Determination of Thermal Stratification, Mixing Pattern, Water Quality and Heat Budget of an Urban Florida Lake

by

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Abstract

Crescent Lake is a stormwater retention water body situated in St. Petersburg, Pinellas County, Florida. The Florida Department of Environmental Protection recognizes Crescent Lake as impaired because the lake sustains high total phosphorus and chlorophyll-a concentrations. Prior work done by Jacobs Engineering Inc., an environmental consultant agency hired by St. Petersburg, has suggested that summer thermal stratification forms and that water quality declines in fall months with concurrent proliferation of phytoplankton. The cause of increased phytoplankton growth in the fall is not fully understood.

The fall increase in phytoplankton might occur because of a mixing event that dissipates thermal stratification and introduces nutrients from bottom waters (hypolimnion) to surface waters (epilimnion). Reduced oxygen levels, which also have been observed in the fall, might be the result of anoxic hypolimnetic waters that reach the epilimnion. The objective of this study was to determine whether mixing causes phytoplankton growth and reduces dissolved oxygen in surface waters. Nutrient, chlorophyll-a and dissolved oxygen concentrations, as well as temperature and other limnological variables were measured at three depths in Crescent Lake from July to December 2019. A heat budget was calculated for comparison with other warm temperate lakes of Florida.

This study showed that thermal stratification was present from July through mid-November with a disparity in concentration of several variables from the epilimnion to the hypolimnion. Mixing homogenized temperature, density and total dissolved solids in the water column for approximately a two-week period in mid-November. Mixing lowered dissolved oxygen concentrations in the epilimnion during this period. Nutrient concentrations increased in the epilimnion but decreased in the hypolimnion relative to the period of stratification.

Chlorophyll-a in surface waters showed a steady increase from mid-September until early December and peaked just after the period of mixis. It appears that an increase in nutrients in the epilimnion during mixis might contribute to phytoplankton growth in Crescent Lake. The calculated heat budget of 4450 cal cm^{-2} is slightly lower than previously reported values of warm-temperate Florida lakes because Crescent Lake has a small volume and low light penetration.

1. Introduction

1.1 Background

Small water bodies serve many purposes, such as being important modifiers of nutrient cycles (Downing et al., 2006), a habitat for sensitive organisms, and are often utilized as stormwater retention ponds in urban areas (Song et al., 2013). Crescent Lake is a 20.5-acre urban lake that is the centerpiece of a 52.5-acre public park (TBEP, 2019) and it acts as a stormwater retention water body for Basin J of St. Petersburg within the Middle Tampa Bay Watershed (Jacobs Engineering Group Inc., 2019). Urban lakes are often impaired due to nutrient-laden runoff from lawns, gardens and inadvertent sewage spills (Tundisi and Tundisi, 2011). It is in the best interest of the community to maintain high water quality, ecological stability, and to promote overall park aesthetics for recreation and residential value.

Crescent Lake has been classified as an impaired water body by the Florida Department of Environmental Protection (FDEP, 2019), because of excess total phosphorus and chlorophyll-a. A volunteer organization, Friends of Crescent Lake, informed Dr. Jim Ivey, Jim Bays and me, that the lake shows increased phytoplankton growth, decreased transparency, and fish deaths in the fall/winter months. Reduced water quality in the fall/winter suggests that a mixing event occurs where nutrients are transported from sediment and waters in the deepest part of the lake to the surface. The formation of a stratified water column during the summer and the circulation of the water column in the winter has been documented to occur in sub-tropical, relatively deep, warm monomictic lakes in Florida (Whitmore et al., 1991; Escobar et al., 2009), but it is comparatively uncommon because most Florida lakes are shallow and mix frequently (Brenner et al., 1990). Jacobs Engineering Group Inc. reported in January 2019 that Crescent Lake has a

maximum depth of 11.52 meters (37.8 feet), which is deep compared to most Florida lakes, and their data showed the initial development of a thermally stratified water column.

Thermal and density gradients form lake stratification. The bottommost layer of a stratified, eutrophic lake often accumulates nutrients and has little dissolved oxygen. Lake mixing typically occurs seasonally when cooler atmospheric temperatures and wind dissipate the stratification and the water body becomes homogenized. A sudden burst in nutrient levels can occur throughout the water column, and can lead to heavy phytoplankton growth at the surface. Determining if thermal stratification occurs at Crescent Lake in the summer, and if mixing occurs in the fall or winter, has been recommended by Jacobs Engineering Group Inc. as a crucial step for restoration planning because of internal nutrient loading that might occur from mixis.

1.2 Problem Statement

It is unclear if increases in nutrient concentrations and excess phytoplankton growth in the fall are caused by mixing of a thermally stratified water column when nutrients stored at the bottom of the lake are suddenly pushed to the surface. Mixing may lead to depletion of oxygen because of dilution from anoxic bottom waters, and this can lead to fish kills. Alternatively, nutrient increases could be from contaminated groundwater inflow, or as a result of increased surface or stormwater run-off from the surrounding urban area. Increased stormwater runoff, for example, could be the result of lifting St. Petersburg's fertilizer ban that extends from June 1st to September 30th (Pinellas County Public Works, 2019). Consequently, the purpose of this study was to determine whether Crescent Lake becomes thermally stratified during the warmer summer months, and if phytoplankton growth and reduced water quality/dissolved oxygen occurs as a result of mixing of the water column in the cooler fall months.

1.3 Need For Research

Many Florida lakes fail to achieve stable thermal stratification because of shallow depths, convective cooling, rainfall, and daily nighttime breezes (Brenner et al., 1990). It has been established that summer stratification does occur in deeper Florida lakes (Beaver et al., 1981; Escobar et al., 2009). A report by Jacobs Engineering Inc. (2019) has recommended that a study be performed to determine whether thermal stratification forms, and if lake mixing ensues in the fall.

It is unknown what the circulation pattern is at Crescent Lake. Fish kills occasionally happen in Florida (Brenner et al., 1990), and have been observed to occur as a result of circulation events and anoxia (Cowell et al., 1975). It was reported that anoxia occurred in the epilimnion of Johnson Pond during winter mixing (Whitmore et al., 1991), and although this is the only reported case of surface anoxia in a Florida lake due to mixing, it is possible that a similar occurrence is causing fish kills at Crescent Lake.

Heat budgets are the difference in heat storage in the water column from the warmest to coldest conditions and are useful when classifying physical conditions of a lake. Heat budgets have been reported for only six of Florida's ~7800 lakes: Lake Mize (Nordlie, 1972), Lake Annie (Brenner et al., 1990), Johnson Pond (Whitmore et al., 1991; Escobar et al., 2009), Lake Sheelar, Lake Verona, and Lake Tulane (Escobar et al., 2009). Florida lakes are numerous, but they are not well studied. The examination of seasonal changes in the temperature profile, circulation patterns, the heat budget, and overall water quality of Crescent Lake in this study will add to the limnological literature of Florida and provide a foundation for mitigation strategies.

2. Literature Review

2.1 Lake Thermal Stratification, Circulation, and Classifications

2.1.1 Lake Thermal Stratification

It is common for deeper lakes to show vertical stratification of their water temperature for some portion of the year, where the surface water (epilimnion) is warmer than the bottom waters (hypolimnion). The middle zone of transition of temperature from the surface to the bottom is known as the metalimnion, or the thermocline. Thermal stratification is formed if a lake is deep enough, and if the sun provides adequate solar radiation to warm the surface water and to establish a thermal gradient in the water column (Brenner et al., 1990; Boehrer & Shultze, 2008; Tundisi & Tundisi, 2011). Generally, the water column of a lake must be greater than 3 meters deep for thermal stratification to occur, and for a lake to withstand the mixing forces of wind (Illinois EPA, 2011). Additionally, morphometric values such as surface shape, surface area, shoreline shape, and incremental shoreline depth, can affect thermal stratification formation (Kalff, 2002).

During thermal stratification, the epilimnion is characterized by higher temperature, lower density, lower dissolved ions, lower nutrient concentrations, homogenized water quality (because of light breezes that gently mix water near the surface), and higher dissolved oxygen concentrations (Tundisi &Tundisi, 2011). Dissolved oxygen levels are high due to photosynthetic activity. The epilimnion thickness is greatest during warm summer months, and it gradually begins to thin as atmospheric temperatures decrease (Boeher & Shultze, 2008).

The hypolimnion contains a lake's coolest and densest water, with the lowest concentrations of dissolved oxygen, and highest concentrations of dissolved substances, including nutrients (Tundisi & Tundisi, 2011). In highly productive lakes, there is little to no

dissolved oxygen in the hypolimnion during stratification because respiratory (oxygen consumptive) processes dominate the hypolimnion (Brenner et al., 1990; Boeher & Shultze, 2008; Escobar et al., 2009). The temperature difference between the epilimnion and hypolimnion decreases with closer proximity to the equator because of greater heat storage in the hypolimnion (Boeher & Shultze, 2008).

The metalimnion, which lies between the epilimnion and hypolimnion, is characterized by a gradual decline in temperature from top to bottom. The thermocline is defined as the portion of water where maximum temperature change occurs and temperature change is greater than 1 degree Celsius per meter (Hutchinson & Löffler, 1956; Kamarainen et al., 2009). Compared to the epilimnion, the metalimnion is generally cooler in temperature, and contains less dissolved oxygen and greater dissolved ions.

2.1.2 Lake Circulation

During cooler months, atmospheric changes such as decreased air temperature, heavy rainfall and strong winds, can cause thermal stratification to break down (Engelhardt & Kirillin, 2014). Vertical circulation of water ensues (sometimes called lake overturn or mixing), and it forces concentrations of nutrients and other dissolved substances from the hypolimnion to become distributed throughout the water column (Boehrer and Shultze, 2008; Escobar et al., 2009). A water column that is completely mixed is referred to as a mixolimnion. The transition time from a mixed to a stratified water column, or vise-versa, can last from days to weeks (Engelhardt & Kirillin, 2014). Mixing can be indicated by a rapid rise in hypolimnetic temperature and dissolved oxygen (Engelhardt & Kirillin, 2014). In nutrient-rich, biologically productive (eutrophic) lakes, the mixing of nutrients can lead to increased phytoplankton growth and photosynthesis within the range of light penetration (euphotic zone). Increased

phytoplankton growth produces organic material that can accumulate in the hypolimnion that is subsequently decomposed. If decomposition and the rate of respiration is high in the hypolimnion, then the concentration of dissolved oxygen can decrease (Boeher & Shultze, 2008). Because of a large volume of anoxic hypolimnetic waters in Johnson Pond, seasonal mixing led to anoxic conditions in the epilimnion (Whitmore et al., 1991).

2.1.3 Lake Classification

There are several categories to describe lake circulation patterns. Warm-monomictic lakes are characterized by thermal stratification in the summer, and significant circulation in the winter. These lakes are common in warm-temperate regions, such as south and central Florida (Brenner et al., 1990; Boeher & Shultze, 2008; Escobar et al., 2009). A holomictic lake overturns and homogenizes at least once a year (Boeher & Shultze, 2008; Tundisi & Tundisi, 2011). A polymictic lake has frequent occurrences of circulation, which are often due to intense wind action and relatively shallow water depth (Brenner et al., 1990). A meromictic lake never experiences complete circulation because of a deep stagnant layer, known as the monimolimnion. The monimolimnion is anoxic and contains a buildup of biological material and dissolved substances (Tundisi & Tundisi, 2011). To be considered meromictic, the monimolimnion is continuously present for more than one year (Boeher & Shultze, 2008). Meromictic lakes have higher concentrations of dissolved substances and organic material with higher density that resists circulation (Boeher & Shultze, 2008). An amictic lake does not experience seasonal circulation, usually because of persistent ice cover (Boeher & Shultze, 2008). A dimictic lake is found in cooler regions and has a mixing period in the spring and another in the fall; it is thermally stratified in the summer, and is iced over in the winter (Tundisi & Tundisi, 2011).

Trophic-state terms are used to describe nutrient levels in a lake. The trophic state of each lake is determined by its biological productivity and concentrations of nutrients. Trophic state can be influenced by several factors such as geology, residence time of water, level of light penetration, surface run-off, and climate. A limiting nutrient is a nutrient that is essential for plant/algal growth, and growth will not occur when this nutrient is absent. Phosphorus and nitrogen are the most common limiting nutrients in lakes and they often determine overall lake productivity (Wetzel, 2001). Phosphorus is sometimes naturally abundant in lakes because of the geological setting, so a relative lack of nitrogen can limit biological productivity in such circumstances. Vollenweider (1979) described nutrient concentrations that are typical of various trophic states, which range from oligotrophic to hypereutrophic (Table 2.1).

Table 2.1: Mean Values of Water Quality Parameters and Lake Classification. (Vollenweider, 1979).

PARAMETER	Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
Total Phosphorus (µg/L or PPB)	8	27	84	>750
Total Nitrogen (mg/L or PPM)	0.661	0.753	1.875	-
Chlorophyll *a* (µg/L or PPB)	1.7	4.7	14.3	-

Chlorophyll-a, total phosphorus, and Secchi-disk measurements have been commonly used to assess the trophic state of lakes (Lambou et al., 1982). Chlorophyll-a is often considered the most reliable response variable for eutrophication (Lambou et al., 1982). Secchi-disk depth is the measurement of water transparency (Lambou et al., 1982), and is based on how deep a

Secchi-disk remains visible when lowered in the water column. Carlson (1977) developed a trophic state index (TSI) using regression analysis to relate Secchi-disk depth to total phosphorus and chlorophyll-a concentrations (Table 2.2.). The numerical trophic state index is represented using a scale of 0-100. Each division of 10 represents a doubling in phytoplankton biomass. The Florida 305(b) Trophic State Index (Paulic et al., 1996; Table 2.3.) is based on the same rationale used by Carlson (1977), but accounts for total nitrogen instead of Secchi-disk depth, as there are dark-water lakes and estuaries in Florida that have low transparency that is not related to phytoplankton.

Table 2.2. Carlson's (1977) Trophic State Index and Parameters.

TSI	Secchi Disk (m)	Surface Phosphorus (mg/m^3)	Surface Chlorophyll (mg/m^3)
0	64	0.75	0.04
10	32	1.5	0.12
20	16	3	0.34
30	8	6	0.94
40	4	12	2.6
50	2	24	6.4
60	1	48	20
70	0.5	96	56
80	0.25	192	154
90	0.12	384	427
100	0.062	768	1183

Table 2.3. The Florida 305(b) Trophic State Index.
(Paulic et al., 1996).

Trophic State Index	Chlorophyll CHLA/ micrograms per liter (μg/1)	Total Phosphorus TP/ milligrams of phosphorus per liter (mgP/1)	Total Nitrogen TN/ milligrams of nitrogen per liter (mgN/1)
0	0.3	0.003	0.06
10	0.6	0.005	0.10
20	1.3	0.009	0.16
30	2.5	0.01	0.27
40	5.0	0.02	0.45
50	10.0	0.04	0.70
60	20.0	0.07	1.2
70	40	0.12	2.0
80	80	0.20	3.4
90	160	0.34	5.6
100	320	0.58	9.3

2.2 Florida Limnology Research

2.2.1 Florida Lake Characteristics (Stratification/ Circulation/ Heat Budget)

Most lakes in Florida were formed by sinkholes that form in karst terrain that is found throughout the state (Brenner et al., 1990). Florida lakes generally maintain water temperatures above 10 °C in the winter (Beaver et al., 1981; Brenner et al., 1990). Most of Florida's lakes are too shallow to form stable stratification and about 75% of the state's lakes have maximum depths less than 5 meters (Brenner et al., 1990).

Brenner et al. (1990) observed that stratification, when it does occur, may last from the months of March through November. Most lakes have at least some oxygen at all depths, and it

is rare for permanent anoxia and subsequent fish kills to occur (Brenner et al., 1990). Beaver et al. (1981) studied water column temperatures monthly for 24 lakes, and bimonthly for 5 lakes, throughout Florida, and divided the state's lakes into three geographical groups (north, central, south). All the lakes showed warm monomictic circulation patterns with a minimum water column temperature rarely less than 14°C, and a maximum temperature seldom exceeding 31°C. This study found that in Florida, as latitude declines, lake temperatures increase and the duration of winter mixing decreases. Crescent Lake lies at the boundary between what Beaver et al. (1981) describe as the central-transitional and south-subtropical latitudes of Florida, suggesting that the period of mixing should be around 1-2 months (Figure 2.1.) (Beaver et al., 1981).

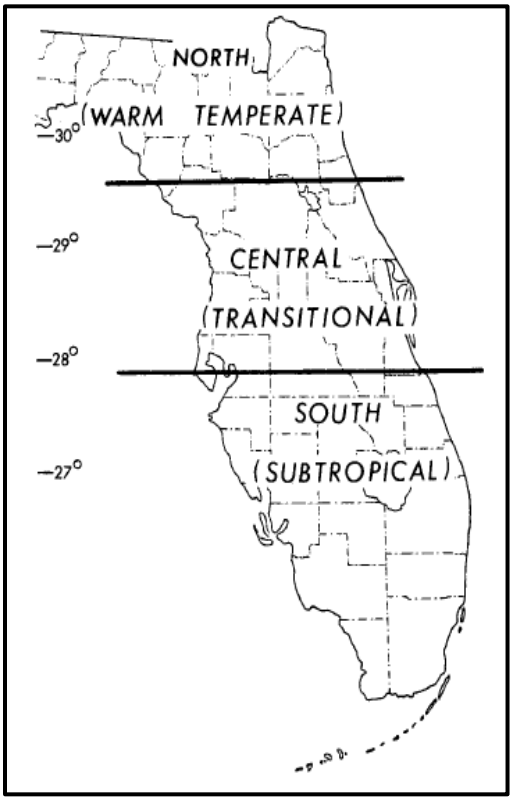

Figure 2.1. Zonal Boundaries for Florida Lakes Based on Monthly Mean Water Column Temperatures (Beaver et al., 1981).

Escobar et al. (2009) studied four deep lakes in central and north Florida (Sheelar, Verona, Johnson Pond, Tulane) and the lakes all displayed hypolimnetic anoxia during thermal stratification. The hypolimnion of Lake Tulane did not show complete oxygenation during winter mixing because of a lack of circulation. Lake Tulane is 23 meters deep and showed anoxic conditions below about 13 meters during the period of thermal stratification. Sheelar Lake is 21 meters deep and showed high dissolved oxygen (DO) levels and uniform water temperature during winter overturn (Escobar et al., 2009), and showed anoxia below about 14 meters from May to September. Lake Verona is 24 meters deep and was stratified from March to September. The deepest waters showed oxygenation during winter mixing and developed anoxia at depths below 10 meters during thermal stratification. Johnson Pond is 17.5 meters deep and was the only lake that deoxygenated during winter circulation (Whitmore et al., 1991); indeed, that pattern was also reported by Escobar et al., 2009. The deepest waters of Johnson pond were anoxic year-round. In all four lakes, hypolimnetic anoxia occurred during thermal stratification (Escobar et al., 2009).

Johnson Pond in Gainesville has a broadly similar climate to that of the Crescent Lake area of St. Petersburg, except that overnight low temperatures from December through February in Gainesville average 4°C cooler than in St. Petersburg. Stratification was observed to break down during cool autumn weather in November, and the water column became isothermic from December through February. Epilimnetic oxygen concentrations were highest during thermal stratification, and became anoxic after mixing (Whitmore et al., 1991; Escobar et al., 2009). Higher levels of total phosphorus (TP) were observed in the epilimnion during winter isothermy when compared with periods of stratification. Johnson Pond is distinctive in that it is surrounded

by dense vegetation that protects the water column from wind, which may limit circulation of the water (Whitmore et al., 1991).

The heat content of a body of water is important in limnology because the thermal structure of a water column has a great effect on the metabolism, physiology, and behavior of aquatic organisms. Heat content is estimated by measuring the temperature at different depths and multiplying that value by the volume of water of that layer obtained from a bathymetric map.

Whitmore et al. (1991) calculated the heat budget of Johnson Pond based on the mean of three separate time intervals of greatest temperature to lowest temperature from 9 August 1986 to 18 January 1988. The warmest water for the three intervals occurred in late August, and the coolest water occurred in January. This timeline should be considered as a model due to the relative proximity of Gainesville to St. Petersburg where Crescent Lake is located. The mean heat budget for Johnson Pond was 5,945 cal cm^{-2}.

Whitmore et al. (1991) discussed the fact that clear water transparency and less color promotes the ability of solar radiation to heat water at greater depths, therefore Secchi-disk depth and color readings matter. The Secchi-disk depth of Johnson Pond was found to be 1.13 meters, and the maximum depth of the lake was 17.5 meters. Whitmore et al. (1991) compared the heat budget of Johnson pond to two other north central Florida lakes, Lake Mize (4,720 cal cm^{-2}), and Lake Annie (8,472 cal cm^{-2}). The heat budget of Johnson Pond was similar to that of Lake Mize because the lakes have comparable maximum and Secchi-disk depths, whereas Lake Annie has clearer water and a deeper Secchi-disk depth of around 6 meters that allows for heating to a greater depth.

The heat budget for Johnson Pond was calculated to be 5105 cal cm^{-2} for the summer-winter period (September 2006 to February 2007). The heat budget for Sheelar Lake for the

summer-winter period was found to be 9060 cal cm^{-2}; Lake Tulane over the same time period, 8459 cal cm^{-2}; and for Lake Verona, 7948 cal cm^{-2} (Escobar et al., 2009). The lake heat budgets found in these studies are comparable to the heat budgets calculated for lakes in tropical regions such as South America, where researchers have found that tropical lakes have low heat budgets compared to lakes in colder climates because of low inter-season temperature differences (Hutchinson & Edmondson, 1957).

2.3 Nutrient Cycling

Thermal stratification is understood to be a regulator of biogeochemical cycles in many lakes that involves nutrients, oxygen levels and phytoplankton (Song et al., 2013). Phytoplankton blooms in lakes are generally correlated to nutrient levels, and these blooms can potentially be toxic and eventually lead to a reduction in dissolved oxygen in the water column (Hogsett et al., 2019). The internal cycling of nutrients within a lake's water column is an important issue in water quality restoration efforts (Hogsett et al., 2019). Based upon previous studies, there are expected to be concentrations of dissolved oxygen, nutrients, and levels of phytoplankton in a lake during periods of stratification and mixing.

In stratified lakes, biotic production, such as plant growth, occurs in the uppermost epilimnion layer and respiratory and oxygen consumptive processes dominate the bottom hypolimnion layer (Brenner et al., 1990; Boeher & Shultze, 2008; Escobar et al., 2009).

Nitrogen is less affected by stratification than phosphorus because biological uptake and denitrification reduces the accumulation of nitrogen in the bottom sediment (Song et al., 2013). Stratified lakes often feature low nitrate levels in the epilimnion (Tundisi, 1983; Tundisi & Tundisi, 2011). Ammonium levels are often low in epilimnion waters as well, but can be higher in anoxic conditions when nitrate is reduced to ammonium (Tundisi & Tundisi, 2011). In the

hypolimnion, ammonium levels may be observed to rise and fall due to excretion by organisms in the epilimnion and decomposition by bottom-dwelling bacteria in the hypolimnion (Tundisi, 1983; Tundisi & Tundisi, 2011). Nitrite is usually low, because this ion can be reduced or oxidized easily (Tundisi & Tundisi, 2011). Nitrite can accumulate in conditions of deep stratification where oxygen tension is very low (Tundisi & Tundisi, 2011), thus it can be inferred that nitrite levels could be higher in the hypolimnion. Atmospheric nitrogen gas (N) can be transferred into the water by cyanobacteria through microbiological fixation, in which N gas is converted into NH_3^+ (ammonia). NH_3 is ingested and transformed by some bacteria into NO_2^- (nitrite) and then to NO_3^- (nitrate) in a process called nitrification that occurs under aerobic conditions. Biological nitrogen fixation can be high in lakes, such as in northern California's Clear Lake, where 43% of the total nitrogen occurs through biological fixation of atmospheric nitrogen (Horne & Goldman, 1994; Tundisi & Tundisi, 2011). Denitrification occurs when there is an absence of oxygen. Denitrification involves bacteria reducing NO_2^- to N gas that returns to the atmosphere.

Whitmore et al. (1991) observed that in Johnson Pond, levels of total phosphorus in the surface waters increased during winter, suggesting that phosphorus is heavily concentrated in the hypolimnion and sediment, and then brought to the surface during winter mixing. The transfer of phosphorus from the sediment to the hypolimnion occurs through hydrodynamic mechanisms such as diffusion, ebullition, bioturbation, and wind-induced turbulence (Tundisi & Tundisi, 2011). The sediment and hypolimnion are interrelated with the oxidation-reduction system, and nutrients concentrate in the sediment. Phosphate is released from the sediment in anoxic conditions (Tundisi & Tundisi, 2011). Nutrients released and circulated through the water column during winter mixing can cause phytoplankton growth (Hogsett et al., 2019).

In the epilimnion, phytoplankton use solar radiation and nutrients for primary production (Boeher & Shultze, 2008). Dissolved orthophosphate in water is the main source of phosphorus for aquatic plants, especially phytoplankton (Tundisi & Tundisi, 2011). Variations in total phosphorus (TP) rather than total nitrogen (TN) have been observed to better predict variations in chlorophyll-a, which links back to the idea that phosphorus is usually the limiting nutrient in most lakes (Hakanson & Boulion, 2002). In the presence of adequate nutrients, temperature and sunlight lead to increased chlorophyll-a concentrations (Hakanson & Boulion, 2002), thus, more chlorophyll-a should be observed in the epilimnion of a stratified lake if more nutrients are present.

2.4 Eutrophication of Lakes

Eutrophication is a process that involves the progressive increase of nutrients into a water body that causes excess phytoplankton growth. Eutrophication ultimately leads to lowered dissolved oxygen that can cause fish kills, and potentially toxic cyanobacteria. Oxygen becomes depleted especially in eutrophic lakes because when large blooms of phytoplankton die, bacterial decomposers consume oxygen during respiration (Tundisi & Tundisi, 2011). Complete anoxia of a lake is rare in Florida, but fish kills have been documented in Crescent Lake and elsewhere (Cowell et al., 1975). Cultural eutrophication occurs when human activities are responsible for excess nutrients; this is not easily reversed because lakes are sinks, and natural processes do not remove surplus nutrients at a high enough rate (Tundisi & Tundisi, 2011). Cultural eutrophication can occur as a result of the discharge of untreated domestic sewage, industrial and agricultural run-off and waste, urban run-off laden with pet waste, and fertilizer from lawn care and gardening. High nutrient input can also come from groundwater, soil erosion, and excessive use of non-biodegradable detergents. Eutrophication is often accompanied by the uncontrolled

growth of macrophytes. A potential consequence of eutrophication is a cyanobacterial bloom, which can lead to anoxia, and the production of toxins (Tundisi & Tundisi, 2011). The presence of cyanobacteria populations has not been studied at Crescent Lake.

2.5 Crescent Lake Background, Data, and History

Crescent lake is situated within the Middle Tampa Bay Watershed (TBEP, 2019) and is a part of St. Petersburg's storm water Basin J that outflows into Coffeepot Bayou and ultimately into Tampa Bay (Jacobs Engineering Inc., 2019; see Figure 2.2). Crescent Lake serves as a retention pond and receives storm-water runoff from a surrounding urban watershed area that is roughly 10 times the size of the lake (Vogel, 2011; see Figure 2.3, Figure 3.1). A project was conducted in April 2007 that sought to absorb nutrient runoff before it reached the lake (Vogel, 2011). This restoration project was initiated because long-term monitoring of lake water quality shows excess levels of nutrients and reduced levels of dissolved oxygen (TBEP, 2019). It has been reported by the Friends of Crescent Lake to Dr. Jim Ivey (University of South Florida St. Petersburg) and Jim Bays (Jacobs Engineering Inc., 2019) that in the fall and winter months the lake's water quality becomes significantly impaired with greater phytoplankton growth and reduced water transparency.

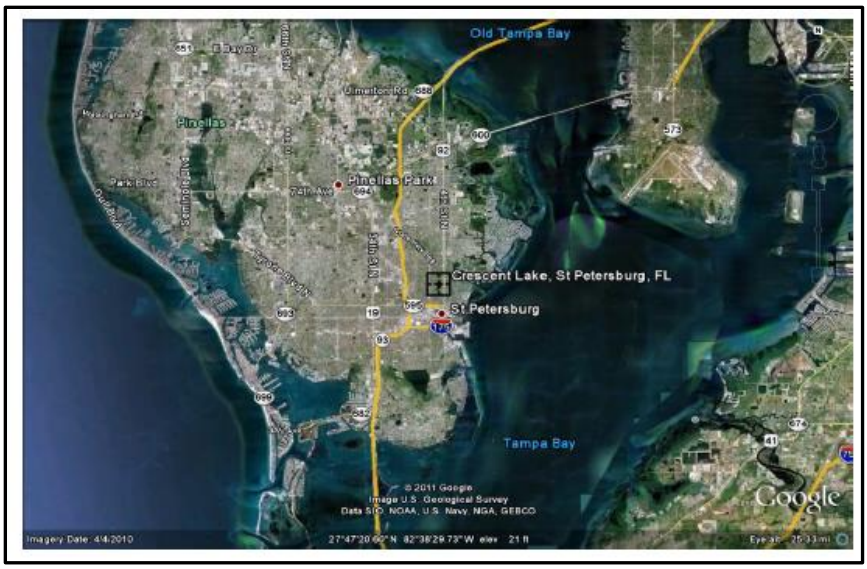

Figure 2.2. Image of Tampa Bay/St. Petersburg Peninsula and Crescent Lake.
Crescent Lake is located just north of downtown St. Petersburg, on the west side of Middle Tampa Bay. Photo from Google Earth (2010).

Figure 2.3. Crescent Lake and Surrounding Urban Area.
Stormwater from the surrounding urban area is flushed into the lake after each rainfall event. Photo from Google Earth (2010).

2.5.1 Crescent Lake Water Quality Data

Crescent Lake (WBID: 1700A) has been classified as an impaired waterbody by the Florida Department of Environmental Protection due to excessive phosphorus and chlorophyll-a (FDEP, 2019). There are five classifications of water bodies in Florida based on usage (Table 2.4). Crescent Lake is a Class III water body located in the Peninsular region. The following parameters regarding surface water quality criteria for Class III water bodies are spelled out in rule 62-302.530 and rule 62-302.531 of the Florida Administrative Code (Table 2.5). The annual geometric mean for TN, TP, and chlorophyll-a, requires at least four samples taken per year, with at least one sample taken between May 1 and September 30, and at least one sample taken during the other months of the calendar year. Additionally, samples must be taken at least one week apart. The samples are not limited to surface water and may be taken from all depths. The threshold nutrient criteria are also based on the color of the water, and Crescent Lake has a Platinum Cobalt Unit (PCU) ≥ 40 according to Jacobs Engineering Inc. (2019) in *Baseline Assessment of Crescent Lake*. Dissolved oxygen thresholds are outlined in rule 602-302.533 (F.A.C.), where a minimum threshold of 38% saturation is required in the Peninsular region. Additionally, averages must be calculated in the upper two meters of lakes. A value of 38% is roughly 2.9 mg/L at 30°C and 3.5 mg/L at 20°C.

Table 2.4. Classification of Water Bodies With Regard to Their Suitable Purposes. Spelled Out in Section 62-302.400 of the Florida Administrative Code.

CLASS	**PURPOSE**
Class I	Potable Water Supply
Class II	Shellfish Propagation or Harvesting
Class III	Recreational Purposes (boating, swimming, fishing). Sustains well-balanced population of fish and wildlife
Class IV	Agricultural Water Supply
Class V	Navigation, Utility, and Industrial Use

Table 2.5. Class III Florida Surface Water Quality Parameters. Peninsular region with PCU ≥ 40. From Section 62-302.531 and 62-302.533 of the Florida Administrative Code.

PARAMETER	**CONCENTRATION** (Geometric Mean)
Dissolved Oxygen	Threshold: 2.9 mg/L at 30°C 3.5 mg/L at 20°C
Total Phosphorus	Threshold: 0.16 mg/L
Total Nitrogen	Threshold: 2.23 mg/L
Chlorophyll-a	Threshold: 20 µg/L

In addition to the basic thresholds outlined in Table 2.5 (above), impaired status is a function of the Florida trophic state index (TSI) based on a scale of 1-100 (Table 2.3) that considers the relationship between total phosphorus, chlorophyll-a, and total nitrogen; a lake value greater than 60 is considered impaired and not suitable for recreation (Paulic et al., 1996). To ensure accuracy, the basis for establishing impairment in Florida waters also requires a minimum sample size of 10, and 80% confidence that nutrients surpass the threshold by at least 10% (Norgart, 2018).

Several organizations have monitored water quality at Crescent Lake, including the City of St. Petersburg, Lakewatch Volunteer Water Quality Monitoring, SWFWMD Water Quality Monitoring Program, and Jacobs Engineering Inc. Water quality sampling at Crescent Lake has occurred more than 5000 times since February 2000 and Crescent Lake is considered hypereutrophic due to high levels of nutrients (Table 2.6). Based on data collected between 2007 and 2018 by Lakewatch, Crescent Lake had a mean total phosphorus (TP) of 110 ug/L (0.11 mg/L), a mean total nitrogen (TN) of 1161 ug/L (1.16 mg/L), uncorrected mean chlorophyll-a levels of 55 ug/L, and a secchi-disk depth mean of 1 meter (Lakewatch, 2019) (Table 2.7).

Total phosphorus and TN levels have declined in more recent samples (Figure 2.4, Figure 2.5). The long-term average TP and TN fall below the threshold for impairment, while chlorophyll-a averages surpass the threshold. Dissolved oxygen levels have dropped in the Fall months as observed in data from 2018 (TBEP, 2019), from levels as high as nearly 16 mg/L in February, to as low as roughly 3 mg/L (below the threshold) in November (Figure 2.7). The amount of dissolved oxygen needed to sustain life depends on the organism, but it is generally accepted that aquatic organisms require at least 3 mg/L (EPA, 2016), and the threshold for DO stated in Florida Rule 62-302.530 regarding Class III waterbodies is about 2.9 mg/L at 30°C.

Table 2.6. General Overview of Limnology Data of Crescent Lake.
From the years 2007-2018 (Lakewatch, 2019).

County	Pinellas
Name	Crescent
Latitude	27.7895
Longitude	-82.6413
Water Body Type	Lake
Surface Area (ha and acre)	7.9 ha or 20 acre
Period of Record (year)	2007 to 2018
Lake Trophic Status (CHL)	Hypereutrophic
TP Zone	**TP6**
Grand TP Geometric Mean Concentration (µg/L, min. and max.)	**110 (60 to 169)**
TN Zone	**TN5**
Grand TN Geometric Mean Concentration (µg/L, min. and max.)	**1161 (728 to 1787)**

Table 2.7. Averages of Water Quality Data of Crescent Lake.
From the years 2007-2018 (Lakewatch, 2019).

Parameter	Minimum and Maximum Annual Geometric Means	Grand Geometric Mean (Sampling years)
Total Phosphorus (µg/L)	60 - 169	**110 (12)**
Total Nitrogen (µg/L)	728 - 1787	**1161 (12)**
Chlorophyll- uncorrected (µg/L)	30 - 161	**55 (12)**
Secchi (ft)	1.9 - 4.9	3.3 (12)
Secchi (m)	0.6 - 1.5	1.0 (12)
Color (Pt-Co Units)	19 - 24	21 (10)
Specific Conductance (µS/cm@25 C)	265 - 359	298 (10)
Lake Classification	**Clear Hardwater**	

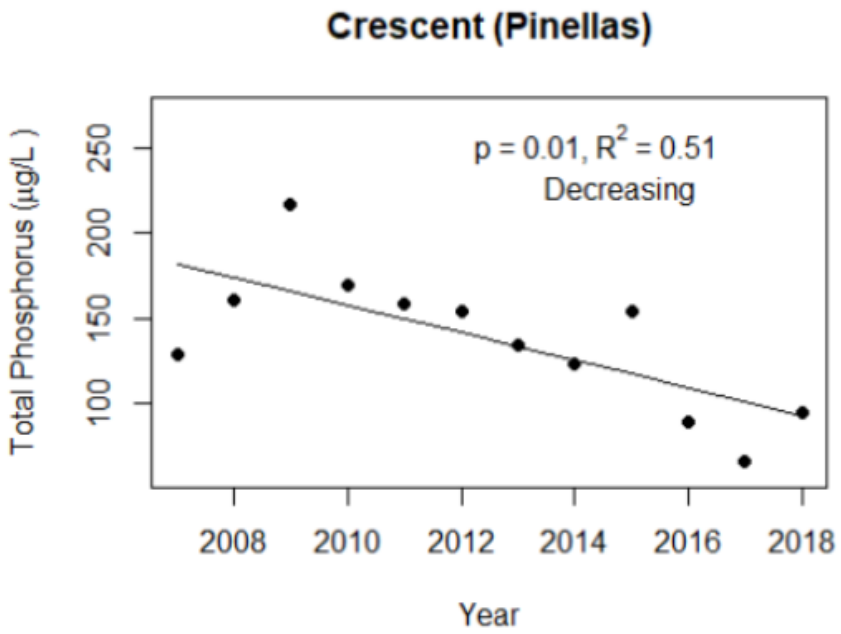

Figure 2.4. Graphed Data of TP at Crescent Lake.
Showing a decreasing trend from 2007-2018 (Lakewatch, 2019).

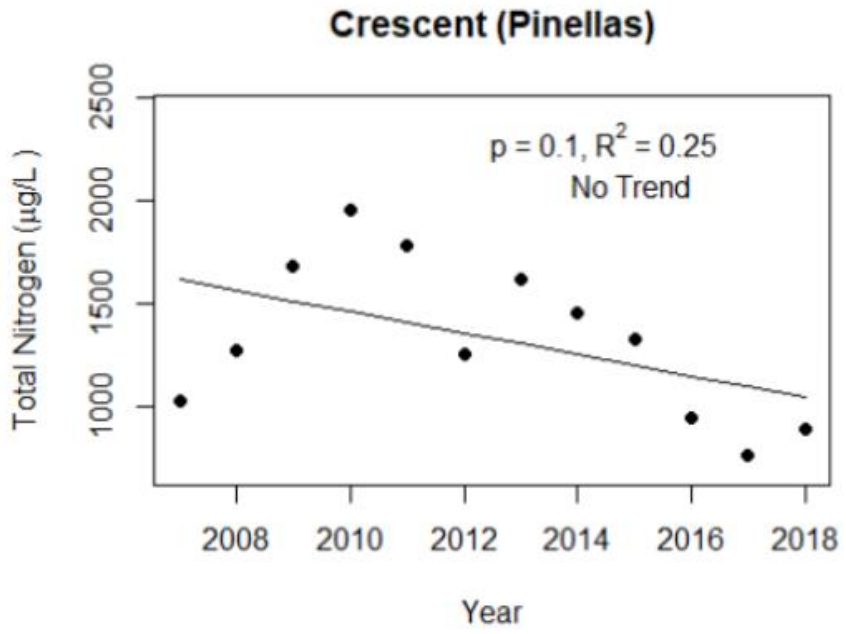

Figure 2.5. Graphed Data of TN at Crescent Lake.
Showing no statistically significant trend, although the slope is decreasing from 2007-2018 (Lakewatch, 2019).

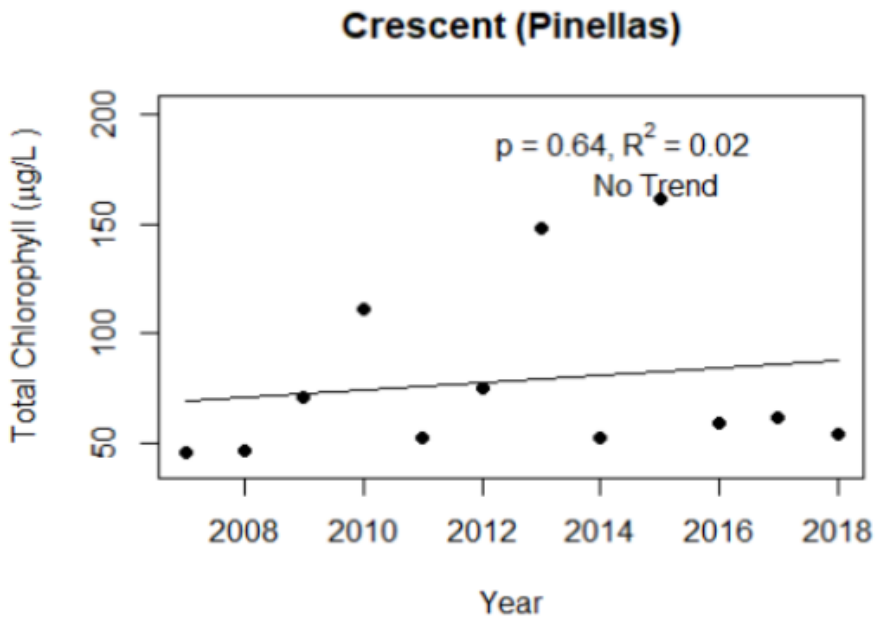

Figure 2.6. Graphed Data of Total Chlorophyll.
At Crescent Lake, 2007-2018 (Lakewatch, 2019).

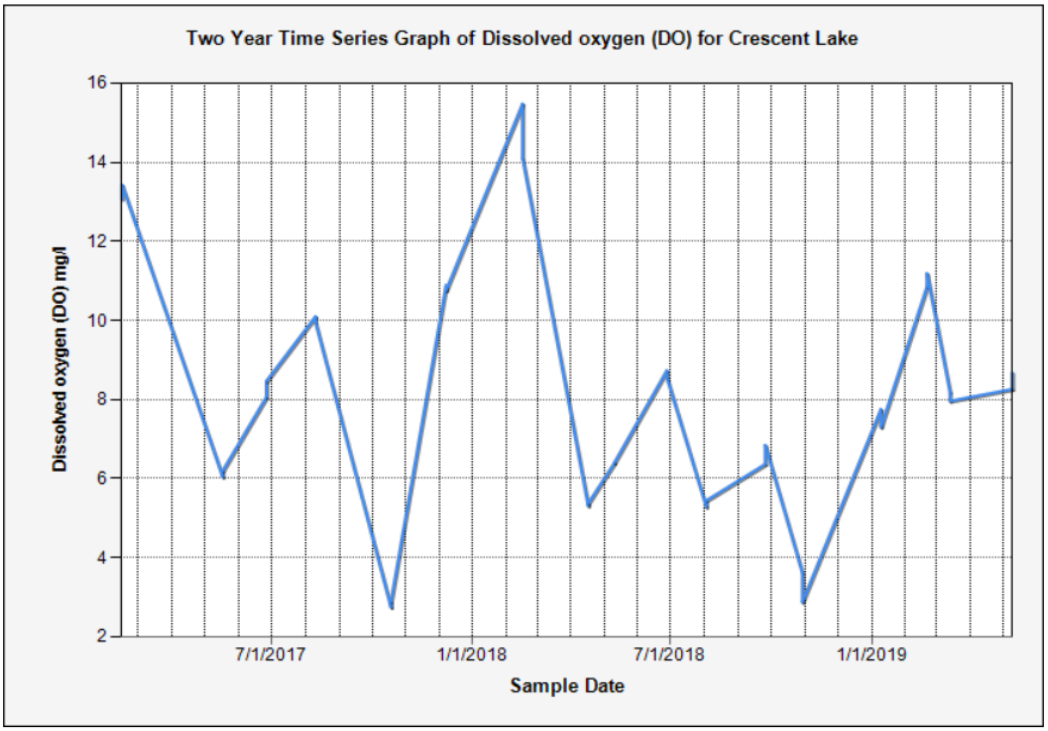

Figure 2.7. Dissolved Oxygen Concentrations at Crescent Lake, 2017-2018.
Dissolved Oxygen appears to decrease in October and November of 2017 and 2018 (TBEP, 2019).

2.6. Jacobs Engineering Inc. Baseline Assessment – January 2019

2.6.1 Jacobs Engineering Summary

Jacobs Engineering Group Inc. conducted research at Crescent Lake on 30 January 2019 that focused on water quality, sediment quality, and on developing a bathymetric map. The City of St. Petersburg wanted to establish a baseline assessment from which to form a plan of action that was intended to improve water quality and overall lake ecology. Water and sediments were sampled at three consistent locations (Figure 2.8): Lk/Sd-1: Outflow Station (max depth of 5.49 meters (18 feet)), Lk/Sd-2: Deepest portion of Lake (max depth of 11.52 meters (37.8 feet)), and Lk/Sd-3: Inflow Station (max depth of 2.4 meters (8 feet)). A bathymetric survey was conducted using a Lowrance Hook 5 echosounder, providing full coverage of the lake and revealing that the deepest point of Crescent Lake is 11.52 meters (37.8 feet) deep (Figure 2.9).

Figure 2.8. Sampling Stations at Crescent Lake.
Locations of interest are Lk/Sd-1, Lk/Sd-2, and Lk/Sd-3 (Jacobs Engineering Inc. 2019).

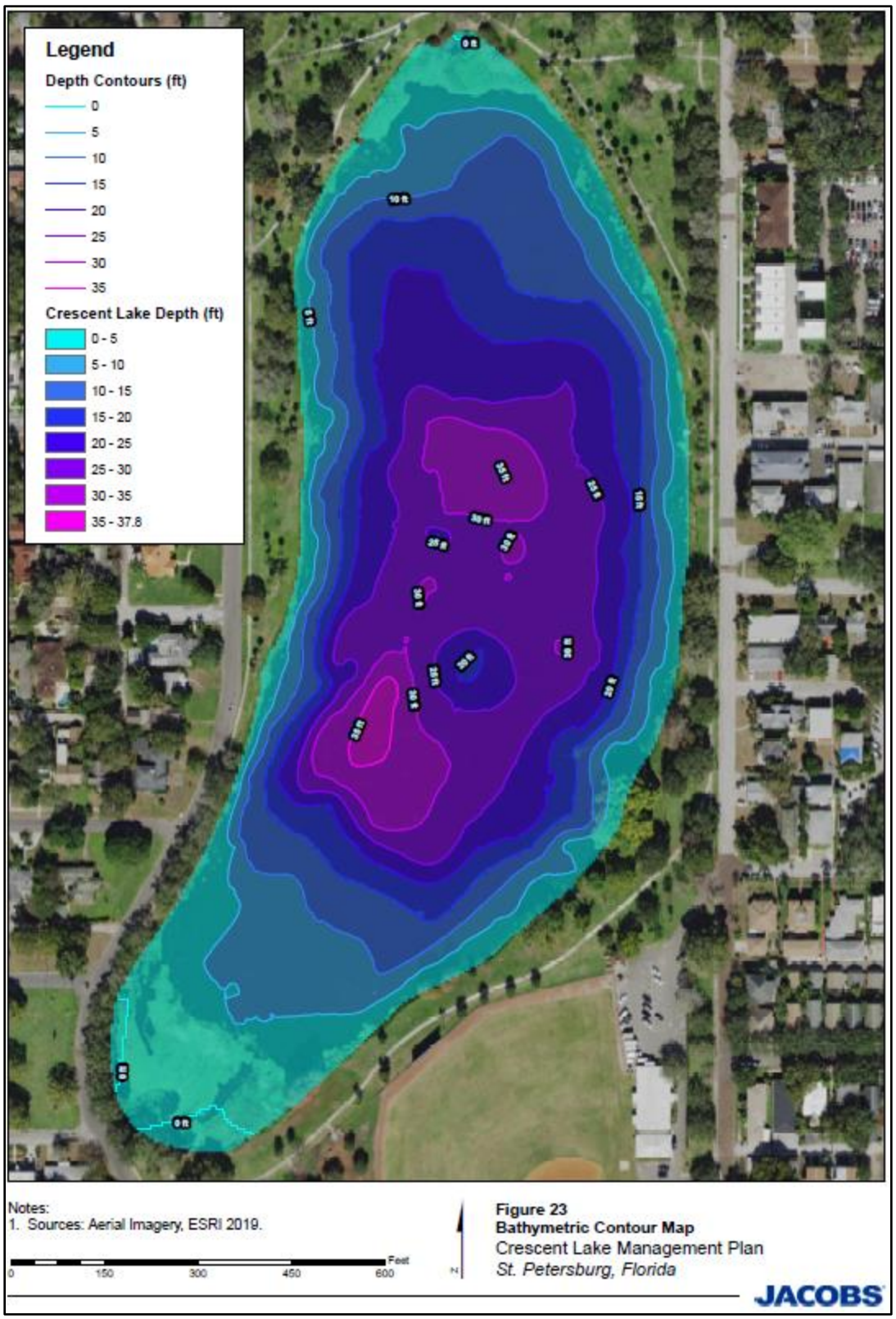

Figure 2.9. Bathymetric Map of Crescent Lake (Jacobs Engineering Inc., 2019).

2.6.2 In-Situ Profile Readings

Jacobs Engineering Inc. used a YSI 556 sonde to collect measurements of several water quality parameters in the lake. Readings were taken at 1-meter increments from the surface to the bottom at all three sampling locations. Of most concern were dissolved oxygen and temperature as they help identify lake water stratification. Station Lk-2 indicated a sharp decrease in dissolved oxygen and temperature as depth increased, particularly between 15 and 24-feet depth (Figure 2.10), suggesting a possible thermocline (Jacobs Engineering Inc., 2019). Anoxic conditions were not found even in the deepest portion of the lake (Figure 2.10). All three stations showed a decrease in temperature with depth, although less than 1-degree Celsius to the bottom, which indicated that the water column is not thermally stratified (Figure 2.11).

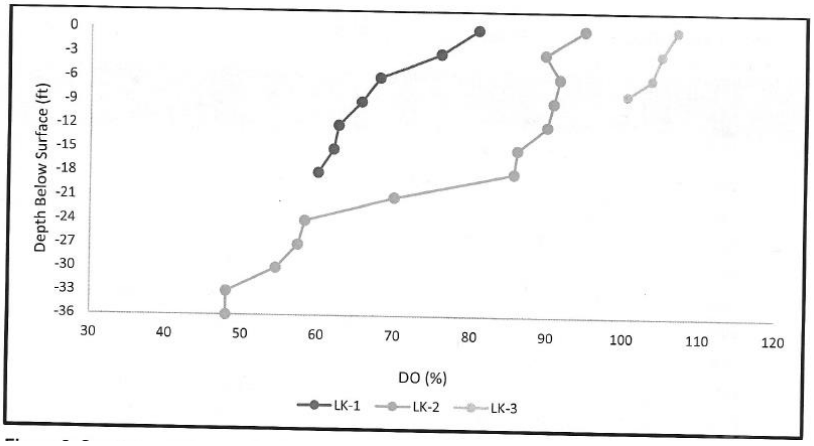

Figure 2.10. Dissolved Oxygen Saturation With Depth at Crescent Lake.
A saturation of 100% is roughly 7-8 mg/L. Taken at 3 separate stations. (Jacobs Engineering Inc., 2019).

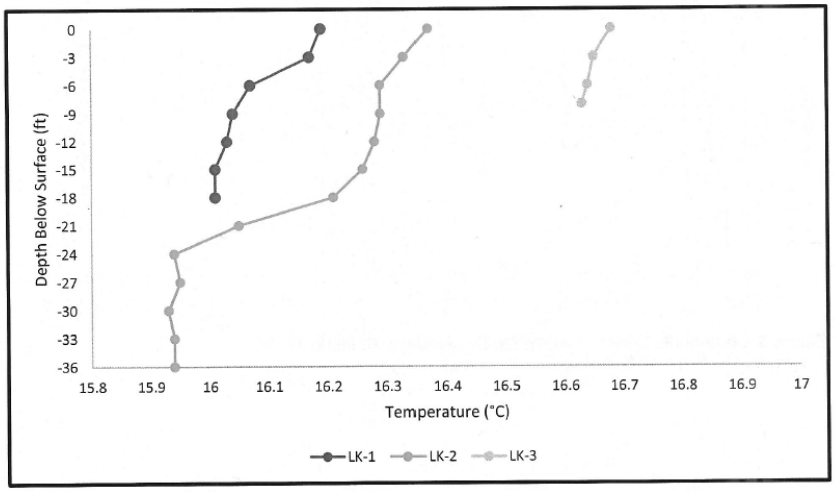

Figure 2.11. Temperature With Depth at Crescent Lake.
Taken at 3 separate stations (Jacobs Engineering Inc., 2019).

2.6.3 Water Quality Sampling

Jacobs Engineering Inc. collected water quality samples using a Van Dorn water bottle for a total of three samples per station. The three samples were at the near surface (S) (0.3 meters), at mid-depth (M), and just above the bottom sediment (B) (1 meter above sediment). The data were collected on January 30, 2019, during winter. The results showed elevated TP throughout the water column when compared to average Florida lake water (FDEP, 2004, Jacobs Engineering Inc., 2019), but less than the data collected by Lakewatch (Table 2.7). Ammonia, total nitrogen, and total phosphorus were not heavily concentrated at the bottom compared to the surface (Tables 2.8, 2.9, 2.10), which suggests that the lake may have undergone a recent mixing period (Tundisi & Tundisi, 2011). Chlorophyll-a values were relatively high in the epilimnion and at all depths when compared to average Florida lakes (FDEP, 2004) at every station (Tables 2.8, 2.9, 2.10). High chlorophyll-a values suggest that Crescent Lake is highly productive, and these values appear related to the higher than average nutrient concentrations (Tables 2.8, 2.9,

2.10) (Tundisi & Tundisi, 2011; Hogsett et al., 2019). Furthermore, when chlorophyll-a values are detected at any concentration below the light extinction depth, which was suggested by these data, this may indicate a recent turnover, and sinking of algae and detrital material (Jacobs Engineering Inc., 2019).

Table 2.8. Water Quality Results of Station Lk-1.
Station Lk-1 reaches a maximum depth of 18 feet. (Jacobs Engineering Inc., 2019) (* FDEP (2004)).

Parameter	Lk-1 S	Lk-1 M	Lk-1 B	Average (P50) FL Lakes*
pH	7.3	7.2	7.2	7.61
Ammonia	0.022 mg/L	0.022 mg/L	0.022 mg/L	0.02
TKN	0.83 mg/L	0.79 mg/L	0.66 mg/L	1.2
Nitrate + Nitrite	0.21 mg/L	0.011 mg/L	0.02 mg/L	0.02
TN	0.851 mg/L	0.801 mg/L	0.68 mg/L	0.73
TP	0.11 mg/L	0.093 mg/L	0.093 mg/L	0.03
Chlorophyll-a	48.5 ug/L	31 ug/L	35.4 ug/L	10

Table 2.9. Water Quality Results of Station Lk-2.
Station Lk-2 reaches a maximum depth of 37.8 feet. (Jacobs Engineering Inc., 2019) (* FDEP (2004)).

Parameter	Lk-2 S	Lk-2 M	Lk-2 B	Average (P50) FL Lakes*
pH	7.7	7.4	7.3	7.61
Ammonia	0.022 mg/L	0.022 mg/L	0.071 mg/L	0.02
TKN	0.89 mg/L	0.57 mg/L	0.81 mg/L	1.2
Nitrate + Nitrite	0.017 mg/L	0.012 mg/L	0.013 mg/L	0.02
TN	0.907 mg/L	0.582 mg/L	0.823 mg/L	0.73
TP	0.096 mg/L	0.094 mg/L	0.099 mg/L	0.03
Chlorophyll-a	85.9 ug/L	46.7 ug/L	27.7 ug/L	10

Table 2.10. Water Quality Results of Station Lk-3.
Station Lk-3 reaches a maximum depth of 8 Feet. (Jacobs Engineering Inc., 2019) (* FDEP (2004)).

Parameter	Lk-3 S	Lk-3 M	Lk-3 B	Average (P50) FL Lakes*
pH	7.5	7.6	7.6	7.61
Ammonia	0.022 mg/L	0.022 mg/L	0.022 mg/L	0.02
TKN	0.78 mg/L	0.82 mg/L	0.87 mg/L	1.2
Nitrate + Nitrite	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.02
TN	0.79 mg/L	0.83 mg/L	0.88 mg/L	0.73
TP	0.1 mg/L	0.11 mg/L	0.1 mg/L	0.03
Chlorophyll-a	51.5 ug/L	46.4 ug/L	51.7 ug/L	10

2.6.4 Nutrient Analysis of Sediments

Sediment samples displayed high levels of phosphorus, ammonia, and total Kjeldhal nitrogen (TKN). The highest sediment nutrient concentrations appear at station Lk-2, which is the deepest part of the lake. Station Lk-2 revealed 21 mg/g of TKN, notably 8 mg/g greater than Lk-1. Greater concentrations of nutrients are often found at increased depths in lakes that are periodically stratified (Tundisi & Tundisi, 2011).

2.7 Research Questions/Hypotheses

The Jacobs Engineering Inc. (2019) assessment provided data that showed a modest transition of temperature and DO between the surface and the bottom of the lake. There was less than one half a degree C temperature transition between 15 and 24 feet, indicating a slight thermocline (Tundisi & Tundisi, 2011). The levels of DO were lower with depth but were not anoxic. These data support the idea that stratification may be re-forming after a recent mixing of the water column. High levels of phosphorus, ammonia, and TKN were observed in the water samples, most notably at the deeper water station (Lk-2) (Table 2.9). Lower levels of chlorophyll-a were observed in the lake's deeper waters in two of three sampling locations, but are relatively high when compared to average Florida lakes. It is possible that nutrients in the lake's deep water and sediment were reduced prior to the Jacobs study because of potential mixing of a stratified water column, which might have contributed to increased nutrients and phytoplankton growth in the euphotic zone. The assessment was conducted on a single day in winter, and further study in the summer and fall was recommended.

This thesis addresses the following questions: Does Crescent Lake stratify during the warm months of summer? If it does, can evidence be found to suggest that lake mixing occurs in

the fall? Does mixing of the water column contribute to dissolved oxygen reduction and to the growth of phytoplankton in surface waters?

The first hypothesis is that thermal stratification is evident and stable during the summer months through the end of September (summer season). If this is the case, the epilimnion will be characterized by higher water temperatures, more dissolved oxygen, lesser density, lesser total dissolved solids, greater pH, greater levels of chlorophyll-a, and lower concentrations of nutrients (nitrate + nitrite, nitrogen, phosphate, silicic acid, and ammonium), than the hypolimnion. It may be that stratification occurs only in the deeper portions of the lake that are further away from the shoreline, such as at station 2 that reaches a max depth of 11.52 meters.

The second hypothesis is that the slightly cooler fall months and occasional heavy winds starting in October/November will lead to a breakup of the thermal stratification, causing a circulation event. It is expected that the mixing event will homogenize temperature, dissolved oxygen levels, density, total dissolved solids, pH and nutrients and this will lead to an increase in nutrients in the epilimnion. Shortly after mixing, increased levels of chlorophyll-a should be observed in the epilimnion. Furthermore, dissolved oxygen levels are expected to increase in the hypolimnion after mixing, but decrease in the epilimnion.

The alternative hypothesis is that summer stratification does not occur. Moreover, temperature and dissolved oxygen levels will not be lower and nutrient concentrations will not be higher in the hypolimnion as compared to the epilimnion. Lake turnover will not occur in the winter months and will not explain the observed increase in phytoplankton and reduction of dissolved oxygen in the fall/winter. It may be that the increased phytoplankton growth is due to increased nutrients from baseflow and run-off or the lifting of the fertilizer ban at the end of September, not from mixing of the water column. It is also possible that there will be no

significant increase in phytoplankton growth and reduction of dissolved oxygen in the fall/winter at all.

3. Methodology

3.1 Objectives

It was unknown if Crescent Lake became thermally stratified in the summer months, or what circulation pattern was characteristic for the lake. The water at different depths was analyzed for several limnological characteristics including temperature, dissolved oxygen, density, total dissolved solids, pH, nutrient levels (nitrate+nitrite, nitrite, ammonium, silicic acid, phosphate), and chlorophyll-a. Data collection took place from early July 2019 through the end of December 2019. Also examined during this study is whether nutrient growth and subsequent chlorophyll-a spikes were observed in the epilimnion during fall months.

3.2 Methodology Overview

This project involved taking water-column profile readings with a sonde, and collecting long-term data at the surface with a time-series sonde. Water samples were analyzed for nutrients and chlorophyll-a. Data were collected once a week starting in July 2019 and continued through December 2019. Air temperature and wind speed data also were collected for this time period. Overall, data were collected with the goal of understanding whether stratification and circulation contributed to seasonal phytoplankton growth in the water column of Crescent Lake.

The data collection sondes were portable and provide live readings. A kayak was used to navigate the lake. The profile readings were taken at station Lk-2 (Station 2), adopted from Jacobs Engineering Inc. (2019) (Figure 3.2), and a buoy was placed with anchors to ensure that sampling always occurred at the same site. Station 2 was the sampling location of primary interest because this was where the lake was deepest, and the full water column could be examined. The time-series sonde was placed at Station 2, just under the surface, to determine

how total ammonia concentrations and temperature changed at the epilimnion. Water was collected using a Van Dorn bottle at Station 2 at three different depths (1-meter, 5-meters, 10-meters), transferred to amber bottles and promptly moved to the WHL lab at University of South Florida St. Petersburg (USFSP) for filtration and storage. The filtered water samples were analyzed for nutrient levels and chlorophyll-a. Nutrient analysis was conducted by Dr. Robert Masserini at the University of Tampa. Chlorophyll-a analysis was conducted at the WHL lab at USFSP using the UV-Vis Spectrophotometer. Further details regarding this methodology are discussed below.

3.3 Study Site

Crescent Lake is located at 1320 5th St. N. in St. Petersburg, Florida, between 12th and 22nd Avenues N. at 27°47'17.8"N, 82°38'28.8"W (Figure 2.1, Figure 2.2, Figure 3.1). Crescent Lake park is home to bountiful wildlife and birds including: otters, turtles, fish, geese, ducks, limpkins, herons, storks, pelicans, and anhingas (CLNA, n.d.). This park also contains a playground, a baseball field, a walking path, and grassland for recreation. Crescent Lake acts as a retention pond and receives storm-water run-off from a surrounding urban watershed that is roughly 10 times the size of the lake (Vogel, 2011). Permission to access this lake through the end of January was granted by the Parks and Recreation Department of the City of St. Petersburg. Figure 3.2 displays the sampling locations within Crescent Lake. Profile readings using a sonde occurred at Station 2 following the procedure done by Jacobs Engineering, Inc., 2019 (Figure 3.2). Water samples were collected at Station 2, which was the deepest part of the lake. Using the deepest location allowed for the identification of the hypolimnion and served as the most appropriate location to observe a thermocline. Data regarding mean daily minimum

temperatures, mean daily precipitation, and mean daily wind speed were gathered from National Oceanic and Atmospheric Administration (NOAA): Albert Whitted Station, St. Petersburg.

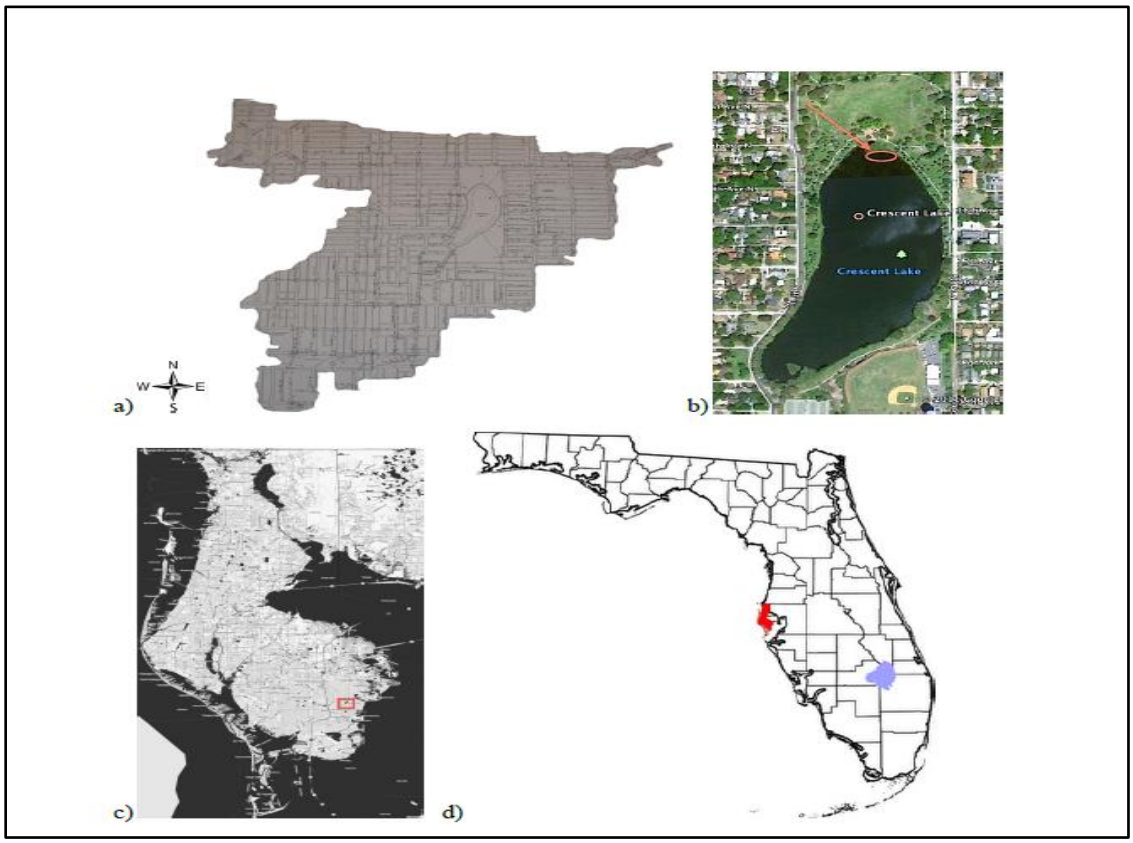

Figure 3.1: Study Site of Crescent Lake.
Adopted from Vogel (2011). A) Crescent Lake Watershed Basin. B) Satellite image of Crescent Lake (Google Earth). C) Map of Pinellas County highlighting the Crescent Lake Watershed Basin. D) Pinellas County, FL shown in red.

Figure 3.2. Sampling Stations Map.
Profile readings will be taken at Lk-2 (Station 2). Water samples will be collected at Station 2 for nutrient and chlorophyll-a analysis. Jacobs Engineering Inc., (2019).

3.4 Data Collection

3.4.1 Aqua Troll-500 Sonde Profile Readings

The water column was analyzed using an Aqua TROLL 500 multiparameter sonde manufactured by In-Situ Inc. (Figure 3.3.). This was a portable device that connects to a wireless datalogger application system and a mobile device via blue tooth in order to transmit live readings to email accounts directly over the internet. There were several parameters that were recorded during live readings, Rugged Dissolved Oxygen (RDO) Concentration (mg/L), pH, Total Dissolved Solids (ppt), Density (g/cm^3), Temperature (°C), and Depth (ft). RDO is different from dissolved oxygen (DO) because of the type of technology used in the probe itself. RDO uses optical sensors and allow for *in-situ* measurements, where traditional DO probes use

electrochemical sensors. According to Windsor et al. (2012), optical RDO technology is accurate compared to electrochemical sensors and has gained widespread acceptance by both regulatory and environmental monitoring organizations.

This sonde was utilized to take profile readings at Crescent Lake at Station 2 (Lk-2) depicted in Figure 3.2 from the surface to the bottom in two second intervals (in feet) that was converted to metric units. The most important parameters for this project were temperature, RDO, density, TDS, and pH as it related to depth, which aided in identifying stratification. The profile readings took place on a weekly basis. Selected measurements from every 2-3 weeks (to avoid visual constraints) were graphed and analyzed like the work done by Jacobs Engineering Inc. in 2019, with depth on the Y-axis, and the parameter on the X-axis (Figure 2.10, Figure 2.11).

A study conducted by Tuna et al. (2013) presents the potential advantages and disadvantages of using portable water monitoring devices including sondes. Sondes are a reasonably affordable option (5-6 thousand dollars), are easy to work with, are portable and the probes on the sonde can be relatively precise, but not as precise as more expensive equipment. Other published studies have been conducted using a portable sonde, such as in the analysis of water quality of Lake Nam in China (Wang et al., 2009), and in the analysis of the Toenepi Stream in New Zealand (Wilcock, et al., 2006). Jacobs Engineering Inc., 2019 used a YSI-556 portable sonde in their study at Crescent Lake. Whitmore et al. (1991) used a YSI model 54A oxygen meter sonde. Escobar et al. (2009) used a YSI Model 85 meter sonde. Also, federal, state, and local governments use sondes for water quality monitoring.

Figure 3.3. Aqua Troll-500 Sonde.
Sensors are inside the protective housing at lower right.

3.4.2 Aqua Troll-600 Daily Time-Series Readings

An Aqua Troll-600 multiparameter sonde, manufactured by In-Situ Inc., was used to observe daily time-series water quality data at the surface of Crescent Lake. The sonde looks identical to the Aqua Troll-500 sonde shown in Figure 3.3, the only difference is that the Aqua Troll-600 required batteries and the Aqua Troll-500 required external power. The base sensor of the Aqua Troll-600 collected data regarding the parameters of optical RDO, pH/ORP, turbidity, conductivity, temperature and pressure. Total ammonia was also measured. This device has a battery life of up to nine months and can take readings at selected intervals from seconds to hours.

The purpose of using this daily time-series sonde was to identify immediate changes in water quality in the epilimnion that might have occurred as lake turnover and circulation began. The time-series sonde was set to take readings at 15-minute intervals. The daily time-series sonde was placed at Station 2 (Lk-2) (Figure 3.2) just below the surface (0-1 meter) and was deployed from early October through December 2019 when the water column at Crescent Lake was expected to cool down and mix. The sonde was visited on a monthly basis for routine maintenance and calibration. Other studies have successfully collected water quality data using a sonde at a fixed location (see Surrat et al., 2008; Westhoff & Paukert, 2014).

3.4.3 Water Collection - Van Dorn Bottle

Jacobs Engineering Inc. utilized a Van Dorn bottle to collect water samples at three different depths at the three locations depicted in Figure 3.2 in January 2019. These water samples were then analyzed for nutrient content. The water sample collection used the same methodology as was used by Jacobs Engineering Inc. (2019). Water samples were collected using a Van Dorn bottle at Station 2 at 3 depths on a weekly basis. A Van Dorn bottle is designed to allow the entrance of water at specific depths, and a weight is dropped down the rope that triggers the closure of the bottle and collects the water. The near surface depth was 1 meter, the mid-depth was 5 meters, and the bottom depth was 10 meters. One liter of water was collected at each depth and transferred to an amber bottle to protect the water from UV-rays. This methodology effectively gathered water from the epilimnion, within the thermocline, and in the hypolimnion (see Jassby & Goldman, 1974; Paerl et al., 1975).

3.5 Nutrient Analysis

Water samples were filtered using 0.22 µm nylon filters and were stored in HCl-soaked 25-mL bottles (provided by Chemistry Professor, Dr. Rob Masserini, from the University of Tampa (UT), and was then placed in the -80 freezer at the WHL lab at USF St. Petersburg until being transported over ice to Dr. Masserini's chemical analysis lab at UT. A total of three 25-mL samples from each of the three depths from Station 2 (Figure 2-7) were collected. The bottom samples were diluted to a ratio of 1:20 with deionized water, because it had been established (in a test-run) that nutrient concentration is very high at the bottom depth and does not register correctly within normal parameters using Dr. Masserini's equipment. The water samples were analyzed using a Continuous Flow Analyzer (CFA). The CFA is a nutrient analyzer that utilizes absorbance based on colorimetric methods.

Professor Masserini utilized the CFA in accordance with the protocol presented by Gordon et al. (2000). The inorganic nutrients measured were: phosphate, silicic acid, nitrate+nitrite, nitrite, and ammonium. Modifications were made in order to extend the limits of detection and the flow rates and concentrations of the reagents. The reagents used included nitroprusside, hypochlorite, phenolate, and citrate. Dr. Masserini noted that 18 megaohm deionized water was used instead of seawater as the wash solution and for the matrix to prepare standards.

The results of this nutrient analysis were calculated in mmol/L, and converted to mg/L. These data were compared to data previously collected by Florida Lakewatch, the FDEP, and the EPA that is accessible on the Tampa Bay Estuary Program website (TBEP, n.d.), and Jacobs Engineering Inc. (2019). The results of these data show the movement of these nutrients throughout the water column at different depths.

3.6 Chlorophyll-a Analysis

3.6.1 Overview

Chlorophyll-a is a useful indicator of phytoplankton biomass in a water body and is the primary photosynthetic pigment in almost all oxygenic photosynthetic organisms (Ritchie, 2006). Furthermore, levels of chlorophyll-a have been used as an indicator of phytoplankton blooms (Boyer et al., 2009). Pheophytin is a natural degradation product of chlorophyll and has an absorption peak in a similar spectral range as chlorophyll-a; some studies try to account for its presence by using a model to reduce the initial chlorophyll-a readings, but it was not corrected for in this project. Methanol was used as the solvent and there is no known method for correcting for pheophytin when methanol is used as the solvent during the use of the trichromatic method with a spectrophotometer.

Water was collected at all three depths at Station 2: Near Surface (1-meter), Mid-Depth (5-meters), and Bottom (10-meters). There was one chlorophyll-a sample for each depth per week. These samples were filtered and stored in the -80 freezer (standard method recommended by FDEP, 2010) at the STG lab at USFSP and analyzed using a Shimadzu brand UV-Vis Spectrophotometer.

3.6.2 Spectrophotometer Methodology

The water samples were vacuum filtered through a glass fiber filter and stored in a -80 freezer at the WHL lab after being folded in half with the phytoplankton facing in, wrapped in aluminum foil, and labelled with the date and sample depth. Maximum holding time was 28 days, in accordance with the Florida DEP (2010). The total volume of sample water filtered for each depth was 100 mL for the surface and mid-depth, and 20 mL for the bottom depth. The glass fiber filters used were Advantec 25 mm, and the funnel system was a glass 150 mL Advantec brand.

The reagent used for extraction in this project was methanol. Methanol is a very good extractant for chlorophylls from phytoplankton (Ritchie, 2006). Exposure to light was limited to avoid degradation (Florida DEP, 2010). A study done by Holm-Hansen and Riemann (1978) utilized methanol and soaked the filters in methanol in a test tube for one hour. The quartz cuvettes provided by Dr. James Ivey (environmental science faculty member at USF St. Petersburg) held a maximum volume of 30 mL, and the filters were soaked in 15 mL (to account for washing of the equipment) to reach the exact 30 mL volume. After soaking, the solution with the filter was mixed and ground for less than 1 minute to minimize overheating from friction (Florida DEP, 2010). The walls of the grinding tube were rinsed with methanol back into the test tube.

The Shimadzu brand spectrophotometer was located in room WHL-114 at USF St. Petersburg. The reference cuvette was filled with methanol, and 2 blanks were scanned to provide a background in accordance to the volume of the sample. The absorption was set to scan between the wavelengths of 400-750 nm. The absorbance of the extract was measured at 750, 665, 664, 647, and 630 nm wavelengths, respectively.

The following equations to quantify chlorophyll-a levels derive from Florida DEP (2010) *Spectral Method for Chlorophyll-A*, and U.S. EPA (1997) *In Vitro Determination of Chlorophylls a, b, c1 + c2 and Pheopigments in Marine and Freshwater Algae by Visible Spectrophotometry*. The coefficients for the equations used in conjunction with methanol as the reagent are adopted from Ritchie (2006). The path length for the Shimadzu brand spectrophotometer in the WHL lab was 5 cm. The equations used with the coefficients for chlorophyll-a were as follows:

Equation 3.1: Chlorophyll-a Concentration in the Cell (Ritchie, 2006).

$$Concentration\ in\ the\ cell = -2.6839(Abs.at\ 632 - Abs.at\ 750) + 13.2654(Abs.at\ 665 - Abs.at\ 750)$$

Equation 3.2: Chlorophyll-a Concentration in Water (Ritchie, 2006).

$$Concentration\ in\ water\ \left(\frac{mg}{L}\right) = \frac{Conc.in\ the\ cell\ \times Volume\ (L)}{(Volume\ filtered\ (L) \times Cuvette\ length\ (cm)}$$

3.7 Lake Morphometric Values

Lake morphometry refers to a lake's horizontal and vertical shape and structure. Morphometric values are useful for predicting how weather and pollution can affect water levels and water quality. Furthermore, these values can aid in directing mitigation efforts.

The surface area of the lake was calculated using Equation 3.3 (Lakewatch, 2001). The bathymetric map of Crescent Lake used for this calculation is shown in Figure 2.9. A bathymetric map was printed, then cut-out and weighed, along with a square cut-out of a known scale and area. The known actual area of the scale cut-out was divided by the weight of the known cut-out square to determine the area/weight. The area/weight value that was determined was then multiplied by the weight of the unknown cut-out of the lake to determine the surface area. The area/weight value of the known scale cut-out was multiplied by cut-outs (using the same weight paper) of all the contour intervals to determine total surface area.

Equation 3.3: Surface Area (Lakewatch, 2001).

$$\frac{Known\ Actual\ Area\ of\ Square}{Weight\ of\ Known\ Square} = X\ area/weight$$

$$X\frac{area}{weight} \times Weight\ of Unknown\ = Actual\ Area$$

Volume was then determined using a bathymetric map and surface area data of each contour interval following the methodology explained in Taube (2000) (Equation 3.4). The volume of a contour interval (V), was determined by multiplying the height of the contour interval (H) by the surface area (A) of vertically adjacent contours and divided by 2. This method was applied to each contour interval of the bathymetric map and the values were summed to determine total volume.

Equation 3.4: Volume of Contour Interval (Taube, 2000).

$$V = \frac{H * (A1 + A2)}{2}$$

The following lake morphometric values were adopted from Tundisi and Tundisi (2011). Maximum depth (Z_{max}), was determined by measuring the distance from the surface to the bottom at the deepest part of the lake, and was provided by Jacobs Engineering Inc. (2019). Relative depth (expressed as a %) is the ratio of maximum depth to mean diameter of the lake. Total volume was determined by using a bathymetric map and summing the areas of each contour interval from the surface shoreline depth to the point of maximum depth. The mean depth (Z_{ave}) was calculated as the volume divided by the surface area. Maximum length, the distance between the two most distant points on the lake shore, was estimated. Maximum width, the length of a line at a right angle to the maximum length of a lake, was also determined. Maximum width and maximum length were determined using a GIS floodplain map with a ruler function (City of St. Petersburg, n.d.). The shoreline development index was calculated as the ratio of the shoreline length to the circumference of a circle with equal area of the lake (circular lakes have a ratio of 1 and elongated lakes have greater ratio).

3.8 Heat Budget Calculation

Jacobs Engineering Inc. (2019) created a bathymetric map (Figure 2.9), that depicted the percentage of total lake area corresponding to 5-foot depth contour intervals and was used to calculate the surface area and volume of Crescent Lake. Heat budget calculations were adopted

from the methods used in Escobar et al. (2009) and by Cole and Weihe (2015) and required surface area and volume data. Total heat content (calories) was calculated by multiplying the water column temperature (°C) from each 1.524-meter contour by the volume in the contour interval (M^3), and then summing the heat content from all contours. The sum of the heat content was calculated for the day when the water column was at its maximum temperature, and for the day when the water column was at its minimum temperature. The total heat content from the day of maximum temperature was subtracted from the day of minimum temperature. The difference in heat content was multiplied by the surface area of the lake (cm^2) and resulted in the heat budget in cal/cm^{-2}. Annual heat budgets are calculated from summer to winter, and from winter to summer. For this study, only one heat budget was calculated (summer to winter).

3.9 Secchi-Disk

Secchi-disk methodology was adopted from Davies-Colley et al. (2003). During mid-day, between 10:00 a.m. and 2:00 p.m., the Secchi-disk was lowered straight down into the water on the shady side of the boat, just over data collection Station 2 (Figure 3.2), the depth at which the disk disappeared was recorded, as well as the depth of reappearance. The Secchi-disk depth value was recorded as the average of the depth of appearance and reappearance. Secchi-disk measurements were collected twice a month.

3.10 Presentation and Analysis of Data

The sonde water column profile data variables (temperature, RDO, density, TDS, pH) measured from lake surface to bottom, from Station 2, were plotted on the X-axis vs. depth on the Y-axis. A visual representation of the data was constructed similar to those presented by Jacobs Engineering (2019) (Examples**:** Figures 2.10 and 2.11). Data from every week of the

sonde profile readings were not displayed on the graphs due to visual limitation. Rather, dates were chosen that best represent a change in the profile of each water quality parameter. The nutrients (nitrate+nitrite, nitrite, ammonium, phosphate, silicic acid) and chlorophyll-a data were graphed with concentration on the Y-axis and every sampling date was color-coded on the X-axis. The graph of the time-series data regarding temperature at the near surface were displayed on the Y-axis and the date on the X-axis, along with daily minimum atmospheric temperature data from NOAA (Albert Whitted Airport Station, St. Petersburg). The graph of time-series data regarding total ammonia at the near surface were displayed with the near surface sample concentrations of ammonium on the Y-axis and date on the X-axis.

In a similar study of heat budgets in lakes, interpolated isopleths of temperature and DO were plotted using Matlab software (Escobar et al., 2009). The heat budget calculated in this study was compared with the heat budget data of other Florida lakes presented in Nordlie (1972), Whitmore et al. (1991), and Escobar et al. (2009). Whitmore et al. (1991) utilized the mean, standard deviation, and number of samples with regard to limnological characteristics. Temperature and oxygen isopleths were used that relate to depth and date to represent changes in temperature and stratification over different seasonal variations (Figure 3.4). A similar visual graphing technique was not utilized in this study due to a lack of accessibility to appropriate software.

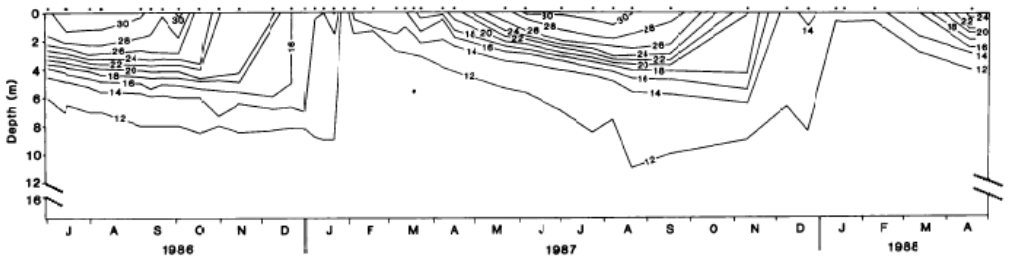

Figure 3.4. Temperature Isopleth (Whitmore et al., 1991).

The results of this study were compared with several references. Escobar et al. (2009) and Whitmore et al. (1991) provided water quality data that are based on means of nutrient and chlorophyll-a levels, measured in ug/L, in several Florida lakes. Previous averages of water quality data from Crescent Lake (nutrients, chlorophyll-a, Secchi-disk depth) collected by Florida Lakewatch, and the Tampa Bay Estuary Program (including Florida DEP and EPA data), and Jacobs Engineering Inc. (2019) data were incorporated as a basis of comparison.

3.11 Expected Results and Significance

The hypotheses of this study were that Crescent Lake would become thermally stratified in the summer and would undergo circulation in the fall, leading to increased nutrient concentrations, increased phytoplankton productivity, and a reduction of dissolved oxygen in the epilimnion. These expectations were based on data provided by Florida Lakewatch that showed an increase in nutrient and chlorophyll-a levels and a reduction of dissolved oxygen in the fall months, and on the data provided by Jacobs Engineering Inc. (2019) that showed relatively homogenized conditions in January 2019 that suggested mixing had already occurred.

The results of this study are intended to add to the limnological literature of Florida lakes, particularly urban lakes, and to assist in mitigation efforts

3.12 Timeline

Sampling and profiling bagan in July 2019 during warm summer months when thermal stratification was hypothesized to be forming and ended on 27 December. Data analysis, including drafting of the results, discussion, and conclusion, was conducted in early 2020. A graphic representation of this timeline is displayed in Table 3.1.

Table 3.1. Study Timeline.

Study Timeline	2019/2020										
	Jul.	Aug	Sep.	Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May /Jun
Proposal defense											
Make revisions as necessary											
Collect data	e										
Analyze data											
Complete results/discussion chapters											
Thesis rough draft #1											
Rough draft #2											
Thesis defense											
Graduate											

4. Results

4.1 Sonde Profile Readings

Limnological variables in the water column of Crescent Lake were measured weekly from the surface to the bottom using an Aqua-troll 500 multiparameter sonde (Figure 3.3). The limnological variables of interest were temperature, rugged dissolved oxygen, density, pH, and total dissolved solids. Selected weekly readings are illustrated in graphs, and the entire dataset can be found in the Appendix (Tables A2-A20).

4.1.1 Temperature

Sonde profile readings of temperature in the water column taken at Station 2 (Figure 3.2) selected from 4 July to 27 December 2019 are displayed in Figure 4.1, showing the change in temperature from summer to winter months. The maximum temperature of the surface water was 31.83°C on 23 August and decreased every subsequent sampling date by a cumulative total of 11.66°C until the minimum temperature of the surface water (20.17°C) was recorded on 19 December. Surface water temperature increased by 1.36°C to 21.53°C on the last date of sampling, 27 December. The greatest change in temperature from the surface to the bottom was recorded on 4 July, where temperature decreased by a total of 11.2°C (36%). This trend continued through August, September and declined on 23 October when a difference of just over 4°C was observed between the surface and bottom waters. On 16 November, the water column was nearly isothermal, increasing just 0.15°C from the surface to the bottom. Similarly, on 3 and 19 December, there were changes in temperature from the surface to the bottom of less than 1°C. On 27 December, lake water temperature declined 2°C from the surface to bottom. The warmest temperature at lake bottom was 23.34°C on 16 November, which is 3.85°C higher than the minimum bottom temperature (19.49°C) recorded on 27 December.

The time-series sonde allowed for continuous readings of temperature at the near surface of Crescent Lake, Station 2, every 15 minutes and was deployed when the water temperature was expected to drop from 24 October 2019 until 6 January 2020. Figure 4.2 displays the time-series temperature data, alongside the average minimum daily air temperatures recorded at the closest meteorological station (NOAA: St. Petersburg Albert Whitted Airport, 2020), from the same time period. Minimum daily air temperature is important because it influences lake mixing. Both sets of data show a similar negative trendline slope. Within the time period of deployment, the time-series sonde captured a maximum water surface temperature of 29.05°C on 31 October 2019, and a minimum water surface temperature of 19.40°C on 25 December 2019. Also, within this time frame, the NOAA minimum daily air temperature was as high as 25.56°C on 27 October 2019, and declining to 8.89°C on 19 December 2019.

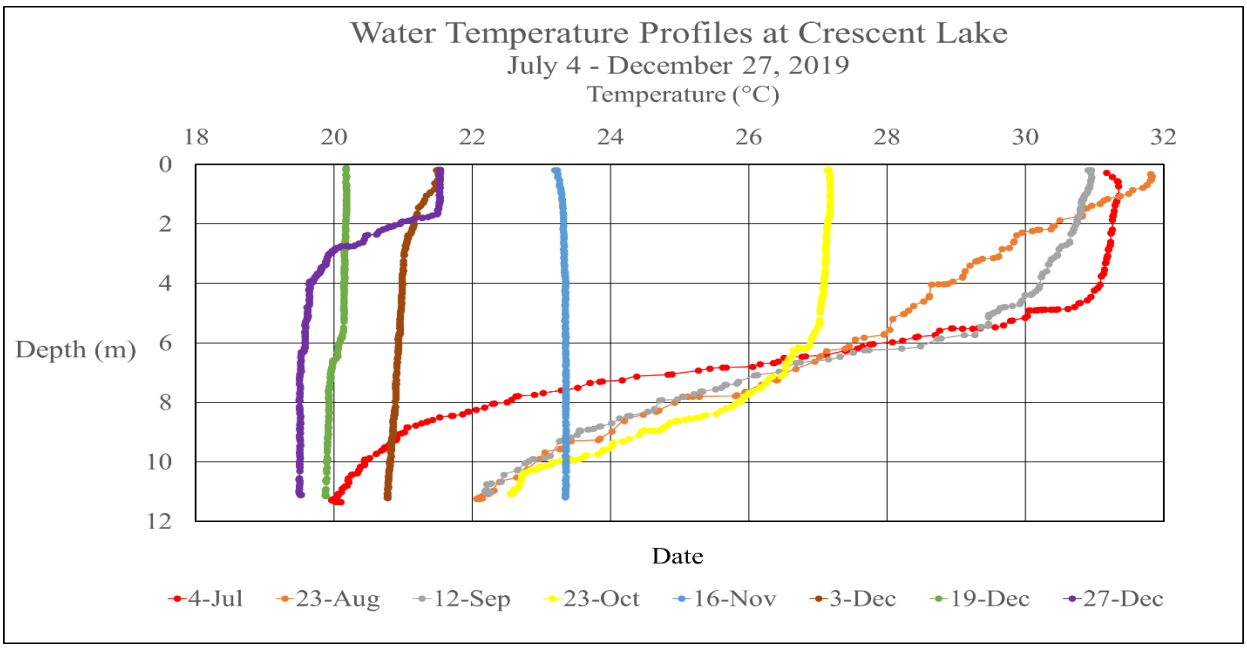

Figure 4.1. Sonde Water Column Profile Readings of Temperature.
The selected weekly readings were taken at Crescent Lake, Station 2, from 4 July to 27 December 2019.

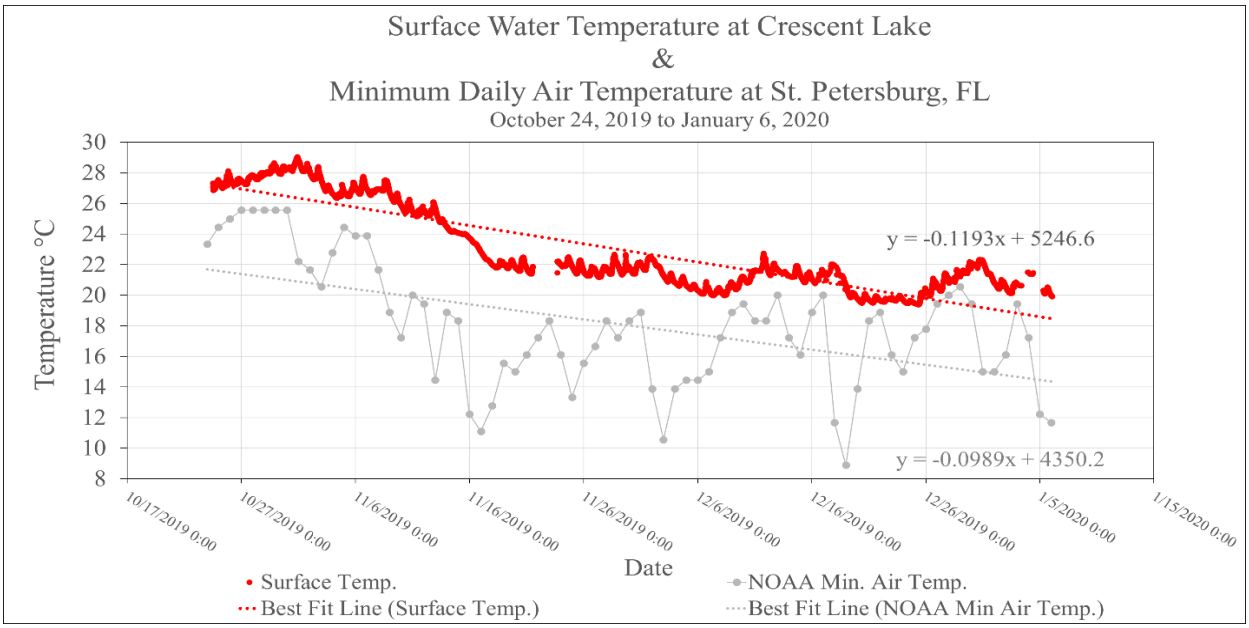

Figure 4.2. Surface Water Temperature Data.
Time-series data was recorded at the surface of Crescent Lake, Station 2. The minimum atmospheric temperatures were recorded at the NOAA: St. Petersburg Albert Whitted Airport station. Both sets of data span from 24 October 2019 to 6 January 2020, which was the time period of the time-series deployment.

4.1.2 Rugged Dissolved Oxygen

The rugged dissolved oxygen (RDO) concentration sonde profile readings of the water column selected from 4 July to 27 December 2019 are displayed in Figure 4.3. The RDO levels at the surface in the warmer months ranged from above 7 mg/L on 19 July, to roughly 15 mg/L on 29 October, and the concentration dropped below 0.10 mg/L from about 5 meters to the bottom during this time frame. The lowest surface RDO value was recorded on 16 November at 3.60 mg/L and remained nearly the same throughout the water column. Concentrations of RDO on 3 and 27 December showed an increasing trend at the surface and remained greater than 2 mg/L at the greatest depths of the water column.

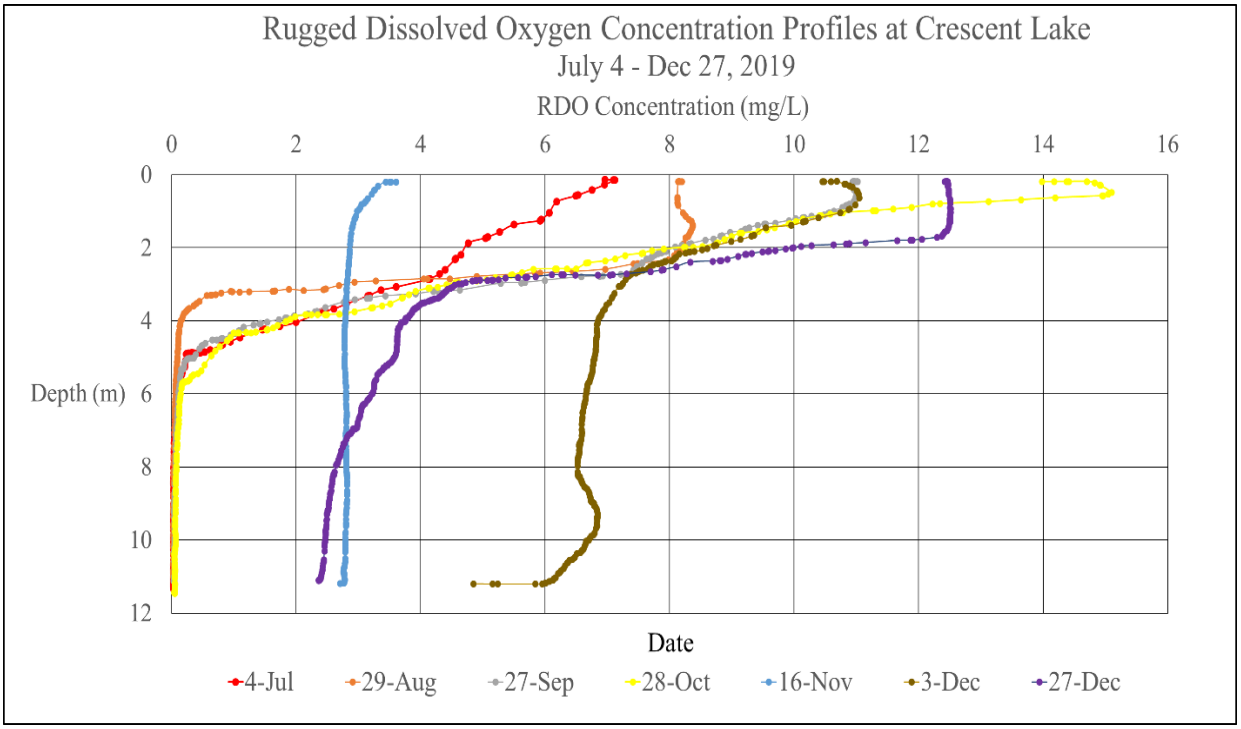

Figure 4.3. Sonde Water Column Profile Readings of Rugged Dissolved Oxygen. Selected weekly readings were taken at Crescent Lake, Station 2, from 4 July to 27 December 2019.

4.1.3 Density

Profile readings of the water column pertaining to density selected from 4 July to 27 December 2019, are portrayed in Figure 4.4. The first four readings show a greater change in density from the surface to the bottom than the last three readings. The lowest surface density value was recorded on 4 July and increased each successive sampling date. The highest change of density from the surface to the bottom was an increase of 0.0029 g/cm^3 on 4 July. Change in density from the surface to the bottom gradually decreased until 16 November, when the density remained constant throughout the water column. The bottom was observed to have a slightly greater density than the surface on each subsequent sampling date in December. Total density in the water column was the greatest on 27 December.

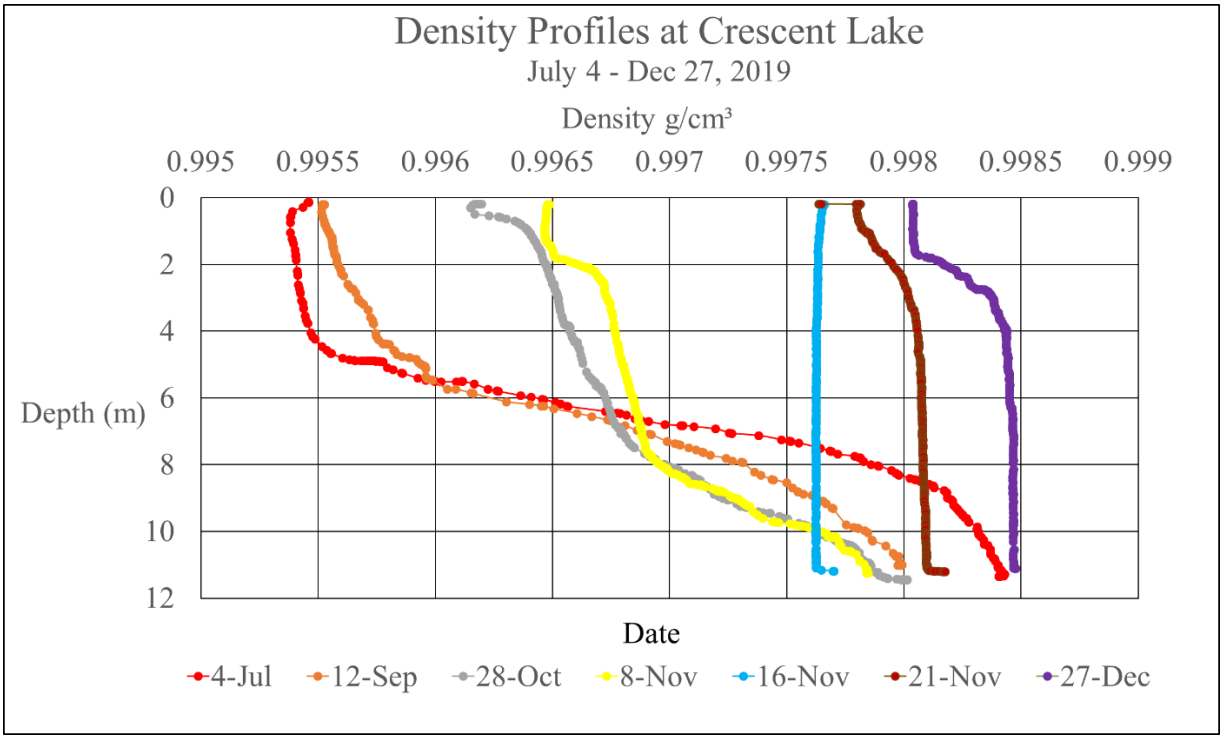

Figure 4.4. Sonde Water Column Profile Reading of Density.
Selected weekly readings were taken at Crescent Lake, Station 2, from 4 July to 27 December 2019.

4.1.4 pH

Selected weekly profile readings of pH between the dates of 4 July to 27 December 2019 are shown in Figure 4.5. The first four readings from 4 July to 23 October display a surface pH ranging from 7.3 to 8.1, with a decreasing trend as depth increases, ranging from 6.2 to 6.8 at the bottom. The greatest difference in pH from the surface to the bottom was from 8.04 to 6.43 on 23 August. The lowest surface pH occurred on 16 November, at a value of 7.04; on this date pH remained constant from the surface to the bottom. The pH on 19 December remained almost the same throughout the water column, with a slightly greater surface pH than on 16 November. The greatest surface pH was recorded on 27 December, at a value of 8.48, and showed a large change from the surface to the bottom from about 8.5 to below 7.

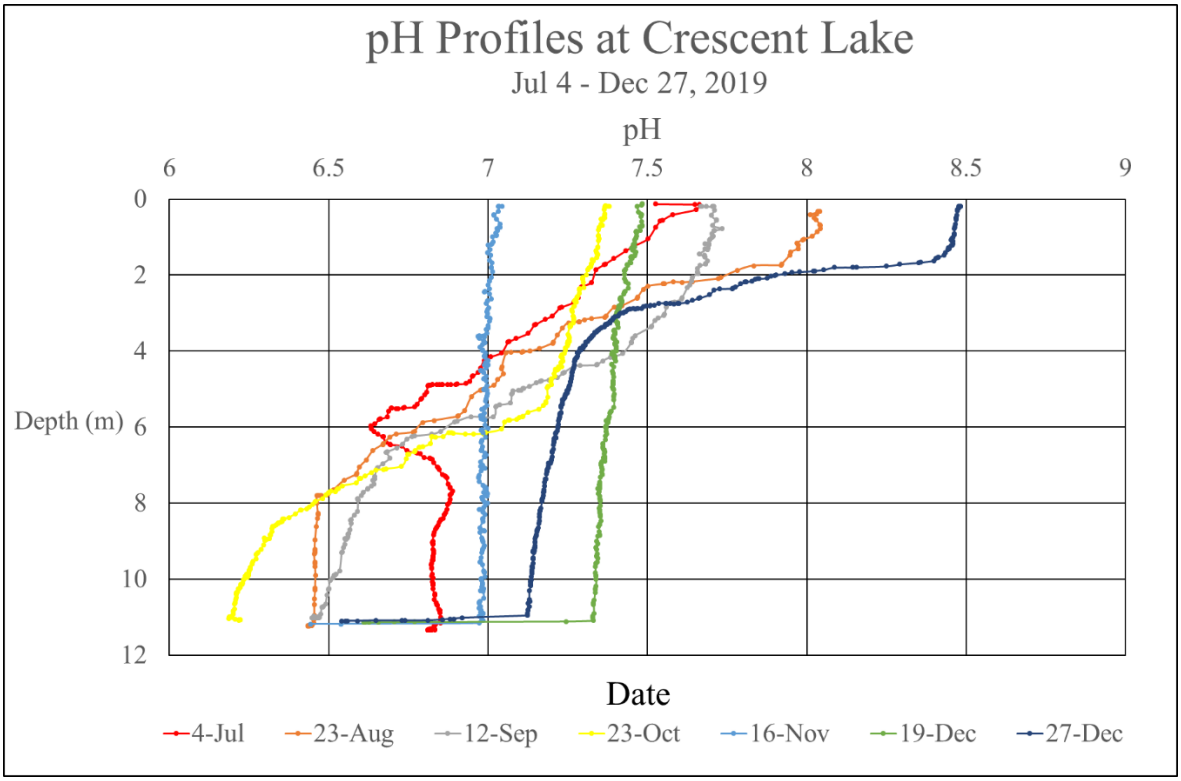

Figure 4.5. Sonde Water Column Profile Readings of pH.
Selected readings were taken at Crescent Lake, Station 2, from 4 July to 27 December 2019.

4.1.5 Total Dissolved Solids

Sonde profile readings of total dissolved solids (TDS) were taken between 4 July and 27 December 2019 (Figure 4.6). The surface TDS concentrations range from 230 mg/L to 300 mg/L, except for a minimum value of 170 mg/L recorded on 4 July, an is attributed to an instrument error, likely due to being initiated before being submerged in water. Flat lines indicate when the sonde reaches and disrupts the bottom sediment. The TDS concentrations increase as depth increases in successive readings leading to 16 November, when the TDS readings are equal throughout the water column. Nearly equivalent TDS in the water column is also observed on 19 and 27 December.

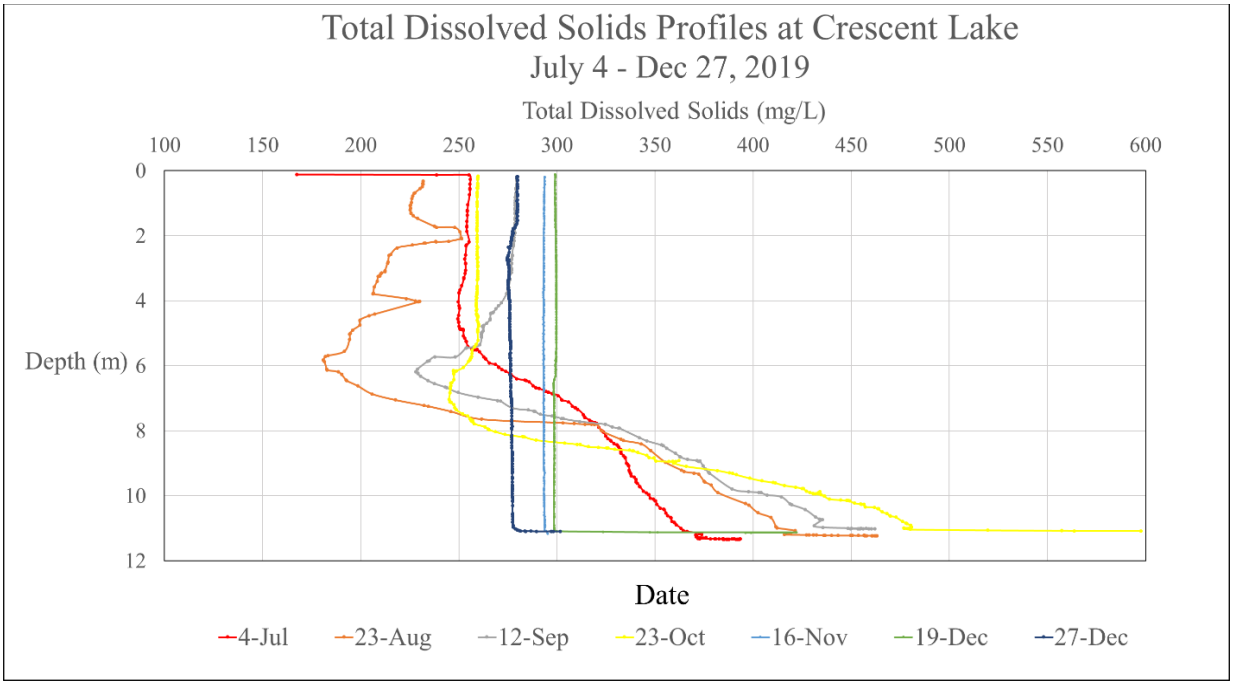

Figure 4.6. Sonde Water Column Profile Reading of Total Dissolved Solids.
Selected readings taken at Crescent Lake, Station 2, from 4 July to 27 December 2019.

4.2 Atmospheric Temperature, Rainfall, and Wind Speed at St. Petersburg from July through December 2019

Figure 4.7 displays daily precipitation, daily mean wind speed, and minimum atmospheric daily temperatures recorded at the NOAA: St. Petersburg Albert Whitted Airport Station from 4 July 2019 to 15 January 2020. The minimum daily air temperature from 4 July to 1 November 2019 ranged from a maximum of 29.4°C to a minimum of 21.7°C, decreasing slightly after mid-September. The minimum daily air temperature from 2 November 2019 to 15 January 2020 ranged from a maximum of 24.4°C, to a minimum of 8.9°C, with a sharp decline into mid-November, followed by overnight lows for the rest of 2019 oscillating between 10-20°C. The average wind speed for the entire series was 4.1 m/s. Average daily wind speed was modest during July and August 2019 but showed a relative increase from September through December 2019. A combination of low atmospheric temperatures and high wind speed promote mixing of the water column; this combination is pronouncedly observed in November and December 2019. On 3 November 2019, the minimum temperature fell to 20.56 °C, and the average wind speed reached 7.00 m/s. On 9 November 2019, the minimum temperature fell to 18.89 °C, and the average wind speed reached 7.50 m/s. On 13 November 2019, the minimum daily temperature fell to 14.44 °C, and the average wind speed reached 8.80 m/s.

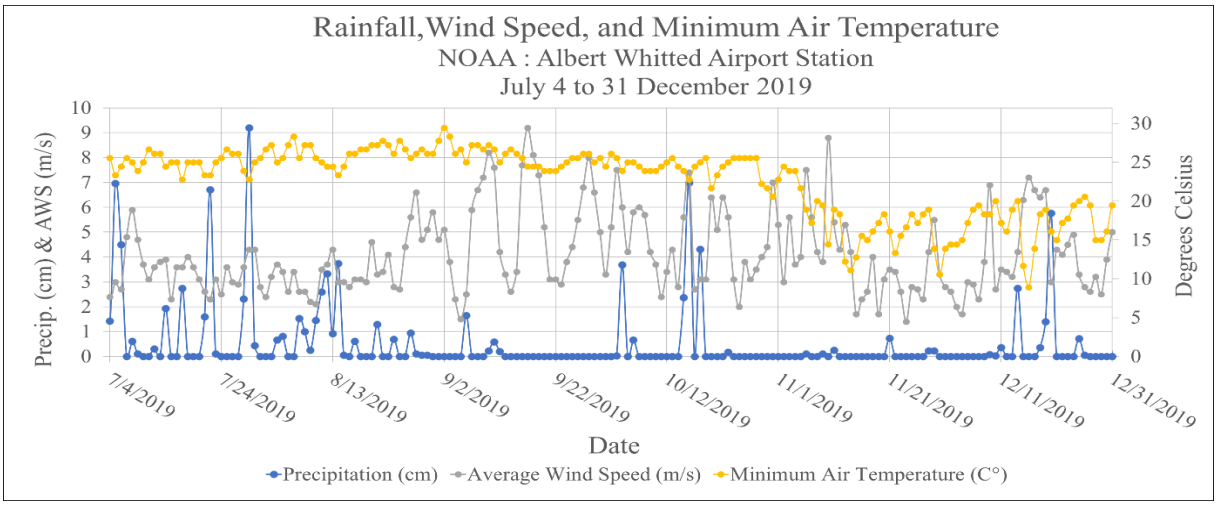

Figure 4.7. Time-Series Weather Patterns from NOAA.
Data recorded at NOAA: St. Petersburg Albert Whitted Airport Station from 4 July through 31 December 2019. Variables include daily precipitation, daily mean wind speed, and daily minimum atmospheric temperature.

4.3 Nutrient Sample Concentrations

The nutrient sample concentrations consist of nitrate+nitrite ($NO_3^- + NO_2^-$), nitrite (NO_2^-), ammonium (NH_{4+}), and phosphate (PO_4^{-3}). Also included in this section, for convenience, are silicic acid (H_4O_4Si), and chlorophyll-a (Chl-A). A summary of these variables and their formulas are displayed in Table 4.1. The samples were taken during a time span of 4 July to 27 December 2019 at Crescent Lake, Station 2. All of these data are displayed in the Appendix (Table A12).

Table 4.1. Nutrient Variables and Formulas.

Variable	Formula
Nitrate+Nitrite	$NO_3^- + NO_2^-$
Nitrite	NO_2^-
Ammonium	NH_4^+
Phosphate	PO_4^{-3}
Silicic Acid	H_4O_4Si
Chlorophyll-a	Chl-A

4.3.1 Near Surface (1 Meter Deep) Nutrient Sample Concentration Overview

Figure 4.8 shows changing nutrient concentrations over time at the near surface 1-meter depth. The mean nitrate+nitrite concentration from 4 July through 23 October was 0.37 mg/L. A sharp rise in concentration, to just over 2.01 mg/L, occurred on 28 October. Nitrate+nitrite dropped down to 0.39 mg/L in November, before rising to just over 2 mg/L again on 23 December.

The mean ammonium concentration between 4 July through 8 November was 0.05 mg/L, which includes an increase to 0.28 mg/L on 19 September. The ammonium concentration increased dramatically from the summer and early fall to a maximum concentration of 0.83 mg/L on 16 November. Ammonium concentrations remained elevated between 23 November and 19 December with a mean concentration of 0.54 mg/L, before dropping to 0.016 mg/L on 27 December.

The average phosphate concentration was 0.013 mg/L from 4 July through 8 November. The concentration spiked to the maximum recorded concentration of 0.23 mg/L on 16 November. The concentration remained above 0.1 mg/L before decreasing to 0.064 mg/L on 27 December.

The mean silicic acid concentration between 4 July to 16 November was 4.23 mg/L, including a maximum concentration of 6.16 mg/L on 16 November. The silicic acid concentration plunged just a week later to 0.25 mg/L. Silicic acid concentration increased to 3.18 mg/L on 3 December and then subsequently decreased to 0.21 mg/L on 27 December.

Chlorophyll-a concentrations show lower values in the summer and a steady increase into late fall, with a slight dip on 16 November, a subsequent rise for a couple weeks, and then a

more substantial drop in mid-December. A maximum value of just less than 13 mg/L occurred on 3 December before dropping on 19 December to about 6 mg/L.

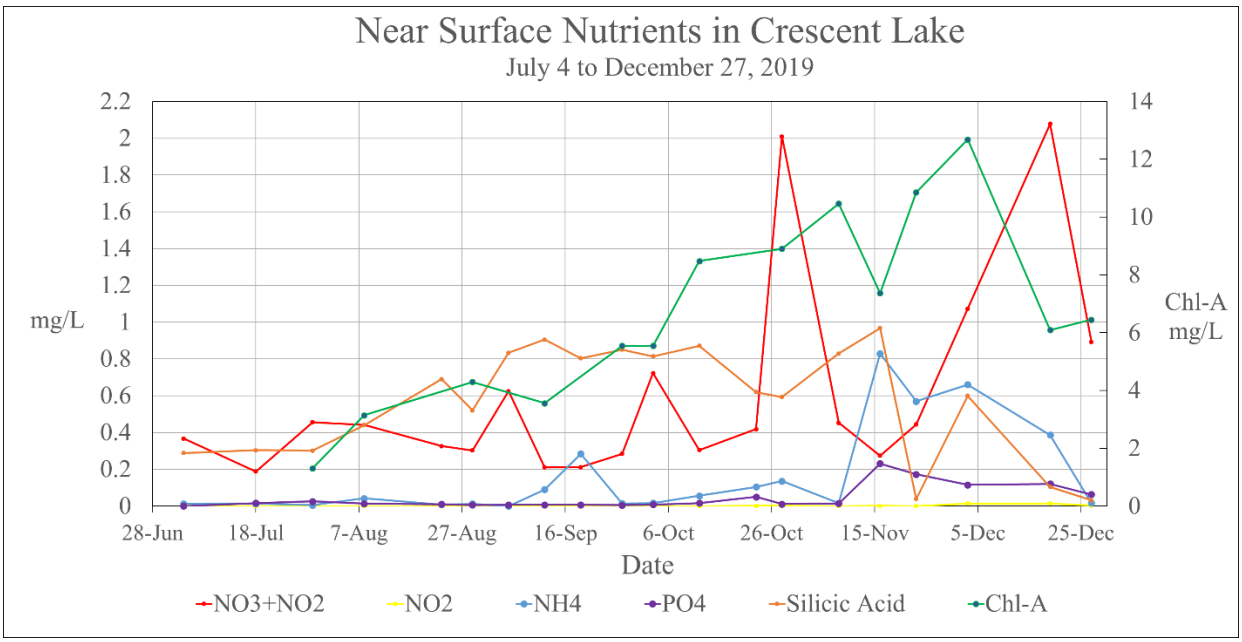

Figure 4.8. Near Surface Nutrient Sample Concentrations.
The samples were taken from 4 July to 27 December 2019 at Crescent Lake, Station 2.

4.3.2 Mid-Depth (5 Meters Deep) Nutrient Sample Concentration Overview

Figure 4.9 displays the movement in concentration of nutrients over time, specifically at 5 meters deep. The mean nitrate+nitrite concentration from 4 July to 27 December was 0.67 mg/L and was notably greater than the mean on 19 December at 2.18 mg/L. The mean phosphate concentration throughout the study was 0.11 mg/L, with a slight increase in August and on 16 and 23 November. Fluctuations of ammonium concentrations were seen in August and early September. The maximum ammonium concentration reached 0.86 mg/L on both 16 and 23 November. Silicic acid concentrations reached a maximum concentration of 6.13 mg/L on 23

November and decreased 90% to 0.59 mg/L on 27 December. The maximum chlorophyll-a concentration was 9.2 mg/L, recorded on 3 December.

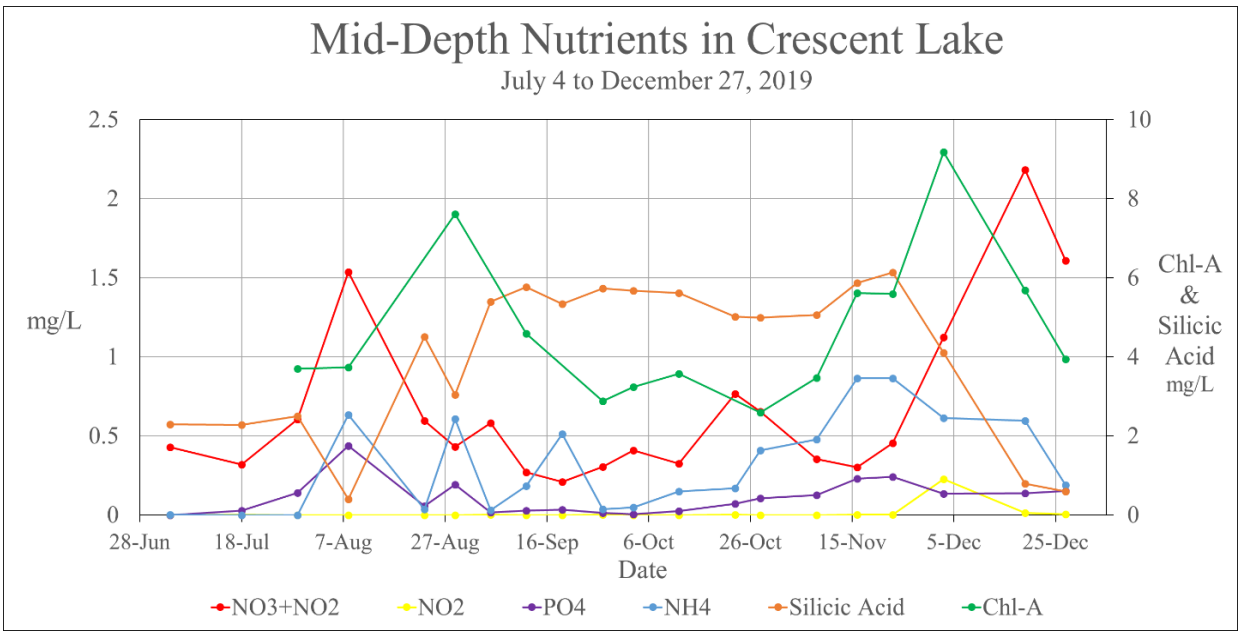

Figure 4.9. Mid-Depth Nutrient Sample Concentrations.
The samples were taken from a time span of 4 July to 27 December 2019, at Crescent Lake, Station 2, at 5 meters deep.

4.3.3 Bottom Nutrient Sample Concentration Overview

Figure 4.10 shows changing nutrient concentrations in water 10 meters deep. The mean nitrate+nitrite concentration from 4 July to 27 December was 2.22 mg/L. The maximum nitrate+nitrite concentration was 7.78 mg/L on 27 September. Nitrate+nitrite fell to a minimum of 0.04 mg/L on 23 October and remained below the mean through 27 December. The mean ammonium concentration from 4 July to 27 December was 9.54 mg/L. The maximum ammonium concentration was 19.28 mg/L on 27 September. Ammonium fell to 1.07 mg/L on 16 November, and remained lower the rest of the year, reaching 0.30 mg/L on 27 December. The mean phosphate concentration from 4 July to 27 December was 3.35 mg/L. The maximum

phosphate concentration was 7.24 mg/L on 27 September. Phosphate levels fell below the average from 16 November through 27 December, including a minimum concentration of 0.02 mg/L on 19 December. The maximum silicic acid concentration in deep water was 32.05 mg/L on 29 August. Silicic acid concentrations subsequently declined to 0.0 mg/L on 27 December. Chlorophyll-a concentrations showed an increasing trend to about 17 mg/L on 3 October, and then showed a decreasing trend through 27 December.

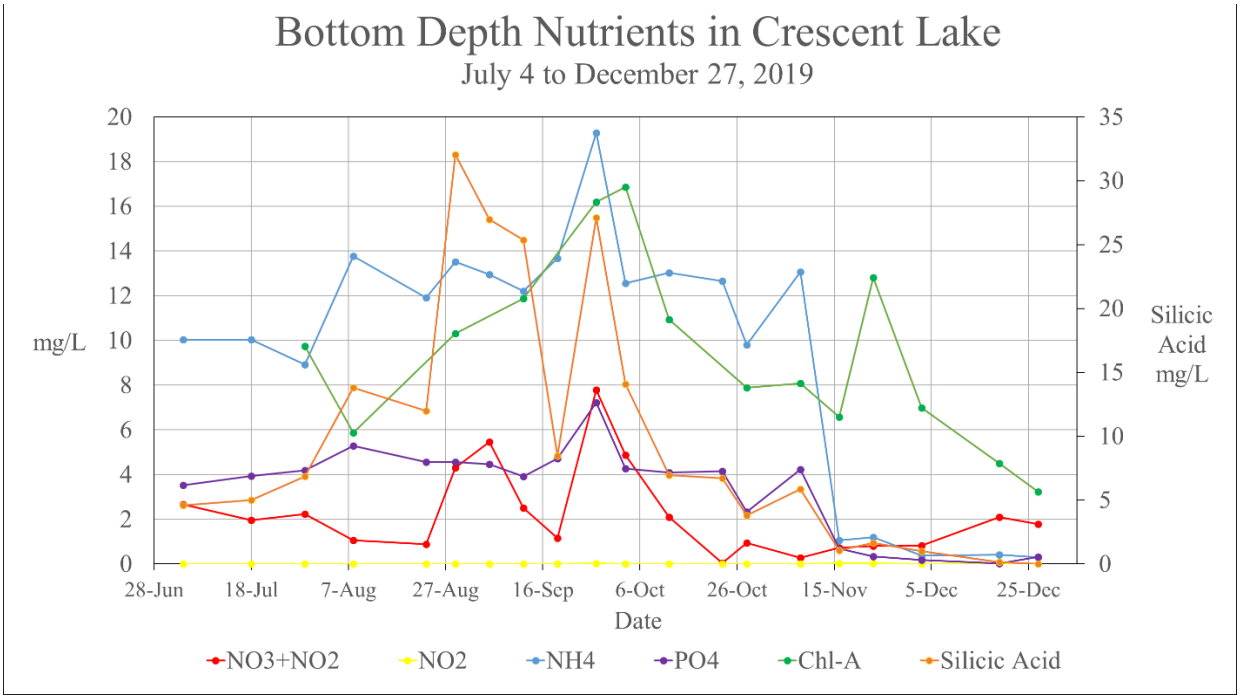

Figure 4.10. Bottom Nutrient Sample Concentrations.
The samples were taken from a time span of 4 July to 27 December at Crescent Lake, Station 2, at 10 meters deep.

4.3.4 Nitrite+Nitrate Sample Concentrations at All Depths

The nitrate+nitrite sample concentrations from the near surface, mid-depth, and the bottom of Crescent Lake, Station 2, are shown in Figure 4.11. The sample dates range from 4 July to 27 December 2019. The nitrate+nitrite concentrations at all depths are graphed together

to illustrate differences throughout the water column. The lowest mean concentration during the study period was at the near surface, at 0.60 mg/L, followed by at mid-depth at 0.67 mg/L; the greatest total mean concentration occurred at the bottom at 2.22 mg/L. Concentrations at 1 and 5 meters deep ranged from 0.2 to just over 2.0 mg/L throughout the study period and both showed a small spike on 29 October and again on 19 December. Samples from 10 meters deep were high in the summer and early fall months, reaching a maximum concentration of 7.78 mg/L on 27 September, before declining to just above zero on 23 October. The concentrations at all depths were similar from 23 October to 27 December.

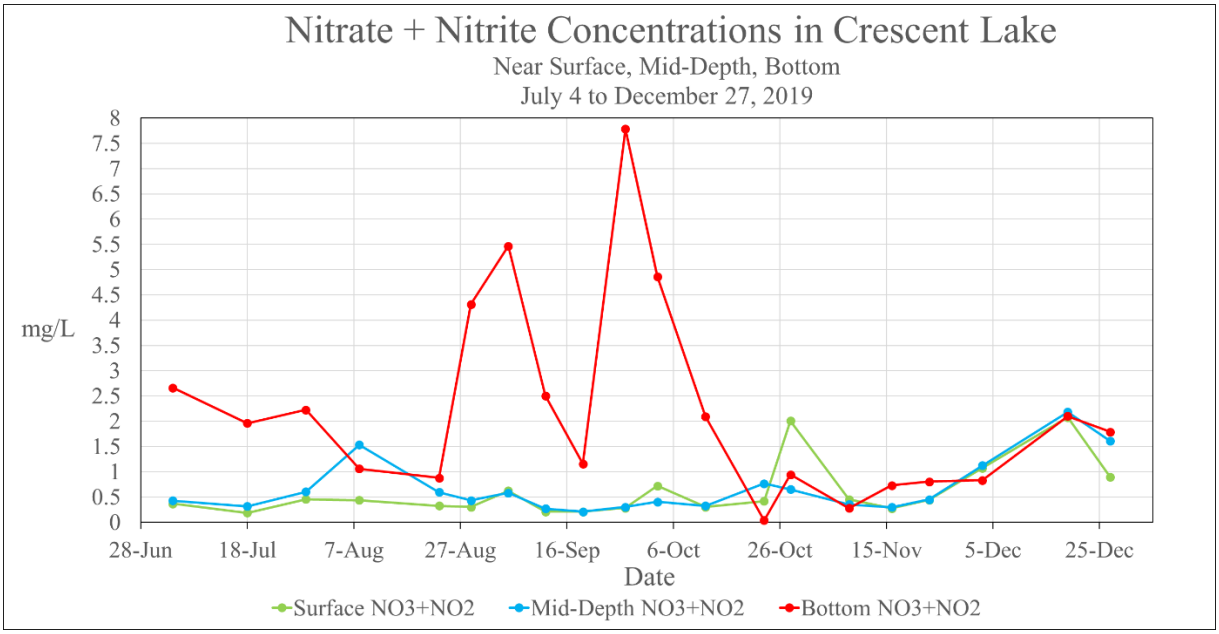

Figure 4.11. Nitrate+Nitrite Sample Concentrations at All Depths.
Nitrate+nitrite sample concentrations from the near surface (1-meter), mid-depth (5-meters), and the bottom (10-meters) of Crescent Lake, Station 2. The sample dates range from 4 July to 27 December 2019.

4.3.5 Phosphate Sample Concentrations at All Depths

Figure 4.12 depicts the near surface, mid-depth, and bottom phosphate sample concentrations from 4 July to 27 December 2019. The concentrations at all depths are graphed together to illustrate differences throughout the water column. Water near the surface features the lowest average concentration of phosphate for the duration of the study (0.05 mg/L), followed by mid-depth (0.11 mg/L), and the highest mean concentration is at the bottom (3.35 mg/L). The maximum single sample concentration was from the bottom on 27 September at 7.21 mg/L.

The near surface concentrations remained less than 0.05 mg/L, until a spike observed on 16 November. The mid-depth concentrations showed fluctuations in the summer and a spike on 16 November. The bottom concentrations were very high in the summer and fall months and decreased sharply on 16 November.

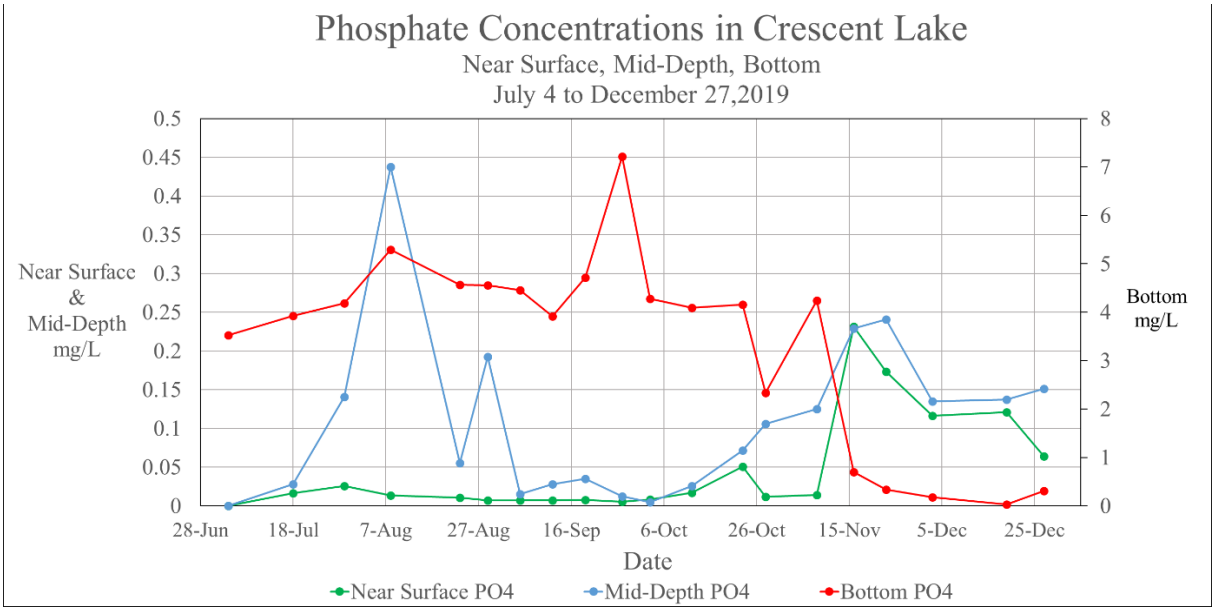

Figure 4.12. Phosphate Sample Concentrations at All Depths.
Samples were taken near the surface (1-meter), mid-depth (5-meters), and bottom (10-meters) of Crescent Lake, Station 2. Sample dates span from 4 July to 27 December 2019.

4.3.6 Ammonium Sample Concentrations at All Depths

Figure 4.13 displays the near surface, mid-depth, and bottom sample concentrations of ammonium sampled from 4 July to 27 December 2019. The lowest mean concentration of ammonium was at the near surface (0.16 mg/L), was greater at the mid-depth (0.32 mg/L), and greatest at the bottom-depth (9.54 mg/L). The near surface concentrations fluctuated in the summer and early fall months, from nearly zero to just below 0.3 mg/L, and rose significantly on 16 November. The mid-depth concentrations fluctuated in the summer and fall months ranging from near zero to about 0.6 mg/L, and increased greatly on 16 November. The bottom waters accumulated far more ammonium than any other depth and reached a maximum of 19.28 mg/L on 9 September. The bottom sample decreased on 16 November, from 13.07 mg/L to 1.07 mg/L, and all sample depths showed a decrease on 27 December.

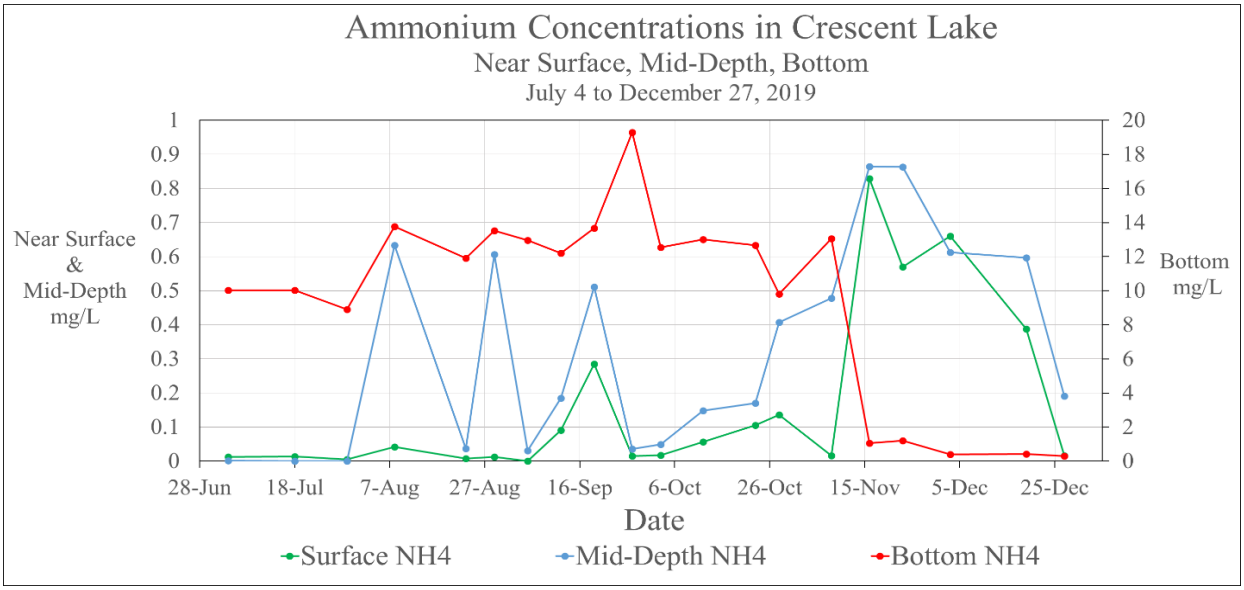

Figure 4.13. Ammonium Sample Concentrations at All Depths.
Ammonium sample concentrations at the near surface (1-meter), mid-depth (5-meters), and bottom (10-meters) of Crescent Lake, Station 2. Sample dates span from 4 July to 27 December 2019.

4.3.7 Daily vs. Weekly Time-Series Total Ammonia

The surface daily total ammonia data (taken at 15-minute intervals) is depicted alongside the weekly near surface ammonium sample concentrations from Crescent Lake, Station 2 (Figure 4.14). The daily time-series sonde was deployed during the time period when mixing was expected to occur from 3 October to 21 November 2019. After calibration on 21 November, the total ammonia sensor failed on the data time-series sonde. The near surface ammonium sample concentration data ranges from 3 October to 27 December 2019 to partially overlap the deployment of the daily time-series sonde. These two parameters are graphed together to help pinpoint the date of mixing, indicated by a rise of total ammonia/ammonium at the near surface.

It should be noted that the daily time-series data were artificially high because the sensors require precise calibration, but trends are still significant. A two-sample *t*-test of the daily time-series sonde data comparing (3 October – 7 November) to (7 November - 21 November) determined a statistically significant difference in concentration (p-value ≤ 0.05; confidence interval $\geq 95\%$). The mean of the 3 October – 7 November daily time-series data was 1.78 mg/L, and was far less than the mean data from 7 November – 21 November, which was 121.32 mg/L. The first major increase in mean concentration in the daily time-series data was from 3 November (0.043 mg/L) to 4 November (12.7 mg/L). The mean concentration of the daily time-series total ammonia data increased again on 8 November to 21.1 mg/L. The daily time-series data jumped from around 60 mg/L on 10 November to over 300 mg/L on 16 November. The daily time-series total ammonia data began to decrease from 16 November to the last day of sonde deployment on 21 November.

Like the daily time-series data, the weekly near surface ammonium sample concentrations increased drastically from 0.016 mg/L on 8 November to 0.829 mg/L on 16

November. Weekly near surface ammonium sample concentration decreased on 23 November, coinciding with the daily time-series data. The maximum concentration occurred on 16 November for both the daily time-series total ammonia data set and the weekly near surface ammonium sample data.

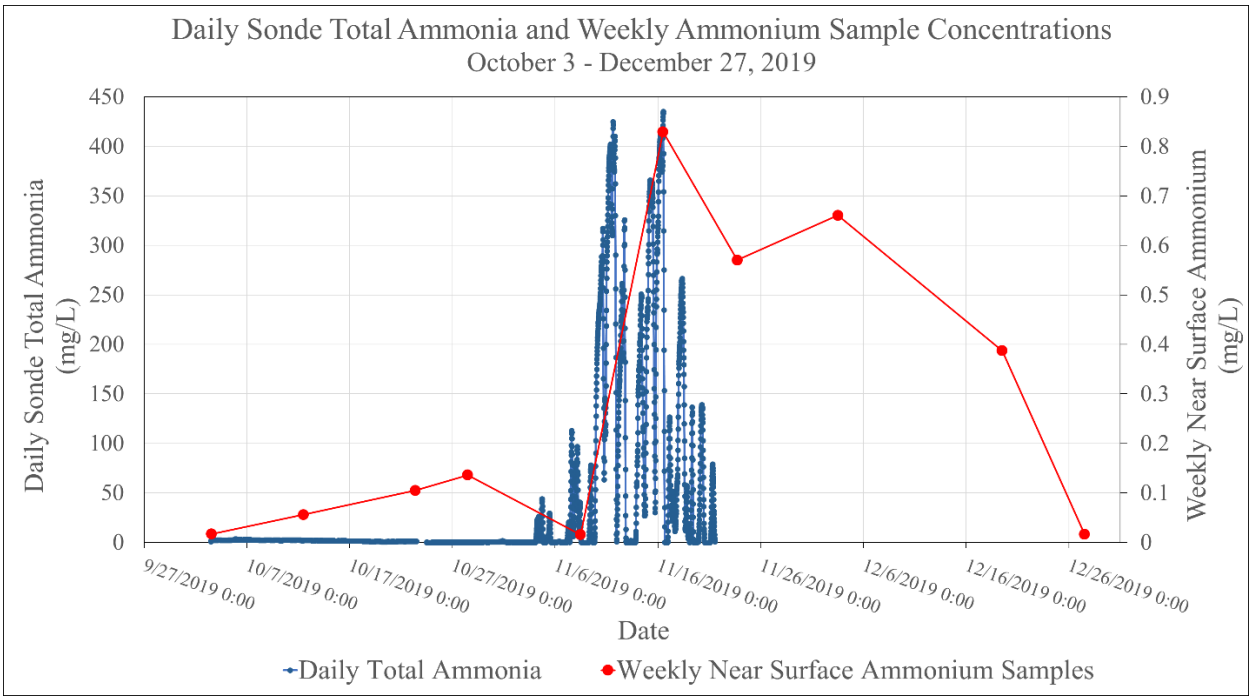

Figure 4.14. Time-Series Sonde Total Ammonia and Near Surface Ammonium Sample Concentrations.
The time-series data spans from 3 October to 21 November 2019. The near surface ammonium sample concentration data ranges from 3 October to 27 December 2019 at 1 meter deep. At Crescent Lake, Station 2.

4.3.8 Silicic Acid Sample Concentrations at All Depths

The silicic acid sample concentrations from the near surface, mid-depth, and the bottom are shown in Figure 4.15. The sample dates range from 4 July to 27 December 2019. The concentrations at all depths are graphed together to display differences in the water column. The lowest mean of the entire study period was at the surface at 3.63 mg/L, followed by the mid-depth at 4.06 mg/L, and the greatest mean concentration occurred at the bottom at 10.17 mg/L. The near surface and mid-depth concentrations were far lower than those at the bottom in the summer and early fall months. The bottom reached a maximum value of 32.05 mg/L on 29 August. The bottom sample concentration fell to 6.96 mg/L on 12 October; from that date forward, all three depths had concentrations within 5 mg/L of each other. The surface and mid-depth samples had a greater average concentration than the bottom samples from 12 October through 27 December.

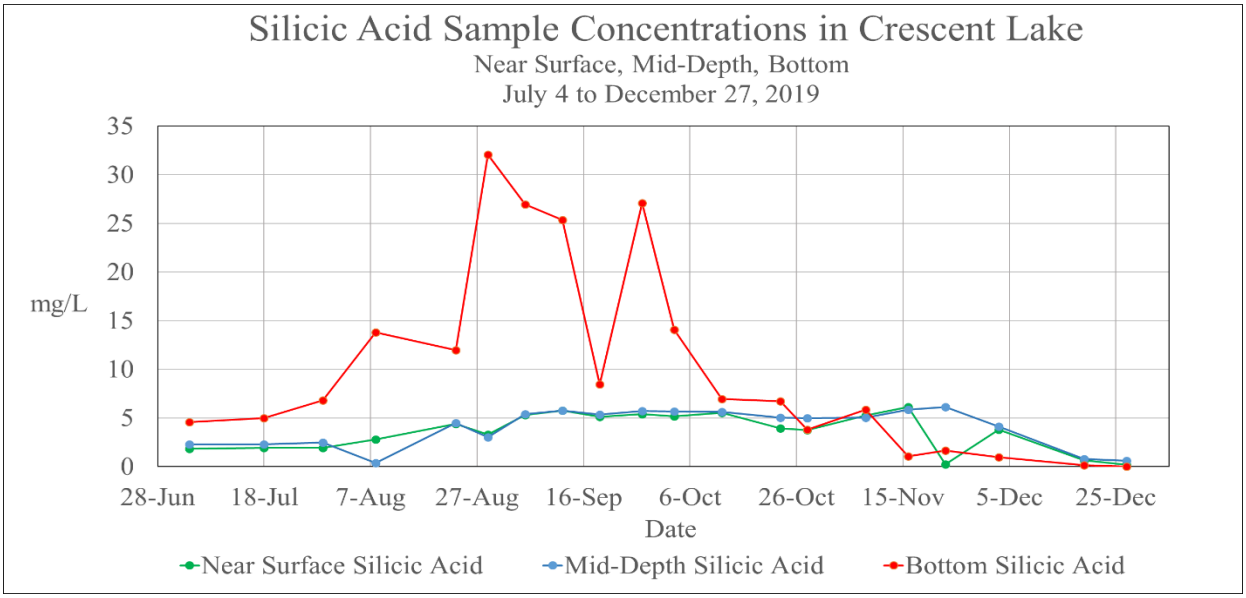

Figure 4.15. Silicic Acid Sample Concentrations at All Depths.
The silicic acid sample concentrations are from the near surface (1-meter), mid-depth (5-meters), and the bottom (10-meters) of Crescent Lake, Station 2. The sample dates range from 4 July to 27 December 2019.

4.4 Chlorophyll-a

4.4.1 Chlorophyll-a Sample Concentrations at All Depths

Figure 4.16 displays the chlorophyll-a (Chl-A) concentrations at the near surface, mid-depth, and bottom from 29 July to 27 December 2019. The purpose of this graph is to illustrate the changes in Chl-A concentration throughout the water column with time. The highest mean Chl-A concentration throughout the entire study period was from the bottom (94.18 µg/L), followed by the surface (67.65 µg/L), and mid-depth (46.72 µg/L). The maximum recorded Chl-A concentration was from the bottom on 3 October at 168.64 µg/L. On 16 November, Chl-A at all depths were within 20 µg/L of each other. The surface Chl-A concentration increased from 73.66 µg/L on 16 November to 126.88 µg/L on 3 December. From 3 December onward, the greatest concentration of Chl-A was at the surface.

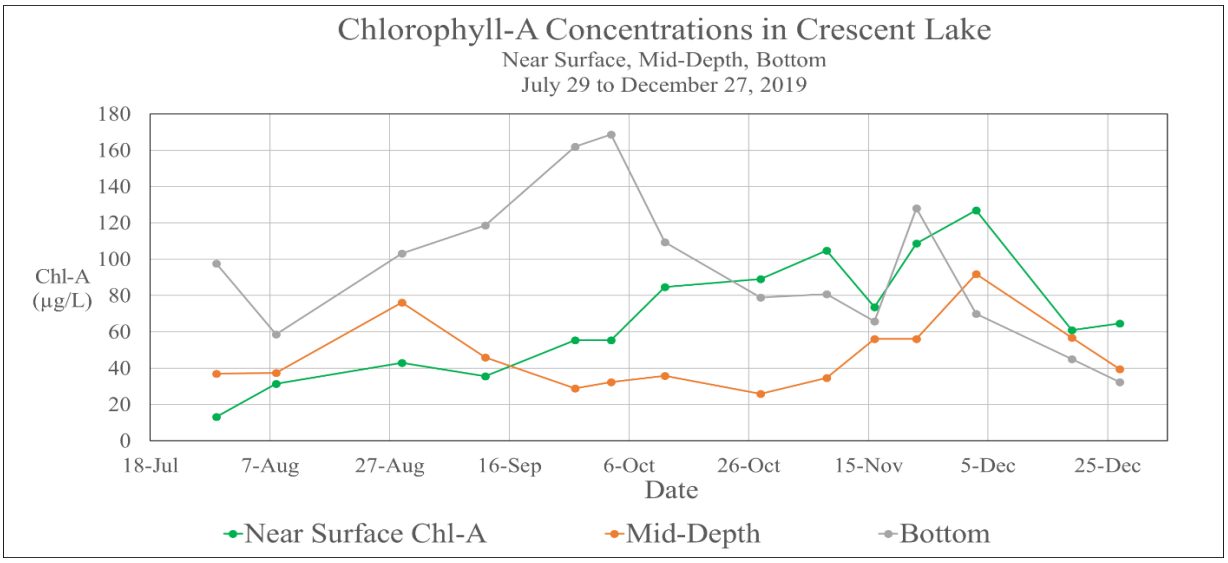

Figure 4.16. Chlorophyll-a Sample Concentrations at All Depths.
Taken from the near surface (1-meter), mid-depth (5-meters), and bottom (10-meters) of, Station 2, Crescent Lake. Sampling dates span from 29 July to 27 December 2019.

4.4.2 Chlorophyll-a and Secchi-Disk Depth

Figure 4.17 displays Secchi-disk depth readings with near surface Chl-A sample concentration values. The Secchi-disk depth readings were taken on 29 August through 27 December 2019. The Secchi-disk depth readings began after 4 July because there was no Secchi-disk available at the time. The Chl-A concentrations were sampled from 29 July to 27 December 2019 at 1 meter deep. The Chl-A data begins after 4 July because the samples exceeded the storage life of 28 days. The purpose of this graph is to determine if there is any relationship between Secchi-disk depth and Chl-A. The mean Secchi-disk depth value was 1.01 meters. The greatest Secchi-disk depth value was 1.34 meters on 12 September and declined from that date forward. Conversely, Chl-A showed an increasing trend, and the maximum concentration of surface Chl-A occurred the same day that the lowest Secchi-disk depth value was recorded (0.72 meters on 3 December).

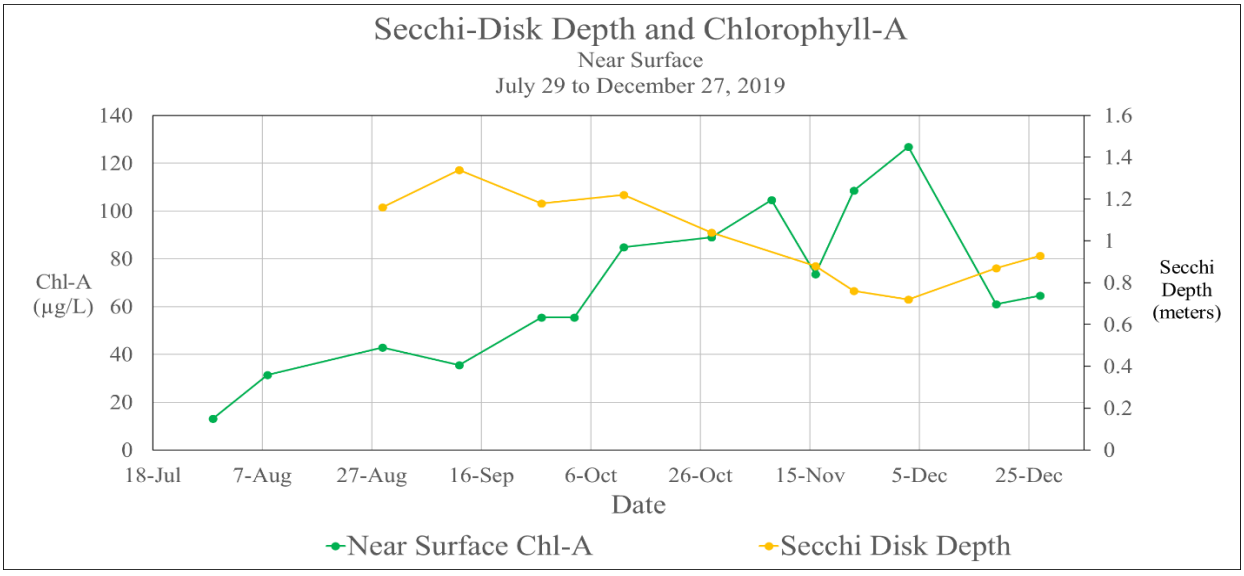

Figure 4.17. Near Surface Chlorophyll-a and Secchi-Disk Depth.
The secchi-disk depth readings were taken on 29 August through 27 December 2019. The Chl-A near surface sample concentrations were recorded from 29 July to 27 December 2019 at 1 meter deep. At Crescent Lake, Station 2.

4.4.3 Chlorophyll-a, Phosphate, and Ammonium Surface Sample Concentrations

Figure 4.18 depicts the near surface sample concentrations of Chl-A, phosphate and ammonium from 4 July to 27 December 2019. These three parameters are graphed together to illustrate possible connections between nutrient levels and Chl-A. Near surface Chl-A reached a maximum concentration (126.88 µg/L) on 3 December, 17 days after both the near surface PO_4^{-3} (0.23 mg/L) and near surface NH_4^+ (0.83 mg/L) values reached their maximum concentration on 16 November.

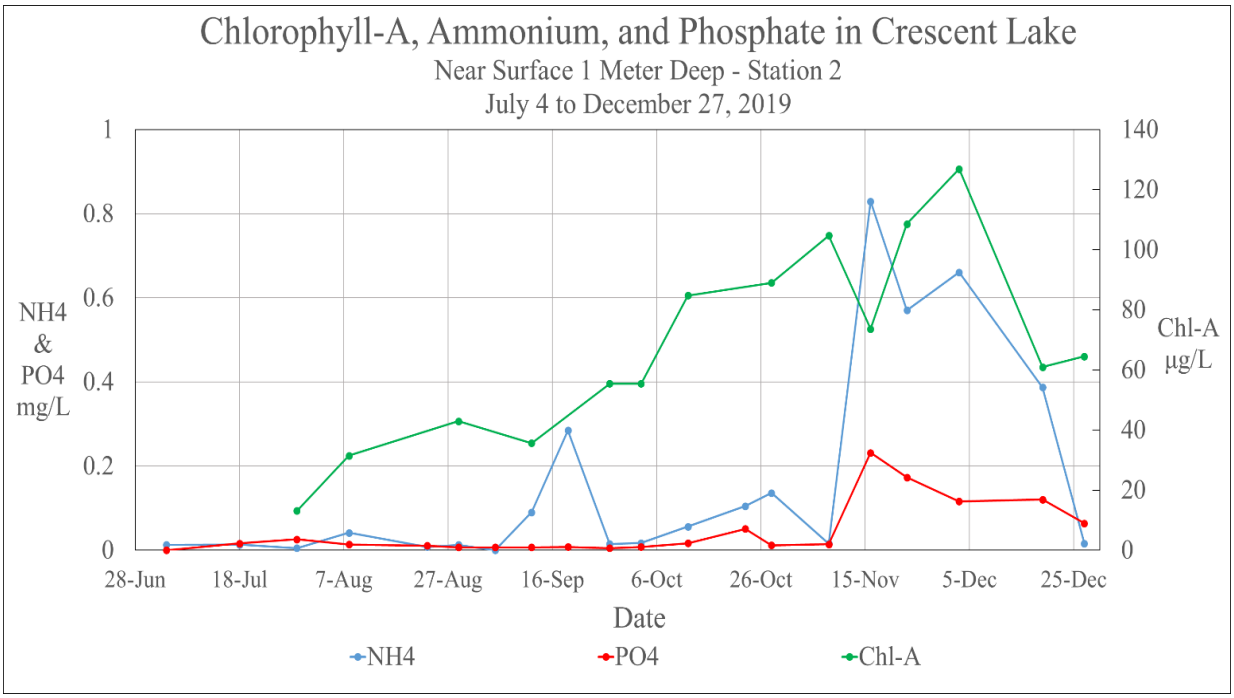

Figure 4.18. Near Surface Chlorophyll-a, Phosphate and Ammonium.
Samples taken from near surface water of Crescent Lake, at 1 meter deep, Station 2. From 4 July to 27 December 2019.

4.4.4 Chlorophyll-a and Nitrate+Nitrite Surface Sample Concentrations

Depicted in Figure 4.19 are the near surface sample concentrations (1 meter deep) of Chl-A and nitrate+nitrite. Sampling took place from 4 July to 27 December 2019. The purpose of this graph is to illustrate the relationship between the two variables over time. Both nitrate+nitrite and Chl-A concentrations show an increasing trend from 4 July to 28 October. On 3 November, NO_3^- + NO_2^- decreased from 2 mg/L to just above 0.4 mg/L, and Chl-A increased by about 20 µg/L. Both parameters decreased on 16 November and then increased through 3 December. The Chl-A concentration decreased on 23 December, and the nitrate+nitrite concentrations increased to a maximum recorded value of 2.08 mg/L.

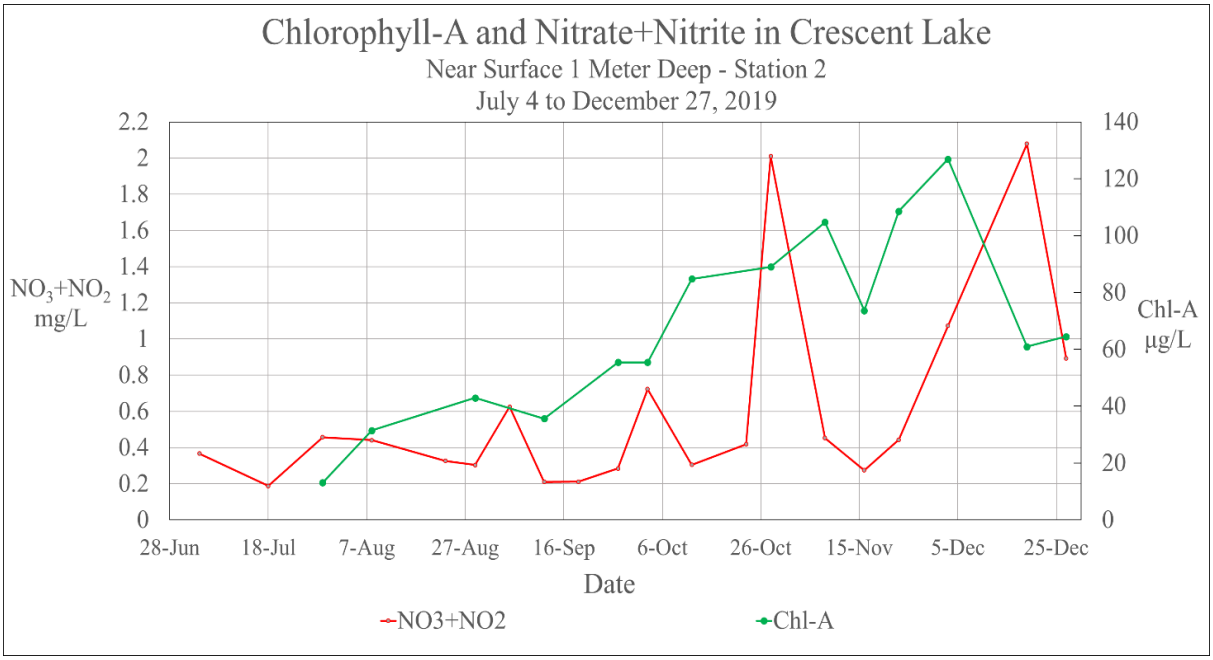

Figure 4.19. Near Surface Chlorophyll-a and Nitrate+Nitrite.
The surface sample concentrations of both Chl-A and NO_3^- + NO_2^- are from a depth of 1 meter at Crescent Lake, Station 2. Sampling occurred from 4 July to 27 December 2019.

4.5 Morphometric Values and Heat Budget

Table 4.2. The Morphometric Values and Heat Budget of Crescent Lake.

Crescent Lake	
Geographic Location	**Value**
Latitude	27° 47' N
Longitude	82° 38' W
Morphometric Variables	
Maximum Depth (m)	11.52
Mean Depth (m)	4.81
Surface Area (m^2)	77325
Total Volume (m^3)	372219
Maximum Length (m)	540
Maximum Width (m)	172
Mean Width (m)	161.28
Shoreline Length (m)	1331.04
Shoreline Development Index	2.26
Relative Depth (%)	3.39
Heat Budget	
Aug 23 - Dec 19 2019	4450 cal cm^{-2}

Total heat content (calories) was calculated by multiplying the average water column temperature (°C) from each 1.524-meter stratum by the volume in the average stratum interval (M^3), and then the heat content from all stratums were summed. The sum of the heat content was calculated for the day of maximum water column temperature (29 August 2019) and the day of minimum water column temperature (19 December 2019). The difference in heat content from water column maximum temperature to minimum temperature was multiplied by the surface area of the lake in cm^2. This resulted in a heat budget of 4450 cal/cm^{-2} from 29 August to 19 December 2019 (Figure 4.20).

Depth (m)	Surface Area (m2)	Stratum (m)	Avg. Volume of Stratum (m3)	Max Temp. °C 8/23/2019	Avg. Temp of Stratum (°C)	Max Temp (cal)	Min Temp °C 12/19/2019	Avg. Temp of Stratum (°C)	Min Temp (cal)
0	7.73E+04			31.8			20.17		
		0-1.52	1.06E+05		31.49	3.34E+06		20.175	
1.52	6.19E+04			31.18			20.18		2.14E+06
		1.52-3.05	8.47E+04		30.39	2.58E+06		20.165	
3.05	4.93E+04			29.6			20.15		1.71E+06
		3.05-4.57	6.74E+04		29.05	1.96E+06		20.145	
4.57	3.92E+04			28.5			20.14		1.36E+06
		4.57-6.01	5.24E+04		27.975	1.47E+06		20.1	
6.09	2.96E+04			27.45			20.06		1.05E+06
		6.09-7.62	3.72E+04		26.695	9.92E+05		19.99	
7.62	1.92E+04			25.94			19.92		7.43E+05
		7.62-9.14	1.91E+04		24.895	4.75E+05		19.91	
9.14	5.85E+03			23.85			19.9		3.80E+05
		9.14-10.67	5.09E+03		23.12	1.18E+05		19.89	
10.67	8.31E+02			22.39			19.88		1.01E+05
		10.67-11.28	2.54E+02		22.22	5.65E+03		19.875	
11.28	0.00E+00			22.05			19.87		5.05E+03
			Total Volume						
Total Surface Area			3.72E+05			Total			Total
	7.73E+04 (m2)					1.09E+07	Difference in heat content		7.49E+06
	7.73E+08 (cm2)					Summer Heat Content (cal-cm2)	3.44112E+12		Winter Heat Content (cal-cm2)
						1.09304E+13	Heat Budget 8/23-12/19		7.48927E+12
							4450.17249	cal/cm2	

Figure 4.20. Heat Budget Calculation of Crescent Lake.

5. Discussion

5.1 Thermal Stratification

The atmospheric temperatures in St. Petersburg, Florida are warm in the summer and early fall months (Figure 4.7), and this contributes to high surface-water temperatures and thermal density gradients in Crescent Lake's water column (Figure 4.1). A disparity greater than 4°C from the surface to the bottom of the water column supports the conclusion that thermal stratification is present (Boehrer et al., 2008). On the first day of this study, 4 July 2019, the surface water at Crescent Lake was 11.2°C greater than the water temperature at the deepest depth (Figure 4.1), signifying thermal stratification. A density gradient forms during thermal stratification when there are greater water temperatures in the epilimnion and lower temperatures in the hypolimnion because cold water is denser than warm water (Boehrer & Shultze, 2008; Tundisi & Tundisi, 2011). A density gradient was observed at Crescent Lake on 4 July (Figure 4.4). Several other physical and chemical variables at Crescent Lake were affected by the density gradient during thermal stratification including: total dissolved solids (TDS), rugged dissolved oxygen concentration (RDO), and pH.

Consistent with the thermal and density gradients observed on 4 July at Crescent Lake, the concentrations of TDS were lower at the surface and increased with depth (Figure 4.6), which was expected because dissolved water constituents contribute to density (Moreira et al., 2016). The concentration of dissolved oxygen was greater in the epilimnion than in the hypolimnion during the summer and early fall months (Figure 4.3), which was an anticipated occurrence in a thermally stratified lake (Tundisi & Tundisi, 2011). The level of RDO at the epilimnion on 4 July at Crescent Lake was above 6 mg/L and became anoxic at depths greater than 5 meters; and this trend continued until 16 November (Figure 4.3). Similarly, Escobar et al.

(2009) found that all four lakes that were studied in central to north Florida displayed hypolimnetic anoxia during thermal stratification.

At Crescent Lake, the 4°C difference in temperature from the surface to the bottom persisted from 4 July through 8 November, supporting a thermally stratified water column. Additionally, density, TDS, and RDO showed a difference from the surface to the bottom during this time frame, which also supports the conclusion about thermal stratification.

Nutrient concentrations were also affected by thermal stratification. For example, beginning on 4 July when the water column was thermally stratified, nitrate+nitrite (NO_3^- +NO_{2-}), nitrite (NO_2^-), ammonium (NH_4^+), phosphate (PO_4^{-3}), and silicic acid (Table 4.1) were most concentrated in the hypolimnion (Figure 4.10) compared to the epilimnion (Figure 4.8). Interestingly, each nutrient showed a different trend. Nitrate+nitrite concentrations were greatest in the hypolimnion through 12 October (Figure 4.11). Silicic acid concentrations were greatest in the hypolimnion through 23 October. Ammonium (Figure 4.13) and phosphate (Figure 4.12) concentrations were greatest in the hypolimnion through 8 November. Speculation regarding these patterns are offered in Section 5.3. These observations are consistent with the literature that suggests nutrient concentrations are typically higher in the hypolimnion during stratification (Boehrer & Shultze, 2008; Tundisi & Tundisi, 2011; Song et al., 2013).

5.2 Mixing

The water column at Crescent Lake appeared mixed from 16 November through the last day of study on 27 December 2019, consistent with expectations because atmospheric changes during cooler months (such as decreased air temperature, heavy rainfall and strong winds) can cause thermal stratification to weaken (Engelhardt & Kirillin, 2014). The mean minimum

atmospheric temperature was roughly 25°C in the months of July through October and subsequently dropped to a mean temperature of 18°C in November 2019 (Figure 4.7). The Aqua-troll 600 daily time-series sonde captured the surface water temperature of Crescent Lake from 24 October 2019 to 6 January 2020 (Figure 4.2) and recorded similar declining trends as the NOAA atmospheric minimum temperature data collected during that time, asserting that atmospheric temperatures had an impact on the declining surface water temperature at Crescent Lake. Additionally, daily average wind speed was relatively high in the month of November, often reaching above 7 m/s. The comparatively low atmospheric temperatures and high wind speeds in the month of November 2019 were prime conditions for lake mixing.

Isothermal (equal temperature) and near-isothermal conditions in the water column (within 3°C from the surface to the bottom) reduces density gradients and provides opportunities for mixing in Florida lakes (Escobar et al., 2009). On 8 November, the sonde profile readings showed a difference of 4.72°C from the surface to the bottom, and on 16 November there was a difference of just 0.15°C (Figure 4.1). These data suggest that the water column of Crescent Lake was thermally stratified on the first day of the study, 4 July 2019, until no later than 16 November 2019. This pattern of thermal stratification generally agrees with Brenner et al. (1990) who reported that stratification normally persists in Florida lake waters from March through November. Additionally, Johnson Pond in Gainesville, Florida was thermally stratified from March through November in 1987 (Whitmore et al., 1991).

Water column density at Crescent Lake was nearly homogenous on 16 November (Figure 4.4), the same date that the water column was nearly isothermal (Figure 4.1). Mixing was indicated by a rise in RDO concentration on 16 November 2019 in the hypolimnion to just under 3.0 mg/L at the deepest depth (Figure 4.3), consistent with typical DO concentrations in a mixed

lake (Boehrer & Shultze, 2008; Escobar et al., 2009; Tundisi & Tundisi, 2011). Similarly, TDS concentrations (Figure 4.6) and pH (Figure 4.5) became nearly uniform throughout the water column on 16 November, because both physical and chemical transport throughout the water column were enabled when the density gradient diminished (Boehrer & Shultze, 2008).

The RDO concentration fell to below 4 mg/L in the epilimnion on 16 November (Figure 4.3). This value is above the minimum threshold of 2.9 mg/L for class III waterbodies in Florida (FDS, 2016, Table 2.5). The reduction of RDO on 16 November was comparable to the reduction of DO documented by Lakewatch that occurred in October and November of 2007 and 2008 (Figure 2.7). This suggests that RDO does decrease at the surface after mixing, but in this instance, is likely caused by dilution of anoxic hypolimnetic waters, as was observed at Johnson Pond (Whitmore et al., 1991). In December, RDO concentrations increased in the epilimnion above 10 mg/L, a very high level suggesting increased photosynthetic activity. Further research in winter months is needed to determine whether dissolved oxygen levels decrease in part because of increased phytoplankton growth and decomposition/respiration of organic matter.

When the thermally stratified water column of a lake mixes, nutrients are redistributed from the hypolimnion to the epilimnion (Whitmore et al., 1991; Boehrer & Shultze, 2008; Escobar et al., 2009; Tundisi & Tundisi, 2011). The daily time-series sonde recorded levels of total ammonia at the surface of Crescent Lake at 15-minute intervals, and the data suggested that total ammonia rose significantly on 10 November and increased to a maximum concentration on 16 November (Figure 4.14). Coincidingly, the NOAA dataset of weather variables (Figure 4.7) showed that on 9 November, atmospheric minimum temperature fell to 18.89°C, which was cool compared to summer months, and average wind speed was 7.50 m/s, which was relatively high wind speed. The rise in total ammonia concentrations and the weather conditions suggest that

mixing began on 10 November. Additionally, on 16 November, the concentrations of phosphate, ammonium and silicic acid displayed a significant decrease in the hypolimnion (Figure 4.10), and an equally noticeable increase in the epilimnion (Figure 4.8), which indicated that mixing had occurred.

The water column at Crescent Lake appeared mixed from 16 November through the last day of study, 27 December 2019. This assertion is based on isothermal conditions in the water column (Figure 4.1), and relatively homogenized concentrations of density (Figure 4.4), and TDS (Figure 4.6), and RDO concentrations at all depths (Figure 4.3). Similarly, nitrate+nitrite concentrations were relatively homogenized in the water column from 16 November through 27 December (Figure 4.11), as well as phosphate (Figure 4.12), ammonium (Figure 4.13), and silicic acid (Figure 4.15). Further research in winter months would be necessary to determine the full duration of mixing at Crescent Lake, which is likely to vary from year to year.

5.3 Nutrient Concentrations/Cycling

5.3.1 Nitrate + Nitrite

Total nitrogen (TN) is the sum of total khejdahl nitrogen ((TKN) organic nitrogen + ammonia) and nitrate+nitrite (NO_3^- + NO_2^-), and TN is used as an indicator of impairment of waterbodies by regulatory agencies of Florida (FDS, 2016). Only nitrate+nitrite was analyzed for in this study and findings were not compared to Class III thresholds in Florida but it is potentially useful for understanding the movement of nitrogen throughout the water column at Crescent Lake.

Interestingly, the reduction of nitrate+nitrite observed in the hypolimnion on 23 October, to about 0 mg/L, occurred a few weeks before stratification subsided on 16 November. By 28

October, the surface had reached a maximum concentration of over 2 mg/L. The movement of nitrate+nitrite in the water column prior to 16 November may be explained by the process of denitrification (Tundisi & Tundisi, 2011, Song et al., 2013), where bacteria converts nitrate+nitrite to nitrogen gas in anoxic conditions.

The grand geometric mean of TN at Crescent Lake from 2007-2018 collected by Lakewatch was 1.16 mg/L (Table 2.7) and the mean of TN collected at Crescent Lake by Jacobs Engineering Inc. on 30 January 2019, Station 2 was 0.77 mg/L. The grand geometric mean of nitrate+nitrite at Crescent Lake from 4 July to 27 December 2019 at all depths (1.17 mg/L) was consistent with the Lakewatch value and was much higher than what Jacobs Engineering Inc. observed in the winter of 2019. This suggests that the TN levels may decrease in the winter months, perhaps due to uptake by phytoplankton, denitrification processes, and less runoff as a result of lower rainfall (Tundisi & Tundisi, 2011).

The source of nitrate+nitrite at Crescent Lake is unknown, but it may come from fertilizer runoff in the surrounding urban watershed. There was no noticeable increase in nitrate+nitrite after 30 September when the fertilizer ban was lifted, but groundwater and surface run-off can potentially take months to travel a short distance. Another possibility is that ammonium is generated by bacteria as an end product of decomposition of organic matter and converts to nitrite and then to nitrate through the process of nitrification under oxidized conditions (Tundisi & Tundisi, 2011). This is possible because oxygen reaches all depths of the water column after 16 November (Figure 4.3), and Crescent Lake is an urban lake subject to plentiful organic matter from plants, fish and bird waste, and inadvertent domestic animal waste.

5.3.2 Phosphate

Regulatory agencies commonly test for total phosphorus (TP) as an indicator of impairment in water ways (FDS, 2016). Total phosphorus is the measure of all forms of phosphate, organic and inorganic. In this study, inorganic phosphate (PO_4^{-3}), which is the reactive form of phosphorus used by plants and phytoplankton, was analyzed. It is impossible to convert units of phosphate to TP, so a comparison to Class III water body thresholds was not conducted.

Concentrations of PO_4^{-3} were highest in the hypolimnion under stratified conditions from 4 July to 16 November, whereas there was a lesser concentration at the near surface and mid-depth (Figure 4.12). During thermal stratification the mean hypolimnion concentration of PO_4^{-3} was 3.35 mg/L and it reached over 7 mg/L on 27 September; the near surface and mid-depth concentrations never exceeded a value of 0.45 mg/L. The increase of phosphate in the hypolimnion by the end of the summer may be explained by a release of phosphorus from sediment that has been bound to oxidized iron and unbinds when there are prolonged anoxic conditions (Tundisi & Tundisi, 2011). Unlike the nitrogen cycle, phosphorus cannot escape in a gaseous form, and remains in lake systems as "legacy Phosphorus," cycling between sediments and the water column and accumulating over time (Paerl, 2017).

On 16 November, the near surface and mid-depth concentrations of PO_4^{-3} increased and concentrations at the bottom decreased, likely due to mixing of the water column. Similarly, in another Florida Lake, Johnson Pond, higher levels of TP were observed in the epilimnion during winter isothermy when compared with periods of stratification (Whitmore et al., 1991). It is expected for dissolved substances and nutrients from the hypolimnion to become distributed throughout the water column (Boehrer & Shultze, 2008). The increased concentrations of PO_4^{-3}

in the euphotic zone of the near surface waters can contribute to phytoplankton growth (Tundisi & Tundisi, 2011; Paerl et al., 2017), and may explain the increase of Chl-A that was observed after mixing (Figure 4.7).

5.3.3 Ammonium

Ammonium (NH_4^+) sample concentrations were greatest in the hypolimnion under stratified conditions from 4 July to 16 November when compared with mid-depth and near surface concentrations (Figure 4.14). Ammonium concentrations reached as high as 19.28 mg/L at the bottom depth during stratification, whereas the near surface and mid-depth concentrations never exceeded 0.7 mg/L. Ammonium concentrations may have been at such a high concentrations near the lake bottom due to the by-products of decomposition (settling plant and animal matter); this nutrient commonly accumulates in the hypolimnion of anoxic lakes (Beutel, 2001; Tundisi &Tundisi, 2011).

On 16 November, ammonium levels were nearly uniform throughout the lake, ranging from 0.83 mg/L near the surface, and 1.07 mg/L near the bottom. The homogenized conditions of nutrients from 16 November to 27 December were indicative of mixing (Boehrer & Shultze, 2008). The reduction of ammonium levels after mixing may be the result of dilution, and/or nitrification, where ammonia is converted to NO_2^- and then to NO_3^- (Tundisi & Tundisi, 2011). Nitrification is supported by the fact that $NO_3^- + NO_2^-$ increased from 16 November to 23 December (Figure 4.11).

5.3.4 Silicic Acid

Silicic acid is the simplest soluble form of silica, and the two terms are generally used synonymously (Belton et al., 2012). Silicic acid accumulated in the hypolimnion of Crescent

Lake during stratification (Figure 4.15). An accumulation of silica in the hypolimnion also occurred in Wisconsin's Lake Mendota because of thermal density gradients (Stauffer, 1986). Silicic acid concentration reached its maximum in late summer at all depths of Crescent Lake on 27 September; the same occurred in late summer at Lake Mendota (Stauffer, 1986). After lake mixing on 16 November, the silicic concentration in Crescent Lake declined at all depths, as was also observed in Lake Mendota after mixing (Stauffer, 1986). After mixing, there was an increase in nutrients at the surface, and an increase in phytoplankton species occurred that may have consumed silica (Figure 4.16). Diatoms require silica for cell division, and silica is known to be a limiting factor for their growth (Schelske & Stoermer, 1971). Thus, it could be possible that silica was consumed by diatoms after 16 November at Crescent Lake, when nutrients (Figure 4.8), and Chl-A (Figure 4.16) concentrations increased at the surface.

5.4 Phytoplankton Concentrations

Chlorophyll-a is the primary photosynthetic pigment in almost all oxygenic photosynthetic organisms (Ritchie, 2006). It is important to note that the Chl-A samples in this study were not corrected for pheophytin, a natural degradation product of Chl-A that has absorption peaks in similar spectral range of Chl-A (Ritchie, 2006). Therefore, the observed values of Chl-A in Crescent Lake may be artificially high. One striking pattern (shown in Figure 4.16) is that there is a large concentration of Chl-A at the bottom depth throughout the duration of the study. A previous limnological study done by Fee (1976), showed that 66-86% of total chlorophyll was found in the hypolimnion of seven lakes in north-western Ontario. This phenomenon was explained by the species of phytoplankton being adapted to low levels of light, and that hypolimnetic nutrients allowed phytoplankton to assimilate carbon better despite low light levels. An increase of phytoplankton was recorded at the surface during mixing, but it was

found that this increase was due to the mixing of previously-produced biomass and not phytoplankton bloom caused by an influx of nutrients (Fee, 1976). Although Chl-A increased on 3 December while bottom Chl-A decreases (Figure 4.16) at Crescent Lake, hypolimnetic photosynthesis is not likely because of low light penetration, and the increase of Chl-A probably resulted in part because of Chl-A degradation products reaching the surface.

In addition to the mixing of Chl-A degradation products at the surface, the mixing of nutrient rich hypolimnetic waters may also have stimulated phytoplankton growth in surface waters (Hutchinson & Edmondson, 1957). The increase of phytoplankton coincided with a rise in nutrient levels after 16 November at the surface within the euphotic zone (range of light) (Figure 4.7), which suggests that the increase of Chl-A might have been induced by mixing of the water column. Increases in phosphate and ammonia were concurrent with increases in Chl-A (Figure 4.18). The concentrations of $NO_3^- + NO_2^-$ were also relatively high at the surface during November and through December when the Chl-A values increased (Figure 4.19).

The concentrations of Chl-A at near surface waters far exceeded the recommended threshold determined for Class III waterbodies (FDEP, 2019), which is 20 μg/L. The only sample that read less than 20 μg/L was recorded on 29 July. The concentration of near surface Chl-A rose to a maximum of above 120 μg/L on 3 December after mixing. Lakewatch data from 2007-2018 (Table 2.6) showed a range of uncorrected chlorophyll-a from 30-161 μg/L, and a mean value of 55 μg/L. The results of this study are consistent with Lakewatch data, and show a range from 13-127 μg/L near the surface, and a mean value of 68 μg/L. Jacobs Engineering Inc. reported that on 30 January 2019, Chl-A values were 85.9 μg/L at the surface of Station 2 (Table 2.8). On the last day of data collection, 27 December 2019, the Chl-A concentration was just above 60 μg/L at the surface. It is evident that there is an excess of Chl-A at Crescent Lake, and

the results suggest that the maximum levels of Chl-A at the surface occur after mixing of the water column.

At Crescent Lake, there was an inverse relationship between the Chl-A concentrations and the Secchi-disk depth readings (Figure 4.17). Carlson's (1977) trophic state index demonstrated the inverse relationship between Secchi-disk depth to chlorophyll-a (Table 2.2). The Secchi-disk depth at Crescent Lake ranged from 0.6 to 1.5 meters in the Lakewatch data from 2007-2018, and the results from this study show a range from 0.7 to 1.3 meters (Figure 4.17). The lowest Secchi-disk depth occurred on 3 December, which was the date of maximum recorded surface Chl-A (Figure 4.16).

5.5 Morphometric Values and Heat Budget

With a maximum depth of 11.52 meters, Crescent Lake (Table 4.1) is deep enough for thermal stratification to occur (Illinois EPA, 2011). Of all the heat budgets of lakes studied in Florida (Nordlie, 1972; Whitmore et al., 1991; Escobar et al., 2009), the heat budget of Crescent Lake (4,450 cal cm $^{-2}$) was closest to that of Lake Mize (4,729 cal cm $^{-2}$) and Johnson Pond (5,945 cal cm $^{-2}$).

Lake Mize and Johnson Pond are located about 2°N of Crescent Lake in terms of latitude. Warmer winter temperatures in latitudes closer to the equator should show smaller heat budgets than in climates further from the equator (Whitmore et al., 1991). The 2°N difference in latitude is arguably negligible, but Crescent Lake does show a slightly smaller heat budget than Lake Mize and Johnson Pond. The depth at which sunlight can penetrate the water column may have influenced the heat budget at Crescent Lake. Lake Mize and Johnson Pond showed a maximum Secchi-disk depth of 1.6 meters (Whitmore et al., 1991), whereas Crescent Lake showed a

maximum Secchi-disk depth of 1.3 meters (Figure 4.18). This suggests that sunlight penetrates less deep into Crescent Lake, and that its deeper waters are not heated as easily. The surface area and total volume of Johnson Pond and Lake Mize are both smaller than Crescent Lake, but they have larger maximum and average depths. The surface waters of Lake Mize and Johnson Pond achieve higher temperatures, but their deep waters remain significantly cooler. Johnson Pond reaches a minimum temperature of 12°C in the hypolimnion, while near surface waters exceed 30°C. At Lake Mize, the minimum temperature reaches around 13°C in the hypolimnion and a maximum temperature of above 31°C in the epilimnion. Crescent Lake, in contrast, shows a maximum surface temperature of just under 32°C in the epilimnion, and a bottom minimum temperature of above 19°C. Because the hypolimnetic waters at Crescent Lake are warmer, there is a lower heat budget. Additionally, water budgets have an influence on heat content in lake waters (Escobar et al., 2009) because a greater exchange of water in a lake can decrease the storage of heat. Crescent Lake is different, however, than Lake Mize and Johnson Pond, because it has been modified with inflow and outflow stations that promote the movement of water in and out of the lake.

5.6 Suggestions for Management of Crescent Lake

High nutrient levels encourage the growth of all types of phytoplankton, and the most effective method for reducing this growth is to limit the input of nutrients into the body of water, specifically phosphorus and nitrogen (Paerl & Otten, 2013; Paerl, 2017). There is a fertilizer ban in place in Pinellas County that forbids the use of fertilizer during the summer rainy season, from June until the end of September (Pinellas County Public Works, 2019). The intention is to reduce fertilization when frequent and heavy rain washes fertilizer off the landscape into receiving water bodies before plants can absorb it. Banning fertilizer during the rainy season is a

positive step towards reducing nutrient input into surrounding water bodies, but a longer duration and stricter policy might be advisable for significant changes to the water quality at Crescent Lake.

An effective method of removing nutrients from water is by biomanipulation. This method involves introducing species to a water body to increase grazing of phytoplankton or to otherwise reduce the recycling of nutrients (Paerl, 2017). One such method involves removing fish that eat plankton and introducing piscivorous fish (Jeppesen et al., 2007) with the intention of increasing herbivorous zooplankton. Another method is to introduce fish or benthic bivalve mollusk filter feeders that consume cyanobacteria (Paerl, 2017) and then eventually harvest some of the filter feeders. Biomanipulation to increase grazing pressure has produced mixed results in diverse settings, but it is difficult to monitor and may create undesirable food chain disruptions.

Reduced phytoplankton growth could also be achieved by applying algaecides to the body of water. One example is copper sulfate, but this has shown to cause negative consequences, such as development of tolerant cyanobacteria, killing sensitive zooplankton that are beneficial to the ecosystem, lysing algal cells that lead to a release of toxic microcystin, and having negative effects on benthic invertebrates (Kenefick, 1993). Applying calcium hydroxide is another option that has been shown to reduce phosphorus and thereby reduce Chl-A concentrations in lakes in Alberta, Canada (Prepas, 1990), but the effects in warm-temperate lakes are unknown. Hydrogen peroxide was added to Lake Koetshuis in the Netherlands (Matthijs et al., 2012) and was shown to reduce the cyanobacteria population by 99%, with few observed negative consequences on other lake biota.

Other methods involve techniques aimed at binding nutrients to sediment. The application of a modified clay, designed to bind phosphorus released from sediments, was used

successfully in Australia to reduce phosphorus concentration in the water and phytoplankton growth (Robb et al., 2003). Adding aluminum sulfate is another method of binding phosphorus to sediments (Osgood, 2012). Introducing aluminum to an ecosystem can potentially be toxic, the Environmental Protection Agency has spelled out criteria to calculate safe dosage levels (EPA, 2018). However, neither of these methods removes nitrogen, a limiting nutrient for phytoplankton (Paerl & Otten 2013). Another technique is sediment dredging, where sediment is removed from the bottom of a lake that has high concentrations of nutrients. The problems with this approach involve inadvertently releasing nutrients into the water column, and disturbing microbial communities that foster natural biogeochemical cycles, such as denitrification (Paerl & Otten, 2013).

Modifying the stratification and mixing patterns of a lake is another approach to remediation. One method involves the application of devices to induce artificial mixing of the water column that oxygenates the hypolimnion. There are several forms of aeration systems that essentially bring air under high pressure down an installed pipe mechanism to the bottom of the lake to release large bubbles, pushing water upwards that oxygenates the hypolimnion and breaks stratification (Visser et al., 2016), but these methods produce mixed results. Artificial mixing can enlarge the habitat for oxygen-dependent organisms, reduce sudden spikes in nutrients at the surface and decrease phosphorus release from the sediment. It also can suppress the accumulation of ammonium, reduce the growth of phytoplankton, and induce a shift from harmful cyanobacteria to green algae and diatom species. Specific cases of success are described in Visser et al. (2016), where mixing rates associated with the buoyancy of phytoplankton species allowed for diatoms and blue-green algae to proliferate while toxic cyanobacteria were reduced. On the other hand, Osgood and Stiegler (1990) found that artificial circulation

increased phosphorus by threefold, did not reduce phytoplankton production, and fish kills still occurred. This is because artificial mixing can release large concentrations of nutrients into the euphotic zone and create favorable conditions for phytoplankton growth year-round (Visser et al., 2016). Additionally, artificial mixing that oxygenates the hypolimnion alters biogeochemical cycles such as denitrification, that increases nitrogen in the water column (Paerl & Otten, 2013).

6. Conclusion

The primary research questions for this study were to determine if thermal stratification develops in the summer; if mixing of the water column occurs sometime in fall to understand the movement of nutrients in the water column; and to determine if observed phytoplankton growth, and reduction of dissolved oxygen levels in the fall, are a result of lake mixing. The heat budget and morphometric values at Crescent Lake were determined and compared to other Florida lakes.

An assessment conducted by Jacobs Engineering Inc. in January 2019 did not provide substantial indication of thermal stratification or mixing, but did display high levels of nutrients and Chl-A in the water column. Studies show that Florida lakes that are deep enough become thermally stratified in the warm summer months and mix in the cooler months of late fall and winter (Beaver et al., 1981; Whitmore et al., 1991; Escobar et al., 2009); this was anticipated to be the case at Crescent Lake. Additionally, the mixing of several Florida lakes resulted in homogenized conditions (temperature, dissolved oxygen) in the water column (Escobar et al., 2009) and a rise of nutrients at the surface (Whitmore et al., 1991). It was hypothesized that a rise of nutrients at the surface would lead to an increase in phytoplankton (Hutchinson & Edmondson, 1957).

The results from the sonde profile readings showed that Crescent Lake was thermally stratified from the first day of research on 4 July, until no later than 16 November. This was supported by the fact that temperature, RDO, density, pH, and TDS all showed significant differentiation from the surface to the bottom throughout the warmer summer and early fall months (Section 5.1). The case for thermal stratification at Crescent Lake was further supported by the spatial and temporal distribution of nutrient concentrations outlined in Section 5.2. The nutrient parameters of nitrate+nitrite, nitrite, ammonium, phosphate, and silicic acid, all showed

accumulation in the hypolimnion and a lesser concentration in the epilimnion during the warmer stratified months.

The sonde profile measurements of temperature, RDO, density, pH, and TDS all showed homogenized conditions on 16 November, indicating mixing of the water column. RDO concentrations reach all depths of the water column and reduced significantly at the surface on 16 November, likely due to dilution from anoxic hypolimnetic waters and not because of increased decomposition/respiration. Additionally, the PO_4^{-3} and NH_4^{+} sample concentrations suggested mixing by 16 November evidenced by decreases in the hypolimnion and increases in the epilimnion. Nitrate+nitrite and silicic acid concentration also became homogenized in the water column on 16 November, but without a decrease in the hypolimnion.

The exact date of mixing was approximately 10 November 2019 based on the daily sonde measurements of total ammonia (Figure 4.14); this is when the concentrations began to rise significantly at the surface. A maximum concentration was reached for both the daily sonde data and the sample concentration at the near surface on 16 November. This mixing date was further supported by local weather data from 9 November, showing that atmospheric minimum temperature dropped several degrees C and wind speed increased several meters per second (Figure 4.7). Atmospheric conditions promoted mixing. The duration of mixing was unconfirmed, but the sonde profile temperature data (Figure 4.1) and density data (Figure 4.4) indicate that the water column was still relatively mixed on the last day of study, 27 December 2019.

The near surface Chl-A concentration on 16 November (74 ug/L) increased after mixing and reached a maximum concentration of over 120 ug/L on 3 December, well above the

threshold of 20 ug/L established for class III waterbodies in Florida. The increase of near surface Chl-A coincided with an increase in PO_4 and NH_4 at the near surface (Figure 4.18), suggesting that the Chl-A growth might have been influenced by nutrient increases. Interestingly, the concentrations of Chl-A in the hypolimnion were high during stratification (109 ug/L) and became homogenized throughout all depths after mixing on 16 November. This suggests that the increase in Chl-A at the near surface could be a result of an existing biomass in the hypolimnion that reaches the surface. Thus, Chl-A values were shown to increase at the near surface after mixing, but the mechanism as to why remains in question: it could be that mixing increased nutrients at the surface, or it could be due to mixing of high concentrations of Chl-A from the bottom to the surface.

The heat budget of Crescent Lake was less than other, deeper, Florida lakes (Nordlie, 1972; Whitmore et al, 1991; Escobar et al., 2009). The comparatively lower heat budget at Crescent Lake was caused by its relatively shallow maximum and average depths, low light penetration, and potentially high inflows and outflows of water.

The results of this study show that there are especially high concentrations of nutrients and phytoplankton at the surface after mixing of the water column. Of the suggested mitigation options found in the scientific literature, the most recommended approach is to reduce input of nutrients into the lake to stop further degradation. Because Crescent Lake is an urban lake, designed to collect run-off from surrounding neighborhoods that use fertilizers, a reduction in nutrient input would require political action. Another approach to mitigation would be to artificially mix the water column at Crescent Lake, which would result in oxygenation of the water column and reduce a sudden spike of phytoplankton growth after mixing. This approach should be applied with caution, however, as there are cases where artificial flow has resulted in

increased nutrients in the euphotic zone and favored growth of toxic cyanobacteria as opposed to relatively harmless diatoms and blue-green algae (Jeppesen et al., 2007). Also, the application of artificial mixing that oxygenates the water column could restrict natural processes of denitrification that occur in anoxic conditions, an undesirable outcome at Crescent Lake because water from the lake flows into Coffee Pot Bayou. Another potential method of mitigation would be to apply binding agents that prevent the release of phosphorus from the sediment.

Several results suggest the need for additional research. Nitrate+nitrite concentrations in the hypolimnion showed a significant decrease in concentration before mixing on 16 November, and this may be due to denitrification processes occurring in anoxic, stratified conditions. Further research should be conducted to confirm this observation. Secondly, silicic acid concentrations reduced drastically in the water column while Chl-A values increased, which suggest that diatom species may be consuming silicic acid (silica), but an identification of phytoplankton species at Crescent Lake is needed to support this theory. Third, an estimate of nutrient input into Crescent Lake from runoff would help determine if input should be reduced through political action. Fourth, calculating a water budget would allow for greater understanding of the change of heat content and residence time of the water column. Fifth, research is required in the winter months to determine if the increased phytoplankton growth observed after mixing leads to high decomposition/respiration rates and subsequently lower DO levels in the water column. Lastly, the duration of this study spanned from 4 July to 27 December 2019, and to fully understand nutrient cycling, water quality, and the heat budget at Crescent Lake, research should be conducted from the months of January through the end of June, or for an entire year.

The results of this study show an increase of nutrients, Chl-A, and a brief reduction of dissolved oxygen at the surface that arose from mixing that followed thermal stratification in the summer and fall.

7. References

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8. Appendix

Table A1. Sample Site: Latitude and Longitude

Site Name	Site ID	Latitude	Longitude
Crescent Lake Station 2	Station 2	27.78741	-82.64193

Figure A1. Photograph of Station 2 at Crescent Lake.
This location reaches a maximum depth of 11.28 meters. A buoy was anchored to maintain sampling consistency.

Table A2. Temperature Readings (°C) and Depth by Date.
4 July to 29 July 2019. Data recorded by Aqua-Troll 500 sonde.

Table A2 (1)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
31.1708	0.27255	29.9401	0.19833	28.865	0.27488	30.5293	0.19592
31.2588	0.41102	29.9679	0.23413	29.3445	0.65694	30.5321	0.21237
31.3279	0.55397	29.9906	1.01342	29.4776	1.1668	30.5333	0.2144
31.3396	0.57663	29.9891	1.4589	29.5416	1.41794	30.5443	0.31246
31.345	0.73606	29.9897	1.54423	29.5526	1.46824	30.5415	0.37711
31.3496	1.04334	29.9298	1.9255	29.5651	1.73452	30.5417	0.38818
31.318	1.22118	29.8824	2.61413	29.5956	2.27042	30.5275	0.45189
31.3143	1.25489	29.8601	3.01295	29.5994	2.63846	30.4977	0.57092
31.2946	1.36448	29.8557	3.08835	29.6011	2.70405	30.3949	0.63004
31.2823	1.56429	29.7546	3.42553	29.597	2.87358	30.3817	0.64156
31.267	1.70442	29.6854	4.11296	29.5902	3.47023	30.3555	0.6972
31.2648	1.72906	29.5778	4.48715	29.5706	3.75043	30.348	0.70552
31.2585	1.86624	29.5622	4.56015	29.5679	3.8081	30.2248	0.80433
31.2591	2.18599	29.2887	4.8929	29.5262	4.11782	30.1567	0.93252
31.2397	2.28952	29.1116	5.60448	29.4833	4.62907	30.0532	1.00406
31.2374	2.31483	28.9331	5.8553	29.4293	4.96841	30.0395	1.01582
31.2335	2.59834	28.9053	5.91342	29.4211	5.02939	29.997	1.13675
31.2249	2.71689	28.3439	6.12714	29.1695	5.26207	29.9421	1.22376
31.2019	2.84393	28.0383	6.45575	29.0087	5.56098	29.9343	1.23845
31.1988	2.86255	27.7526	6.56621	28.8454	5.87206	29.8774	1.30586
31.186	3.06931	27.2066	6.65182	28.8197	5.92181	29.8503	1.37379
31.1726	3.15769	27.1282	6.66479	28.5265	6.19031	29.7886	1.45313
31.1596	3.2983	26.9277	6.88451	28.108	6.60272	29.7811	1.46391
31.1576	3.31768	26.7223	7.08233	27.6331	6.85034	29.7451	1.6337
31.1426	3.53438	26.0294	7.20457	27.5596	6.89653	29.7174	1.66399
31.1311	3.66839	25.9356	7.22655	26.7584	7.16529	29.713	1.67413
31.0999	3.7491	25.5365	7.52156	26.2182	7.77123	29.6561	1.74147
31.0956	3.76323	25.0086	7.76537	25.755	8.0266	29.629	1.89061
31.0756	4.0369	24.289	7.95888	25.0125	8.33854	29.5831	1.97421
31.0477	4.1503	24.1797	7.99113	24.9035	8.38424	29.5773	1.98901
30.9994	4.22557	23.8595	8.32283	24.4631	8.61983	29.5413	2.02751
30.9924	4.23777	23.5842	8.44743	24.0964	9.27706	29.5356	2.03459
30.9453	4.44897	23.1458	8.68978	23.5854	9.66009	29.4837	2.09095
30.8959	4.5618	23.0814	8.72344	23.509	9.73314	29.4484	2.17506

Table A2 (2)

4-Jul		18-Jul		22-Jul		29-Jul	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
30.789	4.64999	22.8057	8.93743	23.1823	9.96382	29.3986	2.25266
30.7741	4.66428	22.6695	9.37771	22.9144	10.4178	29.3918	2.26439
30.7086	4.79221	22.3178	9.65562	22.7434	10.6563	29.3816	2.41029
30.6155	4.85121	22.2699	9.70674	22.7127	10.7035	29.3663	2.44264
30.4656	4.86712	22.0816	9.90408	22.3675	10.7579	29.3295	2.48529
30.4437	4.87081	21.956	10.2087	22.3088	10.9786	29.3244	2.49061
30.4035	4.88091	21.7461	10.402	22.1702	11.045	29.3111	2.65526
30.3611	4.87508	21.7164	10.4367	22.1521	11.0619	29.301	2.69852
30.2795	4.87728	21.6045	10.5425	22.0626	11.0977	29.2994	2.71016
30.268	4.87727	21.4908	10.6286	22.0274	11.123	29.2848	2.84498
30.2387	4.88559	21.4508	10.7178	22.0045	11.1275	29.2649	2.93919
30.2203	4.87958	21.4418	10.7318	22.0005	11.129	29.2382	2.97117
30.179	4.88155	21.3568	11.0037	21.9586	11.1254	29.2342	2.97808
30.1733	4.88151	21.1918	11.2853	21.9182	11.1311	29.2094	3.09436
30.1576	4.89723	21.1261	11.3284	21.8602	11.1341	29.1877	3.15842
30.1346	4.8952	21.1117	11.3439	21.755	11.1418	29.1563	3.21175
30.0628	4.90387	21.1166	11.3556	21.7396	11.1429	29.1517	3.22028
30.0531	4.90479	21.1369	11.3673	21.7049	11.1378	29.1423	3.29453
30.0244	5.08568	21.1238	11.371	21.6846	11.1357	29.1398	3.3048
29.991	5.14789	21.123	11.3718	21.647	11.1287	29.1188	3.36935
29.8057	5.24251	21.1134	11.3751			29.0937	3.49719
29.7814	5.2556	21.1098	11.3762			29.038	3.55977
29.6804	5.39954	21.0992	11.3829			29.0308	3.57114
29.5604	5.46659	21.0978	11.3838			29.0066	3.61607
29.3491	5.48792	21.0871	11.3856			28.9888	3.71269
29.3183	5.49253	21.0818	11.3977			28.986	3.72568
29.2332	5.51131	21.0736	11.4032			28.9226	3.84947
29.088	5.51736	21.0725	11.4044			28.9059	3.85086
28.949	5.50212	21.0632	11.4083			28.9016	3.85605
28.9265	5.50041	21.0608	11.4122			28.871	3.91528
28.7586	5.57239	21.0605	11.4115			28.8491	3.97354
28.6927	5.7247	21.0604	11.4116			28.8098	4.05774
28.4451	5.78543	21.0476	11.4171			28.8044	4.0698
28.4124	5.79869	21.0411	11.4146			28.7894	4.11002
28.2218	5.91863	21.0442	11.4151			28.7629	4.19199
28.0721	5.9622	21.0443	11.415			28.6916	4.25232
27.791	6.03663	21.0381	11.4175			28.6819	4.26286

Table A2 (3)

4-Jul		18-Jul		22-Jul		29-Jul	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
27.7515	6.04675	21.03	11.4213			28.6438	4.32006
27.6409	6.12075	21.0355	11.4201			28.5794	4.36915
27.5678	6.17877	21.0359	11.4201			28.5704	4.37725
27.4111	6.24235					28.4097	4.46189
27.3894	6.25212					28.3742	4.52906
27.1171	6.399					28.2476	4.57503
26.815	6.44546					28.2318	4.58247
26.7685	6.45696					28.1601	4.62936
26.5063	6.49889					28.1007	4.70964
26.4256	6.622					28.0909	4.721
26.3622	6.66741					28.0216	4.8011
26.3525	6.67741					28.0081	4.79669
26.1606	6.70294					28.0037	4.79993
26.0507	6.79293					27.9887	4.8642
25.6699	6.81799					27.9774	4.96264
25.6198	6.82439					27.9329	5.02634
25.4348	6.85486					27.9271	5.03782
25.2673	6.92483					27.8845	5.14653
24.8829	7.04601					27.8778	5.16114
24.8299	7.06347					27.8276	5.23841
24.3729	7.12016					27.7729	5.27428
24.1632	7.24637					27.7662	5.28047
23.8806	7.28502					27.7441	5.33071
23.8397	7.29463					27.7184	5.39932
23.7004	7.33891					27.6711	5.44564
23.5235	7.50116					27.6644	5.45346
23.3184	7.5779					27.6208	5.58677
23.2867	7.5937					27.5296	5.66727
23.0264	7.67946					27.5177	5.68172
22.8934	7.74102					27.4392	5.72722
22.6619	7.77927					27.3765	5.77015
22.6295	7.78592					27.2735	5.81806
22.5654	7.90077					27.2587	5.82539
22.4983	7.98542					27.2297	5.87053
22.3161	8.03125					27.1635	5.95908
22.2918	8.03955					27.0126	5.99474
22.1751	8.164					26.9916	6.00255

Table A2 (4)

4-Jul		18-Jul		22-Jul		29-Jul	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
22.0571	8.24782					26.9387	6.03005
21.9477	8.29836					26.9123	6.06463
21.9305	8.30696					26.8893	6.11695
21.8567	8.39816					26.8857	6.12468
21.7176	8.43913					26.863	6.16585
21.6984	8.44753					26.8337	6.25133
21.5272	8.49667					26.7438	6.29028
21.425	8.58412					26.7318	6.29843
21.3541	8.63009					26.6689	6.32915
21.3419	8.63899					26.5955	6.38596
21.2663	8.6908					26.4772	6.41303
21.1786	8.76307					26.4602	6.4184
21.0677	8.8266					26.4099	6.46807
21.0511	8.83699					26.3666	6.47146
21.0147	8.99506					26.2728	6.49975
20.973	9.03755					26.2599	6.50304
20.921	9.0732					26.2037	6.64217
20.9136	9.07826					26.1532	6.69303
20.9091	9.21279					26.0265	6.74476
20.8917	9.25663					26.009	6.75251
20.8312	9.30923					25.8921	6.90745
20.823	9.31678					25.7871	7.03266
20.8148	9.38284					25.5299	7.1078
20.7931	9.42732					25.4951	7.12125
20.733	9.49638					25.3731	7.29081
20.7248	9.50628					25.2817	7.32455
20.7133	9.57902					24.9848	7.41712
20.6862	9.61256					24.945	7.42909
20.6161	9.70553					24.7504	7.57935
20.6064	9.71795					24.666	7.64306
20.5131	9.8619					24.4414	7.69545
20.4415	9.91721					24.411	7.70385
20.4399	9.96381					24.2756	7.73841
20.4373	9.97094					24.1334	7.8119
20.4411	10.0699					24.0285	7.86862
20.4338	10.101					24.0104	7.87843
20.3833	10.1518					23.7984	7.90368

Table A2 (5)

4-Jul		18-Jul		22-Jul		29-Jul	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.3767	10.1588					23.7257	7.96329
20.358	10.2584					23.6501	8.06229
20.333	10.3809					23.3506	8.15246
20.2594	10.4161					23.31	8.16752
20.2494	10.4246					23.2014	8.27404
20.2078	10.5343					23.1114	8.33503
20.1955	10.6109					22.8892	8.37487
20.2096	10.6703					22.8585	8.38172
20.211	10.6799					22.7887	8.49493
20.1875	10.7857					22.6818	8.55688
20.1572	10.8141					22.4825	8.5794
20.1525	10.8217					22.4536	8.58415
20.1164	10.8889					22.3197	8.61767
20.1004	11.0071					22.262	8.73086
20.0613	11.0652					22.148	8.78201
20.0561	11.0769					22.1322	8.79283
20.0605	11.1013					21.9933	8.8682
20.0357	11.1495					21.9649	8.89219
20.0345	11.1807					21.886	8.91931
20.0333	11.1864					21.8759	8.92306
20.0243	11.2006					21.8332	8.99136
20.0257	11.2233					21.7978	9.01345
19.9696	11.258					21.7084	9.06493
19.963	11.263					21.6959	9.0719
19.9632	11.2867					21.6753	9.15635
19.9875	11.2996					21.6709	9.21142
20.03	11.3099					21.6152	9.26916
20.0363	11.3116					21.6081	9.27814
20.0225	11.3199					21.5852	9.36896
20.0405	11.3261					21.5406	9.38642
20.0236	11.3244					21.4855	9.39094
20.0223	11.3244					21.4769	9.39172
20.0127	11.3302					21.4742	9.52692
20.0206	11.3267					21.4314	9.59992
20.0424	11.3315					21.3623	9.66313
20.0455	11.3319					21.352	9.67335
20.0582	11.3324					21.2611	9.72863

Table A2 (6)

4-Jul		18-Jul		22-Jul		29-Jul	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
20.0655	11.3351					21.2087	9.81663
20.0801	11.3331					21.1832	9.86222
20.0822	11.333					21.1783	9.87117
20.0957	11.3391					21.1439	9.89593
						21.1014	10.1529
						21.0098	10.2261
						20.9081	10.3192
						20.8917	10.3323
						20.8436	10.5297
						20.8197	10.6557
						20.7646	10.7588
						20.7571	10.7757
						20.7395	10.7758
						20.7399	10.9135
						20.7155	10.9072
						20.7125	10.9118
						20.7095	11.1056
						20.6861	11.1226
						20.6651	11.1347
						20.6616	11.1361
						20.6819	11.2494
						20.6651	11.2866
						20.7077	11.2922
						20.7122	11.294
						20.7293	11.3062
						20.7395	11.3369
						20.7537	11.3463
						20.7558	11.3487
						20.7573	11.3521
						20.7631	11.3563
						20.7733	11.3569
						20.7747	11.3571

Table A3. Temperature Readings (°C) and Depth by Date.
1 August to 29 August 2019. Data recorded by Aqua-Troll 500 sonde.

Table A3 (1)							
1-Aug		**8-Aug**		**23-Aug**		**29-Aug**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
30.41644	0.195593	30.73061	0.202072	31.8093	0.319942	31.03418	0.187004
30.43852	0.197255	30.89024	0.197699	31.81186	0.328685	31.04502	0.190189
30.44264	0.197603	30.92053	0.197882	31.82666	0.410415	31.05353	0.188572
30.44507	0.194429	31.09116	0.193715	31.82965	0.39587	31.0548	0.188502
30.45862	0.198451	31.12902	0.214848	31.83062	0.397349	31.07628	0.184047
30.49181	0.396231	31.15652	0.270771	31.82102	0.4949	31.09022	0.191232
30.49644	0.420744	31.19729	0.377311	31.80404	0.546852	31.10247	0.622218
30.45084	0.663732	31.20331	0.392919	31.76	0.677008	31.10446	0.675155
30.34505	1.016147	31.21169	0.564684	31.7539	0.694813	31.11115	0.762712
30.28067	1.195006	31.05795	0.617454	31.69677	0.779739	31.04876	0.840607
30.15529	1.357591	30.82343	0.685047	31.55152	0.855178	31.02242	1.041174
30.13747	1.383254	30.78782	0.694747	31.49155	0.980934	31.00471	1.124376
30.07076	1.624122	30.73327	0.808966	31.37179	1.061657	31.00178	1.142494
30.02268	1.728139	30.70375	0.886843	31.35508	1.076471	30.96023	1.224236
29.95595	1.821415	30.62063	0.961936	31.18673	1.15477	30.9431	1.263893
29.94598	1.836094	30.60933	0.973862	31.13482	1.211392	30.91477	1.363665
29.92579	1.952408	30.56131	0.974143	31.08531	1.301572	30.91074	1.37735
29.90641	2.146243	30.52752	1.107686	31.07792	1.314778	30.89231	1.401496
29.84021	2.298508	30.50139	1.119037	30.95513	1.387907	30.86331	1.456602
29.83135	2.324751	30.49696	1.125961	30.88959	1.469723	30.84761	1.547635
29.79313	2.45245	30.461	1.13021	30.82497	1.710582	30.84455	1.561092
29.77489	2.651104	30.4366	1.181309	30.81487	1.743397	30.83323	1.647634
29.74989	2.725403	30.42322	1.225553	30.76277	1.751444	30.82197	1.688969
29.69233	2.831675	30.38455	1.267788	30.49694	1.876279	30.80981	1.719208
29.68413	2.846858	30.37926	1.274583	30.41558	2.062519	30.80789	1.724339
29.65483	3.012201	30.35559	1.446028	30.39477	2.090666	30.7994	1.879457
29.63235	3.14356	30.33195	1.538178	30.3701	2.171674	30.79192	1.941907
29.58364	3.285178	30.2952	1.592332	30.20634	2.191003	30.7745	2.025109
29.57676	3.307409	30.28975	1.60193	30.17165	2.182788	30.77072	2.096065
29.54184	3.322356	30.26444	1.710492	30.10471	2.228095	30.76958	2.108007
29.50902	3.37238	30.24793	1.766897	30.09584	2.233381	30.75359	2.215613
29.44041	3.537915	30.21581	1.82638	29.94856	2.289434	30.6747	2.324357
29.43067	3.560552	30.21125	1.835553	29.87027	2.373751	30.61454	2.425343
29.39045	3.707574	30.17864	1.936895	29.83209	2.582151	30.60388	2.44186
29.30663	3.805891	30.14749	2.087839	29.82491	2.611423	30.54771	2.583063

Table A3 (2)

1-Aug		8-Aug		23-Aug		29-Aug	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
29.2631	3.816806	30.12096	2.16764	29.76257	2.806466	30.48307	2.649181
29.25441	3.821637	30.11655	2.183192	29.66141	2.843957	30.38073	2.685423
29.18849	3.983947	30.09043	2.209805	29.61341	3.074508	30.36566	2.691999
29.12536	4.218022	30.05908	2.324575	29.60358	3.103828	30.33236	2.781388
29.10804	4.409762	29.99318	2.370453	29.53195	3.143843	30.29844	2.849527
29.00769	4.50274	29.89632	2.417398	29.37273	3.171076	30.22477	2.845969
28.99466	4.520771	29.88154	2.424471	29.3167	3.226495	30.2145	2.84792
28.90515	4.76495	29.84192	2.511076	29.30348	3.234334	30.18478	2.908923
28.77514	4.905187	29.81575	2.527887	29.27774	3.253426	30.1723	2.939796
28.58493	5.039189	29.75116	2.552682	29.19573	3.397571	30.15491	3.031029
28.55644	5.060216	29.74225	2.555976	29.12956	3.581542	30.13221	3.127376
28.44993	5.348482	29.71856	2.572997	29.09759	3.760744	30.12872	3.14303
28.31361	5.528528	29.69644	2.577386	29.09138	3.789966	30.10483	3.163212
28.02453	5.695949	29.70177	2.573979	28.94745	3.932609	30.06399	3.135495
27.98342	5.722786	29.70165	2.573651	28.8808	4.002329	29.99686	3.18242
27.86091	5.867839	29.69818	2.621932	28.82294	4.019345	29.98689	3.187083
27.79359	6.118888	29.68277	2.718055	28.81373	4.023566	29.96413	3.198875
27.67142	6.189049	29.62131	2.809816	28.73769	4.023322	29.9445	3.211996
27.65402	6.207513	29.61308	2.824928	28.64443	4.039238	29.91363	3.196931
27.37526	6.366276	29.57647	2.873201	28.60955	4.413423	29.90909	3.195538
27.21343	6.464764	29.5533	2.973187	28.60174	4.460152	29.88357	3.236053
27.04372	6.455465	29.53538	3.025484	28.52849	4.593203	29.87706	3.282697
26.84437	6.51221	29.48477	3.056355	28.37724	4.749357	29.8579	3.289671
26.81329	6.518412	29.47781	3.061707	28.31183	4.901591	29.85537	3.292295
26.76308	6.894767	29.47978	3.202627	28.24424	5.007284	29.80936	3.307851
26.6743	7.023581	29.44461	3.28224	28.23402	5.025791	29.7846	3.468159
26.25899	7.124063	29.35585	3.319083	28.07773	5.19039	29.75975	3.518062
26.20425	7.139768	29.34322	3.326135	28.0342	5.558702	29.67191	3.578394
25.99548	7.22644	29.31681	3.44114	27.96054	5.689592	29.65993	3.587028
25.85485	7.470808	29.31652	3.493566	27.95039	5.720024	29.58589	3.652956
25.385	7.652627	29.29097	3.557598	27.66438	5.821993	29.54002	3.685212
25.32169	7.684892	29.2879	3.567135	27.53845	5.883151	29.43524	3.741481
25.07328	7.74989	29.25276	3.681908	27.44974	6.105401	29.42061	3.7495
24.87914	7.942777	29.18678	4.044697	27.43495	6.135151	29.36502	3.789147
24.72047	8.086544	28.99426	4.062655	27.39406	6.186013	29.31683	3.8774
24.69401	8.111813	28.96786	4.079345	27.12169	6.267982	29.22921	3.946224
24.45157	8.291167	28.88037	4.166434	27.03998	6.436928	29.21667	3.958174

Table A3 (3)

1-Aug		8-Aug		23-Aug		29-Aug	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
24.28518	8.580975	28.83472	4.331707	27.01882	6.461018	29.18281	3.992133
24.0829	8.717653	28.80863	4.399838	26.95361	6.621512	29.14176	4.074398
24.05202	8.745864	28.72128	4.486678	26.68076	6.868104	29.09086	4.112944
23.74923	8.89487	28.70942	4.49939	26.48389	7.052804	29.08301	4.120963
23.63126	9.099314	28.6633	4.549619	26.41402	7.217876	29.02469	4.148059
23.43233	9.294666	28.59104	4.685782	26.39901	7.244563	29.00618	4.26804
23.12228	9.477857	28.48112	4.796397	26.17889	7.405797	28.97041	4.312255
23.07604	9.507522	28.46461	4.815547	25.94394	7.64438	28.92962	4.351167
22.88353	9.832835	28.44798	4.920061	25.82497	7.756528	28.92313	4.357153
22.68758	9.97271	28.39789	5.057781	25.80173	7.77939	28.90783	4.464691
22.46017	10.16614	28.27954	5.18438	25.28182	7.797388	28.87094	4.50922
22.42471	10.19435	28.2628	5.205294	25.18416	7.803188	28.70857	4.559183
22.3062	10.41054	28.23947	5.233276	25.11861	7.803849	28.68682	4.566696
22.20086	10.69059	28.12883	5.30722	25.10896	7.804075	28.55994	4.652127
22.03061	10.79447	28.03231	5.432039	25.03615	7.806699	28.47938	4.760512
22.00566	10.81791	28.0159	5.450399	24.92341	8.006452	28.38563	4.826574
21.95235	10.84586	27.91925	5.516404	24.69126	8.263133	28.37123	4.838851
21.91104	10.94856	27.88989	5.605163	24.65825	8.303039	28.19574	4.879192
21.89405	10.99709	27.83938	5.670222	24.46987	8.404136	28.1258	4.99028
21.82963	10.99973	27.62915	5.704459	24.19519	8.612591	28.06027	5.047699
21.82102	11.00132	27.60064	5.710859	24.01562	8.965072	27.93139	5.112432
21.73732	11.13482	27.5488	5.760628	23.84671	9.212463	27.91283	5.122249
21.70237	11.1957	27.51324	5.812685	23.81993	9.25662	27.88237	5.217927
21.58333	11.20079	27.43464	5.891439	23.42651	9.302405	27.82068	5.291884
21.56737	11.20306	27.42361	5.903173	23.35179	9.340372	27.67454	5.350082
21.57835	11.19787	27.28811	6.078598	23.27477	9.54854	27.6538	5.359863
21.59172	11.2407	27.19283	6.149241	23.26426	9.57602	27.58475	5.479409
21.58801	11.28104	27.02969	6.173987	23.04674	9.675187	27.50418	5.542828
21.58802	11.28784	27.00612	6.179165	22.96753	9.900701	27.40273	5.610183
21.49989	11.31141	26.87406	6.227409	22.79787	10.24085	27.38711	5.620597
21.42623	11.33391	26.75833	6.384105	22.77452	10.29201	27.34992	5.649805
		26.67461	6.462447	22.64176	10.51907	27.2956	5.754365
		26.65999	6.478397	22.39178	10.67188	27.25007	5.816766
		26.45442	6.517126	22.30672	10.94879	27.24236	5.828668
		26.33818	6.610351	22.28642	10.98817	27.15531	5.919677
		26.226	6.725367	22.23244	11.07405	27.12665	6.029299
		26.03017	6.837745	22.13905	11.145	27.02302	6.131036

Table A3 (4)

1-Aug		8-Aug		23-Aug		29-Aug	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
		26.00173	6.855956	22.09326	11.18863	26.9241	6.215312
		25.92428	6.936763	22.11429	11.20103	26.90756	6.229393
		25.84809	6.965745	22.11576	11.20386	26.84467	6.300421
		25.7783	7.051768	22.11483	11.20584	26.76672	6.371003
		25.76695	7.063225	22.12856	11.21062	26.70473	6.419381
		25.70079	7.180375	22.13825	11.21587	26.69413	6.427931
		25.58485	7.200923	22.14003	11.21671	26.66221	6.530762
		25.26783	7.265681	22.13644	11.21895	26.63959	6.598997
		25.22388	7.274032	22.13625	11.22085	26.43922	6.652097
		25.12957	7.386544	22.13985	11.22141	26.41344	6.660972
		25.10167	7.51787	22.14031	11.22154	26.33133	6.752091
		25.02915	7.595596	22.1329	11.22317	26.16949	6.801137
		25.01939	7.610088	22.13766	11.22254	26.11189	6.80487
		24.67528	7.725501	22.13605	11.21973	26.0984	6.80698
		24.46037	7.876102	22.13608	11.21935	25.94256	6.848232
		24.26225	7.943846	22.12681	11.22368	25.85027	6.928644
		23.94118	8.014371	22.1169	11.22537	25.78446	6.9842
		23.89384	8.025093	22.10472	11.22475	25.55903	7.091372
		23.76663	8.171737	22.09298	11.22535	25.52835	7.106705
		23.63338	8.232155	22.09107	11.22539	25.46567	7.350634
		23.40213	8.309817	22.0778	11.22925	25.32632	7.403968
		23.36838	8.321189	22.06434	11.22791	25.21272	7.47004
		23.25628	8.55822	22.05888	11.22666	25.19322	7.479134
		23.21747	8.579022			25.08146	7.698019
		23.09153	8.676538			25.00665	7.751295
		23.07489	8.688324			24.83033	7.885855
		22.97856	8.748043			24.80585	7.9037
		22.87954	8.870076			24.71622	7.923685
		22.79555	8.96352			24.62382	8.08794
		22.78147	8.979863			24.54098	8.179869
		22.5467	9.043581			24.52733	8.197836
		22.44449	9.142847			24.20858	8.224666
		22.37585	9.216943			24.13962	8.22566
		22.24541	9.261304			24.09179	8.229055
		22.22676	9.269287			24.0844	8.229418
		22.17833	9.374968			24.00515	8.227504
		22.07519	9.428241			23.95617	8.389518

Table A3 (5)

1-Aug		8-Aug		23-Aug		29-Aug	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
		22.02319	9.492158			23.87615	8.444063
		22.01273	9.501777			23.86465	8.457278
		21.96788	9.63584			23.62396	8.449778
		21.90276	9.684995			23.60171	8.736422
		21.86129	9.80448			23.43896	8.83359
		21.85367	9.820731			23.30633	8.951701
		21.848	9.877086			23.28315	8.968808
		21.81279	9.965648			23.25222	9.071003
		21.78755	10.00873			23.17649	9.139802
		21.78303	10.01745			23.11115	9.190024
		21.76578	10.06985			23.10011	9.198522
		21.70102	10.23763			23.02003	9.234553
		21.67122	10.31403			22.94232	9.351996
		21.54776	10.42573			22.79708	9.564044
		21.53132	10.44193			22.77624	9.595029
		21.49172	10.53133			22.65264	9.697476
		21.45247	10.67014			22.56466	9.827614
		21.33682	10.72598			22.46885	9.875922
		21.32094	10.73818			22.45387	9.886888
		21.30221	10.85527			22.43747	9.986443
		21.23606	10.89635			22.32583	10.12026
		21.22403	10.93655			22.23858	10.19629
		21.21995	10.94262			22.15298	10.34297
		21.21171	11.01149			22.13931	10.3638
		21.16455	11.07647			22.05436	10.62047
		21.14595	11.10992			21.97051	10.67559
		21.14174	11.11647			21.89482	10.82217
		21.12959	11.192			21.88237	10.84143
		21.1233	11.24294			21.86152	10.85931
		21.10926	11.27793			21.87715	10.88742
		21.14468	11.30603			21.89855	10.90293
		21.14865	11.31068			21.90192	10.90592
		21.11097	11.32702			21.91118	10.94746
		21.12969	11.33779			21.92106	10.97628
		21.16335	11.34039			21.89922	10.9782
		21.16855	11.34106			21.8969	10.97946
		21.17869	11.34741			21.8261	10.9872

Table A3 (6)							
1-Aug		**8-Aug**		**23-Aug**		**29-Aug**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
		21.19246	11.35877			21.83819	10.98701
		21.21505	11.35087			21.85019	10.98756
		21.21837	11.35032			21.86174	10.99235
		21.22239	11.3528			21.86363	10.99298
		21.2301	11.36354			21.86152	10.99363
		21.2479	11.3694			21.86112	10.99786
		21.2504	11.37055			21.84269	11.00102
		21.27259	11.35726			21.84037	11.00159
		21.27809	11.35889			21.7932	10.99845
						21.76844	11.00298
						21.76426	10.99714

Table A4. Temperature Readings (°C) and Depth by Date.
5 September to 27 September 2019. Data recorded by Aqua-Troll 500 sonde.

Table A4 (1)							
5-Sep		**12-Sep**		**19-Sep**		**27-Sep**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
27.68936	0.23778	30.90558	0.192846	29.9604	0.374541	29.93825	0.18985
27.93021	0.198752	30.91061	0.192352	30.0057	0.34325	29.939	0.190036
27.96574	0.194487	30.92434	0.193821	30.01824	0.349282	29.94573	0.186801
28.16722	0.19052	30.94182	0.195836	30.05306	0.274556	29.95305	0.189943
28.03728	0.188107	30.94954	0.194763	30.05768	0.265683	29.96041	0.188447
28.38091	0.268507	30.95115	0.194704	30.08006	0.349198	29.96159	0.188401
28.52436	0.325429	30.9468	0.291816	30.09683	0.631081	29.9693	0.193929
28.55712	0.335877	30.95767	0.422422	30.12063	0.680638	29.9726	0.190749
28.8119	0.421418	30.94501	0.544611	30.14522	0.829927	29.97305	0.192001
28.96495	0.541044	30.94392	0.564695	30.14919	0.849084	29.97321	0.192
29.03697	0.589663	30.93269	0.696559	30.15519	1.134518	29.97415	0.275067
29.05073	0.600127	30.92382	0.777747	30.18192	1.153016	29.96213	0.333836
29.13623	0.644165	30.90516	0.816521	30.1835	1.237889	29.93381	0.400587
29.20029	0.791975	30.90256	0.824099	30.18474	1.24761	29.92982	0.410916
29.2303	0.846229	30.90043	0.91071	30.22186	1.509774	29.90629	0.414695
29.23623	0.858816	30.88548	0.967622	30.22603	1.62649	29.87243	0.52198
29.25763	0.905328	30.85874	1.002974	30.23805	1.690865	29.83032	0.60863
29.25644	0.956182	30.84788	1.061335	30.23954	1.702325	29.78358	0.664605
29.27341	1.04934	30.84552	1.069799	30.26352	1.783237	29.77621	0.674493
29.27538	1.062771	30.84126	1.171361	30.25822	1.813018	29.68196	0.719893
29.31216	1.098956	30.8292	1.17207	30.26481	1.880294	29.63917	0.797758
29.35176	1.117114	30.8186	1.180916	30.26531	1.889504	29.61541	0.840003
29.41711	1.127023	30.8168	1.181531	30.28451	1.96112	29.61121	0.848195
29.426	1.179093	30.81672	1.214685	30.30648	2.092436	29.56267	0.897102
29.4295	1.185986	30.81598	1.302612	30.32238	2.180318	29.54113	0.992975
29.48818	1.249587	30.81603	1.326569	30.32516	2.196251	29.4937	1.044118
29.48569	1.376358	30.81601	1.332953	30.31497	2.242121	29.48716	1.05415
29.46556	1.423268	30.80384	1.287819	30.31615	2.391727	29.40233	1.098793
29.4626	1.433956	30.80371	1.441653	30.32194	2.393382	29.35465	1.136643
29.48195	1.489193	30.80375	1.484459	30.29719	2.368923	29.30587	1.166849
29.48787	1.548849	30.80379	1.496253	30.29428	2.364964	29.29823	1.171957
29.49558	1.659724	30.79168	1.480216	30.30647	2.356661	29.28319	1.204515
29.49669	1.675702	30.79309	1.518569	30.32108	2.386126	29.22771	1.252324
29.49812	1.739844	30.78912	1.625092	30.31623	2.403031	29.20358	1.323679

Table A4 (2)

5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
29.52553	1.768125	30.78766	1.69197	30.31616	2.40639	29.19879	1.343255
29.53696	1.864819	30.78731	1.704444	30.28341	2.567108	29.19757	1.348297
29.53696	1.864819	30.78731	1.704444	30.28341	2.567108	29.19757	1.348297
29.5395	1.877662	30.75879	1.748367	30.24628	2.630902	29.18771	1.381364
29.54019	1.901008	30.74662	1.830622	30.13174	2.679614	29.1658	1.452231
29.49808	1.901359	30.74795	1.913349	30.11617	2.68758	29.14774	1.48505
29.4966	2.042407	30.74777	1.926833	30.08064	2.739081	29.14463	1.491868
29.50638	2.074845	30.73961	1.956335	30.05551	2.913564	29.1134	1.549883
29.50781	2.084624	30.71966	2.054473	30.01896	2.95031	29.08849	1.57876
29.48425	2.15929	30.70073	2.149127	29.97506	2.997219	29.06944	1.665429
29.48483	2.269386	30.69761	2.164708	29.96822	3.003492	29.0662	1.677143
29.47042	2.309091	30.69121	2.266662	29.9462	3.130969	29.05374	1.76261
29.46876	2.318156	30.65507	2.329985	29.92875	3.207306	29.02562	1.789346
29.44085	2.351638	30.63943	2.590337	29.89554	3.248747	29.01112	1.884861
29.42457	2.361888	30.63604	2.624607	29.89078	3.25633	29.00821	1.897411
29.4208	2.410299	30.58928	2.707165	29.87204	3.346221	28.99555	1.932801
29.4198	2.416567	30.5224	2.734308	29.85727	3.461713	28.989	1.974495
29.40558	2.446675	30.48592	2.844033	29.82758	3.531487	28.98578	2.095124
29.41134	2.470657	30.46119	3.025844	29.82336	3.544444	28.97566	2.120418
29.42118	2.582497	30.457	3.053094	29.79981	3.589665	28.97429	2.128222
29.44382	2.616366	30.40694	3.130098	29.77497	3.74591	28.95811	2.155258
29.44707	2.62499	30.36966	3.188397	29.73644	3.837836	28.94924	2.197561
29.44687	2.678488	30.33565	3.338662	29.73074	3.855459	28.94569	2.241413
29.44428	2.77456	30.33013	3.359457	29.70716	3.923746	28.94497	2.24846
29.43402	2.812682	30.3036	3.587019	29.6873	4.03221	28.9267	2.296974
29.43262	2.820977	30.24763	3.657769	29.67077	4.07313	28.90975	2.299261
29.41416	2.88889	30.23163	3.761429	29.63935	4.087071	28.90627	2.409697
29.3954	3.002655	30.22745	3.776208	29.63482	4.089744	28.90522	2.423284
29.37813	3.031872	30.2043	4.064188	29.6223	4.248464	28.89197	2.507671
29.3753	3.039805	30.19345	4.154642	29.60313	4.257586	28.88137	2.607635
29.35555	3.068202	30.14978	4.253859	29.56894	4.267553	28.86331	2.719229
29.34596	3.092502	30.0986	4.350152	29.56392	4.268272	28.8466	2.766613
29.34116	3.15602	30.09041	4.36576	29.55887	4.249726	28.84382	2.77644
29.34026	3.16477	30.0753	4.377373	29.55688	4.294377	28.82104	2.791875
29.32908	3.217827	29.9938	4.391186	29.54147	4.36854	28.8101	2.890107
29.30491	3.252429	29.95276	4.558513	29.53949	4.379707	28.79309	2.949237

Table A4 (3)

5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
29.28861	3.375136	29.94438	4.580091	29.52951	4.54851	28.79063	2.960576
29.27677	3.451874	29.9155	4.691356	29.51707	4.616434	28.76322	2.971637
29.27477	3.466327	29.80963	4.755724	29.51355	4.666242	28.75715	3.157586
29.28348	3.538945	29.70733	4.782938	29.51264	4.674514	28.74666	3.175431
29.30073	3.628092	29.69039	4.788433	29.50509	4.795401	28.74524	3.185053
29.3192	3.692716	29.63267	4.82847	29.49878	4.895139	28.72645	3.258458
29.32218	3.704048	29.60004	4.925367	29.49227	5.010972	28.72027	3.314691
29.33377	3.731826	29.54112	4.976532	29.46906	5.109189	28.71648	3.373319
29.34151	3.782234	29.53274	4.986626	29.46589	5.125672	28.71584	3.382524
29.33533	3.82626	29.50004	5.025151	29.44694	5.322085	28.70203	3.415434
29.33482	3.833676	29.49287	5.03598	29.42541	5.364691	28.69342	3.482664
29.33885	3.887482	29.47211	5.050302	29.17104	5.485322	28.68402	3.632838
29.349	3.928302	29.46353	5.114057	29.13832	5.50114	28.67382	3.733761
29.35888	4.000905	29.46167	5.122603	29.00878	5.88754	28.6722	3.752185
29.36051	4.011341	29.46359	5.356913	28.8646	6.10096	28.65149	3.808086
29.35148	4.013066	29.45844	5.41697	28.63757	6.227748	28.64575	3.864877
29.35706	4.047287	29.36009	5.452063	28.60402	6.250509	28.64311	3.913569
29.36739	4.143316	29.34749	5.457592	28.42744	6.337022	28.64267	3.921676
29.37067	4.186416	29.26364	5.731689	28.27353	6.36744	28.62467	3.966955
29.37147	4.195538	29.11357	5.726419	28.15376	6.427525	28.60968	4.030936
29.36937	4.233167	28.77443	5.845809	28.00667	6.700015	28.6056	4.070494
29.36507	4.357754	28.72642	5.85915	27.98416	6.736992	28.60459	4.077742
29.3617	4.408263	28.48127	6.105754	27.63144	6.951737	28.59168	4.115209
29.36112	4.419448	28.20771	6.1853	27.22818	7.10811	28.58528	4.169336
29.3191	4.477303	27.73853	6.232484	26.69333	7.293916	28.58818	4.259881
29.29972	4.520884	27.67028	6.240619	26.61154	7.322429	28.58833	4.2731
29.28393	4.611372	27.50707	6.315547	26.24654	7.572225	28.58071	4.354331
29.28138	4.624105	27.31803	6.453158	25.98688	7.655617	28.56457	4.389552
29.24242	4.658638	27.15252	6.547528	25.53934	7.7348	28.55591	4.478275
29.22012	4.696272	26.73916	6.651585	25.47464	7.746845	28.5542	4.490332
29.20654	4.752511	26.6813	6.66772	25.26443	7.918973	28.54886	4.518705
29.2041	4.760878	26.53136	6.82277	24.94541	8.14761	28.53903	4.519156
29.18866	4.798952	26.43332	6.963694	24.71657	8.378842	28.53427	4.6131
29.15568	4.829802	26.12173	7.068013	24.67595	8.416148	28.53362	4.671503
29.13677	4.903407	26.07945	7.086004	24.49161	8.594136	28.53341	4.68267
29.12014	4.943371	25.84689	7.299509	24.355	8.963261	28.50734	4.76078

Table A4 (4)

5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
29.11748	4.95118	25.82339	7.362703	24.29282	9.051125	28.48825	4.919345
29.08634	4.995081	25.6712	7.398766	24.02287	9.184529	28.48031	5.000765
29.06478	5.104965	25.65249	7.404861	23.98693	9.202655	28.47869	5.0169
29.04912	5.20641	25.60192	7.494535	23.79931	9.567924	28.47329	5.016379
29.04645	5.223356	25.51774	7.547391	23.61681	9.725873	28.45497	5.022816
28.99997	5.290911	25.32931	7.620869	23.45257	9.881557	28.45305	5.031643
28.96641	5.317041	25.3028	7.631734	23.42555	9.905526	28.45209	5.032999
28.91743	5.399927	25.2039	7.71349	23.26526	10.19909	28.44407	5.059714
28.91018	5.410994	25.06054	7.801679	23.127	10.2833	28.4415	5.124627
28.82424	5.471381	24.96427	7.88488	23.0022	10.34859	28.43768	5.240058
28.68514	5.508851	24.73948	7.916919	22.98175	10.35879	28.43713	5.256824
28.59252	5.637208	24.708	7.923779	22.90211	10.47821	28.42483	5.315367
28.47994	5.72118	24.63029	8.212502	22.85249	10.74176	28.40187	5.317126
28.46282	5.736757	24.53227	8.308059	22.79668	10.81321	28.39287	5.340384
28.10328	5.765123	24.27713	8.437132	22.78805	10.83246	28.3968	5.346745
27.92404	5.895693	24.24156	8.455684	22.77805	10.85114	28.39709	5.348461
27.75703	5.988595	24.1269	8.533923	22.79544	10.86504	28.37982	5.33256
27.73091	6.005367	24.0143	8.692697	22.80164	10.86656	28.38039	5.460747
27.45814	6.082752	23.85463	8.79334	22.79091	10.8694	28.36788	5.513142
27.34512	6.207772	23.83068	8.812015	22.7897	10.86973	28.36643	5.524913
27.2733	6.265443	23.75223	8.883322	22.78997	10.8711	28.33514	5.603514
27.26112	6.277351	23.67344	8.912188	22.7771	10.87451	28.31632	5.745922
27.03639	6.299909	23.56398	8.942582	22.76403	10.87627	28.30663	5.843176
26.90225	6.311384	23.54753	8.94726	22.76187	10.87662	28.30481	5.860741
26.78886	6.362002	23.5482	8.937053	22.75292	10.87595	28.26207	5.898537
26.77035	6.368647	23.51599	9.077934	22.73696	10.87775	28.25323	5.950905
26.69956	6.421146	23.42473	9.167321	22.68447	10.88036	28.23929	6.083167
26.64791	6.467845	23.27974	9.284581	22.67733	10.88076	28.23739	6.101554
26.58278	6.603913	23.25794	9.302146	22.61047	10.87473	28.21908	6.161969
26.49942	6.644249	23.12296	9.790853	22.53818	10.87551	28.14881	6.257888
26.48654	6.654508	23.03989	9.874261	22.49243	10.8745	28.10491	6.403325
26.2439	6.700222	22.89186	9.897123	22.43217	10.87865	28.0967	6.424825
26.12291	6.774471	22.87065	9.90092			28.06379	6.51014
25.99704	6.825727	22.81534	9.976029			27.94681	6.582246
25.97767	6.834925	22.75999	10.03214			27.85417	6.702066
25.68268	6.870756	22.66117	10.24799			27.78141	6.77036

Table A4 (5)

5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
25.59176	6.944553	22.64688	10.27676			27.76917	6.783386
25.4749	6.99883	22.45306	10.42478			27.64662	6.835489
25.45814	7.008403	22.41663	10.65162			27.49511	6.918055
25.27715	7.096154	22.27018	10.72041			27.33768	6.987589
25.17383	7.147848	22.25138	10.73775			27.31262	6.999293
25.10915	7.257379	22.20619	10.73744			27.12519	7.117912
25.09766	7.272694	22.2034	10.92629			27.01742	7.112588
25.04581	7.328052	22.18369	10.97122			26.88123	7.214666
24.97462	7.377519	22.18034	10.99624			26.86073	7.226614
24.91314	7.450427	22.17915	11.00009			26.72434	7.264831
24.90282	7.461247	22.21282	11.00875			26.51269	7.296519
24.83514	7.51463	22.22625	11.0092			26.42937	7.4431
24.6953	7.559677	22.24428	11.01028			26.411	7.462329
24.6132	7.655895	22.24691	11.01039			26.34066	7.532838
24.49876	7.704733	22.26273	11.01167			26.15096	7.596263
24.48184	7.714502	22.25959	11.01618			26.02492	7.710064
24.41252	7.778418	22.25761	11.01401			25.91126	7.798247
24.38325	7.82544	22.25717	11.01392			25.89295	7.813603
24.30379	7.843526	22.2542	11.01788			25.52086	7.885294
24.29299	7.847364	22.25118	11.0139			25.35268	7.992514
24.10552	7.95562	22.24801	11.01621			25.27086	8.066708
23.98722	8.011149	22.23942	11.01774			25.25597	8.079957
23.91579	8.099747					25.05442	8.163197
23.90289	8.112539					24.91649	8.168583
23.88646	8.161119					24.81548	8.324474
23.8465	8.2316					24.79821	8.343709
23.76587	8.252548					24.74995	8.438546
23.71049	8.239482					24.52629	8.515233
23.70048	8.238168					24.39521	8.619997
23.60354	8.272231					24.36999	8.635736
23.51131	8.348692					24.32572	8.685904
23.45897	8.371237					24.23589	8.799174
23.44921	8.37697					24.17697	8.918574
23.3568	8.379299					24.07041	8.986129
23.3172	8.428555					24.05518	8.998763
23.2765	8.495221					23.95375	9.043112

Table A4 (6)

5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
23.27026	8.50555					23.87695	9.155992
23.15779	8.573773					23.8183	9.20114
23.11373	8.656815					23.80841	9.211128
23.07094	8.794593					23.74764	9.227205
23.06433	8.814666					23.70929	9.27377
22.9995	8.848159					23.70928	9.369985
22.97327	8.889747					23.70799	9.38377
22.97042	8.949717					23.60381	9.471436
22.92373	9.012289					23.476	9.532835
22.91784	9.022383					23.40611	9.620695
22.84866	9.057809					23.3926	9.633737
22.83354	9.1442					23.35432	9.709802
22.79383	9.203807					23.22898	9.789622
22.7886	9.214608					23.16553	9.951122
22.65757	9.251213					23.10033	10.01072
22.61688	9.327095					23.09028	10.02428
22.56629	9.422423					22.97317	10.04954
22.55895	9.437236					22.91651	10.11413
22.44941	9.532182					22.8586	10.12452
22.36258	9.625273					22.84965	10.12832
22.32477	9.719077					22.72926	10.13071
22.31695	9.734124					22.71207	10.17975
22.28862	9.819707					22.68648	10.2765
22.22678	9.897025					22.68312	10.2905
22.13983	9.967574					22.64219	10.32166
22.10193	9.999997					22.59112	10.37269
22.09401	10.00646					22.55056	10.50509
22.01396	10.00881					22.54365	10.52335
21.98677	10.04296					22.50519	10.58641
21.9595	10.0657					22.4305	10.6381
21.9554	10.06993					22.38997	10.73497
21.89474	10.11129					22.37947	10.78358
21.87078	10.17837					22.37697	10.7933
21.87279	10.25754					22.30397	10.84959
21.87233	10.26994					22.26442	10.95427
21.87377	10.26404					22.23287	10.97721

Table A4 (7)							
5-Sep		12-Sep		19-Sep		27-Sep	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
21.84578	10.33195					22.22773	10.98397
21.802	10.40695					22.15359	11.00539
21.79547	10.41898					22.16096	11.03681
21.77813	10.46434					22.15356	11.07917
21.73091	10.50781					22.15329	11.08561
21.69668	10.64646					22.14925	11.0896
21.67625	10.7313					22.16174	11.08761
21.67257	10.74735					22.17626	11.09417
21.59817	10.77096					22.17857	11.09488
21.57775	10.89217					22.18763	11.09545
21.57567	10.91624					22.1978	11.09862
21.57497	10.92407					22.21243	11.11208
21.56385	10.9478					22.22221	11.11184
21.56225	11.03089					22.22398	11.11233
21.54691	11.16984					22.24325	11.10699
21.54499	11.19037					22.25235	11.11646
21.5219	11.2408					22.26128	11.11275
21.49858	11.28778					22.26266	11.1127
21.50071	11.35174					22.26668	11.11323
21.51312	11.373					22.26681	11.12108
21.51495	11.37795						
21.52408	11.37588						
21.5246	11.3819						
21.52735	11.38625						
21.52766	11.38705						
21.54013	11.39031						
21.53465	11.39312						

Table A5. Temperature Readings (°C) and Depth by Date.
3 October to 28 October 2019. Data recorded by Aqua-Troll 500 sonde.

Table A5 (1)							
3-Oct		**12-Oct**		**23-Oct**		**28-Oct**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
27.48662	0.193276	27.96453	0.196206	27.13182	0.18994	28.65097	0.188378
27.71243	0.190362	27.96411	0.194892	27.1419	0.192938	28.6679	0.187031
27.79147	0.191666	27.97435	0.198003	27.15327	0.189556	28.71361	0.186203
27.85182	0.18986	27.97954	0.196755	27.15114	0.170692	28.71984	0.186028
27.9854	0.188476	27.9806	0.196734	27.15128	0.168182	28.73094	0.184246
28.00424	0.188221	27.98191	0.191856	27.15866	0.208512	28.76625	0.216831
28.13963	0.214608	27.98019	0.197692	27.16382	0.265403	28.81536	0.27939
28.25524	0.285883	27.97359	0.238235	27.16635	0.385493	28.82287	0.288523
28.2986	0.350334	27.97271	0.24348	27.16684	0.402608	28.83773	0.483787
28.30804	0.361158	27.96242	0.285866	27.16694	0.453652	28.76208	0.532382
28.34538	0.501616	27.96379	0.381864	27.16952	0.493468	28.43509	0.570842
28.35171	0.568775	27.96252	0.468087	27.17961	0.534215	28.39164	0.576835
28.44765	0.612195	27.95654	0.535613	27.18095	0.540667	28.2981	0.630049
28.45954	0.619716	27.95572	0.547008	27.17392	0.519999	28.20688	0.685393
28.46661	0.654005	27.96925	0.678983	27.1719	0.548013	28.12296	0.738175
28.45127	0.748816	27.97022	0.702496	27.17697	0.652466	28.08219	0.790416
28.45414	0.789868	27.95088	0.730266	27.17523	0.684365	28.07428	0.798792
28.47317	0.810639	27.94842	0.734015	27.17523	0.692358	28.03917	0.894297
28.47581	0.8143	27.92713	0.828112	27.17548	0.746707	28.01191	0.943201
28.47997	0.90609	27.91128	0.864519	27.17821	0.81033	27.97981	0.978553
28.47263	0.973401	27.89203	0.915773	27.17623	0.958819	27.97486	0.984466
28.50115	1.057036	27.88908	0.923215	27.17608	0.979805	27.96813	1.0348
28.50443	1.069783	27.8853	0.988626	27.17055	1.036089	27.94977	1.073958
28.53543	1.165185	27.87767	1.025126	27.17443	1.096975	27.928	1.117625
28.55169	1.209657	27.86891	1.069569	27.17348	1.260032	27.92458	1.124396
28.56907	1.252616	27.86487	1.103788	27.17355	1.282476	27.90008	1.215272
28.57176	1.259327	27.86406	1.109679	27.17647	1.355166	27.8915	1.273603
28.58299	1.297585	27.85195	1.219298	27.17276	1.405802	27.85916	1.333356
28.61172	1.383863	27.85065	1.316284	27.16744	1.445418	27.85491	1.342779
28.62992	1.427321	27.83799	1.363634	27.16662	1.452106	27.83186	1.449326
28.63331	1.436097	27.83641	1.372903	27.17348	1.534629	27.82164	1.503721
28.61864	1.477005	27.83086	1.541165	27.17174	1.595538	27.8004	1.548018
28.6062	1.560363	27.83109	1.630416	27.16896	1.627994	27.78168	1.592045
28.60285	1.58289	27.82356	1.65601	27.16613	1.69961	27.77852	1.599047

Table A5 (2)

3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
28.57104	1.61117	27.82266	1.662033	27.16567	1.709624	27.77292	1.686924
28.56695	1.615143	27.80924	1.755663	27.16162	1.782311	27.76641	1.767305
28.54707	1.68576	27.80362	1.815599	27.1506	1.812729	27.74526	1.864315
28.54321	1.725925	27.79684	1.870005	27.14262	1.85123	27.74237	1.879287
28.53352	1.764328	27.79582	1.878812	27.14119	1.856899	27.7303	1.966067
28.53226	1.770401	27.78614	2.004039	27.13771	1.985734	27.71939	1.981546
28.52658	1.812301	27.78872	2.053787	27.12995	2.062045	27.70747	1.980981
28.52026	1.891523	27.77834	2.08855	27.12644	2.099946	27.70559	1.981149
28.51036	1.973184	27.77125	2.12698	27.1257	2.107176	27.69727	2.035154
28.5089	1.986394	27.76992	2.132933	27.12654	2.187505	27.69381	2.079748
28.50609	2.026851	27.76778	2.249625	27.12687	2.32148	27.67933	2.141427
28.50066	2.117246	27.76482	2.323543	27.11973	2.351415	27.67743	2.150654
28.49169	2.18182	27.75278	2.364351	27.11886	2.360326	27.66827	2.207073
28.49037	2.193358	27.75115	2.371815	27.11989	2.399297	27.66704	2.304466
28.4523	2.227182	27.74574	2.470308	27.11704	2.483027	27.65079	2.356565
28.4473	2.322918	27.73988	2.523866	27.11862	2.551485	27.62929	2.410455
28.44271	2.373918	27.733	2.585015	27.12151	2.595866	27.62593	2.418789
28.43011	2.404039	27.73192	2.594356	27.12195	2.603729	27.61742	2.578342
28.42837	2.409325	27.72984	2.700076	27.11607	2.657445	27.60376	2.571655
28.41795	2.496547	27.72803	2.709984	27.11753	2.680521	27.5907	2.576606
28.41175	2.553782	27.72285	2.729578	27.11317	2.707936	27.58855	2.57614
28.41273	2.602334	27.72214	2.731966	27.11271	2.712026	27.58203	2.584869
28.41266	2.610293	27.71066	2.831124	27.10765	2.808551	27.57488	2.674546
28.41655	2.641664	27.71594	2.885749	27.11088	2.82786	27.57056	2.73905
28.41648	2.703428	27.70806	2.973804	27.1119	2.911436	27.56976	2.750693
28.41075	2.7582	27.69971	3.028059	27.11218	2.922173	27.56105	2.819349
28.41002	2.767396	27.69831	3.038133	27.10859	2.955457	27.54459	2.875527
28.40312	2.80827	27.70379	3.150588	27.10895	3.08274	27.53133	2.903027
28.40475	2.920821	27.69469	3.256199	27.10697	3.120442	27.52578	2.941826
28.40251	2.952162	27.69542	3.317802	27.10876	3.172021	27.52465	2.947492
28.39378	2.9981	27.69511	3.329125	27.10891	3.179259	27.51387	3.011909
28.39257	3.004468	27.69497	3.414316	27.10633	3.254096	27.5107	3.074886
28.39058	3.098001	27.69666	3.458726	27.11106	3.305614	27.50816	3.099009
28.38405	3.1926	27.68672	3.504596	27.10233	3.348281	27.50777	3.10423
28.38365	3.250158	27.68556	3.511725	27.10145	3.355282	27.50134	3.19352
28.38335	3.26071	27.69209	3.624496	27.09853	3.553435	27.5043	3.275709

Table A5 (3)

3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
28.38282	3.29306	27.68681	3.724541	27.10069	3.591195	27.48874	3.358763
28.37687	3.304599	27.67843	3.78484	27.10141	3.643648	27.48695	3.371999
28.37259	3.307903	27.67715	3.79584	27.1016	3.650692	27.47202	3.529726
28.37181	3.308628	27.68023	3.84918	27.09542	3.720174	27.46476	3.583679
28.36742	3.343718	27.6721	3.909281	27.09748	3.745812	27.44757	3.638269
28.36803	3.410674	27.66859	3.981841	27.09544	3.739857	27.44521	3.646586
28.36959	3.454709	27.67056	4.043618	27.0953	3.739854	27.42844	3.74762
28.36983	3.462764	27.67072	4.05399	27.08858	3.7626	27.43073	3.785812
28.36256	3.513374	27.67131	4.194328	27.09329	3.789558	27.40201	3.810341
28.35336	3.611698	27.66723	4.300454	27.08934	3.813807	27.38515	3.82245
28.36169	3.659433	27.67188	4.393161	27.08907	3.817818	27.38185	3.824718
28.36065	3.695931	27.67231	4.408217	27.08696	3.787098	27.37257	3.832454
28.3609	3.701865	27.66774	4.633121	27.08829	3.866849	27.36525	3.822283
28.35814	3.803158	27.66781	4.765998	27.08193	3.910323	27.34941	3.830262
28.36275	3.856336	27.66692	4.840082	27.08279	3.962426	27.34717	3.830808
28.36292	3.899924	27.66683	4.853612	27.08263	3.970274	27.34067	3.886617
28.36313	3.906983	27.66746	5.005364	27.08649	4.061183	27.33365	3.94957
28.36488	3.951259	27.66925	5.088229	27.08068	4.101731	27.32796	4.007336
28.3649	4.019415	27.66623	5.133432	27.07535	4.140692	27.32699	4.016849
28.37004	4.044392	27.66593	5.141753	27.07442	4.146754	27.31712	4.118836
28.37067	4.050085	27.66909	5.261423	27.07953	4.179924	27.30581	4.188266
28.36974	4.113112	27.663	5.332417	27.07829	4.263584	27.27435	4.24029
28.36705	4.227537	27.66306	5.403566	27.07506	4.300006	27.27004	4.249177
28.37045	4.266391	27.66495	5.456641	27.07458	4.307821	27.26247	4.303548
28.37077	4.275669	27.66524	5.465767	27.0729	4.407662	27.25412	4.3242
28.37059	4.321055	27.66031	5.565791	27.06971	4.405285	27.25098	4.313496
28.3667	4.444258	27.65091	5.66662	27.07275	4.4173	27.23155	4.326629
28.36699	4.490817	27.65254	5.6947	27.06715	4.456964	27.22901	4.327732
28.35752	4.53366	27.6524	5.701664	27.06658	4.462502	27.21799	4.325934
28.35636	4.540216	27.65114	5.76473	27.05992	4.495797	27.21401	4.452271
28.35078	4.669717	27.64712	5.783432	27.05548	4.477766	27.18511	4.532191
28.35404	4.756925	27.64393	5.857891	27.05079	4.50907	27.18139	4.547361
28.3478	4.807397	27.64338	5.867647	27.05006	4.512066	27.1711	4.708254
28.34718	4.816602	27.63822	5.941609	27.04867	4.603039	27.16179	4.812073
28.34004	4.871646	27.63701	5.990006	27.04629	4.663115	27.13217	4.936172
28.336	4.973578	27.62885	6.057339	27.03912	4.721905	27.12815	4.95512

Table A5 (4)

3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
28.33227	5.0173	27.62782	6.067367	27.03813	4.731247	27.10582	5.204657
28.33167	5.026672	27.63107	6.15292	27.03556	4.78808	27.06616	5.35751
28.32521	5.074773	27.62231	6.215623	27.03151	4.878281	26.99293	5.437943
28.31917	5.150094	27.60773	6.258062	27.02891	4.924224	26.96603	5.477114
28.3209	5.210603	27.59699	6.288092	27.02843	4.933359	26.95995	5.48424
28.31619	5.275693	27.5951	6.2932	27.02654	4.959165	26.94099	5.527114
28.3157	5.28591	27.58118	6.366431	27.02001	5.215559	26.92848	5.613621
28.31545	5.402548	27.57192	6.396803	27.0215	5.332679	26.90204	5.639235
28.31396	5.472813	27.55224	6.464203	27.02143	5.357449	26.89831	5.645706
28.30413	5.565059	27.54947	6.473505	27.00006	5.425059	26.8806	5.656413
28.30283	5.578866	27.52746	6.561487	26.98622	5.524221	26.8771	5.684578
28.29902	5.644715	27.51689	6.622015	26.94975	5.619006	26.85559	5.675157
28.29629	5.731564	27.4814	6.661109	26.93664	5.709549	26.85284	5.675075
28.28126	5.789582	27.47668	6.66801	26.9336	5.724224	26.844	5.70701
28.27929	5.800024	27.45761	6.738857	26.92804	5.754294	26.83355	5.775949
28.25772	5.832176	27.44083	6.78221	26.91777	5.788379	26.79775	5.84562
28.24631	5.94972	27.38322	6.816016	26.91273	5.816867	26.79292	5.85694
28.23674	5.976913	27.37548	6.821637	26.91172	5.821646	26.77231	5.9953
28.23517	5.984995	27.34974	6.918656	26.89885	5.865556	26.77128	6.073258
28.19938	6.073127	27.33587	6.960268	26.88074	6.055032	26.74508	6.164401
28.17555	6.207345	27.31565	6.98986	26.83825	6.153606	26.73762	6.205093
28.15988	6.25253	27.31268	6.994864	26.8323	6.173426	26.73565	6.213347
28.14016	6.293804	27.29655	7.042097	26.80255	6.186806	26.73107	6.356346
28.13718	6.300009	27.2877	7.127236	26.77303	6.187778	26.70853	6.467897
28.11677	6.433371	27.27165	7.186419	26.7478	6.15783	26.67772	6.542359
28.1063	6.486108	27.23923	7.261012	26.74359	6.154142	26.67298	6.555401
28.03856	6.540686	27.23454	7.272277	26.708	6.143243	26.66019	6.711301
28.02973	6.548955	27.18879	7.400527	26.68255	6.244471	26.64289	6.814727
27.99885	6.598406	27.14386	7.486623	26.66818	6.258214	26.57963	6.886596
27.9686	6.722844	26.95057	7.515078	26.64499	6.246861	26.57109	6.899019
27.9364	6.784578	26.9247	7.521359	26.64165	6.245398	26.56251	6.9163
27.9313	6.797123	26.82578	7.598126	26.62607	6.428802	26.55079	6.918119
27.78016	6.848491	26.75274	7.643054	26.60507	6.521557	26.53453	6.916282
27.70043	6.933536	26.61768	7.668458	26.58163	6.532554	26.53206	6.916062
27.59806	6.993475	26.59834	7.673069	26.57798	6.536778	26.53695	7.056254
27.58273	7.004182	26.50149	7.748881	26.55961	6.614989	26.51777	7.078348

Table A5 (5)

3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
27.41553	7.033517	26.396	7.798647	26.55009	6.64762	26.47815	7.10722
27.30223	7.111131	26.14855	7.837321	26.53878	6.706272	26.45049	7.194941
27.18068	7.156903	26.114	7.843819	26.53708	6.714538	26.4455	7.207089
26.97867	7.215895	25.99379	7.912588	26.523	6.837607	26.4164	7.351009
26.94891	7.224739	25.87981	7.941576	26.51003	7.031119	26.39991	7.414102
26.83363	7.278948	25.70073	7.94729	26.46907	7.095319	26.33868	7.478123
26.76632	7.401436	25.62518	7.949101	26.46353	7.110741	26.33048	7.487946
26.62313	7.495047	25.60913	7.949366	26.339	7.129643	26.25989	7.658802
26.60306	7.511475	25.55934	8.064538	26.28765	7.19911	26.1741	7.755556
26.4597	7.580643	25.49162	8.10132	26.26021	7.284258	26.04305	7.824499
26.34217	7.712639	25.40854	8.164261	26.23901	7.345114	26.02356	7.836251
26.2183	7.78331	25.39562	8.173036	26.23558	7.35573	25.95436	7.98217
26.19872	7.797202	25.35451	8.309436	26.17547	7.471317	25.88992	8.052274
26.02031	7.881006	25.31058	8.347263	26.14882	7.541612	25.7638	8.096181
25.95283	7.965602	25.15018	8.388412	26.05858	7.621871	25.74586	8.103938
25.84886	8.009784	25.1286	8.394447	26.04648	7.634173	25.69158	8.155096
25.834	8.018403	25.0422	8.480817	26.02032	7.691268	25.62992	8.259808
25.7284	8.10488	24.95024	8.531859	25.99709	7.67665	25.50742	8.307492
25.67546	8.335626	24.75903	8.574605	25.98419	7.723014	25.48727	8.34758
25.52362	8.434294	24.73201	8.581643	25.98177	7.727909	25.48025	8.353916
25.15326	8.49819	24.67714	8.650015	25.93843	7.783139	25.46817	8.416736
25.10064	8.508878	24.62013	8.685779	25.90766	7.878019	25.44338	8.436132
24.9481	8.597607	24.566	8.721695	25.88947	7.951167	25.39047	8.467781
24.83418	8.695751	24.5223	8.738305	25.88614	7.963852	25.38289	8.472207
24.68615	8.775395	24.51494	8.741634	25.80799	8.025434	25.34874	8.603057
24.66376	8.788906	24.45022	8.865166	25.76934	8.106221	25.31767	8.656132
24.57199	8.863249	24.39275	8.888793	25.74639	8.146461	25.24992	8.718104
24.48805	8.989579	24.32943	8.918141	25.67919	8.180155	25.24038	8.727397
24.41095	9.085434	24.31949	8.922137	25.67004	8.185507	25.19647	8.875645
24.39835	9.102173	24.26311	8.997717	25.59631	8.285026	25.1839	8.948126
24.2127	9.156998	24.22322	9.041765	25.53051	8.37509	25.07362	9.004456
24.13449	9.27021	24.17863	9.13477	25.37082	8.415919	25.01268	9.049287
24.06611	9.308281	24.17171	9.147784	25.34844	8.424142	25.0006	9.056757
23.97136	9.370738	24.07456	9.237546	25.29547	8.490158	24.92922	9.157111
23.95709	9.379479	23.98318	9.318772	25.24914	8.507138	24.8732	9.240125
23.87681	9.536593	23.82991	9.355581	25.15156	8.524276	24.76767	9.260677

Table A5 (6)

3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
23.79515	9.561734	23.75699	9.387519	25.13783	8.526772	24.75253	9.265986
23.57605	9.598144	23.74217	9.392514	25.07607	8.570457	24.66326	9.395026
23.54562	9.602871	23.67535	9.498162	24.98152	8.599692	24.56714	9.437659
23.50054	9.708007	23.59549	9.541783	24.94568	8.619976	24.42558	9.445069
23.39375	9.798808	23.47509	9.581119	24.9376	8.623505	24.40444	9.447047
23.30545	9.858153	23.45705	9.587239	24.86753	8.6673	24.28906	9.541789
23.29028	9.868769	23.38001	9.638095	24.81495	8.757504	24.24613	9.588497
23.1349	9.917022	23.30435	9.655023	24.78635	8.826992	24.14539	9.621436
23.06253	10.03722	23.16399	9.700448	24.75965	8.836394	24.13163	9.627022
22.98654	10.11963	23.14375	9.706562	24.75545	8.839802	24.05509	9.751801
22.97479	10.13457	23.1008	9.770326	24.7291	8.925654	23.96271	9.789247
22.82422	10.197	23.01543	9.855742	24.68308	8.946358	23.83938	9.830753
22.74733	10.28793	22.94235	9.941765	24.61748	8.945303	23.80073	9.87947
22.72535	10.36332	22.92995	9.955663	24.60751	8.945538	23.7915	9.887074
22.69339	10.44179	22.89004	10.0613	24.54687	8.942682	23.74084	9.985053
22.68893	10.45421	22.88198	10.14243	24.47858	8.917037	23.71112	10.04809
22.639	10.59316	22.83767	10.17218	24.44375	8.984237	23.62734	10.09472
22.62481	10.63979	22.81107	10.26544	24.4369	8.991557	23.61586	10.10258
22.56264	10.69384	22.80597	10.27796	24.40544	9.093834	23.57246	10.16332
22.55453	10.70179	22.78706	10.3797	24.2696	9.221317	23.54202	10.1993
22.53447	10.75407	22.75058	10.43778	24.1815	9.29523	23.40948	10.26158
22.51682	10.85291	22.69088	10.44192	24.16515	9.309229	23.39189	10.27053
22.45452	10.91525	22.68203	10.44421	24.03807	9.350207	23.35447	10.31754
22.44614	10.9268	22.65813	10.51818	24.01296	9.45929	23.31676	10.36886
22.35287	10.95824	22.61629	10.54842	23.98786	9.538674	23.2611	10.36599
22.35289	10.99087	22.55392	10.60266	23.89828	9.58993	23.2528	10.36756
22.35704	11.00048	22.54456	10.61028	23.88618	9.598927	23.21101	10.37979
22.34369	11.00453	22.50201	10.70749	23.8578	9.679317	23.18702	10.41621
22.34216	11.00521	22.47571	10.7601	23.80806	9.73331	23.11491	10.45822
22.3476	11.01393	22.42796	10.81	23.65106	9.773033	23.08073	10.51389
22.35512	11.01792	22.42114	10.81795	23.62949	9.779781	23.07365	10.52242
		22.42189	10.92357	23.59424	9.854368	23.03726	10.63165
		22.41051	10.97813	23.54881	9.895843	23.0168	10.66531
		22.36038	11.01576	23.49421	9.928516	23.0313	10.7205
		22.33958	11.06888	23.48577	9.933895	23.0325	10.72821
		22.33501	11.07674	23.47889	9.939531	23.02652	10.81349

Table A5 (7)							
3-Oct		12-Oct		23-Oct		28-Oct	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
		22.32052	11.17768	23.44726	9.942015	22.99541	10.85518
		22.30894	11.2117	23.41807	9.94381	22.95132	10.88318
		22.31379	11.22109	23.41318	9.944115	22.94459	10.88797
		22.31401	11.2231	23.40653	9.937577	22.89248	10.93445
		22.31952	11.28133	23.40266	9.866605	22.8675	10.96436
		22.3221	11.31615	23.39423	9.898833	22.84516	11.03375
		22.32377	11.33573	23.31768	9.915322	22.84159	11.04334
		22.32405	11.33927	23.30765	9.91915	22.82567	11.17212
		22.33507	11.33702	23.28956	9.941055	22.80384	11.21988
		22.32918	11.34652	23.2509	9.966647	22.73663	11.21187
		22.32665	11.35172	23.17171	10.00532	22.71145	11.29865
		22.32605	11.35276	23.16029	10.0111	22.70572	11.30887
		22.33541	11.35063	23.13196	10.09495	22.66653	11.36652
		22.33431	11.35829	23.05631	10.13059	22.65642	11.3938
		22.33572	11.35491	22.99909	10.14229	22.65981	11.40755
				22.989	10.14483	22.66006	11.41005
				22.97559	10.15111	22.6701	11.42836
				22.93766	10.22534	22.66995	11.43376
				22.91084	10.24987	22.66911	11.44236
				22.90601	10.25594	22.66895	11.44356
				22.83738	10.26007	22.67838	11.44751
				22.78125	10.33675	22.67981	11.44637
				22.7697	10.35404	22.67579	11.44448
				22.72971	10.39348	22.67531	11.44418
				22.72453	10.39871	22.67166	11.4498
				22.71412	10.49286	22.66249	11.45596
				22.71374	10.54303	22.657	11.44951
				22.7035	10.61101	22.65634	11.44125
				22.70226	10.62105		
				22.69175	10.65792		
				22.67935	10.78593		
				22.65808	10.84194		
				22.65498	10.8539		
				22.601	10.91211		
				22.59061	10.96379		
				22.5779	10.9864		

Table A5 (8)							
3-Oct		**12-Oct**		**23-Oct**		**28-Oct**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
				22.58946	11.00319		
				22.59051	11.00588		
				22.59597	11.03554		
				22.57305	11.05913		
				22.54943	11.07421		
				22.54549	11.07689		
				22.54998	11.07959		
				22.54812	11.07319		
				22.5514	11.07577		
				22.55171	11.07582		

Table A6. Temperature Readings (°C) and Depth by Date.
8 November to 21 November 2019. Data recorded by Aqua-Troll 500 sonde.

Table A6 (1)					
8-Nov		**16-Nov**		**21-Nov**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
27.67484	0.192473	23.18907	0.195712	22.57603	0.181255
27.68056	0.19637	23.2042	0.194365	22.57557	0.181953
27.68185	0.198352	23.2064	0.194445	22.54937	0.180024
27.70251	0.195618	23.22644	0.194665	22.53272	0.183964
27.71013	0.319616	23.23243	0.316338	22.52959	0.184363
27.72307	0.398354	23.23627	0.41276	22.54012	0.181543
27.72489	0.413289	23.2369	0.429739	22.5991	0.24696
27.7284	0.447077	23.26029	0.524732	22.60583	0.326283
27.72476	0.484331	23.25982	0.658358	22.62205	0.371997
27.72542	0.527318	23.26088	0.721039	22.62402	0.38059
27.72534	0.534033	23.2609	0.733935	22.62625	0.410611
27.72626	0.54627	23.2744	0.779689	22.62619	0.472171
27.72409	0.565219	23.28016	0.817638	22.61671	0.50848
27.73441	0.62756	23.27946	0.894007	22.6155	0.515254
27.73558	0.635961	23.28357	0.943725	22.61024	0.559529
27.74269	0.679576	23.28403	0.952867	22.60654	0.619169
27.74055	0.729386	23.28888	0.998931	22.59763	0.645976
27.74907	0.792856	23.29251	1.12811	22.59639	0.65154
27.74574	0.837462	23.29494	1.175644	22.59139	0.668399
27.74567	0.845356	23.29537	1.186624	22.5793	0.722254
27.74804	0.882732	23.29711	1.213065	22.57239	0.74945
27.75117	0.935562	23.30646	1.320627	22.57107	0.754894
27.74648	0.961668	23.30272	1.401879	22.5555	0.790383
27.74601	0.966894	23.30264	1.416251	22.54787	0.819163
27.75009	1.041646	23.3126	1.470977	22.54614	0.879944
27.74443	1.151945	23.30958	1.613284	22.53302	0.907165
27.74629	1.186607	23.31704	1.679338	22.53133	0.912871
27.74627	1.195035	23.31616	1.785572	22.52186	0.934576
27.73749	1.240621	23.31637	1.800817	22.50558	0.99319
27.72969	1.287289	23.31565	1.904314	22.47557	1.005968
27.73017	1.324398	23.31662	2.066398	22.47118	1.009822
27.72994	1.330722	23.31315	2.142489	22.43841	1.047208

Table A6 (2)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
27.70465	1.357834	23.31276	2.158052	22.41546	1.08093
27.68394	1.38998	23.31539	2.259792	22.39261	1.051454
27.67593	1.434212	23.32122	2.356605	22.38902	1.048958
27.66209	1.467996	23.32457	2.423335	22.38098	1.114557
27.66014	1.473856	23.32521	2.435114	22.3642	1.16009
27.64548	1.514486	23.32229	2.497683	22.35964	1.241254
27.63411	1.570802	23.31968	2.619471	22.35844	1.252885
27.63109	1.609411	23.32298	2.671554	22.33064	1.321538
27.63033	1.61633	23.32329	2.682748	22.30857	1.351637
27.62283	1.655066	23.32713	2.738804	22.30088	1.434982
27.61446	1.737931	23.31953	2.85488	22.29913	1.446235
27.61242	1.780594	23.32902	2.911878	22.28105	1.508751
27.61185	1.789124	23.3249	2.953104	22.23629	1.547258
27.54477	1.832316	23.3248	2.959901	22.22399	1.627175
27.47147	1.850633	23.32748	3.012633	22.1949	1.653853
27.43405	1.899083	23.32178	3.101183	22.191	1.660201
27.38909	1.941056	23.32297	3.133953	22.11466	1.673482
27.38237	1.948187	23.32288	3.141381	22.06849	1.819381
27.27486	1.975062	23.32698	3.210671	22.05055	1.876778
27.23983	2.028958	23.32014	3.322999	22.04683	1.889841
27.19665	2.053193	23.33282	3.377745	21.98147	1.930668
27.19041	2.058272	23.33409	3.388842	21.93582	2.054532
27.1245	2.07619	23.32969	3.424352	21.91204	2.135582
27.09781	2.082641	23.33186	3.528836	21.90753	2.150439
27.06965	2.15537	23.33209	3.59082	21.84879	2.209707
27.06537	2.164626	23.33223	3.602642	21.81856	2.272862
27.0207	2.168454	23.33974	3.631612	21.81311	2.339711
27.01973	2.173306	23.33625	3.664986	21.81142	2.350276
27.00521	2.173687	23.33862	3.728025	21.79209	2.39158
27.00356	2.173931	23.33977	3.762792	21.76021	2.435365
26.96478	2.247049	23.34003	3.769509	21.7508	2.52697
26.94442	2.348323	23.34352	3.825172	21.7484	2.539785
26.92441	2.371982	23.34579	3.90192	21.72889	2.607564
26.91204	2.418877	23.34801	3.968116	21.71759	2.665955
26.9098	2.425142	23.34837	3.979244	21.6993	2.745621
26.88848	2.462934	23.34574	4.042295	21.6967	2.757352

Table A6 (3)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
26.88392	2.499481	23.33982	4.098598	21.68314	2.797137
26.87378	2.519613	23.34825	4.125166	21.67254	2.83355
26.87244	2.523419	23.34907	4.1305	21.67025	2.94734
26.83824	2.586736	23.34425	4.158635	21.66416	2.994798
26.83532	2.655496	23.33842	4.244264	21.66337	3.005169
26.83101	2.697055	23.34785	4.301317	21.63997	3.075227
26.83051	2.70475	23.3488	4.311765	21.6269	3.159579
26.83364	2.787319	23.34541	4.354822	21.62053	3.191326
26.82864	2.846371	23.34274	4.363788	21.61933	3.198296
26.81894	2.948996	23.34917	4.443932	21.60936	3.228772
26.81753	2.963758	23.35022	4.508394	21.59753	3.298753
26.79319	2.980824	23.35063	4.519723	21.57153	3.335968
26.78441	3.04727	23.34339	4.566632	21.56786	3.343316
26.76646	3.101743	23.34497	4.669445	21.55077	3.367882
26.76241	3.141252	23.33967	4.716876	21.55056	3.391466
26.76123	3.148041	23.33911	4.72676	21.54209	3.490326
26.7416	3.168056	23.34032	4.771844	21.54113	3.503124
26.74089	3.346045	23.3412	4.905297	21.52861	3.536952
26.73196	3.416018	23.34287	4.997467	21.52727	3.618729
26.73092	3.431929	23.34311	5.014185	21.51984	3.661978
26.70162	3.556795	23.33956	5.030357	21.51894	3.670186
26.68575	3.76656	23.3456	5.106084	21.51002	3.711436
26.68768	3.897736	23.34288	5.181999	21.51253	3.747492
26.68739	3.921987	23.33907	5.246157	21.50792	3.8374
26.66571	4.008489	23.33844	5.256873	21.50749	3.84982
26.66338	4.037169	23.34566	5.30737	21.49935	3.918217
26.6582	4.12003	23.341	5.42278	21.49392	3.964703
26.65755	4.131085	23.34358	5.490616	21.49249	4.12306
26.64146	4.309491	23.34368	5.503545	21.48382	4.189573
26.62127	4.374321	23.34936	5.529582	21.4827	4.204078
26.60961	4.501618	23.34034	5.637662	21.47322	4.241877
26.61165	4.557636	23.34733	5.682914	21.46439	4.304112
26.61158	4.569269	23.3478	5.692847	21.46515	4.344121
26.60004	4.63443	23.34451	5.704672	21.46494	4.351423
26.58544	4.762374	23.34529	5.77217	21.46235	4.372469
26.57247	4.81982	23.35179	5.797595	21.46345	4.43843

Table A6 (4)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
26.57031	4.831874	23.35264	5.803465	21.45668	4.457147
26.56549	4.853379	23.34774	5.816571	21.45589	4.462079
26.56376	4.93117	23.34754	5.944343	21.45859	4.480674
26.5573	4.987364	23.34294	6.02858	21.46158	4.505925
26.55645	4.997441	23.34974	6.065648	21.46657	4.552542
26.53096	5.025841	23.35042	6.072932	21.46729	4.559256
26.52454	5.080585	23.3448	6.1532	21.46719	4.588257
26.52267	5.159893	23.34649	6.269058	21.46902	4.649707
26.52227	5.171819	23.34599	6.343965	21.45763	4.738132
26.50195	5.218897	23.34603	6.357641	21.44905	4.774825
26.50258	5.255844	23.34888	6.39277	21.44749	4.782606
26.49529	5.402636	23.35177	6.512716	21.43712	4.800948
26.48536	5.42915	23.35311	6.579555	21.43636	4.848263
26.48381	5.438187	23.35338	6.592624	21.43205	4.879031
26.46803	5.507511	23.35291	6.616882	21.43154	4.884715
26.46163	5.603665	23.3478	6.688363	21.43324	4.900335
26.44818	5.678251	23.35331	6.725386	21.4239	4.94395
26.44632	5.691146	23.35378	6.732813	21.4289	4.970003
26.43371	5.746079	23.35113	6.75979	21.42913	4.974959
26.42288	5.795183	23.34726	6.777498	21.419	4.99448
26.42318	5.859037	23.35624	6.919238	21.42646	5.018732
26.42283	5.868708	23.34961	7.005532	21.42055	5.058778
26.40417	5.907712	23.34915	7.022051	21.42017	5.064645
26.38958	5.953818	23.35524	7.039506	21.42006	5.081743
26.38145	6.060427	23.35321	7.050911	21.41632	5.090326
26.37992	6.075305	23.35188	7.075849	21.42338	5.140747
26.36971	6.105935	23.3516	7.079339	21.41977	5.159479
26.35603	6.147407	23.35433	7.145151	21.41961	5.163822
26.35891	6.242535	23.3516	7.258324	21.41934	5.176583
26.35845	6.322386	23.35719	7.315623	21.41715	5.195846
26.3586	6.336073	23.35776	7.327068	21.42353	5.210445
26.34066	6.362413	23.35633	7.427254	21.42424	5.21299
26.33281	6.465938	23.3515	7.526431	21.42777	5.231213
26.32342	6.517093	23.35353	7.580558	21.42948	5.262831
26.32202	6.527572	23.35359	7.590957	21.42963	5.275687
26.30279	6.581761	23.35467	7.617553	21.42971	5.278504

Table A6 (5)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
26.30781	6.647736	23.34885	7.646913	21.42131	5.301298
26.30716	6.693288	23.34982	7.707708	21.42429	5.325251
26.30737	6.701365	23.35187	7.737681	21.41548	5.376852
26.28536	6.75536	23.3522	7.743703	21.41456	5.384063
26.27822	6.787593	23.34848	7.754864	21.41465	5.419275
26.27055	6.830972	23.35243	7.815913	21.412	5.456666
26.2694	6.837441	23.35003	7.843517	21.41854	5.500283
26.27116	6.854412	23.34991	7.849409	21.41694	5.514721
26.27514	6.870445	23.35268	7.897879	21.41702	5.518074
26.26709	6.913065	23.34803	7.966394	21.42044	5.544825
26.25922	6.949244	23.34919	7.997931	21.41021	5.648488
26.25787	6.955442	23.34913	8.004441	21.41202	5.691582
26.25257	6.961819	23.35323	8.041658	21.41181	5.701061
26.24651	7.065326	23.34517	8.122496	21.40946	5.739171
26.24766	7.094677	23.34992	8.159403	21.40956	5.765776
26.24759	7.102535	23.35015	8.167153	21.41285	5.803447
26.24861	7.138489	23.35251	8.226041	21.41327	5.809043
26.23765	7.218766	23.35	8.232917	21.4083	5.824669
26.22758	7.240198	23.35168	8.300945	21.413	5.859909
26.22588	7.245993	23.3513	8.395145	21.41157	5.944563
26.20928	7.295698	23.35134	8.409762	21.41085	5.984968
26.2016	7.351654	23.35013	8.490351	21.41068	5.99327
26.19406	7.452148	23.34726	8.650232	21.41175	6.043554
26.19389	7.531548	23.35258	8.71936	21.41726	6.116717
26.19362	7.545314	23.35313	8.734112	21.4116	6.153027
26.1753	7.54826	23.34809	8.766157	21.4111	6.160271
26.16929	7.648202	23.35317	8.909269	21.40954	6.193475
26.16523	7.654452	23.35224	8.972978	21.41199	6.234602
26.16458	7.659263	23.35235	8.986617	21.41329	6.268644
26.13792	7.700972	23.35424	9.017467	21.41356	6.274386
26.1183	7.700731	23.34734	9.118717	21.40831	6.311216
26.10991	7.734037	23.34868	9.171941	21.40343	6.339698
26.10821	7.73798	23.34709	9.223697	21.40526	6.400719
26.09756	7.793443	23.34698	9.231759	21.40531	6.409287
26.08441	7.870719	23.35421	9.296303	21.39618	6.444121
26.05187	7.89341	23.35717	9.437492	21.40234	6.473953

Table A6 (6)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
26.04735	7.899119	23.35328	9.536833	21.3954	6.541884
26.01406	7.912227	23.35286	9.5547	21.39485	6.551286
25.99497	7.976121	23.35586	9.619336	21.40177	6.568845
25.97896	8.019019	23.34487	9.782737	21.39436	6.59473
25.97631	8.026886	23.35296	9.814953	21.39999	6.635032
25.92902	8.045448	23.35351	9.82534	21.39442	6.652667
25.91493	8.06149	23.34979	9.822838	21.39399	6.656364
25.89287	8.104302	23.35355	9.93327	21.39356	6.690835
25.88049	8.124829	23.35233	9.98961	21.39676	6.766928
25.87813	8.129049	23.35235	10.00112	21.39674	6.803819
25.8751	8.165286	23.34987	10.00906	21.39686	6.811311
25.85234	8.236834	23.35372	10.04078	21.39218	6.854877
25.82977	8.26418	23.34863	10.09406	21.39273	6.919707
25.82603	8.270326	23.3519	10.13034	21.39449	6.954179
25.74083	8.293876	23.35209	10.13689	21.39475	6.960859
25.70285	8.3522	23.3502	10.2081	21.3959	6.992911
25.68523	8.376371	23.35246	10.24652	21.39294	7.016544
25.68187	8.381658	23.35199	10.30089	21.39045	7.071094
25.63398	8.409878	23.35203	10.3089	21.39002	7.078671
25.60452	8.445131	23.35127	10.32339	21.39699	7.105596
25.58127	8.552246	23.35359	10.49894	21.39982	7.147647
25.57739	8.566685	23.3502	10.58108	21.39491	7.193389
25.49002	8.579013	23.34987	10.59831	21.3944	7.200649
25.44255	8.583943	23.34623	10.64354	21.3909	7.230091
25.41717	8.594799	23.34854	10.72611	21.38484	7.256135
25.38901	8.624756	23.35521	10.7569	21.39277	7.286297
25.38471	8.628955	23.35613	10.76394	21.3875	7.315443
25.33411	8.650171	23.3537	10.81305	21.38719	7.320174
25.2706	8.703769	23.34675	10.86192	21.38741	7.348479
25.21791	8.741054	23.34803	10.89092	21.38313	7.392981
25.20899	8.747797	23.34489	10.90728	21.38475	7.421731
25.15825	8.778608	23.34459	10.91022	21.38478	7.42697
25.12895	8.788498	23.35183	10.9129	21.38863	7.45779
25.10946	8.78713	23.34663	10.9222	21.38371	7.478924
25.10606	8.78723	23.34571	10.91006	21.38987	7.544237
25.06803	8.788282	23.34535	10.9089	21.39042	7.553063

Table A6 (7)					
8-Nov		**16-Nov**		**21-Nov**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
25.04919	8.816338	23.3477	10.97253	21.38928	7.587763
25.02142	8.927386	23.34736	11.06895	21.3924	7.647098
25.01736	8.942169	23.34496	11.0805	21.38576	7.682862
24.9547	8.96659	23.34464	11.08561	21.38509	7.689387
24.91909	8.966917	23.34203	11.0893	21.38376	7.724919
24.90216	8.989945	23.35025	11.1603	21.38069	7.759308
24.889	9.012572	23.34525	11.18009	21.38395	7.834118
24.88688	9.016341	23.34297	11.18506	21.38423	7.844611
24.84854	9.0228			21.37527	7.892795
24.83206	9.018821			21.37526	7.93149
24.82218	9.056676			21.37987	8.012734
24.82047	9.061222			21.38046	8.024124
24.78601	9.095152			21.38311	8.05751
24.77157	9.151158			21.38668	8.081798
24.75125	9.177239			21.38083	8.12971
24.74829	9.182596			21.38478	8.174358
24.69876	9.217453			21.38502	8.181774
24.66338	9.23659			21.3745	8.212225
24.64499	9.393931			21.37465	8.29199
24.62041	9.494345			21.36957	8.328961
24.61678	9.513309			21.36902	8.336583
24.5191	9.598653			21.3718	8.359921
24.43666	9.691408			21.37423	8.402563
24.36472	9.709305			21.37441	8.420671
24.35287	9.714805			21.37452	8.424544
24.28454	9.728647			21.3754	8.450213
24.207	9.758772			21.37061	8.476416
24.11256	9.795073			21.37642	8.515434
24.09793	9.800765			21.37693	8.521234
23.95857	9.829893			21.36515	8.531228
23.90854	9.838979			21.36599	8.544063
23.85797	9.851146			21.36546	8.586803
23.85023	9.852907			21.36547	8.592548
23.81899	9.865667			21.36339	8.609662
23.78259	9.868742			21.36254	8.643901
23.73963	9.993684			21.3553	8.686897

Table A6 (8)					
8-Nov		16-Nov		21-Nov	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
23.70044	9.992724			21.3576	8.704541
23.69401	9.997605			21.3576	8.708275
23.61113	10.01906			21.35203	8.73118
23.56737	10.06711			21.35779	8.768308
23.54705	10.12334			21.35039	8.77822
23.54322	10.13216			21.34972	8.780826
23.4977	10.1399			21.35205	8.793423
23.47306	10.16355			21.35419	8.82103
23.46471	10.16377			21.35333	8.843462
23.46292	10.1647			21.35331	8.847309
23.40193	10.14817			21.36132	8.882231
23.3743	10.29238			21.36047	8.901231
23.35062	10.35732			21.35781	8.959229
23.34688	10.37115			21.35742	8.967019
23.3339	10.42054			21.35728	9.016044
23.29081	10.55039			21.35782	9.074749
23.26192	10.57665			21.35238	9.169835
23.25663	10.58503			21.35175	9.18352
23.19248	10.60293			21.35065	9.269201
23.18224	10.61991			21.34812	9.292777
23.14268	10.6714			21.33756	9.359899
23.10738	10.84994			21.33534	9.386626
23.10138	10.87462			21.33465	9.392551
22.98879	10.97454			21.32966	9.445398
22.95354	11.12044			21.33952	9.549016
22.94802	11.15063			21.3297	9.597812
22.94657	11.15973			21.32889	9.607867
22.9507	11.1727			21.3334	9.635657
22.94991	11.19754			21.33653	9.687513
22.96211	11.21062			21.33631	9.723807
22.96358	11.21318			21.33638	9.730308
22.96679	11.21853			21.33891	9.773664
22.97145	11.22949			21.32812	9.798955
22.97429	11.23379			21.33792	9.871116
22.97482	11.23475			21.33162	9.89039
22.96622	11.23575			21.33128	9.895553

Table A6 (9)					
8-Nov		**16-Nov**		**21-Nov**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
22.96829	11.23944			21.33749	9.925294
22.96003	11.23922			21.33216	10.01895
22.95915	11.23935			21.33809	10.06874
22.96018	11.24429			21.33858	10.07864
22.95547	11.24313			21.34177	10.10073
22.95119	11.24602			21.33573	10.13432
				21.33898	10.16179
				21.33912	10.16646
				21.33722	10.19448
				21.3335	10.24292
				21.32808	10.32485
				21.32726	10.33687
				21.32318	10.373
				21.32439	10.40118
				21.3244	10.43907
				21.3217	10.47281
				21.32135	10.47844
				21.31893	10.49405
				21.32268	10.53827
				21.31975	10.56111
				21.31954	10.56568
				21.31978	10.58859
				21.32138	10.63972
				21.31617	10.67688
				21.31558	10.68349
				21.31785	10.71624
				21.32006	10.749
				21.32283	10.77331
				21.32325	10.77753
				21.31639	10.80129
				21.31996	10.81636
				21.32744	10.86687
				21.32221	10.89584
				21.32182	10.90145
				21.32257	10.92886
				21.31493	10.97486

Table A6 (10)					
8-Nov		**16-Nov**		**21-Nov**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
				21.31928	10.99963
				21.3195	11.00443
				21.32068	11.03176
				21.31142	11.07694
				21.31773	11.10574
				21.31813	11.11104
				21.31334	11.12665
				21.3173	11.13408
				21.31128	11.15591
				21.31071	11.15884
				21.32134	11.16838
				21.31863	11.1733
				21.32508	11.17932
				21.31921	11.18507
				21.31874	11.18601
				21.32546	11.18298
				21.3384	11.19377
				21.33808	11.19455
				21.33852	11.19511
				21.34659	11.19424
				21.34826	11.20385
				21.35857	11.20544
				21.35988	11.20603

Table A7. Temperature Readings (°C) and Depth by Date.
3 December to 27 December 2019. Data recorded by Aqua-Troll 500 sonde.

Table A7 (1)					
3-Dec		**19-Dec**		**27-Dec**	
Temp. (°C)	**Depth (M)**	**Temp. (°C)**	**Depth (M)**	**Temp. (°C)**	**Depth (M)**
21.48336	0.184445	20.17009	0.11998	21.53104	0.183758
21.48571	0.184556	20.17093	0.122384	21.53515	0.186968
21.5011	0.183008	20.17136	0.122774	21.52987	0.185552
21.50166	0.175956	20.16404	0.15974	21.5294	0.185517
21.50565	0.251594	20.17137	0.193113	21.53634	0.182814
21.50609	0.260719	20.16732	0.335991	21.53275	0.183058
21.511	0.304531	20.17854	0.388045	21.52938	0.239359
21.5076	0.336928	20.17975	0.40018	21.53605	0.279715
21.51789	0.441011	20.17335	0.460675	21.53678	0.28709
21.519	0.45501	20.16709	0.593155	21.52513	0.311925
21.49387	0.532598	20.17699	0.685678	21.53111	0.416015
21.45185	0.62604	20.17801	0.702263	21.53013	0.483425
21.44875	0.825024	20.17244	0.721122	21.5303	0.495917
21.39214	0.932392	20.17505	0.824049	21.53162	0.547685
21.38514	0.953102	20.17828	0.847103	21.53195	0.661642
21.33487	1.041542	20.17882	0.854034	21.5241	0.723272
21.31115	1.179479	20.179	0.894073	21.52313	0.735372
21.29147	1.271691	20.17757	0.973865	21.53218	0.779817
21.28832	1.288323	20.177	1.018741	21.5234	0.901852
21.24955	1.381341	20.17687	1.0274	21.52391	0.925938
21.21761	1.448834	20.17694	1.072705	21.52357	0.933798
21.19715	1.651591	20.17728	1.162401	21.52659	1.013333
21.19348	1.679182	20.16986	1.196315	21.51871	1.033894
21.18031	1.772442	20.1784	1.243347	21.52866	1.080391
21.15248	1.82738	20.17918	1.250117	21.52454	1.101103
21.1496	1.927072	20.17887	1.288316	21.52447	1.105461
21.14815	1.941303	20.17056	1.348326	21.52809	1.112723
21.15782	2.017239	20.1768	1.385513	21.53088	1.180094
21.15035	2.05838	20.17725	1.392408	21.52587	1.201477
21.14151	2.097991	20.17617	1.447963	21.52534	1.206812
21.14007	2.107603	20.17474	1.49414	21.53152	1.230968
21.13958	2.110148	20.18117	1.514925	21.52168	1.270501

Table A7 (2)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
21.13016	2.143311	20.18191	1.519152	21.52218	1.298582
21.13095	2.167975	20.1785	1.56149	21.52181	1.303581
21.1139	2.260479	20.17467	1.634	21.52088	1.327712
21.11184	2.272914	20.18029	1.670439	21.50915	1.402141
21.10305	2.319432	20.17222	1.719068	21.51471	1.467941
21.08286	2.358707	20.17144	1.72624	21.49701	1.525017
21.07002	2.370199	20.17341	1.740876	21.49505	1.534431
21.06763	2.373036	20.17171	1.842697	21.50137	1.563448
21.06825	2.417488	20.16471	1.88023	21.50159	1.618335
21.06417	2.436977	20.16375	1.888977	21.48819	1.664541
21.07034	2.467136	20.16619	1.972755	21.48647	1.672419
21.07093	2.471483	20.16322	2.097011	21.41664	1.713757
21.06179	2.511673	20.16726	2.165928	21.36219	1.764967
21.05297	2.569957	20.16763	2.17917	21.28125	1.789628
21.05254	2.613277	20.16914	2.225565	21.26926	1.794592
21.04785	2.635395	20.1625	2.345012	21.1725	1.800269
21.04729	2.639594	20.16669	2.428981	21.12299	1.858076
21.03935	2.685533	20.16692	2.444052	21.0731	1.88658
21.02839	2.722662	20.16313	2.501095	21.06528	1.892465
21.03108	2.76439	20.15359	2.591476	20.98821	1.913754
21.03102	2.77087	20.15897	2.606219	20.97147	1.933374
21.03093	2.809558	20.15925	2.611527	20.96062	1.956412
21.02381	2.871566	20.16162	2.61008	20.94464	1.996942
21.00947	2.975539	20.15537	2.616192	20.94229	2.002889
21.0074	2.990813	20.15689	2.641782	20.87583	2.033435
21.01223	3.036627	20.15823	2.671833	20.84772	2.078065
21.00923	3.049924	20.1585	2.676639	20.81373	2.09167
21.00227	3.247778	20.16303	2.711484	20.80868	2.095021
20.99947	3.34747	20.15579	2.771141	20.77812	2.112934
20.99885	3.367985	20.14851	2.793064	20.75489	2.152955
20.9948	3.50277	20.14728	2.798032	20.70722	2.177957
20.99973	3.565907	20.15484	2.809801	20.70048	2.182624
20.98979	3.664096	20.15327	2.878036	20.65	2.232645
20.98876	3.678254	20.14705	2.899757	20.62828	2.311102
20.98286	3.728622	20.14617	2.905198	20.61495	2.345382
20.98515	3.810811	20.15062	2.905495	20.61259	2.35266

Table A7 (3)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.98421	3.856879	20.14338	2.947565	20.48695	2.365553
20.98421	3.865727	20.14882	2.981627	20.45485	2.392198
20.98511	3.897318	20.14918	2.987567	20.43564	2.513786
20.98285	3.914645	20.14798	2.999498	20.41821	2.599436
20.98607	4.005754	20.14583	3.036869	20.41544	2.615022
20.98637	4.017601	20.14948	3.062828	20.35796	2.656367
20.98443	4.080186	20.14602	3.089628	20.30274	2.710472
20.98016	4.099168	20.14575	3.093837	20.28175	2.740131
20.98405	4.221783	20.14955	3.135282	20.27717	2.745832
20.9845	4.270692	20.15446	3.212862	20.21441	2.752221
20.98474	4.281673	20.14748	3.247208	20.19095	2.745548
20.98241	4.326117	20.14678	3.254441	20.17786	2.740278
20.97201	4.404392	20.15514	3.293648	20.17556	2.739327
20.97506	4.4605	20.15125	3.377635	20.09777	2.740254
20.97503	4.470479	20.14477	3.442737	20.06786	2.789653
20.97272	4.48833	20.14376	3.454096	20.03844	2.799488
20.97233	4.531929	20.15431	3.48908	20.03388	2.802744
20.96901	4.57794	20.14894	3.525087	20.01985	2.811971
20.96859	4.585373	20.14476	3.544407	20.01395	2.82961
20.97354	4.649857	20.14398	3.548138	20.01418	2.868718
20.97506	4.678357	20.151	3.550098	20.00743	2.879054
20.96924	4.775181	20.14462	3.594425	20.00663	2.881832
20.96856	4.788059	20.15	3.627586	20.00188	2.895915
20.96847	4.837754	20.14262	3.649122	20.00358	2.880395
20.96483	4.89819	20.14194	3.652914	19.99013	2.893092
20.96659	4.93626	20.14697	3.691112	19.98853	2.893973
20.96006	4.985617	20.15113	3.765876	19.96621	2.905653
20.95933	4.993027	20.14611	3.795745	19.96702	2.953554
20.96035	5.04608	20.14563	3.802329	19.95238	2.980202
20.95559	5.080351	20.15096	3.83519	19.9507	2.985425
20.95467	5.139668	20.15052	3.882655	19.9292	2.989547
20.95436	5.148223	20.1435	3.931841	19.91492	3.022294
20.95293	5.189442	20.14258	3.93975	19.91033	3.075922
20.94825	5.232569	20.15068	3.958796	19.90651	3.100613
20.94885	5.314569	20.14838	3.987946	19.90593	3.10569
20.94873	5.326346	20.14481	3.995562	19.90142	3.127711

Table A7 (4)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.95207	5.394282	20.14424	3.997641	19.88965	3.17594
20.95077	5.429473	20.14396	4.019707	19.89434	3.201618
20.95291	5.488979	20.13986	4.033987	19.89448	3.206675
20.95311	5.49751	20.14266	4.077318	19.89073	3.232563
20.95382	5.513679	20.13805	4.10601	19.88128	3.254947
20.95989	5.564901	20.13761	4.111256	19.88662	3.284483
20.95102	5.625779	20.13727	4.13908	19.88692	3.288958
20.95442	5.666919	20.14202	4.179003	19.87629	3.299933
20.95446	5.674267	20.14395	4.197278	19.87952	3.340808
20.9498	5.68399	20.14439	4.201039	19.87894	3.358461
20.93945	5.695703	20.14086	4.217662	19.87905	3.362286
20.93835	5.741091	20.14731	4.256047	19.86652	3.383776
20.93782	5.747169	20.14085	4.336913	19.86173	3.391411
20.93482	5.792972	20.14033	4.348479	19.84394	3.418586
20.93139	5.832301	20.14122	4.410143	19.82316	3.439637
20.92296	5.867443	20.13993	4.52363	19.81984	3.44335
20.92178	5.873212	20.13857	4.580503	19.81048	3.462271
20.93011	5.906961	20.13834	4.591978	19.81646	3.492941
20.93036	5.95481	20.1406	4.677513	19.81403	3.510667
20.92864	5.991536	20.13786	4.772511	19.81402	3.514035
20.9284	5.997912	20.14086	4.801817	19.80284	3.532149
20.9335	6.064974	20.13861	4.847458	19.80724	3.571655
20.92647	6.144886	20.13845	4.853798	19.79492	3.600469
20.9317	6.200271	20.13635	4.882127	19.79362	3.60559
20.9241	6.240823	20.14599	4.95334	19.78938	3.627568
20.92339	6.24769	20.1461	4.982825	19.78787	3.650061
20.92193	6.2706	20.14652	4.989259	19.77691	3.663532
20.92474	6.349973	20.14012	5.025678	19.77552	3.666044
20.92149	6.466717	20.14269	5.120991	19.75251	3.671716
20.9212	6.48448	20.14377	5.184502	19.75576	3.696842
20.91927	6.487348	20.14404	5.196144	19.74485	3.748339
20.91235	6.516849	20.14061	5.281868	19.72694	3.764425
20.91471	6.633398	20.13424	5.476778	19.72421	3.768388
20.91472	6.649077	20.13339	5.580945	19.71845	3.785626
20.90747	6.715876	20.13305	5.601387	19.71065	3.839387
20.90363	6.826909	20.12649	5.634145	19.70171	3.853334

Table A7 (5)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.90711	6.978781	20.11548	5.732764	19.7003	3.857184
20.89682	7.057778	20.11824	5.782295	19.6855	3.903892
20.89568	7.073173	20.11337	5.80481	19.67572	3.912862
20.89504	7.135361	20.11293	5.809037	19.68227	3.91666
20.90051	7.25366	20.1059	5.816687	19.68274	3.9173
20.8959	7.297312	20.10088	5.836535	19.69267	3.945465
20.89554	7.307242	20.10144	5.837086	19.68262	3.958577
20.89935	7.376041	20.10135	5.837918	19.67608	3.940613
20.88888	7.416983	20.09077	5.853548	19.66862	3.936404
20.89561	7.415669	20.08806	5.882252	19.66747	3.935059
20.89601	7.41683	20.08279	5.95943	19.64217	3.93206
20.88975	7.363395	20.08207	5.970134	19.63577	3.979168
20.89136	7.350549	20.07742	5.992447	19.63621	4.006669
20.89102	7.365517	20.06665	6.028055	19.63614	4.012057
20.89107	7.367056	20.05735	6.105416	19.64811	4.020381
20.89516	7.392871	20.05578	6.11634	19.64791	4.03029
20.89552	7.401704	20.06095	6.174212	19.64224	4.041381
20.89048	7.414264	20.05455	6.23199	19.64147	4.043127
20.89584	7.419717	20.04655	6.323679	19.65254	4.048305
20.89631	7.420853	20.05153	6.423188	19.65282	4.127839
20.88808	7.488321	20.05187	6.439049	19.65185	4.156653
20.88922	7.53292	20.02411	6.521204	19.6517	4.163475
20.89076	7.581515	20.00979	6.552051	19.64532	4.185111
20.89104	7.589064	19.9969	6.587556	19.63906	4.187955
20.89193	7.62078	19.99485	6.592795	19.63374	4.206492
20.8934	7.648561	19.97786	6.596754	19.63973	4.233676
20.89242	7.712393	19.97696	6.615468	19.64031	4.237845
20.89235	7.721326	19.98158	6.64673	19.64127	4.275864
20.89527	7.738217	19.98219	6.651365	19.63548	4.366983
20.8925	7.757482	19.97765	6.691652	19.64392	4.423746
20.89612	7.815578	19.97556	6.779817	19.64474	4.434368
20.89643	7.823472	19.9716	6.802231	19.64306	4.485663
20.89094	7.879628	19.97105	6.80844	19.64004	4.534151
20.88312	7.967196	19.9666	6.832271	19.63935	4.542902
20.88889	8.141167	19.96366	6.842216	19.63915	4.545748
20.87987	8.183176	19.9593	6.894761	19.63431	4.569122

Table A7 (6)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.87901	8.194938	19.96075	6.908269	19.641	4.645038
20.87367	8.243383	19.96078	6.91203	19.63968	4.714892
20.87711	8.266242	19.95249	6.940997	19.63981	4.726538
20.87382	8.283465	19.94368	7.00452	19.60581	4.79392
20.87358	8.286291	19.94828	7.057848	19.61488	4.813639
20.87393	8.268793	19.94854	7.066961	19.61892	4.889582
20.86941	8.292393	19.94058	7.116041	19.61928	4.908924
20.87473	8.357961	19.94042	7.173566	19.61944	4.91431
20.8752	8.367144	19.94679	7.241183	19.61373	4.949098
20.8734	8.416215	19.94761	7.251667	19.61372	4.995474
20.86204	8.442697	19.9356	7.306705	19.61457	5.021862
20.85931	8.534834	19.92799	7.443822	19.6147	5.026876
20.85851	8.547089	19.93176	7.484974	19.62111	5.052969
20.85554	8.57256	19.93196	7.49552	19.6218	5.088967
20.84785	8.599909	19.9329	7.52146	19.61198	5.109134
20.84833	8.669162	19.93175	7.534115	19.61076	5.113002
20.85685	8.732423	19.92026	7.585763	19.61887	5.135465
20.85799	8.743045	19.91888	7.605992	19.61547	5.155891
20.85589	8.800576	19.91825	7.610555	19.60671	5.186105
20.84934	8.846751	19.91576	7.611061	19.60267	5.211329
20.85165	8.918083	19.91881	7.701304	19.60183	5.215596
20.85169	8.92858	19.92241	7.746504	19.5973	5.231128
20.84991	8.957458	19.923	7.755824	19.59068	5.266528
20.85492	8.961082	19.91935	7.815169	19.58626	5.283468
20.84763	8.986193	19.91884	7.879406	19.58546	5.286946
20.84694	8.989333	19.92561	7.923907	19.57774	5.343237
20.85352	9.063545	19.92645	7.931792	19.57339	5.399104
20.84666	9.083642	19.92461	7.945245	19.58346	5.432246
20.84159	9.133901	19.92409	8.063584	19.58458	5.438388
20.84125	9.167915	19.92394	8.124371	19.58398	5.48117
20.84105	9.174118	19.92306	8.174995	19.57691	5.607818
20.83281	9.214596	19.92295	8.183106	19.57466	5.624928
20.82677	9.289192	19.92331	8.204319	19.57409	5.632094
20.82582	9.327653	19.91768	8.248043	19.57728	5.652956
20.82551	9.335239	19.92445	8.304669	19.57906	5.68487
20.82369	9.372432	19.92507	8.313453	19.58221	5.737452

Table A7 (7)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.83134	9.37872	19.92785	8.346227	19.58275	5.766117
20.82606	9.37815	19.9188	8.468077	19.58293	5.771664
20.82572	9.378147	19.92407	8.552457	19.57969	5.838046
20.8301	9.361432	19.92434	8.567809	19.57723	5.932127
20.8255	9.362932	19.91486	8.614264	19.57925	5.980472
20.83011	9.391801	19.91196	8.756047	19.57942	5.99
20.83046	9.395477	19.91921	8.834142	19.57705	6.01185
20.82355	9.419418	19.92002	8.849457	19.57759	6.10135
20.82598	9.466428	19.91436	8.869211	19.57772	6.143612
20.82803	9.543554	19.91124	8.993252	19.57777	6.152435
20.82648	9.601509	19.91639	9.065383	19.56713	6.169107
20.82635	9.611667	19.90536	9.159988	19.56413	6.262764
20.82495	9.627482	19.90418	9.174121	19.56035	6.274694
20.81765	9.671277	19.90295	9.216995	19.55981	6.279915
20.82182	9.79569	19.90376	9.331963	19.53261	6.302161
20.82205	9.813051	19.89804	9.385422	19.52475	6.301972
20.81833	9.858443	19.89736	9.396577	19.53006	6.351314
20.81112	9.893715	19.9021	9.453185	19.52271	6.383511
20.80932	9.938488	19.89782	9.550259	19.52204	6.389576
20.80882	9.945288	19.90059	9.58441	19.51735	6.468412
20.80979	10.00166	19.90073	9.592365	19.5214	6.577781
20.81077	10.00378	19.89975	9.66366	19.51409	6.630463
20.80181	10.03156	19.89657	9.836849	19.51336	6.641097
20.80074	10.03485	19.90223	9.899951	19.51006	6.672286
20.80775	10.11221	19.9028	9.914608	19.51569	6.777071
20.80391	10.15941	19.89152	9.919016	19.51447	6.849019
20.79698	10.24472	19.89329	10.00668	19.51456	6.862115
20.79515	10.28254	19.89565	10.19054	19.51829	6.92103
20.79467	10.29045	19.88771	10.2492	19.52026	6.944916
20.78955	10.35025	19.8868	10.26348	19.52066	6.948281
20.7936	10.37267	19.8923	10.34602	19.52078	6.949467
20.78675	10.4686	19.89215	10.55704	19.51588	6.94025
20.78608	10.48125	19.88276	10.62033	19.51712	6.95085
20.79361	10.52317	19.88155	10.6364	19.51288	7.006489
20.78326	10.54618	19.88364	10.67021	19.50597	7.051692
20.78334	10.61397	19.88067	10.90638	19.50492	7.059592

Table A7 (8)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
20.78289	10.62316	19.87157	10.97206	19.50553	7.081356
20.77946	10.69633	19.87031	10.98976	19.50401	7.109781
20.7814	10.77855	19.87411	11.01774	19.49744	7.164959
20.78272	10.83913	19.87557	11.09077	19.49656	7.172908
20.78298	10.84971	19.86922	11.11252	19.49523	7.23822
20.77497	10.8892	19.87328	11.12528	19.49849	7.356928
20.77432	10.91393	19.87353	11.12729	19.49473	7.364593
20.77342	11.0256	19.88269	11.12966	19.4944	7.370165
20.76933	11.05523	19.87789	11.1408	19.50891	7.453633
20.76877	11.06332	19.88779	11.14219	19.51046	7.543121
20.77088	11.09859	19.8888	11.1428	19.50286	7.650479
20.76997	11.12891			19.50627	7.704639
20.77229	11.17386			19.50639	7.715148
20.77253	11.18054			19.50372	7.805989
20.76665	11.19589			19.49486	7.871838
20.77465	11.20064			19.49386	7.906059
20.77417	11.1999			19.49339	7.912505
20.77446	11.19993			19.5034	7.944831
20.77434	11.1956			19.49838	8.133322
				19.49739	8.188424
				19.49701	8.202844
				19.50242	8.195334
				19.50302	8.275096
				19.50473	8.35128
				19.50494	8.364017
				19.51626	8.461378
				19.50959	8.530567
				19.50776	8.647153
				19.51355	8.68957
				19.51425	8.699186
				19.50635	8.714386
				19.50498	8.754304
				19.50986	8.84114
				19.51046	8.85359
				19.49535	8.881277
				19.50143	8.930433

Table A7 (9)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
				19.50678	9.014645
				19.50776	9.027016
				19.49756	9.110765
				19.49616	9.174496
				19.50091	9.184014
				19.50148	9.187479
				19.50098	9.18662
				19.50615	9.248525
				19.51272	9.257806
				19.50907	9.28075
				19.50884	9.283654
				19.51004	9.297144
				19.51358	9.433542
				19.50572	9.462591
				19.50487	9.47171
				19.50553	9.578784
				19.50635	9.664093
				19.49724	9.677839
				19.49614	9.682569
				19.50092	9.704608
				19.50556	9.758403
				19.5012	9.793191
				19.50084	9.799579
				19.5076	9.857162
				19.50117	9.937385
				19.49668	10.02312
				19.49438	10.04733
				19.49395	10.05337
				19.50027	10.08084
				19.49694	10.13847
				19.50273	10.16828
				19.50328	10.1742
				19.50302	10.30104
				19.49452	10.53898
				19.48957	10.57319
				19.48862	10.58648

Table A7 (10)					
3-Dec		19-Dec		27-Dec	
Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)	Temp. (°C)	Depth (M)
				19.50242	10.64324
				19.50487	10.718
				19.49791	10.80657
				19.4971	10.82033
				19.49794	10.90749
				19.49204	10.95858
				19.48987	11.02049
				19.49607	11.04507
				19.4968	11.05036
				19.50259	11.06382
				19.50759	11.08597
				19.51559	11.08993
				19.51677	11.09126
				19.50966	11.08913
				19.51191	11.10002
				19.51958	11.09708
				19.52065	11.09717
				19.52181	11.10148

Table A8. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 4 July to 29 October 2019. Data recorded by Aqua-Troll 500 sonde.

Table A8 (1)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
RDO (mg/L)	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**
6.959288	0.124813	2.084587	0.278703	6.682128	0.255863	7.466197	0.200141
7.09179	0.13626	2.821959	0.211427	6.796972	0.274877	7.467464	0.196568
7.116212	0.138199	3.447042	0.201985	6.825241	0.656943	7.481135	0.195824
6.951545	0.272552	3.548936	0.198329	7.106368	1.166797	7.480304	0.19592
6.748263	0.411018	4.409649	0.234125	6.864012	1.417936	7.478417	0.21237
6.525259	0.553965	4.711707	1.013424	6.654881	1.468242	7.478091	0.214396
6.490199	0.576628	4.943513	1.458897	6.617474	1.734521	7.480888	0.312464
6.184884	0.736059	4.980454	1.544234	6.255486	2.270415	7.475931	0.377113
6.062507	1.043338	5.129187	1.9255	6.062334	2.638459	7.475514	0.388176
5.934215	1.221184	5.054949	2.614126	5.889756	2.704049	7.438901	0.451892
5.9147	1.254886	4.874111	3.012946	5.862626	2.873577	7.400596	0.570916
5.495417	1.364484	4.848331	3.088348	5.511921	3.470232	7.369863	0.630042
5.268108	1.564289	4.472674	3.425535	5.179369	3.750427	7.364854	0.641556
5.073647	1.704424	3.607644	4.112959	4.854004	3.808098	7.308547	0.697204
5.042578	1.729057	3.093099	4.48715	4.802049	4.117818	7.301318	0.705521
4.762075	1.866242	2.995751	4.560146	4.091835	4.62907	7.270783	0.804328
4.645589	2.185988	2.557043	4.892902	3.595754	4.968406	7.241518	0.932524
4.561839	2.289515	1.889248	5.604477	3.118631	5.029387	7.233336	1.004062
4.548006	2.314833	1.595717	5.855303	3.042994	5.262066	7.231619	1.015816
4.388294	2.598338	1.534581	5.913417	2.64725	5.560981	7.253948	1.136748
4.300065	2.716891	1.316507	6.127141	2.035806	5.872057	7.263432	1.22376
4.146118	2.843933	1.016139	6.455745	1.765	5.921813	7.265449	1.238453
4.124751	2.862552	0.899016	6.566215	1.707888	6.190311	7.268507	1.305865
3.605304	3.069314	0.784494	6.651817	1.501105	6.602722	7.244948	1.373794
3.362198	3.157687	0.767411	6.664785	1.163188	6.850335	7.221397	1.453127
3.176145	3.298299	0.625125	6.884508	1.025445	6.896535	7.218042	1.463913
3.146775	3.317681	0.570166	7.082329	0.995342	7.165288	7.123044	1.633695
2.803128	3.534383	0.516609	7.204572	0.893986	7.771225	7.057067	1.663991
2.60435	3.668391	0.508508	7.226547	0.691325	8.026599	7.04534	1.67413
2.410677	3.749101	0.409649	7.52156	0.614481	8.338537	6.96734	1.741468
2.380619	3.763228	0.365224	7.76537	0.54667	8.384237	6.797647	1.890615
1.996672	4.036903	0.327152	7.958881	0.536365	8.619832	6.700428	1.974208
1.735535	4.150299	0.32123	7.991128	0.442396	9.277065	6.683344	1.989008
1.492105	4.225568	0.263815	8.322828	0.397107	9.660085	6.42745	2.027511

Table A8 (2)

4-Jul		18-Jul		22-Jul		29-Jul	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
1.453568	4.237772	0.240857	8.447428	0.359063	9.733139	6.39513	2.034591
1.09702	4.448973	0.221282	8.689784	0.353006	9.963819	6.233023	2.090953
0.939181	4.561795	0.218199	8.723441	0.289492	10.41783	5.840732	2.175064
0.814948	4.649994	0.189564	8.937428	0.263162	10.65634	5.63405	2.252657
0.795173	4.664282	0.175271	9.377711	0.241959	10.70354	5.596909	2.264389
0.615073	4.792207	0.162772	9.655623	0.238542	10.7579	5.235444	2.410294
0.528668	4.851207	0.160774	9.706736	0.221351	10.97857	5.064942	2.442638
0.461997	4.86712	0.138341	9.904078	0.194395	11.04497	4.905733	2.485292
0.451175	4.870814	0.1279	10.2087	0.182415	11.06192	4.882325	2.490606
0.367813	4.880911	0.119453	10.40205	0.179908	11.09767	4.550968	2.655262
0.339313	4.875078	0.118115	10.43668	0.173347	11.12295	4.387306	2.698523
0.319013	4.877275	0.103801	10.54248	0.159572	11.1275	4.355248	2.71016
0.315822	4.877266	0.09703	10.62863	0.153208	11.12897	4.137081	2.844984
0.285402	4.885593	0.091326	10.71778	0.151889	11.12539	4.012302	2.939194
0.274559	4.879582	0.090413	10.7318	0.146416	11.13108	3.898478	2.97117
0.26608	4.881554	0.081978	11.0037	0.138658	11.13409	3.880978	2.97808
0.26473	4.881512	0.078909	11.28531	0.135425	11.1418	3.680976	3.094361
0.244609	4.897233	0.07455	11.32837	0.133426	11.14286	3.558476	3.158415
0.238758	4.895197	0.073921	11.34394			3.435062	3.211749
0.232576	4.903874	0.071244	11.35556			3.415987	3.220283
0.231686	4.904791	0.065461	11.36728			3.136091	3.294526
0.219675	5.085684	0.063628	11.37097			3.100624	3.304803
0.21381	5.147894	0.063186	11.37183			2.992313	3.369351
0.206955	5.242514	0.062001	11.37511			2.843256	3.49719
0.205948	5.255602	0.060996	11.37619			2.712451	3.559771
0.173481	5.39954	0.060585	11.3829			2.692665	3.571137
0.160607	5.466586	0.0605	11.38376			2.407657	3.616068
0.147703	5.487921	0.060077	11.38557			2.243728	3.712688
0.145743	5.49253	0.060114	11.39765			2.21434	3.725678
0.128447	5.511311	0.060691	11.40322			1.901795	3.84947
0.122145	5.517358	0.060764	11.40439			1.76103	3.850856
0.118621	5.502124					1.733693	3.85605
0.118018	5.500411					1.533887	3.915282
0.110885	5.57239					1.412124	3.973539
0.106188	5.7247					1.288956	4.057745
0.099148	5.785428					1.270707	4.069796

Table A8 (3)							
4-Jul		18-Jul		22-Jul		29-Jul	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.098119	5.798692					1.068742	4.110018
0.086237	5.918632					0.984718	4.191993
0.080866	5.962201					0.914385	4.252319
0.077735	6.036632					0.90317	4.262856
0.077214	6.046754					0.786465	4.320061
0.074077	6.120753					0.716806	4.369153
0.074683	6.178772					0.703808	4.377254
0.074231	6.242347					0.57334	4.46189
0.074215	6.252118					0.508028	4.529061
0.068828	6.399003					0.445694	4.575026
0.066627	6.445459					0.436622	4.582466
0.066144	6.456964					0.342391	4.629363
0.064242	6.498894					0.302503	4.709643
0.062975	6.622002					0.293852	4.721003
0.061892	6.667412					0.262981	4.801103
0.061721	6.677412					0.217874	4.79669
0.059404	6.702935					0.212229	4.79993
0.056331	6.792929					0.190345	4.864197
0.055542	6.817985					0.165183	4.962639
0.055337	6.824392					0.15463	5.026336
0.05063	6.854855					0.152453	5.037821
0.04937	6.924828					0.142941	5.146532
0.047859	7.046007					0.141446	5.161137
0.047646	7.063475					0.137203	5.238412
0.045506	7.120162					0.126147	5.274276
0.04389	7.246367					0.12499	5.280466
0.042145	7.285017					0.116879	5.330707
0.041876	7.29463					0.113112	5.399317
0.035887	7.338912					0.109248	5.445645
0.035351	7.501164					0.108691	5.453456
0.03558	7.5779					0.103004	5.586766
0.035608	7.5937					0.100604	5.667266
0.035434	7.679461					0.100107	5.681719
0.034731	7.741021					0.096458	5.727217
0.034789	7.779272					0.09337	5.770146
0.03477	7.785922					0.089118	5.818059

Table A8 (4)							
4-Jul		18-Jul		22-Jul		29-Jul	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.033452	7.900765					0.088493	5.825395
0.032255	7.985416					0.084662	5.87053
0.032025	8.031253					0.08443	5.95908
0.031957	8.039546					0.084558	5.994739
0.030435	8.164005					0.084582	6.002548
0.029743	8.247821					0.084393	6.030055
0.029174	8.298363					0.083526	6.064627
0.029087	8.306964					0.083457	6.116949
0.026046	8.398159					0.083415	6.124685
0.026515	8.439125					0.081735	6.165855
0.02645	8.447531					0.080891	6.251335
0.027484	8.496666					0.080503	6.290283
0.028902	8.584121					0.080427	6.298433
0.028896	8.630094					0.082602	6.329153
0.028948	8.638991					0.08408	6.385956
0.030098	8.690802					0.08635	6.41303
0.030736	8.763072					0.086674	6.4184
0.032499	8.826596					0.093471	6.468071
0.032731	8.836989					0.095648	6.471457
0.031404	8.995056					0.095728	6.499753
0.029888	9.037546					0.095782	6.503036
0.028534	9.0732					0.09176	6.64217
0.028326	9.078263					0.087635	6.69303
0.025959	9.212792					0.084753	6.744761
0.025576	9.256632					0.084251	6.752514
0.02495	9.309235					0.077044	6.907446
0.024871	9.316778					0.075334	7.032664
0.024923	9.382844					0.072493	7.107802
0.025345	9.427324					0.072119	7.121247
0.025997	9.496382					0.066486	7.290808
0.026093	9.506279					0.063772	7.32455
0.0243	9.579016					0.061772	7.41712
0.023856	9.612563					0.061444	7.429086
0.023368	9.705532					0.057984	7.579351
0.0233	9.717955					0.05555	7.643057
0.022679	9.861902					0.052822	7.695453

Table A8 (5)							
4-Jul		18-Jul		22-Jul		29-Jul	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.02413	9.917208					0.052402	7.703849
0.024884	9.963813					0.05487	7.738412
0.025036	9.970945					0.055152	7.811899
0.024204	10.0699					0.054617	7.868619
0.023688	10.10103					0.054553	7.878433
0.024405	10.15182					0.053214	7.903685
0.024478	10.15878					0.050617	7.963286
0.026054	10.25835					0.048311	8.062286
0.028152	10.38089					0.045972	8.152463
0.028457	10.41607					0.045598	8.167516
0.028567	10.4246					0.042364	8.274035
0.028142	10.53433					0.040497	8.335026
0.027296	10.6109					0.040018	8.374874
0.026246	10.67027					0.039901	8.381722
0.026086	10.67993					0.036462	8.494925
0.026167	10.78566					0.035642	8.556876
0.026034	10.81409					0.033843	8.579397
0.026026	10.82169					0.033603	8.584154
0.025988	10.88891					0.030794	8.617671
0.026467	11.0071					0.029724	8.730859
0.025505	11.06521					0.028711	8.782005
0.02541	11.07685					0.028554	8.792825
0.024255	11.10134					0.028459	8.868196
0.022931	11.14947					0.028081	8.892185
0.022457	11.18074					0.027551	8.919314
0.02235	11.18639					0.027473	8.92306
0.023403	11.20062					0.02613	8.991359
0.024436	11.22326					0.024996	9.01345
0.025705	11.25802					0.023911	9.064925
0.025894	11.26302					0.023736	9.071905
0.028061	11.2867					0.023286	9.156349
0.028484	11.2996					0.023123	9.211423
0.028857	11.30989					0.02337	9.269156
0.02891	11.31156					0.023397	9.278141
0.029831	11.31991					0.024381	9.368961
0.030563	11.32614					0.025479	9.386419

Table A8 (6)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
RDO (mg/L)	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**
0.030709	11.32438					0.024771	9.390936
0.030753	11.32438					0.024721	9.391716
0.032151	11.33022					0.02555	9.526916
0.032258	11.32672					0.025504	9.599921
0.031825	11.33151					0.025761	9.663133
0.031769	11.33192					0.025787	9.673347
0.030846	11.33236					0.029034	9.728635
0.030203	11.33505					0.029029	9.816626
0.03022	11.33313					0.028663	9.862219
0.0302	11.33301					0.028606	9.87117
0.030239	11.33909					0.026748	9.895931
0.030559	11.33371					0.025942	10.15286
0.030689	11.33602					0.024925	10.22608
0.030717	11.33607					0.02433	10.31922
0.031143	11.33642					0.024218	10.33235
0.031299	11.32469					0.023834	10.52973
0.031212	11.32944					0.02362	10.65571
0.031205	11.32954					0.022131	10.7588
0.030661	11.33816					0.021939	10.77568
0.030388	11.34056					0.023695	10.77583
0.030202	11.33841					0.025636	10.91348
0.030172	11.33819					0.027306	10.90715
0.029953	11.33374					0.027582	10.91179
0.029833	11.33231					0.02756	11.10559
0.02967	11.32873					0.026049	11.12265
0.029646	11.32825					0.025092	11.13472
						0.024913	11.13606
						0.02348	11.24937

Table A9. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 1 August to 29 August. Data recorded by Aqua-Troll 500 sonde.

Table A9 (1)							
1-Aug		**8-Aug**		**23-Aug**		**29-Aug**	
RDO (mg/L)	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**	**RDO (mg/L)**	**Depth (M)**
6.847784	0.195593	7.0697	0.202072	11.09143	0.319942	8.193818	0.187004
6.830763	0.197255	7.219559	0.197699	11.09241	0.328685	8.156437	0.190189
6.82741	0.197603	7.24355	0.197882	11.09999	0.410415	8.14996	0.188572
6.805521	0.194429	7.373783	0.193715	11.08372	0.39587	8.147611	0.188502
6.79015	0.198451	7.55542	0.214848	11.082	0.397349	8.143079	0.184047
6.776977	0.396231	7.631986	0.270771	11.08572	0.4949	8.132469	0.191232
6.7748	0.420744	7.684225	0.377311	11.09047	0.546852	8.122446	0.622218
6.748832	0.663732	7.69282	0.392919	11.04772	0.677008	8.120799	0.675155
6.697848	1.016147	7.762161	0.564684	11.0426	0.694813	8.1236	0.762712
6.668961	1.195006	7.687148	0.617454	10.983	0.779739	8.136843	0.840607
6.594223	1.357591	7.653758	0.685047	10.92622	0.855178	8.211946	1.041174
6.58391	1.383254	7.646212	0.694747	10.83955	0.980934	8.248268	1.124376
6.366283	1.624122	7.440468	0.808966	10.7772	1.061657	8.255809	1.142494
6.254117	1.728139	7.344698	0.886843	10.76617	1.076471	8.304993	1.224236
6.137051	1.821415	7.264145	0.961936	10.75887	1.15477	8.349301	1.263893
6.118939	1.836094	7.251253	0.973862	10.71371	1.211392	8.365821	1.363665
5.893451	1.952408	7.132722	0.974143	10.6899	1.301572	8.369435	1.37735
5.780282	2.146243	7.091055	1.107686	10.68511	1.314778	8.373017	1.401496
5.672701	2.298508	7.068023	1.119037	10.69485	1.387907	8.35844	1.456602
5.655755	2.324751	7.063965	1.125961	10.69736	1.469723	8.334178	1.547635
5.401868	2.45245	7.027781	1.13021	10.66468	1.710582	8.330554	1.561092
5.220047	2.651104	7.01709	1.181309	10.66069	1.743397	8.307407	1.647634
5.050107	2.725403	7.000663	1.225553	10.55052	1.751444	8.293535	1.688969
4.852778	2.831675	6.97892	1.267788	10.39847	1.876279	8.25714	1.719208
4.82208	2.846858	6.975578	1.274583	9.73795	2.062519	8.252179	1.724339
4.4532	3.012201	6.921232	1.446028	9.650558	2.090666	8.223392	1.879457
4.302345	3.14356	6.879892	1.538178	9.179949	2.171674	8.200757	1.941907
4.194229	3.285178	6.8293	1.592332	8.789348	2.191003	8.179206	2.025109
4.176605	3.307409	6.821561	1.60193	8.042469	2.182788	8.123348	2.096065
3.820204	3.322356	6.733063	1.710492	7.722495	2.228095	8.115557	2.108007
3.507354	3.37238	6.69069	1.766897	7.654377	2.233381	8.067414	2.215613
3.174302	3.537915	6.642711	1.82638	7.40052	2.289434	7.982197	2.324357
3.121687	3.560552	6.635443	1.835553	6.806727	2.373751	7.481668	2.425343

Table A9 (2)

1-Aug		8-Aug		23-Aug		29-Aug	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
2.492398	3.707574	6.552732	1.936895	6.494466	2.582151	7.415893	2.44186
2.172179	3.805891	6.496933	2.087839	6.432566	2.611423	6.961267	2.583063
1.901702	3.816806	6.44126	2.16764	6.136254	2.806466	6.442262	2.649181
1.857625	3.821637	6.432467	2.183192	5.368579	2.843957	5.915087	2.685423
1.626149	3.983947	6.301911	2.209805	4.908007	3.074508	5.830603	2.691999
1.254754	4.218022	6.189488	2.324575	4.820619	3.103828	4.899898	2.781388
1.105165	4.409762	6.06251	2.370453	4.473621	3.143843	4.467257	2.849527
0.982042	4.50274	5.858025	2.417398	4.056845	3.171076	4.105205	2.845969
0.962744	4.520771	5.827621	2.424471	3.386416	3.226495	4.047147	2.84792
0.743078	4.76495	5.38553	2.511076	3.287994	3.234334	3.274988	2.908923
0.645727	4.905187	5.19379	2.527887	3.001318	3.253426	2.932144	2.939796
0.565269	5.039189	5.003045	2.552682	2.753232	3.397571	2.687954	3.031029
0.552514	5.060216	4.973895	2.555976	2.249837	3.581542	2.474107	3.127376
0.447206	5.348482	4.56355	2.572997	1.989353	3.760744	2.439501	3.14303
0.399211	5.528528	4.356515	2.577386	1.937664	3.789966	2.11527	3.163212
0.35573	5.695949	4.19547	2.573979	1.763371	3.932609	1.879542	3.135495
0.348859	5.722786	4.169055	2.573651	1.412045	4.002329	1.657115	3.18242
0.283899	5.867839	3.957386	2.621932	1.223447	4.019345	1.621387	3.187083
0.25621	6.118888	3.866652	2.718055	1.186432	4.023566	1.244784	3.198875
0.236499	6.189049	3.765896	2.809816	1.057527	4.023322	1.085952	3.211996
0.233182	6.207513	3.750595	2.824928	0.878711	4.039238	0.968052	3.196931
0.216217	6.366276	3.483942	2.873201	0.797579	4.413423	0.948642	3.195538
0.1889	6.464764	3.323947	2.973187	0.780783	4.460152	0.791168	3.236053
0.172926	6.455465	3.180195	3.025484	0.68857	4.593203	0.706407	3.282697
0.162144	6.51221	3.027685	3.056355	0.601914	4.749357	0.636665	3.289671
0.160305	6.518412	3.003698	3.061707	0.485856	4.901591	0.625177	3.292295
0.139473	6.894767	2.70051	3.202627	0.438812	5.007284	0.559676	3.307851
0.128258	7.023581	2.549726	3.28224	0.428767	5.025791	0.446648	3.468159
0.122146	7.124063	2.323985	3.319083	0.392265	5.19039	0.398578	3.518062
0.121043	7.139768	2.291166	3.326135	0.327989	5.558702	0.354448	3.578394
0.108419	7.22644	1.788029	3.44114	0.295401	5.689592	0.347647	3.587028
0.101528	7.470808	1.567397	3.493566	0.288909	5.720024	0.280524	3.652956
0.095417	7.652627	1.401102	3.557598	0.260413	5.821993	0.253585	3.685212
0.094435	7.684892	1.373961	3.567135	0.222091	5.883151	0.230912	3.741481
0.086786	7.74989	1.118856	3.681908	0.205474	6.105401	0.227332	3.7495
0.081753	7.942777	0.993515	4.044697	0.201978	6.135151	0.19303	3.789147
0.077262	8.086544	0.879608	4.062655	0.191596	6.186013	0.176688	3.8774

Table A9 (3)

1-Aug		8-Aug		23-Aug		29-Aug	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.076536	8.111813	0.861426	4.079345	0.180364	6.267982	0.163357	3.946224
0.073778	8.291167	0.658508	4.166434	0.160779	6.436928	0.161195	3.958174
0.068416	8.580975	0.566167	4.331707	0.157938	6.461018	0.144454	3.992133
0.06503	8.717653	0.500643	4.399838	0.149405	6.621512	0.136708	4.074398
0.064401	8.745864	0.450751	4.486678	0.142979	6.868104	0.131674	4.112944
0.064008	8.89487	0.442395	4.49939	0.128286	7.052804	0.130798	4.120963
0.063236	9.099314	0.372882	4.549619	0.122874	7.217876	0.125538	4.148059
0.062423	9.294666	0.344814	4.685782	0.121642	7.244563	0.119658	4.26804
0.06162	9.477857	0.316423	4.796397	0.117064	7.405797	0.113697	4.312255
0.061491	9.507522	0.312123	4.815547	0.109886	7.64438	0.110272	4.351167
0.05528	9.832835	0.26343	4.920061	0.104563	7.756528	0.109634	4.357153
0.051702	9.97271	0.241997	5.057781	0.103628	7.77939	0.108642	4.464691
0.049699	10.16614	0.224413	5.18438	0.103565	7.797388	0.10713	4.50922
0.049336	10.19435	0.221579	5.205294	0.101834	7.803188	0.106566	4.559183
0.045332	10.41054	0.189018	5.233276	0.102009	7.803849	0.106439	4.566696
0.042928	10.69059	0.175792	5.30722	0.10196	7.804075	0.100379	4.652127
0.042899	10.79447	0.164085	5.432039	0.101665	7.806699	0.098006	4.760512
0.042815	10.81791	0.162226	5.450399	0.101324	8.006452	0.095268	4.826574
0.041683	10.84586	0.144173	5.516404	0.096962	8.263133	0.094857	4.838851
0.041318	10.94856	0.135867	5.605163	0.096411	8.303039	0.09312	4.879192
0.040647	10.99709	0.127907	5.670222	0.094196	8.404136	0.090676	4.99028
0.041161	10.99973	0.122766	5.704459	0.092608	8.612591	0.08831	5.047699
0.041203	11.00132	0.121848	5.710859	0.08734	8.965072	0.086147	5.112432
0.043101	11.13482	0.110672	5.760628	0.084284	9.212463	0.085793	5.122249
0.04449	11.1957	0.106065	5.812685	0.083695	9.25662	0.082743	5.217927
0.045514	11.20079	0.103395	5.891439	0.078209	9.302405	0.079154	5.291884
0.045687	11.20306	0.102933	5.903173	0.0737	9.340372	0.075816	5.350082
0.044154	11.19787	0.096523	6.078598	0.071784	9.54854	0.075268	5.359863
0.043414	11.2407	0.091088	6.149241	0.071391	9.57602	0.070697	5.479409
0.042941	11.28104	0.085392	6.173987	0.071242	9.675187	0.068514	5.542828
0.04286	11.28784	0.08449	6.179165	0.067479	9.900701	0.066345	5.610183
0.042834	11.31141	0.080366	6.227409	0.064966	10.24085	0.066007	5.620597
0.042596	11.33391	0.078482	6.384105	0.064499	10.29201	0.062553	5.649805
		0.076483	6.462447	0.061484	10.51907	0.061006	5.754365
		0.076174	6.478397	0.059524	10.67188	0.059066	5.816766
		0.072953	6.517126	0.058178	10.94879	0.058777	5.828668
		0.069292	6.610351	0.057943	10.98817	0.058748	5.919677

Table A9 (4)

1-Aug		8-Aug		23-Aug		29-Aug	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
		0.06707	6.725367	0.056897	11.07405	0.057229	6.029299
		0.06453	6.837745	0.057605	11.145	0.056129	6.131036
		0.064144	6.855956	0.06041	11.18863	0.05454	6.215312
		0.061623	6.936763	0.060988	11.20103	0.054303	6.229393
		0.059668	6.965745	0.061168	11.20386	0.052176	6.300421
		0.057386	7.051768	0.06186	11.20584	0.050318	6.371003
		0.057037	7.063225	0.062181	11.21062	0.049268	6.419381
		0.054863	7.180375	0.062622	11.21587	0.049072	6.427931
		0.05436	7.200923	0.062687	11.21671	0.049579	6.530762
		0.054163	7.265681	0.063133	11.21895	0.049735	6.598997
		0.054129	7.274032	0.064054	11.22085	0.054222	6.652097
		0.049361	7.386544	0.064812	11.22141	0.054787	6.660972
		0.047438	7.51787	0.064942	11.22154	0.057619	6.752091
		0.047149	7.595596	0.065744	11.22317	0.056894	6.801137
		0.047054	7.610088	0.066395	11.22254	0.05466	6.80487
		0.041032	7.725501	0.067909	11.21973	0.054343	6.80698
		0.039726	7.876102	0.06812	11.21935	0.051714	6.848232
		0.038141	7.943846	0.069058	11.22368	0.047532	6.928644
		0.036067	8.014371	0.069942	11.22537	0.046318	6.9842
		0.035748	8.025093	0.071849	11.22475	0.046113	7.091372
		0.033937	8.171737	0.072942	11.22535	0.046065	7.106705
		0.031912	8.232155	0.073151	11.22539	0.044922	7.350634
		0.030471	8.309817	0.074126	11.22925	0.042026	7.403968
		0.030219	8.321189	0.076291	11.22791	0.039987	7.47004
		0.028398	8.55822	0.077546	11.22666	0.039621	7.479134
		0.027264	8.579022			0.037513	7.698019
		0.026821	8.676538			0.035813	7.751295
		0.026728	8.688324			0.035216	7.885855
		0.025092	8.748043			0.035082	7.9037
		0.026516	8.870076			0.032911	7.923685
		0.027684	8.96352			0.032842	8.08794
		0.027894	8.979863			0.032317	8.179869
		0.031338	9.043581			0.032258	8.197836
		0.031806	9.142847			0.030774	8.224666
		0.032077	9.216943			0.030467	8.22566
		0.033008	9.261304			0.030226	8.229055
		0.033134	9.269287			0.030189	8.229418

Table A9 (5)

1-Aug		8-Aug		23-Aug		29-Aug	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
		0.03391	9.374968			0.030691	8.227504
		0.03393	9.428241			0.031223	8.389518
		0.031893	9.492158			0.030026	8.444063
		0.031633	9.501777			0.029899	8.457278
		0.028874	9.63584			0.030269	8.449778
		0.028561	9.684995			0.028959	8.736422
		0.027562	9.80448			0.027742	8.83359
		0.027438	9.820731			0.027288	8.951701
		0.025773	9.877086			0.027189	8.968808
		0.025395	9.965648			0.025156	9.071003
		0.024862	10.00873			0.024203	9.139802
		0.024787	10.01745			0.023605	9.190024
		0.024142	10.06985			0.023503	9.198522
		0.023807	10.23763			0.022359	9.234553
		0.023656	10.31403			0.022109	9.351996
		0.023569	10.42573			0.021253	9.564044
		0.023553	10.44193			0.021142	9.595029
		0.024059	10.53133			0.022367	9.697476
		0.023321	10.67014			0.023506	9.827614
		0.022598	10.72598			0.022986	9.875922
		0.022475	10.73818			0.022964	9.886888
		0.02137	10.85527			0.022139	9.986443
		0.020518	10.89635			0.02176	10.12026
		0.020565	10.93655			0.022113	10.19629
		0.020542	10.94262			0.021925	10.34297
		0.022376	11.01149			0.021918	10.3638
		0.023807	11.07647			0.02343	10.62047
		0.02495	11.10992			0.024234	10.67559
		0.025143	11.11647			0.0245	10.82217
		0.025656	11.192			0.024558	10.84143
		0.026411	11.24294			0.02453	10.85931
		0.02748	11.27793			0.024411	10.88742
		0.027577	11.30603			0.024796	10.90293
		0.027627	11.31068			0.024838	10.90592
		0.02568	11.32702			0.024682	10.94746
		0.025113	11.33779			0.025062	10.97628
		0.024076	11.34039			0.024997	10.9782

Table A9 (6)							
1-Aug		8-Aug		23-Aug		29-Aug	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
		0.023933	11.34106			0.025006	10.97946
		0.020142	11.34741			0.025283	10.9872
		0.018454	11.35877			0.025278	10.98701
		0.016598	11.35087			0.024715	10.98756
		0.016315	11.35032			0.024321	10.99235
		0.014342	11.3528			0.024248	10.99298
		0.013223	11.36354			0.024335	10.99363
		0.012006	11.3694			0.024762	10.99786
		0.011817	11.37055			0.0251	11.00102
		0.011382	11.35726			0.02516	11.00159
		0.009878	11.35889			0.026953	10.99845
						0.027985	11.00298
						0.028604	10.99714

Table A10. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 5 September to 27 September. Data recorded by Aqua-Troll 500 sonde.

Table A10 (1)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
3.028859	0.23778	7.53594	0.192846	9.968784	0.373439	10.96413	0.18985
4.08947	0.198752	7.554951	0.192352	9.972273	0.374541	10.96133	0.190036
4.316814	0.194487	7.620479	0.193821	9.99918	0.34325	10.95267	0.186801
5.019255	0.19052	7.677668	0.195836	9.997993	0.349282	10.93836	0.189943
5.977552	0.188107	7.751359	0.194763	10.01	0.274556	10.94713	0.188447
6.447346	0.268507	7.762568	0.194704	10.0113	0.265683	10.94772	0.188401
6.769456	0.325429	7.791115	0.291816	10.03326	0.349198	10.96411	0.193929
6.822691	0.335877	7.811235	0.422422	10.02166	0.631081	10.98613	0.190749
7.071292	0.421418	7.837418	0.544611	10.03453	0.680638	11.01296	0.192001
7.43791	0.541044	7.841371	0.564695	10.04695	0.829927	11.01713	0.192
7.60972	0.589663	7.847085	0.696559	10.04912	0.849084	10.92436	0.275067
7.644734	0.600127	7.867447	0.777747	10.04689	1.134518	10.92784	0.333836
7.731728	0.644165	7.86446	0.816521	10.04147	1.153016	10.95838	0.400587
7.841393	0.791975	7.864925	0.824099	10.04285	1.237889	10.96267	0.410916
7.875669	0.846229	7.860284	0.91071	10.04282	1.24761	10.96967	0.414695
7.883976	0.858816	7.866099	0.967622	10.03313	1.509774	10.99995	0.52198
7.892999	0.905328	7.856191	1.002974	10.02839	1.62649	10.98674	0.60863
7.867735	0.956182	7.842925	1.061335	10.03592	1.690865	10.98329	0.664605
7.836621	1.04934	7.840813	1.069799	10.03672	1.702325	10.98213	0.674493
7.831687	1.062771	7.827466	1.171361	10.01398	1.783237	10.95366	0.719893
7.773692	1.098956	7.799308	1.17207	10.02817	1.813018	10.88608	0.797758
7.658582	1.117114	7.770601	1.180916	10.02427	1.880294	10.83528	0.840003
7.585208	1.127023	7.765928	1.181531	10.02448	1.889504	10.82634	0.848195
7.537548	1.179093	7.714105	1.214685	10.02269	1.96112	10.7721	0.897102
7.52928	1.185986	7.701437	1.302612	10.00245	2.092436	10.63404	0.992975
7.4866	1.249587	7.681478	1.326569	9.986959	2.180318	10.56296	1.044118
7.410017	1.376358	7.678714	1.332953	9.984234	2.196251	10.54875	1.05415
7.385576	1.423268	7.666071	1.287819	9.955603	2.242121	10.47815	1.098793
7.379636	1.433956	7.63046	1.441653	9.920696	2.391727	10.2767	1.136643
7.34641	1.489193	7.613633	1.484459	9.88641	2.393382	10.1587	1.166849
7.284034	1.548849	7.61014	1.496253	9.825978	2.368923	10.13608	1.171957
7.249597	1.659724	7.598016	1.480216	9.817164	2.364964	10.02073	1.204515
7.242913	1.675702	7.56511	1.518569	9.693851	2.356661	9.914941	1.252324

Table A10 (2)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
7.204463	1.739844	7.557269	1.625092	9.660309	2.386126	9.696261	1.323679
7.137122	1.768125	7.536704	1.69197	9.648074	2.403031	9.54407	1.343255
7.093312	1.864819	7.534004	1.704444	9.645808	2.40639	9.516643	1.348297
7.085277	1.877662	7.504735	1.748367	9.532164	2.567108	9.412616	1.381364
7.047296	1.901008	7.445415	1.830622	9.398338	2.630902	9.274192	1.452231
7.026684	1.901359	7.401716	1.913349	9.218719	2.679614	9.217987	1.48505
6.990997	2.042407	7.393976	1.926833	9.191454	2.68758	9.205889	1.491868
6.955409	2.074845	7.357685	1.956335	8.743754	2.739081	9.148769	1.549883
6.949594	2.084624	7.276728	2.054473	8.518727	2.913564	8.966459	1.57876
6.873959	2.15929	7.218806	2.149127	8.311502	2.95031	8.840202	1.665429
6.678493	2.269386	7.20849	2.164708	7.923589	2.997219	8.817288	1.677143
6.575946	2.309091	7.143868	2.266662	7.867807	3.003492	8.704679	1.76261
6.555531	2.318156	7.092161	2.329985	7.664246	3.130969	8.57235	1.789346
6.472937	2.351638	6.968644	2.590337	7.508525	3.207306	8.342596	1.884861
6.30689	2.361888	6.951556	2.624607	7.36644	3.248747	8.309255	1.897411
6.224846	2.410299	6.859817	2.707165	7.343426	3.25633	8.190978	1.932801
6.208233	2.416567	6.735484	2.734308	7.128963	3.346221	8.088	1.974495
6.133515	2.446675	6.489022	2.844033	7.028805	3.461713	7.941406	2.095124
6.051045	2.470657	6.370635	3.025844	6.947986	3.531487	7.88096	2.120418
5.81133	2.582497	6.34648	3.053094	6.934933	3.544444	7.868034	2.128222
5.629827	2.616366	6.234236	3.130098	6.682803	3.589665	7.81532	2.155258
5.597652	2.62499	5.984482	3.188397	6.507311	3.74591	7.75315	2.197561
5.394207	2.678488	5.804144	3.338662	6.28652	3.837836	7.717506	2.241413
5.068987	2.77456	5.771974	3.359457	6.253032	3.855459	7.710829	2.24846
4.848771	2.812682	5.556512	3.587019	5.762441	3.923746	7.682336	2.296974
4.809373	2.820977	5.356322	3.657769	5.42835	4.03221	7.625955	2.299261
4.565165	2.88889	4.842854	3.761429	5.036825	4.07313	7.559739	2.409697
4.079973	3.002655	4.771904	3.776208	4.681637	4.087071	7.54933	2.423284
3.833402	3.031872	4.472514	4.064188	4.623029	4.089744	7.470218	2.507671
3.784042	3.039805	4.203991	4.154642	4.000967	4.248464	7.412702	2.607635
3.518372	3.068202	3.616867	4.253859	3.649085	4.257586	7.209121	2.719229
3.13791	3.092502	3.198193	4.350152	3.315342	4.267553	6.921302	2.766613
2.981407	3.15602	3.123159	4.36576	3.262599	4.268272	6.876828	2.77644
2.947507	3.16477	2.734599	4.377373	2.758367	4.249726	6.581359	2.791875
2.825883	3.217827	2.386529	4.391186	2.564025	4.294377	5.994593	2.890107
2.705714	3.252429	1.809977	4.558513	2.38524	4.36854	5.676404	2.949237
2.446832	3.375136	1.725458	4.580091	2.35745	4.379707	5.61426	2.960576

Table A10 (3)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
2.307098	3.451874	1.479636	4.691356	2.069206	4.54851	5.280218	2.971637
2.279742	3.466327	1.280864	4.755724	1.89242	4.616434	4.624359	3.157586
2.172214	3.538945	0.998064	4.782938	1.740404	4.666242	4.268249	3.175431
1.98914	3.628092	0.955839	4.788433	1.715496	4.674514	4.199083	3.185053
1.867392	3.692716	0.831726	4.82847	1.605062	4.795401	3.915688	3.258458
1.845263	3.704048	0.727244	4.925367	1.381685	4.895139	3.429458	3.314691
1.72728	3.731826	0.639405	4.976532	1.25325	5.010972	3.182607	3.373319
1.499064	3.782234	0.624777	4.986626	1.136967	5.109189	3.133379	3.382524
1.368834	3.82626	0.475552	5.025151	1.11845	5.125672	2.939011	3.415434
1.343834	3.833676	0.418457	5.03598	0.867099	5.322085	2.761704	3.482664
1.227697	3.887482	0.376573	5.050302	0.742362	5.364691	2.470067	3.632838
1.002346	3.928302	0.319359	5.114057	0.632091	5.485322	2.329524	3.733761
0.892847	4.000905	0.310833	5.122603	0.614532	5.50114	2.301146	3.752185
0.870495	4.011341	0.285448	5.356913	0.467174	5.88754	2.187577	3.808086
0.791132	4.013066	0.263598	5.41697	0.404662	6.10096	1.965636	3.864877
0.725193	4.047287	0.243724	5.452063	0.358601	6.227748	1.843906	3.913569
0.619314	4.143316	0.240485	5.457592	0.350979	6.250509	1.820245	3.921676
0.568448	4.186416	0.20387	5.731689	0.277276	6.337022	1.72022	3.966955
0.558153	4.195538	0.186948	5.726419	0.247741	6.36744	1.533823	4.030936
0.511618	4.233167	0.173098	5.845809	0.223733	6.427525	1.426238	4.070494
0.421102	4.357754	0.170855	5.85915	0.202409	6.700015	1.405924	4.077742
0.368977	4.408263	0.151386	6.105754	0.198937	6.736992	1.312477	4.115209
0.359014	4.419448	0.138902	6.1853	0.15859	6.951737	1.153795	4.169336
0.312721	4.477303	0.129528	6.232484	0.146108	7.10811	1.08841	4.259881
0.248193	4.520884	0.127933	6.240619	0.135064	7.293916	1.07422	4.2731
0.217713	4.611372	0.112659	6.315547	0.133402	7.322429	1.010588	4.354331
0.211535	4.624105	0.106991	6.453158	0.117146	7.572225	0.945966	4.389552
0.186814	4.658638	0.102088	6.547528	0.10859	7.655617	0.81304	4.478275
0.156109	4.696272	0.093333	6.651585	0.100984	7.7348	0.794261	4.490332
0.143487	4.752511	0.092063	6.66772	0.099765	7.746845	0.724134	4.518705
0.140756	4.760878	0.088439	6.82277	0.092114	7.918973	0.649242	4.519156
0.132802	4.798952	0.084995	6.963694	0.088128	8.14761	0.538364	4.6131
0.125579	4.829802	0.081135	7.068013	0.084383	8.378842	0.490869	4.671503
0.117894	4.903407	0.080531	7.086004	0.083787	8.416148	0.480851	4.68267
0.115772	4.943371	0.072968	7.299509	0.073204	8.594136	0.444706	4.76078
0.115239	4.95118	0.068678	7.362703	0.069226	8.963261	0.382861	4.919345
0.11296	4.995081	0.066648	7.398766	0.064768	9.051125	0.35391	5.000765

Table A10 (4)

5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.109504	5.104965	0.066254	7.404861	0.062496	9.184529	0.348	5.0169
0.106017	5.20641	0.063602	7.494535	0.062055	9.202655	0.327435	5.016379
0.105452	5.223356	0.063159	7.547391	0.057944	9.567924	0.283752	5.022816
0.102597	5.290911	0.062671	7.620869	0.055507	9.725873	0.261321	5.031643
0.094995	5.317041	0.062603	7.631734	0.053612	9.881557	0.25684	5.032999
0.090318	5.399927	0.0607	7.71349	0.053297	9.905526	0.237316	5.059714
0.089438	5.410994	0.059198	7.801679	0.050254	10.19909	0.207765	5.124627
0.08317	5.471381	0.057774	7.88488	0.04851	10.2833	0.195867	5.240058
0.075468	5.508851	0.056416	7.916919	0.047512	10.34859	0.193295	5.256824
0.071675	5.637208	0.056196	7.923779	0.04733	10.35879	0.185315	5.315367
0.067812	5.72118	0.052625	8.212502	0.045976	10.47821	0.178183	5.317126
0.06722	5.736757	0.049346	8.308059	0.046253	10.74176	0.162777	5.340384
0.062163	5.765123	0.048578	8.437132	0.045609	10.81321	0.155903	5.346745
0.060476	5.895693	0.048367	8.455684	0.045546	10.83246	0.154459	5.348461
0.058777	5.988595	0.044249	8.533923	0.045932	10.85114	0.150599	5.33256
0.058525	6.005367	0.042937	8.692697	0.04617	10.86504	0.145232	5.460747
0.05515	6.082752	0.041306	8.79334	0.046801	10.86656	0.138506	5.513142
0.048922	6.207772	0.041068	8.812015	0.047397	10.8694	0.137472	5.524913
0.045492	6.265443	0.038099	8.883322	0.047497	10.86973	0.131836	5.603514
0.044826	6.277351	0.037924	8.912188	0.049434	10.8711	0.121617	5.745922
0.042646	6.299909	0.036856	8.942582	0.050349	10.87451	0.117326	5.843176
0.041288	6.311384	0.036728	8.94726	0.051645	10.87627	0.116402	5.860741
0.040646	6.362002	0.035439	8.937053	0.051834	10.87662	0.113574	5.898537
0.040521	6.368647	0.035065	9.077934	0.053992	10.87595	0.108548	5.950905
0.03995	6.421146	0.034624	9.167321	0.055512	10.87775	0.105984	6.083167
0.037822	6.467845	0.034096	9.284581	0.057437	10.88036	0.105472	6.101554
0.036209	6.603913	0.034014	9.302146	0.057729	10.88076	0.102473	6.161969
0.035438	6.644249	0.035035	9.790853	0.062518	10.87473	0.099643	6.257888
0.035289	6.654508	0.034475	9.874261	0.065367	10.87551	0.095719	6.403325
0.033221	6.700222	0.032759	9.897123	0.068608	10.8745	0.095135	6.424825
0.03147	6.774471	0.032516	9.90092	0.071809	10.87865	0.092742	6.51014
0.030552	6.825727	0.030789	9.976029			0.09007	6.582246
0.030378	6.834925	0.030669	10.03214			0.087956	6.702066
0.030605	6.870756	0.030467	10.24799			0.086441	6.77036
0.032033	6.944553	0.030446	10.27676			0.086181	6.783386
0.032452	6.99883	0.03134	10.42478			0.082505	6.835489
0.032562	7.008403	0.03209	10.65162			0.076358	6.918055

Table A10 (5)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.032479	7.096154	0.031926	10.72041			0.073292	6.987589
0.033696	7.147848	0.031934	10.73775			0.072683	6.999293
0.033043	7.257379	0.030244	10.73744			0.070818	7.117912
0.033012	7.272694	0.029149	10.92629			0.067056	7.112588
0.031954	7.328052	0.028781	10.97122			0.066395	7.214666
0.031375	7.377519	0.029765	10.99624			0.066167	7.226614
0.029038	7.450427	0.029881	11.00009			0.066992	7.264831
0.028731	7.461247	0.032113	11.00875			0.066402	7.296519
0.027236	7.51463	0.032953	11.0092			0.0658	7.4431
0.02646	7.559677	0.033647	11.01028			0.065699	7.462329
0.024808	7.655895	0.033757	11.01039			0.063821	7.532838
0.024053	7.704733	0.035333	11.01167			0.064809	7.596263
0.023896	7.714502	0.035833	11.01618			0.065907	7.710064
0.023363	7.778418	0.036889	11.01401			0.065755	7.798247
0.02227	7.82544	0.037034	11.01392			0.065774	7.813603
0.021155	7.843526	0.039034	11.01788			0.064618	7.885294
0.020973	7.847364	0.039691	11.0139			0.063145	7.992514
0.020076	7.95562	0.040875	11.01621			0.061643	8.066708
0.018824	8.011149	0.042373	11.01774			0.061401	8.079957
0.018543	8.099747					0.060381	8.163197
0.01846	8.112539					0.059356	8.168583
0.018138	8.161119					0.058959	8.324474
0.016888	8.2316					0.058873	8.343709
0.016979	8.252548					0.056458	8.438546
0.017305	8.239482					0.05487	8.515233
0.017359	8.238168					0.051398	8.619997
0.017341	8.272231					0.050914	8.635736
0.016243	8.348692					0.048445	8.685904
0.016336	8.371237					0.046821	8.799174
0.016304	8.37697					0.044209	8.918574
0.017096	8.379299					0.042582	8.986129
0.015969	8.428555					0.042282	8.998763
0.015243	8.495221					0.041222	9.043112
0.015102	8.50555					0.039374	9.155992
0.014364	8.573773					0.038976	9.20114
0.013096	8.656815					0.038856	9.211128
0.013146	8.794593					0.038632	9.227205

Table A10 (6)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.013103	8.814666					0.038916	9.27377
0.014258	8.848159					0.039525	9.369985
0.015812	8.889747					0.039614	9.38377
0.015459	8.949717					0.042995	9.471436
0.016068	9.012289					0.045942	9.532835
0.016121	9.022383					0.046185	9.620695
0.015954	9.057809					0.046324	9.633737
0.015576	9.1442					0.04656	9.709802
0.015464	9.203807					0.045879	9.789622
0.015435	9.214608					0.049585	9.951122
0.016154	9.251213					0.051364	10.01072
0.017379	9.327095					0.051742	10.02428
0.018673	9.422423					0.050968	10.04954
0.018881	9.437236					0.04877	10.11413
0.018792	9.532182					0.04774	10.12452
0.01789	9.625273					0.047525	10.12832
0.017426	9.719077					0.046363	10.13071
0.017332	9.734124					0.042489	10.17975
0.017113	9.819707					0.040895	10.2765
0.016706	9.897025					0.040544	10.2905
0.017581	9.967574					0.040325	10.32166
0.017151	9.999997					0.040833	10.37269
0.017134	10.00646					0.042061	10.50509
0.016393	10.00881					0.042234	10.52335
0.014487	10.04296					0.044203	10.58641
0.014446	10.0657					0.045381	10.6381
0.014367	10.06993					0.049169	10.73497
0.013689	10.11129					0.048456	10.78358
0.014091	10.17837					0.04851	10.7933
0.013322	10.25754					0.047197	10.84959
0.013247	10.26994					0.045743	10.95427
0.012265	10.26404					0.044071	10.97721
0.011655	10.33195					0.043811	10.98397
0.012173	10.40695					0.043649	11.00539
0.012215	10.41898					0.044184	11.03681
0.012793	10.46434					0.044439	11.07917
0.012246	10.50781					0.044493	11.08561

Table A10 (7)							
5-Sep		12-Sep		19-Sep		27-Sep	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.011967	10.64646					0.044347	11.0896
0.01262	10.7313					0.042683	11.08761
0.012695	10.74735					0.041335	11.09417
0.013129	10.77096					0.041101	11.09488
0.013787	10.89217					0.039456	11.09545
0.013672	10.91624					0.037968	11.09862
0.013682	10.92407					0.03346	11.11208
0.013044	10.9478					0.0314	11.11184
0.011491	11.03089					0.030967	11.11233
0.010625	11.16984					0.029719	11.10699
0.010456	11.19037					0.029678	11.11646
0.009935	11.2408					0.030052	11.11275
0.009653	11.28778					0.030105	11.1127
0.00974	11.35174					0.02961	11.11323
0.009941	11.373					0.028925	11.12108
0.009972	11.37795						
0.010226	11.37588						
0.009336	11.3819						
0.009039	11.38625						
0.008964	11.38705						
0.008717	11.39031						
0.008794	11.39312						

Table A11. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 3 October to 28 October. Data recorded by Aqua-Troll 500 sonde.

Table A11 (1)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.217353	0.193276	5.791707	0.196206	7.319116	0.18994	13.97725	0.188378
6.574013	0.190362	5.953734	0.194892	7.317892	0.192938	14.17479	0.187031
7.107155	0.191666	6.004295	0.198003	7.29972	0.189556	14.37673	0.186203
7.345427	0.18986	6.035716	0.196755	7.295754	0.170692	14.40868	0.186028
7.546869	0.188476	6.04096	0.196734	7.294538	0.168182	14.70079	0.184246
7.578755	0.188221	6.068714	0.191856	7.286348	0.208512	14.82235	0.216831
7.833426	0.214608	6.080538	0.197692	7.27656	0.265403	14.90769	0.27939
7.942938	0.285883	6.079168	0.238235	7.269891	0.385493	14.92193	0.288523
8.0276	0.350334	6.079387	0.24348	7.2687	0.402608	15.09583	0.483787
8.041337	0.361158	6.052063	0.285866	7.264473	0.453652	15.04538	0.532382
8.176377	0.501616	6.025546	0.381864	7.264006	0.493468	14.96385	0.570842
8.230848	0.568775	6.009473	0.468087	7.242929	0.534215	14.95105	0.576835
8.269347	0.612195	5.984896	0.535613	7.240344	0.540667	14.19213	0.630049
8.275762	0.619716	5.981307	0.547008	7.226891	0.519999	13.64013	0.685393
8.26355	0.654005	5.999171	0.678983	7.214243	0.548013	13.12293	0.738175
8.249559	0.748816	6.010281	0.702496	7.20094	0.652466	12.33978	0.790416
8.219078	0.789868	5.997621	0.730266	7.191818	0.684365	12.2233	0.798792
8.174465	0.810639	5.996396	0.734015	7.190215	0.692358	11.8825	0.894297
8.167651	0.8143	5.881633	0.828112	7.173892	0.746707	11.58765	0.943201
8.070031	0.90609	5.817859	0.864519	7.152665	0.81033	11.30857	0.978553
8.028626	0.973401	5.759092	0.915773	7.149462	0.958819	11.2634	0.984466
7.986516	1.057036	5.749684	0.923215	7.148299	0.979805	10.77837	1.0348
7.980092	1.069783	5.617703	0.988626	7.137808	1.036089	10.57801	1.073958
7.866777	1.165185	5.565579	1.025126	7.130736	1.096975	10.43121	1.117625
7.812149	1.209657	5.522768	1.069569	7.108133	1.260032	10.40703	1.124396
7.771187	1.252616	5.463937	1.103788	7.105093	1.282476	10.14268	1.215272
7.7644	1.259327	5.455089	1.109679	7.094987	1.355166	10.02631	1.273603
7.677309	1.297585	5.414388	1.219298	7.088068	1.405802	9.926073	1.333356
7.611901	1.383863	5.364763	1.316284	7.066572	1.445418	9.90993	1.342779
7.532502	1.427321	5.25718	1.363634	7.063667	1.452106	9.684737	1.449326
7.520352	1.436097	5.241846	1.372903	7.059421	1.534629	9.558364	1.503721
7.431039	1.477005	5.19039	1.541165	7.045112	1.595538	9.426861	1.548018
7.234179	1.560363	5.152177	1.630416	7.025507	1.627994	9.158659	1.592045

Table A11 (2)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
7.132926	1.58289	5.118215	1.65601	7.017048	1.69961	9.120171	1.599047
7.010915	1.61117	5.11266	1.662033	7.01528	1.709624	8.994202	1.686924
6.992593	1.615143	5.019435	1.755663	6.984254	1.782311	8.879609	1.767305
6.787606	1.68576	4.959257	1.815599	6.938915	1.812729	8.770099	1.864315
6.681158	1.725925	4.889164	1.870005	6.851754	1.85123	8.752381	1.879287
6.578803	1.764328	4.878405	1.878812	6.839113	1.856899	8.52368	1.966067
6.562735	1.770401	4.748067	2.004039	6.783149	1.985734	8.374754	1.981546
6.410969	1.812301	4.697937	2.053787	6.730102	2.062045	8.248747	1.980981
6.341719	1.891523	4.643084	2.08855	6.676601	2.099946	8.228022	1.981149
6.266166	1.973184	4.534476	2.12698	6.668028	2.107176	7.903347	2.035154
6.254626	1.986394	4.518814	2.132933	6.565026	2.187505	7.716833	2.079748
6.18217	2.026851	4.465631	2.249625	6.524411	2.32148	7.573864	2.141427
6.037123	2.117246	4.402162	2.323543	6.480603	2.351415	7.549774	2.150654
5.955463	2.18182	4.319845	2.364351	6.47393	2.360326	7.285387	2.207073
5.93969	2.193358	4.307224	2.371815	6.412378	2.399297	7.125229	2.304466
5.864911	2.227182	4.136418	2.470308	6.38484	2.483027	6.960992	2.356565
5.722755	2.322918	4.06225	2.523866	6.365711	2.551485	6.693138	2.410455
5.657058	2.373918	3.985044	2.585015	6.349978	2.595866	6.653608	2.418789
5.590208	2.404039	3.973194	2.594356	6.347389	2.603729	6.494006	2.578342
5.579962	2.409325	3.83063	2.700076	6.315902	2.657445	6.349737	2.571655
5.4528	2.496547	3.754708	2.709984	6.299637	2.680521	6.184639	2.576606
5.402529	2.553782	3.683328	2.729578	6.287357	2.707936	6.158911	2.57614
5.362583	2.602334	3.671978	2.731966	6.285323	2.712026	5.809761	2.584869
5.356194	2.610293	3.55576	2.831124	6.256017	2.808551	5.627217	2.674546
5.266547	2.641664	3.520345	2.885749	6.249491	2.82786	5.47469	2.73905
5.227343	2.703428	3.493221	2.973804	6.240058	2.911436	5.449774	2.750693
5.195191	2.7582	3.413259	3.028059	6.23875	2.922173	5.199501	2.819349
5.189985	2.767396	3.402263	3.038133	6.222259	2.955457	5.057159	2.875527
5.16724	2.80827	3.349978	3.150588	6.219698	3.08274	4.897923	2.903027
5.133667	2.920821	3.307085	3.256199	6.211841	3.120442	4.600436	2.941826
5.113916	2.952162	3.275919	3.317802	6.199838	3.172021	4.557118	2.947492
5.098148	2.9981	3.270585	3.329125	6.198012	3.179259	4.411133	3.011909
5.095572	3.004468	3.233243	3.414316	6.192196	3.254096	4.273643	3.074886
5.04077	3.098001	3.207406	3.458726	6.18502	3.305614	4.143262	3.099009
5.004174	3.1926	3.171412	3.504596	6.175688	3.348281	4.12211	3.10423
4.974034	3.250158	3.166047	3.511725	6.174262	3.355282	3.91656	3.19352
4.969067	3.26071	3.105819	3.624496	6.141769	3.553435	3.809951	3.275709

Table A11 (3)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
4.90873	3.29306	3.08664	3.724541	6.125107	3.591195	3.711769	3.358763
4.873102	3.304599	3.065767	3.78484	6.106008	3.643648	3.696231	3.371999
4.831223	3.307903	3.062657	3.79584	6.103124	3.650692	3.506506	3.529726
4.824836	3.308628	3.009347	3.84918	6.069465	3.720174	3.379551	3.583679
4.711859	3.343718	2.983748	3.909281	6.055193	3.745812	3.231031	3.638269
4.666953	3.410674	2.961751	3.981841	6.046476	3.739857	3.20822	3.646586
4.627639	3.454709	2.92727	4.043618	6.04496	3.739854	2.9352	3.74762
4.621387	3.462764	2.922173	4.05399	6.029241	3.7626	2.805023	3.785812
4.587394	3.513374	2.907473	4.194328	6.022192	3.789558	2.694183	3.810341
4.524661	3.611698	2.8971	4.300454	6.016979	3.813807	2.489737	3.82245
4.481519	3.659433	2.88842	4.393161	6.016105	3.817818	2.46016	3.824718
4.444907	3.695931	2.887004	4.408217	6.003214	3.787098	2.340812	3.832454
4.43892	3.701865	2.881519	4.633121	5.981047	3.866849	2.240913	3.822283
4.354908	3.803158	2.879903	4.765998	5.973812	3.910323	2.159562	3.830262
4.317665	3.856336	2.876699	4.840082	5.960184	3.962426	2.145939	3.830808
4.271743	3.899924	2.876261	4.853612	5.958303	3.970274	1.983683	3.886617
4.264935	3.906983	2.872281	5.005364	5.946501	4.061183	1.905124	3.94957
4.174434	3.951259	2.869573	5.088229	5.933965	4.101731	1.839075	4.007336
4.117484	4.019415	2.868495	5.133432	5.929955	4.140692	1.828395	4.016849
4.051651	4.044392	2.868268	5.141753	5.929004	4.146754	1.699945	4.118836
4.041546	4.050085	2.868039	5.261423	5.910248	4.179924	1.62598	4.188266
3.957717	4.113112	2.867735	5.332417	5.905867	4.263584	1.538217	4.24029
3.803609	4.227537	2.867168	5.403566	5.896882	4.300006	1.524839	4.249177
3.724957	4.266391	2.874788	5.456641	5.89567	4.307821	1.349728	4.303548
3.709208	4.275669	2.87574	5.465767	5.873064	4.407662	1.273089	4.3242
3.636788	4.321055	2.880358	5.565791	5.855026	4.405285	1.19372	4.313496
3.471447	4.444258	2.86761	5.66662	5.826278	4.4173	1.07492	4.326629
3.365707	4.490817	2.78184	5.6947	5.794619	4.456964	1.057158	4.327732
3.229278	4.53366	2.770461	5.701664	5.789571	4.462502	0.994892	4.325934
3.208749	4.540216	2.712315	5.76473	5.741955	4.495797	0.940122	4.452271
2.985448	4.669717	2.667723	5.783432	5.705723	4.477766	0.896083	4.532191
2.835184	4.756925	2.626286	5.857891	5.671742	4.50907	0.888661	4.547361
2.648986	4.807397	2.619575	5.867647	5.666292	4.512066	0.771632	4.708254
2.620698	4.816602	2.554451	5.941609	5.60516	4.603039	0.700552	4.812073
2.355499	4.871646	2.522629	5.990006	5.58545	4.663115	0.640993	4.936172
2.237706	4.973578	2.500802	6.057339	5.566587	4.721905	0.631198	4.95512
2.108	5.0173	2.497066	6.067367	5.563739	4.731247	0.527354	5.204657

Table A11 (4)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
2.088222	5.026672	2.464153	6.15292	5.52416	4.78808	0.472061	5.35751
1.959112	5.074773	2.442976	6.215623	5.502828	4.878281	0.423042	5.437943
1.77614	5.150094	2.415164	6.258062	5.478822	4.924224	0.351629	5.477114
1.682834	5.210603	2.300584	6.288092	5.475159	4.933359	0.340949	5.48424
1.590746	5.275693	2.285028	6.2932	5.394901	4.959165	0.312875	5.527114
1.576486	5.28591	2.198168	6.366431	5.342033	5.215559	0.286285	5.613621
1.424534	5.402548	2.089452	6.396803	5.29597	5.332679	0.263535	5.639235
1.364189	5.472813	1.878937	6.464203	5.288445	5.357449	0.259758	5.645706
1.281413	5.565059	1.84848	6.473505	5.24506	5.425059	0.21921	5.656413
1.269404	5.578866	1.750767	6.561487	5.100349	5.524221	0.202108	5.684578
1.093741	5.644715	1.653219	6.622015	4.97488	5.619006	0.190202	5.675157
1.004316	5.731564	1.558961	6.661109	4.820658	5.709549	0.18822	5.675075
0.92237	5.789582	1.543753	6.66801	4.796958	5.724224	0.168713	5.70701
0.909407	5.800024	1.308609	6.738857	4.435956	5.754294	0.160219	5.775949
0.737901	5.832176	1.182991	6.78221	4.268699	5.788379	0.154109	5.84562
0.666947	5.94972	1.071896	6.816016	4.12938	5.816867	0.153084	5.85694
0.609164	5.976913	1.054112	6.821637	4.107071	5.821646	0.140172	5.9953
0.599796	5.984995	0.833452	6.918656	3.782444	5.865556	0.135156	6.073258
0.54177	6.073127	0.732838	6.960268	3.574521	6.055032	0.133314	6.164401
0.445282	6.207345	0.650316	6.98986	3.362334	6.153606	0.127029	6.205093
0.40057	6.25253	0.636809	6.994864	3.328906	6.173426	0.12619	6.213347
0.362069	6.293804	0.512983	7.042097	2.818066	6.186806	0.120447	6.356346
0.355996	6.300009	0.458295	7.127236	2.515609	6.187778	0.115834	6.467897
0.29791	6.433371	0.412964	7.186419	2.233285	6.15783	0.115882	6.542359
0.271142	6.486108	0.335217	7.261012	2.188057	6.154142	0.115732	6.555401
0.248501	6.540686	0.323919	7.272277	1.932236	6.143243	0.114155	6.711301
0.244888	6.548955	0.290708	7.400527	1.505826	6.244471	0.111909	6.814727
0.212472	6.598406	0.259083	7.486623	1.313586	6.258214	0.10899	6.886596
0.196636	6.722844	0.233035	7.515078	1.154137	6.246861	0.108542	6.899019
0.182582	6.784578	0.228687	7.521359	1.12887	6.245398	0.105972	6.9163
0.180338	6.797123	0.19119	7.598126	0.891302	6.428802	0.103472	6.918119
0.16764	6.848491	0.175405	7.643054	0.789078	6.521557	0.100843	6.916282
0.152358	6.933536	0.162805	7.668458	0.703504	6.532554	0.100426	6.916062
0.143544	6.993475	0.16078	7.673069	0.690044	6.536778	0.094383	7.056254
0.141873	7.004182	0.143109	7.748881	0.547712	6.614989	0.09214	7.078348
0.133355	7.033517	0.136618	7.798647	0.48381	6.64762	0.091292	7.10722
0.120021	7.111131	0.131372	7.837321	0.434997	6.706272	0.088856	7.194941

Table A11 (5)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.116366	7.156903	0.130533	7.843819	0.426993	6.714538	0.088527	7.207089
0.112641	7.215895	0.123033	7.912588	0.352723	6.837607	0.08723	7.351009
0.112102	7.224739	0.11798	7.941576	0.322618	7.031119	0.086803	7.414102
0.101627	7.278948	0.11532	7.94729	0.293974	7.095319	0.084368	7.478123
0.094485	7.401436	0.107618	7.949101	0.289491	7.110741	0.084052	7.487946
0.088074	7.495047	0.106566	7.949366	0.264242	7.129643	0.079085	7.658802
0.087034	7.511475	0.101998	8.064538	0.221398	7.19911	0.077647	7.755556
0.078227	7.580643	0.09829	8.10132	0.201097	7.284258	0.076645	7.824499
0.072302	7.712639	0.094543	8.164261	0.185815	7.345114	0.076485	7.836251
0.06983	7.78331	0.093947	8.173036	0.183349	7.35573	0.074141	7.98217
0.069317	7.797202	0.087798	8.309436	0.164086	7.471317	0.072126	8.052274
0.068581	7.881006	0.083865	8.347263	0.154708	7.541612	0.069515	8.096181
0.066068	7.965602	0.080729	8.388412	0.148753	7.621871	0.069119	8.103938
0.064432	8.009784	0.080206	8.394447	0.147732	7.634173	0.066944	8.155096
0.064131	8.018403	0.074866	8.480817	0.135491	7.691268	0.066246	8.259808
0.061806	8.10488	0.072458	8.531859	0.128499	7.67665	0.064788	8.307492
0.054221	8.335626	0.070713	8.574605	0.121345	7.723014	0.0647	8.34758
0.053155	8.434294	0.07042	8.581643	0.12023	7.727909	0.064635	8.353916
0.051999	8.49819	0.063732	8.650015	0.108946	7.783139	0.064234	8.416736
0.051855	8.508878	0.061392	8.685779	0.103835	7.878019	0.063959	8.436132
0.049049	8.597607	0.059181	8.721695	0.100045	7.951167	0.063385	8.467781
0.047773	8.695751	0.056492	8.738305	0.099415	7.963852	0.063305	8.472207
0.046218	8.775395	0.056077	8.741634	0.094334	8.025434	0.062243	8.603057
0.045986	8.788906	0.05545	8.865166	0.09284	8.106221	0.063036	8.656132
0.042996	8.863249	0.05454	8.888793	0.091685	8.146461	0.062207	8.718104
0.041794	8.989579	0.053026	8.918141	0.090189	8.180155	0.062142	8.727397
0.041201	9.085434	0.052802	8.922137	0.089964	8.185507	0.063453	8.875645
0.041091	9.102173	0.051453	8.997717	0.091406	8.285026	0.065459	8.948126
0.041041	9.156998	0.050697	9.041765	0.091113	8.37509	0.065907	9.004456
0.037876	9.27021	0.050677	9.13477	0.088875	8.415919	0.061771	9.049287
0.03684	9.308281	0.050649	9.147784	0.088573	8.424142	0.061248	9.056757
0.037161	9.370738	0.053843	9.237546	0.082602	8.490158	0.059619	9.157111
0.037181	9.379479	0.052898	9.318772	0.079612	8.507138	0.058752	9.240125
0.037697	9.536593	0.051575	9.355581	0.076372	8.524276	0.058085	9.260677
0.037151	9.561734	0.051789	9.387519	0.075877	8.526772	0.057976	9.265986
0.036222	9.598144	0.051769	9.392514	0.071655	8.570457	0.055532	9.395026
0.03608	9.602871	0.053056	9.498162	0.069914	8.599692	0.054992	9.437659

Table A11 (6)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.036461	9.708007	0.053242	9.541783	0.068605	8.619976	0.054172	9.445069
0.037313	9.798808	0.049906	9.581119	0.068389	8.623505	0.05406	9.447047
0.037567	9.858153	0.049485	9.587239	0.066927	8.6673	0.051951	9.541789
0.037631	9.868769	0.047437	9.638095	0.06702	8.757504	0.05151	9.588497
0.036958	9.917022	0.04663	9.655023	0.066798	8.826992	0.052315	9.621436
0.035565	10.03722	0.046301	9.700448	0.064947	8.836394	0.052406	9.627022
0.03522	10.11963	0.046237	9.706562	0.064702	8.839802	0.054757	9.751801
0.035123	10.13457	0.04649	9.770326	0.06209	8.925654	0.055284	9.789247
0.034693	10.197	0.046184	9.855742	0.060888	8.946358	0.057752	9.830753
0.033749	10.28793	0.044674	9.941765	0.059676	8.945303	0.062286	9.87947
0.032472	10.36332	0.044474	9.955663	0.05949	8.945538	0.06296	9.887074
0.031182	10.44179	0.040238	10.0613	0.054646	8.942682	0.062881	9.985053
0.030973	10.45421	0.037773	10.14243	0.05414	8.917037	0.06387	10.04809
0.027767	10.59316	0.035507	10.17218	0.053084	8.984237	0.063212	10.09472
0.026395	10.63979	0.032361	10.26544	0.052955	8.991557	0.063169	10.10258
0.024735	10.69384	0.031887	10.27796	0.051935	9.093834	0.05743	10.16332
0.024488	10.70179	0.030664	10.3797	0.051621	9.221317	0.054917	10.1993
0.023397	10.75407	0.030784	10.43778	0.049995	9.29523	0.052811	10.26158
0.022853	10.85291	0.03113	10.44192	0.049786	9.309229	0.052474	10.27053
0.022239	10.91525	0.031185	10.44421	0.048244	9.350207	0.04901	10.31754
0.022146	10.9268	0.02995	10.51818	0.045973	9.45929	0.046505	10.36886
0.021621	10.95824	0.029824	10.54842	0.045417	9.538674	0.044921	10.36599
0.020233	10.99087	0.030072	10.60266	0.045408	9.58993	0.044636	10.36756
0.019481	11.00048	0.030104	10.61028	0.045398	9.598927	0.04228	10.37979
0.019213	11.00453	0.030591	10.70749	0.043014	9.679317	0.041576	10.41621
0.019158	11.00521	0.029516	10.7601	0.041076	9.73331	0.042755	10.45822
0.019254	11.01393	0.029313	10.81	0.04024	9.773033	0.044464	10.51389
0.019509	11.01792	0.029242	10.81795	0.040069	9.779781	0.044733	10.52242
		0.028444	10.92357	0.039733	9.854368	0.044983	10.63165
		0.028098	10.97813	0.041703	9.895843	0.047183	10.66531
		0.028774	11.01576	0.043647	9.928516	0.050121	10.7205
		0.030329	11.06888	0.043969	9.933895	0.050578	10.72821
		0.030554	11.07674	0.047011	9.939531	0.053178	10.81349
		0.030827	11.17768	0.04807	9.942015	0.051397	10.85518
		0.030611	11.2117	0.048075	9.94381	0.049386	10.88318
		0.03013	11.22109	0.048107	9.944115	0.04905	10.88797
		0.030059	11.2231	0.047253	9.937577	0.046256	10.93445

Table A11 (7)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
		0.029458	11.28133	0.0459	9.866605	0.046083	10.96436
		0.028589	11.31615	0.04523	9.898833	0.046126	11.03375
		0.027663	11.33573	0.044507	9.915322	0.046135	11.04334
		0.027515	11.33927	0.044397	9.91915	0.048369	11.17212
		0.026738	11.33702	0.040779	9.941055	0.050397	11.21988
		0.026962	11.34652	0.039923	9.966647	0.050961	11.21187
		0.027615	11.35172	0.040859	10.00532	0.048419	11.29865
		0.027707	11.35276	0.040961	10.0111	0.048111	11.30887
		0.028947	11.35063	0.042736	10.09495	0.046321	11.36652
		0.029819	11.35829	0.042435	10.13059	0.044866	11.3938
		0.030292	11.35491	0.042959	10.14229	0.044094	11.40755
				0.043004	10.14483	0.043948	11.41005
				0.040656	10.15111	0.043694	11.42836
				0.039754	10.22534	0.043051	11.43376
				0.039665	10.24987	0.042677	11.44236
				0.039626	10.25594	0.042606	11.44356
				0.038719	10.26007	0.043199	11.44751
				0.036249	10.33675	0.043953	11.44637
				0.034887	10.35404	0.044713	11.44448
				0.034603	10.39348	0.044835	11.44418
				0.034527	10.39871	0.046222	11.4498
				0.035174	10.49286	0.046619	11.45596
				0.034684	10.54303	0.047169	11.44951
				0.034145	10.61101	0.048799	11.44125
				0.034054	10.62105		
				0.036079	10.65792		
				0.037127	10.78593		
				0.03644	10.84194		
				0.036388	10.8539		
				0.035028	10.91211		
				0.034548	10.96379		
				0.03434	10.9864		
				0.034923	11.00319		
				0.034992	11.00588		
				0.0352	11.03554		
				0.035168	11.05913		
				0.034865	11.07421		

Table A11 (8)							
3-Oct		12-Oct		23-Oct		28-Oct	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
				0.034824	11.07689		
				0.031357	11.07959		
				0.029351	11.07319		
				0.02965	11.07577		
				0.029623	11.07582		

Table A12. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 8 November to 21 November. Data recorded by Aqua-Troll 500 sonde.

Table A12 (1)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
12.5478	0.192531	3.600865	0.195712	10.66846	0.181255
12.71464	0.19643	3.517625	0.194365	10.60973	0.181953
12.73783	0.198413	3.504297	0.194445	10.29912	0.180024
12.85115	0.195677	3.43491	0.194665	10.14913	0.183964
13.04937	0.319713	3.313037	0.316338	10.11802	0.184363
13.14534	0.398475	3.260547	0.41276	10.00692	0.181543
13.16484	0.413415	3.249341	0.429739	9.973557	0.24696
13.2585	0.447213	3.210648	0.524732	10.03567	0.326283
13.36756	0.484479	3.147646	0.658358	10.07706	0.371997
13.41283	0.527479	3.120049	0.721039	10.08502	0.38059
13.42251	0.534196	3.11419	0.733935	10.12171	0.410611
13.4389	0.546436	3.090261	0.779689	10.18664	0.472171
13.49577	0.565392	3.049423	0.817638	10.21461	0.50848
13.5229	0.627752	3.030779	0.894007	10.22042	0.515254
13.52854	0.636155	3.008073	0.943725	10.23698	0.559529
13.54029	0.679783	3.004694	0.952867	10.27083	0.619169
13.58205	0.729608	2.973445	0.998931	10.2895	0.645976
13.58979	0.793098	2.95973	1.12811	10.29313	0.65154
13.61544	0.837717	2.947916	1.175644	10.30468	0.668399
13.61874	0.845614	2.946038	1.186624	10.34196	0.722254
13.62966	0.883001	2.933635	1.213065	10.36568	0.74945
13.62792	0.935847	2.914413	1.320627	10.37005	0.754894
13.62573	0.961962	2.905296	1.401879	10.39347	0.790383
13.62533	0.967188	2.903428	1.416251	10.43616	0.819163
13.62529	1.041963	2.892866	1.470977	10.45218	0.879944
13.61318	1.152296	2.880085	1.613284	10.47165	0.907165
13.61978	1.186969	2.874203	1.679338	10.47449	0.912871
13.62012	1.195399	2.871569	1.785572	10.49609	0.934576
13.60229	1.240999	2.871082	1.800817	10.54265	0.99319
13.54093	1.287682	2.866393	1.904314	10.54451	1.005968
13.53494	1.324801	2.860231	2.066398	10.5465	1.009822
13.53173	1.331128	2.856174	2.142489	10.54126	1.047208
13.51948	1.358248	2.855441	2.158052	10.52117	1.08093

Table A12 (2)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
13.46792	1.390404	2.852529	2.259792	10.51987	1.051454
13.41968	1.434649	2.848551	2.356605	10.51891	1.048958
13.35859	1.468443	2.843196	2.423335	10.49365	1.114557
13.34922	1.474305	2.842381	2.435114	10.49091	1.16009
13.30517	1.514948	2.842083	2.497683	10.47605	1.241254
13.24163	1.571281	2.83518	2.619471	10.47421	1.252885
13.21164	1.609902	2.829773	2.671554	10.45572	1.321538
13.20552	1.616823	2.828821	2.682748	10.40895	1.351637
13.18176	1.65557	2.825905	2.738804	10.3458	1.434982
13.12897	1.738461	2.821394	2.85488	10.33616	1.446235
13.08607	1.781137	2.818713	2.911878	10.27266	1.508751
13.07869	1.789669	2.814853	2.953104	10.18773	1.547258
13.00747	1.832874	2.814284	2.959901	9.969653	1.627175
12.55408	1.851198	2.810126	3.012633	9.807216	1.653853
12.07365	1.899661	2.80829	3.101183	9.778389	1.660201
11.50945	1.941647	2.807204	3.133953	9.628946	1.673482
11.42156	1.948781	2.807015	3.141381	9.295302	1.819381
10.81968	1.975664	2.807411	3.210671	9.079238	1.876778
9.557587	2.029576	2.802858	3.322999	9.039358	1.889841
8.870174	2.053819	2.800898	3.377745	8.860703	1.930668
8.735894	2.0589	2.800466	3.388842	8.411308	2.054532
8.201364	2.076822	2.80074	3.424352	8.098124	2.135582
7.264534	2.083276	2.797928	3.528836	8.042001	2.150439
6.820505	2.156027	2.797657	3.59082	7.753634	2.209707
6.729477	2.165286	2.797505	3.602642	7.281321	2.272862
6.398679	2.169115	2.79596	3.631612	7.06761	2.339711
5.809531	2.173968	2.796509	3.664986	7.022985	2.350276
5.570017	2.17435	2.795136	3.728025	6.841978	2.39158
5.517486	2.174593	2.79472	3.762792	6.483479	2.435365
5.352931	2.247734	2.794609	3.769509	6.311765	2.52697
5.04309	2.349039	2.792359	3.825172	6.276513	2.539785
4.891629	2.372705	2.790135	3.90192	6.133087	2.607564
4.754043	2.419614	2.788345	3.968116	5.894345	2.665955
4.732452	2.425881	2.788042	3.979244	5.766678	2.745621
4.619533	2.463684	2.786005	4.042295	5.742493	2.757352
4.428618	2.500243	2.783219	4.098598	5.614684	2.797137
4.309916	2.520381	2.780761	4.125166	5.493181	2.83355

Table A12 (3)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
4.287872	2.524188	2.780351	4.1305	5.291871	2.94734
4.181942	2.587524	2.777955	4.158635	5.181289	2.994798
4.00362	2.656305	2.775259	4.244264	5.159915	3.005169
3.928512	2.697877	2.776182	4.301317	5.0629	3.075227
3.912345	2.705575	2.776195	4.311765	4.898989	3.159579
3.858496	2.788169	2.777263	4.354822	4.819682	3.191326
3.77738	2.847238	2.776429	4.363788	4.803712	3.198296
3.733937	2.949895	2.774917	4.443932	4.737654	3.228772
3.725434	2.964661	2.774046	4.508394	4.625962	3.298753
3.688272	2.981733	2.77388	4.519723	4.573794	3.335968
3.591405	3.048199	2.774225	4.566632	4.563049	3.343316
3.494434	3.102688	2.774125	4.669445	4.520519	3.367882
3.396287	3.14221	2.776162	4.716876	4.470564	3.391466
3.380544	3.149	2.776412	4.72676	4.451538	3.490326
3.272693	3.169022	2.776565	4.771844	4.447316	3.503124
3.001618	3.347065	2.777984	4.905297	4.438048	3.536952
2.872485	3.417059	2.777726	4.997467	4.406629	3.618729
2.845829	3.432975	2.777752	5.014185	4.404225	3.661978
2.699363	3.557879	2.775132	5.030357	4.402788	3.670186
2.359142	3.767708	2.77538	5.106084	4.408957	3.711436
2.215502	3.898924	2.775572	5.181999	4.42949	3.747492
2.184427	3.923182	2.776565	5.246157	4.44496	3.8374
2.088707	4.00971	2.776698	5.256873	4.447694	3.84982
1.847727	4.0384	2.7804	5.30737	4.463811	3.918217
1.697217	4.121286	2.784439	5.42278	4.475427	3.964703
1.669085	4.132344	2.785812	5.490616	4.505715	4.12306
1.500448	4.310805	2.786128	5.503545	4.528574	4.189573
1.183499	4.375654	2.78941	5.529582	4.532619	4.204078
1.044037	4.50299	2.789598	5.637662	4.562339	4.241877
0.941442	4.559025	2.79152	5.682914	4.625214	4.304112
0.924944	4.570661	2.791751	5.692847	4.652923	4.344121
0.844046	4.635843	2.793417	5.704672	4.658754	4.351423
0.715231	4.763825	2.795763	5.77217	4.681265	4.372469
0.646728	4.821289	2.797971	5.797595	4.710043	4.43843
0.633335	4.833347	2.798333	5.803465	4.722404	4.457147
0.570963	4.854858	2.799357	5.816571	4.725015	4.462079
0.48024	4.932673	2.7995	5.944343	4.729374	4.480674

Table A12 (4)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.437296	4.988884	2.800359	6.02858	4.742646	4.505925
0.42853	4.998964	2.797921	6.065648	4.745377	4.552542
0.394739	5.027373	2.797645	6.072932	4.746244	4.559256
0.336394	5.082133	2.796702	6.1532	4.750835	4.588257
0.307725	5.161466	2.79866	6.269058	4.753974	4.649707
0.301909	5.173395	2.801866	6.343965	4.756809	4.738132
0.278965	5.220488	2.802354	6.357641	4.753246	4.774825
0.25238	5.257446	2.806763	6.39277	4.752889	4.782606
0.245127	5.404282	2.80857	6.512716	4.744596	4.800948
0.238864	5.430805	2.808314	6.579555	4.720434	4.848263
0.237941	5.439845	2.808336	6.592624	4.707767	4.879031
0.227318	5.509189	2.807598	6.616882	4.70524	4.884715
0.199039	5.605373	2.805929	6.688363	4.699371	4.900335
0.187052	5.679982	2.804744	6.725386	4.697898	4.94395
0.184454	5.69288	2.804532	6.732813	4.697813	4.970003
0.175071	5.74783	2.805339	6.75979	4.697772	4.974959
0.157952	5.796949	2.805753	6.777498	4.702028	4.99448
0.154281	5.860823	2.80355	6.919238	4.707417	5.018732
0.153175	5.870497	2.803424	7.005532	4.707718	5.058778
0.154249	5.909512	2.803316	7.022051	4.70796	5.064645
0.149571	5.955632	2.799996	7.039506	4.705939	5.081743
0.147115	6.062274	2.798004	7.050911	4.698409	5.090326
0.146615	6.077156	2.795533	7.075849	4.691946	5.140747
0.141762	6.107796	2.79516	7.079339	4.687085	5.159479
0.130388	6.149281	2.793811	7.145151	4.686255	5.163822
0.123758	6.244438	2.793304	7.258324	4.680547	5.176583
0.12014	6.324313	2.794241	7.315623	4.67533	5.195846
0.119484	6.338004	2.794341	7.327068	4.669635	5.210445
0.116629	6.364352	2.796739	7.427254	4.668738	5.21299
0.11912	6.467909	2.799964	7.526431	4.668346	5.231213
0.117585	6.51908	2.80001	7.580558	4.660588	5.262831
0.11751	6.529561	2.800141	7.590957	4.657701	5.275687
0.116245	6.583767	2.801067	7.617553	4.657025	5.278504
0.116981	6.649762	2.801487	7.646913	4.654276	5.301298
0.118263	6.695328	2.802473	7.707708	4.646863	5.325251
0.118458	6.703407	2.801321	7.737681	4.645171	5.376852
0.117646	6.757418	2.801215	7.743703	4.644667	5.384063

Table A12 (5)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.115699	6.789662	2.801829	7.754864	4.635148	5.419275
0.115296	6.833054	2.804075	7.815913	4.631608	5.456666
0.115169	6.839525	2.804637	7.843517	4.625012	5.500283
0.114768	6.856501	2.804796	7.849409	4.623455	5.514721
0.10894	6.872539	2.805197	7.897879	4.623015	5.518074
0.105442	6.915172	2.806641	7.966394	4.619157	5.544825
0.103883	6.951362	2.805769	7.997931	4.612881	5.648488
0.10358	6.957562	2.805718	8.004441	4.605805	5.691582
0.101865	6.963941	2.806451	8.041658	4.604682	5.701061
0.099676	7.067479	2.806632	8.122496	4.602561	5.739171
0.099256	7.096839	2.808733	8.159403	4.59538	5.765776
0.099124	7.1047	2.808996	8.167153	4.594658	5.803447
0.098409	7.140664	2.810033	8.226041	4.594282	5.809043
0.093844	7.220966	2.813762	8.232917	4.593132	5.824669
0.09152	7.242405	2.815449	8.300945	4.596031	5.859909
0.091047	7.248202	2.816825	8.395145	4.592022	5.944563
0.088409	7.297921	2.817045	8.409762	4.594948	5.984968
0.084658	7.353895	2.819016	8.490351	4.595142	5.99327
0.083453	7.454419	2.818844	8.650232	4.59164	6.043554
0.082205	7.533843	2.817073	8.71936	4.592011	6.116717
0.082023	7.547614	2.816834	8.734112	4.593727	6.153027
0.080742	7.550561	2.816194	8.766157	4.593979	6.160271
0.078698	7.650533	2.814238	8.909269	4.591899	6.193475
0.077291	7.656785	2.811499	8.972978	4.590608	6.234602
0.077039	7.661597	2.811081	8.986617	4.58944	6.268644
0.074343	7.703319	2.811291	9.017467	4.589252	6.274386
0.069448	7.703078	2.808112	9.118717	4.589607	6.311216
0.067843	7.736394	2.80666	9.171941	4.58699	6.339698
0.067459	7.740338	2.804609	9.223697	4.581752	6.400719
0.066824	7.795818	2.80431	9.231759	4.580994	6.409287
0.064359	7.873118	2.799629	9.296303	4.578713	6.444121
0.062727	7.895815	2.797571	9.437492	4.563999	6.473953
0.062428	7.901527	2.795796	9.536833	4.556636	6.541884
0.060496	7.914639	2.795515	9.5547	4.555133	6.551286
0.061923	7.978552	2.796934	9.619336	4.550325	6.568845
0.061822	8.021463	2.79337	9.782737	4.547612	6.59473
0.061875	8.029333	2.789889	9.814953	4.542632	6.635032

Table A12 (6)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.062077	8.0479	2.789302	9.82534	4.545421	6.652667
0.069028	8.063947	2.78805	9.822838	4.54559	6.656364
0.070013	8.106772	2.786704	9.93327	4.545459	6.690835
0.07044	8.127306	2.785497	9.98961	4.544959	6.766928
0.070489	8.131527	2.785297	10.00112	4.543651	6.803819
0.070255	8.167775	2.784012	10.00906	4.543468	6.811311
0.070223	8.239345	2.784358	10.04078	4.546907	6.854877
0.070273	8.266699	2.784733	10.09406	4.547399	6.919707
0.070279	8.272847	2.78542	10.13034	4.547883	6.954179
0.071789	8.296404	2.78552	10.13689	4.547947	6.960859
0.074571	8.354746	2.787392	10.2081	4.547863	6.992911
0.073705	8.378924	2.787218	10.24652	4.550748	7.016544
0.073705	8.384212	2.787064	10.30089	4.551567	7.071094
0.071422	8.412441	2.787027	10.3089	4.551788	7.078671
0.071323	8.447705	2.78826	10.32339	4.556493	7.105596
0.071964	8.554852	2.785689	10.49894	4.558786	7.147647
0.072046	8.569296	2.785317	10.58108	4.562645	7.193389
0.070687	8.581628	2.785162	10.59831	4.563195	7.200649
0.065947	8.586559	2.782964	10.64354	4.566072	7.230091
0.064174	8.597418	2.773206	10.72611	4.569795	7.256135
0.062682	8.627385	2.766497	10.7569	4.577857	7.286297
0.062451	8.631585	2.765276	10.76394	4.580867	7.315443
0.061259	8.652807	2.763954	10.81305	4.581549	7.320174
0.061927	8.706422	2.759501	10.86192	4.579993	7.348479
0.062944	8.743718	2.758899	10.89092	4.585201	7.392981
0.063106	8.750463	2.760349	10.90728	4.591641	7.421731
0.063981	8.781283	2.760533	10.91022	4.592663	7.42697
0.061801	8.791176	2.764059	10.9129	4.600598	7.45779
0.060719	8.789808	2.76697	10.9222	4.606425	7.478924
0.060491	8.789909	2.770098	10.91006	4.608467	7.544237
0.059438	8.79096	2.77059	10.9089	4.608926	7.553063
0.057286	8.819025	2.771205	10.97253	4.610842	7.587763
0.055929	8.930107	2.774726	11.06895	4.614021	7.647098
0.055677	8.944895	2.777819	11.0805	4.617893	7.682862
0.05547	8.969323	2.778345	11.08561	4.618477	7.689387
0.054411	8.969649	2.775006	11.0893	4.622587	7.724919
0.053728	8.992685	2.768902	11.1603	4.628109	7.759308

Table A12 (7)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.052676	9.015319	2.76338	11.18009	4.627399	7.834118
0.052522	9.019089	2.701668	11.18506	4.627519	7.844611
0.051019	9.02555			4.630277	7.892795
0.047522	9.02157			4.634838	7.93149
0.046186	9.059436			4.637799	8.012734
0.045883	9.063984			4.638339	8.024124
0.044866	9.097924			4.637794	8.05751
0.04499	9.153947			4.638007	8.081798
0.045404	9.180037			4.63796	8.12971
0.045465	9.185395			4.638125	8.174358
0.045559	9.220262			4.638143	8.181774
0.047526	9.239406			4.640956	8.212225
0.047767	9.396794			4.640867	8.29199
0.047441	9.497239			4.640934	8.328961
0.047396	9.516208			4.640924	8.336583
0.043382	9.601579			4.641186	8.359921
0.042939	9.694361			4.636304	8.402563
0.042184	9.712265			4.636817	8.420671
0.042094	9.717766			4.636681	8.424544
0.041648	9.731612			4.637082	8.450213
0.040719	9.761746			4.633158	8.476416
0.041245	9.798059			4.628581	8.515434
0.041275	9.803752			4.627851	8.521234
0.042232	9.832889			4.62077	8.531228
0.042853	9.841978			4.60382	8.544063
0.043554	9.854148			4.598533	8.586803
0.043663	9.85591			4.597204	8.592548
0.04373	9.868674			4.594107	8.609662
0.040864	9.871749			4.587755	8.643901
0.040528	9.99673			4.569046	8.686897
0.040166	9.99577			4.563535	8.704541
0.040125	10.00065			4.562127	8.708275
0.037512	10.02212			4.559949	8.73118
0.035998	10.07018			4.555504	8.768308
0.035398	10.12642			4.558043	8.77822
0.035277	10.13525			4.558197	8.780826
0.034767	10.14299			4.553589	8.793423

Table A12 (8)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
0.033833	10.16665			4.555201	8.82103
0.032654	10.16686			4.553272	8.843462
0.032471	10.1678			4.553123	8.847309
0.031408	10.15126			4.553305	8.882231
0.031124	10.29552			4.5539	8.901231
0.030377	10.36048			4.551516	8.959229
0.030278	10.37432			4.551246	8.967019
0.029887	10.42372			4.546068	9.016044
0.029609	10.55361			4.53264	9.074749
0.029298	10.57988			4.521231	9.169835
0.029249	10.58825			4.519333	9.18352
0.028587	10.60616			4.507951	9.269201
0.02873	10.62314			4.487524	9.292777
0.028075	10.67465			4.431172	9.359899
0.02759	10.85324			4.400161	9.386626
0.027501	10.87793			4.394111	9.392551
0.028462	10.97789			4.368046	9.445398
0.02809	11.12383			4.312361	9.549016
0.027564	11.15403			4.284559	9.597812
0.027477	11.16313			4.278947	9.607867
0.027194	11.1761			4.256248	9.635657
0.027295	11.20095			4.224782	9.687513
0.027636	11.21404			4.207842	9.723807
0.027684	11.2166			4.204555	9.730308
0.028935	11.22195			4.190405	9.773664
0.033425	11.23291			4.168735	9.798955
0.034496	11.23721			4.156704	9.871116
0.034808	11.23817			4.149823	9.89039
0.035887	11.23917			4.148612	9.895553
0.036984	11.24287			4.144164	9.925294
0.037789	11.24265			4.135015	10.01895
0.037928	11.24277			4.130008	10.06874
0.038353	11.24772			4.129033	10.07864
0.039037	11.24655			4.127171	10.10073
0.039477	11.24945			4.123052	10.13432
				4.118214	10.16179
				4.117455	10.16646

Table A12 (9)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
				4.116076	10.19448
				4.109466	10.24292
				4.10143	10.32485
				4.100168	10.33687
				4.090681	10.373
				4.0628	10.40118
				4.050925	10.43907
				4.036521	10.47281
				4.034396	10.47844
				4.021068	10.49405
				4.004867	10.53827
				4.000941	10.56111
				3.99987	10.56568
				3.994277	10.58859
				3.977736	10.63972
				3.965017	10.67688
				3.962781	10.68349
				3.948909	10.71624
				3.925917	10.749
				3.913387	10.77331
				3.910947	10.77753
				3.898812	10.80129
				3.872488	10.81636
				3.859268	10.86687
				3.848045	10.89584
				3.846255	10.90145
				3.834499	10.92886
				3.822679	10.97486
				3.814895	10.99963
				3.813511	11.00443
				3.806974	11.03176
				3.791855	11.07694
				3.782571	11.10574
				3.780827	11.11104
				3.773336	11.12665
				3.745892	11.13408
				3.732373	11.15591

Table A12 (10)					
8-Nov		16-Nov		21-Nov	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
				3.729618	11.15884
				3.718355	11.16838
				3.708694	11.1733
				3.695436	11.17932
				3.689693	11.18507
				3.688495	11.18601
				3.681418	11.18298
				3.673245	11.19377
				3.668483	11.19455
				3.667592	11.19511
				3.665362	11.19424
				3.660189	11.20385
				3.652281	11.20544
				3.651097	11.20603

Table A13. Rugged Dissolved Oxygen Concentration (mg/L) and Depth by Date. 3 December to 21 December. Data recorded by Aqua-Troll 500 sonde.

Table A13 (1)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
10.45414	0.184445	6.800121	0.11998	12.41464	0.183758
10.47631	0.184556	6.794194	0.122384	12.43463	0.186968
10.59025	0.183008	6.793128	0.122774	12.44636	0.185552
10.6823	0.175956	6.790246	0.15974	12.44858	0.185517
10.80573	0.251594	6.783525	0.193113	12.45301	0.182814
10.82433	0.260719	6.774663	0.335991	12.46461	0.183058
10.88777	0.304531	6.769741	0.388045	12.46908	0.239359
10.93114	0.336928	6.768802	0.40018	12.46881	0.279715
11.0048	0.441011	6.76621	0.460675	12.46889	0.28709
11.01544	0.45501	6.771473	0.593155	12.46772	0.311925
11.03573	0.532598	6.781205	0.685678	12.48222	0.416015
11.04584	0.62604	6.782652	0.702263	12.48349	0.483425
10.9798	0.825024	6.786335	0.721122	12.48424	0.495917
10.88899	0.932392	6.771184	0.824049	12.48435	0.547685
10.87492	0.953102	6.761833	0.847103	12.49994	0.661642
10.74014	1.041542	6.760042	0.854034	12.50455	0.723272
10.38858	1.179479	6.75549	0.894073	12.50576	0.735372
10.18112	1.271691	6.747183	0.973865	12.50717	0.779817
10.14165	1.288323	6.743344	1.018741	12.50016	0.901852
9.949164	1.381341	6.742546	1.0274	12.51014	0.925938
9.545366	1.448834	6.747346	1.072705	12.51108	0.933798
9.352519	1.651591	6.747879	1.162401	12.50542	1.013333
9.312905	1.679182	6.735338	1.196315	12.51195	1.033894
9.137134	1.772442	6.713171	1.243347	12.50099	1.080391
8.984991	1.82738	6.709851	1.250117	12.50044	1.101103
8.743361	1.927072	6.664121	1.288316	12.49989	1.105461
8.707951	1.941303	6.650486	1.348326	12.50705	1.112723
8.603234	2.017239	6.634771	1.385513	12.50446	1.180094
8.51944	2.05838	6.632492	1.392408	12.49806	1.201477
8.396171	2.097991	6.622934	1.447963	12.49712	1.206812
8.325996	2.107603	6.606248	1.49414	12.50904	1.230968
8.312677	2.110148	6.600653	1.514925	12.4958	1.270501
8.252303	2.143311	6.599315	1.519152	12.50018	1.298582

Table A13 (2)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
8.150663	2.167975	6.588467	1.56149	12.50013	1.303581
8.099726	2.260479	6.574199	1.634	12.49292	1.327712
8.089529	2.272914	6.557512	1.670439	12.48463	1.402141
8.061512	2.319432	6.53645	1.719068	12.47092	1.467941
8.026021	2.358707	6.533192	1.72624	12.45292	1.525017
7.933228	2.370199	6.49496	1.740876	12.45013	1.534431
7.920371	2.373036	6.488657	1.842697	12.41996	1.563448
7.865951	2.417488	6.470975	1.88023	12.39497	1.618335
7.814884	2.436977	6.468728	1.888977	12.37575	1.664541
7.736696	2.467136	6.432254	1.972755	12.37249	1.672419
7.725154	2.471483	6.411996	2.097011	12.29109	1.713757
7.687767	2.511673	6.392138	2.165928	12.05354	1.764967
7.649554	2.569957	6.389016	2.17917	11.89677	1.789628
7.567781	2.613277	6.378533	2.225565	11.8679	1.794592
7.513346	2.635395	6.362913	2.345012	11.65285	1.800269
7.503394	2.639594	6.356147	2.428981	11.14294	1.858076
7.453537	2.685533	6.354712	2.444052	10.88414	1.88658
7.378204	2.722662	6.345952	2.501095	10.832	1.892465
7.341978	2.76439	6.306969	2.591476	10.62999	1.913754
7.334676	2.77087	6.270798	2.606219	10.27625	1.933374
7.306056	2.809558	6.264791	2.611527	10.10924	1.956412
7.287694	2.871566	6.240532	2.61008	9.987233	1.996942
7.246673	2.975539	6.199157	2.616192	9.967283	2.002889
7.240959	2.990813	6.173302	2.641782	9.860326	2.033435
7.215788	3.036627	6.153005	2.671833	9.694831	2.078065
7.179189	3.049924	6.149662	2.676639	9.596473	2.09167
7.109718	3.247778	6.129372	2.711484	9.577986	2.095021
7.076615	3.34747	6.120762	2.771141	9.490551	2.112934
7.069862	3.367985	6.096754	2.793064	9.315383	2.152955
7.030935	3.50277	6.0935	2.798032	9.22618	2.177957
6.982492	3.565907	6.074403	2.809801	9.208307	2.182624
6.959897	3.664096	6.046961	2.878036	9.100392	2.232645
6.955313	3.678254	6.030219	2.899757	8.926891	2.311102
6.92988	3.728622	6.027101	2.905198	8.824742	2.345382
6.901986	3.810811	6.013889	2.905495	8.805394	2.35266
6.889434	3.856879	5.998862	2.947565	8.691687	2.365553
6.886862	3.865727	5.990831	2.981627	8.328934	2.392198

Table A13 (3)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.87681	3.897318	5.989273	2.987567	8.10732	2.513786
6.863997	3.914645	5.982686	2.999498	7.900585	2.599436
6.846982	4.005754	5.979342	3.036869	7.867665	2.615022
6.844392	4.017601	5.978778	3.062828	7.691289	2.656367
6.836633	4.080186	5.972003	3.089628	7.305285	2.710472
6.828837	4.099168	5.971141	3.093837	7.081172	2.740131
6.82969	4.221783	5.967182	3.135282	7.038296	2.745832
6.829215	4.270692	5.966111	3.212862	6.846088	2.752221
6.829239	4.281673	5.968938	3.247208	6.482145	2.745548
6.832116	4.326117	5.969273	3.254441	6.295886	2.740278
6.831403	4.404392	5.96894	3.293648	6.258771	2.739327
6.821027	4.4605	5.965974	3.377635	6.108213	2.740254
6.819675	4.470479	5.962765	3.442737	5.843716	2.789653
6.821743	4.48833	5.962246	3.454096	5.706317	2.799488
6.814194	4.531929	5.959352	3.48908	5.679013	2.802744
6.817964	4.57794	5.946766	3.525087	5.558875	2.811971
6.818114	4.585373	5.942954	3.544407	5.359073	2.82961
6.813532	4.649857	5.941976	3.548138	5.248471	2.868718
6.813157	4.678357	5.93472	3.550098	5.158145	2.879054
6.808354	4.775181	5.921372	3.594425	5.14346	2.881832
6.807766	4.788059	5.919798	3.627586	5.071279	2.895915
6.809702	4.837754	5.914542	3.649122	4.950442	2.880395
6.803573	4.89819	5.913895	3.652914	4.891257	2.893092
6.795258	4.93626	5.909296	3.691112	4.879292	2.893973
6.789809	4.985617	5.904002	3.765876	4.827679	2.905653
6.788822	4.993027	5.902755	3.795745	4.718342	2.953554
6.789892	5.04608	5.902408	3.802329	4.664778	2.980202
6.776756	5.080351	5.900952	3.83519	4.65388	2.985425
6.775798	5.139668	5.897604	3.882655	4.609072	2.989547
6.775139	5.148223	5.897296	3.931841	4.541581	3.022294
6.772933	5.189442	5.897128	3.93975	4.509989	3.075922
6.764605	5.232569	5.897336	3.958796	4.478611	3.100613
6.763462	5.314569	5.889965	3.987946	4.473796	3.10569
6.762989	5.326346	5.885672	3.995562	4.432004	3.127711
6.75835	5.394282	5.88484	3.997641	4.413487	3.17594
6.751534	5.429473	5.881003	4.019707	4.393456	3.201618
6.741058	5.488979	5.875218	4.033987	4.390425	3.206675

Table A13 (4)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.739505	5.49751	5.873072	4.077318	4.378973	3.232563
6.73121	5.513679	5.866583	4.10601	4.356281	3.254947
6.729133	5.564901	5.865716	4.111256	4.345474	3.284483
6.714811	5.625779	5.866075	4.13908	4.343253	3.288958
6.709619	5.666919	5.86174	4.179003	4.332107	3.299933
6.7084	5.674267	5.85854	4.197278	4.308911	3.340808
6.704514	5.68399	5.85796	4.201039	4.292746	3.358461
6.690681	5.695703	5.858302	4.217662	4.289838	3.362286
6.679826	5.741091	5.856511	4.256047	4.271441	3.383776
6.677931	5.747169	5.856513	4.336913	4.219652	3.391411
6.674242	5.792972	5.856438	4.348479	4.190273	3.418586
6.67149	5.832301	5.853179	4.410143	4.158577	3.439637
6.669909	5.867443	5.853685	4.52363	4.153698	3.44335
6.669618	5.873212	5.85172	4.580503	4.125293	3.462271
6.664443	5.906961	5.851512	4.591978	4.062342	3.492941
6.664062	5.95481	5.85248	4.677513	4.03369	3.510667
6.656808	5.991536	5.850682	4.772511	4.027689	3.514035
6.65592	5.997912	5.851247	4.801817	4.00807	3.532149
6.651955	6.064974	5.850193	4.847458	3.970706	3.571655
6.648947	6.144886	5.850091	4.853798	3.957247	3.600469
6.638962	6.200271	5.850906	4.882127	3.954132	3.60559
6.637123	6.240823	5.843054	4.95334	3.943561	3.627568
6.636508	6.24769	5.84803	4.982825	3.917943	3.650061
6.626189	6.2706	5.848335	4.989259	3.907812	3.663532
6.61976	6.349973	5.848733	5.025678	3.905545	3.666044
6.609542	6.466717	5.841888	5.120991	3.895007	3.671716
6.608054	6.48448	5.83925	5.184502	3.873035	3.696842
6.603211	6.487348	5.83864	5.196144	3.864291	3.748339
6.597701	6.516849	5.841044	5.281868	3.856817	3.764425
6.596096	6.633398	5.837179	5.476778	3.855649	3.768388
6.595692	6.649077	5.836277	5.580945	3.848951	3.785626
6.589943	6.715876	5.835999	5.601387	3.828814	3.839387
6.586518	6.826909	5.832612	5.634145	3.817548	3.853334
6.583556	6.978781	5.813209	5.732764	3.815352	3.857184
6.588675	7.057778	5.803894	5.782295	3.801127	3.903892
6.589233	7.073173	5.793134	5.80481	3.784649	3.912862
6.585634	7.135361	5.791515	5.809037	3.775769	3.91666

Table A13 (5)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.576457	7.25366	5.776313	5.816687	3.774052	3.9173
6.568726	7.297312	5.757716	5.836535	3.769828	3.945465
6.567399	7.307242	5.729857	5.837086	3.76393	3.958577
6.560519	7.376041	5.725683	5.837918	3.759925	3.940613
6.553789	7.416983	5.704303	5.853548	3.759429	3.936404
6.548948	7.415669	5.655661	5.882252	3.759244	3.935059
6.548103	7.41683	5.637148	5.95943	3.7547	3.93206
6.547928	7.363395	5.632947	5.970134	3.75232	3.979168
6.549024	7.350549	5.614344	5.992447	3.749	4.006669
6.546943	7.365517	5.578489	6.028055	3.748512	4.012057
6.546731	7.367056	5.561825	6.105416	3.739032	4.020381
6.544562	7.392871	5.558362	6.11634	3.711764	4.03029
6.544271	7.401704	5.543336	6.174212	3.698483	4.041381
6.543347	7.414264	5.511461	6.23199	3.695758	4.043127
6.541189	7.419717	5.501745	6.323679	3.685099	4.048305
6.54088	7.420853	5.483887	6.423188	3.670058	4.127839
6.547077	7.488321	5.481442	6.439049	3.661813	4.156653
6.540876	7.53292	5.457044	6.521204	3.660216	4.163475
6.547071	7.581515	5.441926	6.552051	3.654718	4.185111
6.547565	7.589064	5.421959	6.587556	3.641161	4.187955
6.545654	7.62078	5.418985	6.592795	3.638021	4.206492
6.5416	7.648561	5.401753	6.596754	3.633468	4.233676
6.531979	7.712393	5.370714	6.615468	3.632848	4.237845
6.530626	7.721326	5.355939	6.64673	3.629927	4.275864
6.5267	7.738217	5.352908	6.651365	3.628478	4.366983
6.522487	7.757482	5.344776	6.691652	3.624276	4.423746
6.51926	7.815578	5.323819	6.779817	3.623706	4.434368
6.518702	7.823472	5.317395	6.802231	3.622868	4.485663
6.51711	7.879628	5.315779	6.80844	3.620155	4.534151
6.51704	7.967196	5.308078	6.832271	3.61893	4.542902
6.517294	8.141167	5.294858	6.842216	3.61867	4.545748
6.520691	8.183176	5.288914	6.894761	3.618021	4.569122
6.521133	8.194938	5.283749	6.908269	3.617954	4.645038
6.527723	8.243383	5.282937	6.91203	3.616492	4.714892
6.542584	8.266242	5.272321	6.940997	3.616312	4.726538
6.54867	8.283465	5.271894	7.00452	3.614444	4.79392
6.550003	8.286291	5.263361	7.057848	3.612062	4.813639

Table A13 (6)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.553248	8.268793	5.26233	7.066961	3.605841	4.889582
6.556736	8.292393	5.258851	7.116041	3.599022	4.908924
6.573626	8.357961	5.252145	7.173566	3.597923	4.91431
6.575852	8.367144	5.248011	7.241183	3.591087	4.949098
6.58696	8.416215	5.247239	7.251667	3.575937	4.995474
6.598116	8.442697	5.244748	7.306705	3.56583	5.021862
6.626602	8.534834	5.243546	7.443822	3.563982	5.026876
6.630529	8.547089	5.240919	7.484974	3.555236	5.052969
6.649707	8.57256	5.240556	7.49552	3.538467	5.088967
6.671443	8.599909	5.236699	7.52146	3.532199	5.109134
6.699328	8.669162	5.231236	7.534115	3.530769	5.113002
6.706591	8.732423	5.231462	7.585763	3.519925	5.135465
6.708504	8.743045	5.224555	7.605992	3.494375	5.155891
6.71237	8.800576	5.223723	7.610555	3.47925	5.186105
6.725713	8.846751	5.217322	7.611061	3.464002	5.211329
6.730927	8.918083	5.214595	7.701304	3.461632	5.215596
6.732094	8.92858	5.210009	7.746504	3.437968	5.231128
6.746894	8.957458	5.209355	7.755824	3.421311	5.266528
6.754187	8.961082	5.210526	7.815169	3.404836	5.283468
6.777833	8.986193	5.21137	7.879406	3.402222	5.286946
6.780999	8.989333	5.210567	7.923907	3.381631	5.343237
6.786949	9.063545	5.210496	7.931792	3.343323	5.399104
6.802071	9.083642	5.210274	7.945245	3.324949	5.432246
6.820529	9.133901	5.214335	8.063584	3.321191	5.438388
6.824743	9.167915	5.215763	8.124371	3.303155	5.48117
6.825918	9.174118	5.219223	8.174995	3.280891	5.607818
6.83525	9.214596	5.219694	8.183106	3.270277	5.624928
6.842297	9.289192	5.219611	8.204319	3.268121	5.632094
6.845376	9.327653	5.217331	8.248043	3.260185	5.652956
6.845991	9.335239	5.217171	8.304669	3.25376	5.68487
6.838868	9.372432	5.217059	8.313453	3.248105	5.737452
6.836154	9.37872	5.217878	8.346227	3.247027	5.766117
6.834784	9.37815	5.219951	8.468077	3.246705	5.771664
6.834537	9.378147	5.220766	8.552457	3.246066	5.838046
6.83125	9.361432	5.220948	8.567809	3.235464	5.932127
6.834898	9.362932	5.222699	8.614264	3.223706	5.980472
6.833243	9.391801	5.223325	8.756047	3.221802	5.99

Table A13 (7)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.833205	9.395477	5.219228	8.834142	3.206641	6.01185
6.832668	9.419418	5.218741	8.849457	3.174332	6.10135
6.834772	9.466428	5.219739	8.869211	3.15608	6.143612
6.829853	9.543554	5.210088	8.993252	3.152555	6.152435
6.830735	9.601509	5.206336	9.065383	3.139637	6.169107
6.830637	9.611667	5.199346	9.159988	3.104777	6.262764
6.828199	9.627482	5.198368	9.174121	3.088244	6.274694
6.812758	9.671277	5.190401	9.216995	3.084835	6.279915
6.792761	9.79569	5.186008	9.331963	3.078012	6.302161
6.78963	9.813051	5.179442	9.385422	3.062327	6.301972
6.775909	9.858443	5.178482	9.396577	3.053598	6.351314
6.738686	9.893715	5.175708	9.453185	3.048935	6.383511
6.719499	9.938488	5.17334	9.550259	3.048091	6.389576
6.715653	9.945288	5.169292	9.58441	3.041631	6.468412
6.69441	10.00166	5.168708	9.592365	3.028159	6.577781
6.683573	10.00378	5.166516	9.66366	3.018319	6.630463
6.658231	10.03156	5.161946	9.836849	3.01657	6.641097
6.65474	10.03485	5.163225	9.899951	3.00427	6.672286
6.642409	10.11221	5.163201	9.914608	2.985432	6.777071
6.634384	10.15941	5.163362	9.919016	2.98062	6.849019
6.612	10.24472	5.163212	10.00668	2.979305	6.862115
6.590249	10.28254	5.15905	10.19054	2.977239	6.92103
6.586656	10.29045	5.157406	10.2492	2.960509	6.944916
6.55808	10.35025	5.157032	10.26348	2.950529	6.948281
6.505178	10.37267	5.151836	10.34602	2.948617	6.949467
6.473702	10.4686	5.15275	10.55704	2.938167	6.94025
6.467757	10.48125	5.151632	10.62033	2.910644	6.95085
6.43702	10.52317	5.151557	10.6364	2.896983	7.006489
6.387397	10.54618	5.149142	10.67021	2.885366	7.051692
6.358443	10.61397	5.143786	10.90638	2.883509	7.059592
6.352952	10.62316	5.141086	10.97206	2.873102	7.081356
6.318785	10.69633	5.140542	10.98976	2.837821	7.109781
6.293756	10.77855	5.138668	11.01774	2.821654	7.164959
6.253395	10.83913	5.133179	11.09077	2.818247	7.172908
6.247518	10.84971	5.126399	11.11252	2.803669	7.23822
6.229418	10.8892	5.107288	11.12528	2.772722	7.356928
6.204805	10.91393	5.104616	11.12729	2.757562	7.364593

Table A13 (8)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
6.165253	11.0256	5.074846	11.12966	2.754473	7.370165
6.14162	11.05523	5.059059	11.1408	2.744022	7.453633
6.137187	11.06332	5.036825	11.14219	2.722217	7.543121
6.121519	11.09859	5.033553	11.1428	2.711619	7.650479
6.063156	11.12891			2.699079	7.704639
6.007267	11.17386			2.697215	7.715148
5.997968	11.18054			2.676404	7.805989
5.953261	11.19589			2.666682	7.871838
5.838272	11.20064			2.655128	7.906059
5.233533	11.1999			2.653398	7.912505
5.153912	11.19993			2.640167	7.944831
4.844522	11.1956			2.617627	8.133322
				2.608476	8.188424
				2.606478	8.202844
				2.597111	8.195334
				2.584199	8.275096
				2.57857	8.35128
				2.577382	8.364017
				2.573067	8.461378
				2.563893	8.530567
				2.558994	8.647153
				2.553476	8.68957
				2.552637	8.699186
				2.5464	8.714386
				2.543636	8.754304
				2.540416	8.84114
				2.539933	8.85359
				2.536422	8.881277
				2.528849	8.930433
				2.523195	9.014645
				2.522198	9.027016
				2.518144	9.110765
				2.511921	9.174496
				2.508307	9.184014
				2.507621	9.187479
				2.503277	9.18662
				2.498695	9.248525

Table A13 (9)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
				2.496167	9.257806
				2.493607	9.28075
				2.493209	9.283654
				2.49244	9.297144
				2.488907	9.433542
				2.487846	9.462591
				2.487574	9.47171
				2.487018	9.578784
				2.480786	9.664093
				2.47708	9.677839
				2.476367	9.682569
				2.473994	9.704608
				2.470049	9.758403
				2.470469	9.793191
				2.470368	9.799579
				2.470395	9.857162
				2.465797	9.937385
				2.463632	10.02312
				2.461111	10.04733
				2.460732	10.05337
				2.457108	10.08084
				2.457967	10.13847
				2.455947	10.16828
				2.45575	10.1742
				2.453322	10.30104
				2.44538	10.53898
				2.442127	10.57319
				2.441413	10.58648
				2.434511	10.64324
				2.424865	10.718
				2.41879	10.80657
				2.41767	10.82033
				2.409494	10.90749
				2.401111	10.95858
				2.396598	11.02049
				2.391917	11.04507
				2.391194	11.05036

Table A13 (10)					
3-Dec		19-Dec		27-Dec	
RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)	RDO (mg/L)	Depth (M)
				2.384747	11.06382
				2.37628	11.08597
				2.369913	11.08993
				2.368804	11.09126
				2.36774	11.08913
				2.363827	11.10002
				2.361549	11.09708
				2.36111	11.09717
				2.359544	11.10148

Table A14. Density (g/cm^3) and Depth by Date. 4 July to 29 July 2019. Data recorded by Aqua-Troll 500 sonde.

Table A14 (1)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
Density (g/cm³)	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**
0.995459	0.124813	0.995526	0.192846	0.996197	0.188378	0.996487	0.192531
0.995459	0.124813	0.995884	0.278703	0.99612	-0.01277	0.995613	0.200141
0.995454	0.13626	0.995822	0.211427	0.996118	0.172364	0.995612	0.196568
0.99546	0.138199	0.995801	0.201985	0.996106	0.255863	0.995611	0.195824
0.995434	0.272552	0.995797	0.198329	0.996104	0.274877	0.995604	0.19592
0.995391	0.411018	0.995789	0.234125	0.995967	0.656943	0.995603	0.21237
0.995383	0.553965	0.995768	1.013424	0.995921	1.166797	0.995603	0.214396
0.99538	0.576628	0.995779	1.458897	0.995906	1.417936	0.995601	0.312464
0.995379	0.736059	0.99578	1.544234	0.995903	1.468242	0.995601	0.377113
0.995381	1.043338	0.995799	1.9255	0.9959	1.734521	0.995601	0.388176
0.995388	1.221184	0.995817	2.614126	0.99589	2.270415	0.995605	0.451892
0.995389	1.254886	0.995826	3.012946	0.995889	2.638459	0.995631	0.570916
0.995395	1.364484	0.995828	3.088348	0.995888	2.704049	0.995647	0.630042
0.995401	1.564289	0.995846	3.425535	0.99589	2.873577	0.99565	0.641556
0.995403	1.704424	0.995895	4.112959	0.995896	3.470232	0.995669	0.697204
0.995404	1.729057	0.995926	4.48715	0.995899	3.750427	0.995672	0.705521
0.995406	1.866242	0.995932	4.560146	0.9959	3.808098	0.995697	0.804328
0.995409	2.185988	0.995978	4.892902	0.995908	4.117818	0.995732	0.932524
0.995412	2.289515	0.996078	5.604477	0.995932	4.62907	0.995749	1.004062
0.995412	2.314833	0.996161	5.855303	0.995963	4.968406	0.995752	1.015816
0.995413	2.598338	0.996175	5.913417	0.995967	5.029387	0.995781	1.136748
0.995419	2.716891	0.996265	6.127141	0.996009	5.262066	0.995791	1.22376
0.995424	2.843933	0.996432	6.455745	0.996102	5.560981	0.995793	1.238453
0.995424	2.862552	0.996522	6.566215	0.996142	5.872057	0.9958	1.305865
0.995428	3.069314	0.996612	6.651817	0.99615	5.921813	0.995816	1.373794
0.995433	3.157687	0.996626	6.664785	0.996207	6.190311	0.995828	1.453127
0.995436	3.298299	0.996737	6.884508	0.996475	6.602722	0.99583	1.463913
0.995437	3.317681	0.996813	7.082329	0.996584	6.850335	0.995847	1.633695
0.995444	3.534383	0.996951	7.204572	0.996608	6.896535	0.995854	1.663991
0.995447	3.668391	0.99697	7.226547	0.996744	7.165288	0.995856	1.67413
0.995454	3.749101	0.997213	7.52156	0.997015	7.771225	0.995866	1.741468
0.995455	3.763228	0.997306	7.76537	0.997124	8.026599	0.99588	1.890615
0.995469	4.036903	0.997424	7.958881	0.997243	8.338537	0.995887	1.974208

Table A14 (2)

4-Jul		18-Jul		22-Jul		29-Jul	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
0.995475	4.150299	0.997441	7.991128	0.997261	8.384237	0.995889	1.989008
0.995485	4.225568	0.997585	8.322828	0.997372	8.619832	0.995908	2.027511
0.995487	4.237772	0.997635	8.447428	0.997531	9.277065	0.99591	2.034591
0.995516	4.448973	0.997704	8.689784	0.997603	9.660085	0.995916	2.090953
0.995535	4.561795	0.997714	8.723441	0.997618	9.733139	0.995936	2.175064
0.995552	4.649994	0.99778	8.937428	0.997697	9.963819	0.995942	2.252657
0.995555	4.664282	0.997845	9.377711	0.997799	10.41783	0.995943	2.264389
0.995603	4.792207	0.997901	9.655623	0.997838	10.65634	0.99595	2.410294
0.995633	4.851207	0.99791	9.706736	0.997846	10.70354	0.995955	2.442638
0.995654	4.86712	0.997954	9.904078	0.997898	10.7579	0.995962	2.485292
0.995657	4.870814	0.998008	10.2087	0.997943	10.97857	0.995962	2.490606
0.995681	4.880911	0.998037	10.40205	0.997967	11.04497	0.995967	2.655262
0.995692	4.875078	0.998043	10.43668	0.997972	11.06192	0.995969	2.698523
0.995708	4.877275	0.998068	10.54248	0.997976	11.09767	0.995969	2.71016
0.995711	4.877266	0.998103	10.62863	0.998001	11.12295	0.995973	2.844984
0.995719	4.885593	0.998114	10.71778	0.99802	11.1275	0.995982	2.939194
0.99573	4.879582	0.998117	10.7318	0.998024	11.12897	0.995987	2.97117
0.995738	4.881554	0.998128	11.0037	0.998022	11.12539	0.995988	2.97808
0.99574	4.881512	0.998179	11.28531	0.998046	11.13108	0.996001	3.094361
0.995744	4.897233	0.99818	11.32837	0.998062	11.13409	0.996008	3.158415
0.995761	4.895197	0.998182	11.34394	0.998076	11.1418	0.996012	3.211749
0.995774	4.903874	0.998188	11.35556	0.998079	11.14286	0.996012	3.220283
0.995776	4.904791	0.998187	11.36728	0.998088	11.13777	0.996017	3.294526
0.995794	5.085684	0.99819	11.37097	0.9981	11.13572	0.996018	3.304803
0.995818	5.147894	0.99819	11.37183	0.998109	11.12868	0.996021	3.369351
0.995854	5.242514	0.998191	11.37511	0.99811	11.12775	0.996034	3.49719
0.99586	5.255602	0.998193	11.37619	0.998125	10.88002	0.996045	3.559771
0.995924	5.39954	0.998195	11.3829	0.998195	10.31796	0.996046	3.571137
0.995959	5.466586	0.998195	11.38376	0.998216	10.00279	0.996057	3.616068
0.995994	5.487921	0.998196	11.38557	0.998222	9.941951	0.996069	3.712688
0.996	5.49253	0.998199	11.39765	0.998225	9.634051	0.99607	3.725678
0.996024	5.511311	0.998201	11.40322	0.998224	9.015474	0.996078	3.84947
0.996088	5.517358	0.998201	11.40439	0.998213	8.509732	0.996086	3.850856
0.996111	5.502124	0.998202	11.40831	0.998212	8.422947	0.996087	3.85605
0.996116	5.500411	0.998202	11.41223	0.998196	7.950171	0.996092	3.915282
0.996165	5.57239	0.998205	11.41153	0.998135	7.118467	0.996105	3.973539
0.996223	5.7247	0.998205	11.41158	0.998078	6.650978	0.996111	4.057745

Table A14 (3)

4-Jul		18-Jul		22-Jul		29-Jul	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.996262	5.785428	0.998205	11.41708	0.998068	6.560966	0.996112	4.069796
0.996269	5.798692	0.998206	11.4146	0.997963	6.146464	0.996116	4.110018
0.996363	5.918632	0.998207	11.4151	0.997658	5.608354	0.996131	4.191993
0.996409	5.962201	0.998207	11.41503	0.997478	5.235072	0.996143	4.252319
0.996454	6.036632	0.998208	11.4175	0.997363	4.914319	0.996145	4.262856
0.996461	6.046754	0.998208	11.42133	0.997344	4.862551	0.996155	4.320061
0.996511	6.120753	0.998211	11.42011	0.997204	4.154666	0.996196	4.369153
0.996534	6.178772	0.998211	11.42011	0.996977	3.810034	0.996201	4.377254
0.996561	6.242347	0.998216	11.41807	0.996852	3.651	0.99623	4.46189
0.996565	6.252118	0.998314	10.94581	0.996828	3.621094	0.996248	4.529061
0.996725	6.399003	0.998309	10.60397	0.996723	3.283081	0.996268	4.575026
0.996775	6.445459	0.998325	10.12336	0.996597	2.704719	0.996271	4.582466
0.996787	6.456964	0.998326	10.05261	0.99653	2.308381	0.99629	4.629363
0.996815	6.498894	0.998328	8.909784	0.996517	2.238017	0.996317	4.709643
0.996851	6.622002	0.998319	8.550512	0.996482	1.997835	0.996321	4.721003
0.996876	6.667412	0.998304	8.218214	0.996402	1.509366	0.996333	4.801103
0.99688	6.677412	0.998301	8.168467	0.996365	1.253984	0.996337	4.79669
0.99691	6.702935	0.998274	7.105315	0.996358	1.2044	0.996338	4.79993
0.996979	6.792929	0.998159	6.711277	0.996323	0.957582	0.996338	4.864197
0.997046	6.817985	0.99807	6.398967	0.996254	0.483506	0.996345	4.962639
0.997056	6.824392	0.998055	6.349622	0.996196	0.255477	0.996353	5.026336
0.997104	6.854855	0.997752	5.624288			0.996355	5.037821
0.997196	6.924828	0.997606	5.235639			0.996375	5.146532
0.997255	7.046007	0.997403	4.783465			0.996377	5.161137
0.997265	7.063475	0.997373	4.716394			0.996383	5.238412
0.99738	7.120162	0.997241	4.329165			0.996397	5.274276
0.997475	7.246367	0.996948	3.667598			0.996399	5.280466
0.997509	7.285017	0.996828	3.265486			0.996412	5.330707
0.997517	7.29463	0.996802	3.190972			0.99642	5.399317
0.997549	7.338912	0.996735	2.922079			0.996427	5.445645
0.997642	7.501164	0.996624	2.246856			0.996428	5.453456
0.997682	7.5779	0.996546	1.892208			0.99645	5.586766
0.997691	7.5937	0.996532	1.822118			0.996468	5.667266
0.997718	7.679461	0.996469	1.386039			0.996471	5.681719
0.997789	7.741021	0.996359	0.531761			0.996493	5.727217
0.997808	7.779272	0.996295	0.245124			0.996529	5.770146
0.997813	7.785922	0.996283	0.179417			0.996542	5.818059

Table A14 (4)

4-Jul		18-Jul		22-Jul		29-Jul	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
0.997826	7.900765					0.996545	5.825395
0.997859	7.985416					0.996553	5.87053
0.997888	8.031253					0.996595	5.95908
0.997892	8.039546					0.996619	5.994739
0.997945	8.164005					0.996624	6.002548
0.997964	8.247821					0.996638	6.030055
0.997975	8.298363					0.996648	6.064627
0.997977	8.306964					0.996652	6.116949
0.998025	8.398159					0.996653	6.124685
0.998045	8.439125					0.996661	6.165855
0.99805	8.447531					0.996685	6.251335
0.99807	8.496666					0.9967	6.290283
0.998106	8.584121					0.996703	6.298433
0.998123	8.630094					0.996722	6.329153
0.998126	8.638991					0.996763	6.385956
0.998128	8.690802					0.996781	6.41303
0.998171	8.763072					0.996784	6.4184
0.998179	8.826596					0.99681	6.468071
0.998182	8.836989					0.996824	6.471457
0.998184	8.995056					0.99684	6.499753
0.9982	9.037546					0.996842	6.503036
0.998206	9.0732					0.996873	6.64217
0.998207	9.078263					0.996897	6.69303
0.998211	9.212792					0.996917	6.744761
0.998219	9.256632					0.99692	6.752514
0.998226	9.309235					0.996985	6.907446
0.998227	9.316778					0.997037	7.032664
0.998234	9.382844					0.997071	7.107802
0.99824	9.427324					0.997077	7.121247
0.998249	9.496382					0.997136	7.290808
0.99825	9.506279					0.997183	7.32455
0.998258	9.579016					0.997227	7.41712
0.998267	9.612563					0.997234	7.429086
0.998275	9.705532					0.997284	7.579351
0.998276	9.717955					0.997329	7.643057
0.998312	9.861902					0.997372	7.695453
0.998311	9.917208					0.997378	7.703849

Table A14 (5)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.998314	9.963813					0.997414	7.738412
0.998314	9.970945					0.997475	7.811899
0.998316	10.0699					0.997512	7.868619
0.998319	10.10103					0.997519	7.878433
0.998328	10.15182					0.997539	7.903685
0.998329	10.15878					0.997574	7.963286
0.998339	10.25835					0.997604	8.062286
0.998342	10.38089					0.997654	8.152463
0.998357	10.41607					0.997662	8.167516
0.998358	10.4246					0.997708	8.274035
0.99837	10.53433					0.997746	8.335026
0.998368	10.6109					0.997769	8.374874
0.998368	10.67027					0.997773	8.381722
0.998368	10.67993					0.997814	8.494925
0.99838	10.78566					0.997848	8.556876
0.998385	10.81409					0.997866	8.579397
0.998386	10.82169					0.99787	8.584154
0.99839	10.88891					0.9979	8.617671
0.998403	11.0071					0.997927	8.730859
0.9984	11.06521					0.997942	8.782005
0.998401	11.07685					0.997945	8.792825
0.998404	11.10134					0.997983	8.868196
0.998414	11.14947					0.997994	8.892185
0.998415	11.18074					0.998004	8.919314
0.998416	11.18639					0.998005	8.92306
0.998415	11.20062					0.998022	8.991359
0.998411	11.22326					0.998034	9.01345
0.998426	11.25802					0.998045	9.064925
0.998428	11.26302					0.998047	9.071905
0.998431	11.2867					0.998053	9.156349
0.998419	11.2996					0.998064	9.211423
0.998414	11.30989					0.998067	9.269156
0.998413	11.31156					0.998068	9.278141
0.998416	11.31991					0.998083	9.368961
0.998417	11.32614					0.998093	9.386419
0.998421	11.32438					0.998097	9.390936
0.998421	11.32438					0.998098	9.391716

Table A14 (6)							
4-Jul		**18-Jul**		**22-Jul**		**29-Jul**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.998424	11.33022					0.998099	9.526916
0.998421	11.32672					0.998115	9.599921
0.998419	11.33151					0.998126	9.663133
0.998419	11.33192					0.998128	9.673347
0.998416	11.33236					0.998149	9.728635
0.998413	11.33505					0.998166	9.816626
0.998412	11.33313					0.998173	9.862219
0.998411	11.33301					0.998175	9.87117
0.998409	11.33909					0.998177	9.895931
0.998407	11.33371					0.998207	10.15286
0.998408	11.33602					0.99822	10.22608
0.998408	11.33607					0.998233	10.31922
0.998406	11.33642					0.998235	10.33235
0.998406	11.32469					0.998251	10.52973
0.998407	11.32944					0.998256	10.65571
0.998407	11.32954					0.998267	10.7588
0.998407	11.33816					0.998268	10.77568
0.998406	11.34056					0.998272	10.77583
0.998405	11.33841					0.998275	10.91348
0.998405	11.33819					0.998279	10.90715
0.998408	11.33374					0.99828	10.91179
0.998407	11.33231					0.99828	11.10559
0.998407	11.32873					0.998287	11.12265
0.998407	11.32825					0.998292	11.13472
						0.998293	11.13606
						0.998287	11.24937
						0.998289	11.28658
						0.998285	11.29224
						0.998285	11.29403
						0.998281	11.30625
						0.998279	11.33693
						0.99828	11.34632
						0.99828	11.3487
						0.998282	11.3521
						0.998281	11.35626
						0.998281	11.35689
						0.998281	11.3571

Table A15. Density (g/cm^3) and Depth by Date. 1 August to 8 November 2019. Data recorded by Aqua-Troll 500 sonde.

Table A15 (1)							
1-Aug		**12-Sep**		**28-Oct**		**8-Nov**	
Density (g/cm³)	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**	**Density (g/cm³)**	**Depth (M)**
0.995637	0.303455	0.995526	0.192846	0.996197	0.188378	0.996487	0.192531
0.995634	0.303454	0.995525	0.192352	0.996189	0.187031	0.996479	0.19643
0.995633	0.303454	0.99552	0.193821	0.996182	0.186203	0.996478	0.198413
0.995633	0.303454	0.995519	0.195836	0.996181	0.186028	0.996479	0.195677
0.995618	0.30345	0.995518	0.194763	0.996167	0.184246	0.996474	0.319713
0.995613	0.303448	0.995518	0.194704	0.996158	0.216831	0.996473	0.398475
0.995612	0.303448	0.995515	0.291816	0.996152	0.27939	0.996473	0.413415
0.99563	0.303453	0.995514	0.422422	0.99615	0.288523	0.996472	0.447213
0.99568	0.303468	0.995518	0.544611	0.996168	0.483787	0.996473	0.484479
0.995701	0.303475	0.995518	0.564695	0.996228	0.532382	0.996474	0.527479
0.995722	0.303481	0.995524	0.696559	0.99627	0.570842	0.996474	0.534196
0.995726	0.303482	0.995527	0.777747	0.996277	0.576835	0.996473	0.546436
0.995759	0.303492	0.99553	0.816521	0.996302	0.630049	0.996474	0.565392
0.995772	0.303496	0.995531	0.824099	0.996338	0.685393	0.996471	0.627752
0.995781	0.303499	0.995536	0.91071	0.996353	0.738175	0.99647	0.636155
0.995783	0.3035	0.99554	0.967622	0.996364	0.790416	0.996468	0.679783
0.995789	0.303502	0.995545	1.002974	0.996366	0.798792	0.996469	0.729608
0.995806	0.303507	0.995548	1.061335	0.996383	0.894297	0.996468	0.793098
0.995816	0.30351	0.995548	1.069799	0.996389	0.943201	0.996467	0.837717
0.995818	0.30351	0.995554	1.171361	0.996394	0.978553	0.996467	0.845614
0.995828	0.303514	0.995557	1.17207	0.996394	0.984466	0.996467	0.883001
0.99584	0.303517	0.995557	1.180916	0.996402	1.0348	0.996468	0.935847
0.995852	0.303521	0.995557	1.181531	0.996406	1.073958	0.996467	0.961962
0.99586	0.303523	0.995557	1.214685	0.996408	1.117625	0.996467	0.967188
0.995861	0.303524	0.995558	1.302612	0.996409	1.124396	0.996466	1.041963
0.995876	0.303528	0.99556	1.326569	0.996418	1.215272	0.996467	1.152296
0.995881	0.30353	0.995561	1.332953	0.996423	1.273603	0.99647	1.186969
0.995889	0.303532	0.995562	1.287819	0.996428	1.333356	0.996471	1.195399
0.99589	0.303532	0.995561	1.441653	0.996429	1.342779	0.99647	1.240999
0.995907	0.303538	0.995562	1.484459	0.996435	1.449326	0.996472	1.287682
0.995918	0.303541	0.995562	1.496253	0.996443	1.503721	0.996476	1.324801
0.995929	0.303544	0.995565	1.480216	0.996444	1.548018	0.996476	1.331128
0.99593	0.303545	0.995565	1.518569	0.996449	1.592045	0.996479	1.358248
0.99594	0.303548	0.995566	1.625092	0.99645	1.599047	0.996485	1.390404
0.995973	0.303558	0.995568	1.69197	0.996454	1.686924	0.996491	1.434649

Table A15 (2)							
1-Aug		12-Sep		28-Oct		8-Nov	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
0.995983	0.303561	0.995569	1.704444	0.996455	1.767305	0.996494	1.468443
0.995985	0.303561	0.995575	1.748367	0.99646	1.864315	0.996495	1.474305
0.995996	0.303565	0.995578	1.830622	0.99646	1.879287	0.996496	1.514948
0.996017	0.303571	0.995578	1.913349	0.996467	1.966067	0.9965	1.571281
0.996026	0.303574	0.995578	1.926833	0.99647	1.981546	0.996502	1.609902
0.996046	0.30358	0.995581	1.956335	0.996471	1.980981	0.996502	1.616823
0.996049	0.303581	0.995587	2.054473	0.996471	1.981149	0.996503	1.65557
0.996112	0.3036	0.995594	2.149127	0.996474	2.035154	0.996506	1.738461
0.996142	0.303609	0.995596	2.164708	0.996477	2.079748	0.996512	1.781137
0.996173	0.303619	0.995599	2.266662	0.996479	2.141427	0.996513	1.789669
0.996177	0.30362	0.995607	2.329985	0.996479	2.150654	0.996528	1.832874
0.996245	0.303641	0.995625	2.590337	0.996481	2.207073	0.996549	1.851198
0.996281	0.303652	0.995627	2.624607	0.996486	2.304466	0.996571	1.899661
0.996334	0.303668	0.995639	2.707165	0.996489	2.356565	0.996587	1.941647
0.996342	0.30367	0.995648	2.734308	0.996492	2.410455	0.996589	1.948781
0.996377	0.303681	0.995659	2.844033	0.996492	2.418789	0.996603	1.975664
0.996434	0.303698	0.99567	3.025844	0.996499	2.578342	0.996621	2.029576
0.996481	0.303713	0.995672	3.053094	0.996501	2.571655	0.99663	2.053819
0.996489	0.303715	0.995683	3.130098	0.996503	2.576606	0.996631	2.0589
0.996524	0.303726	0.995693	3.188397	0.996503	2.57614	0.996642	2.076822
0.996622	0.303756	0.995711	3.338662	0.996507	2.584869	0.996656	2.083276
0.996664	0.303768	0.995713	3.359457	0.996506	2.674546	0.996661	2.156027
0.996685	0.303775	0.995722	3.587019	0.996508	2.73905	0.996662	2.165286
0.996688	0.303776	0.995731	3.657769	0.996508	2.750693	0.99667	2.169115
0.996737	0.303791	0.995735	3.761429	0.996516	2.819349	0.99667	2.173968
0.996814	0.303814	0.995735	3.776208	0.996516	2.875527	0.996676	2.17435
0.996878	0.303834	0.995744	4.064188	0.996519	2.903027	0.996676	2.174593
0.996889	0.303837	0.995748	4.154642	0.996521	2.941826	0.996685	2.247734
0.996945	0.303854	0.995757	4.253859	0.996521	2.947492	0.996691	2.349039
0.997047	0.303885	0.995774	4.350152	0.996525	3.011909	0.996699	2.372705
0.997127	0.30391	0.995777	4.36576	0.996526	3.074886	0.9967	2.419614
0.997141	0.303914	0.99579	4.377373	0.996526	3.099009	0.996701	2.425881
0.997207	0.303934	0.995803	4.391186	0.996526	3.10423	0.996706	2.463684
0.997299	0.303962	0.995822	4.558513	0.996527	3.19352	0.99671	2.500243
0.997341	0.303975	0.995825	4.580091	0.996529	3.275709	0.996715	2.520381
0.99735	0.303977	0.995836	4.691356	0.996531	3.358763	0.996716	2.524188
0.997376	0.303985	0.995856	4.755724	0.996532	3.371999	0.99672	2.587524

Table A15 (3)							
1-Aug		**12-Sep**		**28-Oct**		**8-Nov**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.99747	0.304014	0.995886	4.782938	0.996538	3.529726	0.996722	2.656305
0.997523	0.30403	0.99589	4.788433	0.996542	3.583679	0.996722	2.697877
0.997534	0.304033	0.995917	4.82847	0.996543	3.638269	0.996722	2.705575
0.99756	0.304041	0.995926	4.925367	0.996543	3.646586	0.996721	2.788169
0.997636	0.304065	0.995936	4.976532	0.996548	3.74762	0.996723	2.847238
0.997675	0.304076	0.995938	4.986626	0.99655	3.785812	0.996728	2.949895
0.99772	0.30409	0.995949	5.025151	0.996555	3.810341	0.996729	2.964661
0.997727	0.304092	0.995952	5.03598	0.996559	3.82245	0.996732	2.981733
0.997819	0.30412	0.995956	5.050302	0.99656	3.824718	0.996735	3.048199
0.997855	0.304131	0.995958	5.114057	0.996565	3.832454	0.99674	3.102688
0.997882	0.304139	0.995959	5.122603	0.996566	3.822283	0.996744	3.14221
0.997886	0.304141	0.995959	5.356913	0.996569	3.830262	0.996744	3.149
0.997914	0.304149	0.995962	5.41697	0.99657	3.830808	0.996746	3.169022
0.99798	0.304169	0.995985	5.452063	0.996573	3.886617	0.996748	3.347065
0.997988	0.304172	0.995988	5.457592	0.996573	3.94957	0.996754	3.417059
0.997992	0.304173	0.996051	5.731689	0.996575	4.007336	0.996755	3.432975
0.998	0.304176	0.996087	5.726419	0.996575	4.016849	0.996757	3.557879
0.998014	0.30418	0.996151	5.845809	0.996581	4.118836	0.99676	3.767708
0.998019	0.304181	0.99616	5.85915	0.996584	4.188266	0.996762	3.898924
0.998031	0.304185	0.996303	6.105754	0.99659	4.24029	0.996762	3.923182
0.998033	0.304186	0.996402	6.1853	0.996591	4.249177	0.996766	4.00971
0.998059	0.304194	0.996451	6.232484	0.996593	4.303548	0.996767	4.0384
0.998068	0.304196	0.996461	6.240619	0.996596	4.3242	0.99677	4.121286
0.998088	0.304202	0.996504	6.315547	0.9966	4.313496	0.99677	4.132344
0.998091	0.304203	0.996603	6.453158	0.996602	4.326629	0.996773	4.310805
0.998084	0.304201	0.996667	6.547528	0.996602	4.327732	0.996778	4.375654
0.998077	0.304199	0.996733	6.651585	0.996606	4.325934	0.99678	4.50299
0.998099	0.304206	0.996744	6.66772	0.996609	4.452271	0.996783	4.559025
0.998101	0.304206	0.996809	6.82277	0.996615	4.532191	0.996784	4.570661
0.998177	0.30423	0.99686	6.963694	0.996616	4.547361	0.996784	4.635843
0.998187	0.304233	0.996912	7.068013	0.99662	4.708254	0.996791	4.763825
		0.996921	7.086004	0.996624	4.812073	0.996793	4.821289
		0.996989	7.299509	0.996628	4.936172	0.996793	4.833347
		0.997023	7.362703	0.996629	4.95512	0.996793	4.854858
		0.99704	7.398766	0.996645	5.204657	0.996796	4.932673
		0.997043	7.404861	0.996656	5.35751	0.996797	4.988884
		0.99708	7.494535	0.996666	5.437943	0.996798	4.998964

Table A15 (4)							
1-Aug		12-Sep		28-Oct		8-Nov	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
		0.997113	7.547391	0.996673	5.477114	0.996803	5.027373
		0.997138	7.620869	0.996674	5.48424	0.996805	5.082133
		0.997142	7.631734	0.996682	5.527114	0.996806	5.161466
		0.997172	7.71349	0.996685	5.613621	0.996806	5.173395
		0.99724	7.801679	0.99669	5.639235	0.996811	5.220488
		0.997267	7.88488	0.996691	5.645706	0.99681	5.257446
		0.997306	7.916919	0.996696	5.656413	0.996815	5.404282
		0.997312	7.923779	0.996698	5.684578	0.99682	5.430805
		0.997361	8.212502	0.996702	5.675157	0.996821	5.439845
		0.997389	8.308059	0.996703	5.675075	0.99682	5.509189
		0.997436	8.437132	0.996708	5.70701	0.996825	5.605373
		0.997443	8.455684	0.99671	5.775949	0.996826	5.679982
		0.9975	8.533923	0.996718	5.84562	0.996827	5.69288
		0.997524	8.692697	0.996719	5.85694	0.996829	5.74783
		0.997545	8.79334	0.996725	5.9953	0.996832	5.796949
		0.997549	8.812015	0.996731	6.073258	0.996833	5.860823
		0.997569	8.883322	0.996733	6.164401	0.996833	5.870497
		0.997606	8.912188	0.996735	6.205093	0.996837	5.909512
		0.99762	8.942582	0.996735	6.213347	0.996841	5.955632
		0.997624	8.94726	0.996743	6.356346	0.996845	6.062274
		0.997623	8.937053	0.996747	6.467897	0.996845	6.077156
		0.997654	9.077934	0.996752	6.542359	0.996847	6.107796
		0.997668	9.167321	0.996752	6.555401	0.996851	6.149281
		0.997693	9.284581	0.99676	6.711301	0.99685	6.244438
		0.997696	9.302146	0.996768	6.814727	0.996852	6.324313
		0.997753	9.790853	0.996779	6.886596	0.996852	6.338004
		0.997784	9.874261	0.996781	6.899019	0.996855	6.364352
		0.997801	9.897123	0.996786	6.9163	0.99686	6.467909
		0.997805	9.90092	0.99679	6.918119	0.996864	6.51908
		0.997832	9.976029	0.996791	6.916282	0.996864	6.529561
		0.997846	10.03214	0.996791	6.916062	0.996866	6.583767
		0.997863	10.24799	0.99679	7.056254	0.996865	6.649762
		0.997866	10.27676	0.996801	7.078348	0.996866	6.695328
		0.997922	10.42478	0.996806	7.10722	0.996867	6.703407
		0.997953	10.65162	0.996814	7.194941	0.996871	6.757418
		0.997965	10.72041	0.996815	7.207089	0.996872	6.789662
		0.997967	10.73775	0.996827	7.351009	0.996875	6.833054

Table A15 (5)							
1-Aug		12-Sep		28-Oct		8-Nov	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
		0.997977	10.73744	0.996836	7.414102	0.996875	6.839525
		0.99798	10.92629	0.996846	7.478123	0.996874	6.856501
		0.997986	10.97122	0.996848	7.487946	0.996873	6.872539
		0.997991	10.99624	0.996892	7.658802	0.996878	6.915172
		0.997992	11.00009	0.996914	7.755556	0.996878	6.951362
		0.997986	11.00875	0.996935	7.824499	0.996879	6.957562
		0.997979	11.0092	0.996938	7.836251	0.99688	6.963941
		0.997979	11.01028	0.996977	7.98217	0.996881	7.067479
		0.997978	11.01039	0.996999	8.052274	0.996881	7.096839
		0.997974	11.01167	0.997019	8.096181	0.996881	7.1047
		0.997972	11.01618	0.997022	8.103938	0.996881	7.140664
		0.997976	11.01401	0.997037	8.155096	0.996886	7.220966
		0.997977	11.01392	0.997066	8.259808	0.996888	7.242405
		0.997978	11.01788	0.997093	8.307492	0.996889	7.248202
		0.997981	11.0139	0.997099	8.34758	0.996892	7.297921
		0.997982	11.01621	0.9971	8.353916	0.996894	7.353895
		0.997985	11.01774	0.997111	8.416736	0.996896	7.454419
				0.997123	8.436132	0.996897	7.533843
				0.997129	8.467781	0.996897	7.547614
				0.997131	8.472207	0.996902	7.550561
				0.997149	8.603057	0.996904	7.650533
				0.99716	8.656132	0.996908	7.656785
				0.997171	8.718104	0.996908	7.661597
				0.997172	8.727397	0.996913	7.703319
				0.997189	8.875645	0.99692	7.703078
				0.997208	8.948126	0.996922	7.736394
				0.997228	9.004456	0.996923	7.740338
				0.997247	9.049287	0.996924	7.795818
				0.99725	9.056757	0.996938	7.873118
				0.997286	9.157111	0.996942	7.895815
				0.9973	9.240125	0.996943	7.901527
				0.997322	9.260677	0.996949	7.914639
				0.997325	9.265986	0.996954	7.978552
				0.997377	9.395026	0.996965	8.021463
				0.997397	9.437659	0.996966	8.029333
				0.997424	9.445069	0.996974	8.0479
				0.997428	9.447047	0.996978	8.063947

Table A15 (6)							
1-Aug		12-Sep		28-Oct		8-Nov	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
				0.997468	9.541789	0.996987	8.106772
				0.997482	9.588497	0.99699	8.127306
				0.997501	9.621436	0.996991	8.131527
				0.997504	9.627022	0.996991	8.167775
				0.99755	9.751801	0.997005	8.239345
				0.997573	9.789247	0.99702	8.266699
				0.997587	9.830753	0.997022	8.272847
				0.997596	9.87947	0.997033	8.296404
				0.997597	9.887074	0.997048	8.354746
				0.99762	9.985053	0.997056	8.378924
				0.997637	10.04809	0.997057	8.384212
				0.997647	10.09472	0.997064	8.412441
				0.997649	10.10258	0.997072	8.447705
				0.997669	10.16332	0.997085	8.554852
				0.997697	10.1993	0.997087	8.569296
				0.997707	10.26158	0.997107	8.581628
				0.99771	10.27053	0.99712	8.586559
				0.99773	10.31754	0.997134	8.597418
				0.997736	10.36886	0.99714	8.627385
				0.997746	10.36599	0.997141	8.631585
				0.997747	10.36756	0.997151	8.652807
				0.997758	10.37979	0.997182	8.706422
				0.997773	10.41621	0.997194	8.743718
				0.997783	10.45822	0.997197	8.750463
				0.997792	10.51389	0.997202	8.781283
				0.997794	10.52242	0.997215	8.791176
				0.997808	10.63165	0.997219	8.789808
				0.997808	10.66531	0.997221	8.789909
				0.997806	10.7205	0.997227	8.79096
				0.997806	10.72821	0.997232	8.819025
				0.997817	10.81349	0.997255	8.930107
				0.997825	10.85518	0.997258	8.944895
				0.99783	10.88318	0.997266	8.969323
				0.997831	10.88797	0.997268	8.969649
				0.99785	10.93445	0.997276	8.992685
				0.997854	10.96436	0.997285	9.015319
				0.997857	11.03375	0.997286	9.019089

Table A15 (7)							
1-Aug		12-Sep		28-Oct		8-Nov	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
				0.997858	11.04334	0.997288	9.02555
				0.997862	11.17212	0.997294	9.02157
				0.997878	11.21988	0.997297	9.059436
				0.997887	11.21187	0.997298	9.063984
				0.997893	11.29865	0.997305	9.097924
				0.997894	11.30887	0.997315	9.153947
				0.997912	11.36652	0.99732	9.180037
				0.997926	11.3938	0.997321	9.185395
				0.99793	11.40755	0.997331	9.220262
				0.997931	11.41005	0.99734	9.239406
				0.997968	11.42836	0.997354	9.396794
				0.997986	11.43376	0.997372	9.497239
				0.997992	11.44236	0.997375	9.516208
				0.997994	11.44356	0.997397	9.601579
				0.997992	11.44751	0.997438	9.694361
				0.997993	11.44637	0.997451	9.712265
				0.997998	11.44448	0.997455	9.717766
				0.997999	11.44418	0.997464	9.731612
				0.998003	11.4498	0.997512	9.761746
				0.998006	11.45596	0.997535	9.798059
				0.99801	11.44951	0.99754	9.803752
				0.998013	11.44125	0.997558	9.832889
						0.99757	9.841978
						0.997585	9.854148
						0.997587	9.85591
						0.997594	9.868674
						0.997604	9.871749
						0.997627	9.99673
						0.997645	9.99577
						0.997648	10.00065
						0.997654	10.02212
						0.997669	10.07018
						0.997673	10.12642
						0.997674	10.13525
						0.997683	10.14299
						0.997691	10.16665
						0.997697	10.16686

Table A15 (8)							
1-Aug		**12-Sep**		**28-Oct**		**8-Nov**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
						0.997698	10.1678
						0.997709	10.15126
						0.997722	10.29552
						0.997724	10.36048
						0.997725	10.37432
						0.99773	10.42372
						0.997743	10.55361
						0.997764	10.57988
						0.997767	10.58825
						0.997773	10.60616
						0.997775	10.62314
						0.997796	10.67465
						0.997809	10.85324
						0.997811	10.87793
						0.99783	10.97789
						0.99784	11.12383
						0.997842	11.15403
						0.997842	11.16313
						0.997842	11.1761
						0.997842	11.20095
						0.997842	11.21404
						0.997842	11.2166
						0.997841	11.22195
						0.99784	11.23291
						0.99784	11.23721
						0.997839	11.23817
						0.997841	11.23917
						0.997841	11.24287
						0.997843	11.24265
						0.997843	11.24277
						0.997845	11.24772
						0.997844	11.24655
						0.997847	11.24945

Table A16. Density (g/cm^3) and Depth by Date. 16 November to 27 December 2019. Data recorded by Aqua-Troll 500 sonde.

Table A16 (1)					
16-Nov		**21-Nov**		**27-Dec**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.99766	0.195712	0.997636	0.181255	0.998038	0.183758
0.997658	0.194365	0.997641	0.181953	0.998037	0.186968
0.997657	0.194445	0.997647	0.180024	0.998038	0.185552
0.997654	0.194665	0.997796	0.183964	0.998039	0.185517
0.997652	0.316338	0.997814	0.184363	0.998036	0.182814
0.99765	0.41276	0.997808	0.181543	0.998037	0.183058
0.99765	0.429739	0.997803	0.24696	0.998036	0.239359
0.997646	0.524732	0.997799	0.326283	0.998038	0.279715
0.997646	0.658358	0.997799	0.371997	0.998038	0.28709
0.997644	0.721039	0.997799	0.38059	0.998039	0.311925
0.997644	0.733935	0.997798	0.410611	0.998038	0.416015
0.997642	0.779689	0.9978	0.472171	0.998039	0.483425
0.997641	0.817638	0.997799	0.50848	0.99804	0.495917
0.99764	0.894007	0.997799	0.515254	0.998038	0.547685
0.99764	0.943725	0.997801	0.559529	0.998039	0.661642
0.99764	0.952867	0.997804	0.619169	0.998038	0.723272
0.997639	0.998931	0.997805	0.645976	0.998038	0.735372
0.997638	1.12811	0.997805	0.65154	0.998037	0.779817
0.997636	1.175644	0.997805	0.668399	0.998039	0.901852
0.997636	1.186624	0.997808	0.722254	0.998037	0.925938
0.997637	1.213065	0.99781	0.74945	0.998037	0.933798
0.997636	1.320627	0.99781	0.754894	0.998039	1.013333
0.997634	1.401879	0.997814	0.790383	0.99804	1.033894
0.997634	1.416251	0.997816	0.819163	0.998039	1.080391
0.997633	1.470977	0.997819	0.879944	0.99804	1.101103
0.997632	1.613284	0.997819	0.907165	0.99804	1.105461
0.997633	1.679338	0.997819	0.912871	0.998038	1.112723
0.997633	1.785572	0.997821	0.934576	0.998039	1.180094
0.997632	1.800817	0.997832	0.99319	0.998039	1.201477
0.997633	1.904314	0.997837	1.005968	0.998038	1.206812
0.997633	2.066398	0.997838	1.009822	0.998037	1.230968
0.997631	2.142489	0.997841	1.047208	0.998039	1.270501
0.99763	2.158052	0.997851	1.08093	0.998038	1.298582
0.997632	2.259792	0.997852	1.051454	0.998038	1.303581

Table A16 (2)

16-Nov		21-Nov		27-Dec	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.99763	2.356605	0.997853	1.048958	0.99804	1.327712
0.997632	2.423335	0.997854	1.114557	0.998042	1.402141
0.997632	2.435114	0.997859	1.16009	0.998044	1.467941
0.997631	2.497683	0.997862	1.241254	0.998046	1.525017
0.997631	2.619471	0.997862	1.252885	0.998046	1.534431
0.997631	2.671554	0.997866	1.321538	0.998044	1.563448
0.997631	2.682748	0.997871	1.351637	0.998047	1.618335
0.99763	2.738804	0.997876	1.434982	0.998051	1.664541
0.997632	2.85488	0.997877	1.446235	0.998052	1.672419
0.997631	2.911878	0.997879	1.508751	0.998063	1.713757
0.99763	2.953104	0.997887	1.547258	0.998091	1.764967
0.99763	2.959901	0.997896	1.627175	0.998105	1.789628
0.99763	3.012633	0.997906	1.653853	0.998108	1.794592
0.997631	3.101183	0.997908	1.660201	0.998116	1.800269
0.997631	3.133953	0.997915	1.673482	0.998137	1.858076
0.997631	3.141381	0.997928	1.819381	0.998148	1.88658
0.99763	3.210671	0.997935	1.876778	0.99815	1.892465
0.997628	3.322999	0.997936	1.889841	0.998156	1.913754
0.99763	3.377745	0.997945	1.930668	0.998159	1.933374
0.99763	3.388842	0.997955	2.054532	0.998165	1.956412
0.997629	3.424352	0.997964	2.135582	0.99817	1.996942
0.997629	3.528836	0.997966	2.150439	0.998171	2.002889
0.997628	3.59082	0.997975	2.209707	0.99818	2.033435
0.997628	3.602642	0.997982	2.272862	0.998192	2.078065
0.997627	3.631612	0.997987	2.339711	0.998198	2.09167
0.997628	3.664986	0.997988	2.350276	0.998199	2.095021
0.997626	3.728025	0.99799	2.39158	0.998201	2.112934
0.997627	3.762792	0.997995	2.435365	0.998216	2.152955
0.997627	3.769509	0.997997	2.52697	0.998222	2.177957
0.997626	3.825172	0.997997	2.539785	0.998223	2.182624
0.997625	3.90192	0.998002	2.607564	0.998228	2.232645
0.997625	3.968116	0.998005	2.665955	0.998232	2.311102
0.997625	3.979244	0.998012	2.745621	0.998245	2.345382
0.997625	4.042295	0.998013	2.757352	0.998247	2.35266
0.997624	4.098598	0.998013	2.797137	0.998263	2.365553
0.997626	4.125166	0.998015	2.83355	0.998269	2.392198
0.997626	4.1305	0.998017	2.94734	0.998276	2.513786
0.997626	4.158635	0.998021	2.994798	0.998281	2.599436

Table A16 (3)					
16-Nov		21-Nov		27-Dec	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
0.997625	4.244264	0.998021	3.005169	0.998282	2.615022
0.997626	4.301317	0.998023	3.075227	0.998289	2.656367
0.997627	4.311765	0.998027	3.159579	0.998303	2.710472
0.997625	4.354822	0.998028	3.191326	0.998311	2.740131
0.997626	4.363788	0.998029	3.198296	0.998312	2.745832
0.997626	4.443932	0.99803	3.228772	0.998319	2.752221
0.997624	4.508394	0.998032	3.298753	0.998326	2.745548
0.997624	4.519723	0.998039	3.335968	0.998332	2.740278
0.997626	4.566632	0.99804	3.343316	0.998333	2.739327
0.997627	4.669445	0.998043	3.367882	0.998344	2.740254
0.997624	4.716876	0.998043	3.391466	0.99835	2.789653
0.997624	4.72676	0.998047	3.490326	0.998356	2.799488
0.997626	4.771844	0.998047	3.503124	0.998357	2.802744
0.997626	4.905297	0.998048	3.536952	0.998359	2.811971
0.997624	4.997467	0.99805	3.618729	0.998361	2.82961
0.997624	5.014185	0.99805	3.661978	0.998362	2.868718
0.997627	5.030357	0.99805	3.670186	0.998364	2.879054
0.997626	5.106084	0.998052	3.711436	0.998364	2.881832
0.997626	5.181999	0.998051	3.747492	0.998363	2.895915
0.997627	5.246157	0.998054	3.8374	0.998366	2.880395
0.997627	5.256873	0.998054	3.84982	0.998369	2.893092
0.997625	5.30737	0.998053	3.918217	0.998369	2.893973
0.997626	5.42278	0.998055	3.964703	0.998371	2.905653
0.997626	5.490616	0.998058	4.12306	0.998374	2.953554
0.997626	5.503545	0.99806	4.189573	0.998375	2.980202
0.997624	5.529582	0.99806	4.204078	0.998376	2.985425
0.997625	5.637662	0.99806	4.241877	0.998378	2.989547
0.997625	5.682914	0.998062	4.304112	0.998381	3.022294
0.997625	5.692847	0.998063	4.344121	0.998383	3.075922
0.997626	5.704672	0.998063	4.351423	0.998383	3.100613
0.997624	5.77217	0.998063	4.372469	0.998383	3.10569
0.997625	5.797595	0.998064	4.43843	0.998384	3.127711
0.997625	5.803465	0.998062	4.457147	0.998385	3.17594
0.997625	5.816571	0.998062	4.462079	0.998385	3.201618
0.997625	5.944343	0.998063	4.480674	0.998385	3.206675
0.997625	6.02858	0.998063	4.505925	0.998386	3.232563
0.997624	6.065648	0.998062	4.552542	0.998387	3.254947
0.997624	6.072932	0.998061	4.559256	0.998388	3.284483

Table A16 (4)

16-Nov		21-Nov		27-Dec	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.997626	6.1532	0.998059	4.588257	0.998388	3.288958
0.997625	6.269058	0.998061	4.649707	0.998389	3.299933
0.997626	6.343965	0.998065	4.738132	0.998389	3.340808
0.997626	6.357641	0.998067	4.774825	0.998389	3.358461
0.997625	6.39277	0.998068	4.782606	0.998389	3.362286
0.997624	6.512716	0.998068	4.800948	0.998391	3.383776
0.997624	6.579555	0.998069	4.848263	0.998392	3.391411
0.997624	6.592624	0.998071	4.879031	0.9984	3.418586
0.997624	6.616882	0.998071	4.884715	0.998403	3.439637
0.997623	6.688363	0.998069	4.900335	0.998403	3.44335
0.997625	6.725386	0.99807	4.94395	0.998403	3.462271
0.997625	6.732813	0.99807	4.970003	0.998402	3.492941
0.997624	6.75979	0.99807	4.974959	0.998404	3.510667
0.997625	6.777498	0.998072	4.99448	0.998404	3.514035
0.997625	6.919238	0.998071	5.018732	0.998404	3.532149
0.997623	7.005532	0.998072	5.058778	0.998406	3.571655
0.997622	7.022051	0.998072	5.064645	0.998407	3.600469
0.997623	7.039506	0.998073	5.081743	0.998407	3.60559
0.997624	7.050911	0.998073	5.090326	0.998407	3.627568
0.997622	7.075849	0.998072	5.140747	0.998407	3.650061
0.997622	7.079339	0.998072	5.159479	0.998413	3.663532
0.997623	7.145151	0.998072	5.163822	0.998414	3.666044
0.997622	7.258324	0.998072	5.176583	0.998415	3.671716
0.997625	7.315623	0.998071	5.195846	0.998414	3.696842
0.997625	7.327068	0.998072	5.210445	0.99842	3.748339
0.997623	7.427254	0.998072	5.21299	0.99842	3.764425
0.997623	7.526431	0.99807	5.231213	0.99842	3.768388
0.997625	7.580558	0.99807	5.262831	0.998421	3.785626
0.997625	7.590957	0.998069	5.275687	0.998425	3.839387
0.997623	7.617553	0.998069	5.278504	0.998428	3.853334
0.997625	7.646913	0.998072	5.301298	0.998429	3.857184
0.997624	7.707708	0.998071	5.325251	0.998428	3.903892
0.997624	7.737681	0.998073	5.376852	0.998429	3.912862
0.997624	7.743703	0.998073	5.384063	0.998427	3.91666
0.997625	7.754864	0.998072	5.419275	0.998427	3.9173
0.997624	7.815913	0.998074	5.456666	0.998427	3.945465
0.997625	7.843517	0.998073	5.500283	0.998429	3.958577
0.997625	7.849409	0.998073	5.514721	0.998431	3.940613

Table A16 (5)					
16-Nov		**21-Nov**		**27-Dec**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.997624	7.897879	0.998073	5.518074	0.998433	3.936404
0.997624	7.966394	0.998072	5.544825	0.998433	3.935059
0.997625	7.997931	0.998074	5.648488	0.998437	3.93206
0.997625	8.004441	0.998075	5.691582	0.998438	3.979168
0.997624	8.041658	0.998076	5.701061	0.998437	4.006669
0.997624	8.122496	0.998075	5.739171	0.998437	4.012057
0.997625	8.159403	0.998074	5.765776	0.998436	4.020381
0.997625	8.167153	0.998074	5.803447	0.998437	4.03029
0.997624	8.226041	0.998074	5.809043	0.998438	4.041381
0.997624	8.232917	0.998075	5.824669	0.998438	4.043127
0.997625	8.300945	0.998074	5.859909	0.998435	4.048305
0.997624	8.395145	0.998074	5.944563	0.998435	4.127839
0.997624	8.409762	0.998073	5.984968	0.998436	4.156653
0.997624	8.490351	0.998073	5.99327	0.998436	4.163475
0.997623	8.650232	0.998074	6.043554	0.998437	4.185111
0.997625	8.71936	0.998074	6.116717	0.998438	4.187955
0.997625	8.734112	0.998074	6.153027	0.998437	4.206492
0.997625	8.766157	0.998074	6.160271	0.998437	4.233676
0.997624	8.909269	0.998074	6.193475	0.998437	4.237845
0.997626	8.972978	0.998074	6.234602	0.998437	4.275864
0.997626	8.986617	0.998076	6.268644	0.998437	4.366983
0.997623	9.017467	0.998076	6.274386	0.998437	4.423746
0.997625	9.118717	0.998075	6.311216	0.998437	4.434368
0.997623	9.171941	0.998076	6.339698	0.998437	4.485663
0.997625	9.223697	0.998077	6.400719	0.998438	4.534151
0.997625	9.231759	0.998077	6.409287	0.998438	4.542902
0.997623	9.296303	0.998078	6.444121	0.998438	4.545748
0.997624	9.437492	0.998076	6.473953	0.998439	4.569122
0.997625	9.536833	0.998076	6.541884	0.998437	4.645038
0.997625	9.5547	0.998076	6.551286	0.998442	4.714892
0.997623	9.619336	0.998077	6.568845	0.998443	4.726538
0.997623	9.782737	0.998078	6.59473	0.998445	4.79392
0.997623	9.814953	0.998078	6.635032	0.998443	4.813639
0.997623	9.82534	0.998077	6.652667	0.998442	4.889582
0.997624	9.822838	0.998077	6.656364	0.998443	4.908924
0.997624	9.93327	0.998078	6.690835	0.998444	4.91431
0.997623	9.98961	0.998077	6.766928	0.998443	4.949098
0.997623	10.00112	0.998078	6.803819	0.998443	4.995474

Table A16 (6)					
16-Nov		**21-Nov**		**27-Dec**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
0.997624	10.00906	0.998078	6.811311	0.998442	5.021862
0.997623	10.04078	0.998078	6.854877	0.998442	5.026876
0.997623	10.09406	0.998078	6.919707	0.998441	5.052969
0.997624	10.13034	0.998079	6.954179	0.998443	5.088967
0.997624	10.13689	0.998079	6.960859	0.998443	5.109134
0.997624	10.2081	0.998078	6.992911	0.998443	5.113002
0.997624	10.24652	0.998078	7.016544	0.998442	5.135465
0.997623	10.30089	0.998077	7.071094	0.998443	5.155891
0.997623	10.3089	0.998077	7.078671	0.998446	5.186105
0.997624	10.32339	0.998079	7.105596	0.998446	5.211329
0.997624	10.49894	0.998077	7.147647	0.998446	5.215596
0.997623	10.58108	0.998078	7.193389	0.998447	5.231128
0.997623	10.59831	0.998078	7.200649	0.998449	5.266528
0.997625	10.64354	0.998079	7.230091	0.99845	5.283468
0.997623	10.72611	0.99808	7.256135	0.998451	5.286946
0.997626	10.7569	0.99808	7.286297	0.998451	5.343237
0.997626	10.76394	0.998078	7.315443	0.998449	5.399104
0.997624	10.81305	0.998078	7.320174	0.998448	5.432246
0.997625	10.86192	0.998079	7.348479	0.998448	5.438388
0.997624	10.89092	0.99808	7.392981	0.998449	5.48117
0.997626	10.90728	0.998081	7.421731	0.998451	5.607818
0.997626	10.91022	0.998081	7.42697	0.998451	5.624928
0.997624	10.9129	0.998079	7.45779	0.998451	5.632094
0.997626	10.9222	0.99808	7.478924	0.99845	5.652956
0.997625	10.91006	0.998079	7.544237	0.99845	5.68487
0.997625	10.9089	0.998079	7.553063	0.998449	5.737452
0.997625	10.97253	0.998079	7.587763	0.998449	5.766117
0.997626	11.06895	0.998078	7.647098	0.998449	5.771664
0.997624	11.0805	0.998079	7.682862	0.99845	5.838046
0.997624	11.08561	0.998079	7.689387	0.99845	5.932127
0.997627	11.0893	0.99808	7.724919	0.99845	5.980472
0.997646	11.1603	0.998081	7.759308	0.99845	5.99
0.997697	11.18009	0.998082	7.834118	0.998451	6.01185
0.997701	11.18506	0.998082	7.844611	0.99845	6.10135
		0.998081	7.892795	0.998452	6.143612
		0.998082	7.93149	0.998453	6.152435
		0.99808	8.012734	0.998453	6.169107
		0.99808	8.024124	0.998454	6.262764

Table A16 (7)					
16-Nov		**21-Nov**		**27-Dec**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
		0.99808	8.05751	0.998457	6.274694
		0.99808	8.081798	0.998457	6.279915
		0.99808	8.12971	0.99846	6.302161
		0.998081	8.174358	0.998461	6.301972
		0.998081	8.181774	0.998462	6.351314
		0.998082	8.212225	0.998462	6.383511
		0.998083	8.29199	0.998462	6.389576
		0.998082	8.328961	0.998463	6.468412
		0.998082	8.336583	0.998464	6.577781
		0.998083	8.359921	0.998465	6.630463
		0.998082	8.402563	0.998465	6.641097
		0.998083	8.420671	0.998464	6.672286
		0.998083	8.424544	0.998463	6.777071
		0.998082	8.450213	0.998463	6.849019
		0.998083	8.476416	0.998463	6.862115
		0.998084	8.515434	0.998463	6.92103
		0.998085	8.521234	0.998462	6.944916
		0.998083	8.531228	0.998463	6.948281
		0.998084	8.544063	0.998463	6.949467
		0.998085	8.586803	0.998463	6.94025
		0.998085	8.592548	0.998463	6.95085
		0.998086	8.609662	0.998465	7.006489
		0.998085	8.643901	0.998466	7.051692
		0.998086	8.686897	0.998466	7.059592
		0.998086	8.704541	0.998465	7.081356
		0.998086	8.708275	0.998467	7.109781
		0.998087	8.73118	0.998467	7.164959
		0.998088	8.768308	0.998467	7.172908
		0.998086	8.77822	0.998467	7.23822
		0.998086	8.780826	0.998468	7.356928
		0.998087	8.793423	0.998467	7.364593
		0.998087	8.82103	0.998467	7.370165
		0.998087	8.843462	0.998465	7.453633
		0.998087	8.847309	0.998464	7.543121
		0.998085	8.882231	0.998466	7.650479
		0.998086	8.901231	0.998465	7.704639
		0.998086	8.959229	0.998465	7.715148
		0.998086	8.967019	0.998466	7.805989

Table A16 (8)					
16-Nov		21-Nov		27-Dec	
Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)	Density (g/cm^3)	Depth (M)
		0.998085	9.016044	0.998468	7.871838
		0.998086	9.074749	0.998466	7.906059
		0.998088	9.169835	0.998466	7.912505
		0.998088	9.18352	0.998466	7.944831
		0.998091	9.269201	0.998467	8.133322
		0.998089	9.292777	0.998466	8.188424
		0.998092	9.359899	0.998466	8.202844
		0.998091	9.386626	0.998466	8.195334
		0.998091	9.392551	0.998466	8.275096
		0.998093	9.445398	0.998464	8.35128
		0.998093	9.549016	0.998463	8.364017
		0.998091	9.597812	0.998463	8.461378
		0.998091	9.607867	0.998465	8.530567
		0.998092	9.635657	0.998464	8.647153
		0.998091	9.687513	0.998464	8.68957
		0.998093	9.723807	0.998464	8.699186
		0.998093	9.730308	0.998465	8.714386
		0.998091	9.773664	0.998465	8.754304
		0.998093	9.798955	0.998464	8.84114
		0.998093	9.871116	0.998464	8.85359
		0.998092	9.89039	0.998468	8.881277
		0.998092	9.895553	0.998465	8.930433
		0.998091	9.925294	0.998465	9.014645
		0.998091	10.01895	0.998465	9.027016
		0.998092	10.06874	0.998467	9.110765
		0.998092	10.07864	0.998466	9.174496
		0.99809	10.10073	0.998466	9.184014
		0.998091	10.13432	0.998466	9.187479
		0.998091	10.16179	0.998466	9.18662
		0.998091	10.16646	0.998465	9.248525
		0.998091	10.19448	0.998465	9.257806
		0.998092	10.24292	0.998466	9.28075
		0.998092	10.32485	0.998466	9.283654
		0.998092	10.33687	0.998465	9.297144
		0.998094	10.373	0.998466	9.433542
		0.998094	10.40118	0.998467	9.462591
		0.998095	10.43907	0.998467	9.47171
		0.998095	10.47281	0.998466	9.578784

Table A16 (9)					
16-Nov		**21-Nov**		**27-Dec**	
Density (g/cm^3)	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**	**Density (g/cm^3)**	**Depth (M)**
		0.998095	10.47844	0.998467	9.664093
		0.998096	10.49405	0.998468	9.677839
		0.998095	10.53827	0.998468	9.682569
		0.998095	10.56111	0.998466	9.704608
		0.998095	10.56568	0.998466	9.758403
		0.998095	10.58859	0.998467	9.793191
		0.998096	10.63972	0.998467	9.799579
		0.998095	10.67688	0.998465	9.857162
		0.998095	10.68349	0.998466	9.937385
		0.998096	10.71624	0.998468	10.02312
		0.998096	10.749	0.998467	10.04733
		0.998096	10.77331	0.998467	10.05337
		0.998096	10.77753	0.998467	10.08084
		0.998094	10.80129	0.998466	10.13847
		0.998095	10.81636	0.998466	10.16828
		0.998095	10.86687	0.998465	10.1742
		0.998095	10.89584	0.998466	10.30104
		0.998095	10.90145	0.998469	10.53898
		0.998095	10.92886	0.998468	10.57319
		0.998096	10.97486	0.998468	10.58648
		0.998098	10.99963	0.998466	10.64324
		0.998098	11.00443	0.998466	10.718
		0.998096	11.03176	0.998466	10.80657
		0.998097	11.07694	0.998466	10.82033
		0.998098	11.10574	0.998467	10.90749
		0.998098	11.11104	0.998469	10.95858
		0.998105	11.12665	0.998468	11.02049
		0.998104	11.13408	0.998467	11.04507
		0.998103	11.15591	0.998467	11.05036
		0.998102	11.15884	0.998468	11.06382
		0.998108	11.16838	0.998467	11.08597
		0.99811	11.1733	0.998467	11.08993
		0.998124	11.17932	0.998467	11.09126
		0.998132	11.18507	0.99847	11.08913
		0.998133	11.18601	0.998472	11.10002
		0.998148	11.18298	0.998474	11.09708
		0.998169	11.19377	0.998474	11.09717
		0.998166	11.19455	0.998477	11.10148

Table A17. pH and Depth by Date. 4 July to 23 October 2019.
Data recorded by Aqua-Troll 500 sonde.

Table A17 (1)							
4-Jul		**23-Aug**		**12-Sep**		**23-Oct**	
pH	**Depth (M)**	**pH**	**Depth (M)**	**pH**	**Depth (M)**	**pH**	**Depth (M)**
7.525832	0.124813	8.035336	0.319942	7.667592	0.192846	7.379952	0.18994
7.649666	0.13626	8.040224	0.328685	7.670132	0.192352	7.375577	0.192938
7.663633	0.138199	8.011477	0.410415	7.683788	0.193821	7.37086	0.189556
7.652522	0.272552	8.030164	0.39587	7.707929	0.195836	7.368014	0.170692
7.579462	0.411018	8.031299	0.397349	7.704085	0.194763	7.367494	0.168182
7.547134	0.553965	8.023326	0.4949	7.704522	0.194704	7.365746	0.208512
7.540197	0.576628	8.029046	0.546852	7.710897	0.291816	7.364163	0.265403
7.526042	0.736059	8.04168	0.677008	7.70004	0.422422	7.36568	0.385493
7.501333	1.043338	8.043515	0.694813	7.715457	0.544611	7.365813	0.402608
7.459543	1.221184	8.041943	0.779739	7.716887	0.564695	7.363765	0.453652
7.453475	1.254886	8.033274	0.855178	7.705055	0.696559	7.3659	0.493468
7.431392	1.364484	8.016071	0.980934	7.734308	0.777747	7.356708	0.534215
7.394187	1.564289	7.990721	1.061657	7.709791	0.816521	7.355679	0.540667
7.368329	1.704424	7.98686	1.076471	7.708073	0.824099	7.353934	0.519999
7.363773	1.729057	7.969524	1.15477	7.701556	0.91071	7.360351	0.548013
7.339233	1.866242	7.972509	1.211392	7.70573	0.967622	7.354501	0.652466
7.324201	2.185988	7.972818	1.301572	7.702844	1.002974	7.358447	0.684365
7.296259	2.289515	7.973077	1.314778	7.695703	1.061335	7.35868	0.692358
7.29239	2.314833	7.949625	1.387907	7.694659	1.069799	7.348142	0.746707
7.281862	2.598338	7.946528	1.469723	7.690167	1.171361	7.346465	0.81033
7.268789	2.716891	7.921915	1.710582	7.67968	1.17207	7.345726	0.958819
7.23022	2.843933	7.918855	1.743397	7.691818	1.180916	7.345628	0.979805
7.225068	2.862552	7.833183	1.751444	7.692934	1.181531	7.348414	1.036089
7.201921	3.069314	7.781605	1.876279	7.691657	1.214685	7.346768	1.096975
7.17994	3.157687	7.730872	2.062519	7.680542	1.302612	7.345221	1.260032
7.149035	3.298299	7.722828	2.090666	7.687967	1.326569	7.344947	1.282476
7.144567	3.317681	7.641497	2.171674	7.688447	1.332953	7.338394	1.355166
7.124929	3.534383	7.60964	2.191003	7.691486	1.287819	7.340681	1.405802
7.086891	3.668391	7.581386	2.182788	7.663627	1.441653	7.343076	1.445418
7.066394	3.749101	7.552851	2.228095	7.677757	1.484459	7.343495	1.452106
7.062437	3.763228	7.548303	2.233381	7.678309	1.496253	7.341317	1.534629
7.042497	4.036903	7.501356	2.289434	7.679044	1.480216	7.326797	1.595538
7.007465	4.150299	7.486811	2.373751	7.679715	1.518569	7.33005	1.627994

Table A17 (2)

4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.990818	4.225568	7.469926	2.582151	7.689501	1.625092	7.325368	1.69961
6.987458	4.237772	7.467472	2.611423	7.682747	1.69197	7.324996	1.709624
6.976402	4.448973	7.419705	2.806466	7.682293	1.704444	7.321534	1.782311
6.967967	4.561795	7.395758	2.843957	7.664933	1.748367	7.317102	1.812729
6.953155	4.649994	7.369704	3.074508	7.657273	1.830622	7.312972	1.85123
6.951058	4.664282	7.3657	3.103828	7.657069	1.913349	7.312291	1.856899
6.943045	4.792207	7.323637	3.143843	7.656822	1.926833	7.307899	1.985734
6.930069	4.851207	7.303526	3.171076	7.657849	1.956335	7.297422	2.062045
6.901825	4.86712	7.287417	3.226495	7.640141	2.054473	7.297107	2.099946
6.897843	4.870814	7.28476	3.234334	7.6389	2.149127	7.296659	2.107176
6.882972	4.880911	7.251835	3.253426	7.638011	2.164708	7.299178	2.187505
6.873106	4.875078	7.233653	3.397571	7.632952	2.266662	7.299592	2.32148
6.857067	4.877275	7.217942	3.581542	7.624793	2.329985	7.288454	2.351415
6.854779	4.877266	7.205477	3.760744	7.609423	2.590337	7.287089	2.360326
6.845977	4.885593	7.20338	3.789966	7.607214	2.624607	7.28722	2.399297
6.838871	4.879582	7.161092	3.932609	7.584577	2.707165	7.286645	2.483027
6.825982	4.881554	7.131716	4.002329	7.576229	2.734308	7.281049	2.551485
6.824131	4.881512	7.109019	4.019345	7.560037	2.844033	7.279282	2.595866
6.818286	4.897233	7.105199	4.023566	7.553647	3.025844	7.278836	2.603729
6.816629	4.895197	7.07151	4.023322	7.552238	3.053094	7.273525	2.657445
6.81223	4.903874	7.056682	4.039238	7.533452	3.130098	7.270623	2.680521
6.811649	4.904791	7.04317	4.413423	7.522858	3.188397	7.275532	2.707936
6.806674	5.085684	7.041042	4.460152	7.512832	3.338662	7.276058	2.712026
6.801539	5.147894	7.047741	4.593203	7.511242	3.359457	7.271585	2.808551
6.790904	5.242514	7.030416	4.749357	7.461864	3.587019	7.269066	2.82786
6.789409	5.255602	7.01806	4.901591	7.4543	3.657769	7.263537	2.911436
6.77695	5.39954	6.980691	5.007284	7.450082	3.761429	7.262768	2.922173
6.768537	5.466586	6.975541	5.025791	7.449465	3.776208	7.264649	2.955457
6.736969	5.487921	6.948747	5.19039	7.421616	4.064188	7.266302	3.08274
6.732747	5.49253	6.92698	5.558702	7.383527	4.154642	7.269626	3.120442
6.718442	5.511311	6.907319	5.689592	7.360533	4.253859	7.269307	3.172021
6.711243	5.517358	6.904116	5.720024	7.343282	4.350152	7.269387	3.179259
6.69771	5.502124	6.83162	5.821993	7.340415	4.36576	7.267499	3.254096
6.695827	5.500411	6.795034	5.883151	7.287899	4.377373	7.259273	3.305614
6.68704	5.57239	6.769037	6.105401	7.270167	4.391186	7.258165	3.348281
6.682986	5.7247	6.764659	6.135151	7.238906	4.558513	7.257703	3.355282
6.661469	5.785428	6.712453	6.186013	7.234547	4.580091	7.250653	3.553435

Table A17 (3)

4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.658672	5.798692	6.691831	6.267982	7.217676	4.691356	7.252646	3.591195
6.644161	5.918632	6.672075	6.436928	7.191239	4.755724	7.254681	3.643648
6.631576	5.962201	6.669001	6.461018	7.167966	4.782938	7.255051	3.650692
6.633805	6.036632	6.638577	6.621512	7.164063	4.788433	7.254609	3.720174
6.633674	6.046754	6.617158	6.868104	7.151824	4.82847	7.255709	3.745812
6.641796	6.120753	6.59624	7.052804	7.130172	4.925367	7.251446	3.739857
6.654466	6.178772	6.58853	7.217876	7.111688	4.976532	7.250963	3.739854
6.668873	6.242347	6.586854	7.244563	7.108572	4.986626	7.251567	3.7626
6.671113	6.252118	6.547795	7.405797	7.103096	5.025151	7.250691	3.789558
6.679552	6.399003	6.515482	7.64438	7.095988	5.03598	7.250175	3.813807
6.691291	6.445459	6.498466	7.756528	7.078579	5.050302	7.250072	3.817818
6.692996	6.456964	6.495236	7.77939	7.075028	5.114057	7.248977	3.787098
6.730212	6.498894	6.476566	7.797388	7.073925	5.122603	7.249483	3.866849
6.745713	6.622002	6.472214	7.803188	7.069288	5.356913	7.242846	3.910323
6.773688	6.667412	6.467573	7.803849	7.035476	5.41697	7.243669	3.962426
6.777481	6.677412	6.466907	7.804075	7.025899	5.452063	7.243507	3.970274
6.786323	6.702935	6.462481	7.806699	7.023351	5.457592	7.237962	4.061183
6.799194	6.792929	6.463586	8.006452	7.01625	5.731689	7.230625	4.101731
6.816253	6.817985	6.466011	8.263133	6.947378	5.726419	7.229395	4.140692
6.818801	6.824392	6.466372	8.303039	6.902312	5.845809	7.228972	4.146754
6.824331	6.854855	6.464587	8.404136	6.893911	5.85915	7.23249	4.179924
6.829757	6.924828	6.461569	8.612591	6.85106	6.105754	7.23426	4.263584
6.84128	7.046007	6.457353	8.965072	6.822653	6.1853	7.229523	4.300006
6.842884	7.063475	6.45643	9.212463	6.768525	6.232484	7.228993	4.307821
6.847615	7.120162	6.456165	9.25662	6.760844	6.240619	7.231589	4.407662
6.856293	7.246367	6.456495	9.302405	6.745013	6.315547	7.225363	4.405285
6.86583	7.285017	6.454736	9.340372	6.730707	6.453158	7.220045	4.4173
6.867326	7.29463	6.456086	9.54854	6.713155	6.547528	7.221561	4.456964
6.86993	7.338912	6.456183	9.57602	6.684398	6.651585	7.221587	4.462502
6.875348	7.501164	6.457667	9.675187	6.680138	6.66772	7.217708	4.495797
6.880041	7.5779	6.458093	9.900701	6.690942	6.82277	7.210305	4.477766
6.880824	7.5937	6.457774	10.24085	6.669205	6.963694	7.210441	4.50907
6.888072	7.679461	6.457745	10.29201	6.654316	7.068013	7.21018	4.512066
6.884727	7.741021	6.455731	10.51907	6.651508	7.086004	7.207567	4.603039
6.881138	7.779272	6.455235	10.67188	6.6447	7.299509	7.208362	4.663115
6.880541	7.785922	6.455509	10.94879	6.644617	7.362703	7.199828	4.721905
6.881161	7.900765	6.45553	10.98817	6.639466	7.398766	7.198805	4.731247

Table A17 (4)

4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.878493	7.985416	6.453071	11.07405	6.638858	7.404861	7.196585	4.78808
6.873691	8.031253	6.45225	11.145	6.642168	7.494535	7.198417	4.878281
6.873006	8.039546	6.444826	11.18863	6.633241	7.547391	7.188881	4.924224
6.871762	8.164005	6.447271	11.20103	6.622985	7.620869	7.187793	4.933359
6.866216	8.247821	6.447295	11.20386	6.621337	7.631734	7.186083	4.959165
6.862613	8.298363	6.447109	11.20584	6.608695	7.71349	7.187262	5.215559
6.861974	8.306964	6.448001	11.21062	6.601625	7.801679	7.18201	5.332679
6.858522	8.398159	6.445476	11.21587	6.590962	7.88488	7.181416	5.357449
6.850996	8.439125	6.445197	11.21671	6.592651	7.916919	7.174174	5.425059
6.849972	8.447531	6.446122	11.21895	6.592481	7.923779	7.159397	5.524221
6.84669	8.496666	6.444814	11.22085	6.590265	8.212502	7.125892	5.619006
6.84373	8.584121	6.444233	11.22141	6.579383	8.308059	7.110458	5.709549
6.839171	8.630094	6.444102	11.22154	6.570662	8.437132	7.107244	5.724224
6.83851	8.638991	6.444099	11.22317	6.569137	8.455684	7.096646	5.754294
6.835637	8.690802	6.442613	11.22254	6.570863	8.533923	7.090473	5.788379
6.830933	8.763072	6.441936	11.21973	6.566993	8.692697	7.067341	5.816867
6.82875	8.826596	6.441791	11.21935	6.561623	8.79334	7.06425	5.821646
6.828303	8.836989	6.441127	11.22368	6.56079	8.812015	7.052026	5.865556
6.827674	8.995056	6.439192	11.22537	6.56021	8.883322	7.042112	6.055032
6.825204	9.037546	6.438961	11.22475	6.558335	8.912188	6.992289	6.153606
6.82638	9.0732	6.439101	11.22535	6.554682	8.942582	6.985754	6.173426
6.826435	9.078263	6.439122	11.22539	6.554157	8.94726	6.953699	6.186806
6.826742	9.212792	6.437223	11.22925	6.550823	8.937053	6.929345	6.187778
6.828197	9.256632	6.43574	11.22791	6.550584	9.077934	6.890977	6.15783
6.829355	9.309235	6.434631	11.22666	6.546824	9.167321	6.885369	6.154142
6.829555	9.316778			6.541672	9.284581	6.876214	6.143243
6.826873	9.382844			6.540871	9.302146	6.858789	6.244471
6.827401	9.427324			6.534701	9.790853	6.835486	6.258214
6.826087	9.496382			6.522386	9.874261	6.824568	6.246861
6.82596	9.506279			6.518453	9.897123	6.822356	6.245398
6.823785	9.579016			6.51749	9.90092	6.819663	6.428802
6.821989	9.612563			6.512582	9.976029	6.795023	6.521557
6.823112	9.705532			6.504985	10.03214	6.784985	6.532554
6.82319	9.717955			6.500068	10.24799	6.782754	6.536778
6.824469	9.861902			6.499171	10.27676	6.771077	6.614989
6.823729	9.917208			6.494934	10.42478	6.768958	6.64762
6.826227	9.963813			6.49068	10.65162	6.750693	6.706272

Table A17 (5)							
4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.826493	9.970945			6.482747	10.72041	6.748387	6.714538
6.824756	10.0699			6.48161	10.73775	6.744243	6.837607
6.826898	10.10103			6.478038	10.73744	6.728343	7.031119
6.827121	10.15182			6.474082	10.92629	6.679293	7.095319
6.827245	10.15878			6.452939	10.97122	6.672595	7.110741
6.827363	10.25835			6.45402	10.99624	6.648926	7.129643
6.832142	10.38089			6.453329	11.00009	6.633581	7.19911
6.832384	10.41607			6.467587	11.00875	6.614158	7.284258
6.832598	10.4246			6.470037	11.0092	6.599479	7.345114
6.83184	10.53433			6.468961	11.01028	6.596956	7.35573
6.836202	10.6109			6.468853	11.01039	6.585402	7.471317
6.839692	10.67027			6.46828	11.01167	6.542987	7.541612
6.840296	10.67993			6.464373	11.01618	6.529618	7.621871
6.844339	10.78566			6.462095	11.01401	6.526281	7.634173
6.847511	10.81409			6.461654	11.01392	6.520204	7.691268
6.848043	10.82169			6.459894	11.01788	6.506434	7.67665
6.849306	10.88891			6.456177	11.0139	6.500055	7.723014
6.850803	11.0071			6.45113	11.01621	6.49873	7.727909
6.851504	11.06521			6.44672	11.01774	6.490076	7.783139
6.851646	11.07685					6.480056	7.878019
6.853029	11.10134					6.459847	7.951167
6.850124	11.14947					6.45699	7.963852
6.834841	11.18074					6.44995	8.025434
6.832872	11.18639					6.438626	8.106221
6.833009	11.20062					6.431347	8.146461
6.830305	11.22326					6.413734	8.180155
6.831265	11.25802					6.411291	8.185507
6.83127	11.26302					6.395413	8.285026
6.827168	11.2867					6.37584	8.37509
6.830013	11.2996					6.358953	8.415919
6.818301	11.30989					6.356123	8.424142
6.816975	11.31156					6.353312	8.490158
6.818377	11.31991					6.349013	8.507138
6.823064	11.32614					6.34173	8.524276
6.831962	11.32438					6.340665	8.526772
6.83323	11.32438					6.336338	8.570457
6.833454	11.33022					6.329413	8.599692

Table A17 (6)							
4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.829538	11.32672					6.324317	8.619976
6.822561	11.33151					6.323419	8.623505
6.821555	11.33192					6.321582	8.6673
6.818896	11.33236					6.321045	8.757504
6.818799	11.33505					6.31796	8.826992
6.816854	11.33313					6.316696	8.836394
6.816626	11.33301					6.316415	8.839802
6.815732	11.33909					6.314377	8.925654
6.816741	11.33371					6.306206	8.946358
6.81731	11.33602					6.300503	8.945303
6.817422	11.33607					6.299465	8.945538
6.815074	11.33642					6.300507	8.942682
6.812513	11.32469					6.298777	8.917037
6.811301	11.32944					6.300374	8.984237
6.811059	11.32954					6.300497	8.991557
6.811948	11.33816					6.294882	9.093834
6.811262	11.34056					6.288699	9.221317
6.810995	11.33841					6.277975	9.29523
6.810931	11.33819					6.276421	9.309229
6.811376	11.33374					6.272836	9.350207
6.81035	11.33231					6.272494	9.45929
6.810829	11.32873					6.262255	9.538674
6.810846	11.32825					6.259956	9.58993
						6.259255	9.598927
						6.254805	9.679317
						6.253184	9.73331
						6.250423	9.773033
						6.250035	9.779781
						6.247065	9.854368
						6.248995	9.895843
						6.245298	9.928516
						6.244934	9.933895
						6.242938	9.939531
						6.242166	9.942015
						6.243218	9.94381
						6.243324	9.944115
						6.242108	9.937577

Table A17 (7)							
4-Jul		23-Aug		12-Sep		23-Oct	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
						6.2413	9.866605
						6.239763	9.898833
						6.237496	9.915322
						6.237152	9.91915
						6.237396	9.941055
						6.237567	9.966647
						6.233519	10.00532
						6.233016	10.0111
						6.23065	10.09495
						6.228084	10.13059
						6.224501	10.14229
						6.223961	10.14483
						6.223289	10.15111
						6.222589	10.22534
						6.218636	10.24987
						6.218123	10.25594
						6.216383	10.26007
						6.214863	10.33675
						6.211098	10.35404
						6.210496	10.39348
						6.210278	10.39871
						6.209676	10.49286
						6.208688	10.54303
						6.206889	10.61101
						6.206627	10.62105
						6.205155	10.65792
						6.204152	10.78593
						6.200832	10.84194
						6.200386	10.8539
						6.199737	10.91211
						6.196265	10.96379
						6.188562	10.9864
						6.189265	11.00319
						6.189071	11.00588
						6.186275	11.03554
						6.206739	11.05913
						6.219214	11.07421

Table A18. pH and Depth by Date. 16 November to 27 December 2019.
Data recorded by Aqua-Troll 500 sonde.

Table A18 (1)					
16-Nov		**19-Dec**		**27-Dec**	
pH	**Depth (M)**	**pH**	**Depth (M)**	**pH**	**Depth (M)**
7.04451	0.195712	7.48364	0.11998	8.482482	0.183758
7.033032	0.194365	7.483144	0.122384	8.480453	0.186968
7.031716	0.194445	7.483354	0.122774	8.477575	0.185552
7.03438	0.194665	7.481708	0.15974	8.477132	0.185517
7.031654	0.316338	7.46781	0.193113	8.478197	0.182814
7.018902	0.41276	7.472322	0.335991	8.481524	0.183058
7.017191	0.429739	7.479697	0.388045	8.476918	0.239359
7.026194	0.524732	7.480897	0.40018	8.472737	0.279715
7.037483	0.658358	7.479015	0.460675	8.472002	0.28709
7.036661	0.721039	7.48124	0.593155	8.471871	0.311925
7.036991	0.733935	7.483203	0.685678	8.469938	0.416015
7.028825	0.779689	7.483549	0.702263	8.468202	0.483425
7.029859	0.817638	7.47661	0.721122	8.467908	0.495917
7.02445	0.894007	7.477003	0.824049	8.46865	0.547685
7.026551	0.943725	7.464997	0.847103	8.467463	0.661642
7.026593	0.952867	7.46355	0.854034	8.465115	0.723272
7.015027	0.998931	7.465234	0.894073	8.46477	0.735372
7.015695	1.12811	7.465137	0.973865	8.463152	0.779817
7.011298	1.175644	7.463731	1.018741	8.461747	0.901852
7.010834	1.186624	7.463544	1.0274	8.462132	0.925938
7.000849	1.213065	7.459848	1.072705	8.462127	0.933798
7.005137	1.320627	7.458825	1.162401	8.457609	1.013333
6.999186	1.401879	7.455563	1.196315	8.453845	1.033894
6.998668	1.416251	7.459879	1.243347	8.451629	1.080391
7.008956	1.470977	7.460302	1.250117	8.455816	1.101103
7.003996	1.613284	7.449793	1.288316	8.456281	1.105461
7.011379	1.679338	7.45406	1.348326	8.458161	1.112723
7.009106	1.785572	7.46162	1.385513	8.458628	1.180094
7.009143	1.800817	7.462798	1.392408	8.455984	1.201477
7.013205	1.904314	7.462405	1.447963	8.455661	1.206812
7.010637	2.066398	7.460642	1.49414	8.453567	1.230968
7.004817	2.142489	7.449237	1.514925	8.444274	1.270501
7.003957	2.158052	7.447751	1.519152	8.445818	1.298582
6.999893	2.259792	7.451691	1.56149	8.445637	1.303581
7.004724	2.356605	7.445797	1.634	8.443256	1.327712

Table A18 (2)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.990248	2.423335	7.448435	1.670439	8.434637	1.402141
6.988664	2.435114	7.437133	1.719068	8.429925	1.467941
7.003483	2.497683	7.435834	1.72624	8.413074	1.525017
7.009404	2.619471	7.438835	1.740876	8.410791	1.534431
6.998736	2.671554	7.432227	1.842697	8.404308	1.563448
6.997598	2.682748	7.428408	1.88023	8.399261	1.618335
6.993618	2.738804	7.427644	1.888977	8.357208	1.664541
7.002975	2.85488	7.427647	1.972755	8.351732	1.672419
6.998007	2.911878	7.426948	2.097011	8.292001	1.713757
6.996577	2.953104	7.432202	2.165928	8.249097	1.764967
6.996139	2.959901	7.432833	2.17917	8.156996	1.789628
6.998147	3.012633	7.439145	2.225565	8.144034	1.794592
6.997009	3.101183	7.439348	2.345012	8.08578	1.800269
7.004563	3.133953	7.429736	2.428981	8.052886	1.858076
7.005455	3.141381	7.428535	2.444052	8.024879	1.88658
7.003689	3.210671	7.426122	2.501095	8.020291	1.892465
6.999326	3.322999	7.415756	2.591476	7.976062	1.913754
7.000294	3.377745	7.418447	2.606219	7.953288	1.933374
7.000244	3.388842	7.418355	2.611527	7.930707	1.956412
6.994527	3.424352	7.413052	2.61008	7.904231	1.996942
6.995383	3.528836	7.415051	2.616192	7.90011	2.002889
6.97174	3.59082	7.414508	2.641782	7.887624	2.033435
6.968892	3.602642	7.419232	2.671833	7.875136	2.078065
6.987839	3.631612	7.419799	2.676639	7.849881	2.09167
6.97221	3.664986	7.420841	2.711484	7.846268	2.095021
6.985407	3.728025	7.415623	2.771141	7.837935	2.112934
6.988876	3.762792	7.41597	2.793064	7.828511	2.152955
6.989937	3.769509	7.415796	2.798032	7.808934	2.177957
6.982902	3.825172	7.410181	2.809801	7.806149	2.182624
6.975113	3.90192	7.411682	2.878036	7.792069	2.232645
6.981851	3.968116	7.408892	2.899757	7.776674	2.311102
6.982413	3.979244	7.408634	2.905198	7.768503	2.345382
6.992601	4.042295	7.408624	2.905495	7.76691	2.35266
6.989942	4.098598	7.406259	2.947565	7.726213	2.365553
6.988256	4.125166	7.404859	2.981627	7.708543	2.392198
6.987894	4.1305	7.404588	2.987567	7.693895	2.513786
6.990515	4.158635	7.404776	2.999498	7.664695	2.599436

Table A18 (3)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.99931	4.244264	7.407175	3.036869	7.660519	2.615022
6.99236	4.301317	7.399584	3.062828	7.641312	2.656367
6.991855	4.311765	7.399235	3.089628	7.625258	2.710472
6.988829	4.354822	7.398871	3.093837	7.599768	2.740131
6.999664	4.363788	7.399367	3.135282	7.596023	2.745832
6.994272	4.443932	7.399389	3.212862	7.582124	2.752221
6.978782	4.508394	7.405722	3.247208	7.571323	2.745548
6.97654	4.519723	7.406517	3.254441	7.559455	2.740278
6.98656	4.566632	7.406048	3.293648	7.557608	2.739327
6.994379	4.669445	7.408011	3.377635	7.534862	2.740254
6.987348	4.716876	7.396039	3.442737	7.522243	2.789653
6.986734	4.72676	7.394631	3.454096	7.50977	2.799488
6.993725	4.771844	7.397586	3.48908	7.507797	2.802744
6.995216	4.905297	7.398612	3.525087	7.495342	2.811971
6.987381	4.997467	7.397596	3.544407	7.488127	2.82961
6.98644	5.014185	7.3975	3.548138	7.482401	2.868718
6.996423	5.030357	7.397505	3.550098	7.47025	2.879054
6.997512	5.106084	7.39419	3.594425	7.468527	2.881832
6.997059	5.181999	7.393898	3.627586	7.461554	2.895915
6.994934	5.246157	7.391804	3.649122	7.455369	2.880395
6.994637	5.256873	7.391546	3.652914	7.446045	2.893092
6.991644	5.30737	7.397725	3.691112	7.444662	2.893973
6.995434	5.42278	7.403264	3.765876	7.436933	2.905653
6.988007	5.490616	7.397729	3.795745	7.432243	2.953554
6.987242	5.503545	7.397226	3.802329	7.425109	2.980202
6.980356	5.529582	7.397837	3.83519	7.424067	2.985425
6.987774	5.637662	7.401232	3.882655	7.41557	2.989547
6.984414	5.682914	7.4022	3.931841	7.411263	3.022294
6.984331	5.692847	7.402456	3.93975	7.407048	3.075922
6.975456	5.704672	7.402389	3.958796	7.397406	3.100613
6.9785	5.77217	7.40265	3.987946	7.396038	3.10569
6.983488	5.797595	7.400134	3.995562	7.392726	3.127711
6.984267	5.803465	7.399838	3.997641	7.389804	3.17594
6.99109	5.816571	7.389571	4.019707	7.385553	3.201618
6.990407	5.944343	7.390044	4.033987	7.384919	3.206675
6.999184	6.02858	7.388095	4.077318	7.382432	3.232563
6.980263	6.065648	7.39465	4.10601	7.381422	3.254947

Table A18 (4)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.978214	6.072932	7.395395	4.111256	7.374251	3.284483
6.983327	6.1532	7.397643	4.13908	7.373327	3.288958
6.993011	6.269058	7.395481	4.179003	7.368363	3.299933
6.981189	6.343965	7.397281	4.197278	7.366777	3.340808
6.980069	6.357641	7.397407	4.201039	7.364923	3.358461
6.9774	6.39277	7.398767	4.217662	7.364647	3.362286
6.981379	6.512716	7.399373	4.256047	7.35533	3.383776
6.980843	6.579555	7.388712	4.336913	7.353909	3.391411
6.98095	6.592624	7.387401	4.348479	7.350516	3.418586
6.978154	6.616882	7.393441	4.410143	7.346225	3.439637
6.989409	6.688363	7.389427	4.52363	7.345553	3.44335
6.992969	6.725386	7.392004	4.580503	7.343053	3.462271
6.993884	6.732813	7.392129	4.591978	7.339808	3.492941
6.987353	6.75979	7.393443	4.677513	7.334649	3.510667
6.989508	6.777498	7.392824	4.772511	7.333882	3.514035
6.976741	6.919238	7.392379	4.801817	7.334333	3.532149
6.982708	7.005532	7.392871	4.847458	7.329585	3.571655
6.982935	7.022051	7.39292	4.853798	7.326241	3.600469
6.976105	7.039506	7.392054	4.882127	7.325628	3.60559
6.983112	7.050911	7.390869	4.95334	7.323811	3.627568
6.989141	7.075849	7.392225	4.982825	7.321796	3.650061
6.990218	7.079339	7.392353	4.989259	7.32051	3.663532
6.97729	7.145151	7.394154	5.025678	7.320275	3.666044
6.971595	7.258324	7.395444	5.120991	7.318372	3.671716
6.969735	7.315623	7.394121	5.184502	7.315584	3.696842
6.969326	7.327068	7.394	5.196144	7.312543	3.748339
6.97163	7.427254	7.395019	5.281868	7.307537	3.764425
6.984602	7.526431	7.394251	5.476778	7.306798	3.768388
6.991794	7.580558	7.385319	5.580945	7.305943	3.785626
6.993207	7.590957	7.38418	5.601387	7.304889	3.839387
6.990072	7.617553	7.3828	5.634145	7.299867	3.853334
6.995059	7.646913	7.379743	5.732764	7.299201	3.857184
6.98601	7.707708	7.37841	5.782295	7.299049	3.903892
6.989705	7.737681	7.377052	5.80481	7.297314	3.912862
6.989769	7.743703	7.376845	5.809037	7.295419	3.91666
6.99758	7.754864	7.376862	5.816687	7.295113	3.9173
6.995169	7.815913	7.376375	5.836535	7.293393	3.945465

Table A18 (5)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
6.98246	7.843517	7.371555	5.837086	7.292293	3.958577
6.980724	7.849409	7.370929	5.837918	7.291832	3.940613
6.981743	7.897879	7.372604	5.853548	7.290812	3.936404
6.988626	7.966394	7.376081	5.882252	7.290671	3.935059
6.996428	7.997931	7.370779	5.95943	7.288057	3.93206
6.997674	8.004441	7.370254	5.970134	7.288413	3.979168
6.992262	8.041658	7.368182	5.992447	7.284237	4.006669
6.986326	8.122496	7.370246	6.028055	7.283741	4.012057
6.973921	8.159403	7.370164	6.105416	7.283539	4.020381
6.972172	8.167153	7.370246	6.11634	7.284018	4.03029
6.983261	8.226041	7.37187	6.174212	7.281064	4.041381
6.98345	8.232917	7.367706	6.23199	7.280716	4.043127
6.991172	8.300945	7.369132	6.323679	7.280225	4.048305
6.983502	8.395145	7.360494	6.423188	7.280257	4.127839
6.982841	8.409762	7.359492	6.439049	7.278999	4.156653
6.983702	8.490351	7.360436	6.521204	7.278847	4.163475
6.973866	8.650232	7.360342	6.552051	7.275916	4.185111
6.986605	8.71936	7.363142	6.587556	7.273872	4.187955
6.987795	8.734112	7.363482	6.592795	7.273433	4.206492
6.97401	8.766157	7.363801	6.596754	7.272032	4.233676
6.980577	8.909269	7.365108	6.615468	7.27185	4.237845
6.982094	8.972978	7.366487	6.64673	7.270526	4.275864
6.982615	8.986617	7.36671	6.651365	7.269835	4.366983
6.983975	9.017467	7.365203	6.691652	7.268892	4.423746
6.988263	9.118717	7.365951	6.779817	7.268753	4.434368
6.986828	9.171941	7.36307	6.802231	7.267723	4.485663
6.982017	9.223697	7.362751	6.80844	7.265646	4.534151
6.981318	9.231759	7.365506	6.832271	7.26488	4.542902
6.979649	9.296303	7.364633	6.842216	7.264704	4.545748
6.97857	9.437492	7.365334	6.894761	7.262772	4.569122
6.975556	9.536833	7.357251	6.908269	7.26184	4.645038
6.975142	9.5547	7.35626	6.91203	7.261351	4.714892
6.981597	9.619336	7.354779	6.940997	7.261261	4.726538
6.985346	9.782737	7.355105	7.00452	7.259528	4.79392
6.988335	9.814953	7.35619	7.057848	7.259172	4.813639
6.98883	9.82534	7.356347	7.066961	7.257459	4.889582
6.988417	9.822838	7.357755	7.116041	7.255044	4.908924

Table A18 (6)					
16-Nov		**19-Dec**		**27-Dec**	
pH	**Depth (M)**	**pH**	**Depth (M)**	**pH**	**Depth (M)**
6.989237	9.93327	7.356855	7.173566	7.254672	4.91431
6.979107	9.98961	7.357406	7.241183	7.253118	4.949098
6.977894	10.00112	7.35743	7.251667	7.252151	4.995474
6.978889	10.00906	7.353005	7.306705	7.250119	5.021862
6.979976	10.04078	7.350282	7.443822	7.249833	5.026876
6.982189	10.09406	7.351274	7.484974	7.247779	5.052969
6.982726	10.13034	7.351301	7.49552	7.248237	5.088967
6.982876	10.13689	7.348656	7.52146	7.247139	5.109134
6.980784	10.2081	7.350234	7.534115	7.247031	5.113002
6.98641	10.24652	7.351214	7.585763	7.243671	5.135465
6.976994	10.30089	7.350478	7.605992	7.243134	5.155891
6.976051	10.3089	7.350415	7.610555	7.240443	5.186105
6.983767	10.32339	7.345317	7.611061	7.240775	5.211329
6.985897	10.49894	7.34926	7.701304	7.240712	5.215596
6.974019	10.58108	7.346284	7.746504	7.239363	5.231128
6.972591	10.59831	7.346097	7.755824	7.237651	5.266528
6.97264	10.64354	7.349434	7.815169	7.234178	5.283468
6.97527	10.72611	7.350017	7.879406	7.233678	5.286946
6.972786	10.7569	7.352695	7.923907	7.233226	5.343237
6.972586	10.76394	7.353034	7.931792	7.233048	5.399104
6.977551	10.81305	7.35267	7.945245	7.229778	5.432246
6.976618	10.86192	7.351946	8.063584	7.229365	5.438388
6.97991	10.89092	7.348631	8.124371	7.229908	5.48117
6.982924	10.90728	7.350528	8.174995	7.228182	5.607818
6.983441	10.91022	7.350641	8.183106	7.22796	5.624928
6.980605	10.9129	7.350223	8.204319	7.227858	5.632094
6.979849	10.9222	7.350664	8.248043	7.224334	5.652956
6.984218	10.91006	7.351712	8.304669	7.225068	5.68487
6.98475	10.9089	7.351865	8.313453	7.22439	5.737452
6.971334	10.97253	7.352379	8.346227	7.223968	5.766117
6.97931	11.06895	7.354132	8.468077	7.223883	5.771664
6.98152	11.0805	7.35057	8.552457	7.221807	5.838046
6.982183	11.08561	7.350195	8.567809	7.220783	5.932127
6.984012	11.0893	7.346661	8.614264	7.219836	5.980472
6.97306	11.1603	7.34902	8.756047	7.219687	5.99
6.539285	11.18009	7.349942	8.834142	7.218656	6.01185
6.442693	11.18506	7.350167	8.849457	7.216839	6.10135

Table A18 (7)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
		7.345209	8.869211	7.213906	6.143612
		7.341317	8.993252	7.213472	6.152435
		7.344921	9.065383	7.211576	6.169107
		7.338832	9.159988	7.211268	6.262764
		7.33823	9.174121	7.212242	6.274694
		7.340731	9.216995	7.212356	6.279915
		7.341517	9.331963	7.209289	6.302161
		7.341233	9.385422	7.207061	6.301972
		7.341216	9.396577	7.207028	6.351314
		7.344388	9.453185	7.20689	6.383511
		7.341409	9.550259	7.206886	6.389576
		7.339346	9.58441	7.205184	6.468412
		7.338954	9.592365	7.204934	6.577781
		7.337092	9.66366	7.201395	6.630463
		7.336349	9.836849	7.200949	6.641097
		7.338586	9.899951	7.201782	6.672286
		7.338838	9.914608	7.202078	6.777071
		7.338467	9.919016	7.199023	6.849019
		7.339246	10.00668	7.198651	6.862115
		7.338165	10.19054	7.197861	6.92103
		7.337373	10.2492	7.195031	6.944916
		7.337225	10.26348	7.194875	6.948281
		7.335733	10.34602	7.194741	6.949467
		7.332774	10.55704	7.193027	6.94025
		7.330727	10.62033	7.189823	6.95085
		7.330358	10.6364	7.189058	7.006489
		7.331045	10.67021	7.189528	7.051692
		7.331932	10.90638	7.189576	7.059592
		7.329057	10.97206	7.187834	7.081356
		7.328733	10.98976	7.185291	7.109781
		7.328766	11.01774	7.184437	7.164959
		7.329863	11.09077	7.184236	7.172908
		7.244234	11.11252	7.182378	7.23822
		6.769905	11.12528	7.181189	7.356928
		6.705974	11.12729	7.180339	7.364593
		6.65551	11.12966	7.180192	7.370165
		6.626583	11.1408	7.17732	7.453633

Table A18 (8)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
		6.613503	11.14219	7.177123	7.543121
		6.611007	11.1428	7.176105	7.650479
				7.174232	7.704639
				7.173957	7.715148
				7.173492	7.805989
				7.170691	7.871838
				7.168939	7.906059
				7.168608	7.912505
				7.168518	7.944831
				7.16511	8.133322
				7.164206	8.188424
				7.163955	8.202844
				7.162663	8.195334
				7.161218	8.275096
				7.161228	8.35128
				7.161175	8.364017
				7.160433	8.461378
				7.159698	8.530567
				7.156343	8.647153
				7.156133	8.68957
				7.155976	8.699186
				7.153287	8.714386
				7.1534	8.754304
				7.151032	8.84114
				7.150754	8.85359
				7.149642	8.881277
				7.147658	8.930433
				7.147602	9.014645
				7.147519	9.027016
				7.147069	9.110765
				7.146404	9.174496
				7.145616	9.184014
				7.145493	9.187479
				7.144526	9.18662
				7.144558	9.248525
				7.141268	9.257806
				7.142075	9.28075

Table A18 (9)					
16-Nov		19-Dec		27-Dec	
pH	Depth (M)	pH	Depth (M)	pH	Depth (M)
				7.142045	9.283654
				7.143023	9.297144
				7.140481	9.433542
				7.140653	9.462591
				7.140566	9.47171
				7.141373	9.578784
				7.137341	9.664093
				7.138927	9.677839
				7.138955	9.682569
				7.138848	9.704608
				7.138171	9.758403
				7.136641	9.793191
				7.136426	9.799579
				7.137048	9.857162
				7.136271	9.937385
				7.13524	10.02312
				7.133468	10.04733
				7.133207	10.05337
				7.132464	10.08084
				7.133377	10.13847
				7.13358	10.16828
				7.133646	10.1742
				7.129342	10.30104
				7.12917	10.53898
				7.130436	10.57319
				7.130605	10.58648
				7.126278	10.64324
				7.129047	10.718
				7.125786	10.80657
				7.125517	10.82033
				7.1236	10.90749
				7.123292	10.95858
				6.918757	11.02049
				6.891899	11.04507
				6.88025	11.05036
				6.857286	11.06382
				6.810565	11.08597

Table A19. Total Dissolved Solids (TDS) and Depth by Date. 4 July to 23 October 2019. Data recorded by Aqua-Troll 500 sonde.

Table A19 (1)							
4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.167304	0.124813	0.231819	0.319942	0.279336	0.192846	0.259763	0.18994
0.238608	0.13626	0.231862	0.328685	0.27958	0.192352	0.259713	0.192938
0.255138	0.138199	0.231814	0.410415	0.279436	0.193821	0.259755	0.189556
0.255787	0.272552	0.23158	0.39587	0.279387	0.195836	0.259711	0.170692
0.255643	0.411018	0.231549	0.397349	0.279319	0.194763	0.259707	0.168182
0.255527	0.553965	0.231403	0.4949	0.27931	0.194704	0.259661	0.208512
0.255495	0.576628	0.230293	0.546852	0.279356	0.291816	0.259622	0.265403
0.255439	0.736059	0.227584	0.677008	0.279291	0.422422	0.259585	0.385493
0.254577	1.043338	0.227205	0.694813	0.279021	0.544611	0.259579	0.402608
0.254334	1.221184	0.226431	0.779739	0.278985	0.564695	0.259529	0.453652
0.254269	1.254886	0.226019	0.855178	0.278969	0.696559	0.259503	0.493468
0.254287	1.364484	0.225753	0.980934	0.278886	0.777747	0.259428	0.534215
0.254009	1.564289	0.225284	1.061657	0.278828	0.816521	0.259418	0.540667
0.254008	1.704424	0.225217	1.076471	0.278817	0.824099	0.259426	0.519999
0.253997	1.729057	0.225301	1.15477	0.278714	0.91071	0.259475	0.548013
0.254006	1.866242	0.225112	1.211392	0.278644	0.967622	0.25944	0.652466
0.25521	2.185988	0.225521	1.301572	0.27867	1.002974	0.259366	0.684365
0.253776	2.289515	0.225564	1.314778	0.278649	1.061335	0.259355	0.692358
0.253656	2.314833	0.226659	1.387907	0.278647	1.069799	0.259391	0.746707
0.253393	2.598338	0.228836	1.469723	0.278605	1.171361	0.259352	0.81033
0.252968	2.716891	0.237404	1.710582	0.278668	1.17207	0.259368	0.958819
0.253289	2.843933	0.238549	1.743397	0.278686	1.180916	0.259369	0.979805
0.253312	2.862552	0.247864	1.751444	0.278691	1.181531	0.259353	1.036089
0.253403	3.069314	0.250505	1.876279	0.278702	1.214685	0.259339	1.096975
0.253159	3.157687	0.251159	2.062519	0.27868	1.302612	0.259318	1.260032
0.25254	3.298299	0.251311	2.090666	0.278719	1.326569	0.259315	1.282476
0.252456	3.317681	0.244668	2.171674	0.278723	1.332953	0.259284	1.355166
0.251474	3.534383	0.238365	2.191003	0.278718	1.287819	0.259276	1.405802
0.250486	3.668391	0.238099	2.182788	0.278752	1.441653	0.259325	1.445418
0.250139	3.749101	0.232776	2.228095	0.278673	1.484459	0.259331	1.452106
0.250062	3.763228	0.23213	2.233381	0.278665	1.496253	0.2593	1.534629
0.249729	4.036903	0.226301	2.289434	0.278703	1.480216	0.2593	1.595538
0.249993	4.150299	0.218463	2.373751	0.278681	1.518569	0.259342	1.627994
0.250204	4.225568	0.215153	2.582151	0.278596	1.625092	0.259272	1.69961
0.250243	4.237772	0.214451	2.611423	0.278435	1.69197	0.259264	1.709624

Table A19 (2)

4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.249777	4.448973	0.21386	2.806466	0.278412	1.704444	0.259172	1.782311
0.249466	4.561795	0.213598	2.843957	0.278349	1.748367	0.259206	1.812729
0.249865	4.649994	0.212438	3.074508	0.278343	1.830622	0.25925	1.85123
0.249903	4.664282	0.212285	3.103828	0.278428	1.913349	0.259258	1.856899
0.250074	4.792207	0.210563	3.143843	0.278438	1.926833	0.259348	1.985734
0.250425	4.851207	0.210255	3.171076	0.278238	1.956335	0.259333	2.062045
0.250597	4.86712	0.209745	3.226495	0.278078	2.054473	0.259349	2.099946
0.250632	4.870814	0.209676	3.234334	0.277983	2.149127	0.25935	2.107176
0.250811	4.880911	0.208811	3.253426	0.277966	2.164708	0.259357	2.187505
0.251129	4.875078	0.20835	3.397571	0.277898	2.266662	0.259428	2.32148
0.251286	4.877275	0.20691	3.581542	0.277711	2.329985	0.259443	2.351415
0.251317	4.877266	0.206329	3.760744	0.277167	2.590337	0.259447	2.360326
0.25167	4.885593	0.2062	3.789966	0.277093	2.624607	0.259425	2.399297
0.251872	4.879582	0.223223	3.932609	0.277064	2.707165	0.259408	2.483027
0.252016	4.881554	0.227853	4.002329	0.277019	2.734308	0.259418	2.551485
0.252041	4.881512	0.229673	4.019345	0.277023	2.844033	0.25943	2.595866
0.252128	4.897233	0.230001	4.023566	0.276934	3.025844	0.259431	2.603729
0.252178	4.895197	0.229731	4.023322	0.276924	3.053094	0.259446	2.657445
0.252221	4.903874	0.229249	4.039238	0.276673	3.130098	0.259473	2.680521
0.252228	4.904791	0.206964	4.413423	0.276099	3.188397	0.259416	2.707936
0.25233	5.085684	0.204201	4.460152	0.276012	3.338662	0.25941	2.712026
0.252834	5.147894	0.1995	4.593203	0.275979	3.359457	0.259484	2.808551
0.253644	5.242514	0.199518	4.749357	0.275538	3.587019	0.259515	2.82786
0.253764	5.255602	0.195854	4.901591	0.275003	3.657769	0.259496	2.911436
0.25442	5.39954	0.194637	5.007284	0.274511	3.761429	0.259494	2.922173
0.256421	5.466586	0.194336	5.025791	0.27443	3.776208	0.25955	2.955457
0.257047	5.487921	0.194313	5.19039	0.271737	4.064188	0.259546	3.08274
0.257204	5.49253	0.191635	5.558702	0.270207	4.154642	0.259533	3.120442
0.257674	5.511311	0.183172	5.689592	0.26891	4.253859	0.259525	3.172021
0.258912	5.517358	0.181995	5.720024	0.267437	4.350152	0.259523	3.179259
0.25933	5.502124	0.180932	5.821993	0.267207	4.36576	0.259524	3.254096
0.259429	5.500411	0.181594	5.883151	0.266427	4.377373	0.25949	3.305614
0.260367	5.57239	0.182693	6.105401	0.266169	4.391186	0.259447	3.348281
0.262574	5.7247	0.182862	6.135151	0.266002	4.558513	0.25944	3.355282
0.263612	5.785428	0.18848	6.186013	0.265975	4.580091	0.259373	3.553435
0.263824	5.798692	0.190225	6.267982	0.264174	4.691356	0.259286	3.591195
0.265499	5.918632	0.192476	6.436928	0.262618	4.755724	0.259242	3.643648

Table A19 (3)

4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.268561	5.962201	0.192803	6.461018	0.262137	4.782938	0.259234	3.650692
0.27014	6.036632	0.19855	6.621512	0.262022	4.788433	0.259265	3.720174
0.270447	6.046754	0.205851	6.868104	0.262478	4.82847	0.259255	3.745812
0.27193	6.120753	0.217756	7.052804	0.262337	4.925367	0.259229	3.739857
0.273869	6.178772	0.232176	7.217876	0.261692	4.976532	0.259225	3.739854
0.275895	6.242347	0.234429	7.244563	0.261605	4.986626	0.259255	3.7626
0.276215	6.252118	0.245975	7.405797	0.261485	5.025151	0.259119	3.789558
0.279493	6.399003	0.261515	7.64438	0.261627	5.03598	0.2591	3.813807
0.283621	6.445459	0.302909	7.756528	0.261574	5.050302	0.259092	3.817818
0.284239	6.456964	0.308687	7.77939	0.261612	5.114057	0.259003	3.787098
0.285779	6.498894	0.314209	7.797388	0.261614	5.122603	0.259001	3.866849
0.287878	6.622002	0.317616	7.803188	0.260719	5.356913	0.259007	3.910323
0.289102	6.667412	0.318949	7.803849	0.257631	5.41697	0.25892	3.962426
0.289323	6.677412	0.31923	7.804075	0.254062	5.452063	0.258909	3.970274
0.290938	6.702935	0.320718	7.806699	0.253493	5.457592	0.258931	4.061183
0.294373	6.792929	0.322897	8.006452	0.248079	5.731689	0.258989	4.101731
0.295447	6.817985	0.332527	8.263133	0.237706	5.726419	0.25899	4.140692
0.295704	6.824392	0.333799	8.303039	0.234807	5.845809	0.258992	4.146754
0.297556	6.854855	0.342943	8.404136	0.234046	5.85915	0.258913	4.179924
0.300575	6.924828	0.347817	8.612591	0.228818	6.105754	0.259012	4.263584
0.302336	7.046007	0.355203	8.965072	0.228102	6.1853	0.258988	4.300006
0.302661	7.063475	0.363435	9.212463	0.229022	6.232484	0.25899	4.307821
0.305897	7.120162	0.364744	9.25662	0.229127	6.240619	0.258962	4.407662
0.30791	7.246367	0.369916	9.302405	0.230416	6.315547	0.25904	4.405285
0.30908	7.285017	0.372244	9.340372	0.234265	6.453158	0.259104	4.4173
0.309289	7.29463	0.374872	9.54854	0.237592	6.547528	0.259211	4.456964
0.31058	7.338912	0.375267	9.57602	0.24292	6.651585	0.259226	4.462502
0.313381	7.501164	0.378534	9.675187	0.243705	6.66772	0.259528	4.495797
0.31412	7.5779	0.381989	9.900701	0.249553	6.82277	0.259688	4.477766
0.31432	7.5937	0.396022	10.24085	0.2597	6.963694	0.259612	4.50907
0.316691	7.679461	0.397897	10.29201	0.269633	7.068013	0.259607	4.512066
0.319265	7.741021	0.40238	10.51907	0.271261	7.086004	0.259414	4.603039
0.320139	7.779272	0.408973	10.67188	0.277268	7.299509	0.259866	4.663115
0.320333	7.785922	0.411521	10.94879	0.285409	7.362703	0.259983	4.721905
0.32132	7.900765	0.412091	10.98817	0.288301	7.398766	0.260018	4.731247
0.322664	7.985416	0.421506	11.07405	0.288967	7.404861	0.259945	4.78808
0.323608	8.031253	0.419088	11.145	0.291526	7.494535	0.259616	4.878281

Table A19 (4)

4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.323769	8.039546	0.415921	11.18863	0.297571	7.547391	0.259487	4.924224
0.324724	8.164005	0.427138	11.20103	0.302397	7.620869	0.259457	4.933359
0.32584	8.247821	0.428455	11.20386	0.303231	7.631734	0.259478	4.959165
0.327306	8.298363	0.430651	11.20584	0.311551	7.71349	0.259779	5.215559
0.327522	8.306964	0.432171	11.21062	0.324671	7.801679	0.258809	5.332679
0.328926	8.398159	0.436039	11.21587	0.328057	7.88488	0.258702	5.357449
0.330463	8.439125	0.436572	11.21671	0.331463	7.916919	0.258031	5.425059
0.330697	8.447531	0.440036	11.21895	0.331951	7.923779	0.256668	5.524221
0.331471	8.496666	0.443143	11.22085	0.342057	8.212502	0.256663	5.619006
0.332521	8.584121	0.449621	11.22141	0.345752	8.308059	0.256361	5.709549
0.332461	8.630094	0.45054	11.22154	0.353226	8.437132	0.256331	5.724224
0.332493	8.638991	0.453603	11.22317	0.354261	8.455684	0.256192	5.754294
0.332633	8.690802	0.456589	11.22254	0.355823	8.533923	0.255893	5.788379
0.333969	8.763072	0.456407	11.21973	0.360301	8.692697	0.255558	5.816867
0.334707	8.826596	0.456496	11.21935	0.362557	8.79334	0.255505	5.821646
0.33485	8.836989	0.456673	11.22368	0.363015	8.812015	0.254954	5.865556
0.335314	8.995056	0.456854	11.22537	0.366407	8.883322	0.2522	6.055032
0.33608	9.037546	0.457691	11.22475	0.371392	8.912188	0.248652	6.153606
0.336499	9.0732	0.460432	11.22535	0.372317	8.942582	0.248101	6.173426
0.336574	9.078263	0.460812	11.22539	0.372625	8.94726	0.247929	6.186806
0.336788	9.212792	0.462082	11.22925	0.372953	8.937053	0.247371	6.187778
0.336968	9.256632	0.462542	11.22791	0.374446	9.077934	0.247281	6.15783
0.337454	9.309235	0.463046	11.22666	0.375471	9.167321	0.247247	6.154142
0.33752	9.316778			0.377392	9.284581	0.247204	6.143243
0.337758	9.382844			0.377667	9.302146	0.247442	6.244471
0.339335	9.427324			0.389309	9.790853	0.247323	6.258214
0.340157	9.496382			0.397648	9.874261	0.247381	6.246861
0.34032	9.506279			0.402983	9.897123	0.247382	6.245398
0.340284	9.579016			0.403931	9.90092	0.247503	6.428802
0.340986	9.612563			0.407067	9.976029	0.246412	6.521557
0.342064	9.705532			0.414308	10.03214	0.245907	6.532554
0.342225	9.717955			0.418744	10.24799	0.2458	6.536778
0.344036	9.861902			0.419576	10.27676	0.245808	6.614989
0.345562	9.917208			0.426488	10.42478	0.245673	6.64762
0.346637	9.963813			0.431764	10.65162	0.245654	6.706272
0.346819	9.970945			0.433861	10.72041	0.245646	6.714538
0.347475	10.0699			0.434311	10.73775	0.245469	6.837607

Table A19 (5)							
4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.349108	10.10103			0.435264	10.73744	0.245068	7.031119
0.350069	10.15182			0.431027	10.92629	0.245404	7.095319
0.35025	10.15878			0.435496	10.97122	0.245429	7.110741
0.350812	10.25835			0.448202	10.99624	0.246054	7.129643
0.352714	10.38089			0.450015	11.00009	0.247325	7.19911
0.354372	10.41607			0.457578	11.00875	0.247929	7.284258
0.35465	10.4246			0.454833	11.0092	0.248568	7.345114
0.355465	10.53433			0.454115	11.01028	0.248664	7.35573
0.356312	10.6109			0.453874	11.01039	0.251787	7.471317
0.357802	10.67027			0.453313	11.01167	0.254549	7.541612
0.358012	10.67993			0.449721	11.01618	0.255514	7.621871
0.358463	10.78566			0.454054	11.01401	0.25573	7.634173
0.35967	10.81409			0.454446	11.01392	0.256214	7.691268
0.359826	10.82169			0.455947	11.01788	0.25695	7.67665
0.360699	10.88891			0.458953	11.0139	0.257054	7.723014
0.363279	11.0071			0.460302	11.01621	0.257094	7.727909
0.364372	11.06521			0.461996	11.01774	0.257735	7.783139
0.364608	11.07685					0.263358	7.878019
0.366272	11.10134					0.264839	7.951167
0.372914	11.14947					0.265251	7.963852
0.373449	11.18074					0.268487	8.025434
0.37378	11.18639					0.273392	8.106221
0.370696	11.20062					0.27706	8.146461
0.371094	11.22326					0.282506	8.180155
0.37099	11.25802					0.28331	8.185507
0.371007	11.26302					0.2894	8.285026
0.375883	11.2867					0.303984	8.37509
0.372107	11.2996					0.310377	8.415919
0.372026	11.30989					0.311739	8.424142
0.371847	11.31156					0.31595	8.490158
0.372617	11.31991					0.320979	8.507138
0.378242	11.32614					0.325169	8.524276
0.380334	11.32438					0.325873	8.526772
0.380813	11.32438					0.329502	8.570457
0.382648	11.33022					0.336945	8.599692
0.384407	11.32672					0.338552	8.619976
0.384707	11.33151					0.339042	8.623505

Table A19 (6)							
4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
0.384804	11.33192					0.34117	8.6673
0.38487	11.33236					0.345858	8.757504
0.384704	11.33505					0.346961	8.826992
0.384902	11.33313					0.349248	8.836394
0.384919	11.33301					0.349553	8.839802
0.385273	11.33909					0.350474	8.925654
0.386267	11.33371					0.357108	8.946358
0.386963	11.33602					0.358805	8.945303
0.387084	11.33607					0.359283	8.945538
0.387718	11.33642					0.360587	8.942682
0.389179	11.32469					0.362119	8.917037
0.390101	11.32944					0.359616	8.984237
0.39027	11.32954					0.359361	8.991557
0.391181	11.33816					0.365828	9.093834
0.392379	11.34056					0.381696	9.221317
0.392167	11.33841					0.387961	9.29523
0.392183	11.33819					0.389363	9.309229
0.392429	11.33374					0.391401	9.350207
0.39293	11.33231					0.398354	9.45929
0.393244	11.32873					0.404321	9.538674
0.393301	11.32825					0.410237	9.58993
						0.41118	9.598927
						0.415811	9.679317
						0.421734	9.73331
						0.424935	9.773033
						0.425552	9.779781
						0.427196	9.854368
						0.428799	9.895843
						0.430422	9.928516
						0.43068	9.933895
						0.431728	9.939531
						0.433263	9.942015
						0.43348	9.94381
						0.433566	9.944115
						0.4337	9.937577
						0.433887	9.866605
						0.433568	9.898833

Table A19 (7)							
4-Jul		23-Aug		12-Sep		23-Oct	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
						0.433137	9.915322
						0.433069	9.91915
						0.433547	9.941055
						0.434557	9.966647
						0.43611	10.00532
						0.436344	10.0111
						0.438774	10.09495
						0.444487	10.13059
						0.447631	10.14229
						0.448246	10.14483
						0.449187	10.15111
						0.451635	10.22534
						0.454676	10.24987
						0.455147	10.25594
						0.456442	10.26007
						0.457026	10.33675
						0.461687	10.35404
						0.463476	10.39348
						0.463887	10.39871
						0.465695	10.49286
						0.468065	10.54303
						0.469609	10.61101
						0.469888	10.62105
						0.472818	10.65792
						0.476073	10.78593
						0.477958	10.84194
						0.478311	10.8539
						0.480389	10.91211
						0.480659	10.96379
						0.476807	10.9864
						0.477077	11.00319
						0.476956	11.00588
						0.480082	11.03554
						0.519612	11.05913
						0.557327	11.07421
						0.563671	11.07689
						0.597679	11.07959

Table A20. Total Dissolved Solids (TDS) and Depth by Date. 16 November to 27 December 2019. Data recorded by Aqua-Troll 500 sonde.

Table A20 (1)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293762	0.195712	0.299133	0.11998	0.279799	0.183758
0.29373	0.194365	0.299076	0.122384	0.279722	0.186968
0.293717	0.194445	0.299071	0.122774	0.279762	0.185552
0.293681	0.194665	0.299136	0.15974	0.279763	0.185517
0.293706	0.316338	0.29915	0.193113	0.279746	0.182814
0.29365	0.41276	0.299085	0.335991	0.279777	0.183058
0.293644	0.429739	0.299063	0.388045	0.279724	0.239359
0.293599	0.524732	0.299058	0.40018	0.27974	0.279715
0.293571	0.658358	0.298996	0.460675	0.279739	0.28709
0.293486	0.721039	0.29907	0.593155	0.279774	0.311925
0.293475	0.733935	0.29909	0.685678	0.279746	0.416015
0.293433	0.779689	0.299096	0.702263	0.279773	0.483425
0.293419	0.817638	0.299142	0.721122	0.279775	0.495917
0.293441	0.894007	0.299096	0.824049	0.279745	0.547685
0.29347	0.943725	0.299132	0.847103	0.279728	0.661642
0.293475	0.952867	0.299134	0.854034	0.279751	0.723272
0.293444	0.998931	0.2991	0.894073	0.279753	0.735372
0.293411	1.12811	0.298994	0.973865	0.279738	0.779817
0.293371	1.175644	0.299021	1.018741	0.279786	0.901852
0.293365	1.186624	0.299021	1.0274	0.279706	0.925938
0.293454	1.213065	0.299157	1.072705	0.279698	0.933798
0.293367	1.320627	0.299198	1.162401	0.27976	1.013333
0.293427	1.401879	0.299218	1.196315	0.279801	1.033894
0.29343	1.416251	0.299191	1.243347	0.279783	1.080391
0.293469	1.470977	0.299188	1.250117	0.279802	1.101103
0.293499	1.613284	0.299211	1.288316	0.279803	1.105461
0.293423	1.679338	0.299198	1.348326	0.279755	1.112723
0.293373	1.785572	0.299166	1.385513	0.279761	1.180094
0.293363	1.800817	0.299161	1.392408	0.279743	1.201477
0.293339	1.904314	0.29918	1.447963	0.279741	1.206812
0.293335	2.066398	0.299165	1.49414	0.279688	1.230968
0.293263	2.142489	0.299118	1.514925	0.279769	1.270501
0.293254	2.158052	0.299111	1.519152	0.279726	1.298582
0.293318	2.259792	0.299242	1.56149	0.279724	1.303581
0.293293	2.356605	0.299267	1.634	0.279722	1.327712

Table A20 (2)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293362	2.423335	0.299327	1.670439	0.279749	1.402141
0.29337	2.435114	0.299283	1.719068	0.279725	1.467941
0.293335	2.497683	0.29928	1.72624	0.279773	1.525017
0.293348	2.619471	0.299336	1.740876	0.279778	1.534431
0.293318	2.671554	0.29944	1.842697	0.279677	1.563448
0.293315	2.682748	0.299488	1.88023	0.279586	1.618335
0.2933	2.738804	0.299498	1.888977	0.279107	1.664541
0.293373	2.85488	0.299495	1.972755	0.279043	1.672419
0.293323	2.911878	0.299448	2.097011	0.278684	1.713757
0.293298	2.953104	0.29942	2.165928	0.278416	1.764967
0.293293	2.959901	0.299414	2.17917	0.277727	1.789628
0.29327	3.012633	0.299423	2.225565	0.277631	1.794592
0.293325	3.101183	0.299447	2.345012	0.277566	1.800269
0.293339	3.133953	0.299465	2.428981	0.27747	1.858076
0.293344	3.141381	0.299468	2.444052	0.277508	1.88658
0.293279	3.210671	0.299545	2.501095	0.277509	1.892465
0.293311	3.322999	0.299609	2.591476	0.277612	1.913754
0.293274	3.377745	0.299563	2.606219	0.277639	1.933374
0.293271	3.388842	0.29956	2.611527	0.27729	1.956412
0.293241	3.424352	0.299568	2.61008	0.277158	1.996942
0.293213	3.528836	0.299613	2.616192	0.277127	2.002889
0.293216	3.59082	0.299564	2.641782	0.276933	2.033435
0.293215	3.602642	0.299554	2.671833	0.276809	2.078065
0.293176	3.631612	0.29955	2.676639	0.27672	2.09167
0.293209	3.664986	0.299532	2.711484	0.276705	2.095021
0.293168	3.728025	0.299654	2.771141	0.2769	2.112934
0.293175	3.762792	0.299648	2.793064	0.27678	2.152955
0.293174	3.769509	0.299652	2.798032	0.276578	2.177957
0.293173	3.825172	0.299619	2.809801	0.276547	2.182624
0.293167	3.90192	0.299655	2.878036	0.27658	2.232645
0.293183	3.968116	0.299616	2.899757	0.27629	2.311102
0.293185	3.979244	0.299613	2.905198	0.275386	2.345382
0.293195	4.042295	0.29964	2.905495	0.275262	2.35266
0.293224	4.098598	0.299685	2.947565	0.275708	2.365553
0.293211	4.125166	0.299627	2.981627	0.275839	2.392198
0.29321	4.1305	0.299622	2.987567	0.275583	2.513786
0.293191	4.158635	0.299651	2.999498	0.275318	2.599436

Table A20 (3)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293191	4.244264	0.299665	3.036869	0.275273	2.615022
0.293213	4.301317	0.29967	3.062828	0.274659	2.656367
0.293216	4.311765	0.299682	3.089628	0.274478	2.710472
0.293187	4.354822	0.299684	3.093837	0.274467	2.740131
0.293199	4.363788	0.299658	3.135282	0.274462	2.745832
0.293212	4.443932	0.299684	3.212862	0.274437	2.752221
0.29316	4.508394	0.299685	3.247208	0.274583	2.745548
0.293154	4.519723	0.299687	3.254441	0.274938	2.740278
0.293165	4.566632	0.299628	3.293648	0.274988	2.739327
0.293223	4.669445	0.299704	3.377635	0.275372	2.740254
0.293163	4.716876	0.299694	3.442737	0.275441	2.789653
0.293157	4.72676	0.299696	3.454096	0.275134	2.799488
0.293213	4.771844	0.299655	3.48908	0.275097	2.802744
0.293211	4.905297	0.299686	3.525087	0.275198	2.811971
0.293173	4.997467	0.29967	3.544407	0.275149	2.82961
0.293168	5.014185	0.29967	3.548138	0.275118	2.868718
0.29321	5.030357	0.299675	3.550098	0.275167	2.879054
0.293174	5.106084	0.299714	3.594425	0.275172	2.881832
0.293167	5.181999	0.299714	3.627586	0.275222	2.895915
0.293207	5.246157	0.299731	3.649122	0.275189	2.880395
0.293212	5.256873	0.299733	3.652914	0.275274	2.893092
0.293161	5.30737	0.299711	3.691112	0.275283	2.893973
0.293117	5.42278	0.299707	3.765876	0.27536	2.905653
0.293186	5.490616	0.299731	3.795745	0.275459	2.953554
0.293193	5.503545	0.299734	3.802329	0.275593	2.980202
0.293153	5.529582	0.29966	3.83519	0.275613	2.985425
0.293147	5.637662	0.299668	3.882655	0.275702	2.989547
0.293193	5.682914	0.299718	3.931841	0.275683	3.022294
0.293199	5.692847	0.299725	3.93975	0.275724	3.075922
0.293234	5.704672	0.299644	3.958796	0.275711	3.100613
0.293215	5.77217	0.299668	3.987946	0.275711	3.10569
0.293198	5.797595	0.299698	3.995562	0.275718	3.127711
0.293195	5.803465	0.299703	3.997641	0.275643	3.17594
0.293179	5.816571	0.299694	4.019707	0.275585	3.201618
0.293163	5.944343	0.299733	4.033987	0.275575	3.206675
0.293184	6.02858	0.29973	4.077318	0.275548	3.232563
0.293228	6.065648	0.299753	4.10601	0.275613	3.254947

Table A20 (4)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293234	6.072932	0.299755	4.111256	0.275542	3.284483
0.293273	6.1532	0.299741	4.13908	0.275536	3.288958
0.293241	6.269058	0.299703	4.179003	0.275554	3.299933
0.293278	6.343965	0.299769	4.197278	0.275494	3.340808
0.293281	6.357641	0.299776	4.201039	0.275234	3.358461
0.293282	6.39277	0.299731	4.217662	0.2752	3.362286
0.293262	6.512716	0.299732	4.256047	0.275056	3.383776
0.293257	6.579555	0.299747	4.336913	0.274995	3.391411
0.293255	6.592624	0.299749	4.348479	0.275093	3.418586
0.293226	6.616882	0.299734	4.410143	0.275222	3.439637
0.293221	6.688363	0.299736	4.52363	0.275243	3.44335
0.29321	6.725386	0.299749	4.580503	0.275164	3.462271
0.293209	6.732813	0.299751	4.591978	0.275146	3.492941
0.29322	6.75979	0.299735	4.677513	0.275209	3.510667
0.293264	6.777498	0.299768	4.772511	0.275217	3.514035
0.293268	6.919238	0.299672	4.801817	0.275224	3.532149
0.293229	7.005532	0.299742	4.847458	0.275131	3.571655
0.293224	7.022051	0.299747	4.853798	0.275246	3.600469
0.29324	7.039506	0.299744	4.882127	0.275256	3.60559
0.293267	7.050911	0.299675	4.95334	0.275177	3.627568
0.293227	7.075849	0.299707	4.982825	0.275242	3.650061
0.293224	7.079339	0.299708	4.989259	0.275334	3.663532
0.293173	7.145151	0.299656	5.025678	0.275348	3.666044
0.293186	7.258324	0.299672	5.120991	0.275404	3.671716
0.293213	7.315623	0.299656	5.184502	0.275375	3.696842
0.293217	7.327068	0.299655	5.196144	0.275454	3.748339
0.293182	7.427254	0.299684	5.281868	0.275436	3.764425
0.293231	7.526431	0.299719	5.476778	0.275438	3.768388
0.293295	7.580558	0.299506	5.580945	0.27542	3.785626
0.293305	7.590957	0.299481	5.601387	0.275501	3.839387
0.293245	7.617553	0.299523	5.634145	0.275605	3.853334
0.293262	7.646913	0.299646	5.732764	0.275621	3.857184
0.293246	7.707708	0.299553	5.782295	0.275582	3.903892
0.293243	7.737681	0.299552	5.80481	0.275635	3.912862
0.293241	7.743703	0.299547	5.809037	0.275568	3.91666
0.293271	7.754864	0.299508	5.816687	0.275563	3.9173
0.293296	7.815913	0.299296	5.836535	0.275551	3.945465

Table A20 (5)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293312	7.843517	0.299313	5.837086	0.275546	3.958577
0.293315	7.849409	0.299306	5.837918	0.275623	3.940613
0.293289	7.897879	0.299366	5.853548	0.275663	3.936404
0.293405	7.966394	0.299368	5.882252	0.275672	3.935059
0.293374	7.997931	0.299242	5.95943	0.27576	3.93206
0.293375	8.004441	0.299227	5.970134	0.275862	3.979168
0.293304	8.041658	0.29927	5.992447	0.275814	4.006669
0.293336	8.122496	0.299286	6.028055	0.275812	4.012057
0.293327	8.159403	0.299352	6.105416	0.275852	4.020381
0.293327	8.167153	0.299361	6.11634	0.275795	4.03029
0.293287	8.226041	0.299317	6.174212	0.275824	4.041381
0.293276	8.232917	0.299329	6.23199	0.275825	4.043127
0.293297	8.300945	0.299305	6.323679	0.275787	4.048305
0.293284	8.395145	0.298581	6.423188	0.275825	4.127839
0.293284	8.409762	0.29849	6.439049	0.27593	4.156653
0.29327	8.490351	0.298392	6.521204	0.275944	4.163475
0.293235	8.650232	0.298247	6.552051	0.275844	4.185111
0.293285	8.71936	0.298266	6.587556	0.275824	4.187955
0.29329	8.734112	0.298263	6.592795	0.275786	4.206492
0.293291	8.766157	0.298396	6.596754	0.275779	4.233676
0.293255	8.909269	0.298377	6.615468	0.275777	4.237845
0.293327	8.972978	0.298396	6.64673	0.275827	4.275864
0.293335	8.986617	0.298397	6.651365	0.27581	4.366983
0.293303	9.017467	0.298418	6.691652	0.275799	4.423746
0.293353	9.118717	0.298352	6.779817	0.275797	4.434368
0.293361	9.171941	0.29842	6.802231	0.275806	4.485663
0.293462	9.223697	0.298425	6.80844	0.27575	4.534151
0.293475	9.231759	0.298407	6.832271	0.275809	4.542902
0.293636	9.296303	0.298461	6.842216	0.275814	4.545748
0.293348	9.437492	0.298533	6.894761	0.275771	4.569122
0.293449	9.536833	0.298474	6.908269	0.275815	4.645038
0.293449	9.5547	0.298469	6.91203	0.27596	4.714892
0.293522	9.619336	0.298522	6.940997	0.27598	4.726538
0.293396	9.782737	0.298524	7.00452	0.275968	4.79392
0.293372	9.814953	0.298499	7.057848	0.275954	4.813639
0.293364	9.82534	0.298495	7.066961	0.275921	4.889582
0.293398	9.822838	0.298559	7.116041	0.276027	4.908924

Table A20 (6)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
0.293373	9.93327	0.298538	7.173566	0.27604	4.91431
0.293465	9.98961	0.298543	7.241183	0.27603	4.949098
0.293475	10.00112	0.298542	7.251667	0.276031	4.995474
0.293591	10.00906	0.298545	7.306705	0.276048	5.021862
0.293452	10.04078	0.298576	7.443822	0.276051	5.026876
0.293429	10.09406	0.298613	7.484974	0.276016	5.052969
0.29344	10.13034	0.298619	7.49552	0.276029	5.088967
0.293442	10.13689	0.298609	7.52146	0.276104	5.109134
0.293461	10.2081	0.298577	7.534115	0.276114	5.113002
0.293549	10.24652	0.298619	7.585763	0.276097	5.135465
0.293561	10.30089	0.298625	7.605992	0.276165	5.155891
0.293566	10.3089	0.298628	7.610555	0.276173	5.186105
0.293588	10.32339	0.298689	7.611061	0.276174	5.211329
0.29353	10.49894	0.298666	7.701304	0.276174	5.215596
0.293598	10.58108	0.298646	7.746504	0.276262	5.231128
0.293604	10.59831	0.298643	7.755824	0.276319	5.266528
0.293673	10.64354	0.29867	7.815169	0.276379	5.283468
0.293728	10.72611	0.29869	7.879406	0.276389	5.286946
0.293796	10.7569	0.298698	7.923907	0.276384	5.343237
0.293807	10.76394	0.2987	7.931792	0.276431	5.399104
0.293751	10.81305	0.298677	7.945245	0.276261	5.432246
0.293755	10.86192	0.298687	8.063584	0.276242	5.438388
0.293769	10.89092	0.29869	8.124371	0.276266	5.48117
0.293815	10.90728	0.29868	8.174995	0.276299	5.607818
0.293821	10.91022	0.298678	8.183106	0.276175	5.624928
0.293765	10.9129	0.298689	8.204319	0.276161	5.632094
0.293903	10.9222	0.298693	8.248043	0.2761	5.652956
0.293775	10.91006	0.29864	8.304669	0.27609	5.68487
0.293765	10.9089	0.298633	8.313453	0.27613	5.737452
0.293779	10.97253	0.298653	8.346227	0.276198	5.766117
0.293743	11.06895	0.29868	8.468077	0.276208	5.771664
0.294179	11.0805	0.298702	8.552457	0.276302	5.838046
0.294232	11.08561	0.298706	8.567809	0.276316	5.932127
0.294447	11.0893	0.298719	8.614264	0.276243	5.980472
0.295255	11.1603	0.298722	8.756047	0.276234	5.99
		0.298693	8.834142	0.27623	6.01185
		0.29869	8.849457	0.276228	6.10135

Table A20 (7)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
		0.298675	8.869211	0.276307	6.143612
		0.298703	8.993252	0.276317	6.152435
		0.298598	9.065383	0.276317	6.169107
		0.29857	9.159988	0.276149	6.262764
		0.298562	9.174121	0.276162	6.274694
		0.298569	9.216995	0.276156	6.279915
		0.298606	9.331963	0.276226	6.302161
		0.298587	9.385422	0.276261	6.301972
		0.298586	9.396577	0.276279	6.351314
		0.298534	9.453185	0.276299	6.383511
		0.298558	9.550259	0.276302	6.389576
		0.2985	9.58441	0.276326	6.468412
		0.298494	9.592365	0.276509	6.577781
		0.298557	9.66366	0.276502	6.630463
		0.298555	9.836849	0.276508	6.641097
		0.29853	9.899951	0.276446	6.672286
		0.298526	9.914608	0.27638	6.777071
		0.298538	9.919016	0.276459	6.849019
		0.298534	10.00668	0.276466	6.862115
		0.298559	10.19054	0.276535	6.92103
		0.29855	10.2492	0.27662	6.944916
		0.298549	10.26348	0.27656	6.948281
		0.298529	10.34602	0.276556	6.949467
		0.298586	10.55704	0.276605	6.94025
		0.29862	10.62033	0.276578	6.95085
		0.298626	10.6364	0.276701	7.006489
		0.298562	10.67021	0.27679	7.051692
		0.298575	10.90638	0.276806	7.059592
		0.298579	10.97206	0.276818	7.081356
		0.29858	10.98976	0.276817	7.109781
		0.298589	11.01774	0.276968	7.164959
		0.299936	11.09077	0.276987	7.172908
		0.323494	11.11252	0.276963	7.23822
		0.347238	11.12528	0.276989	7.356928
		0.351199	11.12729	0.276956	7.364593
		0.421847	11.12966	0.276953	7.370165
		0.416842	11.1408	0.276895	7.453633

Table A20 (8)					
16-Nov		**19-Dec**		**27-Dec**	
TDS (ppt)	**Depth (M)**	**TDS (ppt)**	**Depth (M)**	**TDS (ppt)**	**Depth (M)**
		0.398867	11.14219	0.276915	7.543121
		0.395987	11.1428	0.277004	7.650479
				0.277008	7.704639
				0.277012	7.715148
				0.27697	7.805989
				0.277124	7.871838
				0.277064	7.906059
				0.277063	7.912505
				0.276996	7.944831
				0.27706	8.133322
				0.277059	8.188424
				0.277061	8.202844
				0.277055	8.195334
				0.27707	8.275096
				0.277028	8.35128
				0.277023	8.364017
				0.277005	8.461378
				0.277048	8.530567
				0.277085	8.647153
				0.277131	8.68957
				0.277138	8.699186
				0.277167	8.714386
				0.277177	8.754304
				0.277143	8.84114
				0.277139	8.85359
				0.277233	8.881277
				0.277229	8.930433
				0.27722	9.014645
				0.277218	9.027016
				0.277258	9.110765
				0.277224	9.174496
				0.277197	9.184014
				0.277192	9.187479
				0.277189	9.18662
				0.277175	9.248525
				0.27715	9.257806
				0.277212	9.28075

Table A20 (9)					
16-Nov		19-Dec		27-Dec	
TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)	TDS (ppt)	Depth (M)
				0.277219	9.283654
				0.277188	9.297144
				0.277226	9.433542
				0.277284	9.462591
				0.277293	9.47171
				0.277244	9.578784
				0.277243	9.664093
				0.277264	9.677839
				0.277267	9.682569
				0.277148	9.704608
				0.277221	9.758403
				0.277237	9.793191
				0.277243	9.799579
				0.277216	9.857162
				0.277235	9.937385
				0.277267	10.02312
				0.277322	10.04733
				0.27733	10.05337
				0.277357	10.08084
				0.277402	10.13847
				0.277402	10.16828
				0.277404	10.1742
				0.277395	10.30104
				0.277409	10.53898
				0.277502	10.57319
				0.277514	10.58648
				0.277472	10.64324
				0.277488	10.718
				0.277451	10.80657
				0.277448	10.82033
				0.277576	10.90749
				0.277593	10.95858
				0.278738	11.02049
				0.279647	11.04507
				0.279808	11.05036
				0.280629	11.06382
				0.281395	11.08597

Table A21. Nutrient Sample Concentrations and Sample Date. (μM)
Calculated in micromolar units. Collected at Crescent Lake, Station 2. Analysis performed using a continuous flow analyzer at University of Tampa by Dr. Robert Masserini. 1:20 indicates dilution factor. S indicates near surface (1 meter), M indicates mid-depth (5 meters), B indicates bottom (10 meters).

1. Sample ID	$[NO_3 + NO_2]$ (micromolar)	[NO2] (micromolar)	$[NH_4]$ (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
7/4 S	3.3	0.0	0.7	0.0	20.1
7/4 S	3.4	0.1	0.8	0.0	18.8
7/4 S	3.5	0.0	0.6	0.0	18.4
7/4 M	4.1	0.0	0.2	0.0	23.9
7/4 M	3.9	0.0	0.1	0.0	23.5
7/4 M	4.0	0.0	0.1	0.0	24.2
7/4 B 1:20	1.2	0.0	28.0	1.8	1.6
7/4 B 1:20	1.2	0.0	27.6	1.9	3.2
7/4 B 1:20	1.3	0.0	28.0	1.9	2.4
7/18 S	1.9	0.0	1.0	0.3	20.9
7/18 S	1.6	0.0	1.0	0.2	21.6
7/18 S	1.8	0.0	0.2	0.0	17.8
7/18 M	2.7	0.3	0.0	0.3	24.0
7/18 M	3.2	0.3	0.0	0.3	23.6
7/18 M	3.0	0.3	0.0	0.3	23.5
7/18 B 1:20	1.0	0.0	28.6	2.0	1.7
7/18 B 1:20	0.8	0.0	28.0	2.0	2.0
7/18 B 1:20	1.0	0.0	27.1	2.1	4.1
7/29 S	4.1	0.1	0.4	0.3	20.0
7/29 S	4.2	0.1	0.3	0.3	20.5
7/29 S	4.4	0.1	0.1	0.2	19.5
7/29 M	5.5	0.1	0.0	1.4	26.3
7/29 M	5.6	0.1	0.0	1.5	26.1
7/29 M	5.7	0.1	0.0	1.5	25.5
7/29 B 1:20	1.2	0.0	24.2	2.2	4.8
7/29 B 1:20	1.1	0.0	25.0	2.2	3.2

2. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
7/29 B 1:20	1.0	0.0	25.1	2.2	2.7
8/8 S	4.9	0.1	2.9	0.2	30.8
8/8 S	5.2	0.1	2.5	0.2	27.5
8/8 S	2.1	0.0	1.6	0.1	29.3
8/8 M 1:20	0.9	0.0	1.7	0.4	0.0
8/8 M 1:20	0.8	0.0	1.8	0.2	0.1
8/8 M 1:20	0.4	0.0	1.8	0.2	0.5
8/8 B 1:20	0.4	0.0	38.3	2.7	6.7
8/8 B 1:20	0.4	0.0	37.6	2.9	8.3
8/8 B 1:20	0.7	0.0	38.8	2.8	6.6
8/23 S	3.0	0.1	0.9	0.2	45.3
8/23 S	3.0	0.1	0.3	0.1	45.5
8/23 S	3.1	0.1	0.2	0.1	46.4
8/23 M	5.4	0.1	2.0	0.6	47.4
8/23 M	5.5	0.1	2.0	0.6	47.8
8/23 M	5.6	0.1	2.2	0.6	45.6
8/23 B 1:20	0.7	0.0	33.7	2.4	5.9
8/23 B 1:20	0.3	0.0	33.4	2.4	5.3
8/23 B 1:20	0.3	0.0	32.2	2.4	7.5
8/29 S	2.9	0.1	1.7	0.2	31.9
8/29 S	2.8	0.0	0.3	0.0	32.7
8/29 S	2.7	0.1	0.1	0.0	39.0
8/29 M	4.1	0.1	33.5	2.0	30.7
8/29 M	3.8	0.1	33.8	1.9	27.5
8/29 M	4.1	0.0	33.8	2.2	36.8
8/29 B 1:20	2.3	0.1	38.4	2.2	16.1
8/29 B 1:20	1.8	0.1	37.7	2.5	17.1
8/29 B 1:20	1.9	0.1	36.5	2.5	16.8

3. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
9/5 S	5.1	0.1	0.1	0.1	55.6
9/5 S	7.0	0.1	0.0	0.1	55.5
9/5 S	5.3	0.1	0.0	0.0	54.4
9/5 M	5.4	0.2	1.5	0.1	57.9
9/5 M	5.5	0.2	2.1	0.2	55.1
9/5 M	5.4	0.1	1.6	0.2	55.6
9/5 B 1:20	2.6	0.2	36.7	2.3	14.5
9/5 B 1:20	2.5	0.2	34.8	2.4	14.3
9/5 B 1:20	2.5	0.1	36.4	2.3	13.4
9/12 S	2.3	0.1	5.0	0.1	59.5
9/12 S	1.7	0.1	4.7	0.1	60.5
9/12 S	1.9	0.1	5.3	0.0	60.0
9/12 M	2.5	0.1	9.9	0.3	58.7
9/12 M	2.4	0.1	10.1	0.3	62.8
9/12 M	2.7	0.1	10.8	0.3	58.6
9/12 B 1:20	1.5	0.1	33.6	2.0	12.2
9/12 B 1:20	1.1	0.1	33.9	2.1	14.5
9/12 B 1:20	0.9	0.1	34.2	2.1	13.0
9/19 S	1.9	0.1	15.9	0.2	53.3
9/19 S	1.9	0.1	15.6	0.1	55.2
9/19 S	2.1	0.0	15.9	0.0	51.3
9/19 M	2.0	0.0	28.2	0.3	57.8
9/19 M	2.0	0.0	28.9	0.4	55.0
9/19 M	1.9	0.0	28.2	0.4	53.9
9/19 B 1:20	0.6	0.0	38.3	2.5	3.7
9/19 B 1:20	0.5	0.0	37.8	2.5	5.1
9/19 B 1:20	0.6	0.0	37.9	2.5	4.4
9/27 S	2.7	0.1	0.9	0.1	55.8
9/27 S	2.6	0.1	0.9	0.1	56.4
9/27 S	2.7	0.1	0.6	0.0	57.0
9/27 M	3.1	0.0	1.7	0.1	59.3

4. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
9/27 M	2.9	0.0	1.7	0.1	59.2
9/27 M	2.5	0.3	2.6	0.1	60.5
9/27 B 1:20	3.6	0.3	52.5	3.8	14.6
9/27 B 1:20	3.6	0.3	53.4	3.9	13.0
9/27 B 1:20	3.7	0.1	54.7	3.7	14.7
10/3 S	6.7	0.1	1.4	0.1	55.0
10/3 S	6.7	0.1	0.9	0.1	55.7
10/3 S	6.7	0.1	0.5	0.0	51.1
10/3 M	4.6	0.1	2.3	0.1	60.3
10/3 M	4.2	0.1	2.9	0.1	56.6
10/3 M	2.5	0.1	2.9	0.0	60.2
10/3 B (1:20)	2.2	0.0	35.1	2.2	9.2
10/3 B (1:20)	2.4	0.0	35.0	2.3	6.0
10/3 B (1:20)	2.2	0.0	34.5	2.3	6.9
10/12 S	2.9	0.1	3.0	0.2	57.2
10/12 S	2.8	0.1	2.9	0.2	60.6
10/12 S	2.8	0.1	3.5	0.2	55.4
10/12 M	3.8	0.1	8.5	0.3	51.0
10/12 M	3.5	0.1	8.8	0.3	61.9
10/12 M	1.8	0.0	7.5	0.2	62.6
10/12 B 1:20	1.1	0.0	35.7	2.1	5.8
10/12 B 1:20	0.9	0.0	36.0	2.2	2.5
10/12 B 1:20	0.9	0.0	36.8	2.2	2.6
10/23 S	2.7	0.0	6.9	0.6	0.0
10/23 S	4.1	0.4	5.1	0.5	64.3
10/23 S	4.8	0.3	5.5	0.5	58.8
10/23 M	8.9	0.2	10.1	0.8	43.3
10/23 M	4.7	0.3	9.3	0.7	54.9
10/23 M	7.7	0.0	9.0	0.7	58.6
10/23 B 1:20	0.3	0.0	35.0	2.2	3.7

5. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
10/23 B 1:20	0.3	0.0	35.4	2.2	3.2
10/23 B 1:20	0.6	0.3	35.1	2.2	3.6
10/28 S	19.4	0.3	8.5	0.2	7.5
10/28 S	18.1	0.3	6.9	0.1	52.8
10/28 S	18.3	0.1	7.3	0.1	57.6
10/28 M	6.1	0.1	22.0	1.0	50.2
10/28 M	5.1	0.1	22.4	1.2	56.9
10/28 M	7.0	0.0	23.5	1.2	48.9
10/28 B 1:20	0.3	0.0	22.7	0.6	0.0
10/28 B 1:20	0.5	0.0	24.4	1.6	6.0
10/28 B 1:20	0.5	0.0	34.5	1.5	0.0
11/8 S	4.0	0.1	1.0	0.2	54.9
11/8 S	4.4	0.1	0.9	0.1	58.0
11/8 S	4.2	0.1	0.7	0.1	51.9
11/8 M	3.3	0.1	27.8	1.2	43.5
11/8 M	3.2	0.1	25.0	1.4	63.1
11/8 M	3.4	0.1	27.0	1.4	51.4
11/8 B 1:20	0.1	0.0	36.6	2.3	3.4
11/8 B 1:20	0.1	0.0	36.0	2.2	2.3
11/8 B 1:20	0.2	0.3	36.3	2.2	3.4
11/16 S	2.5	0.2	46.2	2.3	62.2
11/16 S	2.5	0.3	48.7	2.5	65.2
11/16 S	2.6	0.3	43.3	2.4	64.7
11/16 M	2.8	0.3	46.7	2.7	66.1
11/16 M	2.7	0.3	47.3	2.2	50.1
11/16 M	2.9	0.0	49.9	2.3	67.2
11/16 B 1:20	0.2	0.0	3.1	0.5	1.0
11/16 B 1:20	0.2	0.0	2.9	0.4	0.4
11/16 B 1:20	0.6	0.7	2.9	0.3	0.2

6. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
11/23 S	4.3	0.0	31.6	1.7	3.3
11/23 S	4.2	0.0	33.5	2.1	2.3
11/23 S	3.8	0.0	29.9	1.7	2.1
11/23 M	4.2	1.0	48.9	2.5	64.1
11/23 M	4.1	1.0	47.4	2.5	63.4
11/23 M	4.3	0.0	47.7	2.6	64.0
11/23 B 1:20	0.4	0.1	3.3	0.2	0.7
11/23 B 1:20	0.4	0.1	3.3	0.2	0.9
11/23 B 1:20	0.4	1.1	3.4	0.2	1.0
12/3 S	9.1	5.3	35.3	1.3	38.9
12/3 S	10.4	5.1	37.5	1.1	41.0
12/3 S	10.3	0.1	37.4	1.2	39.2
12/3 M	10.6	5.0	34.6	1.4	42.9
12/3 M	10.1	5.2	32.4	1.5	43.3
12/3 M	10.5	4.5	35.2	1.4	41.9
12/3 B 1:20	0.4	0.1	1.2	0.1	0.6
12/3 B 1:20	0.4	0.1	1.0	0.1	0.3
12/3 B 1:20	0.3	0.1	1.0	0.1	0.7
12/19 S	20.2	3.5	20.3	1.2	6.7
12/19 S	19.5	3.5	24.6	1.3	7.2
12/19 S	18.0	3.1	19.7	1.2	6.9
12/19 M	22.1	3.7	25.0	1.4	7.8
12/19 M	19.2	3.4	37.3	1.4	7.8
12/19 M	19.4	3.5	37.1	1.6	9.3
12/19 B 1:20	1.0	0.2	0.6	0.0	0.1
12/19 B 1:20	1.0	0.2	1.1	0.0	0.1
12/19 B 1:20	1.0	0.2	0.6	0.0	0.1
12/27 S	8.9	0.8	0.8	0.6	1.8
12/27 S	8.5	0.8	0.9	0.7	2.1
12/27 S	7.4	0.7	1.0	0.7	2.4
12/27 M	14.0	1.0	10.1	1.6	5.5

7. Sample ID	[NO_3 + NO_2] (micromolar)	[NO2] (micromolar)	[NH_4] (micromolar)	[PO4] (micromolar)	[Silicic Acid] (micromolar)
12/27 M	18.2	1.2	11.2	1.5	6.9
12/27 M	12.5	0.9	10.4	1.6	6.0
12/27 B 1:20	0.8	0.1	0.8	0.2	0.0
12/27 B 1:20	0.8	0.1	0.8	0.2	0.0
12/27 B 1:20	0.9	0.1	0.9	0.1	0.0

Table A22. Nutrient Sample Concentrations and Sample Date. (mg/L)
Converted from micromolar units and calculated dilution factors to mg/L. Collected at Crescent Lake, Station 2. Analysis performed using a continuous flow analyzer at University of Tampa by Dr. Robert Masserini. S indicates near surface (1 meter), M indicates mid-depth (5 meters), B indicates bottom (10 meters).

1. Sample ID	[$NO_3 + NO_2$] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
7/4 S	0.21	0.00	0.01	0.00	1.93
7/4 S	0.21	0.00	0.01	0.00	1.81
7/4 S	0.22	0.00	0.01	0.00	1.77
7/4 M	0.25	0.00	0.00	0.00	2.30
7/4 M	0.24	0.00	0.00	0.00	2.26
7/4 M	0.25	0.00	0.00	0.00	2.32
7/4 B	1.50	0.01	10.08	3.43	3.04
7/4 B	1.46	0.01	9.92	3.53	6.13
7/4 B	1.63	0.01	10.09	3.61	4.64
7/18 S	0.12	0.00	0.02	0.02	2.01
7/18 S	0.10	0.00	0.02	0.02	2.08
7/18 S	0.11	0.00	0.00	0.00	1.71
7/18 M	0.16	0.01	0.00	0.03	2.31
7/18 M	0.19	0.01	0.00	0.03	2.27
7/18 M	0.18	0.01	0.00	0.03	2.26
7/18 B	1.21	0.01	10.29	3.87	3.28
7/18 B	0.96	0.01	10.07	3.89	3.80
7/18 B	1.20	0.01	9.74	4.03	7.89
7/29 S	0.25	0.00	0.01	0.03	1.92
7/29 S	0.26	0.00	0.01	0.03	1.97
7/29 S	0.27	0.00	0.00	0.02	1.87
7/29 M	0.34	0.00	0.00	0.14	2.53
7/29 M	0.35	0.00	0.00	0.14	2.51
7/29 M	0.35	0.00	0.00	0.14	2.45
7/29 B	1.51	0.01	8.70	4.24	9.22
7/29 B	1.35	0.01	9.01	4.13	6.14
7/29 B	1.21	0.01	9.03	4.18	5.16
8/8 S	0.30	0.00	0.05	0.02	2.96
8/8 S	0.32	0.00	0.04	0.02	2.64
8/8 S	0.13	0.00	0.03	0.01	2.81

2. Sample ID	[NO_3 + NO_2] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
8/8 M	1.11	0.00	0.62	0.69	0.06
8/8 M	1.01	0.00	0.64	0.33	0.19
8/8 M	0.52	0.00	0.64	0.29	0.95
8/8 B	0.54	0.00	13.78	5.15	12.83
8/8 B	0.46	0.00	13.55	5.43	16.02
8/8 B	0.82	0.00	13.97	5.30	12.59
8/23 S	0.18	0.00	0.02	0.02	4.35
8/23 S	0.18	0.00	0.00	0.01	4.37
8/23 S	0.19	0.00	0.00	0.01	4.45
8/23 M	0.33	0.00	0.04	0.06	4.55
8/23 M	0.34	0.00	0.04	0.06	4.59
8/23 M	0.34	0.00	0.04	0.06	4.38
8/23 B	0.82	0.00	12.12	4.56	11.29
8/23 B	0.35	0.00	12.02	4.52	10.20
8/23 B	0.33	0.04	11.59	4.62	14.46
8/29 S	0.18	0.00	0.03	0.02	3.06
8/29 S	0.17	0.00	0.01	0.00	3.14
8/29 S	0.17	0.00	0.00	0.00	3.74
8/29 M	0.25	0.00	0.60	0.19	2.95
8/29 M	0.24	0.00	0.61	0.18	2.64
8/29 M	0.25	0.00	0.61	0.21	3.53
8/29 B	2.83	0.13	13.83	4.17	31.02
8/29 B	2.19	0.13	13.57	4.67	32.89
8/29 B	2.29	0.12	13.15	4.82	32.24
9/5 S	0.32	0.00	0.00	0.01	5.35
9/5 S	0.43	0.00	0.00	0.01	5.33
9/5 S	0.33	0.00	0.00	0.00	5.23
9/5 M	0.33	0.01	0.03	0.01	5.56
9/5 M	0.34	0.01	0.04	0.02	5.29
9/5 M	0.33	0.01	0.03	0.02	5.34
9/5 B	3.11	0.17	13.22	4.31	27.79
9/5 B	3.06	0.17	12.53	4.61	27.43
9/5 B	3.10	0.10	13.12	4.45	25.68
9/12 S	0.14	0.00	0.09	0.01	5.72
9/12 S	0.11	0.00	0.09	0.01	5.81
9/12 S	0.11	0.00	0.10	0.00	5.76
9/12 M	0.15	0.00	0.18	0.03	5.64

3. Sample ID	[NO_3 + NO_2] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
9/12 M	0.15	0.00	0.18	0.03	6.03
9/12 M	0.16	0.01	0.19	0.03	5.63
9/12 B	1.81	0.13	12.09	3.81	23.42
9/12 B	1.26	0.13	12.19	3.95	27.78
9/12 B	1.12	0.07	12.32	3.98	24.91
9/19 S	0.11	0.00	0.29	0.02	5.12
9/19 S	0.12	0.00	0.28	0.01	5.31
9/19 S	0.13	0.00	0.29	0.00	4.93
9/19 M	0.12	0.00	0.51	0.03	5.55
9/19 M	0.12	0.00	0.52	0.04	5.29
9/19 M	0.12	0.00	0.51	0.04	5.18
9/19 B	0.69	0.00	13.77	4.73	7.17
9/19 B	0.59	0.00	13.62	4.77	9.74
9/19 B	0.71	0.00	13.65	4.65	8.45
9/27 S	0.16	0.00	0.02	0.01	5.36
9/27 S	0.16	0.00	0.02	0.01	5.42
9/27 S	0.16	0.00	0.01	0.00	5.48
9/27 M	0.19	0.00	0.03	0.01	5.70
9/27 M	0.18	0.00	0.03	0.01	5.68
9/27 M	0.15	0.02	0.05	0.01	5.82
9/27 B	4.31	0.30	18.91	7.28	27.98
9/27 B	4.36	0.29	19.23	7.40	24.97
9/27 B	4.50	0.11	19.71	6.97	28.33
10/13 S	0.41	0.00	0.03	0.01	5.28
10/13 S	0.42	0.01	0.02	0.01	5.35
10/13 S	0.42	0.00	0.01	0.00	4.91
10/13 M	0.29	0.00	0.04	0.01	5.80
10/13 M	0.26	0.00	0.05	0.01	5.44
10/13 M	0.16	0.00	0.05	0.00	5.79
10/13	2.74	0.04	12.65	4.19	17.59
10/13	2.93	0.04	12.60	4.33	11.44
10/13	2.69	0.00	12.40	4.30	13.22
10/12 S	0.18	0.01	0.05	0.02	5.50
10/12 S	0.17	0.00	0.05	0.02	5.82
10/12 S	0.17	0.01	0.06	0.02	5.33
10/12 M	0.23	0.00	0.15	0.03	4.90
10/12 M	0.22	0.00	0.16	0.03	5.95

4. Sample ID	[NO_3 + NO_2] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
10/12 M	0.11	0.00	0.14	0.02	6.02
10/12 B	1.35	0.01	12.84	4.02	11.10
10/12 B	1.11	0.00	12.98	4.11	4.79
10/12 B	1.14	0.01	13.24	4.16	4.98
10/23 S	0.17	0.00	0.12	0.06	0.00
10/23 S	0.25	0.02	0.09	0.05	6.18
10/23 S	0.29	0.01	0.10	0.05	5.65
10/23 M	0.55	0.01	0.18	0.08	4.16
10/23 M	0.29	0.01	0.17	0.07	5.27
10/23 M	0.48	0.00	0.16	0.07	5.63
10/23 B	0.34	0.01	12.61	4.16	7.09
10/23 B	0.33	0.01	12.75	4.16	6.16
10/23 B	0.61	0.27	12.62	4.15	6.91
10/28 S	1.20	0.02	0.15	0.02	0.72
10/28 S	1.12	0.01	0.12	0.01	5.08
10/28 S	1.14	0.01	0.13	0.01	5.53
10/28 M	0.37	0.00	0.40	0.10	4.83
10/28 M	0.32	0.00	0.40	0.11	5.46
10/28 M	0.43	0.00	0.42	0.11	4.70
10/28 B	0.39	0.00	8.18	1.12	0.00
10/28 B	0.56	0.04	8.79	3.07	11.43
10/28 B	0.66	0.01	12.42	2.83	0.00
11/8 S	0.24	0.00	0.02	0.02	5.27
11/8 S	0.27	0.00	0.02	0.01	5.57
11/8 S	0.26	0.00	0.01	0.01	4.99
11/8 M	0.20	0.00	0.50	0.11	4.18
11/8 M	0.20	0.00	0.45	0.13	6.06
11/8 M	0.21	0.00	0.49	0.13	4.94
11/8 B	0.09	0.00	13.17	4.27	6.52
11/8 B	0.11	0.00	12.96	4.24	4.48
11/8 B	0.20	0.23	13.08	4.19	6.56
11/16 S	0.15	0.01	0.83	0.22	5.98
11/16 S	0.15	0.01	0.88	0.24	6.27
11/16 S	0.16	0.01	0.78	0.23	6.22
11/16 M	0.17	0.01	0.84	0.25	6.35
11/16 M	0.16	0.01	0.85	0.21	4.81
11/16 M	0.18	0.00	0.90	0.22	6.45

5. Sample ID	[NO_3 + NO_2] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
11/16 B	0.27	0.00	1.11	0.92	1.95
11/16 B	0.27	0.00	1.06	0.68	0.82
11/16 B	0.49	0.65	1.03	0.48	0.46
11/23 S	0.27	0.00	0.57	0.16	0.32
11/23 S	0.26	0.00	0.60	0.20	0.23
11/23 S	0.24	0.00	0.54	0.17	0.21
11/23 M	0.25	0.05	0.88	0.24	6.15
11/23 M	0.24	0.05	0.85	0.24	6.09
11/23 M	0.27	0.00	0.86	0.24	6.14
11/23 B	0.47	0.05	1.19	0.39	1.42
11/23 B	0.45	0.05	1.17	0.32	1.68
11/23 B	0.09	0.98	1.21	0.30	1.83
12/3 S	0.48	0.24	0.64	0.12	3.74
12/3 S	0.56	0.23	0.67	0.11	3.94
12/3 S	0.64	0.00	0.67	0.12	3.77
12/3 M	0.58	0.23	0.62	0.13	4.13
12/3 M	0.55	0.24	0.58	0.14	4.16
12/3 M	0.58	0.21	0.63	0.13	4.02
12/3 B	0.49	0.11	0.45	0.26	1.06
12/3 B	0.44	0.11	0.35	0.17	0.60
12/3 B	0.39	0.12	0.35	0.11	1.32
12/19 S	1.20	0.16	0.37	0.12	0.64
12/19 S	1.15	0.16	0.44	0.13	0.69
12/19 S	1.07	0.14	0.35	0.12	0.66
12/19 M	1.31	0.17	0.45	0.13	0.75
12/19 M	1.14	0.16	0.67	0.13	0.75
12/19 M	1.15	0.16	0.67	0.15	0.89
12/19 B	1.16	0.16	0.23	0.02	0.15
12/19 B	1.14	0.17	0.40	0.03	0.16
12/19 B	1.15	0.16	0.22	0.03	0.16
12/27 S	0.54	0.04	0.01	0.06	0.18
12/27 S	0.52	0.04	0.02	0.07	0.20
12/27 S	0.45	0.03	0.02	0.06	0.23
12/27 M	0.85	0.05	0.18	0.15	0.53
12/27 M	1.11	0.06	0.20	0.15	0.67
12/27 M	0.76	0.04	0.19	0.15	0.58
12/27 B	1.02	0.07	0.28	0.37	0.00

6. Sample ID	[NO_3 + NO_2] (mg/L)	[NO2] (mg/L)	[NH_4] (mg/L)	[PO4] (mg/L)	[Silicic Acid] (mg/L)
12/27 B	0.94	0.07	0.28	0.31	0.00
12/27 B	1.04	0.07	0.33	0.25	0.00

Table A23. Uncorrected Chlorophyll-a Concentrations With Sample Date. 29 July to 27 December. (µg/L)

S - Surface (1-meter), M- Mid-depth (5-meters), B- Bottom (10 meters)

	29-Jul	8-Aug	29-Aug	12-Sep	27-Sep	3-Oct	12-Oct	28-Oct	8-Nov	16-Nov	23-Nov	3-Dec	19-Dec	27-Dec
S	13.098202	31.469323	42.964057	35.627808	55.445391	55.44539	84.800193	89.016741	104.689	73.66188	108.582371	126.8817	60.95069	64.53350 63

	29-Jul	8-Aug	29-Aug	12-Sep	27-Sep	3-Oct	12-Oct	28-Oct	8-Nov	16-Nov	23-Nov	3-Dec	19-Dec	27-Dec
M	36.981958	37.358126	76.1284629	45.894303	28.795806	32.37746	35.717571	25.934178	34.68472	56.160798	55.9819463	91.78119	56.876205	39.3762788

	29-Jul	8-Aug	29-Aug	12-Sep	27-Sep	3-Oct	12-Oct	28-Oct	8-Nov	16-Nov	23-Nov	3-Dec	19-Dec	27-Dec
B	97.502066	58.705752	103.04442	118.688988	161.88732	168.6388	109.39332	78.929772	80.87271	65.7594	128.083665	69.90484	44.94505	32.21643