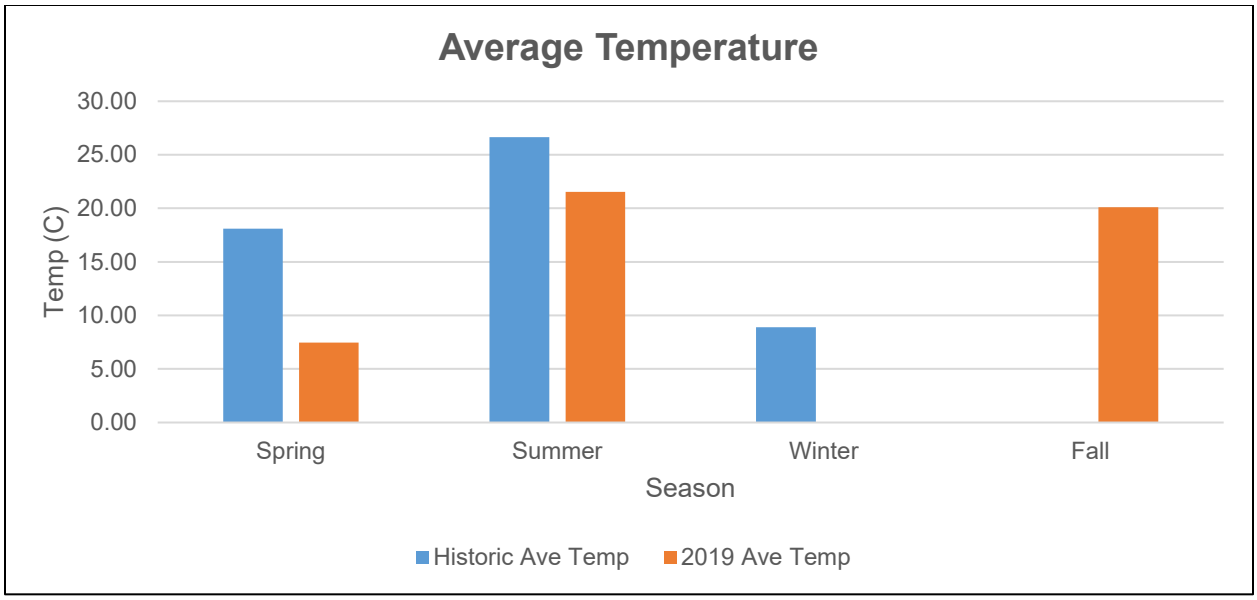
**This report does not acknowledge a water quality criteria for SpCond or ORP.*



Red line placed at the 5 mg/L level.

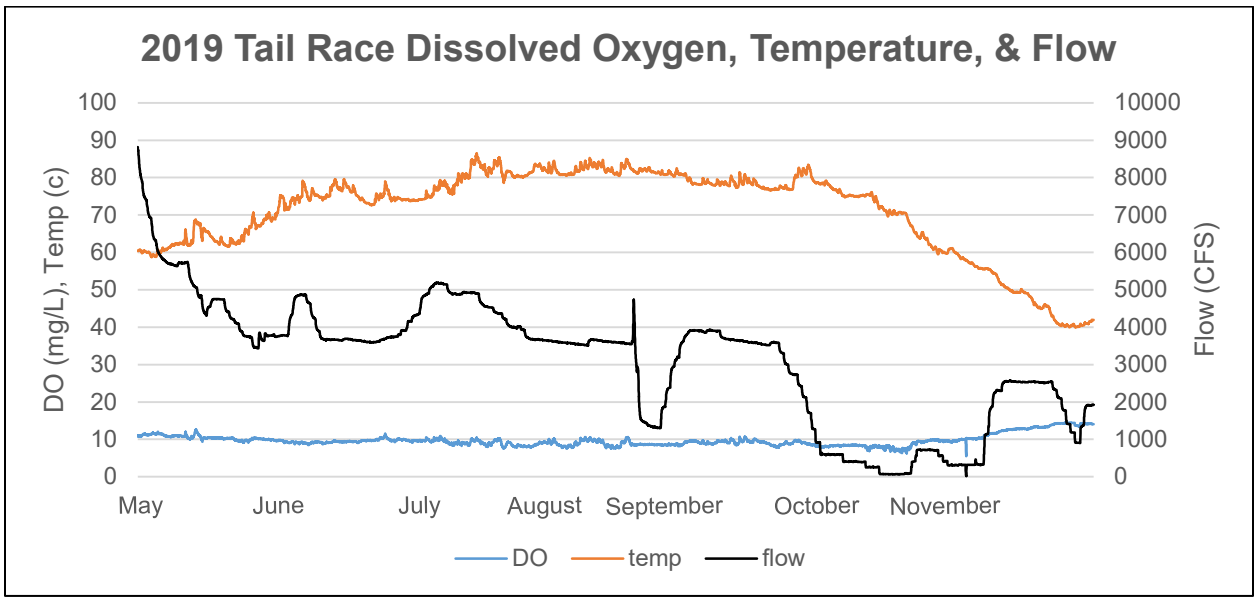
		Historical Reference 2014-2018				2019			
Season	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Spring	RS	9.24	8.97	11	1.54	10.78	10.78	2	15.69
	TR	9.90	9.89	4	3.97	13.30	13.30	1	
	TRIB	11.29	11.74	7	2.44	10.89	10.89	2	8.83
Summer	RS	6.80	6.85	28	0.74	8.36	8.11	10	1.39
	TR	7.74	7.99	11	0.47	9.13	9.13	2	9.15
	TRIB	7.02	7.33	19	0.88	8.21	8.15	4	2.73
Winter	RS	11.05	11.18	4	0.82				
	TR	12.67	12.67	2	1.97				
	TRIB	11.20	11.23	4	0.87				
Fall	RS					6.26	6.33	5	1.58
	TR					7.29	7.29	1	
	TRIB					7.34	7.34	2	31.32

** On October 8 2019 DO was recorded at <5 mg/L at Boulder Marina and the tributary CAR-12. All other observations met the Illinois state standard.*

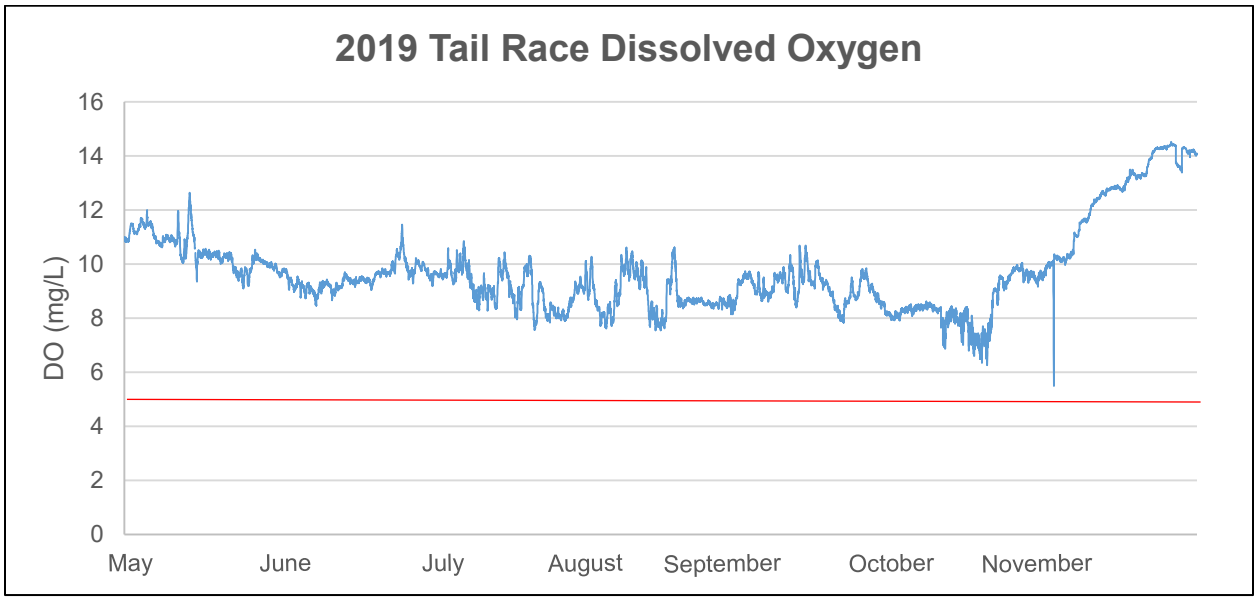


		Historical Reference 2014-2018				2019			
Season	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Spring	RS	18.50	20.28	11	2.66	8.44	8.44	2	5.65
	TR	16.45	16.77	4	5.13	7.56	7.56	1	
	TRIB	18.78	19.56	7	3.14	6.61	6.61	2	9.88
Summer	RS	27.21	27.75	28	0.91	21.77	21.90	10	4.31
	TR	26.25	26.45	11	1.09	22.25	22.25	2	67.98
	TRIB	26.50	27.32	19	0.96	20.33	20.30	4	9.69
Fall	RS					20.13	19.94	5	1.11
	TR					20.50	20.50	1	
	TRIB					19.25	19.25	2	18.00
Winter	RS	9.13	8.86	4	3.73				
	TR	8.92	8.92	2	15.23				
	TRIB	8.65	8.62	4	5.13				

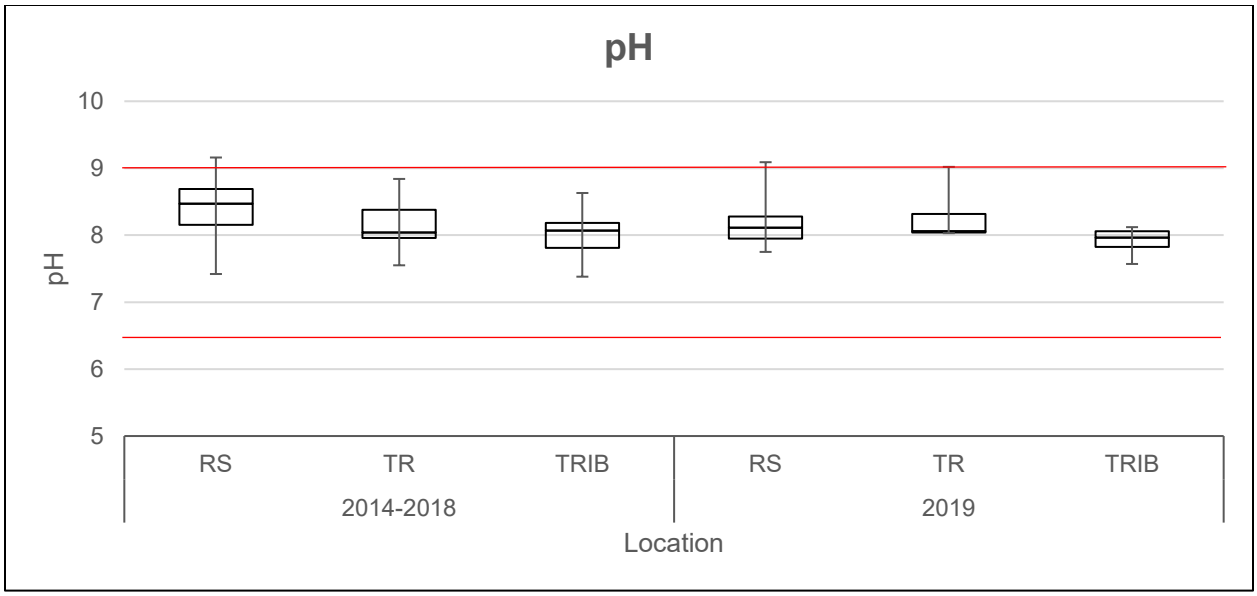
**Temperatures were within acceptable range of water quality criteria during 2019.*



**Data recorded by multi-parameter sonde (except flow) at tail race.*



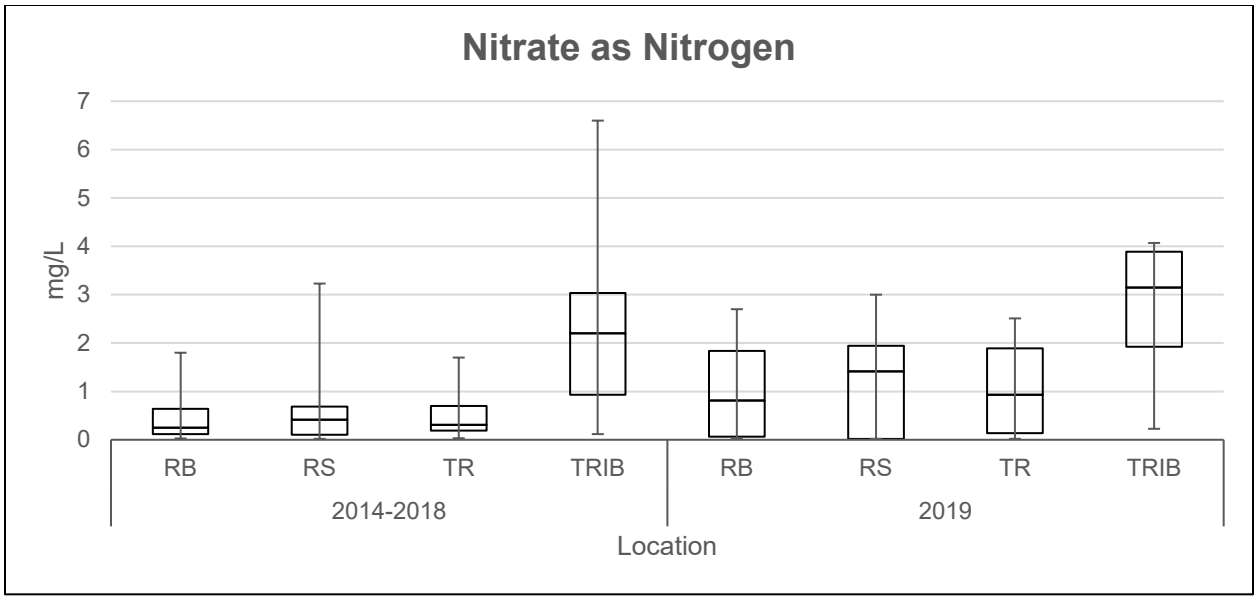
**Data recorded by multi-parameter sonde at tail race. Red line placed at the 5 mg/L level. DO did not fall below 5 mg/L during 2019.*

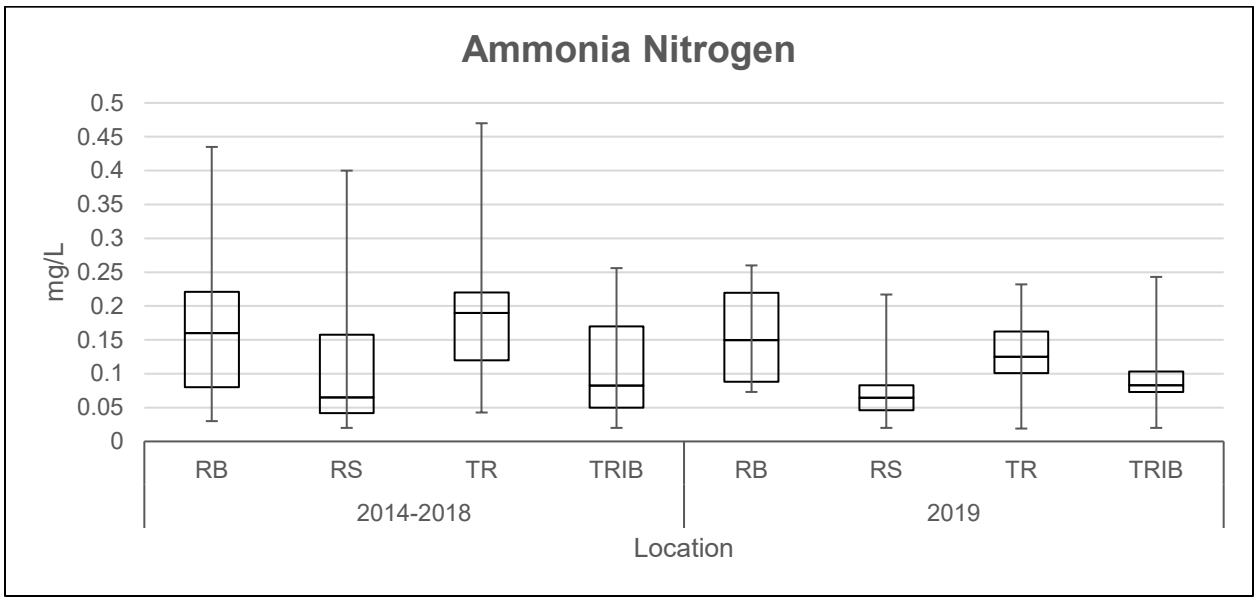


**Red lines indicate the upper and lower water quality criteria standards (9 and 6.5).*

		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
pH	RS	8.39	8.47	43	0.13	8.22	8.11	17	0.21
	TR	8.14	8.04	17	0.16	8.29	8.06	4	0.77
	TRIB	8.02	8.07	30	0.11	7.92	7.97	8	0.17

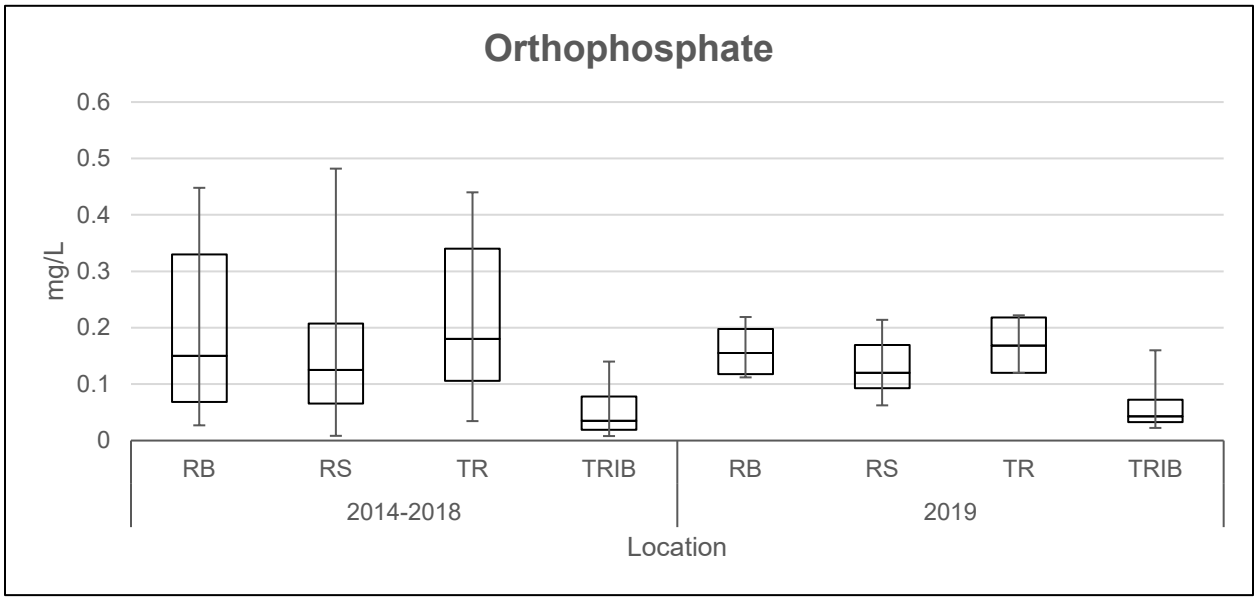
pH was recorded above 9 at CAR-2 and Dam West Marina as well as at the tail race in August. All other readings were within water quality standards during 2019.

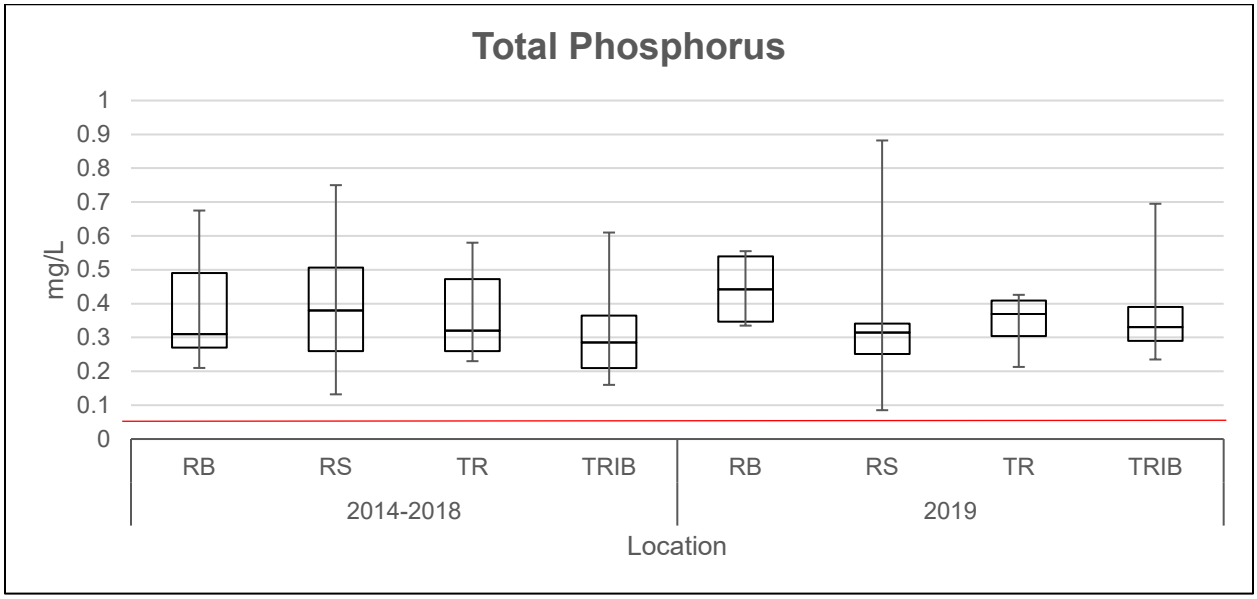




		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
NO3N	RB	0.47	0.25	17	0.26	1.09	0.81	4	2.05
	RS	0.63	0.41	34	0.26	1.27	1.42	8	0.98
	TR	0.51	0.31	17	0.24	1.10	0.93	4	1.91
	TRIB	2.37	2.20	32	0.65	2.65	3.15	8	1.31
NH3N	RB	0.18	0.16	17	0.06	0.16	0.15	4	0.14
	RS	0.11	0.07	34	0.03	0.08	0.06	8	0.05
	TR	0.19	0.19	17	0.05	0.14	0.13	4	0.11
	TRIB	0.11	0.08	32	0.03	0.10	0.08	8	0.05

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

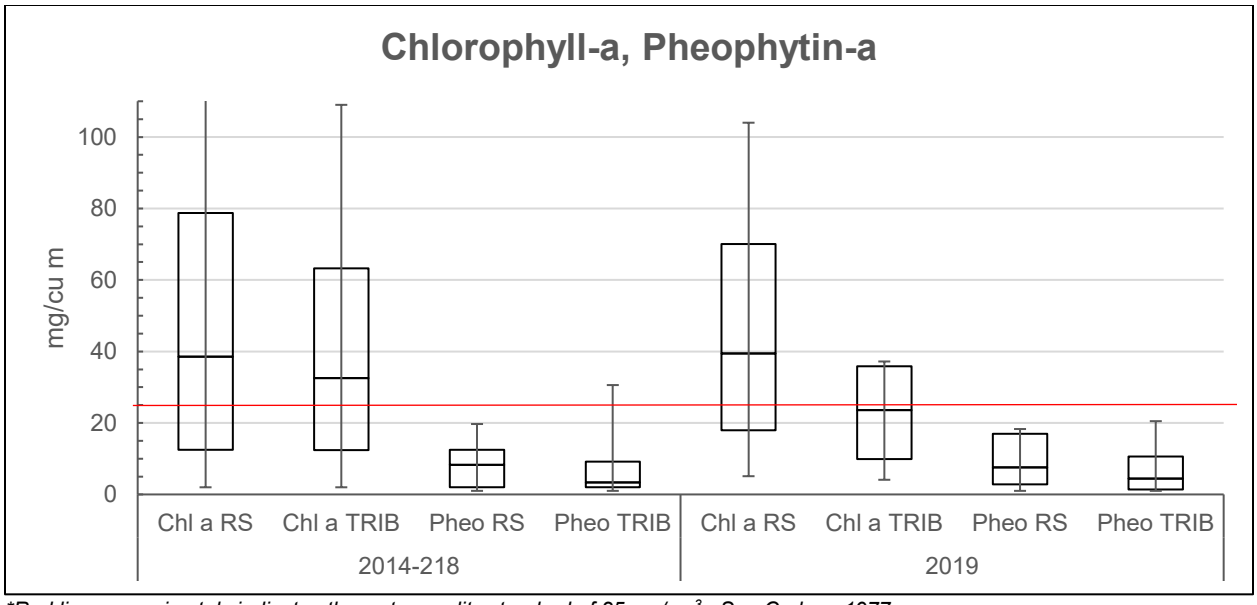




**Red line indicates the water quality standard of 0.05 mg/L.*

		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Ortho	RB	0.19	0.15	17	0.08	0.16	0.16	4	0.08
	RS	0.16	0.13	34	0.04	0.13	0.12	8	0.05
	TR	0.20	0.18	17	0.07	0.17	0.17	4	0.09
	TRIB	0.05	0.03	32	0.01	0.07	0.04	8	0.04
TP	RB	0.38	0.31	17	0.08	0.44	0.44	4	0.19
	RS	0.38	0.38	34	0.05	0.35	0.31	8	0.20
	TR	0.37	0.32	17	0.06	0.34	0.37	4	0.15
	TRIB	0.30	0.29	32	0.04	0.37	0.33	8	0.12

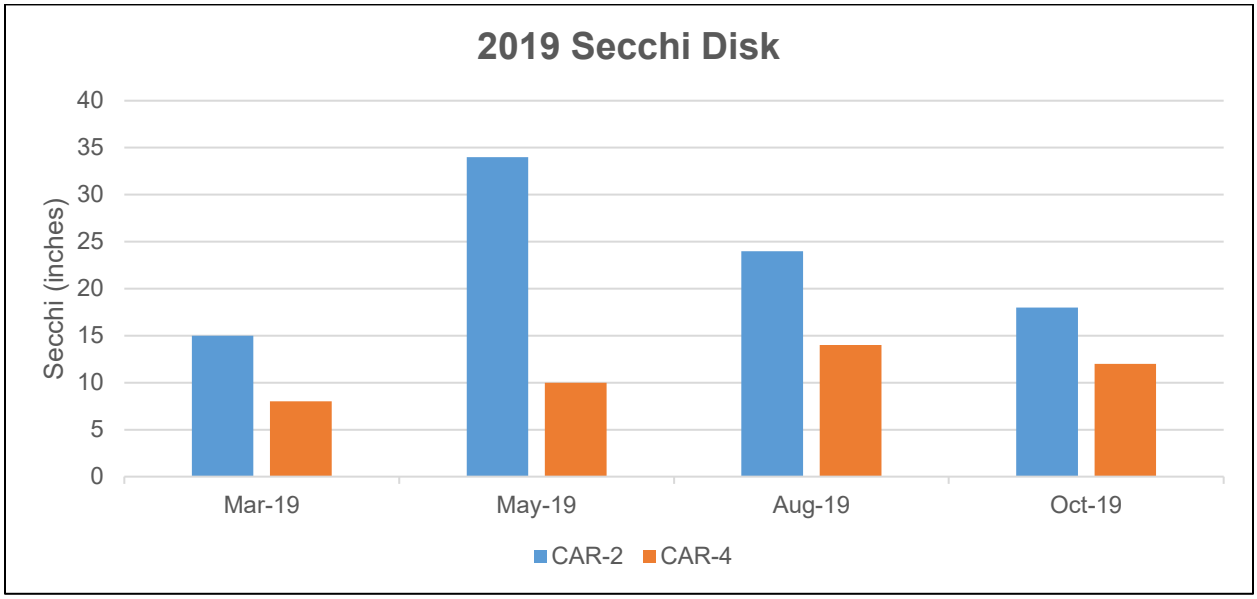
**Total phosphorus exceeded the proposed criteria of 0.05 mg/L for all locations. This study does not acknowledge a water quality criteria for orthophosphate.*

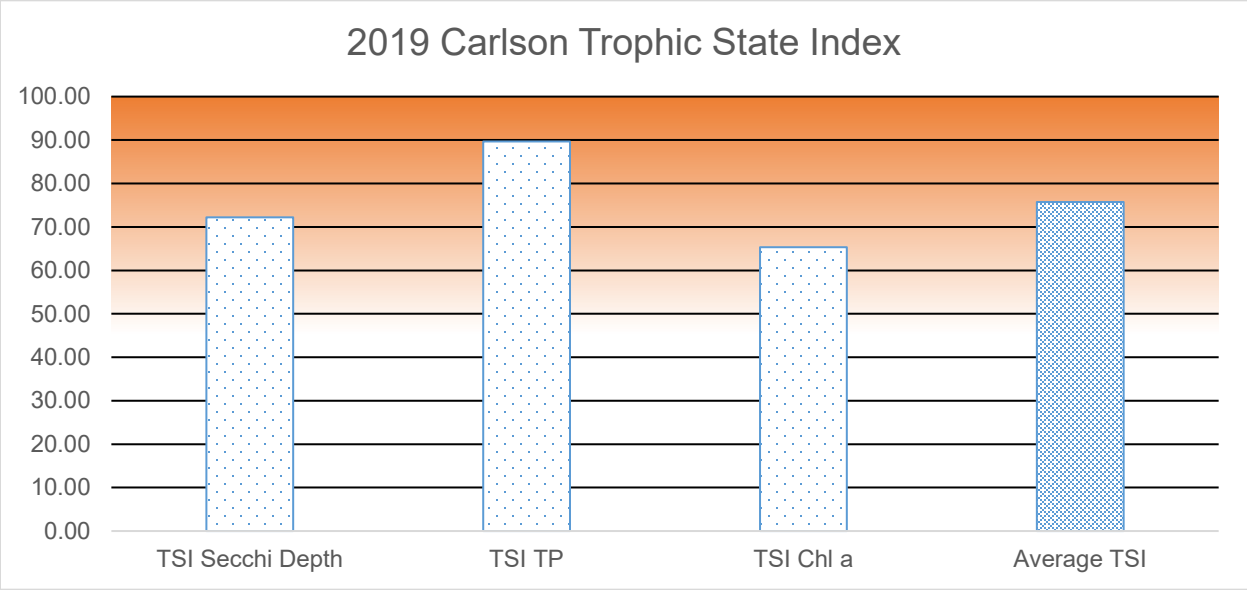


**Red line approximately indicates the water quality standard of 25 mg/cm^3. See Carlson 1977.*

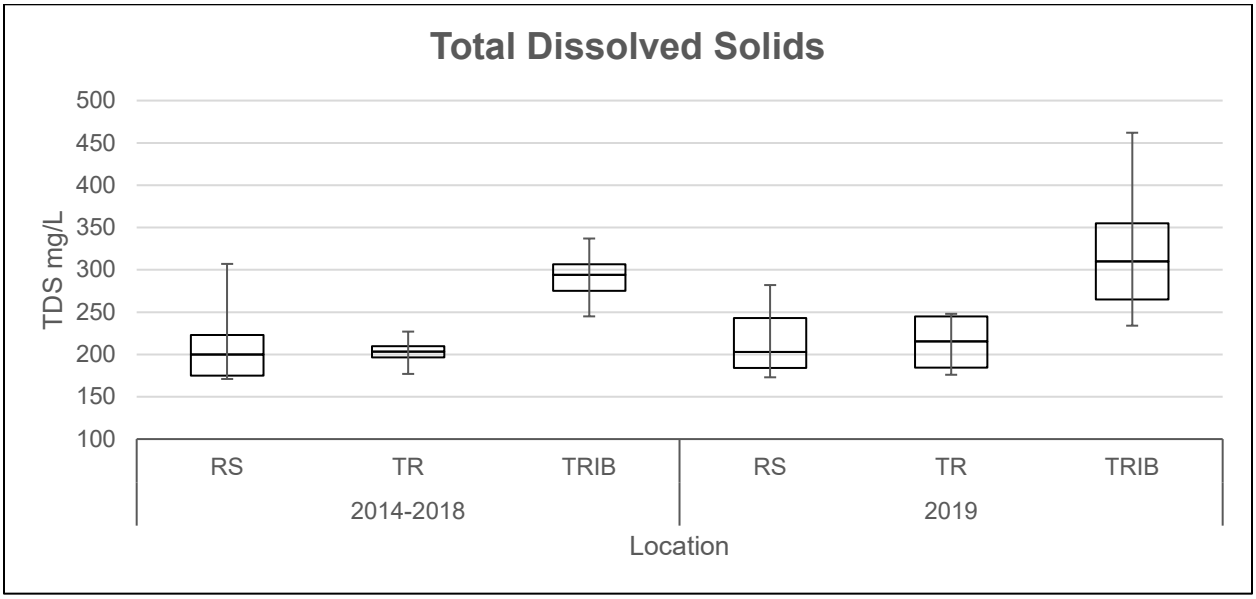
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Chl a	RS	52.92	38.55	32	17.92	46.83	39.45	8	31.66
	TRIB	39.45	32.50	15	17.88	22.13	23.60	4	26.55
Pheo a	RS	8.36	8.25	32	2.07	9.11	7.55	8	6.43
	TRIB	6.51	3.40	15	4.18	7.58	4.40	4	14.45

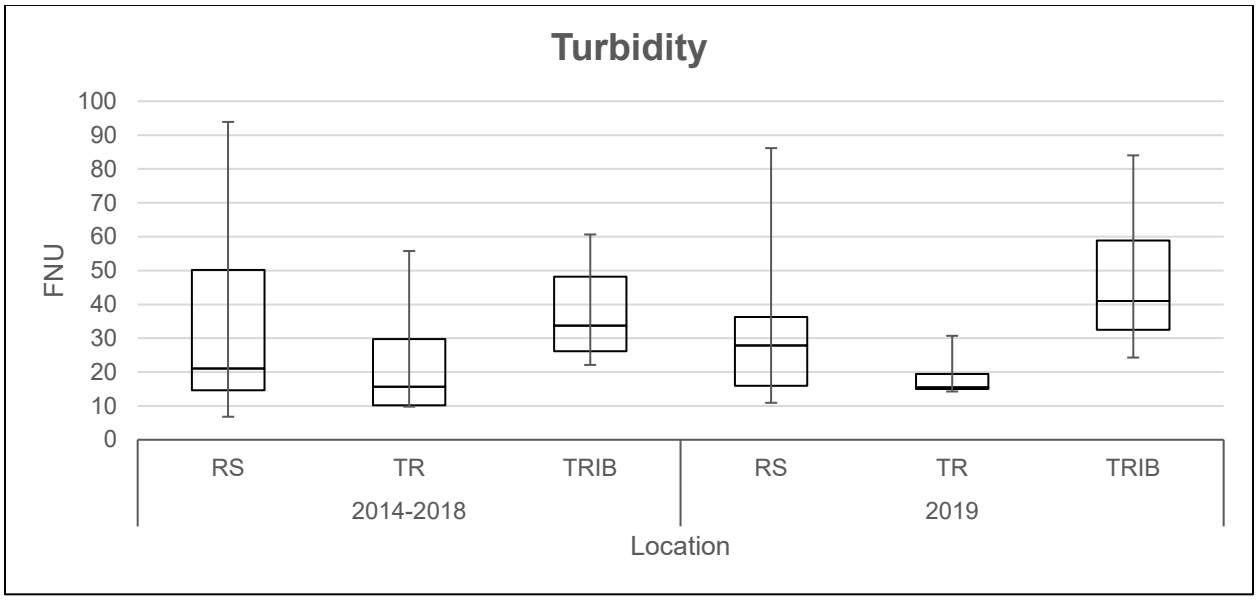
The proposed criteria for chlorophyll-a of 25mg/cm^3 was exceeded at most of the lake sites in 2019. This study does not acknowledge a criteria for pheophytin.





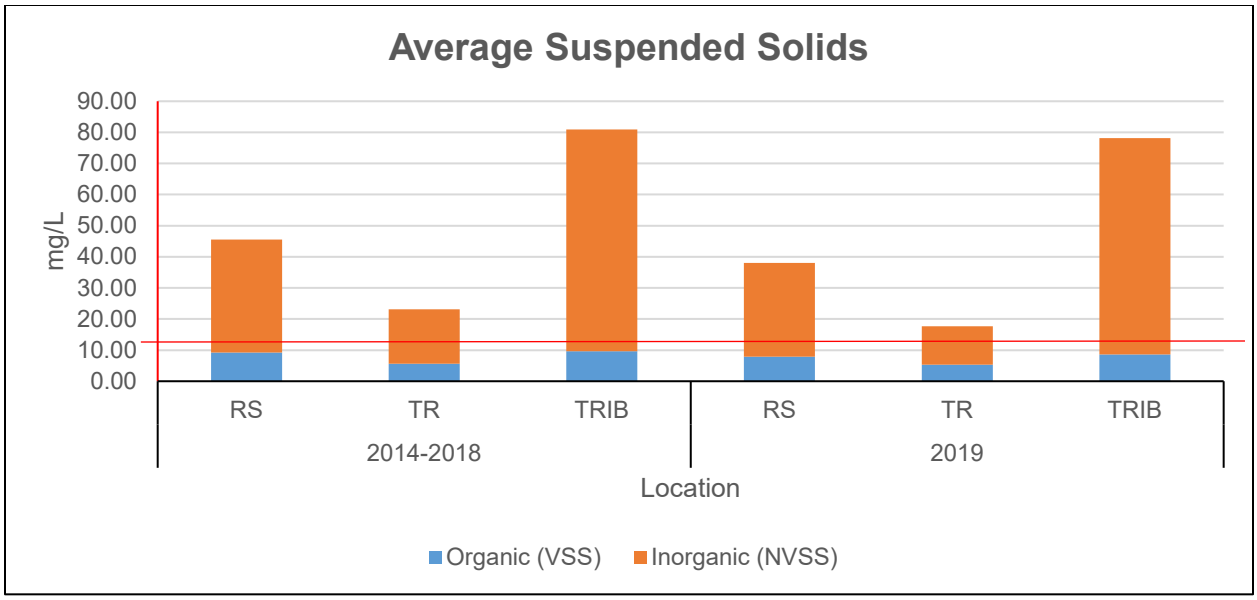
<40 = Oligotrophic __ 40-60 = Mesotrophic __ 60-70 = Eutrophic __ >80 Hypereutrophic





		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
FNU	RS	58.61	23.66	16	53.03	38.88	30.67	17	20.04
	TR	24.24	15.71	4	34.44	18.99	15.49	4	12.47
	TRIB	37.95	33.75	8	12.17	48.03	40.95	8	19.26
TDS	RS	207.18	200.00	17	21.42	213.76	203.00	17	17.71
	TR	202.75	203.50	4	32.52	213.75	215.50	4	59.74
	TRIB	291.63	294.00	8	23.03	327.75	310.00	8	73.05

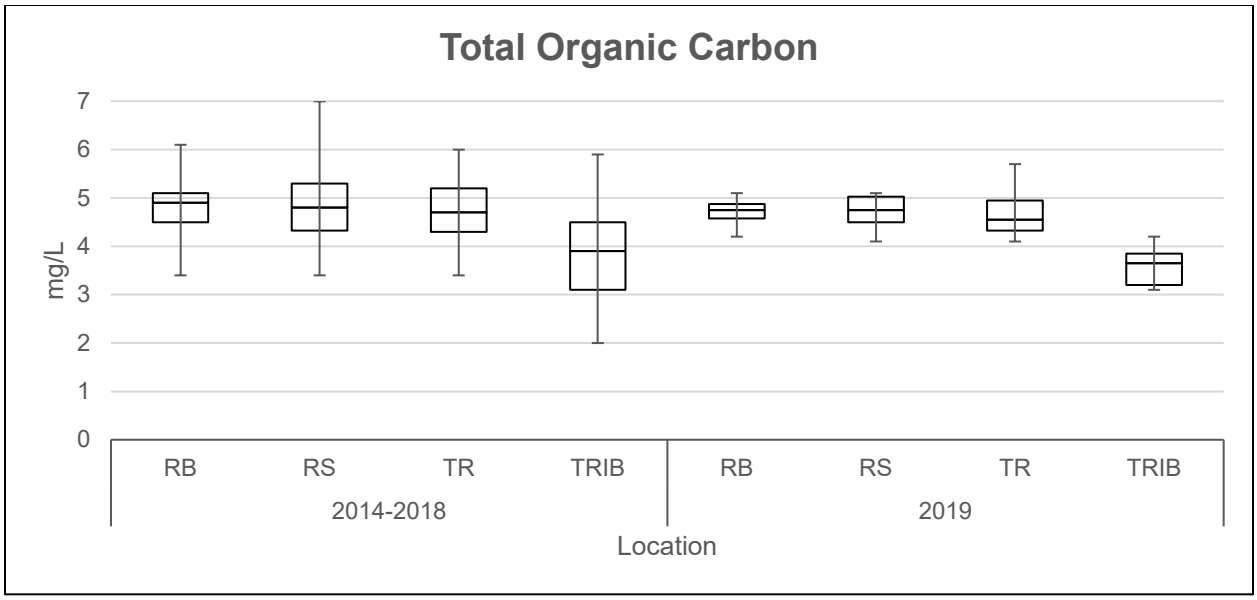
* *All observations of TDS were within the referenced water quality standard.*



**Red line indicates the TSS water quality standard of 12 mg/L for lakes.*

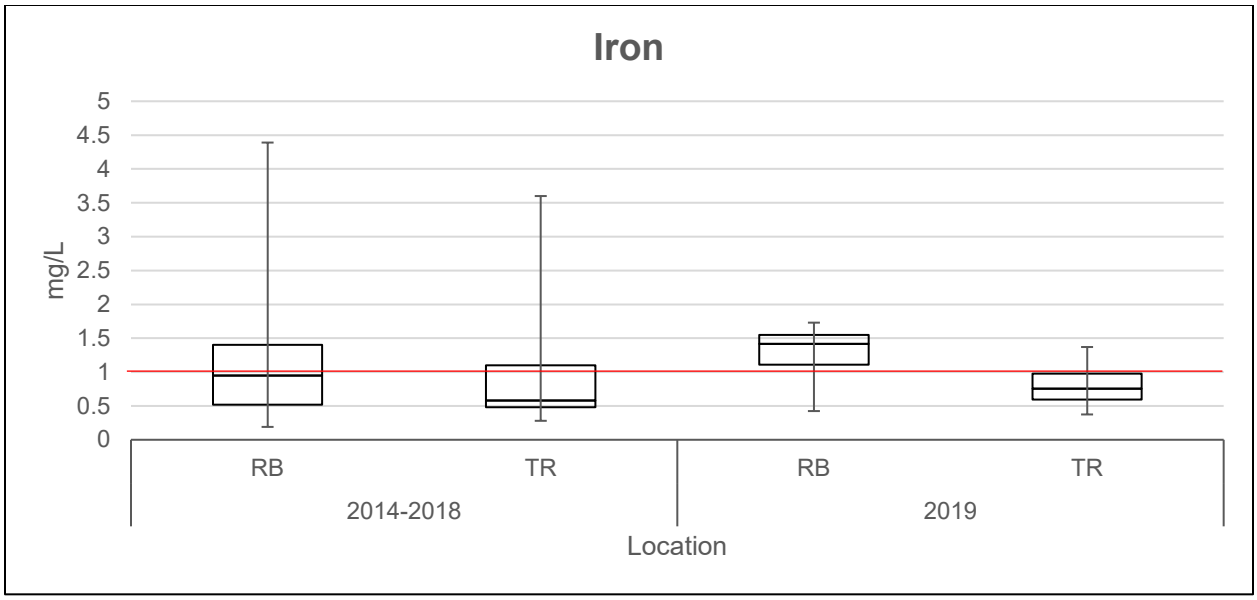
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
TSS	RS	45.50	35.90	34	13.85	38.01	26.40	8	32.65
	TR	23.07	17.80	17	6.87	17.64	19.95	4	9.88
	TRIB	80.88	67.55	32	15.36	78.19	83.00	8	17.93
VSS	RS	9.24	8.45	34	1.85	7.94	7.77	8	3.50
	TR	5.62	5.00	17	1.54	5.28	4.23	4	6.73
	TRIB	9.67	9.60	32	1.27	8.61	8.80	8	1.58
NVSS	RS	36.26	22.75	34	12.49	30.08	17.20	8	31.11
	TR	17.45	13.00	17	5.70	12.36	12.93	4	6.66
	TRIB	71.21	56.25	32	14.64	69.58	76.40	8	17.51

**In 2019 the TSS stream standard (116 mg/L) was not exceeded, while the TSS lake standard (12 mg/L) was exceeded during each sampling event except at CAR-2 in May.*

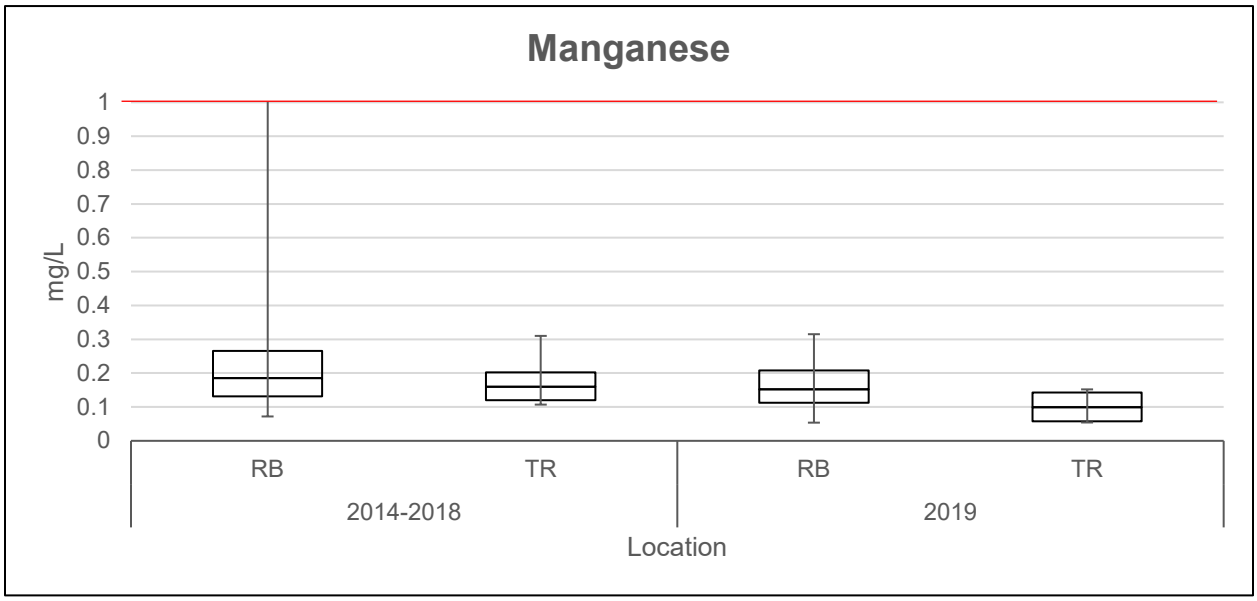


	Historical Reference 2014-2018				2019			
Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
RB	4.75	4.90	17	0.36	4.70	4.75	4	0.60
RS	4.83	4.80	34	0.28	4.70	4.75	8	0.32
TR	4.67	4.70	17	0.38	4.73	4.55	4	1.11
TRIB	3.91	3.90	32	0.36	3.60	3.65	8	0.34

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



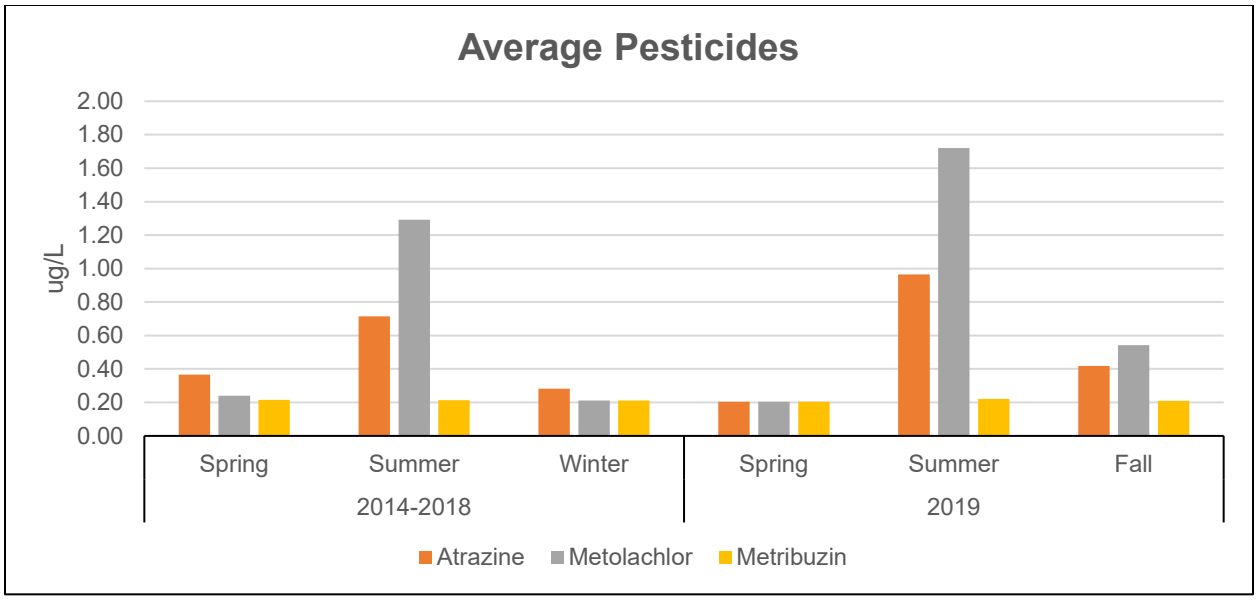
**Red line indicates the water quality standard of 1 mg/L.*



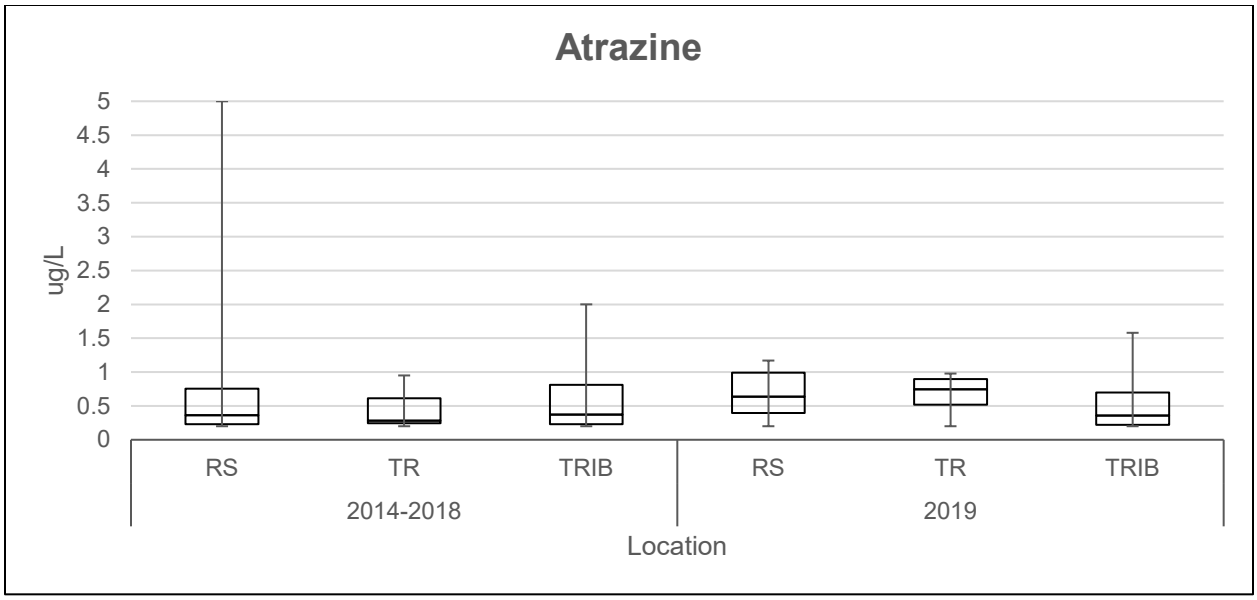
**Red line indicates the water quality standard of 1 mg/L.*

		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Iron	RB	1.26	0.95	16	0.63	1.25	1.42	4	0.91
	TR	1.02	0.58	17	0.50	0.81	0.76	4	0.67
Mang	RB	0.26	0.19	16	0.13	0.17	0.15	4	0.17
	TR	0.17	0.16	17	0.03	0.10	0.10	4	0.08

**In 2019 iron exceeded the standard of 1 mg/L near the lake bottom in front of the dam three times and once in the tail race. Manganese did not exceed the criterion.*

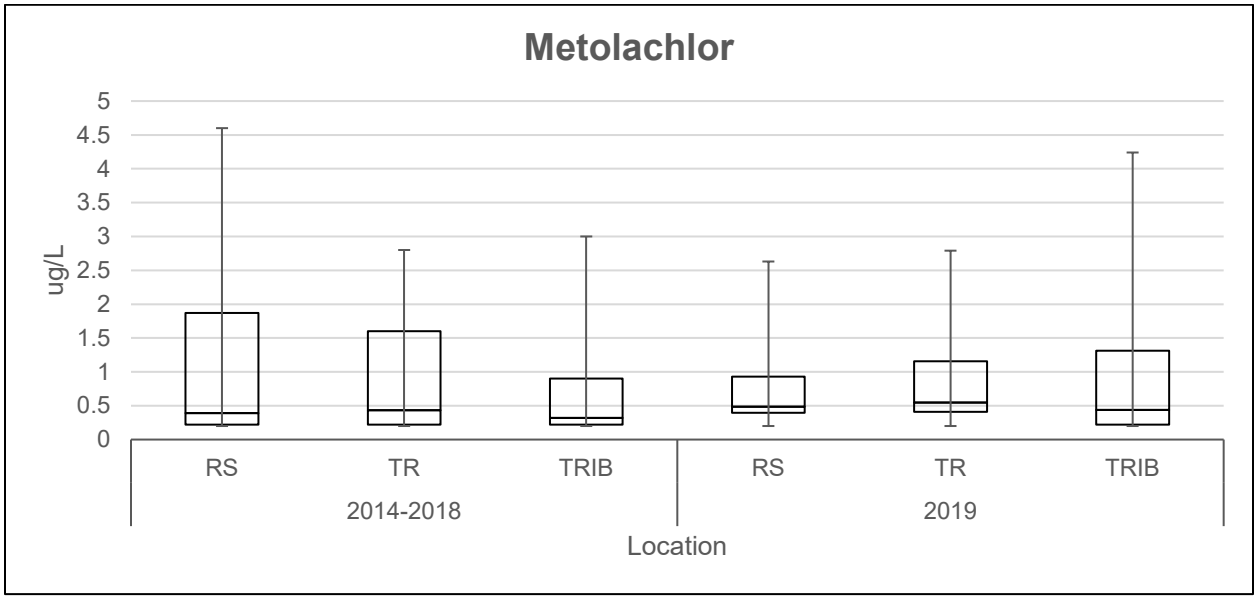


**Of the eight pesticides tested, only the above three were reported above detection levels for the period 2014-2019.*



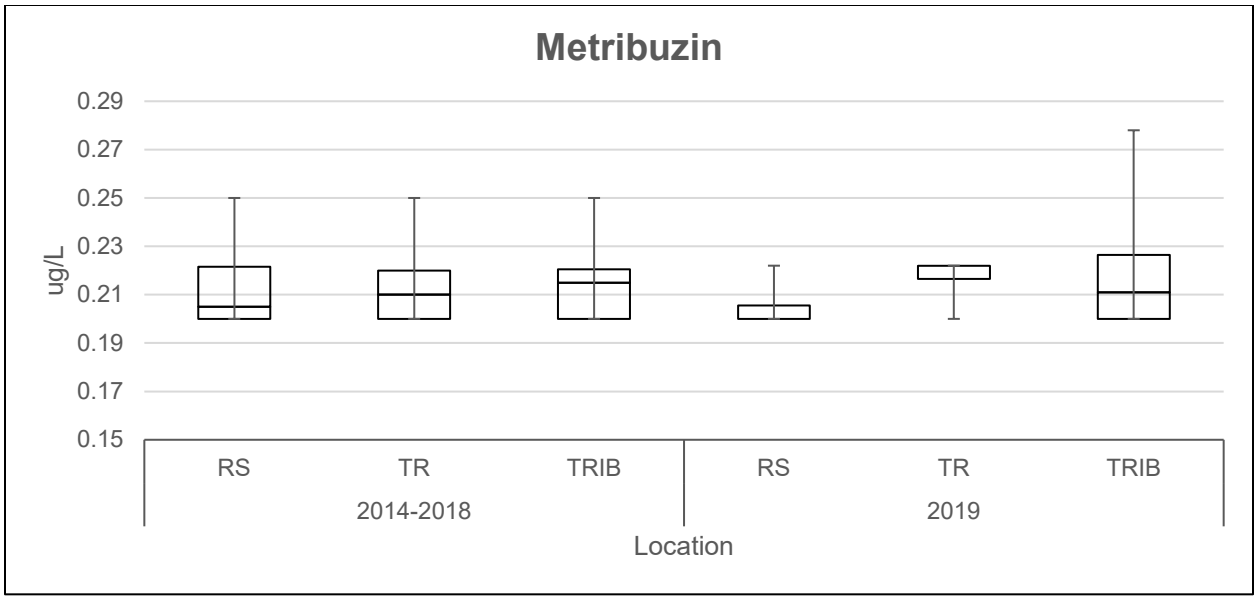
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Atrazine	RS	0.67	0.36	34	0.31	0.66	0.63	8	0.32
	TR	0.43	0.28	17	0.13	0.67	0.74	4	0.55
	TRIB	0.57	0.37	32	0.17	0.60	0.36	8	0.47

**Atrazine did not exceed water quality criteria in 2019.*



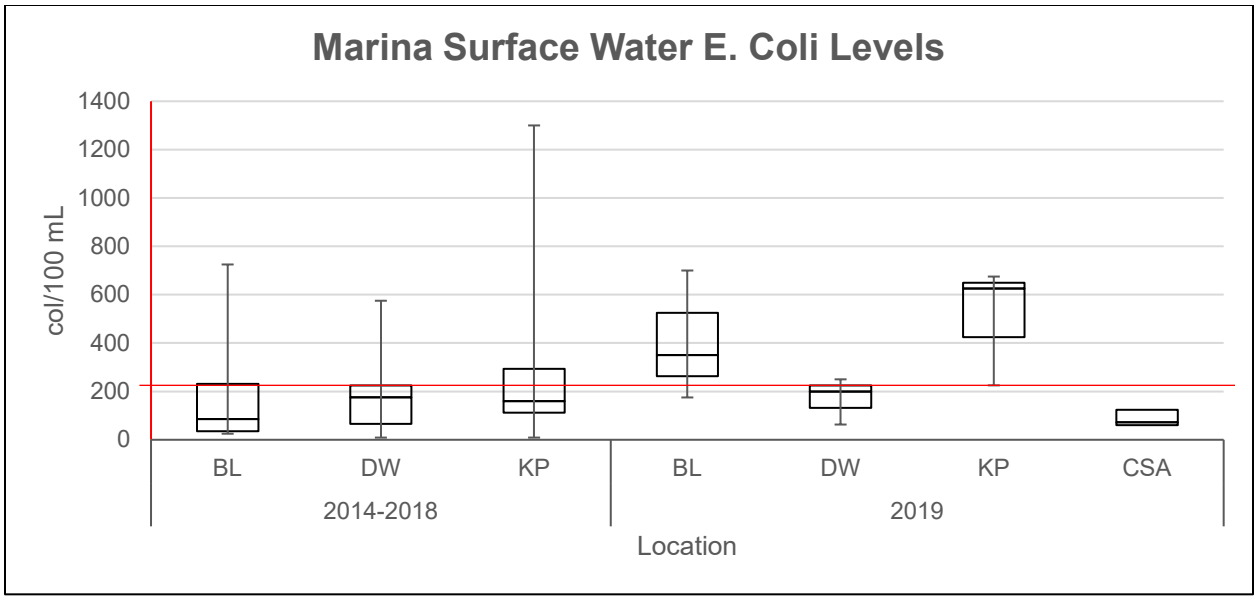
		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Metolachlor	RS	1.05	0.39	34	0.40	0.89	0.49	8	0.78
	TR	0.90	0.43	17	0.44	1.02	0.54	4	1.90
	TRIB	0.80	0.32	32	0.33	1.22	0.44	8	1.35

**Metolachlor did not exceed water quality criteria in 2019.*



		Historical Reference 2014-2018				2019			
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
Metribuzin	RS	0.21	0.21	34	0.01	0.21	0.20	8	0.01
	TR	0.21	0.21	17	0.01	0.22	0.22	4	0.02
	TRIB	0.21	0.22	32	0.01	0.22	0.21	8	0.02

**Metribuzin did not exceed water quality criteria in 2019.*



*Red line approximately indicates the water quality standard of 235 col per 100 mL.

	Historical Reference 2014-2018				2019			
Marina Location	Mean	Median	Count	CL (95.0%)	Mean	Median	Count	CL (95.0%)
Boulder Marina	196.92	85.50	12	154.17	408.33	350.00	3	664.05
Dam West Marina	203.83	175.00	12	119.61	171.00	200.00	3	240.50
Keyesport Marina	268.75	160.00	12	218.06	508.33	625.00	3	612.70
Carlyle Sailing Association					99.00	72.00	3	165.77

*Marina bacteria levels exceeded the reference water quality criterion at all locations except CSA.

2019 Swimming Beach Bacteria Levels (E. Coli / 100mL)										
	Keyesport		Harbor Light		Dam West		McNair		Coles Creek	
	East	West	East	West	North	South	North	South	North	South
5/1/2019	25	45	144	145	40	29	60	55	51	42
5/8/2019	36	50	130	133	43	47	70	55	85	68
5/15/2019	55	51	115	122	65	50	45	33	65	105
5/22/2019	105	102	120	110	45	42	65	60	95	90
5/29/2019	140	112	85	80	120	100	140	122	130	115
6/5/2019	200	180	150	141	120	88	50	45	105	91
6/12/2019	88	79	158	145	45	41	150	110	58	52
6/19/2019	75	75	165	145	55	45	116	94	98	91
6/26/2019	100	90	150	135	75	55	40	40	120	114
7/3/2019	123	110	176	151	96	88	71	60	126	91
7/11/2019	128	89	110	105	160	141	180	150	146	142
7/19/2019	95	105	225	204	120	114	143	120	150	435
7/24/2019	115	108	185	154	105	92	133	112	165	140
7/31/2019	46	41	110	97	75	66	50	41	44	32
8/7/2019	74	58	171	161	84	80	97	78	89	91
8/14/2019	101	79	174	145	87	74	75	69	120	98
8/21/2019	71	88	152	132	75	55	56	40	144	132
9/6/2019	65	55	155	135	45	41	37	35	124	121
9/11/2019	78	65	175	161	47	41	54	50	113	111
9/18/2019	51	45	145	145	41	36	51	49	91	85

**Beach bacteria levels exceeded the reference water quality criterion once in July at Coles Creek South.*

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 bacteria, TP, TSS, and TFe were evident. In addition CHL_a and subsequent TSI levels were indicative of a hyper eutrophic system.

Average E. Coliform levels were higher at Boulder Marina (408 col/100mL) and Keyesport Marina (508 col/100mL) in 2019 compared to the historical averages of 197 col/100mL and 269 col/100mL respectively. Bacteria levels can be highly variable and high levels may not necessarily be representative of the entire system. There were precipitation events before some of these high samples were taken which can increase runoff and contribute to higher bacteria levels. E. Coliform levels are monitored for the protection of human health as it relates to full body contact of recreational waters. Given that 2019 high bacteria levels in the Marinas are not swimming areas, there is a lower risk to humans. Long term bacteria monitoring and analyses will be important to assess changes over time. Swimming beaches at Carlyle Lake are also monitored for bacteria by the Lake Project staff. During 2019 the state standard was exceeded only one time.

TP levels have surpassed the 0.05 mg/L criterion for several years. In 2019 the TP criterion was exceeded at all locations with an average across all sites of 0.37 mg/L, comparable to the historical average of 0.35 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, algal blooms can sometimes contain toxins which may be harmful to humans and wildlife.

Although there is not a state criterion for CHL_a the proposed standard of 25 mg/cm^3 was exceeded at most sampling locations in 2019. The 2019 average CHL_a of 34.48 mg/cm^3 was less than the historical average of 46.19 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 Carlyle Lake is 75.74. Carlyle Lake considered eutrophic based on this TSI level. This does not necessarily mean the water quality is poor, but that its trophic level indicates nutrient levels are abundant, which can support an abundance of plants and algae. Long term monitoring and analyses are important to assess changes over time.

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. The 2019 TSS criteria were exceeded at all locations in the lake (12 mg/L), but not in the tailrace or tributaries. Historical TSS levels are similar to the 2019 results.

Living organisms require trace amounts of metals, excessive levels can be harmful. TFe exceeded the criterion of 1 mg/L three times at the bottom reservoir location in front of the dam and once in the tailrace in 2019. Comparably, there are multiple times TFe was high historically (2014-2018) at the same locations. 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 spillway will be oxidized in a short period of time.

All remaining parameters evaluated during the 2019 water quality monitoring effort were within designated criteria or within historical reference norms.

MONITORING PROGRAM RECOMMENDATIONS

The IEPA currently has listed Carlyle Lake as impaired for total suspended solids, total phosphorous, and mercury while the Kaskaskia River upstream from the Lake is impaired for dissolved oxygen, Atrazine, and mercury. The lists of sources for these impairments are contaminated sediments, crop production, and unknown sources. At present the only tributary being sampled by CEMVS is the Kaskaskia River. IEPA also has the following listed as impaired: Hurricane Creek, North Fork Kaskaskia, and East Fork Kaskaskia. It is recommended to add these three tributaries to the routine sampling plan in order to increase the dataset and improve our ability to assess the water quality condition of Carlyle Lake.

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

Given the eutrophic status of Carlyle Lake it is recommended that Nitrite (NO_2) be added to the monitoring program if possible. Doing so would allow CEMVS to evaluate Total Nitrogen (TN), which is a strong indicator of trophic status.

Given the above mentioned high bacteria levels observed at the Marinas in 2019, it is recommended to add routine bacteria sampling to the tributaries (CAR-12, CAR-13, and any additional tributaries). This would be useful in assessing getting a larger picture of potential bacteria coming in to the lake.

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

APPENDIX A: FIELD DATA

Date	Location	Depth	Temp	Redox	Cond	DO	DO mg/L	pH	TDS	Turbidity
3/19/2019	CAR-1	1.36	7.56	532.3	382	111.3	13.3	8.03	248	30.71
3/19/2019	CAR-2	0.62	7.94	469.7	379.1	101.7	12.04	8.01	246	29.98
3/19/2019	CAR-2	1.061	8.00	473.3	379.1	101.5	12.01	8.05	246	30.67
3/19/2019	CAR-2	2.026	8.00	475.2	379.1	101	11.95	8.05	246	30.26
3/19/2019	CAR-2	3.022	7.50	477.2	380.7	97.1	11.62	8.01	247	30.24
3/19/2019	CAR-2	4.03	7.22	478.4	381.1	95	11.45	7.98	248	28.33
3/19/2019	CAR-2	5.117	7.44	474.7	380.7	96.8	11.61	7.99	247	29.94
3/19/2019	CAR-2	6.025	7.17	474.9	381.4	95.3	11.5	7.97	248	28.73
3/19/2019	CAR-2	7.04	7.17	474.9	381.4	94.5	11.41	7.94	248	29.17
3/19/2019	CAR-2	8.082	7.17	474.2	381.3	94.2	11.38	7.92	248	28.46
3/19/2019	CAR-4	1.028	8.89	442.2	266.3	82.3	9.54	7.95	173	172.16
3/19/2019	CAR-4	2.058	8.89	442.7	266.2	79.8	9.25	7.81	173	173.26
3/19/2019	CAR-4	3.12	8.89	442.3	266.2	79.5	9.22	7.77	173	176.71
3/19/2019	CAR-4	4.089	8.89	441.9	266.2	79.4	9.2	7.76	173	180.84
3/19/2019	CAR-4	5.109	8.89	441.5	266.1	79.3	9.18	7.74	173	154.27
3/19/2019	CAR-4	6.098	8.94	440.8	265.7	79.2	9.17	7.73	173	153.95
3/19/2019	CAR-4	7.101	8.94	439.9	265.9	79.1	9.15	7.72	173	192.64
3/19/2019	CAR-4	8.036	8.89	439.1	266.3	79.1	9.15	7.71	173	174.13
3/19/2019	CAR-9	2.412	5.83	451.3	470.7	93.2	11.63	8.07	306	54.49
3/19/2019	CAR-9	0.998	5.83	453.4	470.4	92.8	11.58	8	306	84.02
3/19/2019	CAR-12	1.735	7.61	426.2	396	86.4	10.32	8.1	257	73.75
3/19/2019	CAR-12	1.263	7.39	425.4	398	84.8	10.19	7.93	259	81.4
5/14/2019	CAR-1	0.514	16.9	361.9	376	101.8	9.85	8.04	244	15.28
5/14/2019	CAR-2	0.039	17.1	367	377.3	82.4	7.94	7.99	245	13.34
5/14/2019	CAR-2	1.1	17.1	372.1	377.3	81.8	7.89	7.84	245	13.69
5/14/2019	CAR-2	2.138	16.9	371.6	377.2	78.9	7.64	7.79	245	13.74
5/14/2019	CAR-2	3.077	16.8	370.3	376.8	76.6	7.43	7.77	245	15.55
5/14/2019	CAR-2	4.061	16.5	369.1	373.6	64.5	6.29	7.65	243	24.54
5/14/2019	CAR-2	5.029	16.6	367.3	373.9	65.2	6.35	7.65	243	21.35
5/14/2019	CAR-2	5.988	16.6	366	374.7	65	6.33	7.65	244	23.77
5/14/2019	CAR-2	6.581	16.5	360.1	372.6	63.1	6.16	7.66	242	27.42
5/14/2019	CAR-4	0.354	16.4	229.6	434	97.3	9.52	8.03	282	32.72
5/14/2019	CAR-4	1.001	16.4	241.3	434.6	97.7	9.54	8.01	282	32.36
5/14/2019	CAR-4	2.165	16.3	247.6	426.3	95.2	9.33	7.95	277	33.33
5/14/2019	CAR-4	3.178	15.6	252.3	412.3	87.3	8.69	7.84	268	37.4
5/14/2019	CAR-4	4.069	15.2	256	412.2	82.5	8.27	7.78	268	42.84
5/14/2019	CAR-4	4.991	15.3	259	418.1	83.3	8.33	7.87	272	41.6
5/14/2019	CAR-4	6.088	15.2	260.1	422.1	82.1	8.23	7.86	274	46.54
5/14/2019	CAR-12	-0.184	15.1	293.1	483.6	100.5	10.09	8.04	314	40
5/14/2019	CAR-13	-0.09	15	305.1	491.7	91.4	9.2	8.11	320	34.38
5/14/2019	CAR-BL-MAR	0	18.2	245.7	295.4	120.7	11.36	8.36	192	18.04

5/14/2019	CAR-BL-MAR	1.167	14.8	156	291.9	60.2	6.09	7.75	190	44.38
5/14/2019	CAR-CSA-MAR	0.126	17.3	359.5	376.8	89.7	8.61	8.23	245	14.8
5/14/2019	CAR-CSA-MAR	1.113	16.8	358.1	373.3	82.9	8.04	8.15	243	17.8
5/14/2019	CAR-DW-MAR	0	17.3	319.7	365.9	88.5	8.49	8.19	238	15.83
5/14/2019	CAR-DW-MAR	1.14	16.8	320.3	365.9	82.7	8.02	8.11	238	16.6
5/14/2019	CAR-DW-MAR	2.349	16.4	264.1	368.4	62.5	6.11	7.88	239	32.94
5/14/2019	CAR-KP-MAR	0.34	16.3	300.7	395.9	90.6	8.88	8.05	257	36.26
5/14/2019	CAR-KP-MAR	1.137	15.4	301.1	395.1	82	8.19	7.94	257	49.85
5/14/2019	CAR-KP-MAR	0.631	15.5	300.5	396.7	80.7	8.05	7.91	258	39.86
8/1/2019	CAR-1	1.023	27.6	282.1	287.9	106.8	8.41	9.02	187	15.69
8/1/2019	CAR-2	0.449	28	165	285	141.2	11.06	9.03	185	10.99
8/1/2019	CAR-2	1.166	28	200.5	284.9	143	11.18	9.09	185	10.92
8/1/2019	CAR-2	2.033	27.9	213.4	285.1	142.4	11.16	9.1	185	11.1
8/1/2019	CAR-2	3.045	27.9	225.5	285.2	140.6	11.03	9.08	185	11.27
8/1/2019	CAR-2	4.095	27.9	232.4	285.2	140.1	10.99	9.08	185	11.34
8/1/2019	CAR-2	5.101	27.9	236.6	285.4	139.1	10.91	9.09	185	11.09
8/1/2019	CAR-2	5.984	27.7	244.4	285.8	129.6	10.19	9.06	186	11.07
8/1/2019	CAR-2	7.317	27.6	250.1	286.8	122	9.61	9.01	186	11.24
8/1/2019	CAR-2	8.011	27.5	255.3	287.7	108.7	8.57	8.95	187	12.86
8/1/2019	CAR-4	0	27.9	187.7	371.1	176	13.79	8.92	241	20.56
8/1/2019	CAR-4	1.043	27	215.3	371.4	119.7	9.53	8.67	241	25.04
8/1/2019	CAR-4	2.153	26.8	244.5	372.1	99.1	7.92	8.46	242	46.44
8/1/2019	CAR-4	3.005	26.3	257.1	369.4	63.6	5.12	8.15	240	45.55
8/1/2019	CAR-4	4.129	26.2	263.7	369.4	59.2	4.78	8.09	240	50.05
8/1/2019	CAR-4	5.08	26.2	268.1	368.2	53.3	4.31	8.03	239	92.38
8/1/2019	CAR-12	-0.378	25.7	275.5	360.3	79.1	6.45	7.57	234	41.9
8/1/2019	CAR-13	-0.167	25.6	367	410.5	87.1	7.12	7.83	267	51.62
8/1/2019	CAR-13	2.857	25.5	374.5	410.6	86.8	7.09	7.77	267	55.64
8/1/2019	CAR-13	2.077	25.5	379	410.5	86.8	7.09	7.7	267	52.09
8/1/2019	CAR-13	0.871	25.5	380.5	410.5	86.8	7.1	7.68	267	51.34
8/1/2019	CAR-BL-MAR	1.693	26.5	382	310.7	70	5.63	8.38	202	32.03
8/1/2019	CAR-BL-MAR	1.33	26.7	369	308.5	64.1	5.13	8.23	201	23.81
8/1/2019	CAR-CSA-MAR	0	28.2	388.3	283.9	155.5	12.13	8.97	185	10.72
8/1/2019	CAR-CSA-MAR	1.496	27.7	384.1	286.1	134	10.54	8.93	186	13.68
8/1/2019	CAR-DW-MAR	0.304	28.4	216.4	281	161.1	12.51	9.14	183	8.94
8/1/2019	CAR-DW-MAR	1.637	28.2	276.2	283	138.4	10.8	9.05	184	11.66
8/1/2019	CAR-DW-MAR	2.541	27.8	302	286.6	99.6	7.82	8.8	186	17.35
8/1/2019	CAR-KP-MAR	1.444	27.3	274.2	374.1	91.1	7.2	8.6	243	31.81
8/1/2019	CAR-KP-MAR	0.542	27.8	262.7	368.6	125.8	9.88	8.7	240	19.47
10/8/2019	CAR-1	0.826	20.5	282.5	270.4	81	7.29	8.08	176	14.26
10/8/2019	CAR-2	0.207	21.3	121.2	267.4	90.3	7.99	8.18	174	12.41
10/8/2019	CAR-2	1.07	21.2	131.2	268	82.2	7.29	8.14	174	13.96
10/8/2019	CAR-2	2.036	21.2	137.3	268	81.8	7.26	8.14	174	15.18

10/8/2019	CAR-2	3.091	21.2	143.9	267.9	82.3	7.3	8.12	174	15.89
10/8/2019	CAR-2	4.004	21.2	146.4	267.9	81.7	7.25	8.13	174	16.05
10/8/2019	CAR-2	5.135	21.2	150	268	81	7.19	8.12	174	15.66
10/8/2019	CAR-2	6.078	21.2	154.3	268.2	79.2	7.03	8.1	174	17.99
10/8/2019	CAR-2	7.048	21.2	156.4	268.1	78.9	7	8.12	174	17.37
10/8/2019	CAR-4	1.013	19.4	133.7	328.5	68.8	6.33	8.08	214	34.55
10/8/2019	CAR-4	2.053	19	142.3	334.3	69.8	6.47	8.06	217	40.69
10/8/2019	CAR-4	3.027	18.8	148.5	334.7	68.7	6.39	8.03	218	57.87
10/8/2019	CAR-4	4.091	18.8	153.3	334.4	68.5	6.37	8.01	217	52.49
10/8/2019	CAR-4	5.048	18.7	158.2	334	70.5	6.57	7.99	217	44.75
10/8/2019	CAR-4	6.055	18.5	163.1	333.6	70.9	6.64	7.96	217	51.16
10/8/2019	CAR-12	0.392	20.6	227.7	707	54.3	4.87	7.87	460	26.94
10/8/2019	CAR-13	0.342	17.9	179.3	710	103.4	9.78	8.12	462	22.02
10/8/2019	CAR-13	0.82	17.9	183.1	711	103.5	9.8	8.12	462	24.28
10/8/2019	CAR-BL-MAR	1.107	19.2	218.2	283.5	46.2	4.27	7.85	184	41.31
10/8/2019	CAR-CSA-MAR	0.528	20.9	107.6	266.5	103.3	9.23	8.46	173	15.57
10/8/2019	CAR-CSA-MAR	1.47	20.6	116	266.2	100.8	9.05	8.48	173	15.63
10/8/2019	CAR-DW-MAR	1.069	20.8	160	268.3	83.1	7.43	8.28	174	22.11
10/8/2019	CAR-DW-MAR	2.05	20.7	160.7	268.1	86	7.7	8.28	174	27.07
10/8/2019	CAR-KP-MAR	1.083	19.9	137.2	313.1	65.9	6	8.12	203	86.16

APPENDIX B: LABORATORY DATA

ARDL Inc.
Environmental | Analytical | Management | Safety

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

Customer Name: SLCOE **Date: 4/16/19**

Project Name: Carlyle Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 3/19/19 **ARDL Report No.: 8466**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
CAR-1	3/19/19	8466-01	NP Pesticide, Metals(1), Inorganics(2)
CAR-2-0	3/19/19	8466-02	NP Pesticide, Inorganics(2)(3)
CAR-2-10	3/19/19	8466-03	Metals(1), Inorganics(2)
CAR-4	3/19/19	8466-04	NP Pesticide, Inorganics(2)(3)
CAR-13	3/19/19	8466-05	NP Pesticide, Inorganics(2)
CAR-12	3/19/19	8466-06	NP Pesticide, Inorganics(2)(3)
CAR-15	3/19/19	8466-07	NP Pesticide, Inorganics(2)(3)

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

The quality control data are summarized as follows:

NPPEST\SIM FRACTION – METHOD 8270

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.

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

CASE NARRATIVE (Continued)

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 recoveries of all matrix spikes and matrix spike duplicates were within control limits.

DUPLICATE
Duplicate analyses are reported as MS/MSD, except TSS, TVSS, chlorophyll/pheophytin. RPD of the duplicate analyses met criteria.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.

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 8466

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-1	ARDL Lab No.:	008466-01
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326905
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	0820	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008466-01 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-1 Sampling Date: 03/19/2019 Moisture: NA
Received: 03/19/2019 Sampling Time: 0820

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		1.37	MG/L	3010A	6010C	03/21/19	03/21/19	P7173
(a) Manganese	0.00400	0.00500		0.0542	MG/L	3010A	6010C	03/21/19	03/21/19	P7173
Ammonia Nitrogen	0.0200	0.0300		0.139	MG/L	NONE	350.1	NA	03/20/19	03214423
Nitrate as Nitrogen	0.0570	0.0600		2.51	MG/L	NONE	GREEN	NA	03/29/19	04084458
Phosphorus	0.00800	0.0100		0.426	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.122	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	2.50	2.50		18.3	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	2.50	2.50		3.25	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

Sample 008466-01, Inorganic Analyses

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-2-0	ARDL Lab No.:	008466-02
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326908
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	0905	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	85%

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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008466-02 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-2-0 Sampling Date: 03/19/2019 Moisture: NA
Received: 03/19/2019 Sampling Time: 0905

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0657	MG/L	NONE	350.1	NA	03/20/19	03214423
Chlorophyll-a, Correcte	1.0	1.00		21.1	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Nitrate as Nitrogen	0.0570	0.0600		2.53	MG/L	NONE	GREEN	NA	03/29/19	04084458
Pheophytin-a	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Phosphorus	0.00800	0.0100		0.315	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.122	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	4.0	4.00		20.4	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		4.2	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008466-03
Field ID: CAR-2-10
Received: 03/19/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 03/19/2019
Sampling Time: 0910

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		1.34	MG/L	3010A	6010C	03/21/19	03/21/19	P7173
(a) Manganese	0.00400	0.00500		0.0537	MG/L	3010A	6010C	03/21/19	03/21/19	P7173
Ammonia Nitrogen	0.0200	0.0300		0.206	MG/L	NONE	350.1	NA	03/20/19	03214423
Nitrate as Nitrogen	0.0570	0.0600		2.7	MG/L	NONE	GREEN	NA	03/29/19	04084458
Phosphorus	0.00800	0.0100		0.35	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.125	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	4.0	4.00		20.0	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		4.2	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

Sample 008466-03, Inorganic Analyses

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-4	ARDL Lab No.:	008466-04
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326909
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	1010	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008466-04
Field ID: CAR-4
Received: 03/19/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 03/19/2019
Sampling Time: 1010

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		0.0866	MG/L	NONE	350.1	NA	03/20/19	03214423
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Nitrate as Nitrogen	0.0570	0.0600		1.75	MG/L	NONE	GREEN	NA	03/29/19	04084458
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Phosphorus	0.00800	0.0100		0.882	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.125	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	6.58	6.58		129	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	6.58	6.58		11.2	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		5.1	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-13	ARDL Lab No.:	008466-05
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326910
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	1120	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	85%

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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008466-05
Field ID: CAR-13
Received: 03/19/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 03/19/2019
Sampling Time: 1120

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		0.103	MG/L	NONE	350.1	NA	03/20/19	03214423
Nitrate as Nitrogen	0.0570	0.0600		4.07	MG/L	NONE	GREEN	NA	03/29/19	04084458
Phosphorus	0.00800	0.0100		0.451	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.162	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	4.0	4.00		83.2	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	4.0	4.00		5.6	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		3.1	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-12	ARDL Lab No.:	008466-06
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326911
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	1230	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	92%

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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008466-06 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-12 Sampling Date: 03/19/2019 Moisture: NA
Received: 03/19/2019 Sampling Time: 1230

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0876	MG/L	NONE	350.1	NA	03/20/19	03214423
Chlorophyll-a, Correcte	1.0	1.00		4.1	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Nitrate as Nitrogen	0.0570	0.0600		3.38	MG/L	NONE	GREEN	NA	03/29/19	04084458
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Phosphorus	0.00800	0.0100		0.695	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.14	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	4.0	4.00		82.8	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	4.0	4.00		6.8	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	03/25/19	04084461

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-15	ARDL Lab No.:	008466-07
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0326912
Sample Date:	03/19/2019	Received Date:	03/19/2019
Sample Time:	1235	Prep. Date:	03/22/2019
Matrix:	WATER	Analysis Date:	03/26/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	82%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008466 Report Date: 04/09/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008466-07 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-15 Sampling Date: 03/19/2019 Moisture: NA
Received: 03/19/2019 Sampling Time: 1235

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0843	MG/L	NONE	350.1	NA	03/20/19	03214423
Chlorophyll-a, Correcte	1.0	1.00		4.1	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Nitrate as Nitrogen	0.0570	0.0600		3.31	MG/L	NONE	GREEN	NA	04/05/19	04084457
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452
Phosphorus	0.00800	0.0100		0.543	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -ortho	0.00800	0.0100		0.14	MG/L	NONE	365.2	NA	03/20/19	03214427
Solids, Total Suspended	4.0	4.00		80.0	MG/L	NONE	160.2	NA	03/21/19	03274441
Solids, Volatile Suspen	4.0	4.00		6.4	MG/L	NONE	160.4	NA	03/21/19	03274442
Total Organic Carbon	0.500	1.00		4.3	MG/L	NONE	415.1	NA	03/25/19	04084461

(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: 008466 Report Date: 03/28/2019

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

Field ID:	NA	ARDL Lab No.:	008466-01B1
Desc/Location:	NA	Lab Filename:	E0326903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	03/22/2019
Matrix:	QC Material	Analysis Date:	03/26/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11034
% 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	92%

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: 008466 Report Date: 04/09/2019

Project Name: CARLYLE 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	03/21/19	03/21/19	P7173	008466-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	03/21/19	03/21/19	P7173	008466-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	03/20/19	03214423	008466-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452	008466-07B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	03/29/19	04084458	008466-05B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	04/05/19	04084457	008467-02B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	03/20/19	03/28/19	04014452	008466-07B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	03/26/19	03/27/19	03294449	008464-07B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	03/20/19	03214427	008466-01B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	03/21/19	03274441	008466-01B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	03/21/19	03274442	008466-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	03/25/19	04084461	008466-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008466

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Matrix: QC Material QC Batch: B11034 Prep. Date: 03/22/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 03/26/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	0.79	1	79	--	--	--	30-130	--	--
Atrazine	0.85	1	85	--	--	--	30-130	--	--
Metribuzin	0.79	1	79	--	--	--	30-130	--	--
Alachlor	0.91	1	91	--	--	--	30-130	--	--
Metolachlor	0.98	1	98	--	--	--	30-130	--	--
Chlorpyrifos	0.88	1	88	--	--	--	30-130	--	--
Cyanazine	1	1	100	--	--	--	30-130	--	--
Pendimethalin	0.67	1	67	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	84	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008466-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008466

Report Date: 04/09/2019

Project Name: CARLYLE 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	--	P7173	008466-01C1
(a) Manganese	0.78	0.75	104	--	--	--	90-114	--	P7173	008466-01C1
Ammonia Nitrogen	0.96	1.0	96	--	--	--	80-120	--	03214423	008466-01C1
Nitrate as Nitrogen	1.1	1.0	106	--	--	--	80-120	--	04084457	008467-02C1
Nitrate as Nitrogen	1.1	1.0	105	--	--	--	80-120	--	04084458	008466-05C1
Phosphorus	0.71	0.67	106	--	--	--	80-120	--	03294449	008464-07C1
Phosphorus, -ortho	0.10	0.10	103	--	--	--	80-120	--	03214427	008466-01C1
Total Organic Carbon	10	10.0	100	--	--	--	76-120	--	04084461	008466-01C1

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 008466

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008466 Report Date: 03/28/2019

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

Field ID:	CAR-1	Prep. Date:	03/22/2019	ARDL Lab No.:	008466-01
Desc/Location:	CARLYLE LAKE	Amount Used:	1000 mL	Lab Filename:	
Sample Date:	03/19/2019	% Moisture:	NA	Received Date:	03/19/2019
Sample Time:	0820	QC Batch:	B11034	Analysis Date:	03/26/2019
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	0.77	1	77	0.69	1	69	30-130	11	30
Atrazine	ND	0.84	1	84	0.84	1	84	30-130	0	30
Metribuzin	ND	0.8	1	80	0.79	1	79	30-130	1.3	30
Alachlor	ND	0.86	1	86	0.87	1	87	30-130	1.2	30
Metolachlor	ND	1.04	1	104	1.02	1	102	30-130	1.9	30
Chlorpyrifos	ND	0.83	1	83	0.79	1	79	30-130	4.9	30
Cyanazine	ND	0.99	1	99	0.97	1	97	30-130	2	30
Pendimethalin	ND	0.74	1	74	0.67	1	67	30-130	9.9	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	92	87	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008466-01, 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: 008466

Report Date: 04/09/2019

Project Name: CARLYLE 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	1.4	2.3	1.0	89	2.2	1.0	87	87-115	1	20	P7173	008466-01MS
(a) Manganese	WATER	0.054	0.52	0.50	92	0.52	0.50	93	90-114	0	20	P7173	008466-01MS
Ammonia Nitrogen	WATER	0.14	2.2	2.0	101	2.1	2.0	97	75-125	3	20	03214423	008466-01MS
Nitrate as Nitrogen	WATER	4.1	5.0	1.0	97	5.1	1.0	99	75-125	0	20	04084458	008466-05MS
Phosphorus	WATER	0.88	1.8	0.83	115	1.6	0.83	88	75-125	13	20	03294449	008466-04MS
Phosphorus, -ortho	WATER	0.12	0.22	0.10	103	0.23	0.10	106	75-125	2	20	03214427	008466-01MS
Total Organic Carbon	WATER	4.1	9.2	5.0	101	9.2	5.0	101	76-120	0	20	04084461	008466-01MS

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 008466

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008466 Report Date: 04/09/2019

Project Name: CARLYLE 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	4.1	4.1	--	MG/CU.M.	0	--	04014452	008466-07D1
Pheophytin-a	ND	0	--	MG/CU.M.	NC	--	04014452	008466-07D1
Solids, Total Suspended	18.3	19.8	--	MG/L	8	--	03274441	008466-01D1
Solids, Volatile Suspend	3.3	3.0	--	MG/L	8	--	03274442	008466-01D1

(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008466

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8466

ARDL, Inc.

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

8466

CHAIN OF CUSTODY RECORD

PROJECT: Carlyle 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
CAR– 1	3/19/19	820		X		X		X	X	X	X	X		X					X	
CAR – 2 – 0	3/19/19	0905		X		X	X	X	X	X	X								X	
CAR – 2 – 10	3/19/19	0910		X		X		X	X	X		X							X	
CAR – 4	3/19/19	1010		X		X	X	X	X	X	X								X	
CAR – 13	3/19/19	1120		X		X		X	X	X	X								X	
CAR – 12	3/19/19	1230		X		X	X	X	X	X	X								X	
CAR – 15	3/19/19	1235		X		X	X	X	X	X	X								X	

Relinquished by: (Signature)	Date 3/19/19	Time 1:10	Received by: (Signature) Valerie Jenkins	REMARKS/SPECIAL INSTRUCTIONS:
Relinquished by: (Signature) Valerie Jenkins	Date 3/19/19	Time 1425	Received by: (Signature) 3-19-19	*Preserved with H_2SO_4 #Preserved with HNO_3
Received for Laboratory by: (Signature)	Date 3/19/19	Time 1425	Shipping Ticket No.	NOTE CAR 13 was taken at site CAR 9

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8466 Cooler # 1 of 2

Number of Coolers in Shipment: 2

Project: Carlyle Lake Date Received: 3-19-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 3-19-19 (20) dlc 3-20-19 (Signature) DLCochrum

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: 3-20-19 (Signature) DLCochrum

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: 3-20-19	On:

Chain-of-Custody # N/A

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

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 84666

Cooler # 2 of 2

Number of Coolers in Shipment: 2

Project: Carlyle Lake

Date Received: 3-19-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 3-20-19 (Signature) DR 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: 3-20-19 (Signature) DR 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: 3-20-19	On:

Chain-of-Custody # N/A

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: 7/01/19**

Project Name: Carlyle Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 5/14/19 **ARDL Report No.: 8476**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
CAR-1	5/14/19	8476-01	NP Pesticides, Metals(1), Inorganics(2)
CAR-2-0	5/14/19	8476-02	NP Pesticides, Inorganics(2)(3)
CAR-2-10	5/14/19	8476-03	Metals(1), Inorganics(2)
CAR-4	5/14/19	8476-04	NP Pesticides, Inorganics(2)(3)
CAR-13	5/14/19	8476-05	NP Pesticides, Inorganics(2)
CAR-12	5/14/19	8476-06	NP Pesticides, Inorganics(2)(3)
CAR-15	5/14/19	8476-07	NP Pesticides, Inorganics(2)(3)
CAR-KP-MARINA	5/14/19	8476-08	E. Coli
CAR-DW-MARINA	5/14/19	8476-09	E. Coli
CAR-BL-MARINA	5/14/19	8476-10	E. Coli
CAR-CSA	5/14/19	8476-11	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 and nitrate-nitrite were analyzed by an accredited outside laboratory due to instrument status. All samples required reanalysis at a dilution for nitrate-nitrite. Those for samples -02, -05, -06 and -07 were performed one day beyond normally accepted holding time. 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 recoveries 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, with the exception of pheophytin-a (23% RPD), 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.

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

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 8476

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-1	ARDL Lab No.:	008476-01
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522905
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	0824	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% 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	0.978		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	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: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008476-01 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-1 Sampling Date: 05/14/2019 Moisture: NA
Received: 05/14/2019 Sampling Time: 0824

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.844	MG/L	3010A	6010C	05/17/19	05/20/19	P7204
(a) Manganese	0.00400	0.00500		0.0582	MG/L	3010A	6010C	05/17/19	05/20/19	P7204
Ammonia Nitrogen	0.0200	0.0300		0.232	MG/L	NONE	350.1	NA	05/28/19	05294591
Nitrate as Nitrogen	0.100	0.100		1.68	MG/L	NONE	GREEN	NA	06/10/19	06144639
Phosphorus	0.00800	0.0100		0.213	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.12	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	1.33	1.33		8.67	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	1.33	1.33		1.47	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

Sample 008476-01, Inorganic Analyses

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-2-0	ARDL Lab No.:	008476-02
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522908
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	0901	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% 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	1.03		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	0.500		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	79%

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: 008476 Report Date: 07/01/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-02
Field ID: CAR-2-0
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
Sampling Time: 0901

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		0.217	MG/L	NONE	350.1	NA	05/28/19	05294591
Chlorophyll-a, Correcte	1.0	1.0		8.5	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Nitrate as Nitrogen	0.100	0.100	X	1.53	MG/L	NONE	GREEN	NA	06/12/19	06144640
Pheophytin-a	1.0	1.0		ND	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Phosphorus	0.00800	0.0100		0.182	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.102	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	1.33	1.33		6.0	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	1.33	1.33		1.47	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-03
Field ID: CAR-2-10
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
Sampling Time: 0906

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		1.73	MG/L	3010A	6010C	05/17/19	05/20/19	P7204
(a) Manganese	0.00400	0.00500		0.172	MG/L	3010A	6010C	05/17/19	05/20/19	P7204
Ammonia Nitrogen	0.0200	0.0300		0.26	MG/L	NONE	350.1	NA	05/28/19	05294591
Nitrate as Nitrogen	0.100	0.100		1.55	MG/L	NONE	GREEN	NA	06/10/19	06144639
Phosphorus	0.00800	0.0100		0.555	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.112	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	4.0	4.00		58.4	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	4.0	4.00		6.4	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.8	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

Sample 008476-03, Inorganic Analyses

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-4	ARDL Lab No.:	008476-04
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522909
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	1029	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.980		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	0.470		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	75%

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: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-04
Field ID: CAR-4
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
Sampling Time: 1029

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		0.0818	MG/L	NONE	350.1	NA	05/28/19	05294591
Chlorophyll-a, Correcte	1.0	1.00		29.0	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Nitrate as Nitrogen	0.250	0.250		3.0	MG/L	NONE	GREEN	NA	06/10/19	06144639
Pheophytin-a	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Phosphorus	0.00800	0.0100		0.274	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.0624	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	3.33	3.33		42.7	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	3.33	3.33		6.33	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.8	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-13	ARDL Lab No.:	008476-05
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522910
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	1138	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% 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	0.411		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	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: 008476 Report Date: 07/01/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-05
Field ID: CAR-13
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
Sampling Time: 1138

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		0.0704	MG/L	NONE	350.1	NA	05/28/19	05294591
Nitrate as Nitrogen	0.500	0.500	X	4.01	MG/L	NONE	GREEN	NA	06/12/19	06144640
Phosphorus	0.00800	0.0100		0.30	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.0283	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	4.0	4.00		85.2	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	4.0	4.00		8.4	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

Sample 008476-05, Inorganic Analyses

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-12	ARDL Lab No.:	008476-06
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522911
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	1223	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% 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	0.400		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: 008476 Report Date: 07/01/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008476-06 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-12 Sampling Date: 05/14/2019 Moisture: NA
Received: 05/14/2019 Sampling Time: 1223

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.078	MG/L	NONE	350.1	NA	05/28/19	05294591
Chlorophyll-a, Correcte	1.0	1.0		37.2	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Nitrate as Nitrogen	0.500	0.500	X	3.85	MG/L	NONE	GREEN	NA	06/12/19	06144640
Pheophytin-a	1.0	1.0		7.3	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Phosphorus	0.00800	0.0100		0.327	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.00800	0.0100		0.0362	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	6.67	6.67		94.0	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	6.67	6.67		10.0	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.2	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID:	CAR-15	ARDL Lab No.:	008476-07
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0522912
Sample Date:	05/14/2019	Received Date:	05/14/2019
Sample Time:	1032	Prep. Date:	05/15/2019
Matrix:	WATER	Analysis Date:	05/22/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.222	0.222	ND		UG/L	1
Atrazine	0.222	0.222	0.933		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	0.456		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	74%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008476 Report Date: 07/01/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008476-07 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-15 Sampling Date: 05/14/2019 Moisture: NA
Received: 05/14/2019 Sampling Time: 1032

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.059	MG/L	NONE	350.1	NA	05/28/19	05294591
Chlorophyll-a, Correcte	1.0	1.0		29.0	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Nitrate as Nitrogen	0.500	0.500	X	2.77	MG/L	NONE	GREEN	NA	06/12/19	06144640
Pheophytin-a	1.0	1.0		2.7	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589
Phosphorus	0.00800	0.0100		0.30	MG/L	365.2	365.2	05/28/19	05/29/19	06034606
Phosphorus, -ortho	0.0080	0.010		0.06	MG/L	NONE	365.2	NA	05/15/19	05174545
Solids, Total Suspended	4.0	4.00		43.6	MG/L	NONE	160.2	NA	05/15/19	05174550
Solids, Volatile Suspen	4.0	4.00		7.2	MG/L	NONE	160.4	NA	05/15/19	05174551
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	05/30/19	06044608

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008476-08 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-KP-MARINA Sampling Date: 05/14/2019 Moisture: NA
Received: 05/14/2019 Sampling Time: 1045

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.0	1.00		625	COL/100 ML	NONE	1604	NA	05/14/19	05174548

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008476-09 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-DW-MARINA Sampling Date: 05/14/2019 Moisture: NA
Received: 05/14/2019 Sampling Time: 0933

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.0	1.00		200	COL/100 ML	NONE	1604	NA	05/14/19	05174548

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-10
Field ID: CAR-BL-MARINA
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
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		175	COL/100 ML	NONE	1604	NA	05/14/19	05174548

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008476-11
Field ID: CAR-CSA
Received: 05/14/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 05/14/2019
Sampling Time: 0922

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		50.0	COL/100 ML	NONE	1604	NA	05/14/19	05174548

(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: 008476 Report Date: 05/23/2019

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

Field ID:	NA	ARDL Lab No.:	008476-01B1
Desc/Location:	NA	Lab Filename:	E0522903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	05/15/2019
Matrix:	QC Material	Analysis Date:	05/22/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11046
% 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	82%

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: 008476 Report Date: 06/17/2019

Project Name: CARLYLE 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	05/17/19	05/20/19	P7204	008476-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	05/17/19	05/20/19	P7204	008476-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	05/28/19	05294591	008476-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589	008476-04B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	05/14/19	05174548	008476-08B1
Nitrate as Nitrogen	0.050	0.050	ND	MG/L	NONE	GREEN	NA	06/12/19	06144640	008476-02B1
Nitrate as Nitrogen	0.050	0.050	ND	MG/L	NONE	GREEN	NA	06/10/19	06144639	008477-02B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	05/15/19	05/28/19	05294589	008476-04B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	05/28/19	05/29/19	06034606	008476-06B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	05/15/19	05174545	008476-01B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	05/15/19	05174550	008476-03B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	05/15/19	05174551	008476-03B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	05/30/19	06044608	008476-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008476

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Matrix: QC Material QC Batch: B11046 Prep. Date: 05/15/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 05/22/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.43	4	86	--	--	--	30-130	--	--
Atrazine	2.99	4	75	--	--	--	30-130	--	--
Metribuzin	3.07	4	77	--	--	--	30-130	--	--
Alachlor	2.75	4	69	--	--	--	30-130	--	--
Metolachlor	3.25	4	81	--	--	--	30-130	--	--
Chlorpyrifos	2.93	4	73	--	--	--	30-130	--	--
Cyanazine	3.72	4	93	--	--	--	30-130	--	--
Pendimethalin	3.45	4	86	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	85.3	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008476-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE 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	--	P7204	008476-01C1
(a) Manganese	0.78	0.75	104	--	--	--	90-114	--	P7204	008476-01C1
Ammonia Nitrogen	1.0	1.0	104	--	--	--	80-120	--	05294591	008476-01C1
Nitrate as Nitrogen	5.0	5.0	99	--	--	--	80-120	--	06144639	008477-02C1
Nitrate as Nitrogen	4.9	5.0	98	--	--	--	80-120	--	06144640	008476-02C1
Phosphorus	0.69	0.67	104	--	--	--	80-120	--	06034606	008476-06C1
Phosphorus, -ortho	0.099	0.10	99	--	--	--	80-120	--	05174545	008476-01C1
Total Organic Carbon	9.2	10.0	92	--	--	--	76-120	--	06044608	008476-01C1

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

(a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008476 Report Date: 05/23/2019

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

Field ID: CAR-1 Prep. Date: 05/15/2019 ARDL Lab No.: 008476-01
Desc/Location: CARLYLE LAKE Amount Used: 900 mL Lab Filename:
Sample Date: 05/14/2019 % Moisture: NA Received Date: 05/14/2019
Sample Time: 0824 QC Batch: B11046 Analysis Date: 05/22/2019
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	3.39	4.44	76.3	3.24	4.44	73	30-130	4.4	30
Atrazine	0.978	4.06	4.44	69.3	4	4.44	68	30-130	1.4	30
Metribuzin	ND	3.28	4.44	73.8	3.24	4.44	73	30-130	1	30
Alachlor	ND	2.79	4.44	62.8	2.78	4.44	62.5	30-130	0.4	30
Metolachlor	0.478	3.84	4.44	75.8	3.8	4.44	74.8	30-130	1.2	30
Chlorpyrifos	ND	2.87	4.44	64.5	2.86	4.44	64.3	30-130	0.4	30
Cyanazine	ND	3.86	4.44	86.8	3.83	4.44	86.3	30-130	0.6	30
Pendimethalin	ND	3.42	4.44	77	3.49	4.44	78.5	30-130	1.9	30

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

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008476-01, 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: 008476 Report Date: 06/17/2019

Project Name: CARLYLE 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	0.84	1.9	1.0	101	1.8	1.0	99	87-115	1	20	P7204	008476-01MS
(a) Manganese	WATER	0.058	0.58	0.50	105	0.58	0.50	105	90-114	0	20	P7204	008476-01MS
Ammonia Nitrogen	WATER	0.23	2.3	2.0	104	2.3	2.0	103	75-125	0	20	05294591	008476-01MS
Phosphorus	WATER	0.33	1.2	0.83	101	1.2	0.83	104	75-125	2	20	06034606	008476-06MS
Phosphorus, -ortho	WATER	0.12	0.22	0.10	96	0.22	0.10	96	75-125	0	20	05174545	008476-01MS
Total Organic Carbon	WATER	4.7	8.9	5.0	83	8.9	5.0	83	76-120	0	20	06044608	008476-01MS

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 008476

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008476 Report Date: 06/17/2019

Project Name: CARLYLE 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	29.0	29.0	--	MG/CU.M.	0	--	05294589	008476-04D1
Pheophytin-a	3.4	2.7	--	MG/CU.M.	23*	--	05294589	008476-04D1
Solids, Total Suspended	58.4	64.8	--	MG/L	10	--	05174550	008476-03D1
Solids, Volatile Suspend	6.4	6.8	--	MG/L	6	--	05174551	008476-03D1

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

[redacted]

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8476

8476

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: Carlyle Lake

SAMPLERS: (Signature) Archeski / Greeling

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
	5/14/19																				
CAR– 1	5/14/19	0824		X		X		X	X	X	X	X		X						X	
CAR – 2 – 0	5/14/19	0901		X		X	X	X	X	X	X									X	
CAR – 2 – 10	5/14/19	0906		X		X		X	X	X		X								X	
CAR – 4	5/14/19	1029		X		X	X	X	X	X	X									X	
CAR – 13	5/14/19	1138		X		X		X	X	X	X									X	
CAR – 12	5/14/19	1223		X		X	X	X	X	X	X									X	
CAR – 15	5/14/19	1032		X		X	X	X	X	X	X									X	
CAR – KP – Marina	5/14/19	1045		X									X							X	
CAR – DW – Marina	5/14/19	0933		X									X							X	
CAR – BL – Marina	5/14/19	1250		X									X							X	
CAR - CSA	5/14/19	0922		X									X							X	

	Date	Time		
Relinquished by: (Signature)	5/14/19	1321	Received by: (Signature)	
Relinquished by: (Signature)	5/14/19	1445	Received by: (Signature)	5-14-19
Received for Laboratory by: (Signature)	5/14/19	1445	Shipping Ticket No.	

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8476

Cooler # 1 of 2

Number of Coolers in Shipment: 2

Project: Carlyle Lake

Date Received: 5-14-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 5-14-19 (Signature) DSCochrum

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. 0.5 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 5-15-19 (Signature) DSCochrum

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: 5-15-19	On:

Chain-of-Custody # NA

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8476

Cooler # 2 of 2

Number of Coolers in Shipment: 2

Project: Carlyle Lake

Date Received: 5-14-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 5-14-19 (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: 5-15-19 (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: 5-15-19	On:

Chain-of-Custody # N/A

ARDL Inc.
Environmental | Analytical | Management | Safety

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

Customer Name: SLCOE **Date: 10/2/19**

Project Name: Carlyle Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 8/1/19 **ARDL Report No.: 8505 Revision 1**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
CAR-1	8/1/19	8505-01	NP Pesticides, Metals(1), Inorganics(2)
CAR-2-0	8/1/19	8505-02	NP Pesticides, Inorganics(2)(3)
CAR-2-10	8/1/19	8505-03	Metals(1), Inorganics(2)
CAR-4	8/1/19	8505-04	NP Pesticides, Inorganics(2)(3)
CAR-13	8/1/19	8505-05	NP Pesticides, Inorganics(2)
CAR-12	8/1/19	8505-06	NP Pesticides, Inorganics(2)(3)
CAR-15	8/1/19	8505-07	NP Pesticides, Inorganics(2)(3)
CAR-KP-MARINA	8/1/19	8505-08	E. Coli
CAR-DW-MARINA	8/1/19	8505-09	E. Coli
CAR-BL-MARINA	8/1/19	8505-10	E. Coli
CAR-CSA	8/1/19	8505-11	E. Coli
KAS-2	8/1/19	8505-12	Inorganics(2)(3)(4)
KAS-1	8/1/19	8505-13	Inorganics(2)(3)(4)

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

Note: This report was revised on 10/2/2019 to correct LOD and LOQ values for nitrate.

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.

Nitrate analysis was performed outside holding time due to instrumentation status. Samples were analyzed via method 300.0 using ion chromatography. 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 recoveries 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, except pheophytin-a.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected.

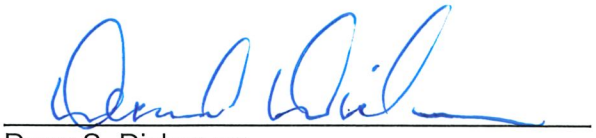
X - Sample preparation and/or analysis was performed outside of holding time requirements.

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 8505

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

Lab Report No: 008505 Report Date: 08/20/2019

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

Field ID:	CAR-1	ARDL Lab No.:	008505-01
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815914
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	0840	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% 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	0.867		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.79		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.

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-01
Field ID: CAR-1
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 0840

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		0.374	MG/L	3010A	6010C	08/22/19	08/23/19	P7252
(a) Manganese	0.00400	0.00500		0.140	MG/L	3010A	6010C	08/22/19	08/23/19	P7252
Ammonia Nitrogen	0.0200	0.0300		0.0703	MG/L	NONE	350.1	NA	08/07/19	08194804
Nitrate as Nitrogen	0.800	1.00	X	ND	MG/L	NONE	300.0	NA	08/28/19	09034843
Phosphorus	0.00800	0.0100		0.404	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.217	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		22.0	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		11.2	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		5.7	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

Sample 008505-01, Inorganic Analyses

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

Lab Report No: 008505 Report Date: 08/20/2019

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

Field ID:	CAR-2-0	ARDL Lab No.:	008505-02
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815917
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	1000	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% Moisture:	NA	Level:	LOW

Parameter	LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin	0.200	0.200	ND		UG/L	1
Atrazine	0.200	0.200	0.780		UG/L	1
Metribuzin	0.200	0.200	ND		UG/L	1
Alachlor	0.200	0.200	ND		UG/L	1
Metolachlor	0.200	0.200	2.63		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	70%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-02
Field ID: CAR-2-0
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1000

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		0.0529	MG/L	NONE	350.1	NA	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		61.7	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Nitrate as Nitrogen	0.800	1.00	X	ND	MG/L	NONE	300.0	NA	08/28/19	09034843
Pheophytin-a	1.0	1.00	J	18.3	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.314	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.194	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		13.6	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		9.2	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		5.0	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008505-03 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-2-10 Sampling Date: 08/01/2019 Moisture: NA
Received: 08/01/2019 Sampling Time: 1015

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.424	MG/L	3010A	6010C	08/22/19	08/23/19	P7252
(a) Manganese	0.00400	0.00500		0.132	MG/L	3010A	6010C	08/22/19	08/23/19	P7252
Ammonia Nitrogen	0.0200	0.0300		0.0731	MG/L	NONE	350.1	NA	08/07/19	08194804
Nitrate as Nitrogen	0.800	1.00	X	ND	MG/L	NONE	300.0	NA	08/28/19	09034843
Phosphorus	0.00800	0.0100		0.335	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.191	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		38.0	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		10.0	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		5.1	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

Sample 008505-03, Inorganic Analyses

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

Lab Report No: 008505 Report Date: 08/20/2019

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

Field ID:	CAR-4	ARDL Lab No.:	008505-04
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815918
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	1145	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% 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	1.17		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	2.12		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	79%

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: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-04
Field ID: CAR-4
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1145

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0631	MG/L	NONE	350.1	NA	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		104	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Nitrate as Nitrogen	0.800	1.00	X	1.3	MG/L	NONE	300.0	NA	08/28/19	09034843
Pheophytin-a	1.0	1.00		17.2	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.0852	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.0653	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		32.4	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		14.0	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 08/16/2019

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

Field ID:	CAR-13	ARDL Lab No.:	008505-05
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815919
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	1310	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% 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	1.39		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	3.36		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	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: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-05
Field ID: CAR-13
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1310

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		0.0741	MG/L	NONE	350.1	NA	08/07/19	08194804
Nitrate as Nitrogen	0.800	1.00	X	2.91	MG/L	NONE	300.0	NA	08/28/19	09034843
Phosphorus	0.00800	0.0100		0.37	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.0339	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	6.67	6.67		108	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	6.67	6.67		11.3	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		3.2	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 08/16/2019

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

Field ID:	CAR-12	ARDL Lab No.:	008505-06
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815920
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	1353	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% 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	1.58		UG/L	1
Metribuzin	0.222	0.222	0.278		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	4.24		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	84%

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

(a) DOD-QSM Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008505-06 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-12 Sampling Date: 08/01/2019 Moisture: NA
Received: 08/01/2019 Sampling Time: 1353

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.104	MG/L	NONE	350.1	NA	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		11.8	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Nitrate as Nitrogen	0.800	1.00	X	2.46	MG/L	NONE	300.0	NA	08/28/19	09034843
Pheophytin-a	1.0	1.00		1.5	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.335	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.0496	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	6.67	6.67		78.7	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	6.67	6.67		10.0	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		3.2	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 08/20/2019

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

Field ID:	CAR-15	ARDL Lab No.:	008505-07
Desc/Location:	CARLYLE LAKE	Lab Filename:	E0815921
Sample Date:	08/01/2019	Received Date:	08/01/2019
Sample Time:	1155	Prep. Date:	08/02/2019
Matrix:	WATER	Analysis Date:	08/15/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% 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	1.34		UG/L	1
Metribuzin	0.222	0.222	ND		UG/L	1
Alachlor	0.222	0.222	ND		UG/L	1
Metolachlor	0.222	0.222	2.43		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	88%

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: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-07
Field ID: CAR-15
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
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	J	0.0298	MG/L	NONE	350.1	NA	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		254	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Nitrate as Nitrogen	0.800	1.00	X	1.31	MG/L	NONE	300.0	NA	08/28/19	09034843
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.0852	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.0601	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		30.4	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		12.4	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-08
Field ID: CAR-KP-MARINA
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1207

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		225	COL/100 ML	NONE	1604	NA	08/01/19	08084769

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-09
Field ID: CAR-DW-MARINA
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1050

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		63.0	COL/100 ML	NONE	1604	NA	08/01/19	08084769

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-10
Field ID: CAR-BL-MARINA
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1410

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	08/01/19	08084769

(a) DOD and/or NELAC Accredited Analyte.

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Mt. Vernon, Illinois 62864

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-11
Field ID: CAR-CSA
Received: 08/01/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 08/01/2019
Sampling Time: 1039

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		72.0	COL/100 ML	NONE	1604	NA	08/01/19	08084769

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008505-12 Sampling Loc'n: KASKASKIA RIVER Matrix: WATER
Field ID: KAS-2 Sampling Date: 08/01/2019 Moisture: NA
Received: 08/01/2019 Sampling Time: 1045

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0456	MG/L	NONE	350.1	NA	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		59.9	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Kjeldahl Nitrogen	0.190	0.200		1.28	MG/L	351.2	351.2	08/19/19	08/21/19	08214825
Nitrate as Nitrogen	0.800	1.00	X	ND	MG/L	NONE	300.0	NA	08/28/19	09034843
Nitrite as Nitrogen	0.0200	0.0200		0.042	MG/L	NONE	354.1	NA	08/02/19	08144792
Pheophytin-a	1.0	1.00		6.8	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.49	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.199	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		70.4	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		10.8	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		4.5	MG/L	NONE	415.1	NA	08/13/19	08204807

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008505-13 Sampling Loc'n: KASKASKIA RIVER Matrix: WATER
Field ID: KAS-1 Sampling Date: 08/01/2019 Moisture: NA
Received: 08/01/2019 Sampling Time: 0922

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	08/07/19	08194804
Chlorophyll-a, Correcte	1.0	1.00		39.9	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Kjeldahl Nitrogen	0.190	0.200		1.79	MG/L	351.2	351.2	08/19/19	08/21/19	08214825
Nitrate as Nitrogen	0.800	1.00	X	ND	MG/L	NONE	300.0	NA	08/28/19	09034843
Nitrite as Nitrogen	0.0200	0.0200		0.115	MG/L	NONE	354.1	NA	08/02/19	08144792
Pheophytin-a	1.0	1.00		16.0	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836
Phosphorus	0.00800	0.0100		0.593	MG/L	365.2	365.2	08/15/19	08/16/19	08204809
Phosphorus, -ortho	0.00800	0.0100		0.178	MG/L	NONE	365.2	NA	08/02/19	08124787
Solids, Total Suspended	4.0	4.00		38.8	MG/L	NONE	160.2	NA	08/06/19	08124778
Solids, Volatile Suspen	4.0	4.00		7.6	MG/L	NONE	160.4	NA	08/06/19	08124779
Total Organic Carbon	0.500	1.00		5.3	MG/L	NONE	415.1	NA	08/13/19	08204807

(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: 008502 Report Date: 08/16/2019

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

Field ID:	NA	ARDL Lab No.:	008502-01B1
Desc/Location:	NA	Lab Filename:	E0815903
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	08/02/2019
Matrix:	QC Material	Analysis Date:	08/15/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11079
% Moisture:	NA	Level:	LOW

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

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	101%

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

(a) DOD-QSM Accredited Analyte.

BLANK SUMMARY REPORT

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

Lab Report No: 008505 Report Date: 10/02/2019

Project Name: CARLYLE 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	08/22/19	08/23/19	P7252	008505-01B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	08/22/19	08/23/19	P7252	008505-01B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	08/07/19	08194804	008505-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836	008505-02B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	08/01/19	08084769	008505-08B1
Kjeldahl Nitrogen	0.19	0.20	ND	MG/L	351.2	351.2	08/19/19	08/21/19	08214825	008502-13B1
Nitrate as Nitrogen	0.80	1.0	ND	MG/L	NONE	300.0	NA	08/28/19	09034843	008505-02B1
Nitrite as Nitrogen	0.020	0.020	ND	MG/L	NONE	354.1	NA	08/02/19	08144792	008505-12B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	08/12/19	08/23/19	08294836	008505-02B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	08/15/19	08/16/19	08204809	008502-02B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	08/02/19	08124787	008505-01B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	08/06/19	08124778	008505-01B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	08/06/19	08124779	008505-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	08/13/19	08204807	008502-06B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008505

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008502 Report Date: 08/16/2019

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

Matrix: QC Material QC Batch: B11079 Prep. Date: 08/02/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 08/15/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.81	4	95	--	--	--	30-130	--	--
Atrazine	3.33	4	83	--	--	--	30-130	--	--
Metribuzin	3.32	4	83	--	--	--	30-130	--	--
Alachlor	3.24	4	81	--	--	--	30-130	--	--
Metolachlor	3.66	4	92	--	--	--	30-130	--	--
Chlorpyrifos	3.24	4	81	--	--	--	30-130	--	--
Cyanazine	3.97	4	99	--	--	--	30-130	--	--
Pendimethalin	3.9	4	98	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	96	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008502-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE LAKE NELAC Certified - IL100308

Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
(a) Iron	5.0	5.0	100	--	--	--	87-115	--	P7252	008505-01C1
(a) Manganese	0.77	0.75	103	--	--	--	90-114	--	P7252	008505-01C1
Ammonia Nitrogen	0.99	1.0	99	--	--	--	80-120	--	08194804	008505-01C1
Kjeldahl Nitrogen	1.0	1.0	102	--	--	--	80-120	--	08214825	008502-13C1
Nitrate as Nitrogen	13.3	14.0	95	--	--	--	80-120	--	09034843	008505-02C1
Nitrite as Nitrogen	0.97	1.0	97	--	--	--	80-120	--	08144792	008505-12C1
Phosphorus	0.65	0.67	97	--	--	--	80-120	--	08204809	008502-02C1
Phosphorus, -ortho	0.094	0.10	94	--	--	--	80-120	--	08124787	008505-01C1
Total Organic Carbon	8.9	10.0	89	--	--	--	76-120	--	08204807	008502-06C1

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: 008505 Report Date: 08/20/2019

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

Field ID: CAR-1 Prep. Date: 08/02/2019 ARDL Lab No.: 008505-01
Desc/Location: CARLYLE LAKE Amount Used: 900 mL Lab Filename:
Sample Date: 08/01/2019 % Moisture: NA Received Date: 08/01/2019
Sample Time: 0840 QC Batch: B11079 Analysis Date: 08/15/2019
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	4.44	67.5	2.86	4.44	64.3	30-130	4.9	30
Atrazine	0.867	3.71	4.44	64	3.87	4.44	67.5	30-130	4.1	30
Metribuzin	ND	3.02	4.44	68	3.14	4.44	70.8	30-130	4	30
Alachlor	ND	2.84	4.44	64	2.93	4.44	66	30-130	3.1	30
Metolachlor	2.79	5.96	4.44	71.3	6.19	4.44	76.5	30-130	3.8	30
Chlorpyrifos	ND	2.6	4.44	58.5	2.48	4.44	55.8	30-130	4.8	30
Cyanazine	ND	3.58	4.44	80.5	3.7	4.44	83.3	30-130	3.4	30
Pendimethalin	ND	3.09	4.44	69.5	2.9	4.44	65.3	30-130	6.3	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	62	69	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008505-01, 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: 008505 Report Date: 09/06/2019

Project Name: CARLYLE 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	1.3	1.0	92	1.3	1.0	97	87-115	4	20	P7252	008505-01MS
(a) Manganese	WATER	0.14	0.65	0.50	103	0.63	0.50	98	90-114	4	20	P7252	008505-01MS
Ammonia Nitrogen	WATER	0.070	2.1	2.0	99	2.1	2.0	99	75-125	1	20	08194804	008505-01MS
Kjeldahl Nitrogen	WATER	1.3	2.1	0.80	103	2.1	0.80	108	75-125	2	20	08214825	008505-12MS
Nitrate as Nitrogen	WATER	ND	7.2	8.0	90	7.1	8.0	89	75-125	1	20	09034843	008505-02MS
Phosphorus	WATER	0.34	1.2	0.83	101	1.2	0.83	103	75-125	2	20	08204809	008505-03MS
Phosphorus, -ortho	WATER	0.22	0.33	0.10	111	0.33	0.10	109	75-125	1	20	08124787	008505-01MS
Total Organic Carbon	WATER	4.4	8.9	5.0	90	8.9	5.0	91	76-120	0	20	08204807	008505-07MS

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 008505

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008505 Report Date: 09/06/2019

Project Name: CARLYLE 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	61.7	65.4	--	MG/CU.M.	6	--	08294836	008505-02D1
Pheophytin-a	18.3	3.9	--	MG/CU.M.	130*	--	08294836	008505-02D1
Solids, Total Suspended	22.0	22.8	--	MG/L	4	--	08124778	008505-01D1
Solids, Volatile Suspend	11.2	12.0	--	MG/L	7	--	08124779	008505-01D1

* 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 8505

8505

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: Carlyle Lake

SAMPLERS: (Signature) Rodgers, Grace; Greeling, Ben

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	TKN	NO2 (Nitrite)			REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
1 CAR– 1	9/1/19	0840		X		X		X	X	X	X	X		X						X	
2 CAR – 2 – 0		1000		X		X	X	X	X	X	X									X	
3 CAR – 2 – 10		1015		X		X		X	X	X		X								X	
4 CAR – 4		1145		X		X	X	X	X	X	X									X	
5 CAR – 13		1310		X		X		X	X	X	X									X	
6 CAR – 12		1353		X		X	X	X	X	X	X									X	
7 CAR – 15		1155		X		X	X	X	X	X	X									X	
8 CAR – KP – Marina		1207		X									X							X	
9 CAR – DW – Marina		1050		X									X							X	
10 CAR – BL – Marina		1410		X									X							X	
11 CAR - CSA		1039		X									X							X	
12 Kas - 2		1045				X	X	X	X	X					X	X				X	
13 Kas - BB1		0922				X	X	X	X	X					X	X				X	

Relinquished by: (Signature)	Date 8/1/19	Time 1456	Received by: (Signature)	REMARKS/SPECIAL INSTRUCTIONS:
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	*Preserved with H_2SO_4 #Preserved with HNO_3 * use 32oz plastic TSS/TVS bottle for NO2
Received for Laboratory by: (Signature)	Date 8/1/19	Time 1602	Shipping Ticket No.	

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8505 Cooler # NONE

Number of Coolers in Shipment: 3

Project: Cantyle Lake / Kaskaskia R. Date Received: 8/1/19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8/1/19 (Signature) DSS

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

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

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: 8-2-19 (Signature) DK Cackowski

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:
NOTE: CORRECTION ON C of C
NOT INITIALED OR DATED
(By: Signature) dlc Date: 8-2-19

Sample Transfer	
Fraction: dlc	Fraction:
Area #: Walkin	Area #:
By: dlc	By:
On: 8-2-19	On:

Chain-of-Custody # N/A

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8505 Cooler # ARDL-5

Number of Coolers in Shipment: 3

Project: Carlyle Lake / Kaskaskia R Date Received: 8/1/19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8/1/19 (Signature) DSS

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

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

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. 2.5 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 8-2-19 (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: 8-2-19	On:

Chain-of-Custody # N/A

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COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8505

Cooler #: ARDL-3

Number of Coolers in Shipment: 3

Project: Carlyle Lake/Kaskaskia R.

Date Received: 8/1/19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8/1/19 (Signature) DSJ

1. Did cooler come with a shipping slip (airbill, etc.)?....... 8/1/19 Commun Courier .... YES NO (circled: NO)

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

2. Were custody seals on outside of cooler?....... YES NO N/A (circled: 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 (circled: NA)
4. Did you screen samples for radioactivity using a Geiger Counter?....... YES NO (circled: YES)
5. Were custody papers sealed in a plastic bag?....... YES NO (circled: NO)
6. Were custody papers filled out properly (ink, signed, etc.)?....... YES NO N/A (circled: YES)
7. Were custody papers signed in appropriate place by ARDL personnel?....... YES NO N/A (circled: YES)
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form....... YES NO N/A (circled: YES)
9. Was a separate container provided for measuring temperature? YES ___ NO ✓ Observed Cooler Temp. 1.3 C

   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 8-2-19 (Signature) D. Blackburn

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

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

Sample Transfer	
Fraction: all	Fraction:
Area #: Walkin	Area #:
By: dlb	By:
On: 8-2-19	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: 10/30/19**

Project Name: Carlyle Lake **Lab Name: ARDL, Inc.**

Samples Received at ARDL: 10/8/19 **ARDL Report No.: 8551**

CASE NARRATIVE

Customer Sample No.	Date Collected	Lab ID Number	Analyses Requested
CAR-1	10/8/19	8551-01	NP Pesticides, Metals(1), Inorganics(2)
CAR-2-0	10/8/19	8551-02	NP Pesticides, Inorganics(2)(3)
CAR-2-10	10/8/19	8551-03	Metals(1), Inorganics(2)
CAR-4	10/8/19	8551-04	NP Pesticides, Inorganics(2)(3)
CAR-13	10/8/19	8551-05	NP Pesticides, Inorganics(2)
CAR-12	10/8/19	8551-06	NP Pesticides, Inorganics(2)(3)
CAR-15	10/8/19	8551-07	NP Pesticides, Inorganics(2)(3)
CAR-KP-MARINA	10/8/19	8551-08	E. Coli
CAR-DW-MARINA	10/8/19	8551-09	E. Coli
CAR-BL-MARINA	10/8/19	8551-10	E. Coli
CAR-CSA	10/8/19	8551-11	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 except cyanazine (+22%). This analyte was not detected in any of the associated samples. 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.

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 recoveries 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 parameter was analyzed for but not detected.

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

REPORT ORGANIZATION

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

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

Dean S. Dickerson
Technical Services Manager

Sample & QC Results

Including as appropriate:

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

ARDL Data Package 8551

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

Lab Report No: 008551 Report Date: 10/29/2019

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

Field ID:	CAR-1	ARDL Lab No.:	008551-01
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025907
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	0830	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.622		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	0.611		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	92%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-01
Field ID: CAR-1
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 0830

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		0.668	MG/L	3010A	6010C	10/16/19	10/23/19	P7284
(a) Manganese	0.00400	0.00500		0.152	MG/L	3010A	6010C	10/16/19	10/23/19	P7284
Ammonia Nitrogen	0.0200	0.0300		0.111	MG/L	NONE	350.1	NA	10/15/19	10234987
Nitrate as Nitrogen	0.0190	0.0200		0.177	MG/L	NONE	GREEN	NA	10/10/19	10245001
Phosphorus	0.00800	0.0100		0.335	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.222	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	4.0	4.00		21.6	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	4.0	4.00		5.2	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

Sample 008551-01, Inorganic Analyses

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Field ID:	CAR-2-0	ARDL Lab No.:	008551-02
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025910
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	0935	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	900 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.489		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	0.533		UG/L	1
Chlorpyrifos	0.222	0.222	ND		UG/L	1
Cyanazine	0.222	0.222	ND		UG/L	1
Pendimethalin	0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	78%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-02
Field ID: CAR-2-0
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 0935

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	10/15/19	10234987
Chlorophyll-a, Correcte	1.0	1.00		49.9	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/10/19	10245001
Pheophytin-a	1.0	1.00		11.7	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Phosphorus	0.00800	0.0100		0.326	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.214	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	4.0	4.00		18.0	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	4.0	4.00		5.6	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		4.6	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008551-03 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-2-10 Sampling Date: 10/08/2019 Moisture: NA
Received: 10/08/2019 Sampling Time: 0940

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		1.49	MG/L	3010A	6010C	10/16/19	10/23/19	P7284
(a) Manganese	0.00400	0.00500		0.315	MG/L	3010A	6010C	10/16/19	10/23/19	P7284
Ammonia Nitrogen	0.0200	0.0300		0.0931	MG/L	NONE	350.1	NA	10/15/19	10234987
Nitrate as Nitrogen	0.0190	0.0200		0.077	MG/L	NONE	GREEN	NA	10/10/19	10245001
Phosphorus	0.00800	0.0100		0.534	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.219	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	8.33	8.33		210	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	8.33	8.33		20.0	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Field ID:	CAR-4	ARDL Lab No.:	008551-04
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025911
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	1105	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.460		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	0.460		UG/L	1
Chlorpyrifos	0.200	0.200	ND		UG/L	1
Cyanazine	0.200	0.200	ND		UG/L	1
Pendimethalin	0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results
Triphenylphosphate	30-130	78%

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

(a) DOD-QSM Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-04
Field ID: CAR-4
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
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	J	0.025	MG/L	NONE	350.1	NA	10/15/19	10234987
Chlorophyll-a, Correcte	1.0	1.00		95.3	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/10/19	10245001
Pheophytin-a	1.0	1.00		16.9	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Phosphorus	0.00800	0.0100		0.387	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.161	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	6.67	6.67		42.0	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	6.67	6.67		11.3	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		5.1	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Field ID:	CAR-13	ARDL Lab No.:	008551-05
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025912
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	1228	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.220		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	0.480		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: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008551-05 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-13 Sampling Date: 10/08/2019 Moisture: NA
Received: 10/08/2019 Sampling Time: 1228

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	10/15/19	10234987
Nitrate as Nitrogen	0.0190	0.0200		0.317	MG/L	NONE	GREEN	NA	10/10/19	10245001
Phosphorus	0.00800	0.0100		0.235	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.0224	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	4.0	4.00		44.0	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	4.0	4.00		9.2	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Field ID:	CAR-12	ARDL Lab No.:	008551-06
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025913
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	1303	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.300		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	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: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-06
Field ID: CAR-12
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 1303

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		0.243	MG/L	NONE	350.1	NA	10/15/19	10234987
Chlorophyll-a, Correcte	1.0	1.00		35.4	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Nitrate as Nitrogen	0.0190	0.0200		0.227	MG/L	NONE	GREEN	NA	10/10/19	10245001
Pheophytin-a	1.0	1.00		20.5	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Phosphorus	0.00800	0.0100		0.261	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.0502	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	4.0	4.00		49.6	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	4.0	4.00		7.6	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		3.5	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Field ID:	CAR-15	ARDL Lab No.:	008551-07
Desc/Location:	CARLYLE LAKE	Lab Filename:	E1025914
Sample Date:	10/08/2019	Received Date:	10/08/2019
Sample Time:	1115	Prep. Date:	10/09/2019
Matrix:	WATER	Analysis Date:	10/25/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	0.360		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	0.350		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.

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Mt. Vernon, Illinois 62864

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-07
Field ID: CAR-15
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 1115

Matrix: WATER
Moisture: NA

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	10/15/19	10234987
Chlorophyll-a, Correcte	1.0	1.00		89.3	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Nitrate as Nitrogen	0.0190	0.0200		ND	MG/L	NONE	GREEN	NA	10/10/19	10245001
Pheophytin-a	1.0	1.00		21.9	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984
Phosphorus	0.00800	0.0100		0.448	MG/L	365.2	365.2	10/21/19	10/23/19	10255009
Phosphorus, -ortho	0.00800	0.0100		0.161	MG/L	NONE	365.2	NA	10/09/19	10154970
Solids, Total Suspended	6.67	6.67		45.3	MG/L	NONE	160.2	NA	10/14/19	10234985
Solids, Volatile Suspen	6.67	6.67		12.0	MG/L	NONE	160.4	NA	10/14/19	10234986
Total Organic Carbon	0.500	1.00		5.5	MG/L	NONE	415.1	NA	10/19/19	TA462384

(a) DOD and/or NELAC Accredited Analyte.

Sample 008551-07, Inorganic Analyses

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-08
Field ID: CAR-KP-MARINA
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 1126

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		675	COL/100 ML	NONE	1604	NA	10/08/19	10154971

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE Analysis: Inorganics
Project No: NELAC Certified - IL100308

ARDL No: 008551-09 Sampling Loc'n: CARLYLE LAKE Matrix: WATER
Field ID: CAR-DW-MARINA Sampling Date: 10/08/2019 Moisture: NA
Received: 10/08/2019 Sampling Time: 1011

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
E. Coliform	1.0	1.00		250	COL/100 ML	NONE	1604	NA	10/08/19	10154971

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-10
Field ID: CAR-BL-MARINA
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 1330

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		700	COL/100 ML	NONE	1604	NA	10/08/19	10154971

(a) DOD and/or NELAC Accredited Analyte.

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE
Project No:

Analysis: Inorganics
NELAC Certified - IL100308

ARDL No: 008551-11
Field ID: CAR-CSA
Received: 10/08/2019

Sampling Loc'n: CARLYLE LAKE
Sampling Date: 10/08/2019
Sampling Time: 1000

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	10/08/19	10154971

(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: 008551 Report Date: 10/28/2019

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

Field ID:	NA	ARDL Lab No.:	008551-01B1
Desc/Location:	NA	Lab Filename:	E1025905
Sample Date:	NA	Received Date:	NA
Sample Time:	NA	Prep. Date:	10/09/2019
Matrix:	QC Material	Analysis Date:	10/25/2019
Amount Used:	1000 mL	Instrument ID:	AG5
Final Volume:	1 mL	QC Batch:	B11120
% 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	97%

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: 008551 Report Date: 10/30/2019

Project Name: CARLYLE LAKE NELAC Certified - IL100308

Analyte	LOD	LOQ	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Arsenic	0.002	0.003	ND	MG/L	3010A	6010C	10/16/19	10/23/19	P7284	008546-04B1
(a) Cadmium	0.0008	0.002	ND	MG/L	3010A	6010C	10/16/19	10/23/19	P7284	008546-04B1
(a) Lead	0.002	0.003	ND	MG/L	3010A	6010C	10/16/19	10/23/19	P7284	008546-04B1
(a) Manganese	0.004	0.005	ND	MG/L	3010A	6010C	10/16/19	10/23/19	P7284	008546-04B1
(a) Zinc	0.004	0.005	ND	MG/L	3010A	6010C	10/16/19	10/23/19	P7284	008546-04B1
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	10/15/19	10234987	008551-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984	008551-06B1
E. Coliform	1.0	1.0	ND	COL/100 ML	NONE	1604	NA	10/08/19	10154971	008551-08B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	10/10/19	10245001	008551-01B1
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	10/09/19	10/14/19	10234984	008551-06B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	10/21/19	10/23/19	10255009	008551-01B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	10/09/19	10154970	008551-03B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	10/14/19	10234985	008551-01B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	10/14/19	10234986	008551-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	10/19/19	TA462384	008551-01B1

(a) DOD and/or NELAC Accredited Analyte

Inorganic Method Blanks for 008551

BLANK SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008551 Report Date: 10/28/2019

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

Matrix: QC Material QC Batch: B11120 Prep. Date: 10/09/2019
Amount Used: 1000 mL Level: LOW Analysis Date: 10/25/2019

Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery Limits	RPD	RPD Limit
Trifluralin	3.21	4	80	--	--	--	30-130	--	--
Atrazine	2.99	4	75	--	--	--	30-130	--	--
Metribuzin	2.98	4	75	--	--	--	30-130	--	--
Alachlor	3.12	4	78	--	--	--	30-130	--	--
Metolachlor	3.39	4	85	--	--	--	30-130	--	--
Chlorpyrifos	3.07	4	77	--	--	--	30-130	--	--
Cyanazine	3.87	4	97	--	--	--	30-130	--	--
Pendimethalin	3.53	4	88	--	--	--	30-130	--	--

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	85.3	--	30-130

(a) DOD-QSM Accredited Analyte.

'*' indicates a recovery outside of standard limits.

Spike Blanks for 008551-01, NP PESTICIDES (8270SIM-MOD)

LABORATORY CONTROL SAMPLE REPORT

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE 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	5.2	5.0	104	--	--	--	87-115	--	P7284	008551-01C1
(a) Manganese	0.80	0.75	107	--	--	--	90-114	--	P7284	008551-01C1
Ammonia Nitrogen	0.99	1.0	99	--	--	--	80-120	--	10234987	008551-01C1
Nitrate as Nitrogen	0.91	1.0	91	--	--	--	80-120	--	10245001	008551-01C1
Phosphorus	0.66	0.67	98	--	--	--	80-120	--	10255009	008551-01C1
Phosphorus, -ortho	0.096	0.10	96	--	--	--	80-120	--	10154970	008551-03C1
Total Organic Carbon	9.7	10.0	97	--	--	--	76-120	--	TA462384	008551-01C1

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

(a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

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

Lab Report No: 008551 Report Date: 10/29/2019

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

Field ID: CAR-1 Prep. Date: 10/09/2019 ARDL Lab No.: 008551-01
Desc/Location: CARLYLE LAKE Amount Used: 900 mL Lab Filename:
Sample Date: 10/08/2019 % Moisture: NA Received Date: 10/08/2019
Sample Time: 0830 QC Batch: B11120 Analysis Date: 10/25/2019
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	4.63	4.44	104.3	3.98	4.44	89.5	30-130	15.2	30
Atrazine	0.622	4.61	4.44	89.8	4.21	4.44	80.8	30-130	9.1	30
Metribuzin	ND	4.01	4.44	90.3	3.66	4.44	82.3	30-130	9.3	30
Alachlor	ND	4.01	4.44	90.3	3.61	4.44	81.3	30-130	10.5	30
Metolachlor	0.611	5.13	4.44	101.8	4.57	4.44	89	30-130	11.7	30
Chlorpyrifos	ND	3.99	4.44	89.8	3.42	4.44	77	30-130	15.3	30
Cyanazine	ND	5.1	4.44	114.8	4.66	4.44	104.8	30-130	9.1	30
Pendimethalin	ND	4.66	4.44	104.8	3.88	4.44	87.3	30-130	18.2	30

SURROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	103	86	30-130

(a) DOD-QSM Accredited Analyte.
'nc' indicates sample >4X spike level.
'*' indicates a recovery outside of standard limits.
Matrix Spikes for 008551-01, 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: 008551 Report Date: 10/30/2019

Project Name: CARLYLE 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	0.67	1.8	1.0	111	1.8	1.0	111	87-115	0	20	P7284	008551-01MS
(a) Manganese	WATER	0.15	0.68	0.50	107	0.68	0.50	106	90-114	0	20	P7284	008551-01MS
Ammonia Nitrogen	WATER	0.11	2.2	2.0	103	2.2	2.0	103	75-125	1	20	10234987	008551-01MS
Nitrate as Nitrogen	WATER	0.18	0.92	1.0	75	0.92	1.0	75	75-125	0	20	10245001	008551-01MS
Phosphorus	WATER	0.34	1.3	0.83	111	1.3	0.83	113	75-125	2	20	10255009	008551-01MS
Phosphorus, -ortho	WATER	0.22	0.32	0.10	102	0.32	0.10	102	75-125	0	20	10154970	008551-03MS
Total Organic Carbon	WATER	4.4	9.3	5.0	98	9.1	5.0	93	76-120	2	20	TA462384	008551-01MS
Total Organic Carbon	WATER	3.5	8.2	5.0	95	8.7	5.0	103	76-120	5	20	TA462384	008551-06MS

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 008551

SAMPLE DUPLICATE REPORT

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

Lab Report No: 008551 Report Date: 10/30/2019

Project Name: CARLYLE 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	35.4	34.5	--	MG/CU.M.	3	--	10234984	008551-06D1
Pheophytin-a	20.5	18.9	--	MG/CU.M.	8	--	10234984	008551-06D1
Solids, Total Suspended	21.6	22.0	--	MG/L	2	--	10234985	008551-01D1
Solids, Volatile Suspend	5.2	4.8	--	MG/L	8	--	10234986	008551-01D1

(a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008551

[redacted]

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8551

8551

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: Carlyle Lake

SAMPLERS: (Signature) Greeling, Ben; Rodgers, Grace

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
CAR– 1	10/8/19	0830		X		X		X	X	X	X	X		X						X	
CAR – 2 – 0		0935		X		X	X	X	X	X	X									X	
CAR – 2 – 10		0940		X		X		X	X	X		X								X	
CAR – 4		1105		X		X	X	X	X	X	X									X	
CAR – 13		1228		X		X		X	X	X	X									X	
CAR – 12		1303		X		X	X	X	X	X	X									X	
CAR – 15		1115		X		X	X	X	X	X	X									X	
CAR – KP – Marina		1126		X									X							X	
CAR – DW – Marina		1011		X									X							X	
CAR – BL – Marina		1330		X									X							X	
CAR - CSA		1000		X									X							X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Valerie Gakins	10/8/19	1407	Valerie Gakins
Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Valerie Gakins	10/8/19	1635	
Received for Laboratory by: (Signature)	Date	Time	Shipping Ticket No.
	10/8/19	1635	

REMARKS/SPECIAL INSTRUCTIONS:

*Preserved with H_2SO_4
#Preserved with HNO_3

PURCHASE ORDER NO: _____

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8551 Cooler # 2 of 3

Number of Coolers in Shipment: 3

Project: Carlyle Lake Date Received: 10-8-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10-8-19 (Signature) D Hackum

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. 0.5 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-9-19 (Signature) D Hackum

10. Describe type of packing in cooler: bubble wrap
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: 10-9-19	On

Chain-of-Custody # N/A

COOLER RECEIPT REPORT
ARDL, INC.

ARDL #: 8551

Cooler # 3 of 3

Number of Coolers in Shipment: 3

Project: Carlyle Lake

Date Received: 10-8-19

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10-8-19 (Signature) DLackrum

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. 0.1 C
   Correction factor 0.0 C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-9-19 (Signature) DLackrum

10. Describe type of packing in cooler: bubble wrap
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: 10-9-19	On

Chain-of-Custody # N/A