2018

MARK TWAIN LAKE

WATER QUALITY

REPORT

U.S. ARMY CORPS OF ENGINEERS, ST. LOUIS DISTRICT ENVIRONMENTAL QUALITY SECTION – WATER QUALITY

Table of Contents

Water Quality Report-Mark Twain Lake

Section and Page No.

List of Figures & Tables

Appendix

Executive Summary

The purpose of this report is to provide an annual analysis of the water quality in the lake for the past year. Mark Twain Lake is located in northeastern Missouri in the Salt River Basin on the Salt River. Clarence Cannon Dam and the Reregulation Dam are located in Ralls County at Salt River miles 63.0 and 53.5, respectively. The purpose of this project is to provide flood control, hydroelectric power generation, water supply, fish and wildlife conservation, recreation and water quality enhancement. The Mark Twain watershed comprises 2,318 square miles, with an additional 29 square miles draining into the Reregulation Pool. Major tributaries are the North Fork, Middle Fork, Elk Fork, and South Fork. The watershed consists of a gently rolling plain in the upstream portion and hillier in the downstream reaches. High rock bluffs border the stream and lake at various locations. Hickory and oak forests are scattered among crop and grazing lands.

Water quality sampling in 2018 revealed minor issues at Mark Twain Lake. The lake is a medium depth reservoir nestled in the Salt River Basin. The lake tends to stratify during the summer months. All sampling sites met the appropriate state standards during 2018 except the following: dissolved oxygen, pH, phosphorus, iron, manganese, and suspended solids. Phosphorous levels have exceeded the state standard on a routine basis. Generally the tail water levels are lower than the incoming tributary flows, which indicates that the lake is sinking the phosphorous. The project area has little pollution potentials at present time, no major form of degradation to the lake or streams is apparent. Continuous water quality monitoring will continue to check future degradation of the watershed.

WATER QUALITY MONITORING PROGRAM

1.1 GENERAL OVERVIEW

This report summarizes water quality activities of the St. Louis District for Fiscal Year 2018 in accordance with ER 1110-2-8154 Water Quality & Environmental management for Corps Civil Works Projects and ETL 1110-2-362 Environmental Engineering Initiatives for Water Management. According to the U.S. Environmental Protection Agency (USEPA) poor lakeshore habitat is the biggest problem in our nation's lakes, followed by nutrients. Shoreline vegetation provides shelter for aquatic wildlife, reduces sediment and nutrient movement. The biology of a lake is characterized by the diversity if it's organisms. The number and kinds of plant and animal species present is a direct measure of a lake's well-being. Water quality at Mark Twain Lake is directly assessed using stream and river data from 10 site locations.

Water quality monitoring remains one of the Sections major responsibilities. The objective is to maintain a reasonable environmental monitoring program for the Mississippi River and the 5 lakes under the St. Louis District's control. The District's reservoirs consist of Mark Twain and Wappapello Lakes in Missouri, and Shelbyville, Carlyle and Rend Lakes in Illinois. Water quality sampling is conducted within the lakes and their tributaries to establish trend analysis and to maintain water quality at or above state and federal regulations.

The main objective is to provide technical expertise of an environmental nature to all Corps elements requesting assistance in accordance with ER 1110-2-8154. This would include updating the water quality management priorities for the district's projects to ensure water quality meets the state and federal regulations, for protection of human health and the environment, and for the safety and economic welfare of those at Corps projects. Ongoing goals include ensuring that downstream water quality meets all state and federal regulations, is suitable for aquatic and human life; and to continue to evaluate trend analysis in relation to baseline conditions at all projects.

Water quality data is provided to the Missouri Department of Natural Resources (MDNR) to be used as a screening mechanism for the Missouri Water Quality Report which is required every two years by the Clean Water Act Sections 303(d) and 305(b). MDNR does not routinely monitor Mark Twain Lake. However, the Lakes of Missouri Volunteer Program (LMVP) in cooperation with the University of Missouri-Columbia has been taking samples at 3 sites since 1989. The LMVP analyzes for nutrients, chlorophyll, suspended solids, temperature, and water clarity. In 2017, the LMVP took eight samples at 3 locations at the lake. LMVP samples for 2018 were not available at the time this report was written. See appendix D for 2017 data.

The National Water Quality Inventory Report to Congress (305(b) report) is the primary vehicle for informing Congress and the public about general water quality conditions in the United States. This document characterizes our water quality, identifies widespread water quality problems of national significance, and describes various programs implemented to restore and protect our waters.

Under Section 303(d) of the 1972 Clean Water Act, states, territories and authorized tribes are required to develop a list of water quality limited segments. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called as Total Maximum Daily Loads (TMDL), to improve water quality.

The 2018 water quality report compiled by the Missouri Department of Natural Resources has listed the Salt River below the Cannon Dam and Mark Twain Lake as impaired. The Salt River is impaired by low dissolved oxygen and mercury. Mark Twain Lake is impaired by mercury. Continued monitoring of the lake and its tributaries is vital in assisting the future assessment of the lake for these and other possible impairments. The water quality monitoring program represents the single metric that encompasses the overall health of the watershed as it is a direct measure of how well the environmental stewardship programs are working.

1.2 INTRODUCTION

Mark Twain Lake is located in northeast Missouri. The land surrounding the lake is used predominately for agriculture. The main agricultural contaminants inputs into the watershed include pesticides and fertilizers. Also a concern is the high sediment loading into the lake and the colloidal characteristic of the sediments as well as low dissolved oxygen levels related to turbine generation. The lake is also susceptible to fish kills due to algal decay in the lake arms. As algae decays it uses up oxygen which reduces the amount of oxygen available to aquatic organisms.

The operating purposes for Mark Twain Lake are fish/wildlife, hydroelectric power, flood control, recreation, navigation and water supply. The water quality management program for the lake includes monitoring of baseline parameters, ecological trends and investigation of problem areas to keep the lake within state and federal standards.

Water quality monitoring was conducted during 2018 to assure safe conditions for human recreation, wildlife and aquatic life as maintained and managed within the lake system. The 2018 water quality monitoring program was funded to conduct four sampling events. The sampling sites include the following: Site 1 (MTL-1) Spillway, Site 5 (MTL-5) South Fork at Hwy D, Site 13 (MTL-13) Elk Fork at county road 715, Site 9 (MTL-9) Middle Fork at Hwy 15, Site 11 (MTL-11) North Fork at Hwy 36, Site 12 (MTL-12) below re-regulation dam, Site 22 (MTL-22) old river channel 1mile up lake from dam, Site 33 (MTL-33) Lick Creek at Hwy J, Site 66 (MTL-66) South Fork at Hwy 107 bridge, and Site 77 (MTL-77) North Fork at Hwy 107 bridge. During the sampling event one site was selected for quality control duplication and denoted as MTL-15. The locations of the ten sampling sites are depicted on the lake map in Figure 1.

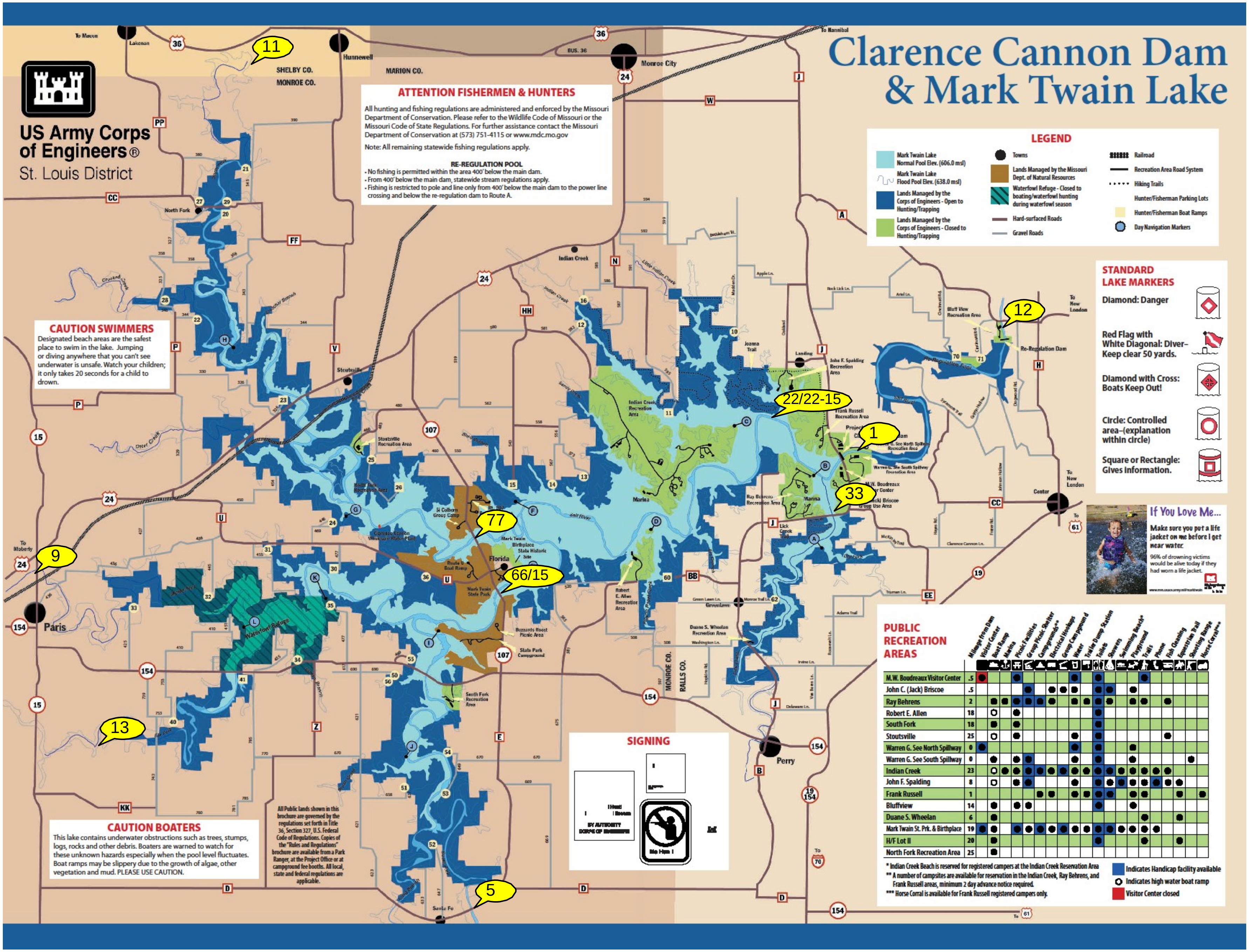


Figure 1
Sample Locations

2.1 WATER QUALITY ASSESSMENT CRITERIA

2.2 Water Quality

The water quality assessment criteria, which have been generally accepted criteria for sustaining adequate aquatic plant and animal growth were based upon the State of Missouri regulatory limits for certain contaminants. The samplings and analysis which were conducted at the Mark Twain Lake sites reflect the minimal set of parameters needed to analyze the current status of water quality for the Mark Twain Lake system.

The following parameters were analyzed in the Fiscal Year 2017 sampling at Mark Twain Lake: Total Organic Carbon (TOC), iron, manganese, ammonia-nitrogen, nitrate-nitrogen, orthophosphate, total phosphate, Total Suspended Solids (TSS), Total Volatile Suspended Solids (TVSS), escherichia coliform (E. coli), pH, temperature, dissolved oxygen, specific conductance, oxidation-reduction potential (ORP), chlorophyll, pheophytin-a, atrazine and alachlor.

The Missouri Department of Natural Resources, Code of State Regulations, Division 20, Chapter 7 classifies water quality criteria based on designated usage. These standards are used to determine the aquatic water quality of the lake. Table 2.1 provides a listing of the regulatory limits where a limit has been established for the parameters analyzed.

TABLE 2.1 State of Missouri Water Quality	
PARAMETER	LIMIT
Temperature	20.5°C - 33°C (68°F - 90°F)
Ammonia Nitrogen	< 15 mg/L
Nitrate Nitrogen	10 mg/L
Iron	1.0 mg/L (Aquatic Life)
Manganese	0.05 mg/L (Drinking Water & GW)
Phosphorous as Phosphate	0.05 mg/L
E. Coli	Missouri standard is 235 E. coli per 100ml for single sample or 126 for geometric
pH	Range: 6.5 to 9.0
DO	> 5.0 mg/L
Atrazine	3ug/L[1], 82ug/L[2], 9ug/L[3]
Alachlor	2ug/L[1]
Conductivity	1,700 *u*S/cm≈TDS of 1,000 mg/L
Total Suspended Solids (TSS)	116mg/L (streams); $\geq$12mg/L Lakes
Chlorpyrifos	10ug/L[1]
Cyanazine	370ug/L[2]; 30ug/L[3]
Metolachlor	1.7mg/L[2]
Metribuzin	200ug/L[1] 91ug/L HRL
Pendmethalin (PROWL)	70ug/L HBSL, 20ug/L[1]
Simazine	4.0ug/L[1]
Trifluarlin	26 ug/L[2] ; 1.1 ug/L[3]

[1] Drinking Water
[2] Acute
[3] Chronic
Health Based Sreening Level (HBSL)
Health Reference Level (HRL)

Nitrogen is an essential component of proteins, genetic material, chlorophyll, and other key organic molecules. All organisms require nitrogen in order to survive. Nitrogen exists in several forms. These forms include gaseous nitrogen (N_2), nitrites (NO_2), nitrate (NO_3), ammonia nitrogen (NH_3-N), and ammonium (NH_4). Ammonia can be toxic to fish and other aquatic organisms at certain levels. Unlike ammonia, ammonium (NH4) is not toxic to aquatic organisms and is readily available for uptake by plankton and macrophytes. Nitrogen levels have increased as human activities have accelerated the rate of fixed nitrogen being put into circulation. High nitrogen levels can cause eutrophication. Eutrophication increases biomass of phytoplankton, decreases water transparency, and causes oxygen depletion. Ammonia nitrogen is monitored so that the effects on fish spawning, hatching, growth rate and pathologic changes in gills, liver and kidney tissue can be related to the detected levels of ammonia nitrogen. Nitrate-nitrogen degrades to nitrite or produces ammonia which has a detrimental effect on aquatic life and, therefore, has been monitored to assure levels are below the regulatory "safe" limit.

Phosphate has been analyzed as phosphorus and has been monitored due to the potential for uptake by nuisance algae. Levels of phosphate can indicate the potential for rapid growth of algae (algae bloom), which can cause serious oxygen depletion during the algae decay process. Phosphorous is typically the limiting nutrient in a water body. Therefore, addition of phosphorous to the ecosystem stimulates the growth of plants and algae. Phosphorous is delivered to lakes and streams by way of storm water runoff from agricultural fields, residential property, and construction sites. Other sources of phosphorous are anaerobic decomposition of organic matter, leaking sewer systems, waterfowl, and point source pollution. The general standard for phosphorous in lake water is 0.05mg/L. Dissolved phosphorous also called ortho-phosphorous is generally found in much smaller concentrations than total phosphorous and is readily available for uptake. For this reason dissolved phosphorous concentrations are variable and difficult to use as an indicator of nutrient availability.

The metals manganese and iron are nutrients for both plants and animals. Living organisms require trace amounts of metals. However, excessive amounts can be harmful to the organism. Heavy metals exist in surface waters in three forms, colloidal, particulate, and dissolved. Water chemistry determines the rate of adsorption and desorption of metals to and from sediment. Metals are desorbed from the sediment if the water experiences increases in salinity, decreases in redox potential, or decreases in pH. Metals in surface waters can be from natural or human sources. Currently human sources contribute more metals than natural sources. Metals levels in surface water may pose a health risk to humans and the environment.

Photosynthetic activity can be hindered by the levels of total suspended solids. Total suspended solids concentrations, which cause the photosynthetic activity to be reduced by more than 10% from the seasonably established norm, can have a detrimental effect on aquatic life. Soil particles, organic material, and other debris comprise suspended solids in the water column. Secchi disk measurements are inverse to suspended solid measurements. As total suspended solids (TSS) increases, the secchi disk depth or water transparency decreases. Total suspended solids can be an important indicator of the type and degree of turbidity. TSS measurements represent a combination volatile suspended solids (VSS), that consist of organic material and nonvolatile suspended solids (NVSS) which is comprised of inorganic mineral particles in the water. In order to more accurately determine the types and amounts of suspended solids, volatile suspended solids (VSS) are analyzed. VSS concentration represents the organic portion of the total suspended solids. Organic material often includes plankton and additional plant and animal debris that are present in water. Total volatile solids indicate the presence of organics in suspension; and therefore, show additional demand levels of oxygen. The state standard for TSS is 116 mg/L for streams and 12 mg/L for lakes. Missouri does not currently have a standard for TVSS. However, IEPA literature suggests that NVSS above 15mg/L could highly impair recreational lake use. A NVSS of 3 to 7mg/L might cause slight impairment.

Chlorophyll and pheophytin *a* are monitored to provide indicators of algae growth and, therefore, potential oxygen depletion activity. Chlorophyll is measured in lakes to estimate the type and amount of algal productivity in the water column. Chlorophyll a is present in green algae, blue-green algae, and in diatoms. Chlorophyll a is often used to indicate the degree of eutrophication. Chlorophyll b and c are used to estimate the extent of algal diversity and productivity. Chlorophyll b is common in green algae and is used as an auxiliary pigment for photosynthesis. Chlorophyll c is most common in diatom species and serves as an auxiliary pigment. Algal productivity and diversity can be determined by the concentrations of the individual pigments. For example high concentrations of chlorophyll a and b would indicate that green algae is abundant. High concentrations of chlorophyll a would indicate abundance of blue- green algae and concentrations of chlorophyll a and c would indicate diatoms are the dominant species.

Fecal coliform bacteria is monitored for the protection of human health as it relates to full body contact of recreational waters. People can be exposed to disease-causing organisms, such as bacteria, viruses and protozoa in beach and recreational waters mainly through accidental ingestion of contaminated water or through skin contact. These organisms, called pathogens, usually come from the feces of humans and other warm-blooded animals. If taken into the body, pathogens can cause various illnesses and on rare occasions, even death. Waterborne illnesses include diseases resulting from bacteria infection such as cholera, salmonellosis, and gastroenteritis, viral infections such as hepatitis, gastroenteritis, and intestinal diseases, and protozoan infections such as ameobic dysentery and giardiasis. The most commonly monitored recreational water indicator organisms are fecal coliform, Escherichia coli, (E. coli) and enterococci. Fecal coliform are bacteria that live in the intestinal tracts of warm-blooded animals. The Missouri standard for fecal coliform is less than 200 colonies per 100ml of sample water calculated as a geometric mean. Fecal coliform was originally recommended in 1968 by the Federal Water Pollution Control Administration (predecessor to EPA) as an effective water quality indicator organism for recreational waters. Recent studies indicate that fecal coliform show less correlation to illness than other indicator organisms such as E. coli and enterococci. The Environmental Protection Agency (EPA) currently recommends E. coli or enterococci as an indicator organism for fresh waters. Since 2009 the St. Louis District has been using E. coli as the standard indicator.

Atrazine and Alachlor herbicides are commonly used agricultural chemicals which can be readily transported by rainfall runoff. Both compounds are suspected of causing cancer; and therefore, were monitored for the protection of human and aquatic health. Organic compounds include many pesticides. A pesticide can be any substance that is intended to prevent, destroy, repel, or mitigate any pest. This includes insecticides, herbicides, fungicides, fumigants, algaecides and other substances. Herbicides which are pesticides used to kill vegetation are the most widely used and sampled. Ten of the most frequently used herbicides detected in water are Atrazine, Metolachlor, Alachlor, 2,4-D, Trifluralin, Glyphosate, Dicamba, Cyanazine, Simazine, and 2,4,5-T. Two of the most widely used pesticides are Atrazine and Alachlor. Atrazine is a preemergence or postemergence herbicide use to control broadleaf weeds and annual grasses. Atrazine is most commonly detected in ground and surface water due to its wide use, and its ability to persist in soil and move in water. Alachlor is a Restricted Use Pesticide (RUP) due to the potential to contaminate groundwater. The drinking water standard for Atrazine is 0.003mg/L and 0.002 mg/L for Alachlor.

Temperature, dissolved oxygen and pH are monitored for the protection of aquatic life. Temperature is important because it controls several aspects of water quality. Colder water hold more dissolved oxygen which is required by aquatic organisms. Plants grow more rapidly and use more oxygen in warmer water. Decomposition of organic matter which uses oxygen is accelerated in warmer water. Temperature can also determine the availability of toxic compounds such as ammonia. Since aquatic organisms are cold blooded, water temperature regulates their metabolism and ability to survive. The number and kinds of organisms that are found in streams or lakes is directly related to temperature. Certain organisms require a specific temperature range, such as trout, which require water temperatures below 20^{o}C. Most aquatic organisms require a minimum concentration of dissolved oxygen to survive. In spring, surface waters of the lake mix with the water below through wind and thermal action. This mixing diminishes as the upper layer of water becomes warmer and less dense. Solar insulation during the summer months stratifies the lake into three zones. The upper warmer water zone is called the epilimnion and the lower cooler water zone is called the hypolimnion. The epilimnion and the hypolimnion zones are divided by a transition zone known as the metalimnion. The thermocline located within the metalimnion exhibits a rapid change in water temperature.
During the summer months the hypolimnion may become anaerobic. In this anaerobic zone, chemical reduction of iron and manganese, or the production of methane and sulfides can occur. Iron rapidly oxidizes in aerobic environments, but manganese oxidizes slowly and can remain in the reduced state for long distances down stream even in aerobic environments. The degree of acidity of water is measured by a logarithmetic scale ranging from 0 to 14 and is known as the pH scale. A reading of 7 indicates neutrality and readings below seven are acidic and above are alkaline. Most Missouri lakes range from 6 to 9 on the pH scale. The buffering capacity of water is the ability to neutralize acid better known as alkalinity. A high alkalinity concentration indicates an increased ability to neutralize pH and resist changes; whereas a low alkalinity concentration indicates that a water body is vulnerable to changes in pH.

Conductivity is a measure of water’s ability to conduct an electrical current. The ability to carry a current is often driven by the dissolved materials present in a water column. These materials can include dissolved ions and other materials in the water and thus are directly proportional to the concentration of total dissolved solids (TDS) present in the water column. Typically TDS concentrations represent 50-60% of the conductivity measurements. Conductivity is also affected by water temperature. The warmer the water, the higher the conductivity. Conductivity in streams and rivers is affected by the geology of the area. Streams running through granite areas tend to have lower conductivity due to granite being composed of inert material, materials that do not ionize or dissolve into ionic compounds in water. On the other hand streams that run through areas of limestone or clay soils tend to have higher conductivity readings because of the presence of materials that ionize. Conductivity is useful as a general measure of water quality. A stream tends to have a relatively constant range of conductivity that once establish can be used as a baseline. Significant changes, either high or low, might indicate a source of pollution has been introduced into the water. The pollution source could be a treatment plant, which raises the conductivity; or an oil spill, which would lower the conductivity.

Redox or Oxidation-Reduction Potential (ORP) is a measure of a water system's capacity to either release or gain electrons. Oxidation involves an exchange of electrons between 2 atoms. The atom that loses an electron is oxidized and the one that gains an electron is reduced. ORP sensors measure the electrochemical potential between the solution and a reference electrode. Readings are expressed in millivolts. Positive readings indicate increased oxidizing potential and negative readings increased reduction. The ORP probe is essentially a millivolt meter, measuring the voltage across 2 electrodes with the water in between. ORP values are used much like pH values to determine water quality. While pH readings characterize the state of a system relative to the receiving or donating hydrogen ions (base or acid), ORP readings characterize the relative state of losing or gaining electrons. The conversion of ammonia (NH_3) requires an oxidating environment to convert it into nitrites (NO_2) and nitrates (NO_3). Ammonia levels as low as 0.002mg/L can be harmful to fish. Generally ORP readings above 400mV are harmful to aquatic life. However, ORP is a non-specific measurement, which is a reflection of a combination of effects of all the dissolved materials in the water. Therefore, the measurement of ORP in relatively clean water has only limited utility unless a predominant redox-active material is known to be present.

Water clarity is intuitively used by the public to judge water quality. Secchi depth has been used for many years as a limnological characterization tool for characterizing water clarity. Secchi depth is a measure of light penetration into a waterbody and is a function of the absorption and scattering of light in the water. There are three characteristics of water which affect the penetration of light: (1) color of water, (2) amount of phytoplankton in the water column, and (3) amount of inorganic material in the water column. Secchi depth integrates the combined impacts of all three of these factors. Water transparency was measured using a Secchi disk. Secchi disk readings were taken at all lake sites.

2.3 Sediment

In accordance with EM-1110-2-1201, sediment samples should be taken to monitor and assess potential impacts to aquatic and human health. For potential ecological risk from inorganic contaminants, seven metals are typically of "most concern" with regards to fish and wildlife: Arsenic, Copper, Cadmium, Selenium, Mercury, Lead, and Zinc. Avian species are thought to be particularly sensitive to arsenic, which is considered a carcinogenic, mutagenic, and teratogenic contaminant in a variety of species in elevated doses over time. Avian species are also known to be particularly sensitive to lead in the environment with effects ranging from mortality, reduced growth and reproductive output, behavior changes, blood chemistry alterations, and lesions of major organs. Finally, the embryo stages in fish and avian species are known to be the most sensitive to selenium affecting reproductive success. For potential human health risk, there are no known values in Missouri for sediments. While not a direct correlation, sample results are compared against Missouri Risk Based Corrective Action (MRBCA) lowest default target levels for all soil types and exposure pathways for soils as well as consensus based concentrations as recommended by Missouri.

3.1 <u>SUMMARY OF MONITORING RESULTS</u>

3.2 Water Quality Summary

The monitoring program for Mark Twain Lake during Fiscal Year 2018 revealed good water quality when compared to limits established by the MDNR for general use, secondary contact, and indigenous aquatic life. Agricultural nutrient runoffs and low dissolved oxygen releases were primary concerns for the lake's water quality. Better land management practices, erosion control and buffering zones are methods used to reduce such contaminants from entering the lake. The St. Louis District personnel are available to work with lake personnel, area communities, and other agencies in the implementation of educational programs and planning to bring about the use of better management techniques to improve the lake's water quality.

E. coli were sampled at the marinas to ensure that the marina areas are not being contaminated by boats with restroom facilities. Bacteria levels for both marinas were well below the Missouri standard of 235 E. coli/100mL. We currently do not take enough samples in a month to calculate a geometric mean, so we mainly look at a high reading of 235/100ml of sample to trigger additional investigations. E. coli beach sample results for the Corps beaches were received from the project office, and data for the state beach was received from MDNR were incorporated into this report. Beach samples were taken weekly during the recreation season. There were no E. coli levels above the state standard at the Corps or State beaches during 2018. The state uses a weekly geometric mean to determine beach status. In accordance with state law, the Missouri Department of Natural Resources will post signs notifying visitors that swimming is not recommended if the geometric mean of the weekly water quality sample results exceeds the equivalent of 190 E. coli colonies per 100 milliliters of water (190 mpn/100 ml). The state reserves the right to close a beach in the event of a documented health risk including things such as but not limited to wastewater bypass, extremely high sampling values, spills of hazardous chemicals, or localized outbreaks of an infectious disease.

Total iron and total manganese are sampled above the dam near the bottom of the channel (MTL-22-15), below the re-regulation dam (MTL-12), and in the spillway area (MTL-1). As was previously stated living organisms require trace amounts of metals, however excessive amounts can be harmful to the organism. Iron cycling is a function of oxidation-reduction processes. Iron oxidizes relatively rapidly (minutes to hours); therefore any iron released through the spillway will normally be oxidized in a short period of time. Iron exceeded the state standard at MTL-1 and MTL-12 on May 8 and at MTL-22-15 on May 8 and July18. Manganese oxidizes slower and can persist in the reduced state long distances downstream even in aerobic environments. Manganese levels exceeded the state standard at MTL-12 multiple days and at MTL-22-15 on July 18. Missouri's standard for manganese is for drinking water and groundwater. Missouri does not have a manganese standard for aquatic life.

Nitrogen and phosphates are sampled at all sites. All lake sites exceeded the total phosphorous 0.05 mg/l standard at least once during the sampling period. Phosphorus levels were exceeded in the tributaries at sites MTL-11, MTL-5, and MTL-9. Phosphorus levels are lower in the tail waters than in the incoming tributary flows. Because phosphorous in water is not considered directly toxic to humans and animals no drinking water standards have been established for phosphorous. However, phosphorous can cause health threats through the stimulation of toxic algal blooms and the resulting oxygen depletion. Nitrates can pose a threat to human and animal health. Nitrate in water is toxic at high levels and has been linked to toxic effects of livestock and to blue baby disease (methemoglobinemia) in infants. The Maximum Contaminant Level (MCL) for nitrate-N in drinking water is 10mg/L to protect babies 3 to 6 months of age. The Missouri Water Quality Standard for ammonia nitrogen (NH_3-N) is 15mg/L. The state standard of 10 mg/L for nitrate nitrogen and 15 mg/L for ammonia nitrogen were not exceeded for the 2018 sampling year. The increased levels of phosphate in combination with nitrogen and other lake conditions, such as temperature, pH and stagnant lake conditions, can lead to increased algae growth. Eutrophication is currently the most widespread water quality problem in the U.S. and many other countries. Restoration of eutrophic waters requires the reduction of nonpoint inputs of phosphorous and nitrogen. The resulting detrimental effects of algae toxins and oxygen depletion could result in health problems for fish and other aquatic species as well as land animals utilizing the water supply.

Chlorophyll *a* was sampled at 4 sites, MTL-22, MTL-33, MTL-66 and MTL-77. MTL- 15 is a duplicate sample of MTL-66. Chlorophyll *a* is a green pigment found in plants. Missouri does not currently have a standard for chlorophyll. Chlorophyll *a* concentrations are an indicator of phytoplankton abundance and biomass. They can be an effective measure of trophic status, and used as a measure of water quality. High levels often indicate poor water quality and low levels suggest good conditions. However, elevated levels are not necessarily bad. It is the long term persistence of elevated levels that can lead to issues. It is natural for chlorophyll *a* levels to fluctuate over time. Chlorophyll *a* tends to be higher after storm events and during the summer months when water temperatures and light levels are elevated. Chlorophyll can reduce the clarity of the water and the amount of oxygen available to other organisms. Chlorophyll concentrations and cyanobacteria cell counts serve as proxies for the actual presence of algal toxins. Exposure to cyanobacteria or their toxins may produce allergic reactions such as skin rashes, eye irritations, respiratory symptoms, and in some cases more severe health effects. Microcystin is currently believed to be the most common cyanotoxin in lakes. EPA's current guidance as of December 2016 for recreational Ambient Water Quality Criteria (AWQC) for Cyanotoxins is 4ug/L for microcystins and 8ug/L for Cylindrospermopsin. The World Health Organization (WHO) has established recreational exposure guidelines for chlorophyl a – levels of 50 mg/cu meter and greater are considered to create moderate risk. Mark Twain Lake chlorophyll levels during 2018 were considered low. All sites were below 14 mg/cu m. The data indicates a normal increase in chlorophyll levels during the warmer summer months.

Seventy percent of the Mark Twain Lake watershed is used for agriculture and 50% of this is used for cropland. Atrazine and Alachlor are pesticides that were sampled at all sites. These chemicals are herbicides used to control weed growth. All tributary and lake sampling sites pesticide levels were below the state standards. These substances can enter water bodies as a result of drift during spraying, surface runoff, and leaching through soil. In order to eliminate pesticide contamination of waters it is important for the public to be educated and institute best management practices when using these chemicals.

Total Suspended Solids (TSS) and Total Volatile Suspended Solids (TVSS) samples are collected at all sites. Solids can affect water quality by increasing temperature through the absorption of sunlight by the particles in the water, which also affects the clarity of the water. This can then affect the amount of oxygen in the water. Total Suspended Solids in the tributaries exceeded the standard of 116 mg/L (streams) at MTL-11 on March 8 and August 27. Also, the lake sites MTL-66 and MTL-77 exceeded the state standard of 12 mg/L (lakes) on May 8 and March 8 respectively. These spikes/exceedances in the tributaries and lake were likely due to the large amount of rain received in the preceding week.

Total Organic Carbon (TOC) is collected at all sites. TOC is an indicator of the organic character of water. The larger the carbon or organic content, the more oxygen is consumed. TOC tends to be higher in the summer months which may be a result of decaying plant material starting to decay after summer growth. TOC was fairly consistent within the lake ranging from 4.2 to 7.0 mg/L and in the tributaries from 4.1 to 14.0 mg/L. Missouri does not currently have a standard for TOC.

Temperature and dissolved oxygen levels were taken at all sites. Measurements were taken at 1 meter intervals at the lake sites. During the summer months the lake stratifies and a boundary is formed between the upper warmer water and the lower cooler water. This transition area is known as the thermocline, the area where the temperature drops significantly. Oxygen levels can also change drastically as a function of depth. This area where the oxygen level significantly drops is called the oxycline. The depth of the thermocline and oxycline can have an effect on the aquatic organisms. Occasionally the thermocline and oxycline are at or near the same depth. There were no exceedances for temperature and dissolved oxygen during the scheduled sampling events. However, there were multiple exceedances recorded by the remote sensors installed at the Clarence Cannon Dam tail race and re-regulation dam. In 2018 there were two sensors located on the upstream side of the re-regulation dam; a shallow sensor and a deep sensor located at approximately 1 and 2.7 meters respectively. The DO graphs showing the data from the sensors at the main and re-reg dams are located in appendix C. All zero recordings due to equipment failure have been removed. There were multiple low DO events in the re-regulation pool near the Clarence Cannon Dam, but no reported fish kills in 2018. As in the previous years, a multi-agency dissolved oxygen work group met weekly during the spring and summer of 2018 to discuss water management options related to the dissolved oxygen levels below Clarence Cannon Dam and in the re-regulation pool.

pH is taken at all sites and at 1 meter intervals at lake sites. There were two readings observed above the state standard range of 6.5 to 9. Site 5 was above a pH of 9 on July 18 and August 27. Acidic pH readings can be caused by the heavy precipitation. The high pH readings might be attributed to very high air and water temperatures and algal activity. During the sampling event on July 18, all pH readings at sites 22, 33, 66, and 77 are likely inaccurate due to a faulty pH sensor. Although that data is displayed in this report, it is not compared to the state standard.

Conductivity and redox are taken at all sites and at 1 meter intervals at lake sites. Recommended standard for conductivity is 1,700*u*S/cm. No sites exceeded this standard. Conductivity readings ranged from 183 to 715 *u*S/cm. Missouri does not currently have a standard for redox. Redox levels ranged from -112 to 501 mV.

Seechi disk readings at sites 22 (above dam) and 33 (Lick Creek Arm near Hwy J) indicate that these sites tend to have better water clarity than the rest of the lake. This would seem to be reasonable since these sites are located closer to the dam which allows solids time to settle out of the water column as they travel down the lake.

3.3 Sediment Summary

Sediment sampling was conducted at sites 22, 33, 66, and 77 on July 18, 2018. Ideally sediment sampling would be conducted every 5 years if funding is available, but was last conducted in 2007. Discrete sediment samples were collected using a ponar dredge. The following parameters were analyzed for: pesticides (same suite as water samples), arsenic, barium, boron, cadmium, chromium, copper, iron, manganese, lead, mercury, nickel, selenium, silver, zinc, total organic carbon, kjeldahl nitrogen, nitrate nitrogen, and total phosphorus. Missouri does not have human health standards for sediment, therefore test results were compared to lowest default target levels referenced in Missouri Risk-Based Corrective Action (MRBCA) table B-1. In addition, metal concentrations were compared to consensus based concentrations as related to sediment dwelling organisms taken from *Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems* (MacDonald et al.). Two reference criteria were used from this paper; Threshold effect concentration (TEC) and Probable effect concentration (PEC). TEC, as defined, 'represents the concentration below which adverse effects are expected to occur only rarely'. PEC, as defined, 'represents the concentration above which adverse effects are expected to occur frequently'. As with any environmental sampling, results only apply to the specific locations where the sample was taken from. A more comprehensive sampling design may lead to different overall results. Although, these samples represent only a snapshot in space and time of sediment in Mark Twain Lake, the data is useful in establishing baselines for future assessments. All pesticides tested for were below the detection limits.

In Table 3.2 the 2018 sediment results are compared to samples taken in 2007. For this comparison, all results labeled ND were below detection limits (not detected). All red text indicates the result exceeds the reference MRBCA level. A blank indicates a sample was not taken.

Table 3.2 Sediment Comparison

Site #	Parameter	2018 Result	2007 Result	Units
MTL-22-0	Alachlor	ND	ND	UG/KG
MTL-33-0	Alachlor	ND	ND	UG/KG
MTL-66-0	Alachlor	ND	ND	UG/KG
MTL-77-0	Alachlor	ND	ND	UG/KG
MTL-22-0	Arsenic	16.7	18	MG/KG
MTL-33-0	Arsenic	17.3		MG/KG
MTL-66-0	Arsenic	16.7		MG/KG
MTL-77-0	Arsenic	16.2		MG/KG
MTL-22-0	Atrazine	ND	ND	UG/KG
MTL-33-0	Atrazine	ND	ND	UG/KG

MTL-66-0	Atrazine	ND	ND	UG/KG
MTL-77-0	Atrazine	ND	ND	UG/KG
MTL-22-0	Barium	298	407	MG/KG
MTL-33-0	Barium	341		MG/KG
MTL-66-0	Barium	335		MG/KG
MTL-77-0	Barium	331		MG/KG
MTL-22-0	Boron	ND	ND	MG/KG
MTL-33-0	Boron	ND		MG/KG
MTL-66-0	Boron	ND		MG/KG
MTL-77-0	Boron	ND		MG/KG
MTL-22-0	Cadmium	ND	ND	MG/KG
MTL-33-0	Cadmium	ND		MG/KG
MTL-66-0	Cadmium	ND		MG/KG
MTL-77-0	Cadmium	ND		MG/KG
MTL-22-0	Chlorpyrifos	ND	ND	UG/KG
MTL-33-0	Chlorpyrifos	ND	ND	UG/KG
MTL-66-0	Chlorpyrifos	ND	ND	UG/KG
MTL-77-0	Chlorpyrifos	ND	ND	UG/KG
MTL-22-0	Chromium	30.3	50.5	MG/KG
MTL-33-0	Chromium	33.4		MG/KG
MTL-66-0	Chromium	34.3		MG/KG
MTL-77-0	Chromium	35.0		MG/KG
MTL-22-0	Copper	23.0	29	MG/KG
MTL-33-0	Copper	25.9		MG/KG
MTL-66-0	Copper	24.6		MG/KG
MTL-77-0	Copper	24.7		MG/KG
MTL-22-0	Cyanazine	ND	ND	UG/KG
MTL-33-0	Cyanazine	ND	ND	UG/KG
MTL-66-0	Cyanazine	ND	ND	UG/KG
MTL-77-0	Cyanazine	ND	ND	UG/KG
MTL-22-0	Iron	28200	42400	MG/KG
MTL-33-0	Iron	31100		MG/KG
MTL-66-0	Iron	32300		MG/KG
MTL-77-0	Iron	32600		MG/KG
MTL-22-0	Kjeldahl nitrogen	2150	4950	MG/KG
MTL-33-0	Kjeldahl nitrogen	2490	1490	MG/KG
MTL-66-0	Kjeldahl nitrogen	2380	3950	MG/KG
MTL-77-0	Kjeldahl nitrogen	2320	3710	MG/KG
MTL-22-0	Lead	24.0	21	MG/KG
MTL-33-0	Lead	27.4		MG/KG
MTL-66-0	Lead	25.7		MG/KG
MTL-77-0	Lead	24.9		MG/KG
MTL-22-0	Manganese	2140	3270	MG/KG
MTL-33-0	Manganese	2400		MG/KG
MTL-66-0	Manganese	1910		MG/KG
MTL-77-0	Manganese	1810		MG/KG
MTL-22-0	Mercury	ND	ND	MG/KG
MTL-33-0	Mercury	ND	ND	MG/KG
MTL-66-0	Mercury	ND	ND	MG/KG
MTL-77-0	Mercury	ND	ND	MG/KG
MTL-22-0	Metolachlor	ND	ND	UG/KG

MTL-33-0	Metolachlor	ND	ND	UG/KG
MTL-66-0	Metolachlor	ND	ND	UG/KG
MTL-77-0	Metolachlor	ND	ND	UG/KG
MTL-22-0	Metribuzin	ND	ND	UG/KG
MTL-33-0	Metribuzin	ND	ND	UG/KG
MTL-66-0	Metribuzin	ND	ND	UG/KG
MTL-77-0	Metribuzin	ND	ND	UG/KG
MTL-22-0	Nickel	29.2	40	MG/KG
MTL-33-0	Nickel	32.3		MG/KG
MTL-66-0	Nickel	28.9		MG/KG
MTL-77-0	Nickel	28.6		MG/KG
MTL-22-0	Nitrate-N	ND	ND	MG/KG
MTL-33-0	Nitrate-N	ND	ND	MG/KG
MTL-66-0	Nitrate-N	ND	ND	MG/KG
MTL-77-0	Nitrate-N	ND	ND	MG/KG
MTL-22-0	Pendimethalin	ND	ND	UG/KG
MTL-33-0	Pendimethalin	ND	ND	UG/KG
MTL-66-0	Pendimethalin	ND	ND	UG/KG
MTL-77-0	Pendimethalin	ND	ND	UG/KG
MTL-22-0	Phosphorus, total	1350	1550	MG/KG
MTL-33-0	Phosphorus, total	1650	1490	MG/KG
MTL-66-0	Phosphorus, total	1200	1290	MG/KG
MTL-77-0	Phosphorus, total	1290	1230	MG/KG
MTL-22-0	Selenium	1.91	ND	MG/KG
MTL-33-0	Selenium	1.85		MG/KG
MTL-66-0	Selenium	2.33		MG/KG
MTL-77-0	Selenium	ND		MG/KG
MTL-22-0	Silver	ND	ND	MG/KG
MTL-33-0	Silver	ND		MG/KG
MTL-66-0	Silver	ND		MG/KG
MTL-77-0	Silver	ND		MG/KG
MTL-22-0	Total Organic Carbon	23000	30700	MG/KG
MTL-33-0	Total Organic Carbon	29000	27100	MG/KG
MTL-66-0	Total Organic Carbon	30000	23100	MG/KG
MTL-77-0	Total Organic Carbon	25000	26100	MG/KG
MTL-22-0	Trifluralin	ND	ND	UG/KG
MTL-33-0	Trifluralin	ND	ND	UG/KG
MTL-66-0	Trifluralin	ND	ND	UG/KG
MTL-77-0	Trifluralin	ND	ND	UG/KG
MTL-22-0	Zinc	113	118	MG/KG
MTL-33-0	Zinc	124		MG/KG
MTL-66-0	Zinc	112		MG/KG
MTL-77-0	Zinc	107		MG/KG

Metals were compared to the background soil concentrations listed in MRBCA. The following were above the MRBCA criteria: arsenic, barium, chromium, and lead. All metal concentrations in 2018 were similar to 2007 levels as well as levels at other lakes in the St. Louis District. Boron, cadmium, mercury, and silver were not detected. When compared to the consensus based TEC's (referenced above) arsenic, chromium, nickel, and zinc were found to be above the criterion as described below. No metals exceeded the PEC criterion. All other metal concentrations were less than this criteria.

Arsenic and nickel concentrations were above the TEC (9.79 mg/kg), but below the PEC (33 mg/kg) at all sites in both 2007 and 2018. The chromium levels were all below the TEC (43.4 mg/gk) and PEC (111 mg/kg) criteria. Zinc levels were greater than the TEC (121 mg/kg) during only one occurrence at site MTL-33 in 2018. Given that no metals were found to exceed the PEC, this indicates at the very least that adverse effects to sediment dwelling organisms could be expected to occur only rarely.

Nutrients nitrate-nitrogen, Kjeldahl nitrogen, and total phosphorus were analyzed for in 2018. There are no nutrient level comparison standards in the above references. Nitrate-nitrogen was not detected in both 2018 and 2007 sampling events. Kjeldahl nitrogen levels were slightly higher on the upper parts of the lake than site 22 near the dam in 2018. Total phosphorus levels were generally consistent throughout the lake in 2007 and 2018.

Total organic carbon (TOC) was also analyzed for in 2018. TOC was lowest at site 22 (23,000 mg/kg) in 2018, while in 2007 site 33 was the lowest (23,100 mg/kg).

4.0 PLANNED 2019 STUDIES

The Mark Twain Lake water quality monitoring will continue in Fiscal Year 2019 with 4 sampling events. The greater number of sampling events there are, the better the ability to evaluate water quality trends, to better defend project operations (lake levels, releases, maintenance projects, construction projects, etc.), to better confirm that we meet state water quality standards, and to better confirm that human health and safety are adequately protected. As with any record keeping or data analysis, the greater the sample size, the more reliable the findings. The sampling events are planned to be conducted between February and October in 2019. Mark Twain Lake provides drinking water to many communities and is a high usage recreational lake. The monitoring of water quality is imperative to assure the water quality is within acceptable limits for the designated usage.

The sampling sites include the following: Site 1 (MTL-1) Spillway, Site 5 (MTL-5) South Fork at Hwy D, Site 13 (MTL-13) Elk Fork at 715, Site 9 (MTL-9) Middle Fork at Hwy 15, Site 11 (MTL-11) North Fork at Hwy 36, Site 12 (MTL-12) below re-regulation dam, Site 22 (MTL-22) old river channel 1mile up lake from dam, Site 33 (MTL-33) Lick Creek at Hwy J, Site 66 (MTL-66) South Fork at Hwy 107 bridge, and Site 77 (MTL-77) North Fork at Hwy 107 bridge. This combination of sites effectively represents the incoming contaminants and their effects on the lake.

A remote sensor was installed several years ago in the spillway to allow the project as well as water quality personnel to remotely monitor temperature and oxygen readings to avoid fish kills. During low flow, water is discharged through the after bay. This water can be low in oxygen and potentially create a low oxygen area below the dam. The sensor allows the project to track oxygen levels below the dam and make appropriate adjustments to avoid a possible fish kill. Normally allowing water to spill through the tainter gates will alleviate low oxygen levels below the dam. In 2009 a remote sensor was installed in the re-reg pool near the re-reg dam to monitor the lower portion of the re-reg pool. This location on the re-reg dam was not situated in ideally constructed pipe. In the spring of 2018 this sensor location was abandoned and a new location was setup on the upstream side wing wall of the re-regulation dam. This new setup will includes high flow pipes and is intended to support two water quality instruments – one at shallow depth, and the other at a deeper depth. Water quality personnel will continue to maintain and monitor these probes. A water quality monitoring station was installed in 2016, and was fully operational in 2017. This pontoon was moored just upstream of the main dam in the lake. It will be installed again in 2019 and record the dissolved oxygen and temperature profile of the water column daily as well as anytime as needed.

This will allow staff to identify the depth of the stratification layer and the depth at which the oxygen decreases. This information will allow staff to better understand the relationships between the lake levels, low dissolved oxygen depth, temperature control weir, and downstream (Re Regulation Pool) water quality in real time during low flow conditions and power generation.

APPENDIX A

DATA

LAB DATA

Site #	Collection Date	Parameter	Flag	Reported Result	MDL	PQL	Units
MTL-1	3/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	8/27/2018	Alachlor	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Alachlor	<	0.250	0.250	0.250	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Alachlor	<	0.250	0.250	0.250	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.222	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Alachlor	<	0.250	0.250	0.250	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L

MTL-66-0	3/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	7/18/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Alachlor	<	0.250	0.250	0.250	UG/L
	5/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Alachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Alachlor	<	0.250	0.250	0.250	UG/L
	7/18/2018	Alachlor	<	0.200	0.200	0.200	UG/L
	8/27/2018	Alachlor	<	0.200	0.200	0.200	UG/L
MTL-1	3/8/2018	Atrazine		0.620	0.200	0.200	UG/L
	5/8/2018	Atrazine		0.450	0.200	0.200	UG/L
	7/18/2018	Atrazine		0.650	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.700	0.200	0.200	UG/L
MTL-11	3/8/2018	Atrazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Atrazine		1.44	0.222	0.222	UG/L
	7/18/2018	Atrazine		0.344	0.222	0.222	UG/L
	8/27/2018	Atrazine	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Atrazine		0.667	0.222	0.222	UG/L
	5/8/2018	Atrazine		0.563	0.250	0.250	UG/L
	7/18/2018	Atrazine		0.490	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.744	0.222	0.222	UG/L
MTL-13	3/8/2018	Atrazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Atrazine		0.233	0.222	0.222	UG/L
	7/18/2018	Atrazine		0.630	0.200	0.200	UG/L
	8/27/2018	Atrazine	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Atrazine		0.544	0.222	0.222	UG/L
	5/8/2018	Atrazine		0.275	0.250	0.250	UG/L
	7/18/2018	Atrazine		0.840	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.990	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Atrazine		0.450	0.200	0.200	UG/L
	7/18/2018	Atrazine		0.730	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.844	0.222	0.222	UG/L

MTL-33-0	3/8/2018	Atrazine		0.767	0.222	0.222	UG/L
	5/8/2018	Atrazine		0.589	0.222	0.222	UG/L
	7/18/2018	Atrazine		0.650	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.770	0.200	0.200	UG/L
MTL-5	3/8/2018	Atrazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Atrazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Atrazine		0.850	0.250	0.250	UG/L
	8/27/2018	Atrazine		0.370	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Atrazine		0.656	0.222	0.222	UG/L
	5/8/2018	Atrazine		0.210	0.200	0.200	UG/L
	7/18/2018	Atrazine		0.844	0.222	0.222	UG/L
	8/27/2018	Atrazine		0.770	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Atrazine		0.475	0.250	0.250	UG/L
	5/8/2018	Atrazine		0.322	0.222	0.222	UG/L
	7/18/2018	Atrazine		0.780	0.200	0.200	UG/L
	8/27/2018	Atrazine		1.00	0.200	0.200	UG/L
MTL-9	3/8/2018	Atrazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Atrazine		1.83	0.250	0.250	UG/L
	7/18/2018	Atrazine		0.410	0.200	0.200	UG/L
	8/27/2018	Atrazine		0.320	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Chlorophyll-a		6.10	1.00	1.00	MG/CU.M.
	5/8/2018	Chlorophyll-a		6.50	1.00	1.00	MG/CU.M.
	7/18/2018	Chlorophyll-a		6.30	1.00	1.00	MG/CU.M.
	8/27/2018	Chlorophyll-a		12.8	1.00	1.00	MG/CU.M.
MTL-22-0	5/8/2018	Chlorophyll-a	B	8.80	1.00	1.00	MG/CU.M.
	7/18/2018	Chlorophyll-a		7.60	1.00	1.00	MG/CU.M.
	8/27/2018	Chlorophyll-a		7.10	1.00	1.00	MG/CU.M.
MTL-33-0	3/8/2018	Chlorophyll-a		2.80	1.00	1.00	MG/CU.M.
	5/8/2018	Chlorophyll-a		10.2	1.00	1.00	MG/CU.M.
	7/18/2018	Chlorophyll-a		13.2	1.00	1.00	MG/CU.M.
	8/27/2018	Chlorophyll-a		9.40	1.00	1.00	MG/CU.M.
MTL-66-0	3/8/2018	Chlorophyll-a		6.80	1.00	1.00	MG/CU.M.
	5/8/2018	Chlorophyll-a		6.20	1.00	1.00	MG/CU.M.
	7/18/2018	Chlorophyll-a		9.40	1.00	1.00	MG/CU.M.
	8/27/2018	Chlorophyll-a		13.4	1.00	1.00	MG/CU.M.

MTL-77-0	3/8/2018	Chlorophyll-a		3.20	1.00	1.00	MG/CU.M.
	5/8/2018	Chlorophyll-a		3.40	1.00	1.00	MG/CU.M.
	7/18/2018	Chlorophyll-a		6.00	1.00	1.00	MG/CU.M.
	8/27/2018	Chlorophyll-a		10.7	1.00	1.00	MG/CU.M.
MTL-1	3/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	5/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	5/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	7/18/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	8/27/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	5/8/2018	Chlorpyrifos	<	0.250	0.250	0.250	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	5/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	5/8/2018	Chlorpyrifos	<	0.250	0.250	0.250	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	5/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	5/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	7/18/2018	Chlorpyrifos	<	0.250	0.250	0.250	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L

MTL-66-0	3/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	5/8/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	7/18/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Chlorpyrifos	<	0.250	0.250	0.250	UG/L
	5/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Chlorpyrifos	<	0.222	0.222	0.222	UG/L
	5/8/2018	Chlorpyrifos	<	0.250	0.250	0.250	UG/L
	7/18/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
	8/27/2018	Chlorpyrifos	<	0.200	0.200	0.200	UG/L
MTL-1	3/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	8/27/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Cyanazine	<	0.250	0.250	0.250	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Cyanazine	<	0.250	0.250	0.250	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.222	0.222	0.222	UG/L

MTL-33-0	3/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	5/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Cyanazine	<	0.250	0.250	0.250	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	7/18/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Cyanazine	<	0.250	0.250	0.250	UG/L
	5/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Cyanazine	<	0.222	0.222	0.222	UG/L
	5/8/2018	Cyanazine	<	0.250	0.250	0.250	UG/L
	7/18/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
	8/27/2018	Cyanazine	<	0.200	0.200	0.200	UG/L
BJ MARINA	5/8/2018	E. Coliform		22.0	1.00	1.00	COL/100 ML
	7/18/2018	E. Coliform		10.0	1.00	1.00	COL/100 ML
	8/27/2018	E. Coliform		17.0	1.00	1.00	COL/100 ML
IC MARINA	5/8/2018	E. Coliform		23.0	1.00	1.00	COL/100 ML
	7/18/2018	E. Coliform		6.00	1.00	1.00	COL/100 ML
	8/27/2018	E. Coliform		42.0	1.00	1.00	COL/100 ML
MTL-1	3/8/2018	Iron		0.513	0.0500	0.100	MG/L
	5/8/2018	Iron		1.61	0.0500	0.100	MG/L
	7/18/2018	Iron		0.225	0.0500	0.100	MG/L
	8/27/2018	Iron		0.145	0.0400	0.0500	MG/L
MTL-12	3/8/2018	Iron		0.778	0.0500	0.100	MG/L

	5/8/2018	Iron		1.51	0.0500	0.100	MG/L
	7/18/2018	Iron		0.581	0.0500	0.100	MG/L
	8/27/2018	Iron		0.285	0.0400	0.0500	MG/L
MTL-22-15	3/8/2018	Iron		0.521	0.0500	0.100	MG/L
	5/8/2018	Iron		1.98	0.0500	0.100	MG/L
	7/18/2018	Iron		2.13	0.0500	0.100	MG/L
	8/27/2018	Iron		0.0578	0.0400	0.0500	MG/L
MTL-1	3/8/2018	Manganese		0.0375	0.00500	0.0100	MG/L
	5/8/2018	Manganese		0.0347	0.00500	0.0100	MG/L
	7/18/2018	Manganese		0.0138	0.00500	0.0100	MG/L
	8/27/2018	Manganese		0.0407	0.00400	0.00500	MG/L
MTL-12	3/8/2018	Manganese		0.0960	0.00500	0.0100	MG/L
	5/8/2018	Manganese		0.0607	0.00500	0.0100	MG/L
	7/18/2018	Manganese		0.0527	0.00500	0.0100	MG/L
	8/27/2018	Manganese		0.0717	0.00400	0.00500	MG/L
MTL-22-15	3/8/2018	Manganese		0.0366	0.00500	0.0100	MG/L
	5/8/2018	Manganese		0.0260	0.00500	0.0100	MG/L
	7/18/2018	Manganese		0.101	0.00500	0.0100	MG/L
	8/27/2018	Manganese		0.0168	0.00400	0.00500	MG/L
MTL-1	3/8/2018	Metolachlor		1.41	0.200	0.200	UG/L
	5/8/2018	Metolachlor		0.870	0.200	0.200	UG/L
	7/18/2018	Metolachlor		0.780	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.660	0.200	0.200	UG/L
MTL-11	3/8/2018	Metolachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metolachlor		0.467	0.222	0.222	UG/L
	7/18/2018	Metolachlor		0.278	0.222	0.222	UG/L
	8/27/2018	Metolachlor		0.356	0.222	0.222	UG/L
MTL-12	3/8/2018	Metolachlor		1.70	0.222	0.222	UG/L
	5/8/2018	Metolachlor		1.14	0.250	0.250	UG/L
	7/18/2018	Metolachlor		0.770	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.711	0.222	0.222	UG/L
MTL-13	3/8/2018	Metolachlor		0.230	0.200	0.200	UG/L
	5/8/2018	Metolachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metolachlor		0.220	0.200	0.200	UG/L

	8/27/2018	Metolachlor		0.420	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Metolachlor		0.967	0.222	0.222	UG/L
	5/8/2018	Metolachlor		0.325	0.250	0.250	UG/L
	7/18/2018	Metolachlor		0.820	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.630	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Metolachlor		0.840	0.200	0.200	UG/L
	7/18/2018	Metolachlor		0.780	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.744	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Metolachlor		1.68	0.222	0.222	UG/L
	5/8/2018	Metolachlor		1.21	0.222	0.222	UG/L
	7/18/2018	Metolachlor		0.820	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.750	0.200	0.200	UG/L
MTL-5	3/8/2018	Metolachlor	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metolachlor	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metolachlor		0.675	0.250	0.250	UG/L
	8/27/2018	Metolachlor	<	0.200	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Metolachlor		1.17	0.222	0.222	UG/L
	5/8/2018	Metolachlor		0.220	0.200	0.200	UG/L
	7/18/2018	Metolachlor		0.656	0.222	0.222	UG/L
	8/27/2018	Metolachlor		0.570	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Metolachlor		0.850	0.250	0.250	UG/L
	5/8/2018	Metolachlor		0.422	0.222	0.222	UG/L
	7/18/2018	Metolachlor		0.760	0.200	0.200	UG/L
	8/27/2018	Metolachlor		0.830	0.200	0.200	UG/L
MTL-9	3/8/2018	Metolachlor	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metolachlor		0.663	0.250	0.250	UG/L
	7/18/2018	Metolachlor		2.45	0.200	0.200	UG/L
	8/27/2018	Metolachlor		1.32	0.200	0.200	UG/L
MTL-1	3/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metribuzin	<	0.222	0.222	0.222	UG/L

	8/27/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metribuzin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metribuzin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metribuzin	<	0.250	0.250	0.250	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Metribuzin	<	0.250	0.250	0.250	UG/L
	5/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Metribuzin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Metribuzin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Metribuzin	<	0.200	0.200	0.200	UG/L

	8/27/2018	Metribuzin	<	0.200	0.200	0.200	UG/L
MTL-1	3/8/2018	Nitrate-N		0.540	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.758	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.356	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0660	0.0190	0.0200	MG/L
MTL-11	3/8/2018	Nitrate-N		1.35	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N	<	0.0380	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.557	0.0190	0.0200	MG/L
MTL-12	3/8/2018	Nitrate-N		0.444	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.640	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.484	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0780	0.0190	0.0200	MG/L
MTL-13	3/8/2018	Nitrate-N		1.35	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N	<	0.0380	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.279	0.0190	0.0200	MG/L
MTL-15-0	3/8/2018	Nitrate-N		0.682	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		1.08	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.258	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
MTL-22-0	3/8/2018	Nitrate-N		0.502	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.595	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.272	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0360	0.0190	0.0200	MG/L
MTL-22-15	3/8/2018	Nitrate-N		0.482	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.742	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.868	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0440	0.0190	0.0200	MG/L
MTL-33-0	3/8/2018	Nitrate-N		0.502	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.636	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.161	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0420	0.0190	0.0200	MG/L
MTL-5	3/8/2018	Nitrate-N		0.858	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N	<	0.0380	0.0380	0.0400	MG/L

	7/18/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.0220	0.0190	0.0200	MG/L
MTL-66-0	3/8/2018	Nitrate-N		0.598	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		1.12	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.225	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
MTL-77-0	3/8/2018	Nitrate-N		0.813	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		1.17	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N		0.240	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
MTL-9	3/8/2018	Nitrate-N		0.987	0.0380	0.0400	MG/L
	5/8/2018	Nitrate-N		0.397	0.0380	0.0400	MG/L
	7/18/2018	Nitrate-N	<	0.0190	0.0190	0.0200	MG/L
	8/27/2018	Nitrate-N		0.453	0.0190	0.0200	MG/L
MTL-1	3/8/2018	Nitrogen, ammonia		0.0616	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia		0.0458	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0425	0.0200	0.0300	MG/L
MTL-11	3/8/2018	Nitrogen, ammonia		0.222	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	J	0.0253	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.188	0.0200	0.0300	MG/L
MTL-12	3/8/2018	Nitrogen, ammonia		0.108	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia		0.0548	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia		0.0483	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0898	0.0200	0.0300	MG/L
MTL-13	3/8/2018	Nitrogen, ammonia		0.150	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	J	0.0295	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0726	0.0200	0.0300	MG/L
MTL-15-0	3/8/2018	Nitrogen, ammonia		0.123	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia		0.0425	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
MTL-22-0	3/8/2018	Nitrogen, ammonia		0.108	0.0200	0.0300	MG/L

	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0676	0.0200	0.0300	MG/L
MTL-22-15	3/8/2018	Nitrogen, ammonia		0.0774	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
MTL-33-0	3/8/2018	Nitrogen, ammonia		0.0444	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0433	0.0200	0.0300	MG/L
MTL-5	3/8/2018	Nitrogen, ammonia		0.172	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	J	0.0283	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0598	0.0200	0.0300	MG/L
MTL-66-0	3/8/2018	Nitrogen, ammonia		0.0844	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	J	0.0206	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
MTL-77-0	3/8/2018	Nitrogen, ammonia		0.179	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	J	0.0201	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia	J	0.0231	0.0200	0.0300	MG/L
MTL-9	3/8/2018	Nitrogen, ammonia		0.289	0.0200	0.0300	MG/L
	5/8/2018	Nitrogen, ammonia		0.0914	0.0200	0.0300	MG/L
	7/18/2018	Nitrogen, ammonia	<	0.0200	0.0200	0.0300	MG/L
	8/27/2018	Nitrogen, ammonia		0.0669	0.0200	0.0300	MG/L
MTL-1	3/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	8/27/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L

MTL-12	3/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Pendimethalin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Pendimethalin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Pendimethalin	<	0.250	0.250	0.250	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Pendimethalin	<	0.250	0.250	0.250	UG/L
	5/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Pendimethalin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Pendimethalin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Pendimethalin	<	0.200	0.200	0.200	UG/L

MTL-15-0	3/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	5/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	7/18/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	8/27/2018	Pheophytin-a		6.60	1.00	1.00	MG/CU.M.
MTL-22-0	5/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	7/18/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	8/27/2018	Pheophytin-a		1.70	1.00	1.00	MG/CU.M.
MTL-33-0	3/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	5/8/2018	Pheophytin-a		1.40	1.00	1.00	MG/CU.M.
	7/18/2018	Pheophytin-a		1.10	1.00	1.00	MG/CU.M.
	8/27/2018	Pheophytin-a		2.40	1.00	1.00	MG/CU.M.
MTL-66-0	3/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	5/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	7/18/2018	Pheophytin-a		2.20	1.00	1.00	MG/CU.M.
	8/27/2018	Pheophytin-a		3.10	1.00	1.00	MG/CU.M.
MTL-77-0	3/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	5/8/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	7/18/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
	8/27/2018	Pheophytin-a	<	1.00	1.00	1.00	MG/CU.M.
MTL-1	3/8/2018	Phosphorus, ortho-		0.0124	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0333	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-11	3/8/2018	Phosphorus, ortho-		0.159	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0254	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.0384	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-		0.0418	0.00800	0.0100	MG/L
MTL-12	3/8/2018	Phosphorus, ortho-	J	0.00980	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0307	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.0122	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-		0.0113	0.00800	0.0100	MG/L
MTL-13	3/8/2018	Phosphorus, ortho-		0.112	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0122	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.0122	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-		0.0529	0.00800	0.0100	MG/L

MTL-15-0	3/8/2018	Phosphorus, ortho-		0.0150	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.118	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-22-0	3/8/2018	Phosphorus, ortho-		0.0517	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-22-15	3/8/2018	Phosphorus, ortho-		0.0177	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0413	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.0463	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-33-0	3/8/2018	Phosphorus, ortho-		0.0150	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0148	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-5	3/8/2018	Phosphorus, ortho-		0.188	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0413	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.215	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-		0.120	0.00800	0.0100	MG/L
MTL-66-0	3/8/2018	Phosphorus, ortho-		0.0150	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.107	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-77-0	3/8/2018	Phosphorus, ortho-		0.0177	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0651	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-	<	0.00800	0.00800	0.0100	MG/L
MTL-9	3/8/2018	Phosphorus, ortho-		0.172	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, ortho-		0.0889	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, ortho-		0.0227	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, ortho-		0.0335	0.00800	0.0100	MG/L
MTL-1	3/8/2018	Phosphorus, total		0.0500	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0589	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0392	0.00800	0.0100	MG/L

	8/27/2018	Phosphorus, total		0.0454	0.00800	0.0100	MG/L
MTL-11	3/8/2018	Phosphorus, total		0.465	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0374	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.266	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.890	0.00800	0.0100	MG/L
MTL-12	3/8/2018	Phosphorus, total		0.0675	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0460	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0863	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0943	0.00800	0.0100	MG/L
MTL-13	3/8/2018	Phosphorus, total		0.356	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0289	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0563	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.214	0.00800	0.0100	MG/L
MTL-15-0	3/8/2018	Phosphorus, total		0.0850	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.123	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0349	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0543	0.00800	0.0100	MG/L
MTL-22-0	3/8/2018	Phosphorus, total		0.0544	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.132	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0263	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0232	0.00800	0.0100	MG/L
MTL-22-15	3/8/2018	Phosphorus, total		0.0457	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0460	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.194	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0232	0.00800	0.0100	MG/L
MTL-33-0	3/8/2018	Phosphorus, total		0.0457	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0289	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0349	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0676	0.00800	0.0100	MG/L
MTL-5	3/8/2018	Phosphorus, total		0.714	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0675	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.275	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.214	0.00800	0.0100	MG/L
MTL-66-0	3/8/2018	Phosphorus, total		0.0893	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.119	0.00800	0.0100	MG/L

	7/18/2018	Phosphorus, total		0.0392	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0898	0.00800	0.0100	MG/L
MTL-77-0	3/8/2018	Phosphorus, total		0.216	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.0804	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.0349	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.0410	0.00800	0.0100	MG/L
MTL-9	3/8/2018	Phosphorus, total		0.666	0.00800	0.0100	MG/L
	5/8/2018	Phosphorus, total		0.179	0.00800	0.0100	MG/L
	7/18/2018	Phosphorus, total		0.146	0.00800	0.0100	MG/L
	8/27/2018	Phosphorus, total		0.321	0.00800	0.0100	MG/L
MTL-1	3/8/2018	Solids, total suspended		2.86	1.43	1.43	MG/L
	5/8/2018	Solids, total suspended		6.40	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		2.67	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		2.40	1.33	1.33	MG/L
MTL-11	3/8/2018	Solids, total suspended		185	8.00	8.00	MG/L
	5/8/2018	Solids, total suspended		28.4	4.00	4.00	MG/L
	7/18/2018	Solids, total suspended		38.8	4.00	4.00	MG/L
	8/27/2018	Solids, total suspended		397	15.4	15.4	MG/L
MTL-12	3/8/2018	Solids, total suspended		9.80	2.00	2.00	MG/L
	5/8/2018	Solids, total suspended		13.0	2.00	2.00	MG/L
	7/18/2018	Solids, total suspended		9.47	0.333	0.333	MG/L
	8/27/2018	Solids, total suspended		5.20	2.00	2.00	MG/L
	3/8/2018	Solids, total suspended		26.0	2.50	2.50	MG/L
MTL-13	5/8/2018	Solids, total suspended		3.73	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		5.07	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		11.8	2.00	2.00	MG/L
MTL-15-0	3/8/2018	Solids, total suspended		5.57	1.43	1.43	MG/L
	5/8/2018	Solids, total suspended		10.4	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		2.13	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		4.00	2.00	2.00	MG/L
MTL-22-0	3/8/2018	Solids, total suspended		3.14	1.43	1.43	MG/L
	5/8/2018	Solids, total suspended		5.73	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		2.00	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		2.40	1.33	1.33	MG/L
MTL-22-15	3/8/2018	Solids, total suspended		2.71	1.43	1.43	MG/L

	5/8/2018	Solids, total suspended		6.93	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		9.33	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		2.13	1.33	1.33	MG/L
MTL-33-0	3/8/2018	Solids, total suspended		2.14	1.43	1.43	MG/L
	5/8/2018	Solids, total suspended		7.33	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		3.33	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		2.67	1.33	1.33	MG/L
MTL-5	3/8/2018	Solids, total suspended		92.0	6.67	6.67	MG/L
	5/8/2018	Solids, total suspended		6.27	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		5.73	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		9.80	2.00	2.00	MG/L
MTL-66-0	3/8/2018	Solids, total suspended		7.00	1.67	1.67	MG/L
	5/8/2018	Solids, total suspended		12.7	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		2.53	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		5.73	1.33	1.33	MG/L
MTL-77-0	3/8/2018	Solids, total suspended		15.2	2.00	2.00	MG/L
	5/8/2018	Solids, total suspended		7.87	1.33	1.33	MG/L
	7/18/2018	Solids, total suspended		2.27	1.33	1.33	MG/L
	8/27/2018	Solids, total suspended		4.67	1.33	1.33	MG/L
MTL-9	3/8/2018	Solids, total suspended		101	6.67	6.67	MG/L
	5/8/2018	Solids, total suspended		19.2	4.00	4.00	MG/L
	7/18/2018	Solids, total suspended		16.0	2.00	2.00	MG/L
	8/27/2018	Solids, total suspended		22.6	2.00	2.00	MG/L
MTL-1	3/8/2018	Solids, Volaltile Suspended	<	1.43	1.43	1.43	MG/L
	5/8/2018	Solids, Volaltile Suspended		2.13	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.87	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		1.47	1.33	1.33	MG/L
MTL-11	3/8/2018	Solids, Volaltile Suspended		21.6	8.00	8.00	MG/L
	5/8/2018	Solids, Volaltile Suspended		5.60	4.00	4.00	MG/L
	7/18/2018	Solids, Volaltile Suspended		10.0	4.00	4.00	MG/L
	8/27/2018	Solids, Volaltile Suspended		33.9	15.4	15.4	MG/L
MTL-12	3/8/2018	Solids, Volaltile Suspended	<	2.00	2.00	2.00	MG/L
	5/8/2018	Solids, Volaltile Suspended		2.20	2.00	2.00	MG/L
	7/18/2018	Solids, Volaltile Suspended		2.80	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended	<	2.00	2.00	2.00	MG/L

MTL-13	3/8/2018	Solids, Volaltile Suspended		4.75	2.50	2.50	MG/L
	5/8/2018	Solids, Volaltile Suspended		2.27	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.73	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		2.20	2.00	2.00	MG/L
MTL-15-0	3/8/2018	Solids, Volaltile Suspended	<	1.43	1.43	1.43	MG/L
	5/8/2018	Solids, Volaltile Suspended		1.87	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended	<	1.33	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		2.00	2.00	2.00	MG/L
MTL-22-0	3/8/2018	Solids, Volaltile Suspended	<	1.43	1.43	1.43	MG/L
	5/8/2018	Solids, Volaltile Suspended	<	1.33	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.87	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		1.47	1.33	1.33	MG/L
MTL-22-15	3/8/2018	Solids, Volaltile Suspended	<	1.43	1.43	1.43	MG/L
	5/8/2018	Solids, Volaltile Suspended		1.60	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.47	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		1.33	1.33	1.33	MG/L
MTL-33-0	3/8/2018	Solids, Volaltile Suspended	<	1.43	1.43	1.43	MG/L
	5/8/2018	Solids, Volaltile Suspended		1.47	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		2.53	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		1.47	1.33	1.33	MG/L
MTL-5	3/8/2018	Solids, Volaltile Suspended		14.7	6.67	6.67	MG/L
	5/8/2018	Solids, Volaltile Suspended		1.73	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.60	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		2.40	2.00	2.00	MG/L
MTL-66-0	3/8/2018	Solids, Volaltile Suspended	<	1.67	1.67	1.67	MG/L
	5/8/2018	Solids, Volaltile Suspended		2.27	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended		1.73	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		2.13	1.33	1.33	MG/L
MTL-77-0	3/8/2018	Solids, Volaltile Suspended		2.00	2.00	2.00	MG/L
	5/8/2018	Solids, Volaltile Suspended	<	1.33	1.33	1.33	MG/L
	7/18/2018	Solids, Volaltile Suspended	<	1.33	1.33	1.33	MG/L
	8/27/2018	Solids, Volaltile Suspended		1.87	1.33	1.33	MG/L
MTL-9	3/8/2018	Solids, Volaltile Suspended		14.0	6.67	6.67	MG/L
	5/8/2018	Solids, Volaltile Suspended		4.80	4.00	4.00	MG/L
	7/18/2018	Solids, Volaltile Suspended		5.20	2.00	2.00	MG/L

	8/27/2018	Solids, Volaltile Suspended		3.80	2.00	2.00	MG/L
MTL-1	3/8/2018	Total Organic Carbon		4.10	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	5.70	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		5.50	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.60	0.500	1.00	MG/L
MTL-11	3/8/2018	Total Organic Carbon		8.40	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	8.60	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		7.90	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		6.40	0.500	1.00	MG/L
MTL-12	3/8/2018	Total Organic Carbon		4.30	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.30	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		5.50	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.80	0.500	1.00	MG/L
MTL-13	3/8/2018	Total Organic Carbon		8.00	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.20	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		6.30	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.90	0.500	1.00	MG/L
MTL-15-0	3/8/2018	Total Organic Carbon		4.50	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon		7.00	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		5.80	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		6.50	0.500	1.00	MG/L
MTL-22-0	3/8/2018	Total Organic Carbon		4.30	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	5.80	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		5.90	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.90	0.500	1.00	MG/L
MTL-22-15	3/8/2018	Total Organic Carbon		4.30	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.00	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		6.40	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.90	0.500	1.00	MG/L
MTL-33-0	3/8/2018	Total Organic Carbon		4.30	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.00	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		6.30	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		6.20	0.500	1.00	MG/L
MTL-5	3/8/2018	Total Organic Carbon		8.30	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	7.20	0.500	1.00	MG/L

	7/18/2018	Total Organic Carbon		7.00	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		6.70	0.500	1.00	MG/L
MTL-66-0	3/8/2018	Total Organic Carbon		4.20	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.70	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		6.30	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.70	0.500	1.00	MG/L
MTL-77-0	3/8/2018	Total Organic Carbon		5.00	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	6.70	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		6.10	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		5.70	0.500	1.00	MG/L
MTL-9	3/8/2018	Total Organic Carbon		8.60	0.500	1.00	MG/L
	5/8/2018	Total Organic Carbon	B	14.0	0.500	1.00	MG/L
	7/18/2018	Total Organic Carbon		8.40	0.500	1.00	MG/L
	8/27/2018	Total Organic Carbon		6.40	0.500	1.00	MG/L
MTL-1	3/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-11	3/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	8/27/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
MTL-12	3/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Trifluralin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
MTL-13	3/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-15-0	3/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Trifluralin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-22-0	5/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L

	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
MTL-33-0	3/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-5	3/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	5/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Trifluralin	<	0.250	0.250	0.250	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-66-0	3/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	7/18/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-77-0	3/8/2018	Trifluralin	<	0.250	0.250	0.250	UG/L
	5/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
MTL-9	3/8/2018	Trifluralin	<	0.222	0.222	0.222	UG/L
	5/8/2018	Trifluralin	<	0.250	0.250	0.250	UG/L
	7/18/2018	Trifluralin	<	0.200	0.200	0.200	UG/L
	8/27/2018	Trifluralin	<	0.200	0.200	0.200	UG/L

U= Analyte was not detected. B= Estimated value.

FIELD DATA

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Secchi (in)	Total Depth (ft)
MTL-1	3/8/2018	0.76	4.6	101.8	201.3	104.9	13.5	7.53	10:36		
	5/8/2018	0.90	14.3	281.1	211.2	100.8	10.3	7.31	10:21		
	7/18/2018	0.71	28.3	361.6	226.6	102.4	8.0	8.37	10:53		
	8/27/2018	1.032	26.5	203.5	230.7	97.7	7.85	8.48	10:40		
MTL-5	3/8/2018	0.27	6.2	157.9	229.2	95.7	11.8	7.67	14:46		
	5/8/2018	0.20	25.2	104.8	553.0	117.5	9.7	8.11	13:28		
	7/18/2018	0.28	30.3	127.8	302.8	189.2	14.2	9.15	13:39		
	8/27/2018	0.258	32.1	152.3	296.5	176.8	12.88	9.1	14:02		
MTL-9	3/8/2018	0.23	5.8	110.0	282.5	95.2	11.9	7.38	13:10		
	5/8/2018	0.11	21.8	146.6	302.0	75.6	6.6	7.66	12:00		
	7/18/2018	0.32	28.4	291.6	409.3	109.7	8.5	8.12	12:40		
	8/27/2018	0.162	27.94	170	222.5	77.4	6.06	7.58	12:59		
MTL-11	3/8/2018	0.61	3.8	160.8	295.6	97.9	12.9	7.56	12:07		
	5/8/2018	0.13	21.4	199.7	556.4	81.6	7.2	7.85	11:19		
	7/18/2018	0.44	28.7	198.7	715.2	94.4	7.3	7.98	12:02		
	8/27/2018	0.281	26.6	151.7	183.8	77.2	6.19	7.58	12:11		
MTL-12	3/8/2018	0.53	5.4	108.1	213.1	107.9	13.6	7.57	10:06		
	5/8/2018	0.43	17.4	277.0	217.1	117.1	11.2	8.11	9:46		
	7/18/2018	0.51	25.3	437.8	227.4	83.2	6.8	7.65	9:48		
	8/27/2018	0.406	26.94	330.3	230.4	91.2	7.28	7.92	10:07		
MTL-13	3/8/2018	0.51	5.1	200.6	393.7	112.3	14.3	8.29	13:57		
	5/8/2018	0.31	23.1	160.6	598.2	108.7	9.3	8.14	12:53		
	7/18/2018	0.26	29.1	215.0	365.3	147.0	11.3	8.83	13:05		
	8/27/2018	0.3	29.38	129.1	262	100	7.63	8.13	13:25		
MTL-22	3/8/2018	0.07	4.0	261.8	197.5	106.2	13.9	7.63	13:29	36	57
		1.04	3.9	257.2	197.6	100.3	13.2	7.57	13:30		
		2.00	3.9	254.6	197.7	99.1	13.0	7.56	13:30		
		3.16	3.9	253.1	197.7	98.3	12.9	7.53	13:31		
		3.97	3.9	253.2	197.6	98.0	12.9	7.5	13:31		
		4.93	3.9	253.4	197.7	97.4	12.8	7.45	13:32		

		6.13	3.9	253.1	197.7	97.2	12.8	7.41	13:32		
		7.23	3.9	249.1	197.7	96.8	12.7	7.41	13:33		
		8.20	3.9	248.3	197.6	96.6	12.7	7.41	13:33		
	5/8/2018	0.40	17.9	229.8	207.3	110.1	10.4	7.74	11:48	16	25
		0.68	17.9	227.6	207.2	108.9	10.3	7.74	11:48		
		1.06	17.9	229.6	207.4	112.3	10.6	7.74	11:49		
		1.93	17.7	229.8	207.4	111.3	10.6	7.71	11:49		
		3.10	17.0	231.2	207.6	108.7	10.5	7.64	11:49		
		4.05	16.4	233.7	207.4	105.3	10.3	7.52	11:50		
		5.03	14.2	238.8	206.3	94.5	9.7	7.35	11:50		
		6.15	13.7	242.1	205.0	92.1	9.6	7.22	11:50		
		7.26	12.9	245.9	206.9	91.5	9.7	7.13	11:51		
		8.07	12.3	249.1	207.4	90.6	9.7	7.07	11:51		
		9.15	10.6	251.1	207.4	87.9	9.8	7.05	11:51		
		9.97	10.2	253.3	207.7	86.5	9.7	7	11:52		
		11.02	8.9	256.0	207.2	82.1	9.5	6.96	11:52		
		13.32	7.9	260.1	207.5	75.9	9.0	6.84	11:52		
		13.33	7.9	258.5	207.5	77.0	9.1	6.89	11:52		
	7/18/2018	0.07	29.6	329.3	224.9	103.9	7.9	10.16	13:49	68	54
		0.93	29.5	333.8	224.9	104.3	8.0	9.4	13:50		
		2.09	29.4	338.9	224.8	104.3	8.0	9.03	13:50		
		2.86	29.3	339.8	224.8	103.8	7.9	8.8	13:50		
		4.12	24.9	343.9	231.3	20.0	1.7	10.15	13:51		
		5.24	21.2	345.8	220.0	6.1	0.5	11.08	13:51		
		6.20	16.7	320.2	215.9	3.3	0.3	10.62	13:52		
		7.29	13.5	310.6	209.8	10.8	1.1	7.4	13:52		
		8.09	12.7	290.4	209.1	23.9	2.5	9.47	13:53		
		8.95	11.5	313.7	208.1	24.5	2.7	10.51	13:54		
	8/27/2018	0.20	26.2	35.7	230.8	86.3	7.0	8.48	12:23	60	
		1.04	26.2	34.1	230.8	86.2	7.0	8.5	12:23		
		2.16	26.2	31.5	230.8	85.9	6.9	8.52	12:22		
		3.39	26.1	28.3	230.7	84.5	6.8	8.5	12:22		
		4.52	26.1	22.7	230.6	83.3	6.8	8.54	12:21		
MTL-33	3/8/2018	0.09	4.0	158.6	200.1	95.4	12.5	7.51	11:38	38	50
		1.01	3.9	156.5	200.1	95.3	12.5	7.53	11:39		

		2.15	3.9	153.8	200.3	95.2	12.5	7.55	11:39		
		3.24	3.9	151.6	200.4	95.0	12.5	7.58	11:40		
		4.11	3.9	149.5	200.5	95.0	12.5	7.61	11:40		
		5.03	3.9	147.4	200.3	95.1	12.5	7.63	11:41		
		6.03	3.9	145.6	201.4	94.6	12.4	7.65	11:41		
		7.04	3.9	144.2	201.2	94.5	12.4	7.67	11:42		
		8.01	3.9	143.6	201.1	94.5	12.4	7.67	11:42		
		8.95	3.9	143.1	201.1	94.5	12.4	7.67	11:42		
	5/8/2018	0.32	17.1	200.2	209.9	111.2	10.7	8.22	11:34	24	
		1.06	15.7	205.3	210.3	106.0	10.5	8.03	11:34		
		1.13	15.7	206.5	210.4	105.6	10.5	8	11:34		
		2.20	14.5	214.6	209.9	100.0	10.2	7.73	11:33		
		2.97	13.8	215.8	209.8	96.4	10.0	7.68	11:33		
		4.14	13.3	217.5	209.2	95.5	10.0	7.69	11:33		
		4.96	13.2	238.6	209.4	93.3	9.8	7.1	11:32		
		5.70	12.6	243.8	210.0	92.3	9.8	7	11:32		
		6.46	11.8	245.7	209.9	90.5	9.8	6.94	11:31		
		7.72	11.2	247.1	209.8	88.6	9.7	6.9	11:31		
		8.78	9.8	248.0	209.3	85.4	9.7	6.86	11:31		
		11.07	8.1	249.1	208.9	77.9	9.2	6.83	11:30		
		16.25	7.4	247.8	209.7	72.2	8.7	6.9	11:30		
	7/18/2018	-0.01	30.2	417.0	225.3	118.4	8.9	8.76	14:52	48	53
		0.95	29.4	484.1	225.8	104.9	8.0	8.74	14:53		
		2.07	28.2	495.0	227.5	69.2	5.4	7.97	14:53		
		3.06	26.1	501.2	226.3	24.2	2.0	6.86	14:54		
		4.22	22.5	488.9	223.9	5.0	0.4	6.67	14:54		
		4.92	19.5	466.7	218.8	3.4	0.3	8.14	14:55		
		6.17	15.4	468.7	212.2	7.2	0.7	8.43	14:56		
		7.07	13.9	470.7	211.3	14.7	1.5	12.6	14:56		
		8.01	12.3	472.1	210.9	22.5	2.4	13.76	14:56		
	8/27/2018	0.08	26.6	34.0	231.8	89.2	7.2	8.79	11:50	52	
		1.01	26.5	34.8	231.8	89.1	7.2	8.81	11:50		
		2.16	26.4	40.4	231.6	87.9	7.1	8.71	11:49		
		3.14	26.4	45.6	231.5	86.9	7.0	8.59	11:49		
		3.85	26.3	59.2	231.4	81.6	6.6	8.23	11:49		

		5.05	24.1	78.2	228.5	42.8	3.6	7.21	11:48		
		6.05	23.2	72.2	226.8	25.5	2.2	7.07	11:48		
		7.44	17.1	-16.6	211.8	4.5	0.4	7.17	11:47		
		8.95	11.3	-6.6	217.0	10.7	1.2	7.65	11:46		
MTL-66	3/8/2018	0.03	5.2	113.0	221.4	95.5	12.1	7.75	12:35	22	40
		1.17	4.9	113.4	221.2	94.1	12.0	7.75	12:35		
		2.05	4.7	113.6	220.8	93.3	12.0	7.76	12:36		
		3.06	4.6	113.5	220.4	92.8	12.0	7.77	12:36		
		4.15	4.6	115.2	219.7	92.4	11.9	7.74	12:36		
		5.07	4.6	134.6	219.4	92.3	11.9	7.39	12:38		
		6.20	4.7	141.1	226.1	92.5	11.9	7.28	12:38		
		7.08	4.7	141.8	227.6	92.6	11.9	7.27	12:39		
		8.20	4.7	141.7	227.1	92.5	11.9	7.28	12:39		
	5/8/2018	0.05	19.3	159.6	201.7	100.0	9.2	7.75	13:05	8	39
		0.48	19.1	159.2	201.6	99.1	9.2	7.63	13:05		
		1.14	18.9	166.4	201.9	98.3	9.1	7.45	13:04		
		1.83	18.7	174.5	202.6	97.2	9.1	7.21	13:04		
		3.24	15.7	180.8	198.6	86.1	8.6	6.94	13:04		
		4.52	14.3	181.4	197.6	83.8	8.6	6.81	13:03		
		5.82	13.2	178.8	190.7	75.6	7.9	6.63	13:03		
		7.11	10.9	170.0	198.8	69.0	7.6	6.61	13:03		
		8.05	9.8	144.5	197.5	57.7	6.5	6.6	13:02		
		9.71	9.3	97.7	200.2	53.2	6.1	6.73	13:01		
		10.70	9.3	3.5	201.4	47.9	5.5	6.93	13:01		
		10.78	9.2	19.3	205.6	52.7	6.1	7.07	13:00		
	7/18/2018	0.16	30.0	310.3	240.2	89.5	6.8	7.04	12:47	54	35
		1.29	29.8	307.8	239.5	90.3	6.9	6.54	12:47		
		1.99	29.7	308.7	238.6	88.4	6.7	6.2	12:48		
		3.02	29.4	307.9	237.8	86.2	6.6	6.53	12:48		
		4.11	27.8	315.6	248.2	16.3	1.3	6.24	12:48		
		5.04	24.4	77.4	253.0	5.0	0.4	6.86	12:49		
		6.04	18.4	103.4	235.0	3.1	0.3	3.35	12:49		
		7.13	14.8	119.3	227.2	2.6	0.3	8.49	12:50		
		8.15	13.3	127.7	225.5	2.4	0.3	9.44	12:50		
		9.23	12.3	134.1	226.0	2.2	0.2	12.91	12:50		

	8/27/2018	0.13	26.7	45.8	248.1	90.0	7.2	8.73	13:43	32	
		1.05	26.6	46.1	248.1	89.3	7.2	8.72	13:42		
		1.96	26.5	45.0	247.8	87.6	7.0	8.68	13:41		
		3.02	26.4	42.6	247.2	85.2	6.9	8.63	13:41		
		3.97	26.2	36.6	246.1	82.1	6.6	8.57	13:40		
		4.43	26.1	29.4	245.4	78.4	6.4	8.34	13:39		
		5.00	25.8	27.2	243.8	67.3	5.5	7.68	13:38		
		6.06	16.4	-93.4	236.6	2.5	0.2	7.36	13:38		
		7.27	14.4	-92.1	236.0	3.4	0.4	7.56	13:37		
		8.99	12.1	-112.0	240.8	6.0	0.6	7.86	13:36		
MTL-77	3/8/2018	0.02	4.7	129.3	219.0	92.0	11.8	7.7	12:16	10	41
		1.12	4.7	137.1	219.2	91.0	11.7	7.54	12:17		
		2.09	4.7	149.3	219.2	90.7	11.7	7.3	12:18		
		3.06	4.7	153.9	219.1	90.5	11.6	7.21	12:18		
		4.02	4.6	154.9	219.0	90.3	11.7	7.19	12:19		
		4.99	4.6	151.6	218.9	90.2	11.7	7.24	12:20		
		6.05	4.4	149.9	218.8	90.0	11.7	7.27	12:21		
		7.00	4.4	148.7	218.7	90.2	11.7	7.29	12:21		
		8.15	4.4	147.2	218.7	89.9	11.7	7.31	12:22		
	5/8/2018	0.03	19.2	238.7	206.1	101.0	9.3	7.14	12:40	10	34
		1.14	19.1	241.7	206.0	100.9	9.3	7.1	12:40		
		2.02	18.9	242.5	205.5	100.3	9.3	7.1	12:40		
		2.98	18.4	243.9	205.8	98.8	9.3	7.09	12:41		
		3.83	16.9	245.9	209.9	94.4	9.2	7.07	12:41		
		4.25	15.7	247.2	211.3	90.5	9.0	7.04	12:41		
		5.20	13.8	249.3	213.9	82.8	8.5	6.97	12:42		
		6.63	12.8	253.3	212.3	78.8	8.3	6.87	12:43		
		7.34	11.4	256.5	213.4	71.5	7.8	6.81	12:43		
		8.49	10.1	264.1	207.9	58.6	6.6	6.6	12:43		
		8.53	10.1	259.7	208.1	62.1	7.0	6.74	12:43		
		10.01	9.8	265.4	206.6	57.8	6.6	6.56	12:44		
		11.63	9.1	108.8	205.9	57.7	6.7	6.8	12:45		
		12.29	9.5	122.2	221.3	64.6	7.4	7.02	12:44		
	7/18/2018	-0.03	29.3	479.7	234.4	90.8	6.9	5.23	12:18	72	35
		1.02	29.3	488.2	234.4	90.8	6.9	5	12:19		

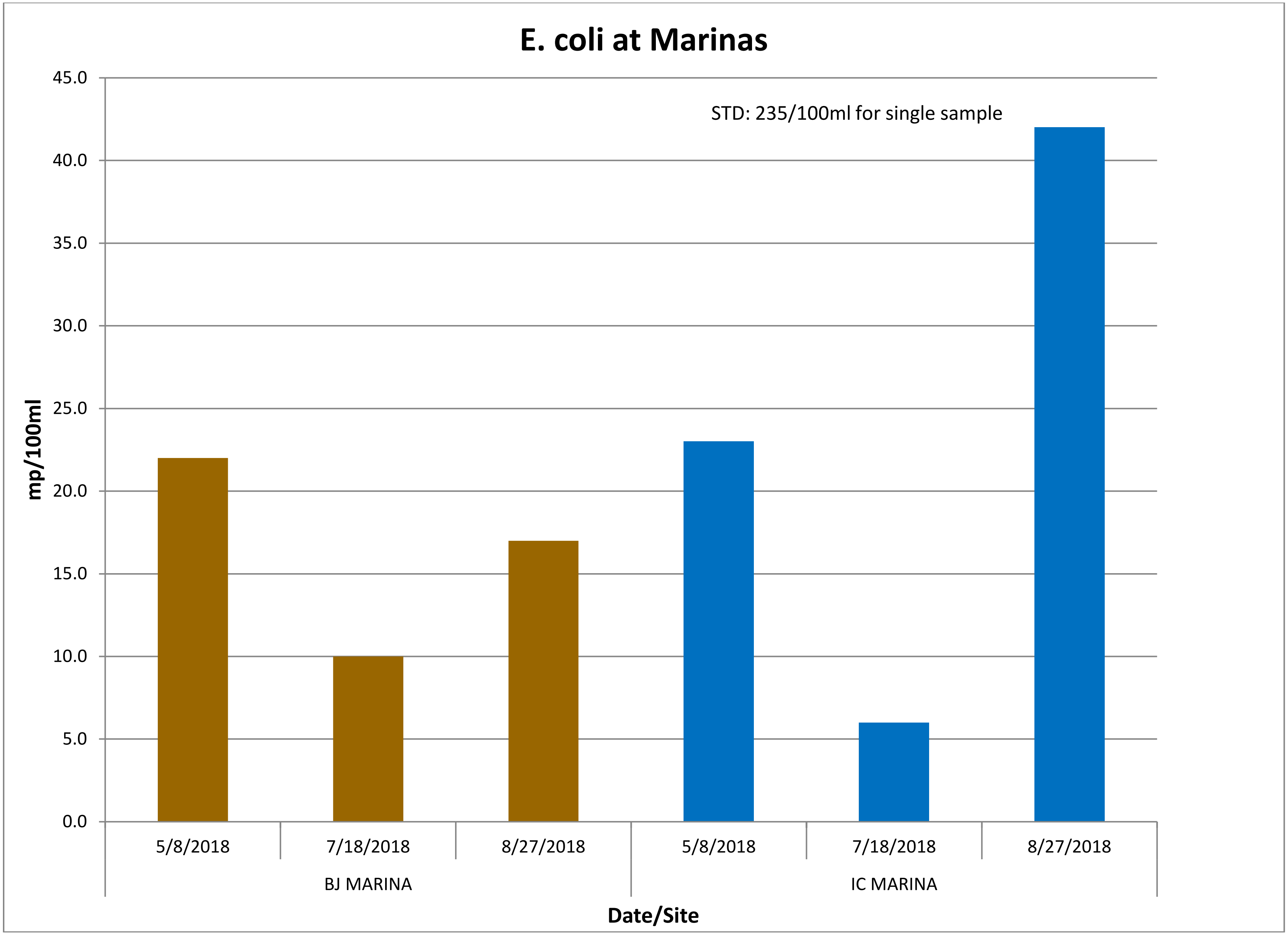
		1.88	29.3	484.2	234.3	90.6	6.9	4.74	12:20		
		3.14	29.2	481.5	234.2	89.9	6.9	4.71	12:20		
		4.09	29.2	478.7	234.1	89.3	6.8	4.7	12:20		
		5.08	29.0	477.0	234.6	81.6	6.3	4.58	12:21		
		6.03	19.2	339.9	235.3	9.4	0.9	8.36	12:21		
		7.00	15.8	281.8	229.5	4.2	0.4	3.88	12:22		
		8.19	13.2	251.9	227.0	3.0	0.3	7.1	12:22		
		9.09	12.1	212.2	225.2	10.4	1.1	13.98	12:24		
	8/27/2018	0.01	26.2	44.7	238.5	84.6	6.8	8.69	13:20	36	
		0.87	26.1	43.9	238.4	83.6	6.8	8.65	13:19		
		1.08	26.1	44.9	238.4	83.8	6.8	8.67	13:20		
		1.90	25.9	41.9	238.1	80.6	6.5	8.53	13:19		
		3.02	25.7	39.6	237.6	75.1	6.1	8.24	13:18		
		3.42	25.6	43.3	237.3	69.4	5.7	7.86	13:18		
		4.91	23.9	32.5	235.9	36.3	3.1	7.36	13:17		
		5.57	22.8	2.5	237.9	14.6	1.3	7.32	13:17		
		6.12	19.6	-75.7	246.3	3.8	0.4	7.34	13:16		
		7.17	15.5	-95.2	242.8	6.0	0.6	7.49	13:16		
		7.41	13.4	-83.3	238.4	10.0	1.0	7.7	13:15		

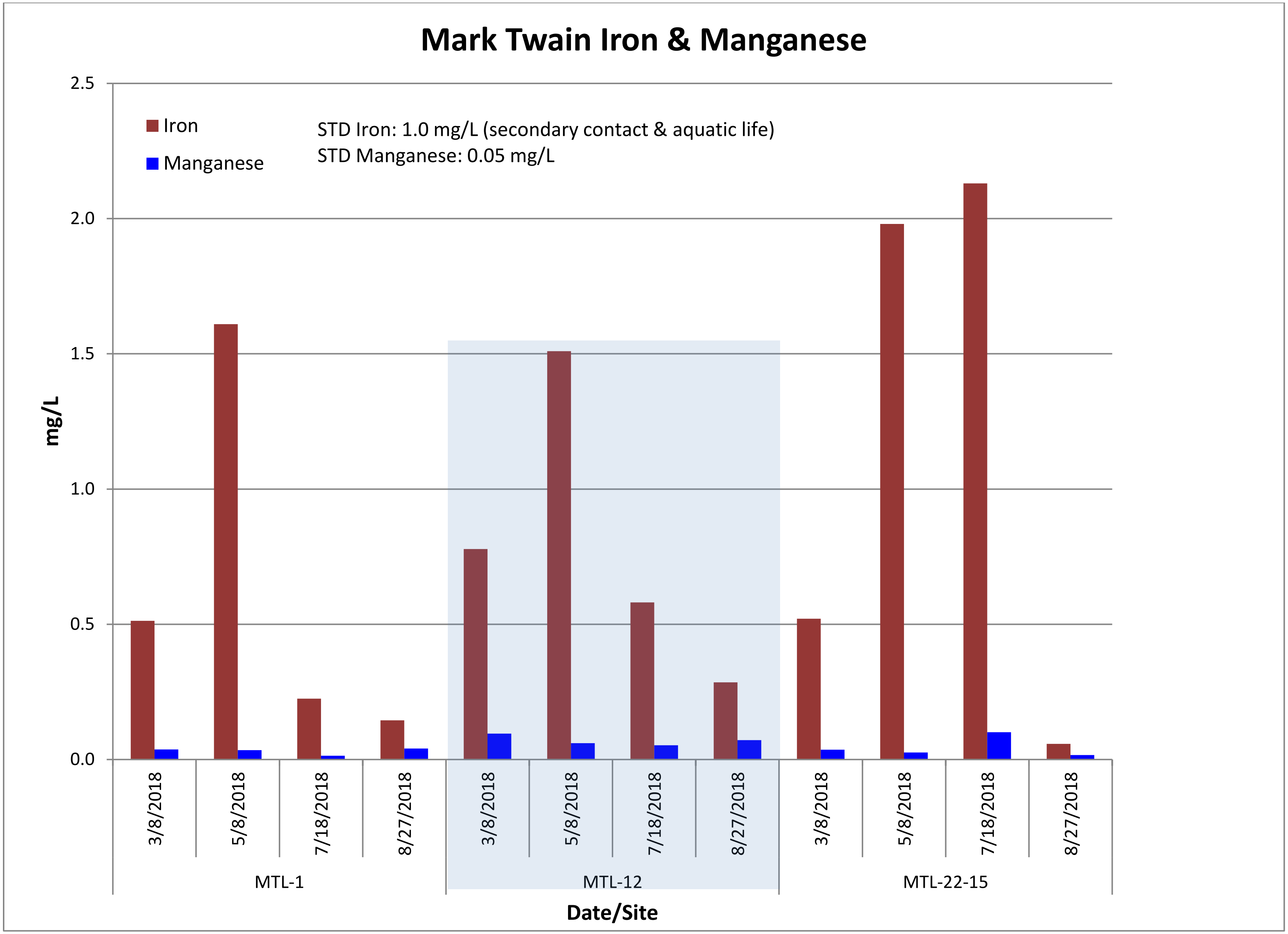
Marina E. Coli Data

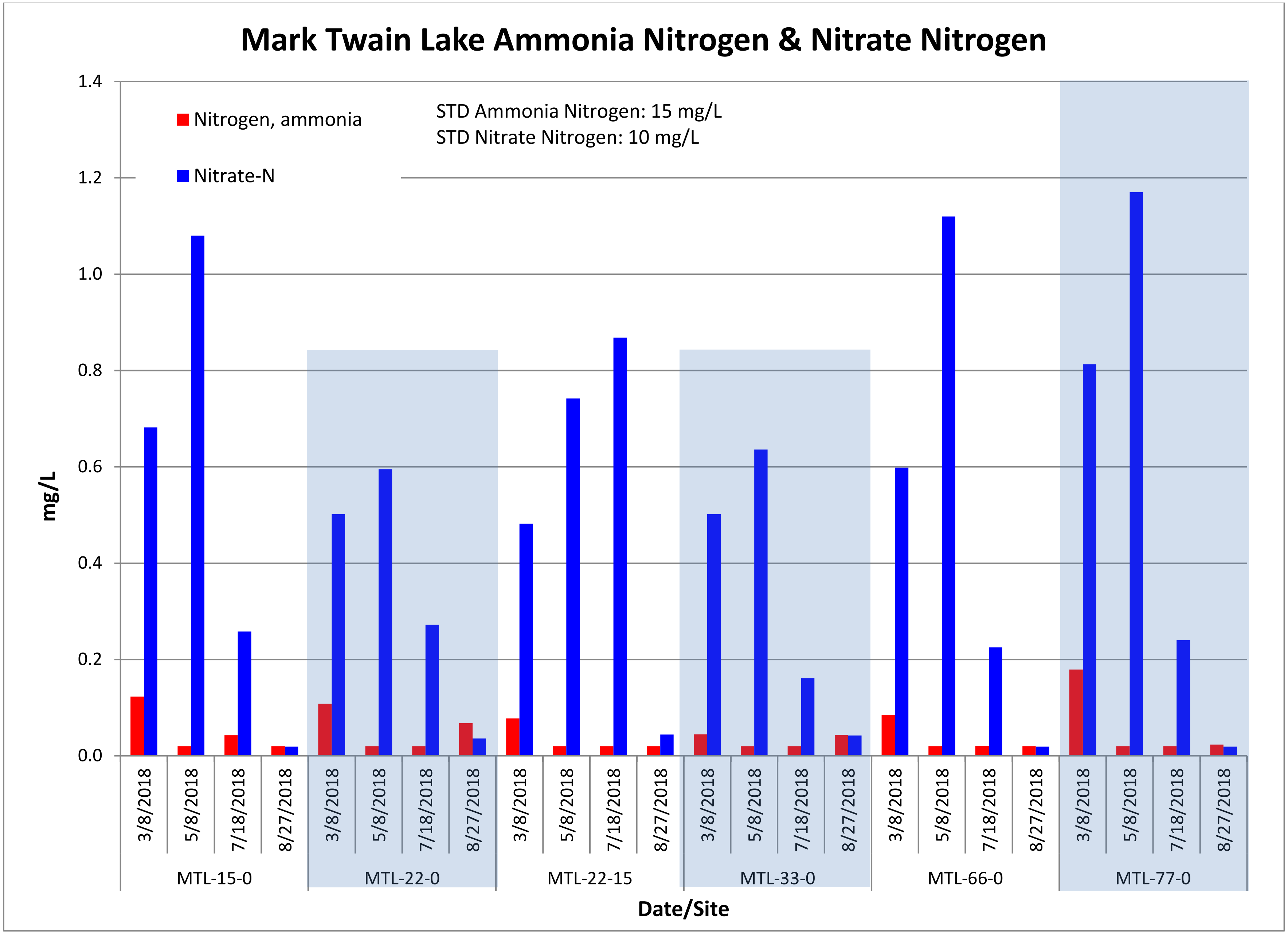
Site	Date Collected	Result	Qualifier	Unit
BJ MARINA	5/8/2018	22.0		COL/100 ML
BJ MARINA	7/18/2018	10.0		COL/100 ML
BJ MARINA	8/27/2018	17.0		COL/100 ML
IC MARINA	5/8/2018	23.0		COL/100 ML
IC MARINA	7/18/2018	6.00		COL/100 ML
IC MARINA	8/27/2018	42.0		COL/100 ML

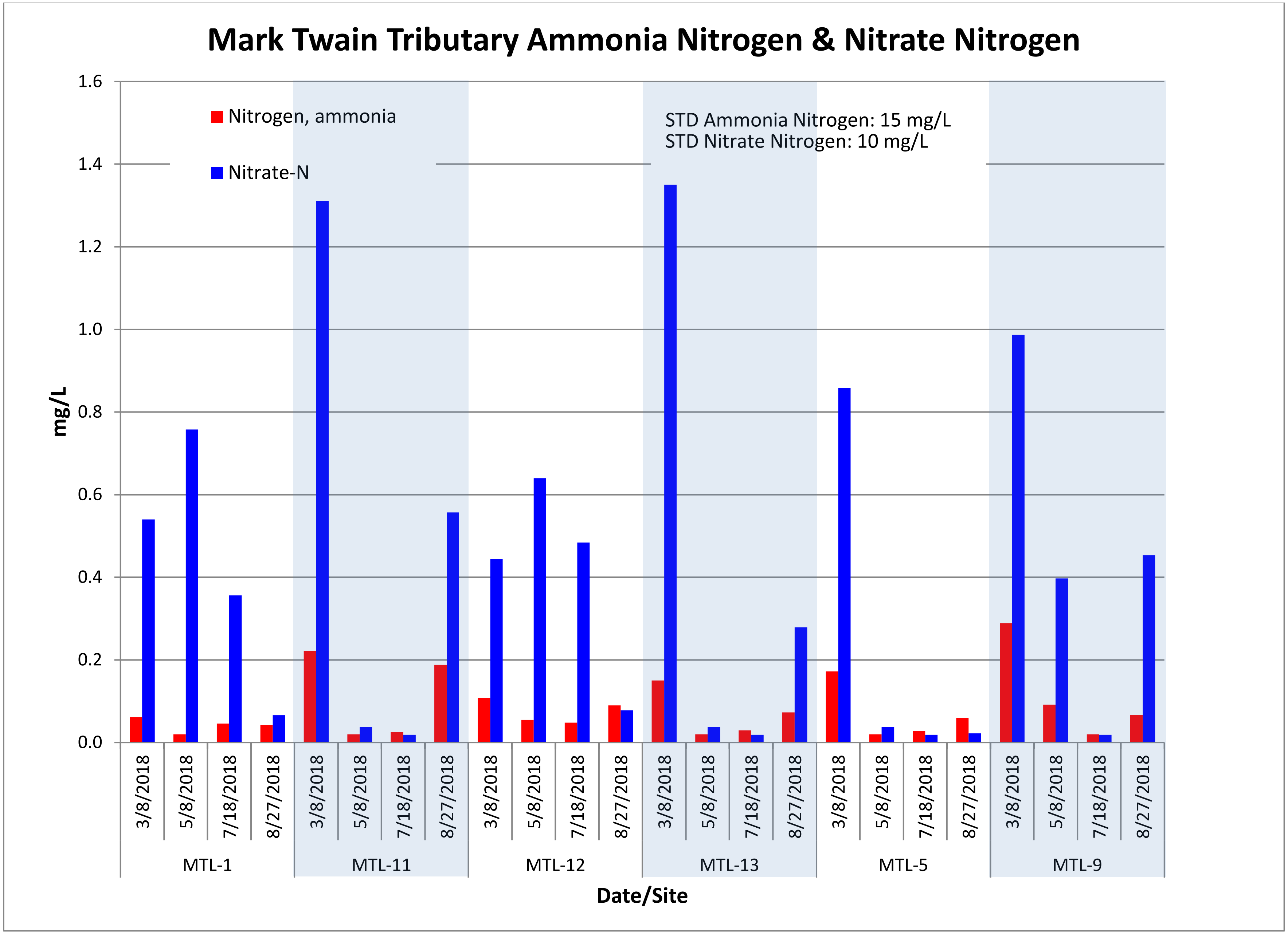
APPENDIX B

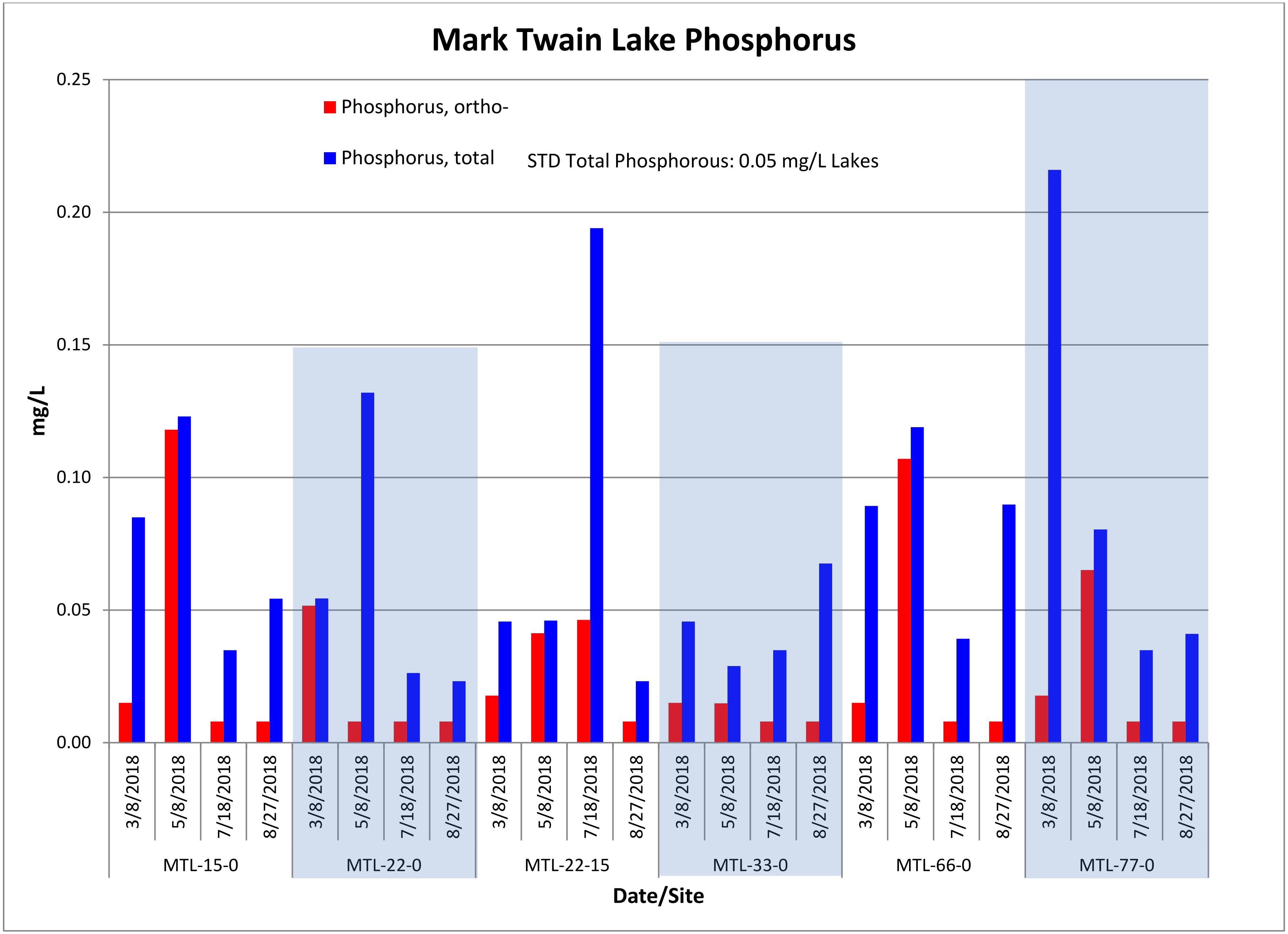
LAB DATA
GRAPHS


E. coli at Marinas
STD: 235/100ml for single sample
mp/100ml
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
5/8/2018
7/18/2018
8/27/2018
5/8/2018
7/18/2018
8/27/2018
BJ MARINA
IC MARINA
Date/Site

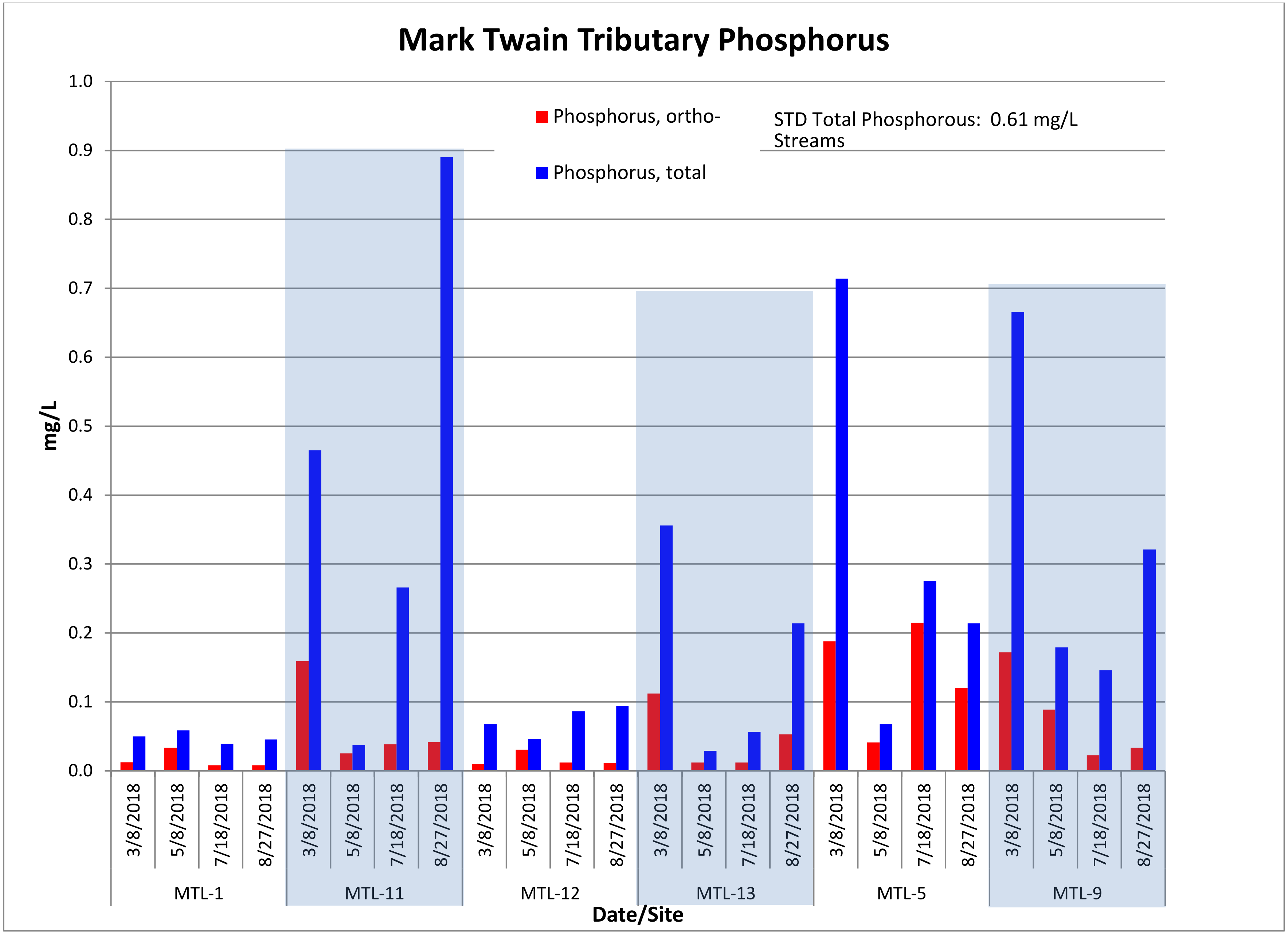

Mark Twain Iron & Manganese
Iron
Manganese
STD Iron: 1.0 mg/L (secondary contact & aquatic life)
STD Manganese: 0.05 mg/L
mg/L
2.5
2.0
1.5
1.0
0.5
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
3/8/2018
5/8/2018
7/18/2018
8/27/2018
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-12
MTL-22-15
Date/Site

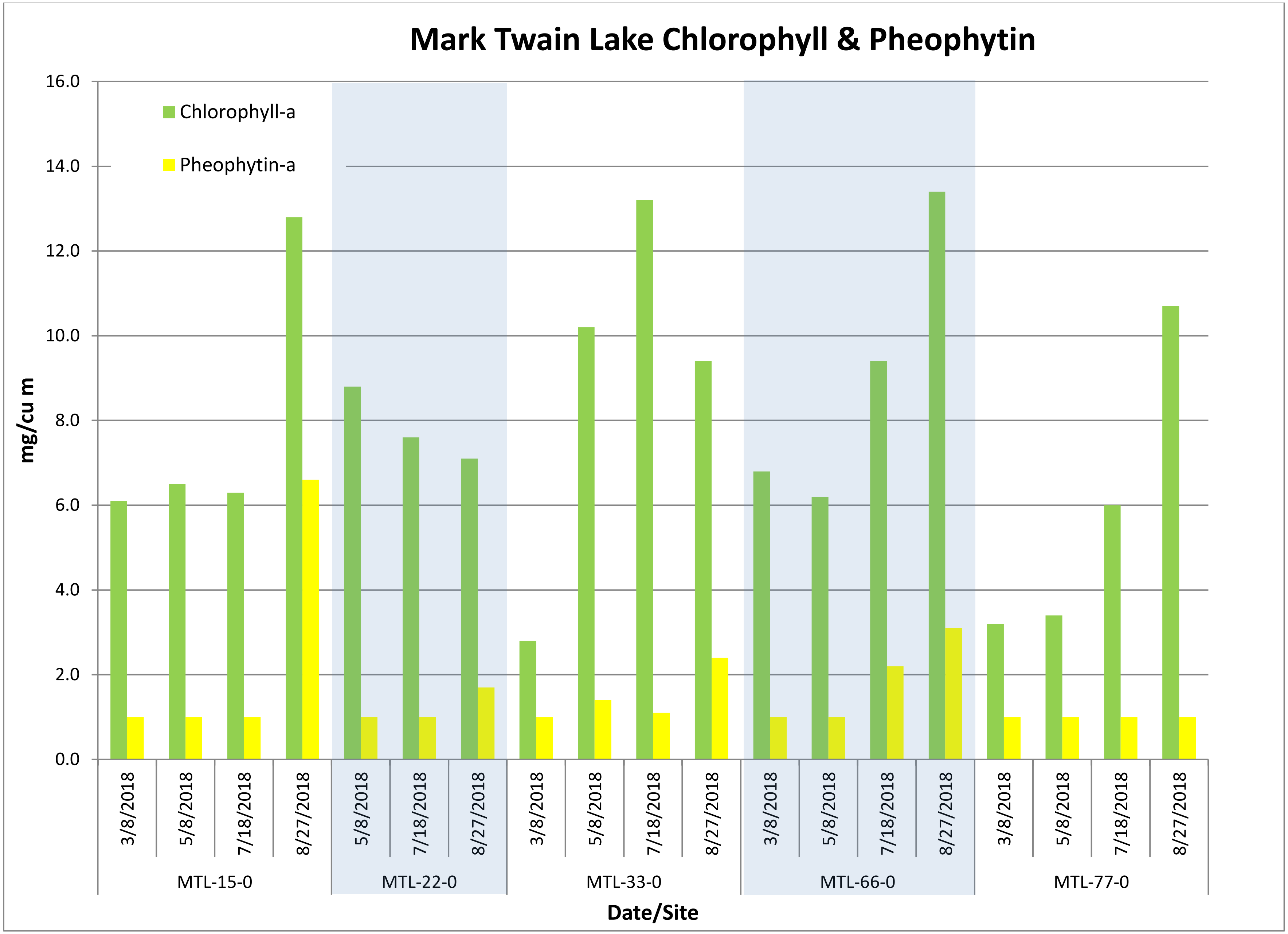

Mark Twain Lake Ammonia Nitrogen & Nitrate Nitrogen
Nitrogen, ammonia
Nitrate-N
STD Ammonia Nitrogen: 15 mg/L
STD Nitrate Nitrogen: 10 mg/L
mg/L
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-22-15
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site

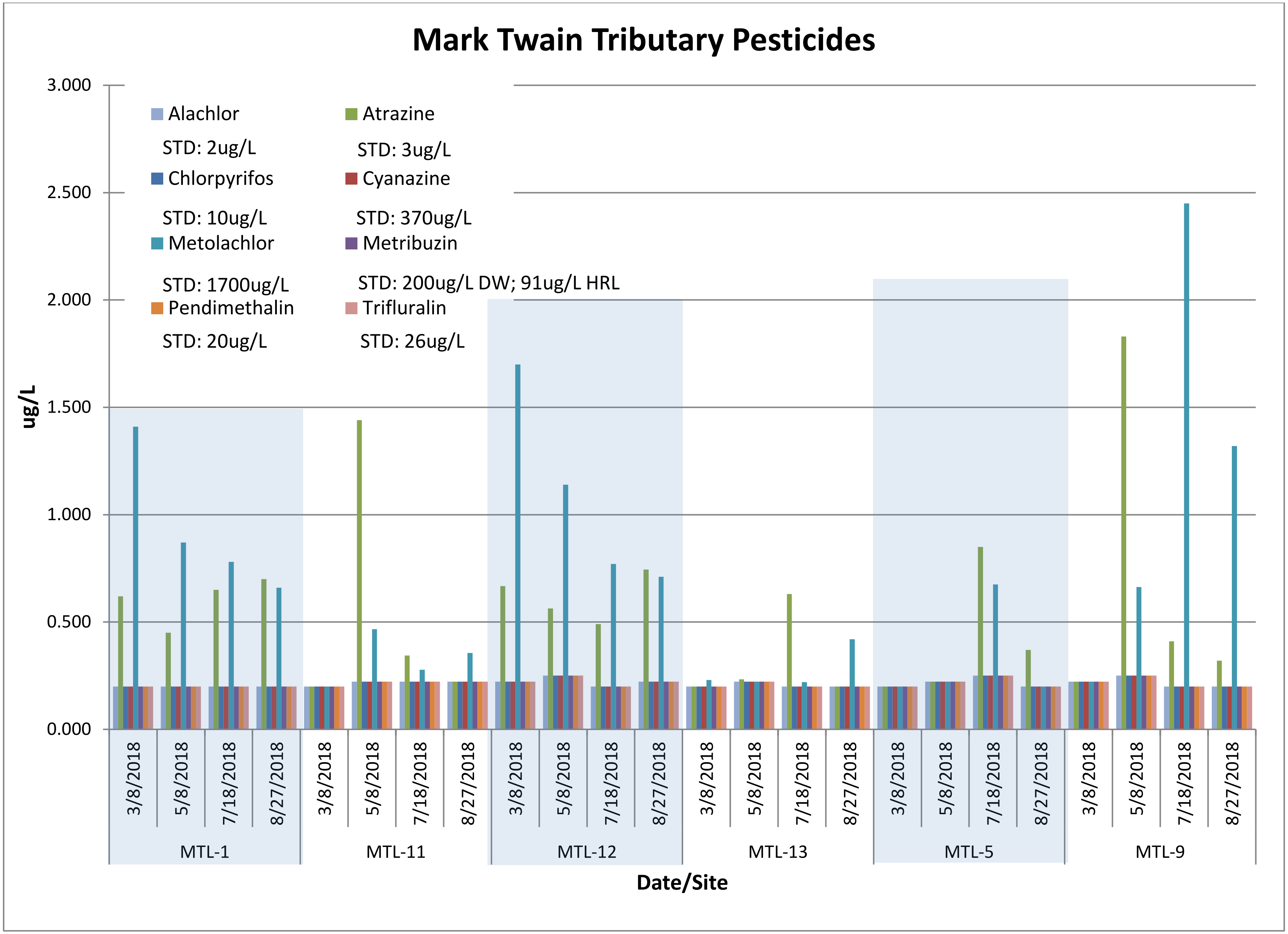

Mark Twain Tributary Ammonia Nitrogen & Nitrate Nitrogen
Nitrogen, ammonia
Nitrate-N
STD Ammonia Nitrogen: 15 mg/L
STD Nitrate Nitrogen: 10 mg/L
mg/L
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-11
MTL-12
MTL-13
MTL-5
MTL-9
Date/Site

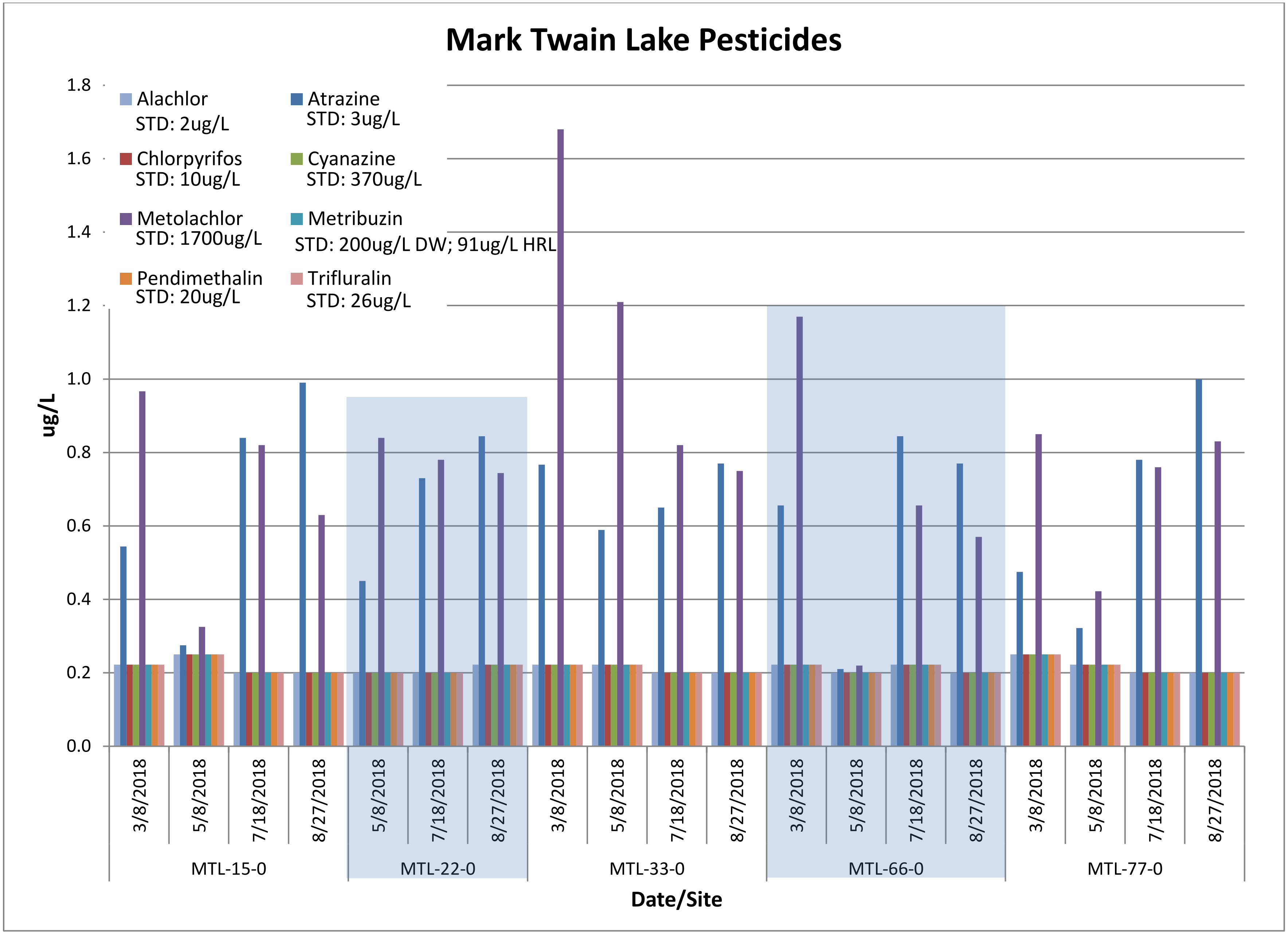


Mark Twain Lake Phosphorus
0.25
0.20
0.15
0.10
0.05
0.00
mg/L
Phosphorus, ortho-
Phosphorus, total
STD Total Phosphorous: 0.05 mg/L Lakes
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-22-15
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site

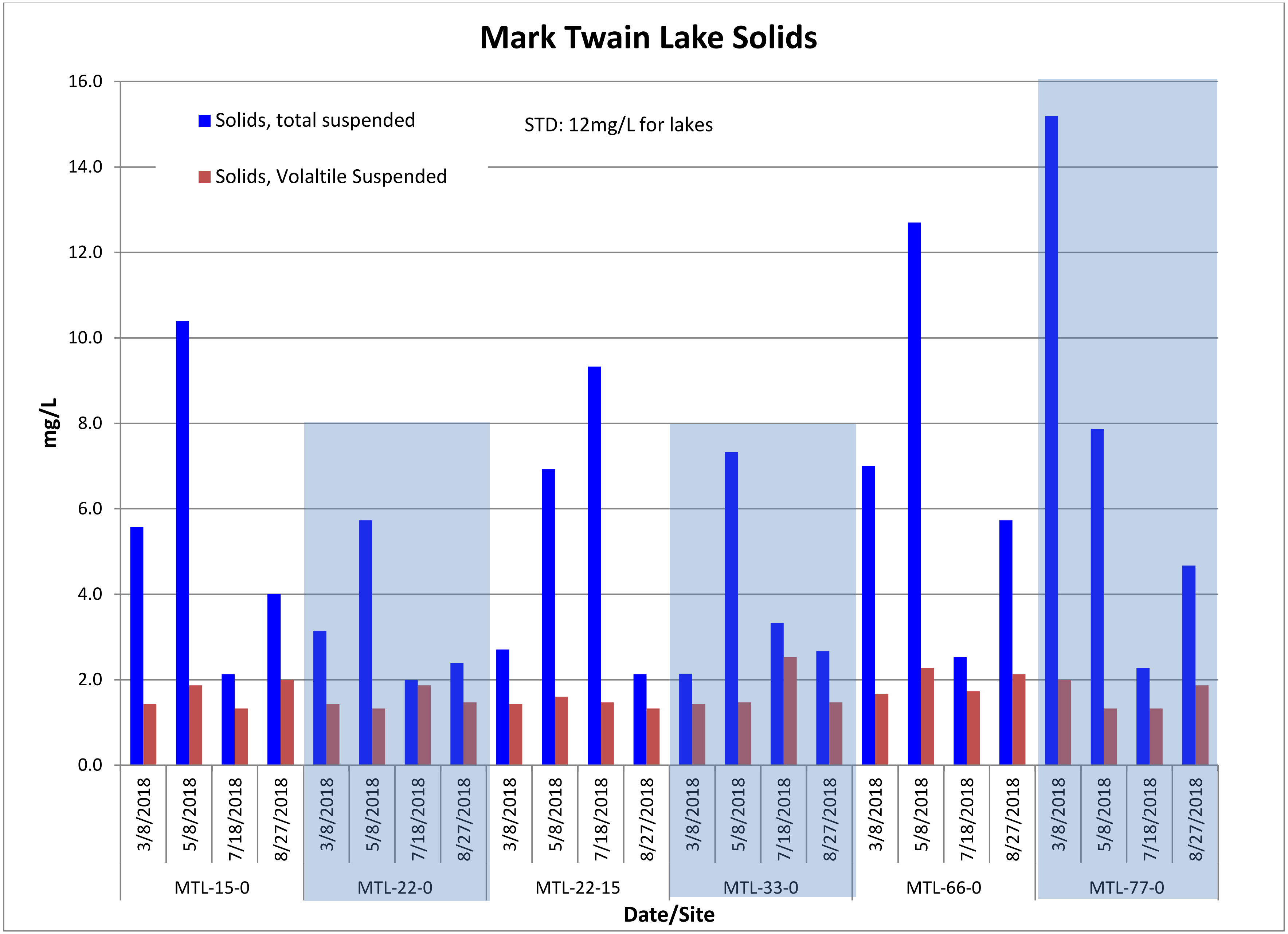

Mark Twain Tributary Phosphorus
Phosphorus, ortho-
Phosphorus, total
STD Total Phosphorous: 0.61 mg/L Streams
mg/L
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-11
MTL-12
MTL-13
MTL-5
MTL-9
Date/Site

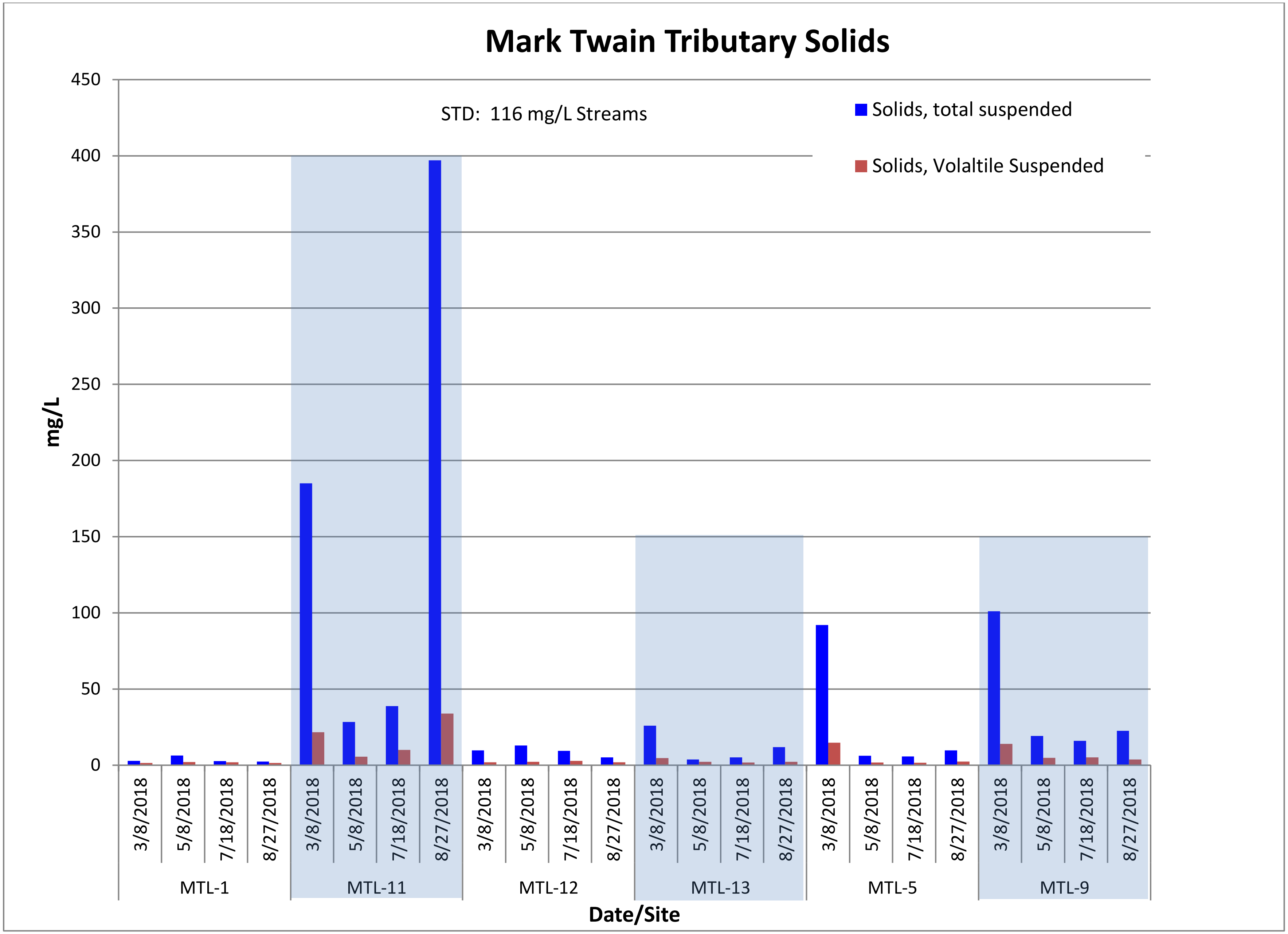

Mark Twain Lake Chlorophyll & Pheophytin
Chlorophyll-a
Pheophytin-a
mg/cu m
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site

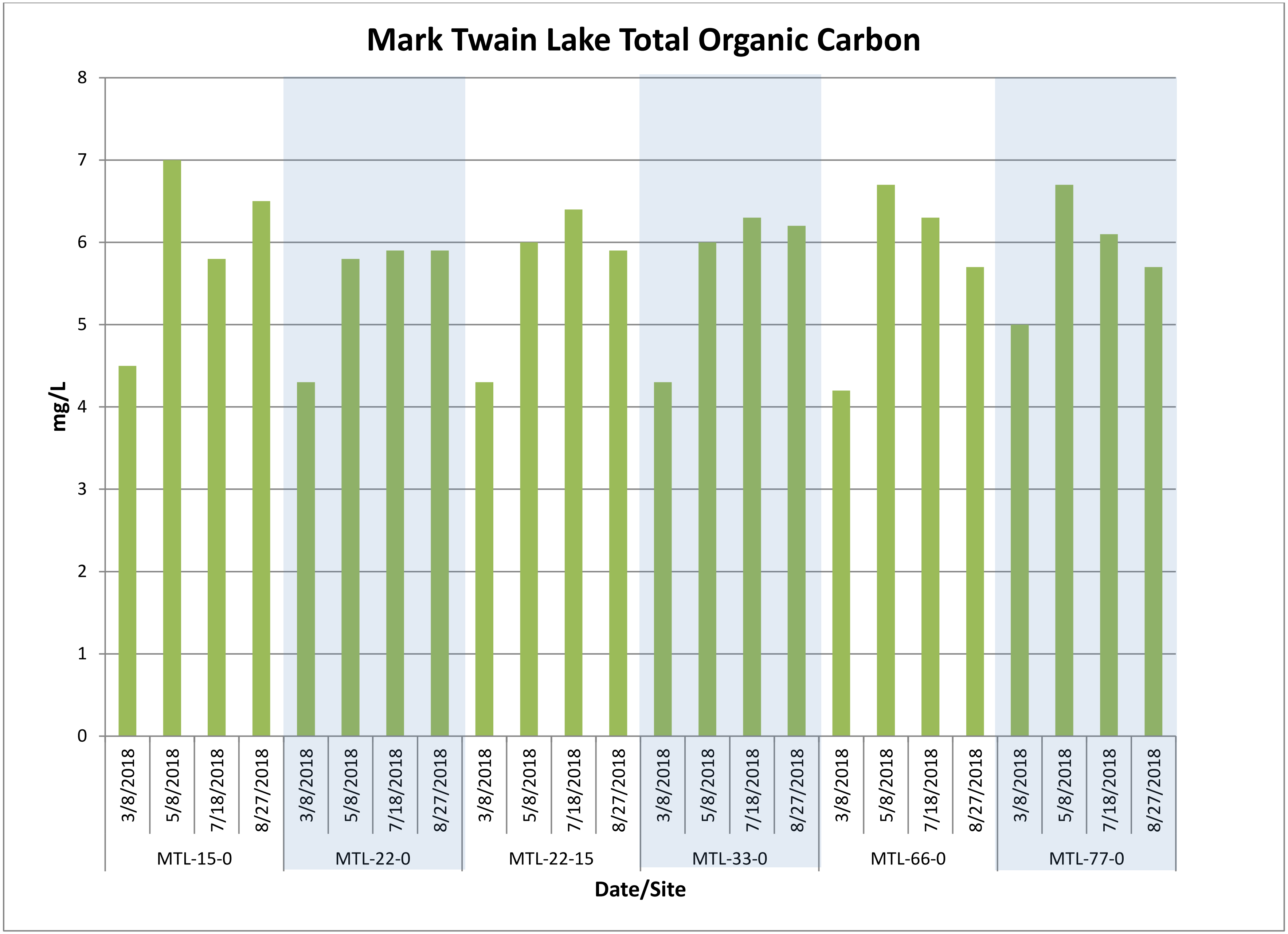

Mark Twain Tributary Pesticides
3.000
2.500
2.000
1.500
1.000
0.500
0.000
ug/L
Alachlor
STD: 2ug/L
Atrazine
STD: 3ug/L
Chlorpyrifos
STD: 10ug/L
Cyanazine
STD: 370ug/L
Metolachlor
STD: 1700ug/L
Metribuzin
STD: 200ug/L DW; 91ug/L HRL
Pendimethalin
STD: 20ug/L
Trifluralin
STD: 26ug/L
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-11
MTL-12
MTL-13
MTL-5
MTL-9
Date/Site



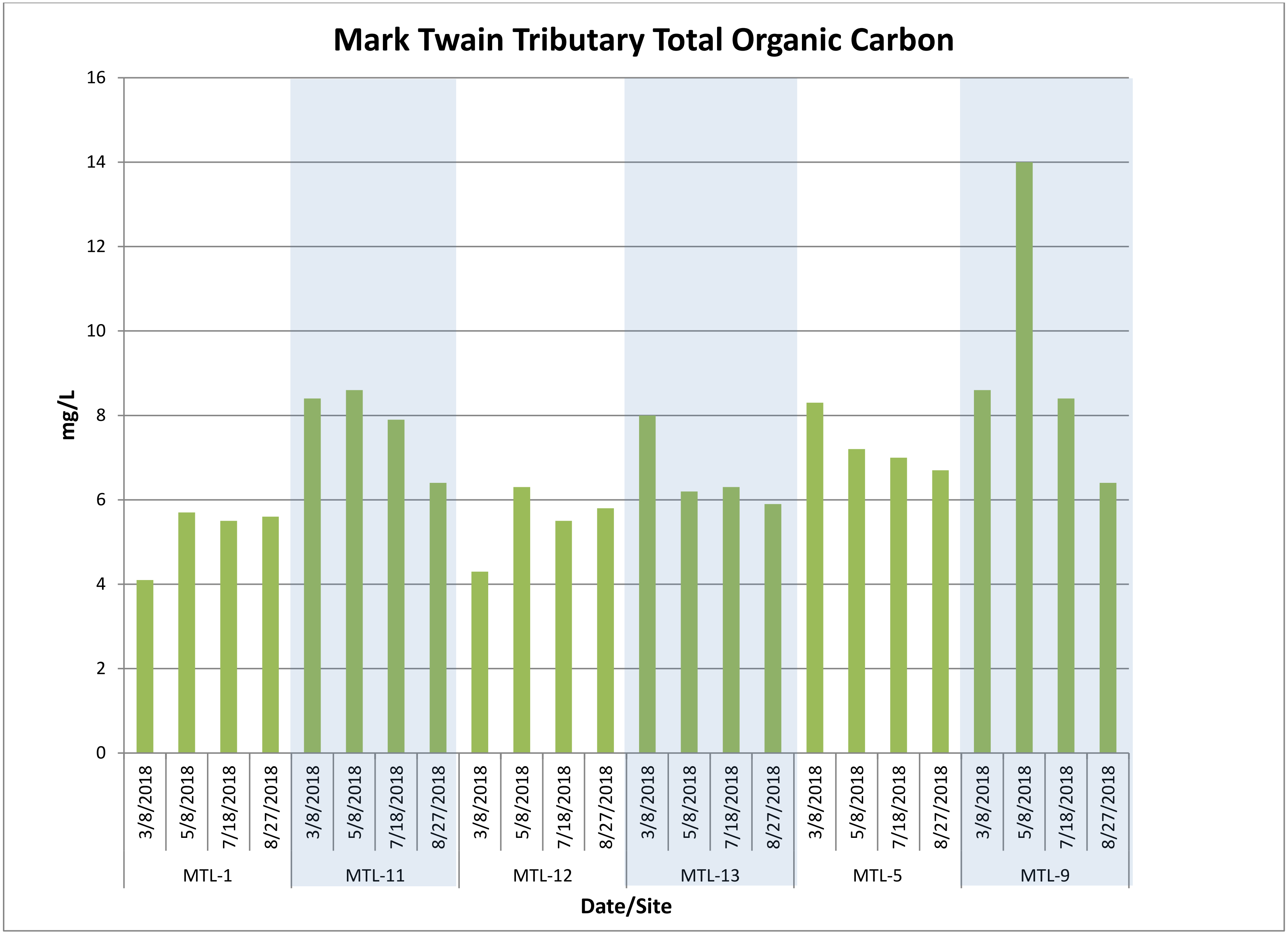
Mark Twain Lake Pesticides
Alachlor STD: 2ug/L
Atrazine STD: 3ug/L
Chlorpyrifos STD: 10ug/L
Cyanazine STD: 370ug/L
Metolachlor STD: 1700ug/L
Metribuzin STD: 200ug/L DW; 91ug/L HRL
Pendimethalin STD: 20ug/L
Trifluralin STD: 26ug/L
ug/L
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site


Mark Twain Lake Solids
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
mg/L
Solids, total suspended
Solids, Volaltile Suspended
STD: 12mg/L for lakes
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-22-15
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site


Mark Twain Tributary Solids
STD: 116 mg/L Streams
Solids, total suspended
Solids, Volaltile Suspended
mg/L
450
400
350
300
250
200
150
100
50
0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-11
MTL-12
MTL-13
MTL-5
MTL-9
Date/Site

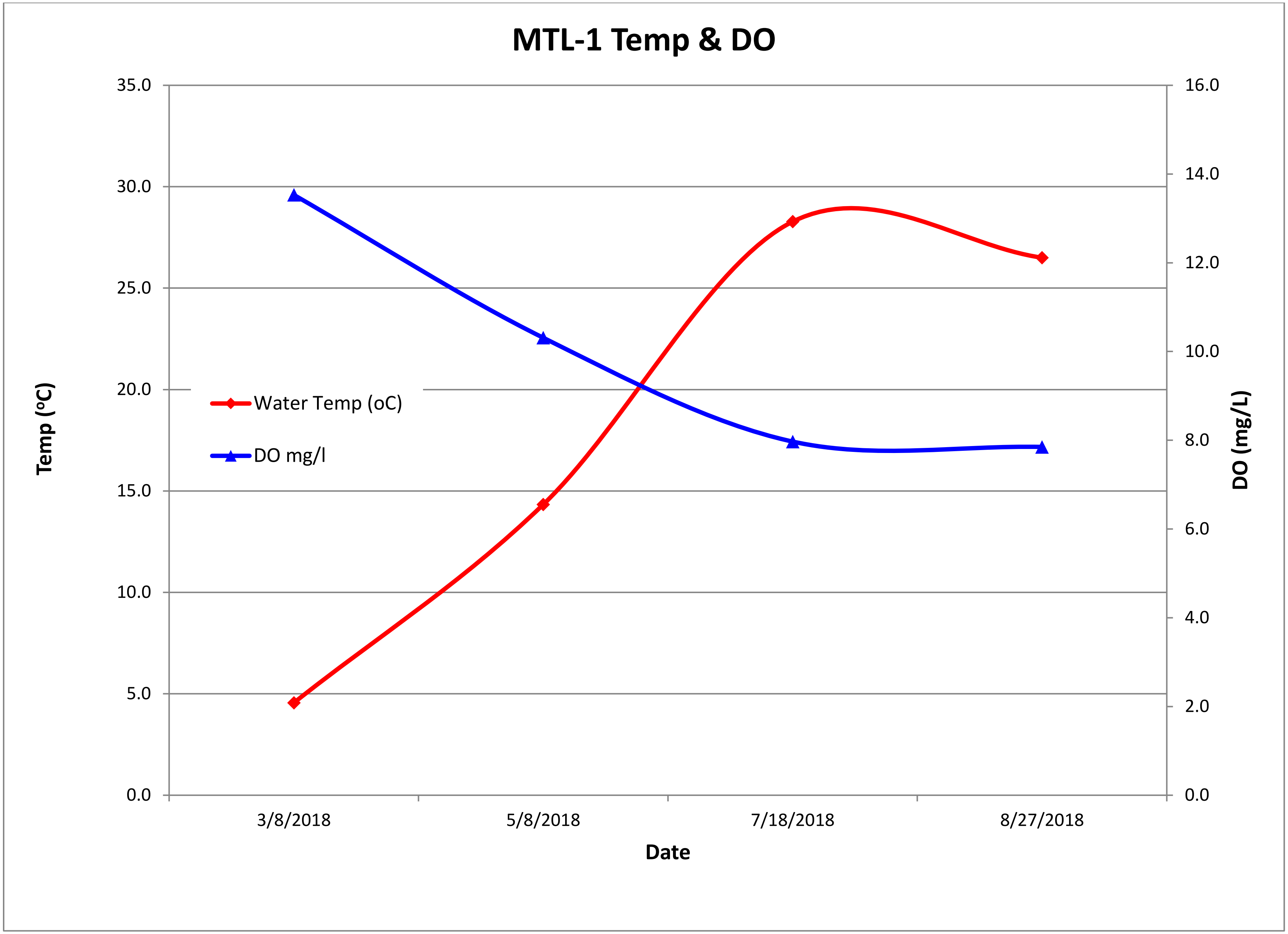


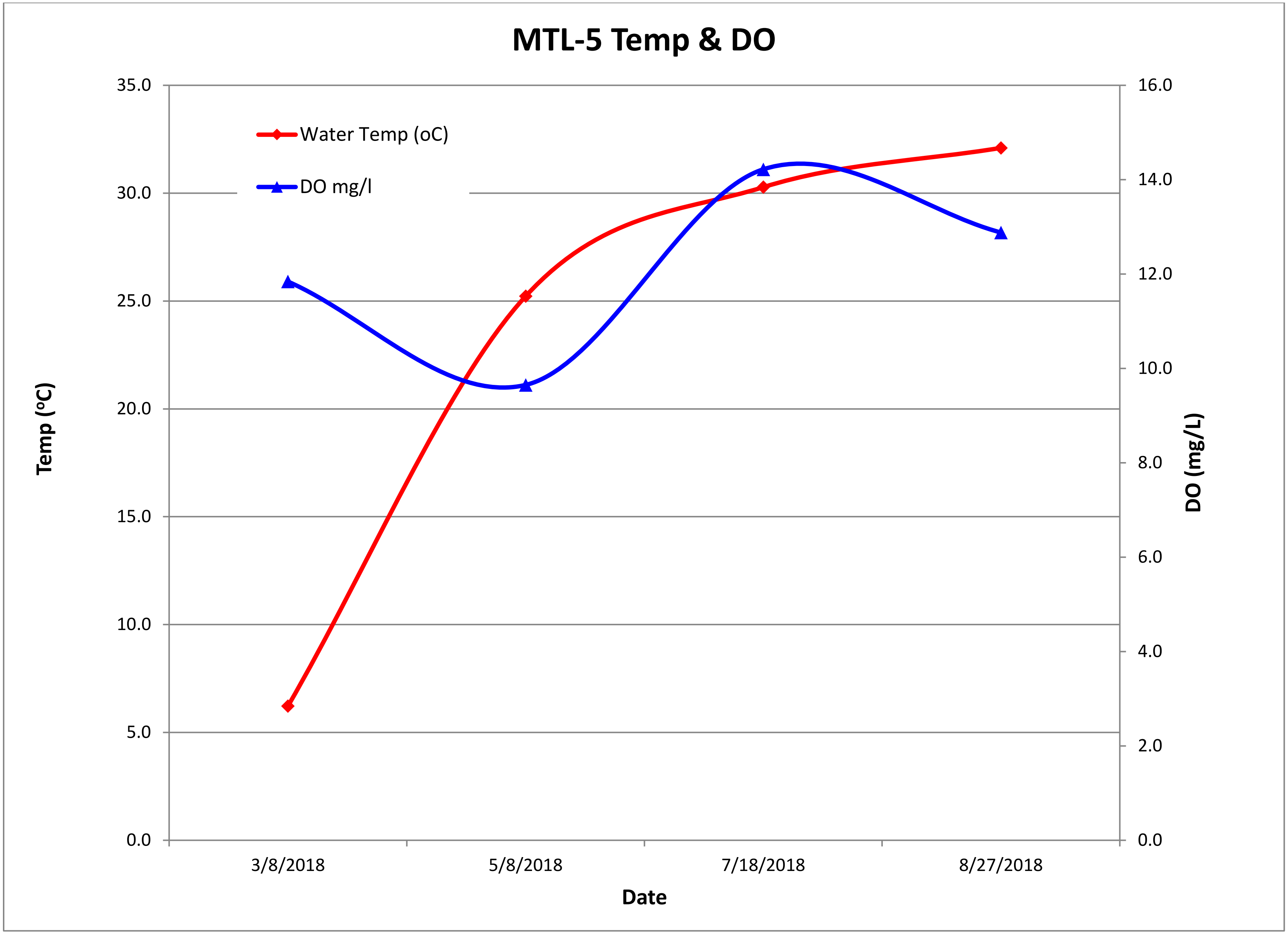
Mark Twain Lake Total Organic Carbon
mg/L
0
1
2
3
4
5
6
7
8
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-15-0
MTL-22-0
MTL-22-15
MTL-33-0
MTL-66-0
MTL-77-0
Date/Site


Mark Twain Tributary Total Organic Carbon
mg/L
16
14
12
10
8
6
4
2
0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-11
MTL-12
MTL-13
MTL-5
MTL-9
Date/Site

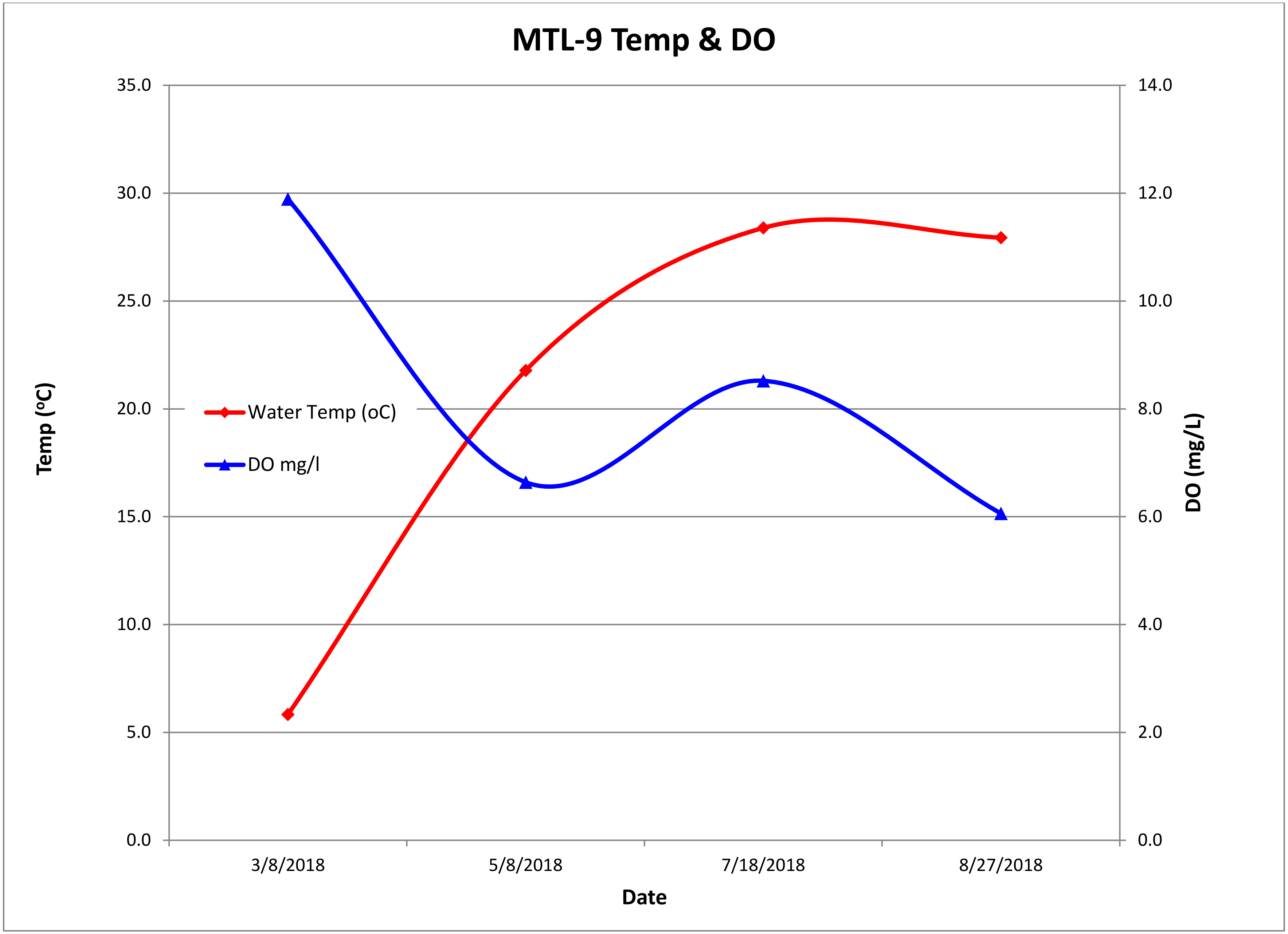
APPENDIX C

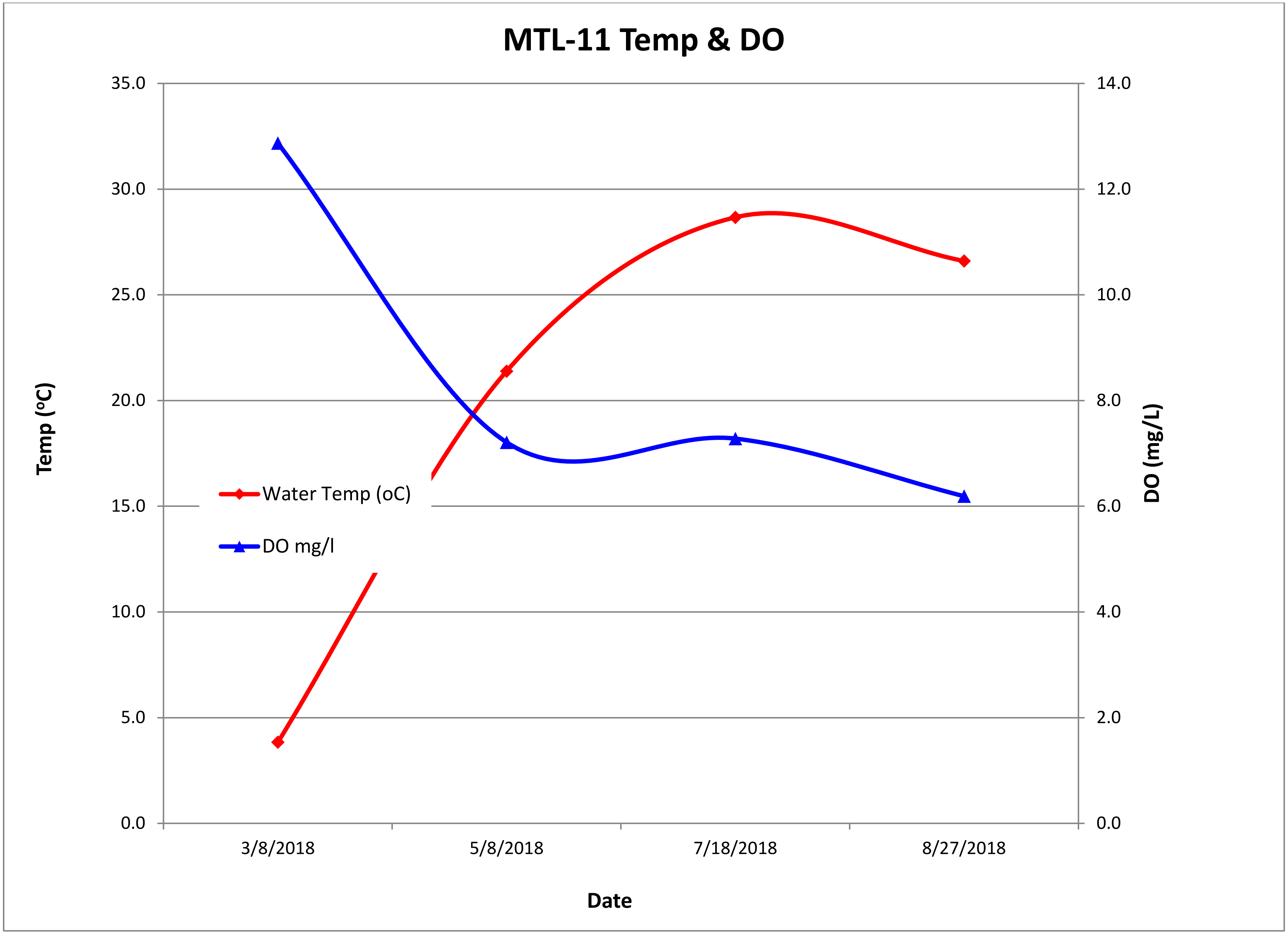
FIELD DATA GRAPHS

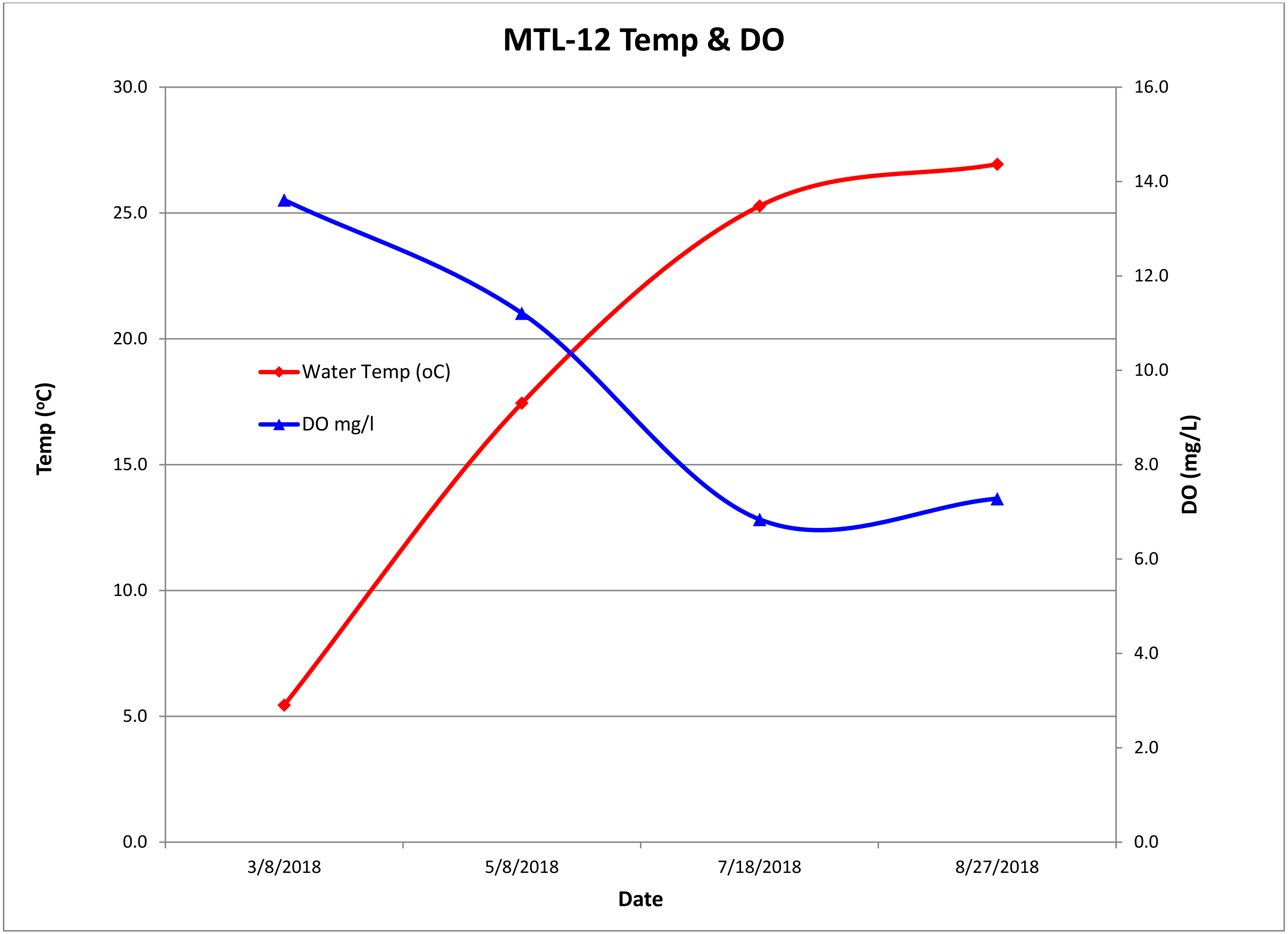

MTL-1 Temp & DO
Temp (oC)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
DO (mg/L)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Water Temp (oC)
DO mg/l
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date

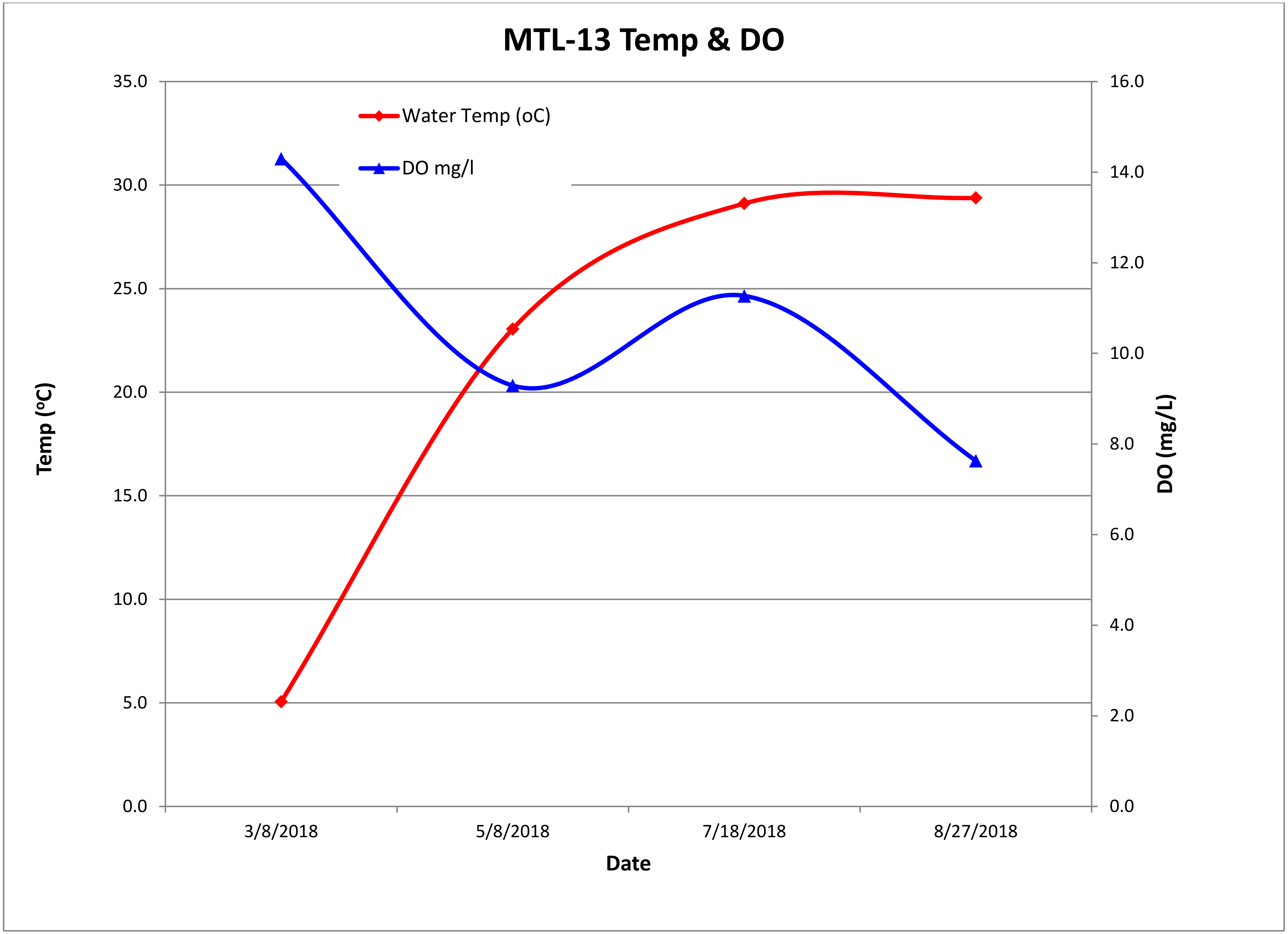


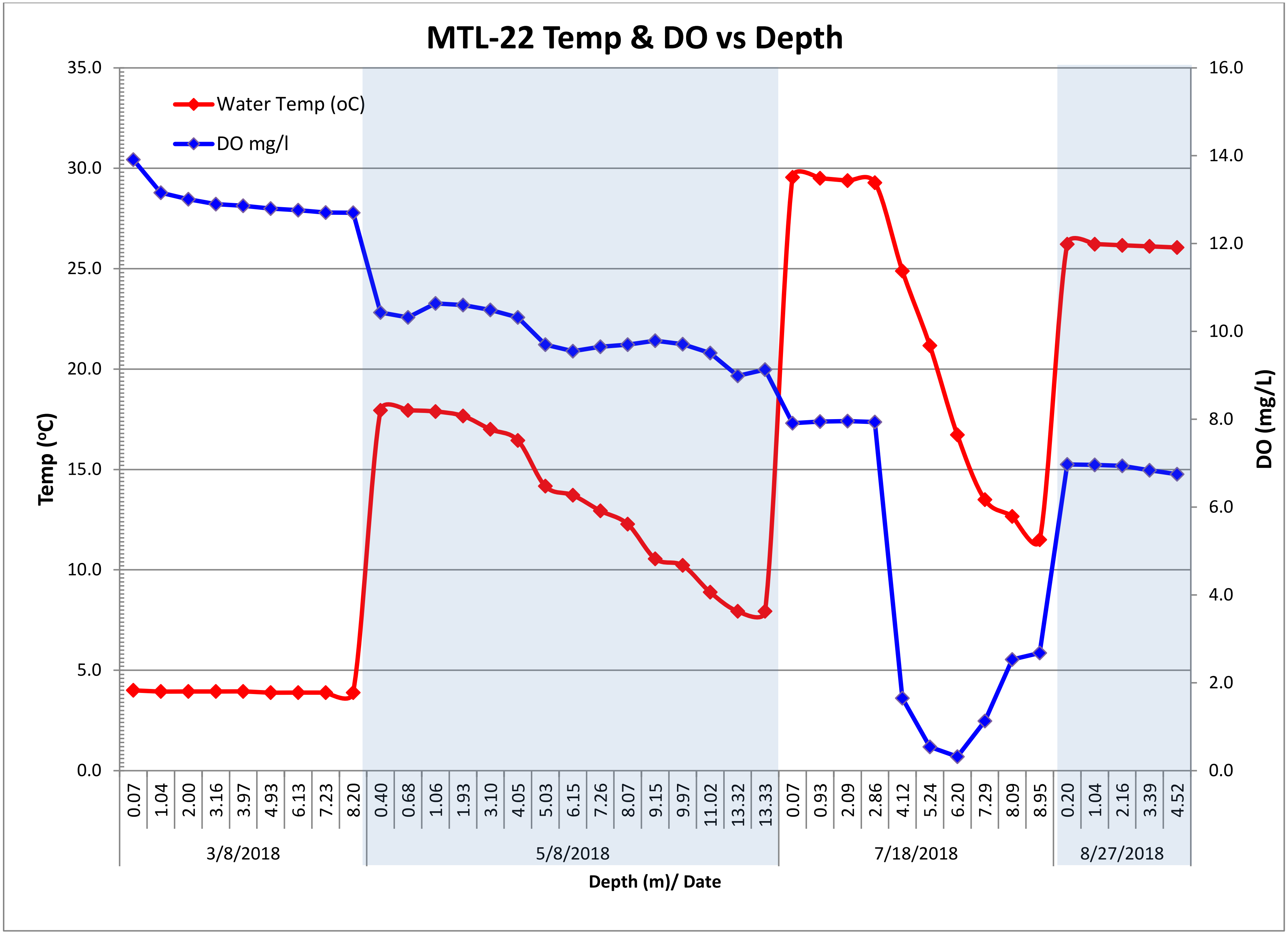
MTL-5 Temp & DO
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Temp (°C)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
DO (mg/L)
Water Temp (oC)
DO mg/l
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date


MTL-9 Temp & DO
Temp (oC)
DO (mg/L)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Water Temp (oC)
DO mg/l
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date

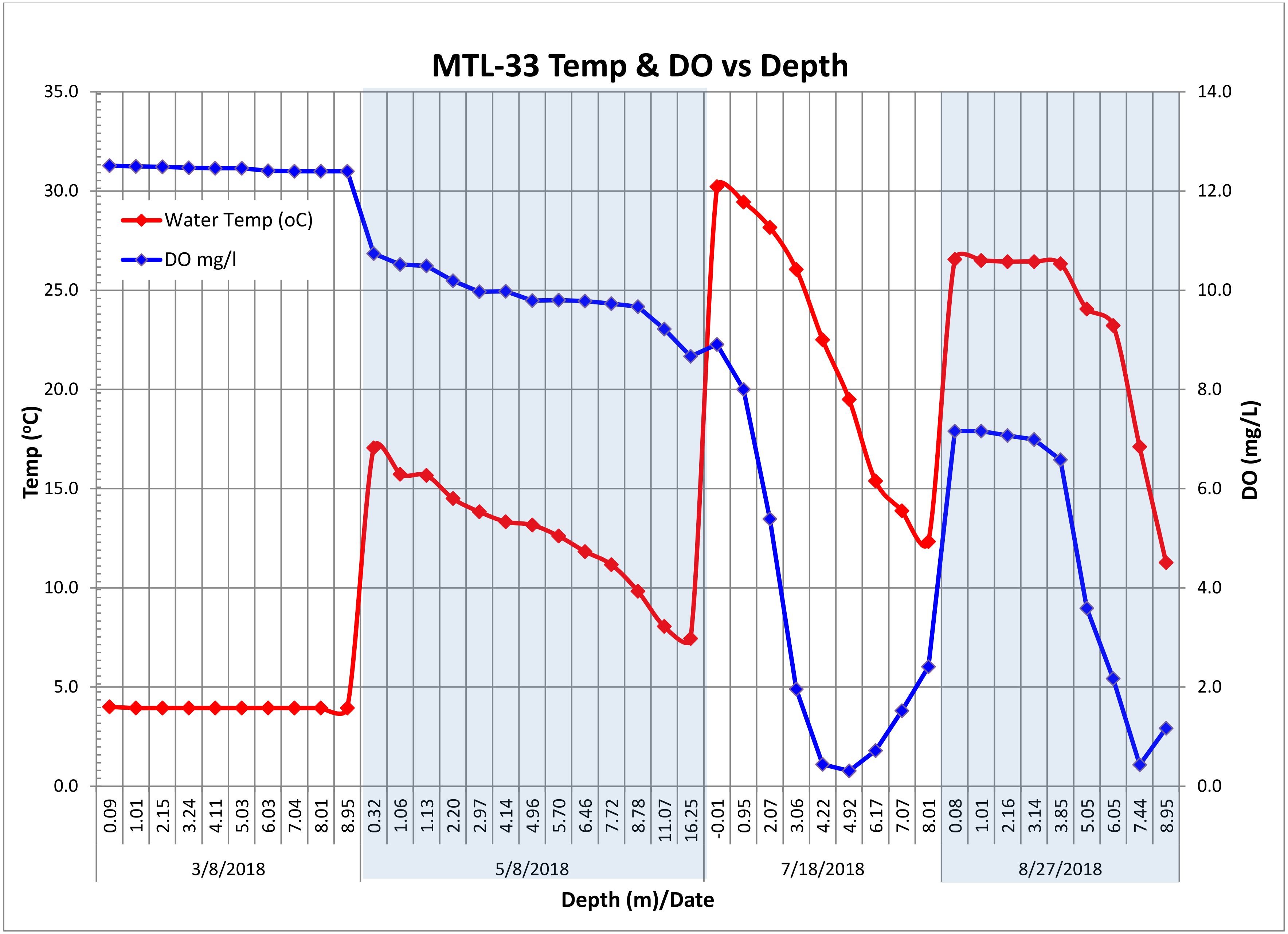

MTL-11 Temp & DO
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Temp (oC)
DO (mg/L)
Water Temp (oC)
DO mg/l
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date

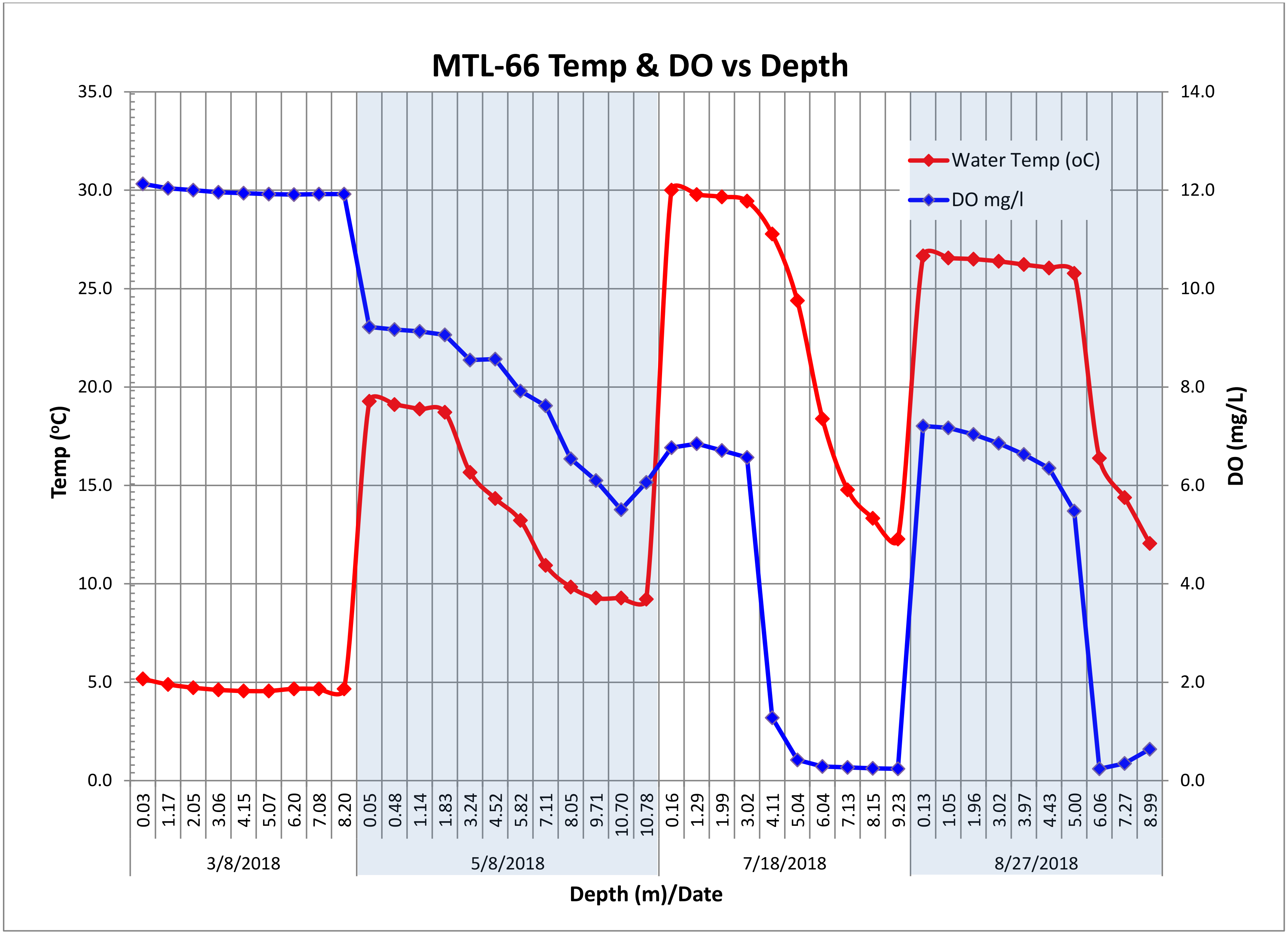

MTL-12 Temp & DO
30.0
25.0
20.0
15.0
10.0
5.0
0.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Water Temp (oC)
DO mg/l
Temp (°C)
DO (mg/L)
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date


MTL-13 Temp & DO
Water Temp (oC)
DO mg/l
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Temp (ºC)
DO (mg/L)
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Date

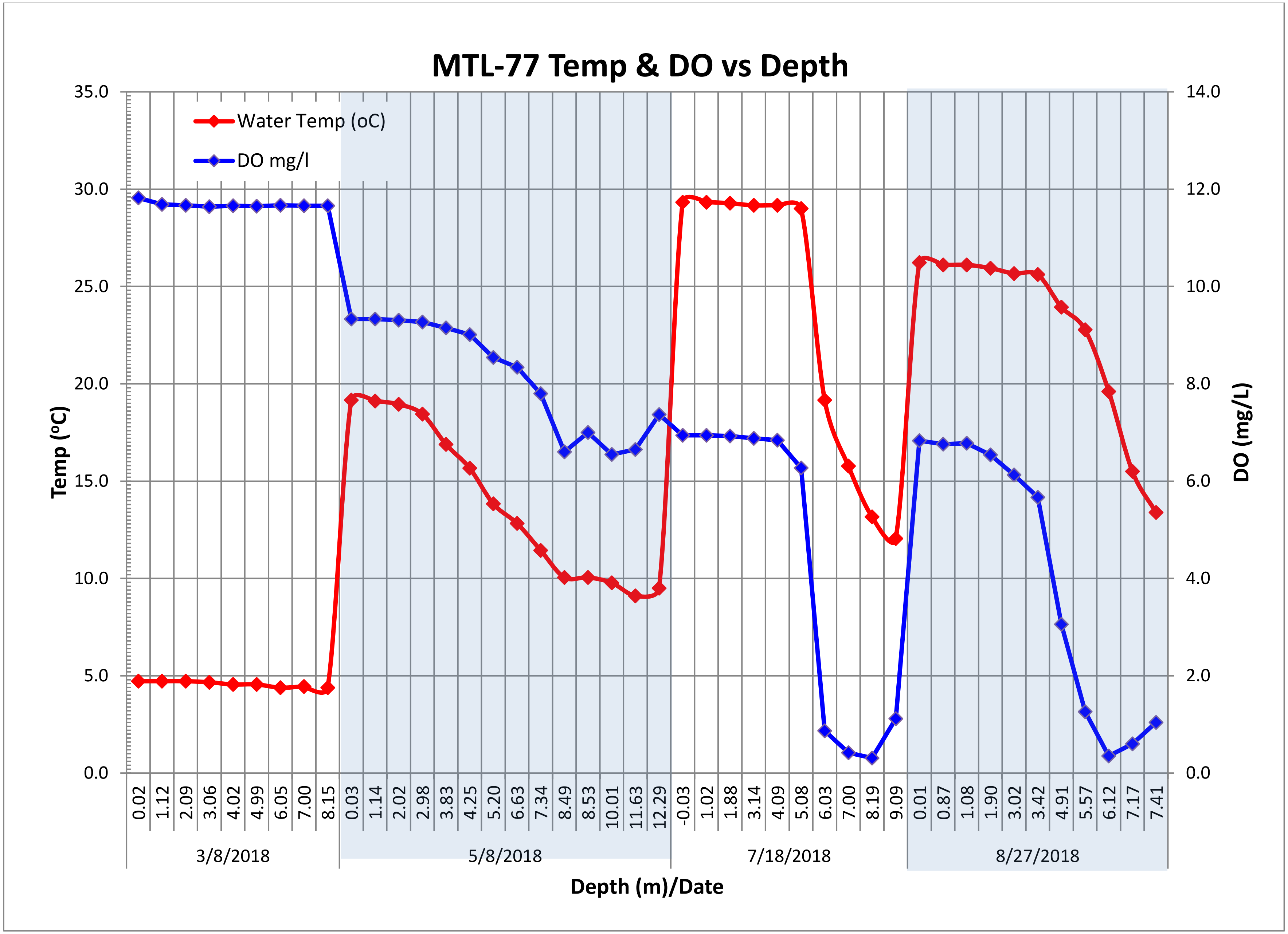


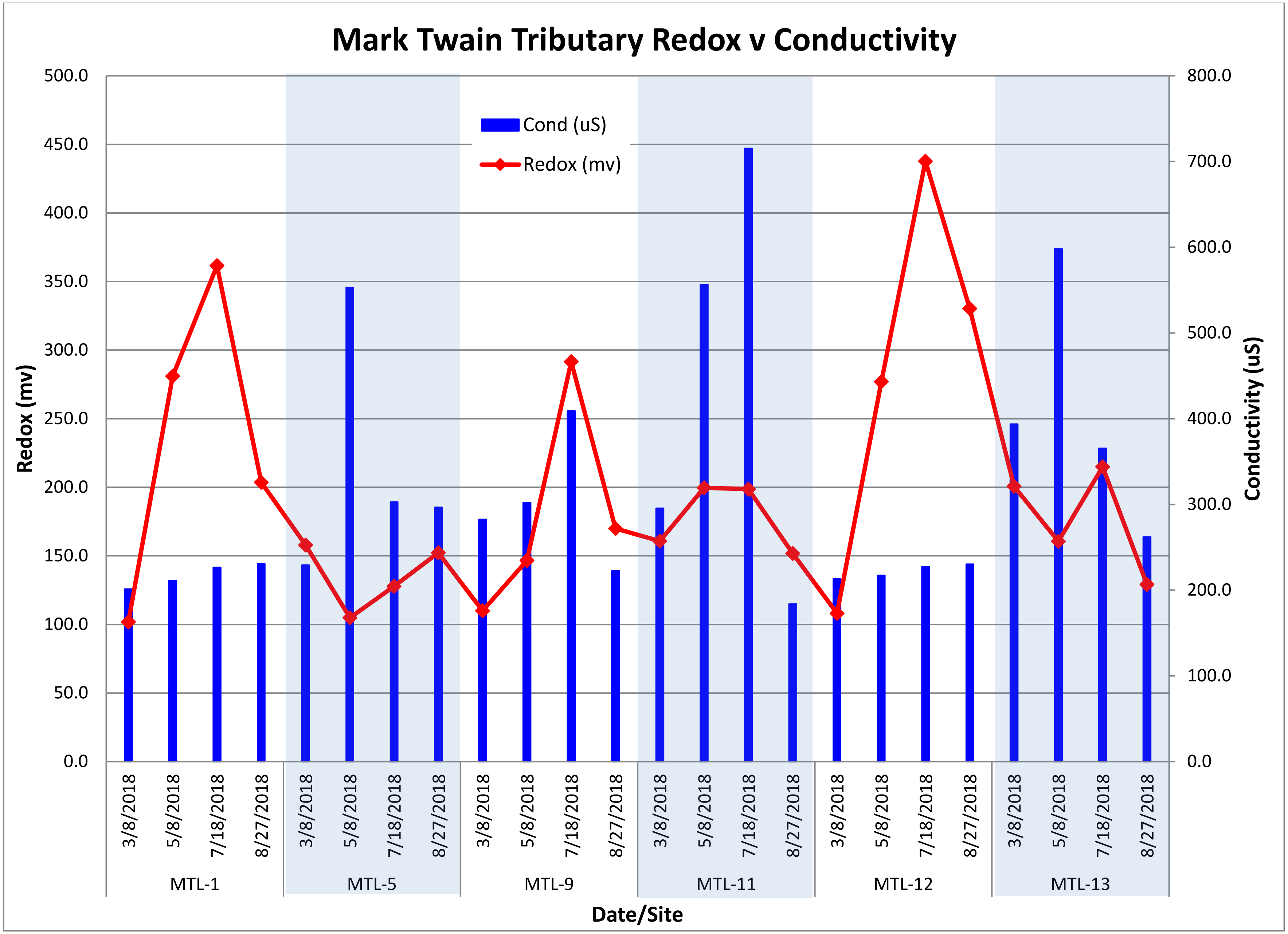
MTL-22 Temp & DO vs Depth
Water Temp (oC)
DO mg/l
Temp (°C)
DO (mg/L)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.07 1.04 2.00 3.16 3.97 4.93 6.13 7.23 8.20
0.40 0.68 1.06 1.93 3.10 4.05 5.03 6.15 7.26 8.07 9.15 9.97 11.02 13.32 13.33
0.07 0.93 2.09 2.86 4.12 5.24 6.20 7.29 8.09 8.95
0.20 1.04 2.16 3.39 4.52
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/ Date


MTL-33 Temp & DO vs Depth
Water Temp (oC)
DO mg/l
Temp (ºC)
DO (mg/L)
Depth (m)/Date
3/8/2018
5/8/2018
7/18/2018
8/27/2018

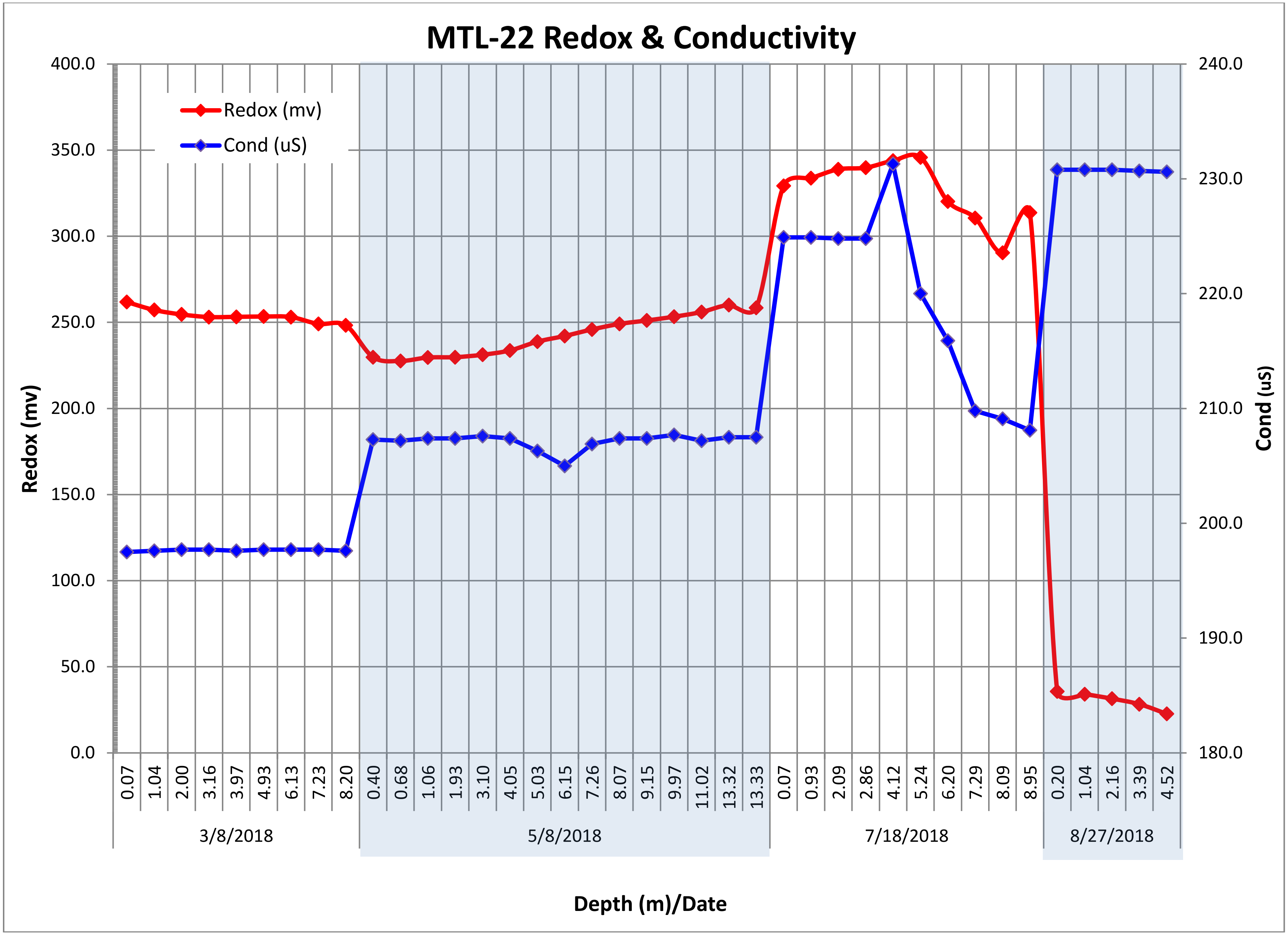


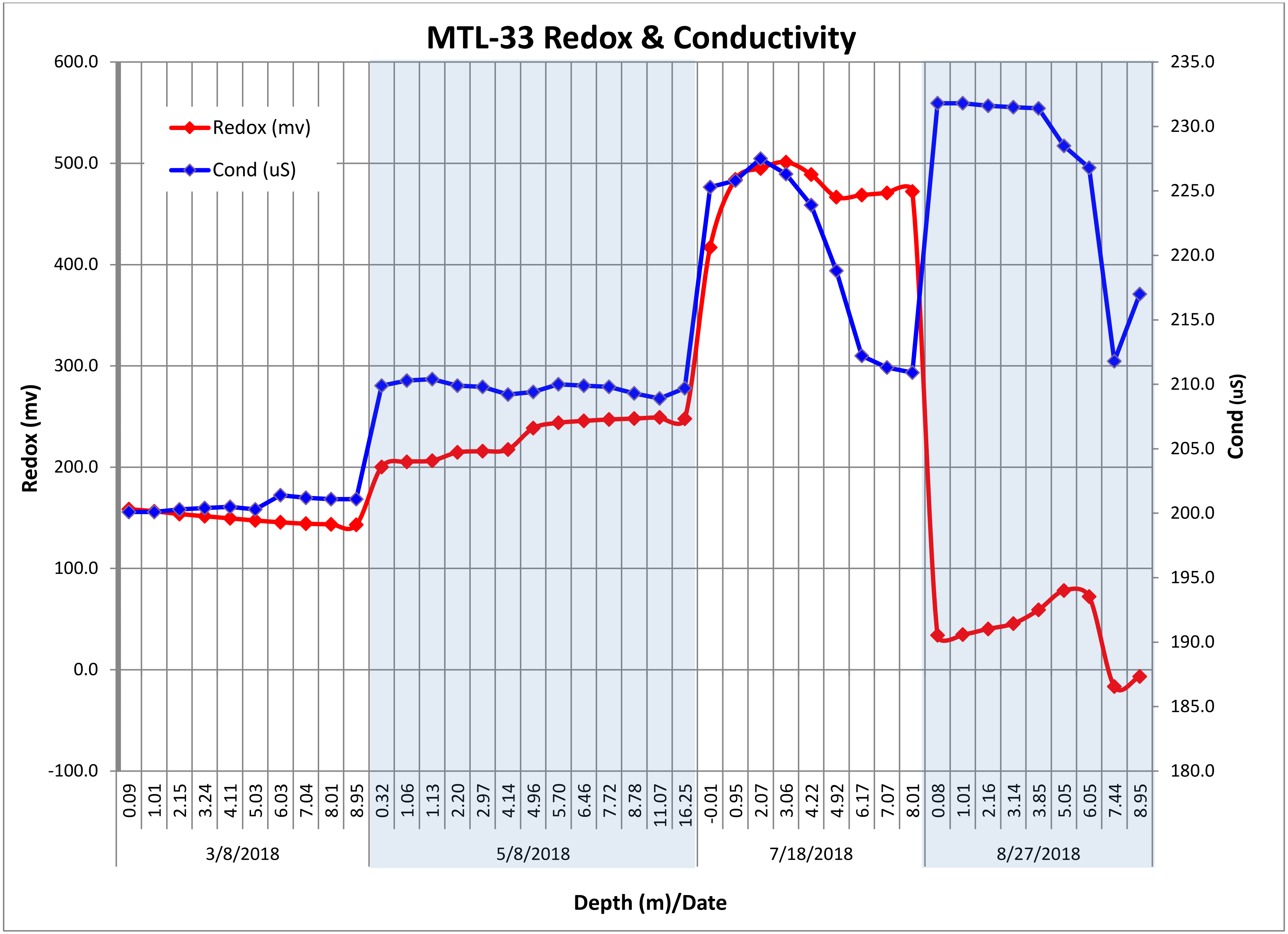
MTL-66 Temp & DO vs Depth
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Temp (ºC)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
DO (mg/L)
Water Temp (oC)
DO mg/l
0.03 1.17 2.05 3.06 4.15 5.07 6.20 7.08 8.20
0.05 0.48 1.14 1.83 3.24 4.52 5.82 7.11 8.05 9.71 10.70 10.78
0.16 1.29 1.99 3.02 4.11 5.04 6.04 7.13 8.15 9.23
0.13 1.05 1.96 3.02 3.97 4.43 5.00 6.06 7.27 8.99
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date


MTL-77 Temp & DO vs Depth
Water Temp (oC)
DO mg/l
Temp (ºC)
DO (mg/L)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.02 1.12 2.09 3.06 4.02 4.99 6.05 7.00 8.15
0.03 1.14 2.02 2.98 3.83 4.25 5.20 6.63 7.34 8.49 8.53 10.01 11.63 12.29
-0.03 1.02 1.88 3.14 4.09 5.08 6.03 7.00 8.19 9.09
0.01 0.87 1.08 1.90 3.02 3.42 4.91 5.57 6.12 7.17 7.41
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

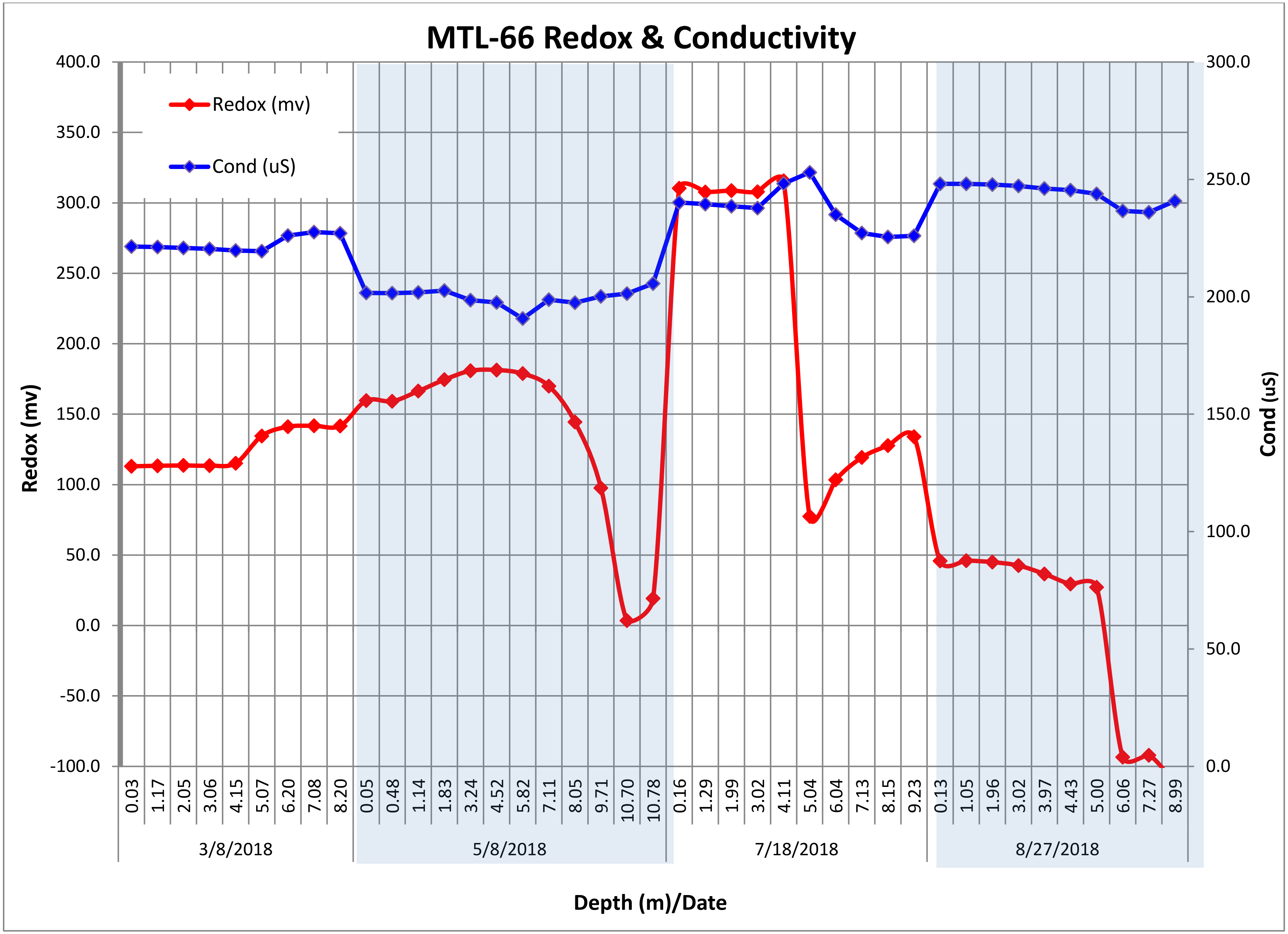


Mark Twain Tributary Redox v Conductivity
Cond (uS)
Redox (mv)
Redox (mv)
Conductivity (uS)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-5
MTL-9
MTL-11
MTL-12
MTL-13
Date/Site

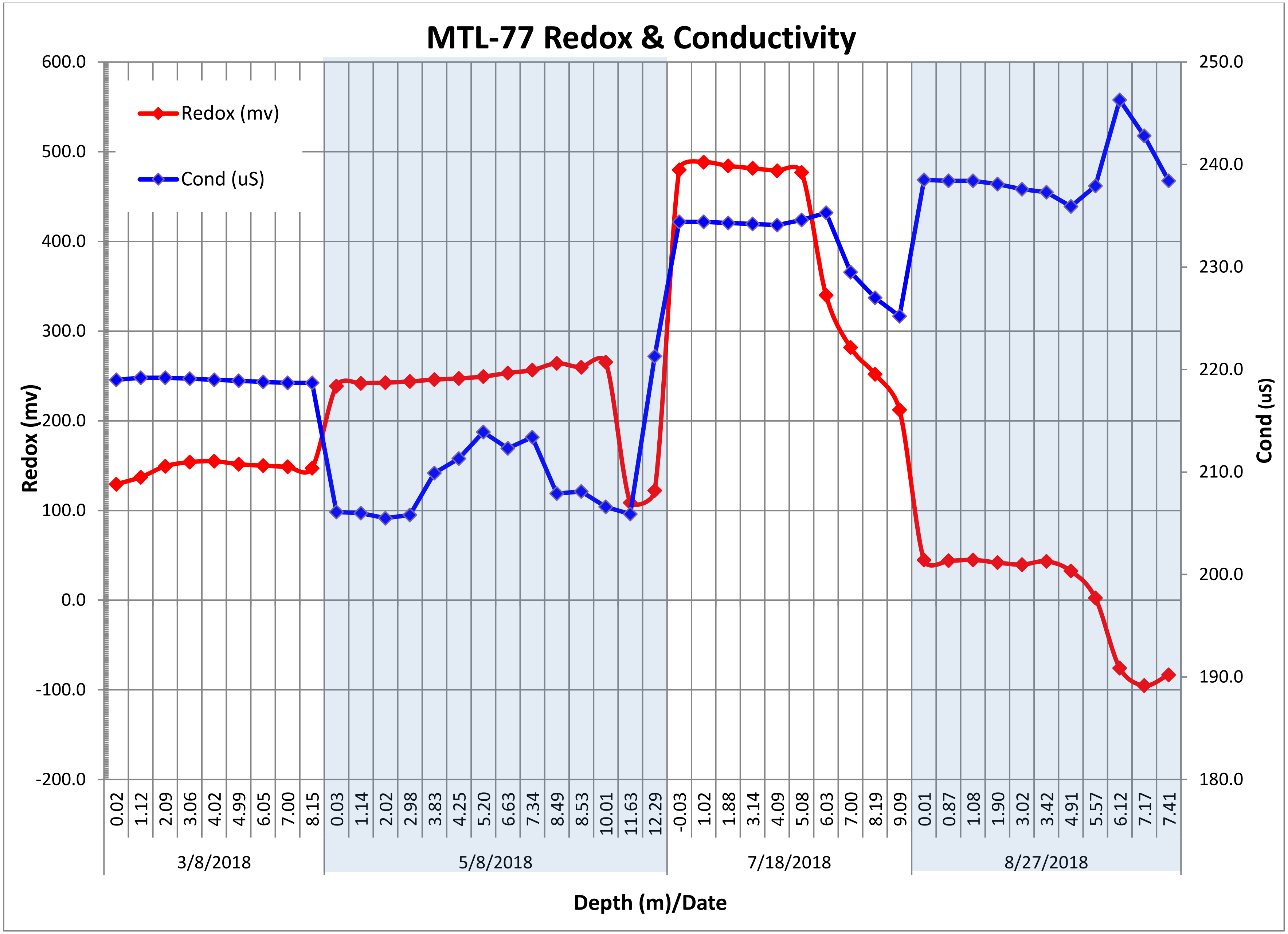

MTL-22 Redox & Conductivity
Redox (mv)
Cond (uS)
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
240.0
230.0
220.0
210.0
200.0
190.0
180.0
Redox (mv)
Cond (uS)
0.07
1.04
2.00
3.16
3.97
4.93
6.13
7.23
8.20
0.40
0.68
1.06
1.93
3.10
4.05
5.03
6.15
7.26
8.07
9.15
9.97
11.02
13.32
13.33
0.07
0.93
2.09
2.86
4.12
5.24
6.20
7.29
8.09
8.95
0.20
1.04
2.16
3.39
4.52
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

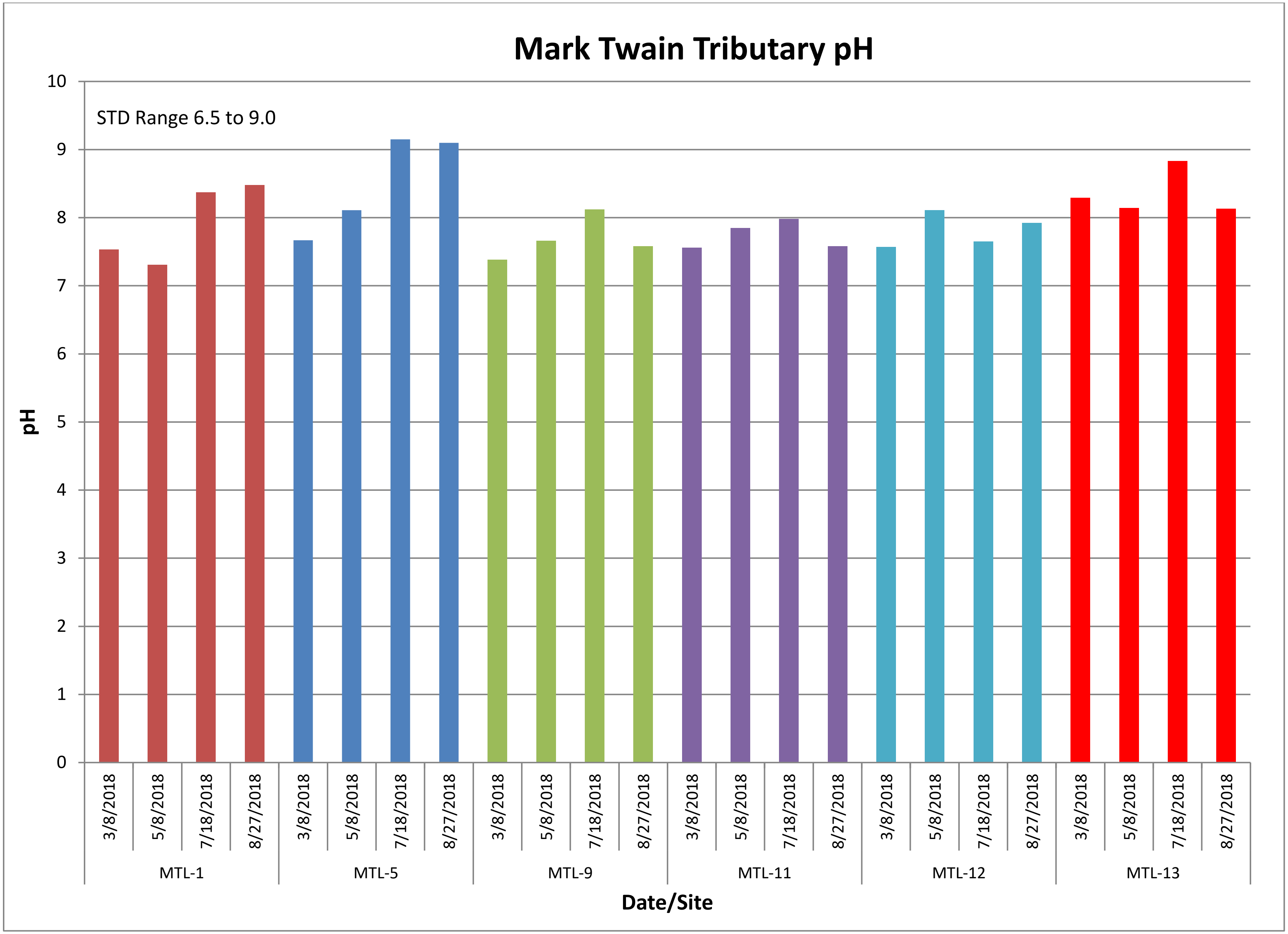


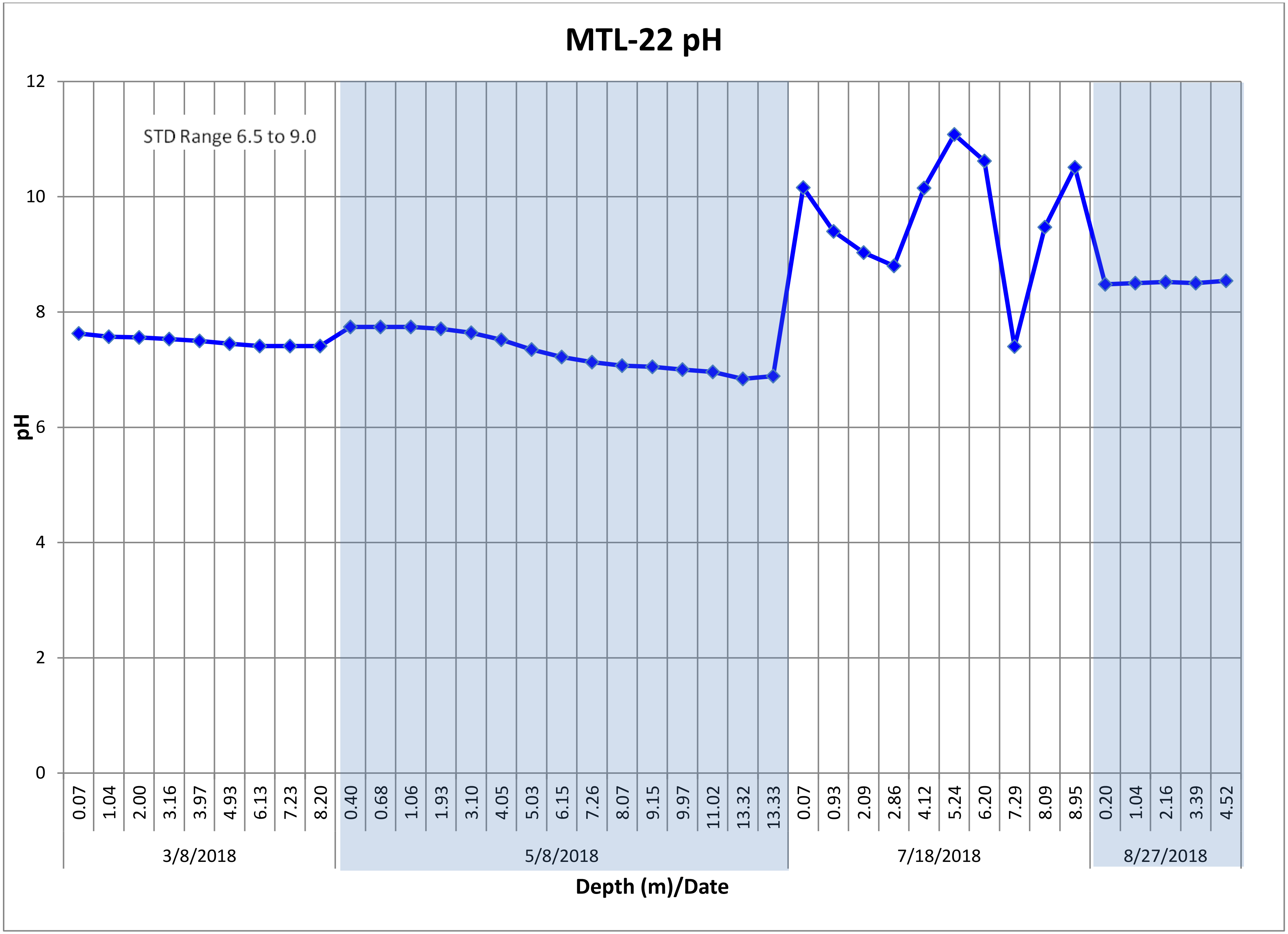
MTL-33 Redox & Conductivity
Redox (mv)
Cond (uS)
600.0
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
235.0
230.0
225.0
220.0
215.0
210.0
205.0
200.0
195.0
190.0
185.0
180.0
Redox (mv)
Cond (us)
0.09 1.01 2.15 3.24 4.11 5.03 6.03 7.04 8.01 8.95
0.32 1.06 1.13 2.20 2.97 4.14 4.96 5.70 6.46 7.72 8.78 11.07 16.25
-0.01 0.95 2.07 3.06 4.22 4.92 6.17 7.07 8.01
0.08 1.01 2.16 3.14 3.85 5.05 6.05 7.44 8.95
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

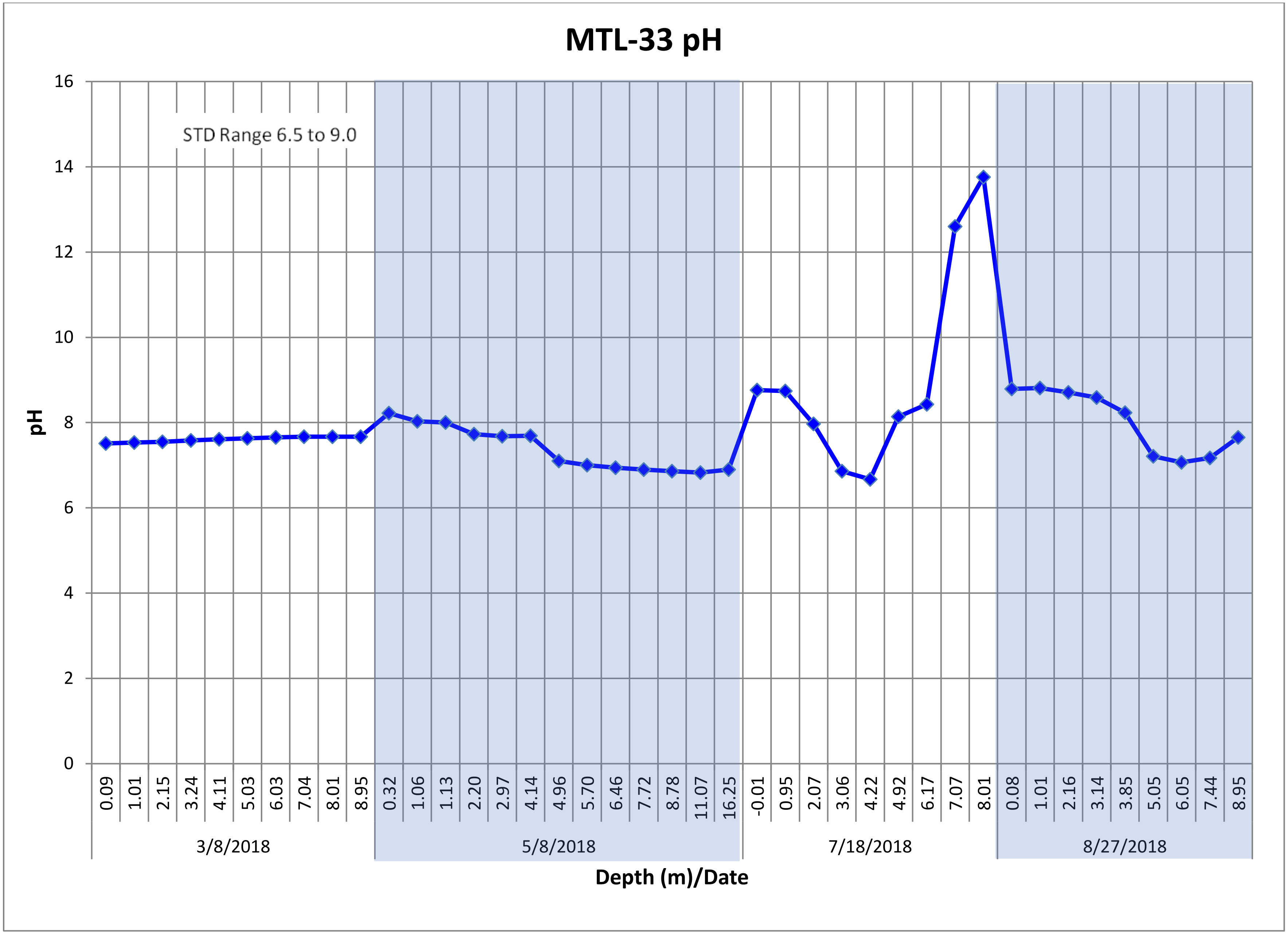


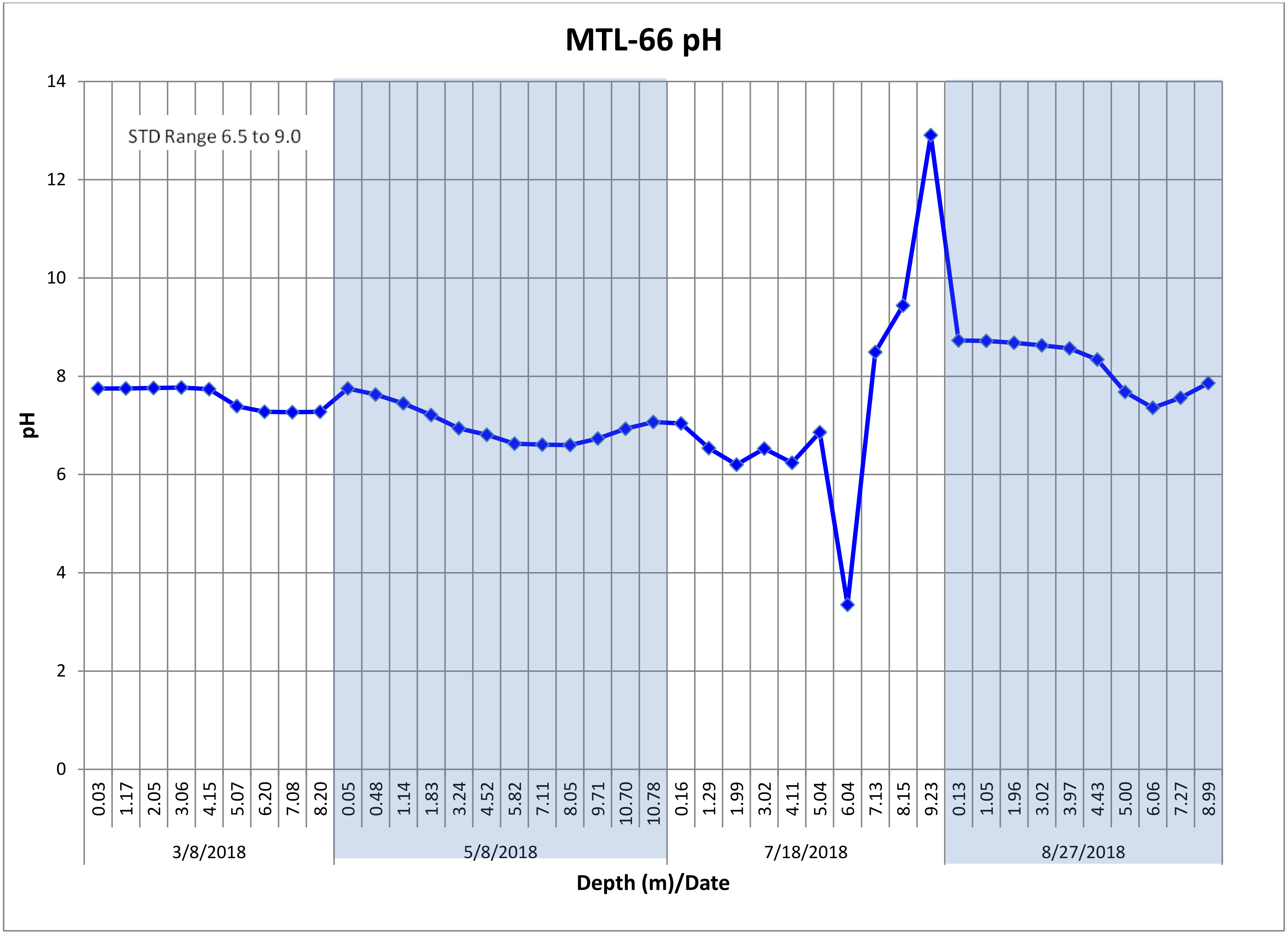
MTL-66 Redox & Conductivity
Redox (mv)
Cond (uS)
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
-50.0
-100.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Redox (mv)
Cond (us)
0.03
1.17
2.05
3.06
4.15
5.07
6.20
7.08
8.20
0.05
0.48
1.14
1.83
3.24
4.52
5.82
7.11
8.05
9.71
10.70
10.78
0.16
1.29
1.99
3.02
4.11
5.04
6.04
7.13
8.15
9.23
0.13
1.05
1.96
3.02
3.97
4.43
5.00
6.06
7.27
8.99
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

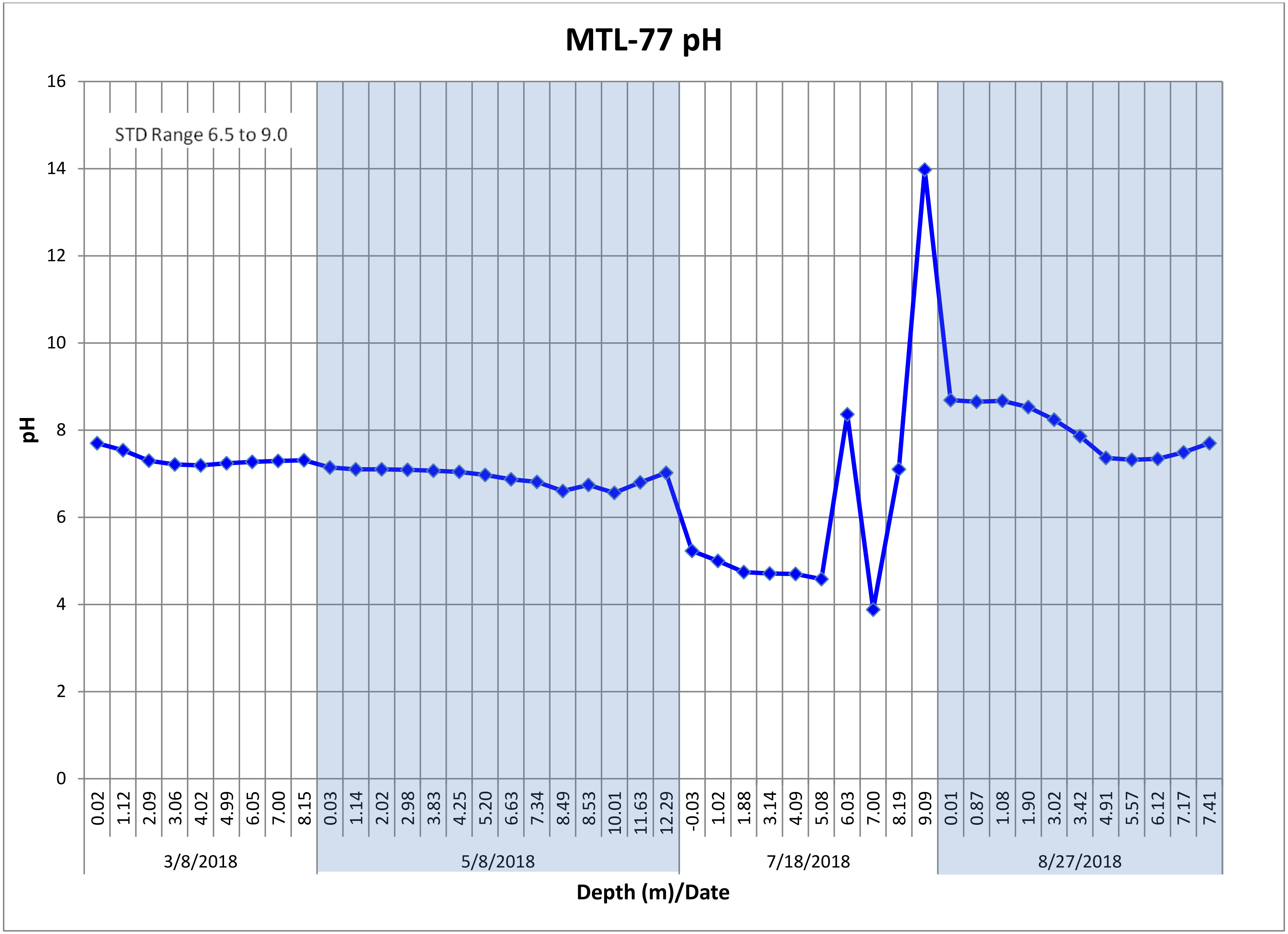

MTL-77 Redox & Conductivity
Redox (mv)
Cond (uS)
600.0
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
250.0
240.0
230.0
220.0
210.0
200.0
190.0
180.0
0.02 1.12 2.09 3.06 4.02 4.99 6.05 7.00 8.15
0.03 1.14 2.02 2.98 3.83 4.25 5.20 6.63 7.34 8.49 8.53 10.01 11.63 12.29
-0.03 1.02 1.88 3.14 4.09 5.08 6.03 7.00 8.19 9.09
0.01 0.87 1.08 1.90 3.02 3.42 4.91 5.57 6.12 7.17 7.41
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date


Mark Twain Tributary pH
STD Range 6.5 to 9.0
pH
0
1
2
3
4
5
6
7
8
9
10
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-1
MTL-5
MTL-9
MTL-11
MTL-12
MTL-13
Date/Site

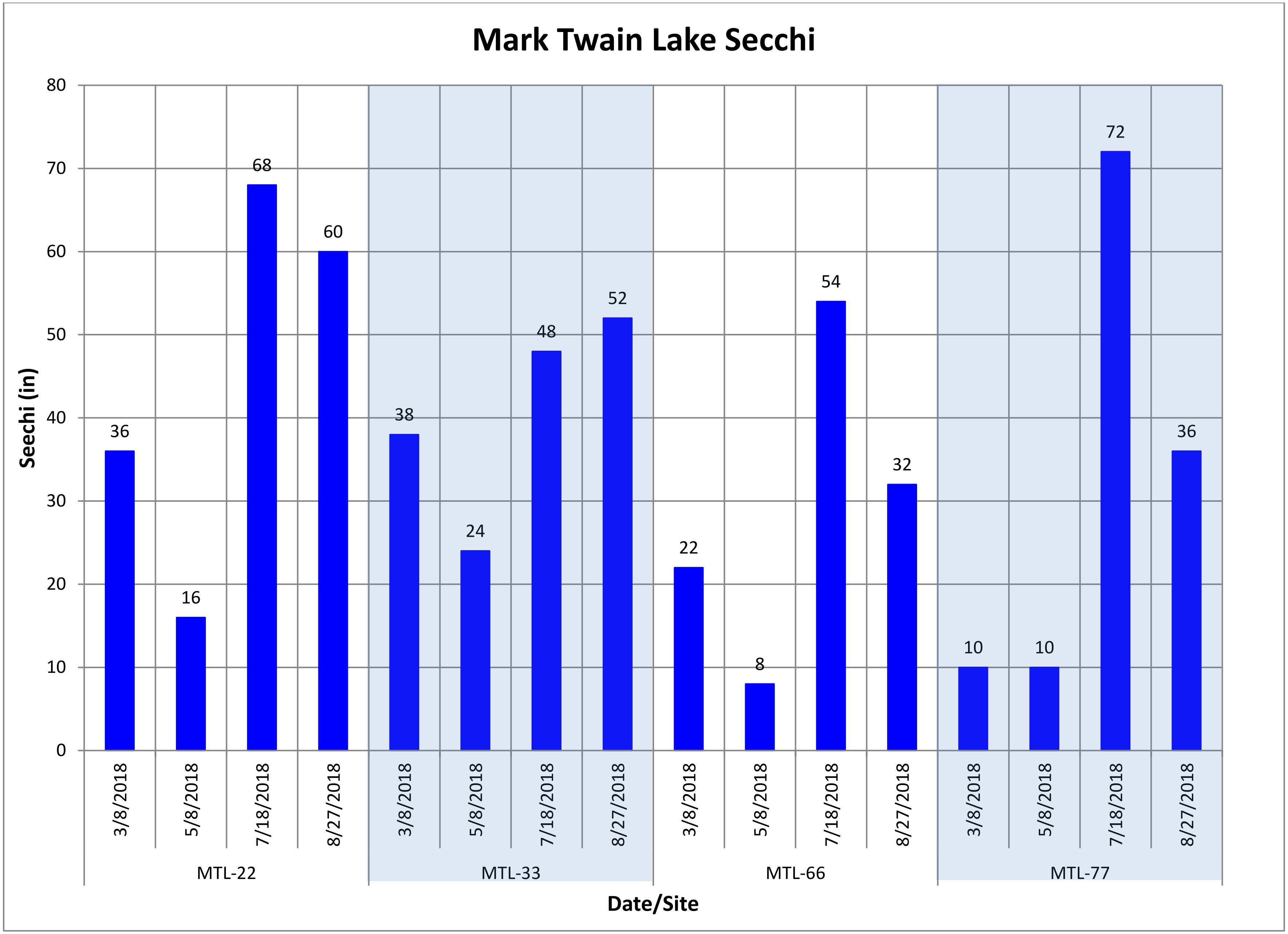

MTL-22 pH
STD Range 6.5 to 9.0
pH
12
10
8
6
4
2
0
0.07
1.04
2.00
3.16
3.97
4.93
6.13
7.23
8.20
0.40
0.68
1.06
1.93
3.10
4.05
5.03
6.15
7.26
8.07
9.15
9.97
11.02
13.32
13.33
0.07
0.93
2.09
2.86
4.12
5.24
6.20
7.29
8.09
8.95
0.20
1.04
2.16
3.39
4.52
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

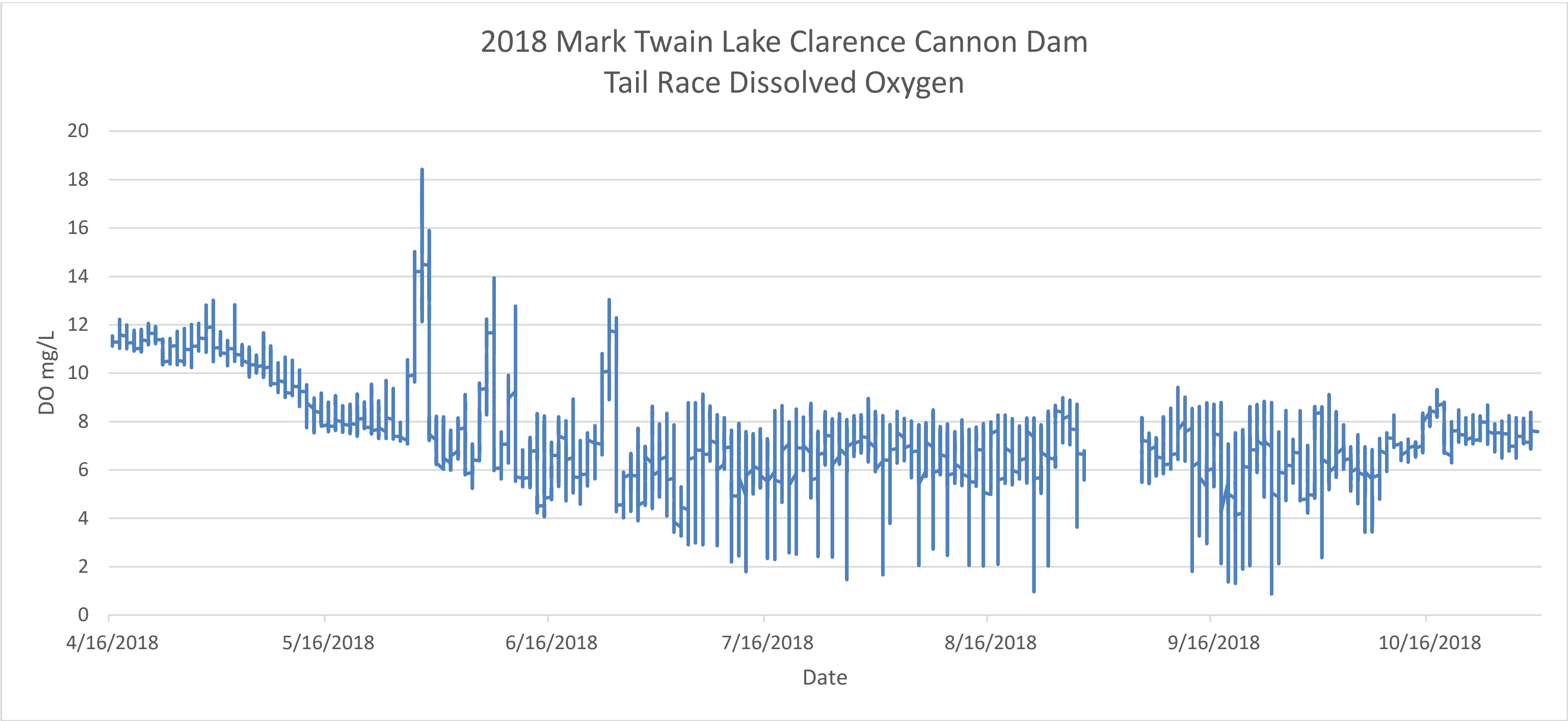

MTL-33 pH
STD Range 6.5 to 9.0
pH
16
14
12
10
8
6
4
2
0
0.09
1.01
2.15
3.24
4.11
5.03
6.03
7.04
8.01
8.95
0.32
1.06
1.13
2.20
2.97
4.14
4.96
5.70
6.46
7.72
8.78
11.07
16.25
-0.01
0.95
2.07
3.06
4.22
4.92
6.17
7.07
8.01
0.08
1.01
2.16
3.14
3.85
5.05
6.05
7.44
8.95
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

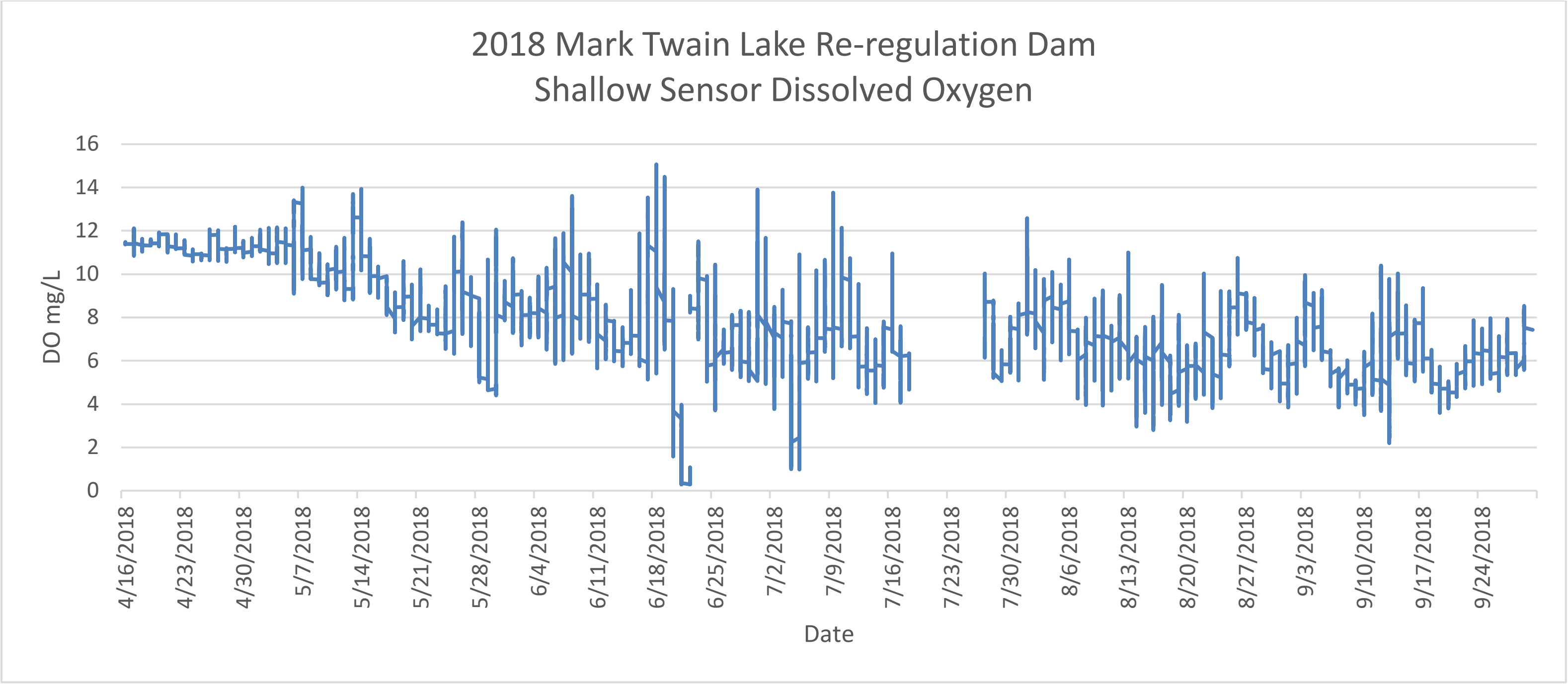

MTL-66 pH
STD Range 6.5 to 9.0
pH
14
12
10
8
6
4
2
0
0.03
1.17
2.05
3.06
4.15
5.07
6.20
7.08
8.20
0.05
0.48
1.14
1.83
3.24
4.52
5.82
7.11
8.05
9.71
10.70
10.78
0.16
1.29
1.99
3.02
4.11
5.04
6.04
7.13
8.15
9.23
0.13
1.05
1.96
3.02
3.97
4.43
5.00
6.06
7.27
8.99
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date

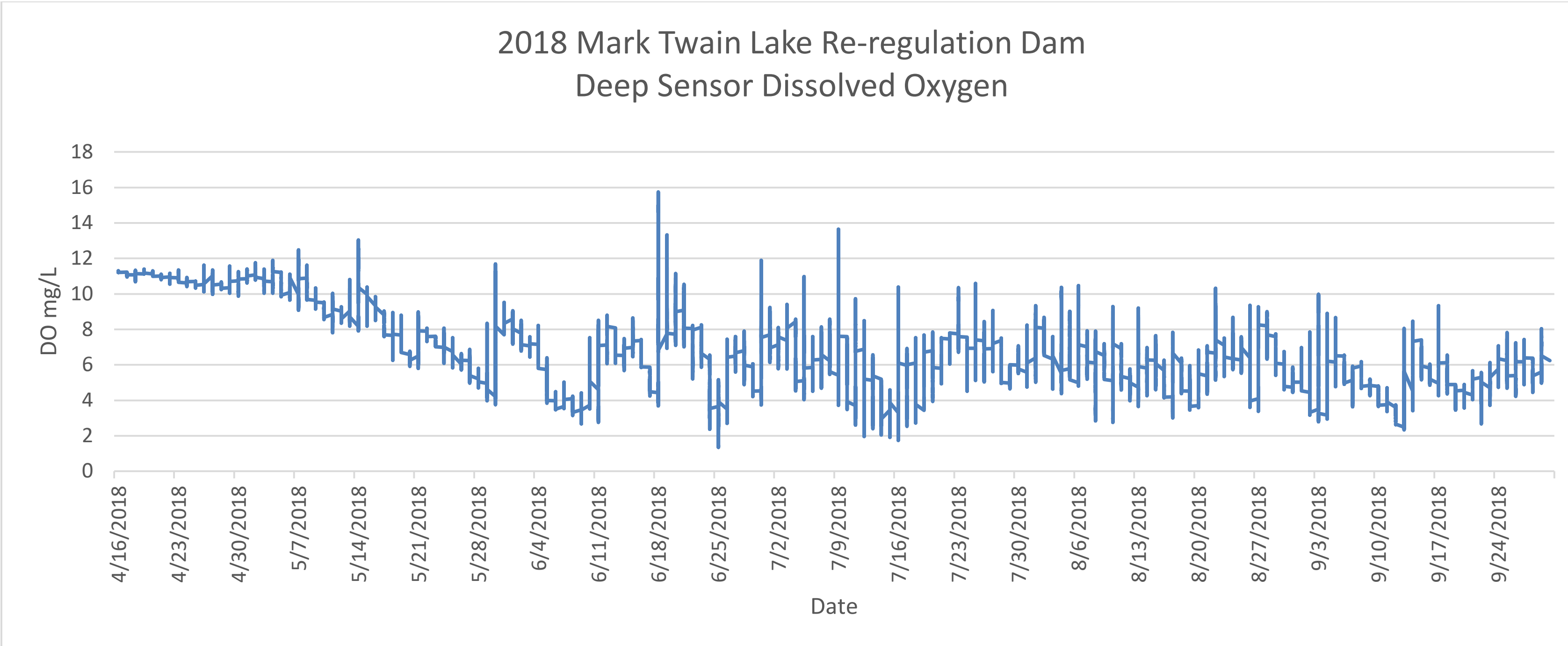


MTL-77 pH
STD Range 6.5 to 9.0
pH
16
14
12
10
8
6
4
2
0
0.02
1.12
2.09
3.06
4.02
4.99
6.05
7.00
8.15
0.03
1.14
2.02
2.98
3.83
4.25
5.20
6.63
7.34
8.49
8.53
10.01
11.63
12.29
-0.03
1.02
1.88
3.14
4.09
5.08
6.03
7.00
8.19
9.09
0.01
0.87
1.08
1.90
3.02
3.42
4.91
5.57
6.12
7.17
7.41
3/8/2018
5/8/2018
7/18/2018
8/27/2018
Depth (m)/Date


Mark Twain Lake Secchi
Seechi (in)
0
10
20
30
40
50
60
70
80
36
16
68
60
38
24
48
52
22
8
54
32
10
10
72
36
3/8/2018
5/8/2018
7/18/2018
8/27/2018
MTL-22
MTL-33
MTL-66
MTL-77
Date/Site


2018 Mark Twain Lake Clarence Cannon Dam
Tail Race Dissolved Oxygen
DO mg/L
20
18
16
14
12
10
8
6
4
2
0
4/16/2018
5/16/2018
6/16/2018
7/16/2018
8/16/2018
9/16/2018
10/16/2018
Date


2018 Mark Twain Lake Re-regulation Dam
Shallow Sensor Dissolved Oxygen
DO mg/L
0
2
4
6
8
10
12
14
16
4/16/2018
4/23/2018
4/30/2018
5/7/2018
5/14/2018
5/21/2018
5/28/2018
6/4/2018
6/11/2018
6/18/2018
6/25/2018
7/2/2018
7/9/2018
7/16/2018
7/23/2018
7/30/2018
8/6/2018
8/13/2018
8/20/2018
8/27/2018
9/3/2018
9/10/2018
9/17/2018
9/24/2018
Date


2018 Mark Twain Lake Re-regulation Dam
Deep Sensor Dissolved Oxygen
DO mg/L
0
2
4
6
8
10
12
14
16
18
4/16/2018
4/23/2018
4/30/2018
5/7/2018
5/14/2018
5/21/2018
5/28/2018
6/4/2018
6/11/2018
6/18/2018
6/25/2018
7/2/2018
7/9/2018
7/16/2018
7/23/2018
7/30/2018
8/6/2018
8/13/2018
8/20/2018
8/27/2018
9/3/2018
9/10/2018
9/17/2018
9/24/2018
Date

APPENDIX D

Lakes of Missouri Volunteer Program (LMVP) Data

2017 Lakes of Missouri Volunteer Program (LMVP) Data

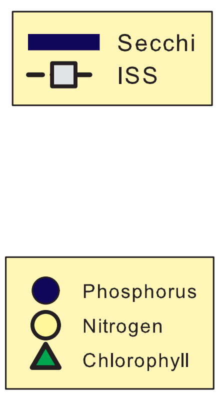
Mark Twain Site 1

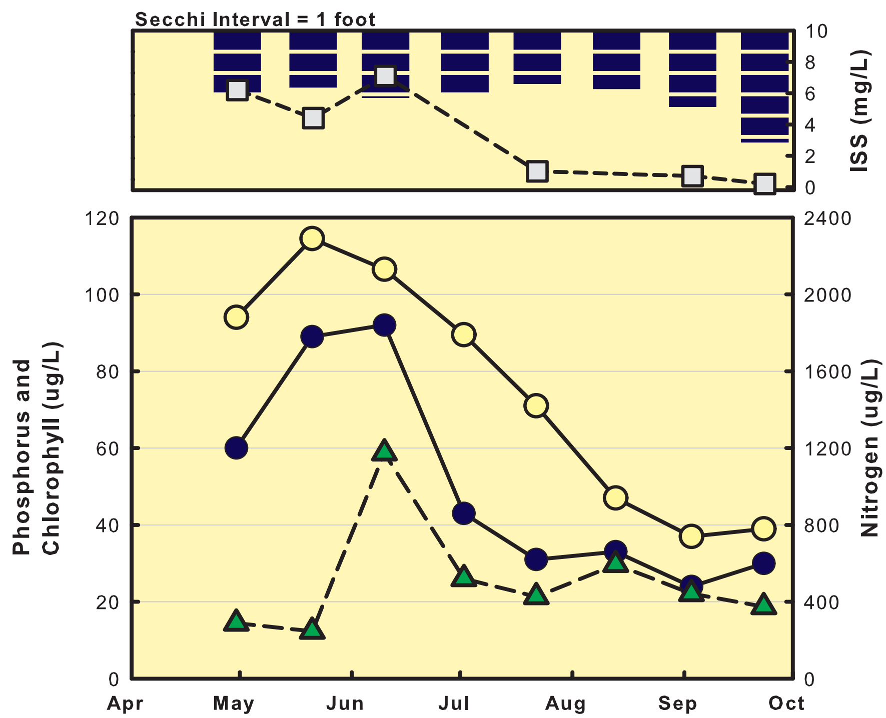
2017 DATA TABLE

	4/30	5/21	6/10	7/2	7/22	8/13	9/3	9/23	Mean
Temp (F)	54	64	71	76	85	76	76	75	**72**
Secchi (inches)	36	32	38	35	30	33	43	63	**38**
TP (µg/L)	60	89	92	43	31	33	24	30	**45**
TN (µg/L)	1880	2290	2130	1790	1420	940	740	780	**1373**
CHL (µg/L)	14.4	12.3	58.7	26.0	21.3	29.7	22.1	18.7	**22.7**
ISS (mg/L)	6.2	4.4	7.1		1.0		0.7	0.2	**1.7**

2017 GRAPH

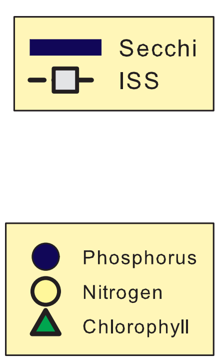
Graph displays all 2017 data

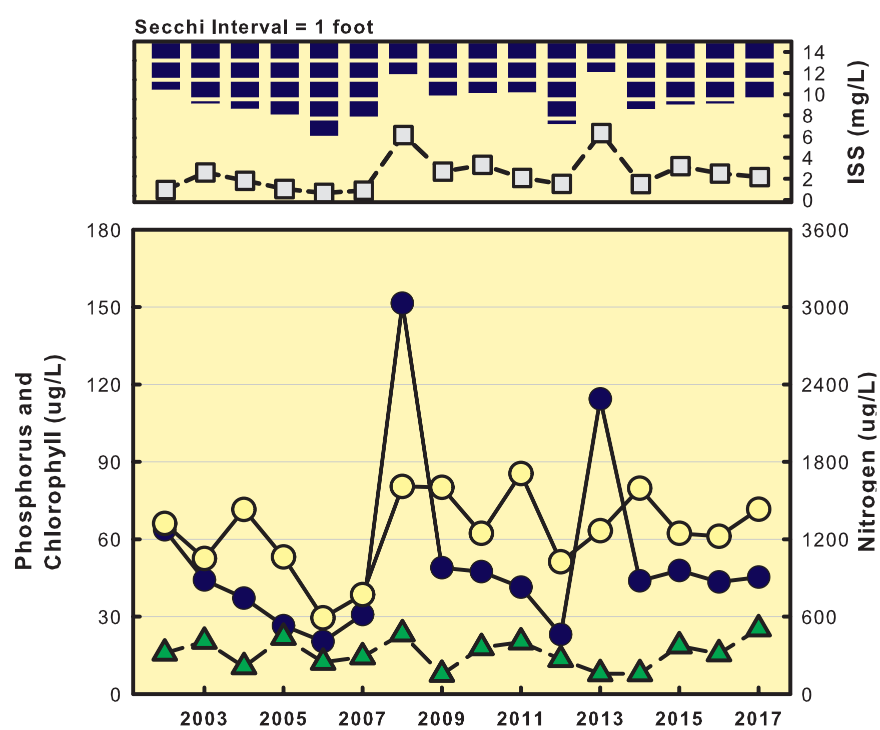




TREND GRAPH

Graph displays geometric mean values for data collected between May 15 and September 15.





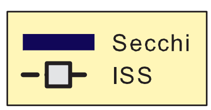
Mark Twain Site 2

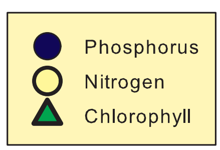
2017 DATA TABLE

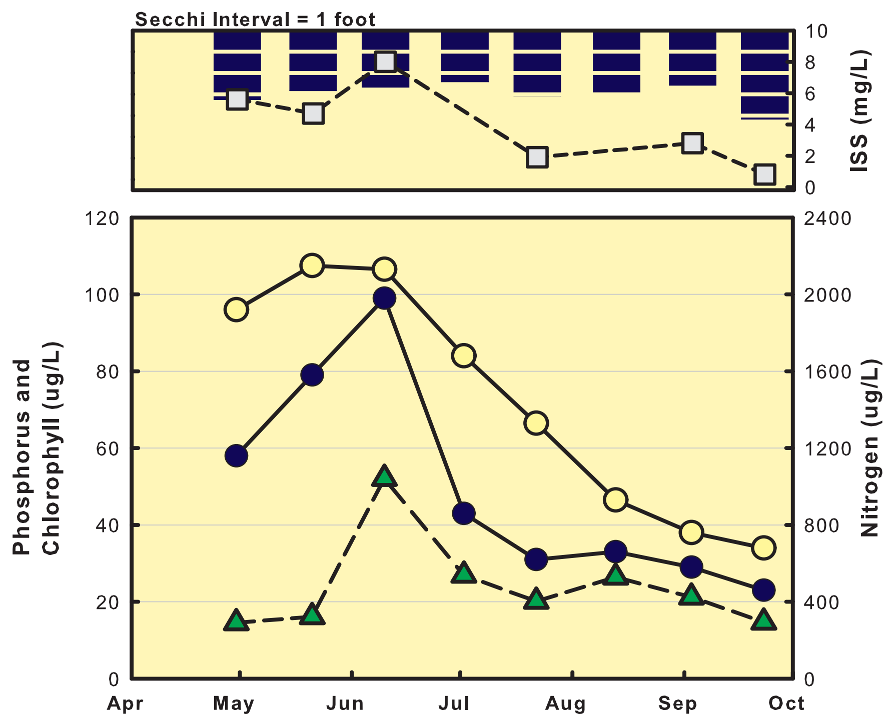
	4/30	5/21	6/10	7/2	7/22	8/13	9/3	9/23	Mean
Temp (F)	55	64	71	76	86	78	77	78	**73**
Secchi (inches)	39	34	32	29	37	35	31	50	**35**
TP (µg/L)	58	79	99	43	31	33	29	23	**44**
TN (µg/L)	1920	2150	2130	1680	1330	930	760	680	**1324**
CHL (µg/L)	14.5	16.1	52.1	26.9	20.1	26.4	21.2	14.7	**22.0**
ISS (mg/L)	5.6	4.7	8.0		1.9		2.8	0.8	**3.1**

2017 GRAPH

Graph displays all 2017 data

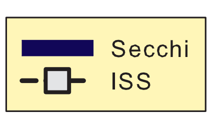


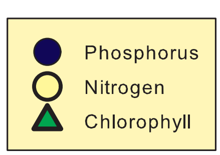


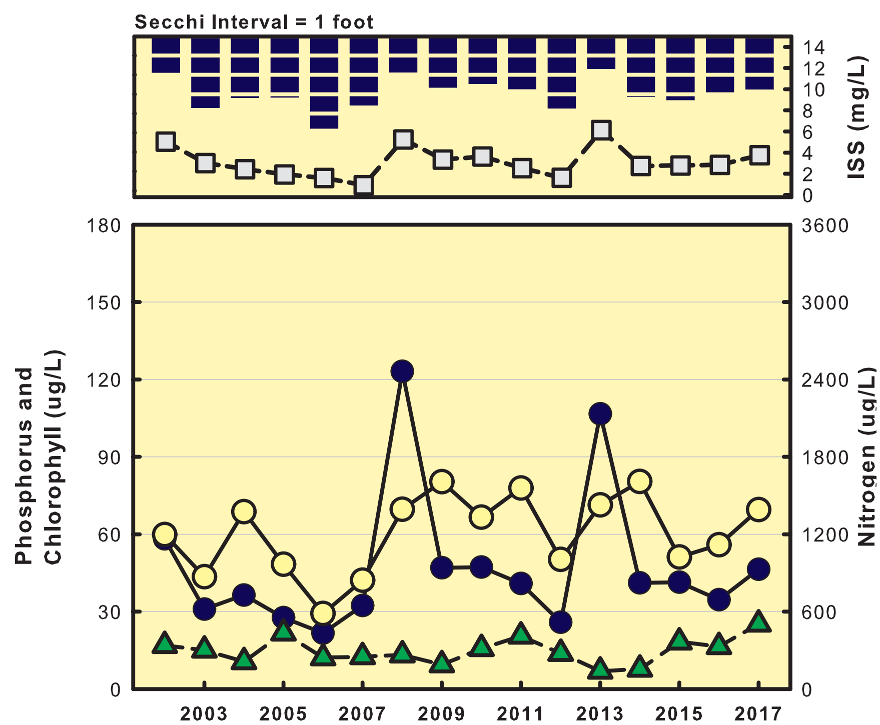


TREND GRAPH

Graph displays geometric mean values for data collected between May 15 and September 15.







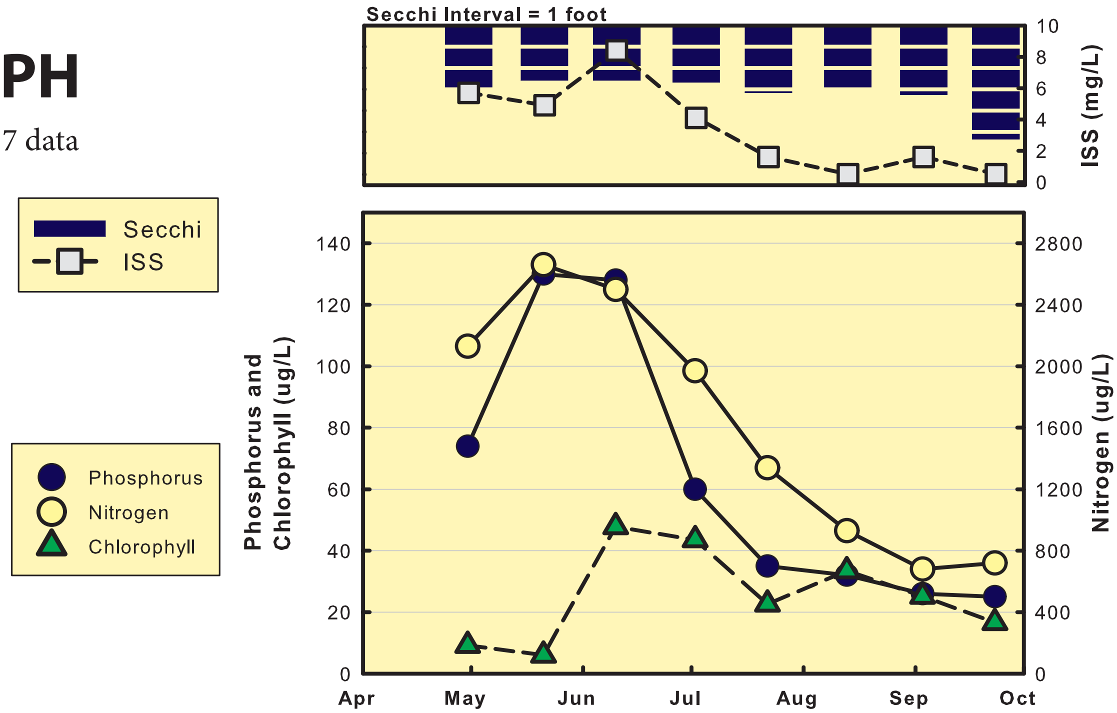
Mark Twain Site 5

2017 DATA TABLE

	4/30	5/21	6/10	7/2	7/22	8/13	9/3	9/23	Mean
Temp (F)	54	63	70	76	85	77	77	77	**72**
Secchi (inches)	36	31	31	32	38	36	39	64	**37**
TP (µg/L)	74	130	128	60	35	32	26	25	**52**
TN (µg/L)	2130	2660	2500	1970	1340	930	680	720	**1425**
CHL (µg/L)	9.2	6.0	47.8	43.5	22.6	33.4	25.2	16.6	**20.9**
ISS (mg/L)	5.7	4.9	8.4	4.1	1.6	0.5	1.6	0.5	**2.2**

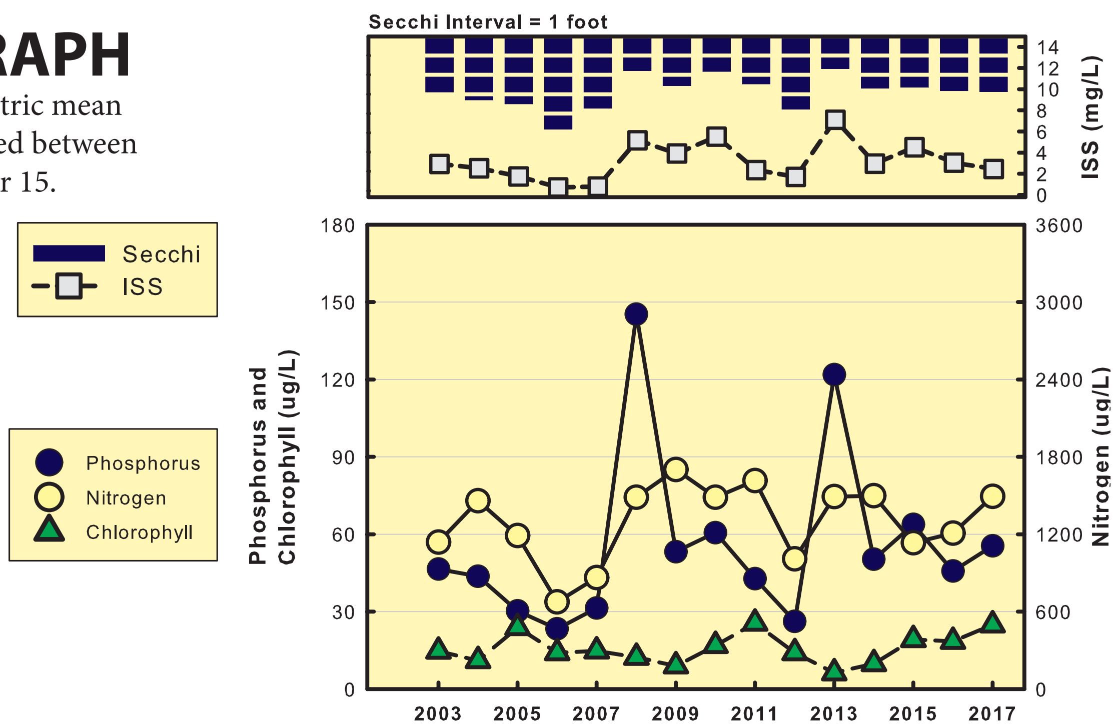
2017 GRAPH

Graph displays all 2017 data



TREND GRAPH

Graph displays geometric mean values for data collected between May 15 and September 15.



APPENDIX E

United Water Services
Clarence Cannon WTP
Data

HIGH SERVICE
Jan-18

	PLANT EFFLUENT														
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	3.92	7.86	100	0.06	0.05	3.51	164	0.007		0.09		230	0.0	5	A
2	4.91	7.88	101	0.06	0.05	3.43	154	0.008		0.10		231	0.0	5	
3	5.10	7.81	100	0.04	0.07	3.60	161	0.007	0.020	0.05	0.005	231	0.0	6	A
4	4.74	7.89	104	0.04	0.06	3.44	162	0.004		0.18		231	0.0	6	
5	4.82	7.95	102	0.04	0.06	3.62	166	0.006		0.07		230	0.0	5	A
6	4.75	7.93	99	0.06	0.06	3.66	160	0.006		0.09		230	0.0	5	
7	4.74	7.91	100	0.06	0.06	3.68	162	0.006		0.09		232	0.0	5	
8	5.94	7.94	105	0.05	0.07	3.67	166	0.009		0.07		232	0.0	6	A
9	5.97	7.92	103	0.04	0.07	3.75	169	0.008		0.07		230	0.0	6	
10	5.69	7.97	101	0.05	0.06	3.74	161	0.006		0.10		231	0.0	7	A
11	5.35	7.92	101	0.06	0.06	3.51	156	0.005		0.11		225	0.0	6	
12	4.99	7.78	101	0.05	0.05	3.50	155	0.004		0.09		225	0.0	7	A
13	4.23	7.79	101	0.04	0.06	3.62	162	0.008		0.10		228	0.0	6	
14	4.83	7.83	100	0.04	0.07	3.54	159	0.006		0.09		228	0.0	6	
15	4.76	7.87	100	0.05	0.06	3.47	152	0.007		0.10		226	0.0	6	A
16	4.79	7.87	101	0.05	0.05	3.68	155	0.004		0.16		228	0.0	6	
17	4.41	7.84	101	0.04	0.08	3.72	160	0.003	0.023	0.06		228	0.0	7	A
18	4.63	7.82	100	0.04	0.08	3.41	155	0.002		0.08		227	0.0	7	
19	4.17	7.88	101	0.04	0.09	3.50	160	0.005		0.08		225	0.0	7	A
20	4.93	7.95	101	0.06	0.06	3.66	150	0.006		0.08		226	0.0	7	
21	4.19	7.97	100	0.06	0.08	3.66	151	0.008		0.08		226	0.0	5	
22	5.17	7.97	104	0.04	0.08	3.64	161	0.004		0.18		226	0.0	8	A
23	4.33	7.89	100	0.04	0.07	3.42	160	0.002		0.02		226	0.0	7	
24	4.14	7.90	99	0.05	0.06	3.42	155	0.005		0.03		225	0.0	8	A
25	4.40	7.93	101	0.06	0.07	3.55	154	0.006		0.04		225	0.0	8	
26	4.26	7.94	100	0.06	0.07	3.59	128	0.007		0.06		225	0.0	8	A
27	3.98	7.92	100	0.04	0.06	3.46	156	0.005		0.10		224	0.0	8	
28	4.13	7.98	101	0.04	0.06	3.46	157	0.007		0.07		124	0.0	8	
29	4.57	8.01	102	0.06	0.06	3.59	150	0.005		0.07		225	0.0	7	A
30	3.99	7.89	100	0.05	0.07	3.68	157	0.003		0.13		224	0.0	8	
31	3.84	7.93	103	0.04	0.06	3.50	160	0.001	0.025	0.04	0.004	225	0.0	8	A
AVG	**4.67**	**7.90**	**101**	**0.05**	**0.06**	**3.57**	**157**	**0.005**	**0.023**	**0.08**	**0.005**	**224**	**0.0**	**6**	
TOTAL	**144.67**														

HIGH SERVICE
Feb-18

	PLANT EFFLUENT														
	Flow	pH	Alkalinity	Turbidity	Free Cl2	Total Cl2	Hardness	Iron	Mn	NH_3	NO_2	TDS	Color	Temp	Total
DATE	(mgd)	-	(mg/l)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(u)	(°C)	Coliforms
1	4.41	7.88	99	0.05	0.07	3.52	154	0.007		0.19		226	0.0	10	
2	4.23	7.89	99	0.03	0.05	3.53	163	0.005		0.06		214	0.0	7	A
3	4.16	8.04	100	0.06	0.06	3.62	163	0.004		0.06		218	0.0	7	
4	4.12	8.10	101	0.05	0.80	3.58	159	0.006		0.06		218	0.0	7	
5	4.16	8.07	101	0.04	0.07	3.51	154	0.002		0.09		229	0.0	9	A
6	3.74	8.02	101	0.03	0.06	3.48	156	0.006		0.13		230	0.0	7	
7	4.45	7.94	99	0.05	0.06	3.69	126	0.004	0.002	0.12	0.002	229	0.0	7	A
8	4.58	7.87	101	0.05	0.07	3.68	153	0.006		0.08		228	0.0	7	
9	3.97	8.00	102	0.05	0.06	3.65	158	0.003		0.12		229	0.0	7	A
10	4.26	8.05	103	0.04	0.06	3.51	158	0.001		0.13		230	0.0	7	
11	3.94	7.96	103	0.03	0.06	3.42	159	0.002		0.12		230	0.0	7	
12	4.70	7.93	101	0.05	0.05	3.60	157	0.006		0.10		230	0.0	7	A
13	4.16	7.95	102	0.05	0.06	3.66	157	0.003		0.12		229	0.0	7	
14	4.00	7.99	103	0.04	0.06	3.56	159	0.004	0.021	0.03	0.003	231	0.0	8	A
15	4.48	8.03	104	0.04	0.07	3.49	162	0.004		0.11		232	0.0	8	
16	4.10	7.99	103	0.04	0.07	3.56	161	0.003		0.07		233	0.0	7	A
17	4.49	8.07	101	0.06	0.06	3.57	160	0.005		0.06		230	0.0	7	
18	3.88	8.06	102	0.06	0.07	3.60	156	0.007		0.08		228	0.0	7	
19	4.68	8.01	105	0.04	0.07	3.41	164	0.003		0.10		232	0.0	8	A
20	4.33	7.91	105	0.04	0.07	3.47	167	0.003		0.09		234	0.0	8	
21	3.78	8.04	102	0.05	0.07	3.64	163	0.031	0.001	0.06	0.004	234	0.0	7	A
22	4.25	7.94	103	0.06	0.05	3.55	165	0.008		0.10		234	0.0	6	
23	4.41	7.82	101	0.07	0.07	3.54	156	0.002		0.13		242	0.0	7	A
24	4.47	7.92	103	0.05	0.06	3.54	161	0.006		0.16		247	0.0	8	
25	3.87	7.89	98	0.05	0.06	3.56	162	0.005		0.07		243	0.0	8	
26	4.66	7.93	97	0.05	0.07	3.62	165	0.008		0.08		240	0.0	7	A
27	4.30	7.94	95	0.06	0.06	3.48	159	0.004		0.17		241	0.0	8	
28	4.07	7.93	94	0.05	0.08	3.63	165	0.004	0.014	0.06	0.006	244	0.0	9	A
AVG	**4.24**	**7.97**	**101**	**0.05**	**0.09**	**3.56**	**159**	**0.005**	**0.010**	**0.10**	**0.004**	**231**	**0.0**	**7**	
TOTAL	**118.65**														

HIGH SERVICE
Mar-18

	PLANT EFFLUENT														
	Flow	pH	Alkalinity	Turbidity	Free Cl2	Total Cl2	Hardness	Iron	Mn	NH_3	NO_2	TDS	Color	Temp	Total
DATE	(mgd)	-	(mg/l)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(u)	(°C)	Coliforms
1	3.97	8.04	93	0.06	0.09	3.78	171	0.002		0.11		249	0.0	8	
2	4.61	8.01	93	0.05	0.08	3.98	176	0.013		0.02		250	0.0	8	A
3	4.43	7.96	92	0.07	0.06	3.75	171	0.008		0.04		240	0.0	8	
4	4.05	7.91	91	0.07	0.06	3.61	170	0.007		0.07		246	0.0	8	
5	4.48	7.79	92	0.05	0.06	3.37	170	0.002		0.12		254	0.0	9	A
6	4.01	7.88	91	0.05	0.06	3.69	175	0.002		0.02		245	0.0	9	
7	4.78	8.04	91	0.06	0.07	3.68	170	0.002	0.010	0.01	0.003	251	0.0	9	A
8	3.66	7.97	94	0.07	0.05	3.70	161	0.006		0.03		250	0.0	8	
9	4.09	7.96	96	0.07	0.06	3.54	175	0.003		0.09		251	0.0	9	A
10	4.38	7.92	96	0.04	0.06	3.45	169	0.009		0.13		254	0.0	9	
11	4.09	7.84	93	0.04	0.05	3.54	167	0.008		0.15		249	0.0	9	
12	4.32	7.90	92	0.06	0.05	3.71	161	0.005		0.11		252	0.0	9	A
13	4.26	7.92	94	0.06	0.06	3.56	165	0.003		0.11		250	0.0	10	
14	4.30	7.93	93	0.04	0.06	3.45	167	0.004	0.015	0.10	0.003	247	0.0	10	A
15	4.11	8.00	96	0.04	0.06	3.30	167	0.003		0.12		249	0.0	10	
16	4.49	8.05	94	0.04	0.05	3.35	166	0.010		0.06		249	0.0	10	A
17	4.17	8.09	89	0.06	0.05	3.50	166	0.005		0.08		250	0.0	10	
18	3.66	8.07	93	0.06	0.05	3.39	163	0.005		0.08		250	0.0	9	
19	4.97	8.03	97	0.04	0.06	3.45	167	0.004		0.12		251	0.0	10	A
20	4.44	7.88	93	0.04	0.06	3.47	161	0.003		0.05		252	0.0	13	
21	3.91	7.85	89	0.05	0.50	3.52	167	0.004	0.004	0.03	0.004	247	0.0	13	A
22	4.23	7.89	93	0.06	0.06	3.57	161	0.005		0.04		242	0.0	12	
23	4.38	7.93	94	0.06	0.05	3.53	161	0.002		0.12		245	0.0	11	A
24	3.96	7.89	96	0.03	0.06	3.47	169	0.001		0.08		248	0.0	10	
25	3.91	7.97	97	0.04	0.07	3.50	166	0.005		0.08		245	0.0	10	
26	4.50	7.96	96	0.06	0.04	3.44	161	0.005		0.08		246	0.0	10	A
27	3.64	7.98	94	0.05	0.05	3.42	168	0.005		0.07		245	0.0	11	
28	4.81	8.00	95	0.04	0.06	3.45	171	0.002	0.016	0.17	0.005	251	0.0	12	A
29	4.57	8.01	101	0.04	0.05	3.54	175	0.002		0.08		260	0.0	11	
30	3.86	7.85	99	0.04	0.50	3.52	173	0.005		0.04		257	0.0	11	A
31	4.40	7.91	94	0.06	0.04	3.45	163	0.006		0.06		258	0.0	11	
AVG	**4.24**	**7.95**	**94**	**0.05**	**0.09**	**3.54**	**167**	**0.005**	**0.011**	**0.08**	**0.004**	**249**	**0.0**	**10**	
TOTAL	**131.44**														

HIGH SERVICE
Apr-18

	PLANT EFFLUENT														
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	3.36	7.98	96	0.06	0.05	3.30	164	0.007		0.08		238	0.0	10	
2	4.40	7.91	96	0.04	0.07	3.49	165	0.005		0.09		243	0.0	10	A
3	4.04	7.82	90	0.04	0.07	3.39	162	0.004		0.06		237	0.0	10	
4	4.15	7.93	87	0.05	0.06	3.59	157	0.004	0.010	0.11	0.002	236	0.0	11	A
5	3.91	7.90	91	0.06	0.07	3.52	160	0.006		0.12		238	0.0	10	
6	4.14	7.83	92	0.05	0.06	3.52	158	0.006		0.10		230	0.0	10	A
7	3.76	7.88	94	0.03	0.06	3.46	159	0.001		0.08		235	0.0	10	
8	4.04	8.04	96	0.04	0.06	3.46	161	0.001		0.11		237	0.0	10	
9	3.97	8.15	95	0.05	0.05	3.38	165	0.005		0.11		235	0.0	10	A
10	4.02	8.22	95	0.06	0.06	3.31	157	0.003		0.12		236	0.0	10	
11	4.40	8.06	95	0.04	0.06	3.45	170	0.003	0.022	0.05	0.003	242	0.0	12	A
12	4.59	7.99	95	0.04	0.05	3.30	166	0.001		0.13		241	0.0	12	
13	3.75	7.97	95	0.04	0.07	3.41	167	0.001		0.15		243	0.0	11	A
14	4.25	7.96	93	0.05	0.08	3.59	164	0.002		0.08		238	0.0	14	
15	3.59	8.12	93	0.05	0.08	3.47	163	0.005		0.06		243	0.0	16	
16	4.56	8.16	97	0.04	0.05	3.41	172	0.001		0.16		247	0.0	14	A
17	4.20	8.15	98	0.04	0.06	3.53	172	0.002		0.06		249	0.0	14	
18	4.50	8.13	98	0.06	0.06	3.63	169	0.004	0.010	0.05	0.002	246	0.0	13	A
19	4.30	8.08	98	0.06	0.06	3.47	163	0.005		0.07		246	0.0	12	
20	4.32	8.03	98	0.06	0.04	3.38	164	0.009		0.12		236	0.0	13	A
21	4.74	8.05	100	0.04	0.05	3.26	167	0.003		0.12		244	0.0	13	
22	3.78	8.15	98	0.04	0.05	3.29	171	0.002		0.09		242	0.0	12	
23	4.75	8.09	101	0.06	0.05	3.35	161	0.005		0.10		240	0.0	12	A
24	5.17	8.02	99	0.05	0.04	3.30	162	0.006		0.10		241	0.0	13	
25	3.99	7.87	94	0.04	0.06	3.44	168	0.003	0.020	0.06	0.004	239	0.0	15	A
26	5.67	7.92	98	0.04	0.06	3.58	168	0.006		0.12		243	0.0	16	
27	5.23	7.95	99	0.04	0.05	3.74	175	0.008		0.12		248	0.0	15	A
28	4.42	7.99	101	0.05	0.04	3.63	175	0.006		0.11		242	0.0	15	
29	4.37	8.03	102	0.06	0.04	3.58	177	0.006		0.11		244	0.0	15	
30	5.17	7.95	101	0.04	0.05	3.53	168	0.007		0.13		242	0.0	15	A
AVG	**4.32**	**8.01**	**96**	**0.04**	**0.06**	**3.46**	**166**	**0.004**	**0.016**	**0.10**	**0.003**	**241**	**0.0**	**12**	
TOTAL	**129.54**														

HIGH SERVICE

May-18

	PLANT EFFLUENT														
	Flow	pH	Alkalinity	Turbidity	Free Cl2	Total Cl2	Hardness	Iron	Mn	NH_3	NO_2	TDS	Color	Temp	Total
DATE	(mgd)	-	(mg/l)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(u)	(°C)	Coliforms
1	4.97	7.96	98	0.04	0.05	3.49	164	0.006		0.13		242	0.0	15	
2	4.63	8.11	99	0.05	0.06	3.47	162	0.008	0.013	0.10	0.004	241	0.0	16	A
3	4.29	8.17	101	0.06	0.06	3.46	160	0.007		0.10		233	0.0	15	
4	4.42	8.05	101	0.06	0.04	3.39	164	0.004		0.15		239	0.0	16	A
5	4.67	8.02	99	0.04	0.04	3.37	165	0.008		0.15		241	0.0	17	
6	4.80	8.00	100	0.04	0.05	3.34	169	0.003		0.14		242	0.0	18	
7	5.02	8.01	102	0.05	0.04	3.36	161	0.005		0.13		240	0.0	18	A
8	4.96	8.03	103	0.05	0.04	3.36	166	0.005		0.13		242	0.0	17	
9	4.87	8.01	101	0.04	0.05	3.36	164	0.003	0.002	0.13	0.006	228	0.0	20	A
10	5.13	8.09	100	0.04	0.04	3.19	167	0.001		0.19		240	0.0	22	
11	4.63	8.16	105	0.04	0.04	3.29	171	0.003		0.04		238	0.0	22	A
12	4.96	8.04	100	0.04	0.05	3.43	168	0.004		0.11		232	0.0	22	
13	4.92	7.97	102	0.04	0.04	3.39	169	0.005		0.08		234	0.0	22	
14	5.37	8.08	104	0.03	0.04	3.32	180	0.003		0.19		242	0.0	22	A
15	4.70	8.22	107	0.04	0.06	3.36	174	0.002		0.10		250	0.0	22	
16	3.87	8.19	106	0.04	0.06	3.43	168	0.004	0.001	0.07	0.004	245	0.0	22	A
17	4.93	7.85	103	0.05	0.05	3.37	170	0.017		0.07		24	0.0	22	
18	4.84	7.88	104	0.05	0.05	3.26	168	0.004		0.12		248	0.0	23	A
19	4.11	7.95	105	0.04	0.04	3.23	171	0.008		0.19		243	0.0	23	
20	4.30	8.02	105	0.03	0.05	3.29	173	0.003		0.20		244	0.0	23	
21	4.85	8.02	106	0.05	0.04	3.29	170	0.005		0.15		245	0.0	22	A
22	4.39	8.00	109	0.04	0.05	3.16	175	0.005		0.23		244	0.0	23	
23	4.93	7.91	109	0.05	0.05	3.26	172	0.004	0.002	0.15	0.003	232	0.0	24	A
24	4.88	8.03	109	0.05	0.06	3.20	171	0.004		0.08		245	0.0	25	
25	5.22	8.01	110	0.05	0.06	3.27	170	0.005		0.28		233	0.0	25	A
26	5.28	7.96	106	0.06	0.04	3.38	169	0.005		0.27		240	0.0	25	
27	5.45	7.99	109	0.06	0.04	3.49	167	0.005		0.28		238	0.0	25	
28	5.57	8.05	111	0.05	0.04	3.45	171	0.003		0.13		252	0.0	25	A
29	5.22	8.12	113	0.04	0.05	3.52	172	0.003		0.24		247	0.0	26	
30	5.52	8.15	111	0.06	0.05	3.40	175	0.003	0.001	0.21	0.002	242	0.0	26	A
31	5.37	8.24	110	0.07	0.06	3.43	171	0.004		0.16		240	0.0	26	
AVG	**4.87**	**8.04**	**105**	**0.05**	**0.05**	**3.35**	**169**	**0.005**	**0.004**	**0.15**	**0.004**	**234**	**0.0**	**21**	
TOTAL	**151.06**														

HIGH SERVICE
Jun-18

	PLANT EFFLUENT														
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	5.26	8.01	108	0.06	0.04	3.46	148	0.003		0.16		236	0.0	26	A
2	5.15	7.87	105	0.04	0.04	3.26	169	0.002		0.08		235	0.0	25	
3	4.74	7.88	102	0.04	0.04	2.87	169	0.001		0.06		230	0.0	25	
4	5.08	7.93	106	0.06	0.05	3.22	167	0.003		0.10		238	0.0	26	A
5	5.05	7.93	102	0.06	0.05	3.30	158	0.005		0.12		234	0.0	25	
6	5.18	8.00	106	0.04	0.05	3.48	171	0.002	0.021	0.04		235	0.0	25	A
7	5.02	8.08	110	0.04	0.05	3.61	172	0.003		0.19		231	0.0	25	
8	5.42	8.09	105	0.04	0.05	3.42	171	0.002		0.15		237	0.0	26	A
9	5.26	8.04	103	0.05	0.06	3.27	169	0.004		0.11		223	0.0	26	
10	5.30	8.02	106	0.05	0.03	3.13	165	0.005		0.10		230	0.0	26	
11	5.35	8.02	108	0.04	0.05	3.21	169	0.006		0.15		238	0.0	26	A
12	4.88	8.11	107	0.04	0.05	3.34	172	0.003		0.12		231	0.0	25	
13	5.41	8.15	104	0.04	0.06	3.54	165	0.003	0.002	0.07	0.002	230	0.0	26	A
14	5.15	7.97	105	0.05	0.04	3.45	164	0.004		0.09		230	0.0	26	
15	4.95	8.16	104	0.05	0.05	3.51	162	0.005		0.11		232	0.0	27	A
16	5.73	8.12	104	0.04	0.04	3.53	161	0.004		0.13		224	0.0	27	
17	5.31	7.93	102	0.04	0.04	3.26	161	0.003		0.15		224	0.0	28	
18	5.09	7.94	103	0.05	0.05	3.22	163	0.002		0.12		228	0.0	27	A
19	5.25	7.94	103	0.05	0.05	3.35	160	0.002		0.12		226	0.0	28	
20	4.49	8.02	102	0.03	0.05	3.35	165	0.001	0.017	0.07	0.004	227	0.0	28	A
21	4.20	8.12	104	0.03	0.04	3.38	164	0.004		0.09		223	0.0	27	
22	3.52	8.21	104	0.04	0.06	3.48	158	0.002		0.09		232	0.0	26	A
23	4.54	8.10	99	0.04	0.06	3.56	160	0.003		0.09		218	0.0	24	
24	3.84	7.99	98	0.04	0.05	3.42	158	0.003		0.10		218	0.0	26	
25	4.16	7.90	100	0.04	0.04	3.36	160	0.003		0.08		230	0.0	26	A
26	4.22	8.09	101	0.04	0.05	3.49	163	0.003		0.15		223	0.0	25	
27	4.45	8.20	100	0.05	0.05	3.66	157	0.002	0.016	0.12	0.002	222	0.0	27	A
28	4.02	8.14	100	0.04	0.05	3.47	161	0.004		0.11		220	0.0	25	
29	4.82	8.05	101	0.04	0.05	3.41	157	0.004		0.16		223	0.0	26	A
30	5.27	8.01	101	0.03	0.04	3.33	163	0.001		0.15		226	0.0	28	
AVG	**4.87**	**8.03**	**103**	**0.04**	**0.05**	**3.38**	**163**	**0.003**	**0.014**	**0.11**	**0.003**	**228**	**0.0**	**26**	
TOTAL	**146.11**														

HIGH SERVICE
Jul-18

	PLANT EFFLUENT														
	Flow	pH	Alkalinity	Turbidity	Free Cl2	Total Cl2	Hardness	Iron	Mn	NH_3	NO_2	TDS	Color	Temp	Total
DATE	(mgd)	-	(mg/l)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(u)	(°C)	Coliforms
1	4.63	8.07	100	0.03	0.05	3.38	163	0.004		0.16		233	0.0	28	
2	4.97	8.09	101	0.03	0.04	3.33	162	0.003		0.11		223	0.0	27	A
3	4.98	8.07	101	0.03	0.05	3.45	160	0.004		0.17		229	0.0	28	
4	5.45	8.19	101	0.03	0.04	3.53	164	0.003	0.004	0.13	0.003	229	0.0	29	A
5	5.08	8.25	100	0.03	0.04	3.52	161	0.001		0.08		228	0.0	29	
6	4.65	8.14	102	0.03	0.05	3.55	165	0.001		0.12		228	0.0	29	A
7	4.83	8.29	98	0.04	0.05	3.57	158	0.062		0.05		215	0.0	28	
8	4.93	8.30	98	0.04	0.05	3.54	156	0.002		0.07		213	0.0	27	
9	5.45	8.29	98	0.03	0.05	3.27	159	0.004		0.11		228	0.0	30	A
10	4.84	8.19	97	0.04	0.06	3.37	152	0.002		0.10		232	0.0	30	
11	5.65	8.18	99	0.05	0.05	3.52	156	0.003	0.004	0.21	0.003	227	0.0	29	A
12	5.07	8.13	99	0.05	0.04	3.43	156	0.025		0.14		224	0.0	30	
13	5.34	8.16	99	0.05	0.04	3.27	157	0.004		0.13		226	0.0	30	A
14	5.31	8.17	100	0.04	0.04	3.13	157	0.008		0.17		228	0.0	30	
15	4.36	8.08	97	0.03	0.04	3.09	161	0.006		0.18		229	0.0	30	
16	5.19	8.19	99	0.05	0.05	3.32	153	0.006		0.14		226	0.0	30	A
17	3.76	8.21	99	0.06	0.05	3.33	156	0.003		0.16		225	0.0	29	
18	4.97	8.11	98	0.05	0.05	3.29	164	0.005	0.017	0.15	0.004	225	0.0	30	A
19	4.33	8.04	99	0.05	0.05	3.26	161	0.005		0.16		221	0.0	30	
20	4.64	7.88	99	0.05	0.04	3.19	162	0.002		0.12		214	0.0	28	A
21	4.69	7.94	98	0.06	0.04	3.32	155	0.003		0.13		215	0.0	30	
22	4.61	8.06	99	0.06	0.06	3.46	158	0.004		0.11		216	0.0	28	
23	4.95	8.17	101	0.05	0.05	3.27	160	0.003		0.14		231	0.0	28	A
24	5.16	8.26	101	0.04	0.05	3.43	160	0.006		0.10			0.0	29	
25	4.83	8.25	101	0.06	0.05	3.72	159	0.002	0.010	0.08	0.002	221	0.0	29	A
26	4.62	8.07	99	0.07	0.05	3.53	161	0.008		0.06		222	0.0	28	
27	4.91	8.05	97	0.05	0.04	3.37	156	0.002		0.12		224	0.0	28	A
28	4.40	8.04	97	0.05	0.47	3.44	156	0.006		0.13		218	0.0	27	
29	3.75	7.93	97	0.05	0.05	3.52	155	0.005		0.11		207	0.0	26	
30	4.59	7.91	96	0.06	0.05	3.45	158	0.007		0.10		207	0.0	27	A
31	4.31	8.08	97	0.06	0.04	3.37	157	0.006		0.09		215	0.0	26	
AVG	**4.81**	**8.12**	**99**	**0.05**	**0.06**	**3.39**	**159**	**0.006**	**0.009**	**0.12**	**0.003**	**222**	**0.0**	**28**	
TOTAL	**149.25**														

HIGH SERVICE
Aug-18

	PLANT EFFLUENT														
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	4.46	8.10	100	0.04	0.04	3.35	160	0.005	0.015	0.13	0.004	226	0.0	27	A
2	4.32	8.07	99	0.04	0.07	3.42	161	0.005		0.12		228	0.0	27	
3	4.68	8.10	99	0.04	0.05	3.48	162	0.004		0.13		225	0.0	28	A
4	4.82	7.97	98	0.06	0.05	3.44	160	0.001		0.11		226	0.0	29	
5	4.61	7.96	99	0.06	0.04	3.39	156	0.004		0.08		225	0.0	29	
6	4.30	8.10	99	0.05	0.05	3.28	163	0.003		0.15		227	0.0	29	A
7	4.89	8.21	99	0.05	0.05	3.39	167	0.006		0.11		231	0.0	29	
8	4.13	8.19	98	0.05	0.05	3.61	164	0.005	0.014	0.08	0.002	227	0.0	28	A
9	4.64	8.16	99	0.07	0.05	3.39	156	0.006		0.08		226	0.0	27	
10	4.38	8.20	100	0.05	0.05	3.51	160	0.004		0.14		231	0.0	28	A
11	5.07	8.17	101	0.04	0.04	3.37	164	0.002		0.20		231	0.0	29	
12	4.13	8.08	99	0.03	0.04	3.37	164	0.004		0.17		229	0.0	28	
13	5.19	8.10	99	0.06	0.05	3.46	165	0.005		0.17		230	0.0	28	A
14	4.01	8.01	99	0.05	0.05	3.34	158	0.005		0.19		223	0.0	27	
15	4.23	7.99	97	0.04	0.05	3.15	167	0.004	0.015	0.17	0.005	231	0.0	28	A
16	4.52	7.89	97	0.04	0.05	3.19	161	0.004		0.19		233	0.0	28	
17	4.36	8.02	97	0.04	0.05	3.36	160	0.004		0.10		224	0.0	27	A
18	4.22	8.15	98	0.06	0.04	3.31	159	0.005		0.11		228	0.0	27	
19	4.75	8.16	98	0.06	0.05	3.33	160	0.005		0.14		226	0.0	27	
20	4.17	7.95	101	0.04	0.04	3.29	165	0.003		0.19		230	0.0	28	A
21	4.60	7.95	102	0.04	0.06	3.20	165	0.001		0.15		224	0.0	26	
22	4.26	8.04	100	0.06	0.05	3.36	165	0.004	0.020	0.08	0.004	225	0.0	26	A
23	4.25	8.09	100	0.06	0.04	3.47	160	0.004		0.10		216	0.0	24	
24	4.35	8.07	101	0.05	0.05	3.40	161	0.003		0.07		228	0.0	26	A
25	4.64	7.99	103	0.04	0.05	3.36	163	0.003		0.09		232	0.0	27	
26	4.67	8.04	106	0.04	0.05	3.44	162	0.001		0.12		226	0.0	28	
27	5.20	8.04	103	0.06	0.05	3.47	159	0.004		0.11		228	0.0	26	A
28	4.53	8.07	103	0.05	0.04	3.49	156	0.005		0.13		235	0.0	27	
29	4.46	8.01	101	0.04	0.05	3.39	161	0.003	0.026	0.11	0.003	229	0.0	27	A
30	4.10	8.00	101	0.03	0.05	3.29	161	0.005		0.12		230	0.0	27	
31	4.14	7.95	101	0.04	0.04	3.25	160	0.003		0.14		227	0.0	26	A
AVG	**4.49**	**8.06**	**100**	**0.05**	**0.05**	**3.37**	**161**	**0.004**	**0.018**	**0.13**	**0.004**	**228**	**0.0**	**27**	
TOTAL	**139.08**														

HIGH SERVICE

Sep-18

	PLANT EFFLUENT														
	Flow	**pH**	**Alkalinity**	**Turbidity**	**Free Cl2**	**Total Cl2**	**Hardness**	**Iron**	**Mn**	**NH_3**	**NO_2**	**TDS**	**Color**	**Temp**	**Total**
DATE	**(mgd)**	**-**	**(mg/l)**	**(NTU)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(u)**	**(°C)**	**Coliforms**
1	3.90	7.93	100	0.06	0.06	3.39	156	0.007		0.11		228	0.0	26	
2	4.95	8.01	102	0.06	0.06	3.33	159	0.006		0.09		230	0.0	26	
3	4.76	8.07	105	0.05	0.05	3.30	163	0.021		0.16		235	0.0	27	A
4	4.84	8.12	105	0.04	0.05	3.53	161	0.006		0.11		235	0.0	27	
5	3.98	8.12	102	0.05	0.05	3.62	147	0.004	0.009	0.15	0.002	222	0.0	27	A
6	4.49	8.21	102	0.05	0.05	3.45	155	0.005		0.14		220	0.0	26	
7	4.16	8.15	101	0.04	0.05	3.41	156	0.011		0.19		218	0.0	27	A
8	4.47	8.06	99	0.03	0.05	3.20	150	0.003		0.16		225	0.0	25	
9	4.29	7.87	93	0.04	0.04	3.16	144	0.002		0.19		215	0.0	25	
10	3.65	7.81	88	0.07	1.81	3.63	143	0.007		0.19		214	0.0	25	A
11	4.25	7.84	89	0.06	3.42	4.04	146	0.004		0.00		205	0.0	25	
12	4.08	7.98	92	0.05	3.01	3.57	148	0.006	0.005	0.00	0.004	200	0.0	25	A
13	3.90	7.99	92	0.04	2.71	3.19	149	0.004		0.00		213	0.0	25	
14	4.21	7.98	93	0.04	2.79	3.39	148	0.009		0.00		210	0.0	26	A
15	4.30	7.97	91	0.05	2.91	3.39	150	0.004		0.00		212	0.0	26	
16	3.95	7.88	91	0.05	3.06	3.53	150	0.003		0.00		210	0.0	26	
17	4.81	7.89	91	0.04	2.86	3.31	146	0.004		0.00		212	0.0	26	A
18	4.21	7.92	91	0.04	2.77	3.30	149	0.004		0.00		211	0.0	26	
19	4.71	7.85	90	0.05	5.64	3.20	148	0.004	0.002	0.00	0.002	207	0.0	27	A
20	4.34	7.89	97	0.05	2.67	3.24	144	0.004		0.00		207	0.0	26	
21	3.79	7.96	96	0.05	2.53	3.09	146	0.006		0.00		218	0.0	26	A
22	3.88	8.07	93	0.04	2.51	3.03	146	0.002		0.00		218	0.0	26	
23	3.86	8.01	94	0.04	2.65	3.13	147	0.004		0.00		217	0.0	26	
24	3.95	7.99	90	0.06	2.79	3.33	147	0.006		0.00		218	0.0	26	A
25	5.27	8.04	90	0.05	2.77	3.40	150	0.006		0.00		222	0.0	25	
26	3.48	8.03	93	0.04	2.80	3.25	148	0.004	0.013	0.00	0.000	219	0.0	25	A
27	4.45	7.99	94	0.05	2.81	3.22	155	0.003		0.00		219	0.0	24	
28	3.73	7.99	95	0.04	2.73	3.21	156	0.003		0.00		222	0.0	23	A
29	3.92	7.97	91	0.05	2.74	3.25	149	0.003		0.00		224	0.0	21	
30	4.05	7.91	91	0.05	2.74	3.37	151	0.004		0.00		219	0.0	23	
AVG	**4.22**	**7.98**	**95**	**0.05**	**2.04**	**3.35**	**150**	**0.005**	**0.007**	**0.05**	**0.002**	**217**	**0.0**	**25**	
TOTAL	**126.63**														

HIGH SERVICE
Oct-18

	PLANT EFFLUENT														
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	4.40	7.85	94	0.04	2.63	3.17	150	0.003		0.00		221	0.0	23	A
2	4.42	7.88	94	0.04	2.67	3.14	152	0.003		0.00		222	0.0	24	
3	4.52	7.94	92	0.05	2.78	3.23	150	0.004	0.003	0.00	0.001	219	0.0	25	A
4	4.27	7.92	94	0.05	2.72	3.20	156	0.005		0.00		221	0.0	25	
5	3.70	7.91	93	0.05	2.73	3.27	151	0.005		0.00		221	0.0	24	A
6	4.02	7.91	95	0.04	2.69	3.15	154	0.002		0.00		224	0.0	24	
7	3.82	7.99	95	0.03	2.61	3.09	156	0.004		0.00		225	0.0	23	
8	4.12	8.02	93	0.05	2.91	3.41	152	0.005		0.00		226	0.0	23	A
9	3.78	7.95	95	0.05	2.81	3.39	156	0.004		0.00		225	0.0	24	
10	4.37	7.89	97	0.04	2.78	3.27	154	0.002	0.003	0.00	0.002	223	0.0	24	A
11	3.52	7.96	99	0.04	2.64	3.10	163	0.002		0.00		227	0.0	22	
12	4.00	7.97	95	0.05	2.54	2.96	152	0.001		0.00		228	0.0	21	A
13	3.91	6.00	92	0.06	2.31	2.71	149	0.003		0.00		226	0.0	20	
14	3.91	7.86	93	0.06	1.99	2.47	152	0.003		0.00		220	0.0	20	
15	3.70	7.84	93	0.05	0.67	2.26	152	0.006		0.03		228	0.0	20	A
16	3.67	7.96	93	0.05	0.05	2.88	148	0.008		0.21		225	0.0	20	
17	3.98	8.11	95	0.06	0.05	3.24	150	0.005	0.001	0.21	0.002	226	0.0	19	A
18	3.51	8.14	97	0.06	0.05	3.36	145	0.006		0.18		226	0.0	19	
19	4.31	8.06	97	0.05	0.04	3.29	148	0.006		0.13		219	0.0	18	A
20	3.38	8.01	97	0.04	0.06	3.28	148	0.004		0.18		222	0.0	19	
21	4.36	8.08	96	0.04	0.05	3.28	152	0.006		0.21		221	0.0	18	
22	4.08	8.07	96	0.05	0.04	3.31	150	0.004		0.16		222	0.0	18	A
23	4.12	8.05	95	0.06	0.03	3.28	152	0.004		0.08		221	0.0	18	
24	3.44	8.03	99	0.04	0.04	3.09	156	0.004	0.016	0.11	0.003	224	0.0	18	A
25	4.22	8.02	100	0.04	0.06	3.14	156	0.003		0.15		226	0.0	18	
26	2.98	8.03	98	0.04	0.05	3.09	159	0.008		0.18		225	0.0	17	A
27	4.33	8.10	95	0.06	0.10	3.22	158	0.004		0.12		226	0.0	16	
28	3.64	8.11	97	0.05	0.05	3.24	158	0.005		0.14		225	0.0	16	
29	3.76	8.09	99	0.04	0.05	3.09	155	0.005		0.18		226	0.0	18	A
30	3.50	8.07	99	0.04	0.06	3.09	160	0.004		0.15		227	0.0	18	
31	4.03	8.06	98	0.06	0.04	3.25	156	0.008	0.012	0.17	0.002	226	0.0	17	A
AVG	**3.93**	**7.93**	**96**	**0.05**	**1.23**	**3.13**	**153**	**0.004**	**0.007**	**0.08**	**0.002**	**224**	**0.0**	**20**	
TOTAL	**121.77**														

HIGH SERVICE

Nov-18

DATE	PLANT EFFLUENT														
	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
1	3.69	8.07	98	0.06	0.04	3.24	151	0.006		0.15		226	0.0	18	
2	3.86	8.07	98	0.06	0.04	3.31	153	0.004		0.13		225	0.0	17	A
3	4.12	7.98	100	0.04	0.04	3.16	151	0.004		0.12		226	0.0	16	
4	3.63	7.98	99	0.04	0.04	3.05	154	0.005		0.14		225	0.0	16	
5	4.25	7.98	97	0.06	0.05	3.20	152	0.005		0.12		225	0.0	15	A
6	3.92	7.89	97	0.06	0.05	3.27	150	0.004		0.07		224	0.0	16	
7	3.74	8.00	99	0.05	0.05	3.05	155	0.003	0.008	0.14	0.003	226	0.0	16	A
8	3.72	8.13	102	0.05	0.05	3.02	156	0.006		0.17		226	0.0	15	
9	3.31	8.15	101	0.05	0.05	3.15	154	0.004		0.13		226	0.0	15	A
10	4.62	8.07	100	0.07	0.06	3.39	158	0.004		0.12		227	0.0	14	
11	3.46	8.00	101	0.06	0.06	3.27	153	0.005		0.12		228	0.0	13	
12	4.52	7.88	99	0.05	0.05	3.13	155	0.005		0.15		228	0.0	14	A
13	3.56	7.93	97	0.05	0.06	3.13	153	0.004		0.15		232	0.0	13	
14	3.89	7.90	96	0.06	0.06	3.26	160	0.005	0.007	0.12	0.006	230	0.0	13	A
15	4.16	7.92	97	0.06	0.05	3.31	151	0.006		0.14		229	0.0	12	
16	3.92	7.93	97	0.06	0.04	3.26	152	0.005		0.10		226	0.0	12	A
17	4.03	7.98	101	0.05	0.07	3.19	153	0.002		0.14		230	0.0	12	
18	3.89	8.04	102	0.05	0.06	3.24	151	0.006		0.15		230	0.0	12	
19	3.76	8.07	98	0.06	0.05	3.41	151	0.006		0.14		228	0.0	12	A
20	4.15	8.03	97	0.06	0.05	3.36	155	0.005		0.15		229	0.0	12	
21	4.22	7.97	98	0.05	0.06	3.24	155	0.005	0.006	0.08	0.005	230	0.0	12	A
22	3.62	7.84	98	0.05	0.05	3.21	157	0.001		0.08		230	0.0	12	
23	3.90	7.98	98	0.05	0.06	3.26	152	0.003		0.08		232	0.0	12	A
24	4.25	8.06	97	0.06	0.05	3.46	150	0.005		0.09		230	0.0	11	
25	3.52	8.14	99	0.06	0.05	3.46	150	0.005		0.11		230	0.0	11	
26	4.30	8.16	100	0.05	0.06	3.28	156	0.001		0.12		232	0.0	11	A
27	3.87	8.04	97	0.05	0.06	3.30	154	0.008		0.11		233	0.0	12	
28	3.75	8.03	96	0.06	0.09	3.77	157	0.006	0.004	0.06	0.002	231	0.0	11	A
29	3.74	8.10	98	0.07	0.05	3.59	149	0.006		0.09		230	0.0	10	
30	3.81	8.03	99	0.06	0.05	3.51	153	0.007		0.14		230	0.0	12	A
AVG	**3.91**	**8.01**	**98**	**0.05**	**0.05**	**3.28**	**153**	**0.004**	**0.006**	**0.12**	**0.004**	**228**	**0.0**	**13**	
TOTAL	**117.18**														

HIGH SERVICE
Dec-18

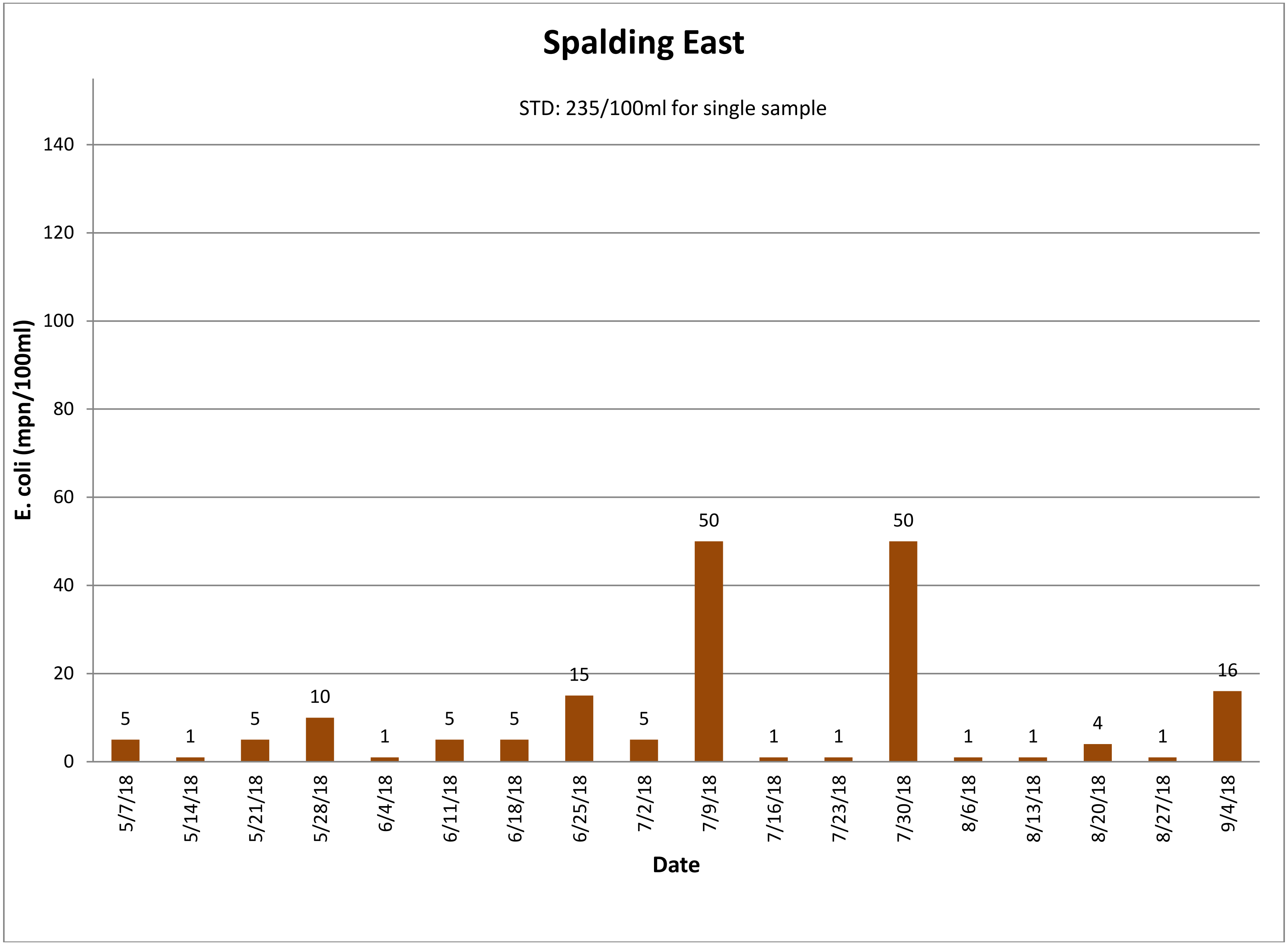
	PLANT EFFLUENT														
	Flow	**pH**	**Alkalinity**	**Turbidity**	**Free Cl2**	**Total Cl2**	**Hardness**	**Iron**	**Mn**	**NH_3**	**NO_2**	**TDS**	**Color**	**Temp**	**Total**
DATE	**(mgd)**	**-**	**(mg/l)**	**(NTU)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(mg/l)**	**(u)**	**(°C)**	**Coliforms**
1	3.76	7.94	100	0.07	0.07	3.19	149	0.004		0.13		224	0.0	9	
2	3.76	7.89	101	0.05	0.07	3.23	154	0.003		0.08		224	0.0	9	
3	4.07	7.88	95	0.06	0.06	3.45	149	0.005		0.10		228	0.0	9	A
4	3.70	7.93	96	0.07	0.06	3.39	154	0.006		0.19		229	0.0	9	
5	3.65	7.81	103	0.06	0.07	3.28	155	0.001	0.007	0.11	0.004	226	0.0	10	A
6	3.78	7.83	103	0.07	0.06	3.24	160	0.003		0.14		246	0.0	9	
7	3.88	7.92	97	0.05	0.06	3.23	151	0.004		0.14		226	0.0	9	A
8	3.89	8.04	99	0.05	0.14	3.55	154	0.042		0.10		249	0.0	12	
9	3.47	7.98	98	0.06	0.06	3.60	157	0.010		0.05		238	0.0	13	
10	4.18	7.95	98	0.06	0.06	3.58	151	0.004		0.10		249	0.0	8	A
11	3.88	7.92	96	0.06	0.05	3.19	114	0.004		0.10		244	0.0	8	
12	4.23	7.96	94	0.06	0.06	3.45	155	0.004	0.004	0.08	0.003	238	0.0	9	A
13	3.84	8.04	94	0.06	0.06	3.48	155	0.005		0.09		200	0.1	8	
14	3.91	7.95	96	0.06	0.05	3.56	153	0.006		0.12		264	0.0	8	A
15	4.14	7.94	101	0.05	0.06	3.23	156	0.003		0.09		284	0.0	10	
16	4.05	8.01	102	0.04	0.06	3.24	155	0.003		0.12		249	0.0	10	
17	4.01	7.98	97	0.06	0.06	3.42	152	0.005		0.13		248	0.0	9	A
18	4.21	8.07	94	0.06	0.06	3.34	160	0.004		0.19		236	0.0	8	
19	4.06	8.03	99	0.05	0.08	3.40	153	0.005	0.015	0.05	0.010	237	0.0	8	A
20	4.02	8.06	100	0.04	0.06	3.23	157	0.004		0.16		239	0.0	9	
21	3.79	8.00	101	0.04	0.08	3.28	158	0.005		0.04		237	0.0	10	A
22	4.49	7.94	99	0.06	0.06	3.49	157	0.006		0.08		232	0.0	9	
23	3.47	8.05	98	0.08	0.05	3.44	150	0.005		0.09		220	0.0	9	
24	4.92	7.93	99	0.05	0.07	3.17	161	0.005		0.14		238	0.0	9	A
25	3.81	7.82	98	0.06	0.05	3.39	158	0.006	0.004	0.14	0.002	236	0.0	9	
26	4.15	7.92	99	0.07	0.07	3.58	165	0.007		0.13		237	0.0	9	A
27	3.84	7.92	98	0.08	0.05	3.48	164	0.006		0.11		240	0.0	9	
28	4.39	7.99	99	0.07	0.05	3.49	157	0.006		0.10		237	0.0	9	A
29	3.59	8.01	103	0.04	0.05	3.34	164	0.003		0.09		240	0.0	9	
30	3.49	8.05	101	0.04	0.06	3.40	164	0.001		0.12		240	0.0	9	
31	3.70	8.15	101	0.07	0.05	3.48	160	0.004		0.11		240	0.0	9	A
AVG	**3.94**	**7.96**	**98**	**0.06**	**0.06**	**3.38**	**155**	**0.006**	**0.008**	**0.11**	**0.005**	**238**	**0.0**	**9**	
TOTAL	**122.13**														

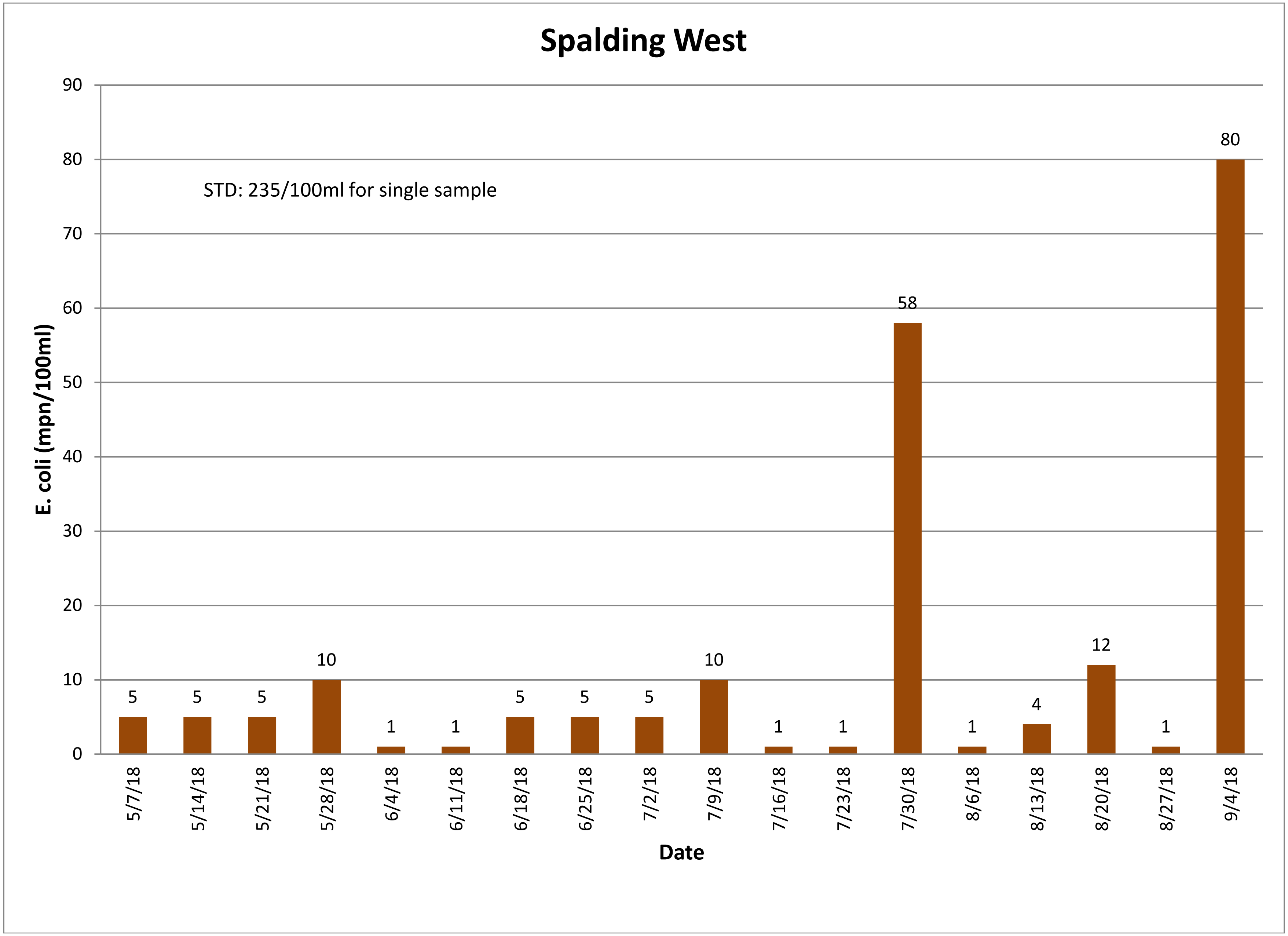
APPENDIX F

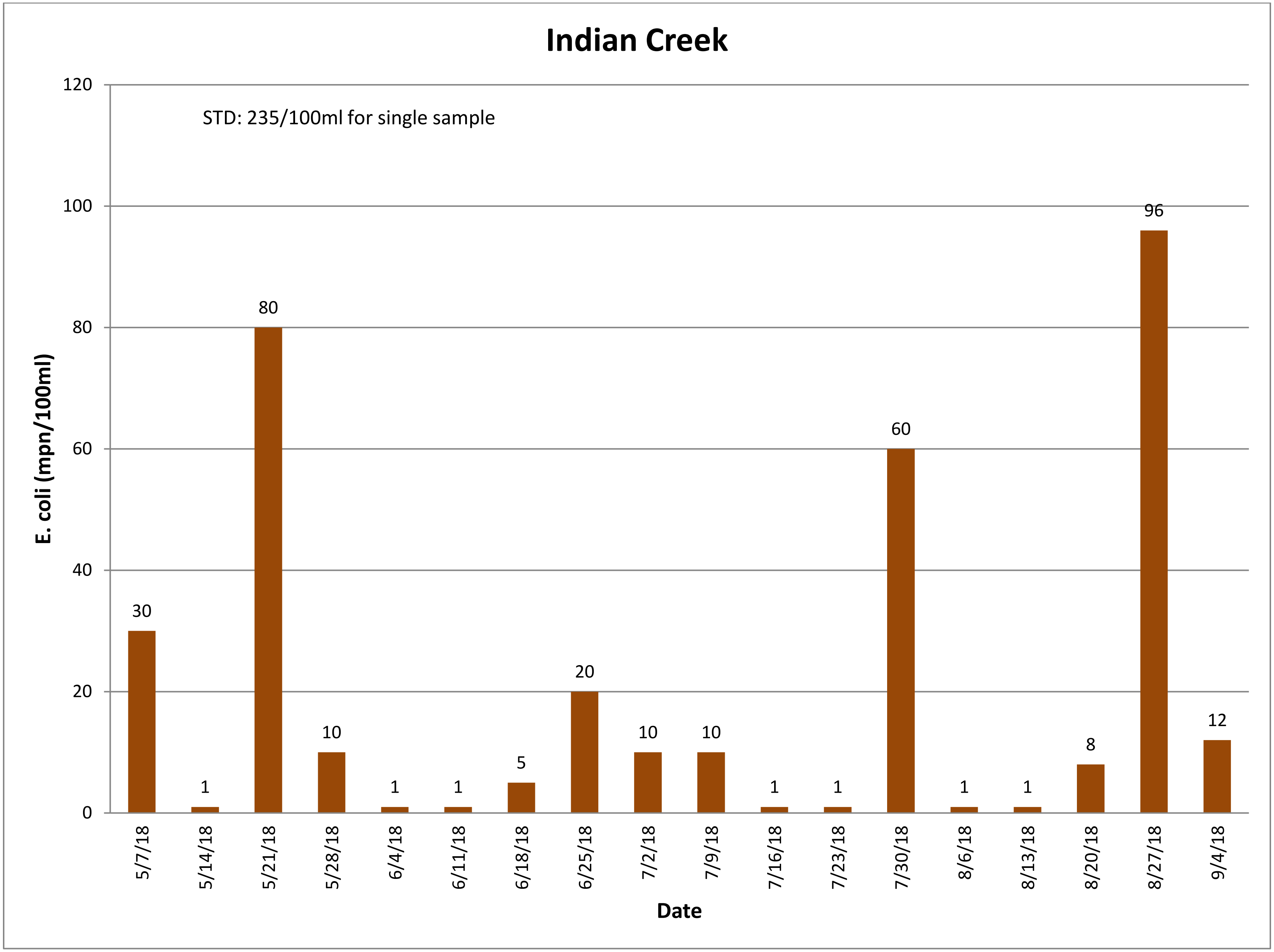
Beach Data & Graphs

2018 Beach Data

Date	Bottle Number	Spalding East (E. Coli / 100 ml)	Bottle Number	Spalding West (E. Coli / 100 ml)	Bottle Number	Indian Creek (E. Coli / 100 ml)
5/7/2018	8011	5	8013	5	8017	30
5/14/2018	8653	1	8654	5	8656	1
5/21/2018	8735	5	8740	5	8753	80
5/28/2018	8652	10	8662	10	8666	10
6/4/2018	8664	1	8669	1	8672	1
6/11/2018	8657	5	8658	1	8660	1
6/18/2018	8665	5	8730	5	8745	5
6/25/2018	8761	15	8779	5	8782	20
7/2/2018	8823	5	8829	5	8830	10
7/9/2018	8805	50	8816	10	8821	10
7/16/2018	8807	1	8809	1	8820	1
7/23/2018	8810	1	8826	1	8831	1
7/30/2018	8836	50	8860	58	8868	60
8/6/2018	8871	1	8863	1	8834	1
8/13/2018	8833	1	8854	4	8866	1
8/20/2018	8839	4	8844	12	8973	8
8/27/2018	8851	1	8877	1	8881	96
9/4/2018	8841	16	8880	80	8882	12

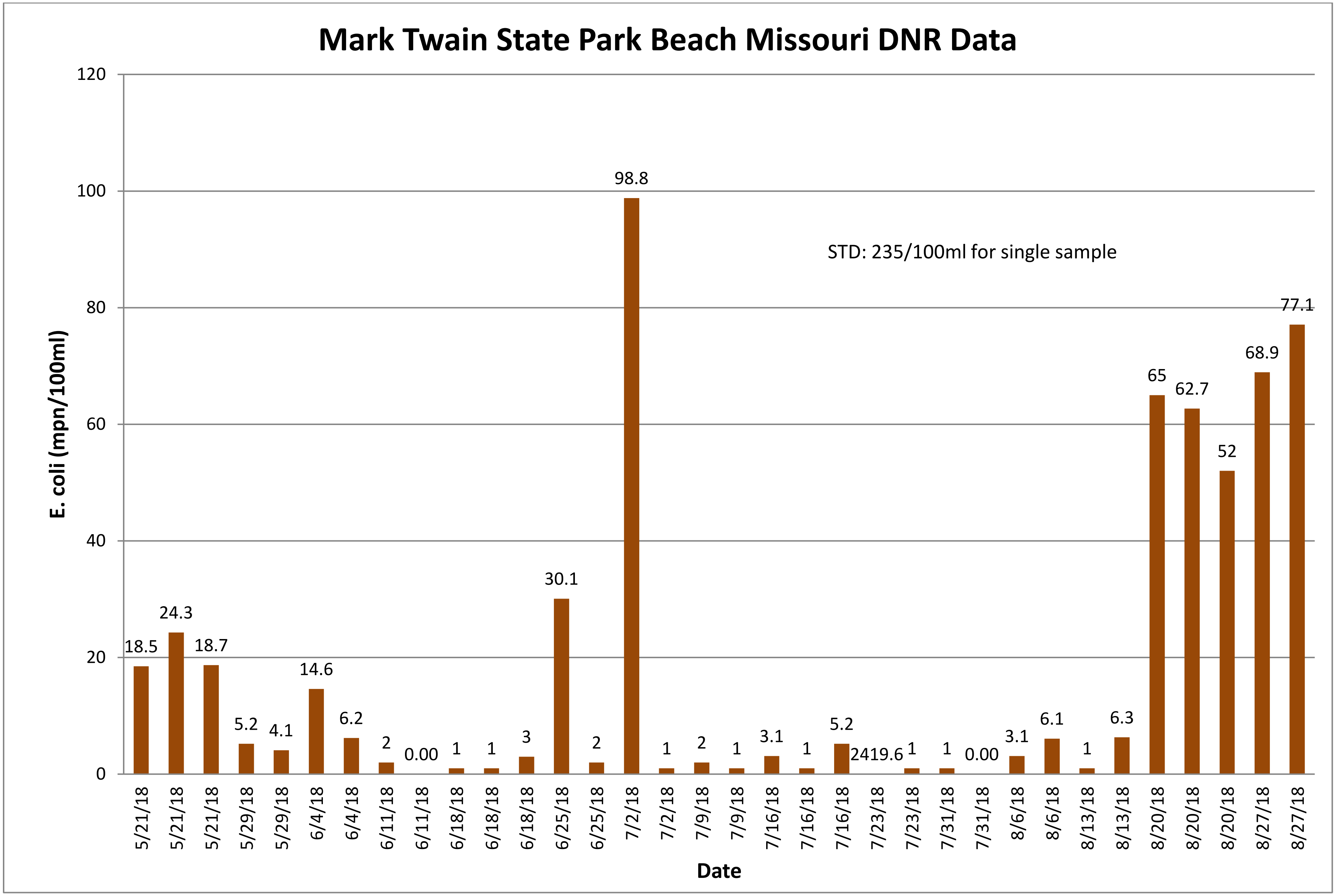

Spalding East
STD: 235/100ml for single sample
E. coli (mpn/100ml)
140
120
100
80
60
40
20
0
5
1
5
10
1
5
5
15
5
50
1
1
50
1
1
4
1
16
5/7/18
5/14/18
5/21/18
5/28/18
6/4/18
6/11/18
6/18/18
6/25/18
7/2/18
7/9/18
7/16/18
7/23/18
7/30/18
8/6/18
8/13/18
8/20/18
8/27/18
9/4/18
Date


Spalding West
STD: 235/100ml for single sample
E. coli (mpn/100ml)
Date
0
10
20
30
40
50
60
70
80
90
5
5
5
10
1
1
5
5
5
10
1
1
58
1
4
12
1
80
5/7/18
5/14/18
5/21/18
5/28/18
6/4/18
6/11/18
6/18/18
6/25/18
7/2/18
7/9/18
7/16/18
7/23/18
7/30/18
8/6/18
8/13/18
8/20/18
8/27/18
9/4/18


Indian Creek
STD: 235/100ml for single sample
E. coli (mpn/100ml)
0
20
40
60
80
100
120
30
1
80
10
1
1
5
20
10
10
1
1
60
1
1
8
96
12
5/7/18
5/14/18
5/21/18
5/28/18
6/4/18
6/11/18
6/18/18
6/25/18
7/2/18
7/9/18
7/16/18
7/23/18
7/30/18
8/6/18
8/13/18
8/20/18
8/27/18
9/4/18
Date

2018 Mark Twain State Park Beach Data

Site	Collect Date	Time	Qualifier	E. Coli	ReportingUnits
Mark Twain State Park - Public Beach	5/21/2018	11:00:00 AM		18.5	mpn/100ml
Mark Twain State Park - Public Beach	5/21/2018	11:00:00 AM		24.3	mpn/100ml
Mark Twain State Park - Public Beach	5/21/2018	11:05:00 AM		18.7	mpn/100ml
Mark Twain State Park - Public Beach	5/29/2018	10:00:00 AM		5.2	mpn/100ml
Mark Twain State Park - Public Beach	5/29/2018	10:02:00 AM		4.1	mpn/100ml
Mark Twain State Park - Public Beach	6/4/2018	9:30:00 AM		14.6	mpn/100ml
Mark Twain State Park - Public Beach	6/4/2018	9:32:00 AM		6.2	mpn/100ml
Mark Twain State Park - Public Beach	6/11/2018	9:30:00 AM		2	mpn/100ml
Mark Twain State Park - Public Beach	6/11/2018	9:32:00 AM	ND	<1	mpn/100ml
Mark Twain State Park - Public Beach	6/18/2018	9:03:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	6/18/2018	9:03:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	6/18/2018	9:00:00 AM		3	mpn/100ml
Mark Twain State Park - Public Beach	6/25/2018	9:02:00 AM		30.1	mpn/100ml
Mark Twain State Park - Public Beach	6/25/2018	9:00:00 AM		2	mpn/100ml
Mark Twain State Park - Public Beach	7/2/2018	9:33:00 AM		98.8	mpn/100ml
Mark Twain State Park - Public Beach	7/2/2018	9:30:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	7/9/2018	9:32:00 AM		2	mpn/100ml
Mark Twain State Park - Public Beach	7/9/2018	9:30:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	7/16/2018	8:00:00 AM		3.1	mpn/100ml
Mark Twain State Park - Public Beach	7/16/2018	8:01:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	7/16/2018	8:02:00 AM		5.2	mpn/100ml
Mark Twain State Park - Public Beach	7/23/2018	10:00:00 AM	ND	<1	mpn/100ml
Mark Twain State Park - Public Beach	7/23/2018	10:05:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	7/31/2018	11:00:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	7/31/2018	11:03:00 AM	ND	<1	mpn/100ml
Mark Twain State Park - Public Beach	8/6/2018	9:00:00 AM		3.1	mpn/100ml
Mark Twain State Park - Public Beach	8/6/2018	9:05:00 AM		6.1	mpn/100ml
Mark Twain State Park - Public Beach	8/13/2018	9:00:00 AM		1	mpn/100ml
Mark Twain State Park - Public Beach	8/13/2018	9:05:00 AM		6.3	mpn/100ml
Mark Twain State Park - Public Beach	8/20/2018	10:05:00 AM		65	mpn/100ml
Mark Twain State Park - Public Beach	8/20/2018	10:05:00 AM		62.7	mpn/100ml
Mark Twain State Park - Public Beach	8/20/2018	10:00:00 AM		52	mpn/100ml
Mark Twain State Park - Public Beach	8/27/2018	8:35:00 AM		68.9	mpn/100ml
Mark Twain State Park - Public Beach	8/27/2018	8:30:00 AM		77.1	mpn/100ml


Mark Twain State Park Beach Missouri DNR Data
E. coli (mpn/100ml)
Date
STD: 235/100ml for single sample
0
20
40
60
80
100
120
18.5
24.3
18.7
5.2
4.1
14.6
6.2
2
0.00
1
1
3
30.1
2
98.8
1
2
1
3.1
1
5.2
2419.6
1
1
0.00
3.1
6.1
1
6.3
65
62.7
52
68.9
77.1
5/21/18
5/21/18
5/21/18
5/29/18
5/29/18
6/4/18
6/4/18
6/11/18
6/11/18
6/18/18
6/18/18
6/18/18
6/25/18
6/25/18
7/2/18
7/2/18
7/9/18
7/9/18
7/16/18
7/16/18
7/16/18
7/23/18
7/23/18
7/31/18
7/31/18
8/6/18
8/6/18
8/13/18
8/13/18
8/20/18
8/20/18
8/20/18
8/27/18
8/27/18