2013

MARK TWAIN LAKE

WATER QUALITY

REPORT

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

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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 was 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 more hilly 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.

The water of Mark Twain Lake and the downstream river channel is generally good. 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 2013 except the phosphorous levels. Phosphorous levels have exceeded the state standard on a routine basis. Generally the tailwater levels are lower than the incoming tributary flows, which indicates that the lake is sinking the phosphorous. This is also occurring with nitrogen. The project area has little pollution potentials at present time, no major form of degradation to the lake or streams is apparent. Constant water quality monitoring will continue to check future degradation of the watershed.

WATER QUALITY MONITORING PROGRAM

1.0 GENERAL OVERVIEW

This report summarizes water quality activities of the St. Louis District for Fiscal Year 2013 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 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 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) through the University of Missouri-Columbia has been taking samples at 3 sites 4 times a year since 1989. The LMVP only analyze for Nutrients and Chlorophyll.

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 2010 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. Mark Twain Lake is listed as eutrophic. 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.

1.1 INTRODUCTION

Mark Twain Lake is located in northeast Missouri. The land surrounding the lake is used predominately for agriculture. The main agricultural contaminants 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.

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 2013 to assure safe conditions for human recreation, wildlife and aquatic life as maintained and managed within the lake system. The 2013 water quality monitoring program was funded to conduct three sampling events. 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.

As mentioned above, LMVP collects samples at Mark Twain Lake. This year they conducted 8 sampling events at 3 sites. Their data is in Appendix D. We have also included data from the United Water Services Clarence Cannon WTP in Appendix E.

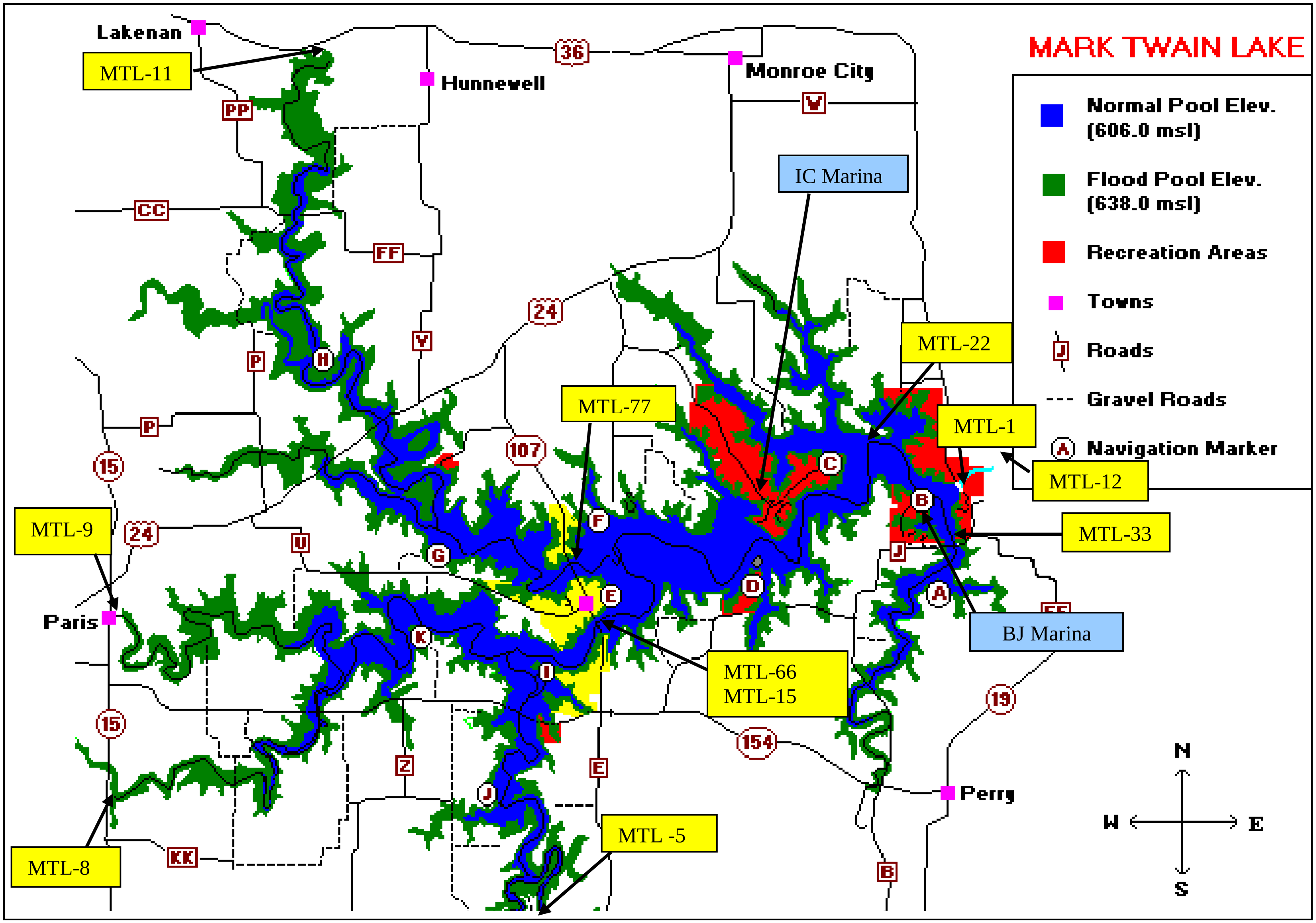


Figure 1
Location of sample sites

2.0 WATER QUALITY ASSESSMENT CRITERIA

2.1 Water Quality

The water quality assessment criteria were based upon the State of Missouri regulatory limits for certain contaminants, which has been generally accepted criteria for sustaining adequate aquatic plant and animal growth. 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 2013 samplings 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), fecal coliform, 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 for the parameters analyzed where a limit has been established.

TABLE 2.1
State of Missouri
Water Quality Standards

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 mean
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); ≥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]

Trifluralin	26ug/L[2]; 1.1ug/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, decrease 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 the total suspended solids (TSS) increase, 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) which is comprised 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 is present in water. Total volatile solids indicate the presence of organics in suspension and, therefore, show additional demand levels of oxygen. Missouri does not currently have a standard for TSS or TVSS. However, literature suggests that NVSS above 15mg/L could highly impair recreational lake use and 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. Chlorophyll production is currently being connected with hypoxia.

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 and 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 Illinois 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 a 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 with positive readings indicating increased oxidizing potential and negative readings being 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. The three factors are the color of water, amount of phytoplankton in the water column, and amount of inorganic material in the water column. Secchi depth integrates the combined impacts of all the factors which influence water clarity. Water transparency was measured using a Secchi disk. Secchi disk readings were taken at all lake sites.

2.2 Sediment

In accordance with EM-1110-2-1201, sediment samples should be taken to monitor and assess potential impacts to aquatic and human health. To assess ecological risk, sample values were compared against toxicity information published in the National Oceanic Atmospheric Administrations (NOAA) Screening Quick Reference Tables (SQRT) or similar references for ecological receptors in freshwater sediment. Without standards or other widely applicable numerical tools, NOAA scientists found it difficult to estimate the possible toxicological significance of chemical concentrations in sediment. Therefore, numerical sediment quality guidelines (SQG's) were developed as informal, interpretive tools. The SQGs were not promulgated as regulatory standards, but rather as informal, non-regulatory guidelines for interpreting chemical data from analyses of sediments. 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, but is also 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 life stage to selenium effecting reproductive success.

It is recommended that the next round of sediment samples focus on organochlorines in freshwater sediment to assess potential chronic aquatic impacts (e.g. aldrin, chlordane, endrin, endosulfan, DDT, methoxychlor).

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.

3.0 SUMMARY OF MONITORING RESULTS

3.1 Water Quality Summary

The monitoring program for Mark Twain Lake during Fiscal Year 2013 revealed good water quality when compared to limits established by the Missouri Department of Natural Resources for general use, secondary contact, and indigenous aquatic life. Agricultural nutrient runoffs 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. 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. No samples were above the Missouri standard for beaches.

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 in June at all 3 sites and at site 22-15 for all 3 sampling events. Manganese oxidizes slower and can persist in the reduced state long distances downstream even in aerobic environments. 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. Phosphorous levels were higher in the upper reaches of the lake (sites 66 & 77, 15 is a duplicate of 66). Levels were higher in May than in June or September. Precipitation event did occur within 48 hours of sampling in May, which may be the cause of the elevated levels. Phosphorous levels are lowest near and below the dam. Phospherous levels at site 5 in April were much higher than the other tributary sites during that time frame. This may have been the result of fertilizer applications in the watershed. However, no precipitation was reported before or during that day which would cause storm water runoff. Total Phosphates are used or locked up as water travels down the lake. 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. Nitrate-Nitrogen did not exceed the 10mg/L standard at any site. The highest value recorded was 1.3mg/L at site 77 (North Fork Arm). Ammonia-Nitrogen tends to be constant throughout the lake. 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. There were no signs of any of these effects during the site visits in 2012.

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 is the problem. 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. While EPA does not currently have water quality criteria for algal toxins, the World Health Organization (WHO) has established recreational exposure guidelines for Chlorophyll-a, cyanobacterial cell counts, and microcystin. Mark Twain lake was in the moderate risk of exposure category for chlorophyll.

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. On June 6, 2013 sites 66 and 77 exceeded the state standard of 3.0ug/L for atrazine and site 11 was at the state standard. All other sites were below the state standard on this date. All sites were below the state standards for the other sampling events. These substances can enter water bodies as a result of drift during spraying, surface runoff, and leaching through soil. Cyanizine, Metolachlor, Trifluralin and Simazine are also analyzed as part of the pesticide screening. In order to eliminate pesticide contamination of waters it is important for the public to be educated and institute best manage 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 are highest at sites MTL-5 (South Fork), MTL-9 (Middle Fork) and MTL-11 (North Fork), and lowest near sites near the dam. On May 6, 2013 site 77 had an unexplained elevated TSS level. Missouri does not currently have a standard for TSS or TVSS. However, literature suggests that Nonvolatile Suspended Solids (NVSS) which is a subdivision of TSS above 15mg/L could highly impair recreational lake use and a NVSS of 3 to 7mg/L might cause slight impairment.

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 plant material, which had grown all summer and begins to decay. 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.

pH is taken at all sites and at 1 meter intervals at lake sites. All sites were within the 6 to 9 pH range. Variances in pH can be caused by a rainfall event.

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. Missouri does not currently have a standard for redox.

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. Although in September all sites except 22 which had no secchi taken had good readings.

3.2 Sediment Summary

Sediment sampling was not conducted in 2013. Sediment sampling is normally conducted every 5 years if funding is available. Sediment sampling was last conducted in 2007.

4.0 PLANNED 2014 STUDIES

The Mark Twain Lake water quality monitoring will continue in Fiscal Year 2014. Because of budgetary constraints the number of sampling events will remain at 3 for 2014. A restored number of sampling events would provide the ability to better evaluate water quality trends, 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. The sampling events are planned to be conducted between April and August in 2014. Mark Twain Lake provides drinking fwater 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 8 Elk Fork at Hwy 15, Site 9 Middle Fork at Hwy 15, Site 11 North Fork at Hwy 36, Site 12 below re-regulation dam, Site 22 MTL-22 old river channel 1mile up lake from dam, Site 33 Lick Creek at Hwy J, Site 66 South Fork at Hwy 107 bridge, and Site 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 is low in oxygen and can create a low oxygen area below the dam. The sensor will allow 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. Water quality personnel will continue to maintain and monitor these probes.

APPENDIX A

DATA

LAB DATA

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-1	4/4/2013	0.20	<	UG/L	Alachlor
MTL-1	6/6/2013	0.20	<	UG/L	Alachlor
MTL-1	9/5/2013	0.20	<	UG/L	Alachlor
MTL-11	4/4/2013	0.20	<	UG/L	Alachlor
MTL-11	6/6/2013	0.20	<	UG/L	Alachlor
MTL-11	9/5/2013	0.20	<	UG/L	Alachlor
MTL-12	4/4/2013	0.20	<	UG/L	Alachlor
MTL-12	6/6/2013	0.20	<	UG/L	Alachlor
MTL-12	9/5/2013	0.20	<	UG/L	Alachlor
MTL-15-0	5/6/2013	0.20	<	UG/L	Alachlor
MTL-15-0	6/6/2013	0.20	<	UG/L	Alachlor
MTL-15-0	9/5/2013	0.20	<	UG/L	Alachlor
MTL-22-0	5/6/2013	0.20	<	UG/L	Alachlor
MTL-22-0	6/6/2013	0.20	<	UG/L	Alachlor
MTL-22-0	9/5/2013	0.20	<	UG/L	Alachlor
MTL-33-0	5/6/2013	0.20	<	UG/L	Alachlor
MTL-33-0	6/6/2013	0.20	<	UG/L	Alachlor
MTL-33-0	9/5/2013	0.20	<	UG/L	Alachlor
MTL-5	4/4/2013	0.20	<	UG/L	Alachlor
MTL-5	6/6/2013	0.20	<	UG/L	Alachlor
MTL-5	9/5/2013	0.20	<	UG/L	Alachlor
MTL-66-0	5/6/2013	0.20	<	UG/L	Alachlor
MTL-66-0	6/6/2013	0.20	<	UG/L	Alachlor
MTL-66-0	9/5/2013	0.20	<	UG/L	Alachlor
MTL-77-0	5/6/2013	0.20	<	UG/L	Alachlor
MTL-77-0	6/6/2013	0.20	<	UG/L	Alachlor
MTL-77-0	9/5/2013	0.20	<	UG/L	Alachlor
MTL-8	4/4/2013	0.20	<	UG/L	Alachlor
MTL-8	6/6/2013	0.20	<	UG/L	Alachlor
MTL-8	9/5/2013	0.20	<	UG/L	Alachlor
MTL-9	4/4/2013	0.20	<	UG/L	Alachlor
MTL-9	6/6/2013	0.22	<	UG/L	Alachlor
MTL-9	9/5/2013	0.20	<	UG/L	Alachlor
MTL-1	4/4/2013	0.27		MG/L	Ammonia Nitrogen
MTL-1	6/6/2013	0.046		MG/L	Ammonia Nitrogen
MTL-1	9/5/2013	0.056		MG/L	Ammonia Nitrogen
MTL-11	4/4/2013	0.085		MG/L	Ammonia Nitrogen
MTL-11	6/6/2013	0.054		MG/L	Ammonia Nitrogen
MTL-11	9/5/2013	0.030	<	MG/L	Ammonia Nitrogen
MTL-12	4/4/2013	0.16		MG/L	Ammonia Nitrogen
MTL-12	6/6/2013	0.057		MG/L	Ammonia Nitrogen
MTL-12	9/5/2013	0.092		MG/L	Ammonia Nitrogen
MTL-15-0	5/6/2013	0.17		MG/L	Ammonia Nitrogen
MTL-15-0	6/6/2013	0.065		MG/L	Ammonia Nitrogen
MTL-15-0	9/5/2013	0.034		MG/L	Ammonia Nitrogen
MTL-22-0	5/6/2013	0.23		MG/L	Ammonia Nitrogen
MTL-22-0	6/6/2013	0.044		MG/L	Ammonia Nitrogen
MTL-22-0	9/5/2013	0.046		MG/L	Ammonia Nitrogen
MTL-22-15	5/6/2013	0.19		MG/L	Ammonia Nitrogen
MTL-22-15	6/6/2013	0.030	<	MG/L	Ammonia Nitrogen

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-22-15	9/5/2013	0.17		MG/L	Ammonia Nitrogen
MTL-33-0	5/6/2013	0.18		MG/L	Ammonia Nitrogen
MTL-33-0	6/6/2013	0.059		MG/L	Ammonia Nitrogen
MTL-33-0	9/5/2013	0.046		MG/L	Ammonia Nitrogen
MTL-5	4/4/2013	0.13		MG/L	Ammonia Nitrogen
MTL-5	6/6/2013	0.069		MG/L	Ammonia Nitrogen
MTL-5	9/5/2013	0.084		MG/L	Ammonia Nitrogen
MTL-66-0	5/6/2013	0.17		MG/L	Ammonia Nitrogen
MTL-66-0	6/6/2013	0.067		MG/L	Ammonia Nitrogen
MTL-66-0	9/5/2013	0.030	<	MG/L	Ammonia Nitrogen
MTL-77-0	5/6/2013	0.46		MG/L	Ammonia Nitrogen
MTL-77-0	6/6/2013	0.045		MG/L	Ammonia Nitrogen
MTL-77-0	9/5/2013	0.030	<	MG/L	Ammonia Nitrogen
MTL-8	4/4/2013	0.11		MG/L	Ammonia Nitrogen
MTL-8	6/6/2013	0.030	<	MG/L	Ammonia Nitrogen
MTL-8	9/5/2013	0.053		MG/L	Ammonia Nitrogen
MTL-9	4/4/2013	0.072		MG/L	Ammonia Nitrogen
MTL-9	6/6/2013	0.076		MG/L	Ammonia Nitrogen
MTL-9	9/5/2013	0.091		MG/L	Ammonia Nitrogen
MTL-1	4/4/2013	0.20	<	UG/L	Atrazine
MTL-1	6/6/2013	1.0		UG/L	Atrazine
MTL-1	9/5/2013	0.40		UG/L	Atrazine
MTL-11	4/4/2013	0.20	<	UG/L	Atrazine
MTL-11	6/6/2013	3.0		UG/L	Atrazine
MTL-11	9/5/2013	0.20	<	UG/L	Atrazine
MTL-12	4/4/2013	0.20	<	UG/L	Atrazine
MTL-12	6/6/2013	0.72		UG/L	Atrazine
MTL-12	9/5/2013	0.22		UG/L	Atrazine
MTL-15-0	5/6/2013	0.20	<	UG/L	Atrazine
MTL-15-0	6/6/2013	2.6		UG/L	Atrazine
MTL-15-0	9/5/2013	0.40		UG/L	Atrazine
MTL-22-0	5/6/2013	0.20	<	UG/L	Atrazine
MTL-22-0	6/6/2013	0.56		UG/L	Atrazine
MTL-22-0	9/5/2013	0.34		UG/L	Atrazine
MTL-33-0	5/6/2013	0.20	<	UG/L	Atrazine
MTL-33-0	6/6/2013	0.78		UG/L	Atrazine
MTL-33-0	9/5/2013	0.28		UG/L	Atrazine
MTL-5	4/4/2013	0.20	<	UG/L	Atrazine
MTL-5	6/6/2013	1.5		UG/L	Atrazine
MTL-5	9/5/2013	0.20	<	UG/L	Atrazine
MTL-66-0	5/6/2013	0.20	<	UG/L	Atrazine
MTL-66-0	6/6/2013	3.2		UG/L	Atrazine
MTL-66-0	9/5/2013	0.46		UG/L	Atrazine
MTL-77-0	5/6/2013	0.20	<	UG/L	Atrazine
MTL-77-0	6/6/2013	3.4		UG/L	Atrazine
MTL-77-0	9/5/2013	0.38		UG/L	Atrazine
MTL-8	4/4/2013	0.20	<	UG/L	Atrazine
MTL-8	6/6/2013	1.8		UG/L	Atrazine
MTL-8	9/5/2013	0.20	<	UG/L	Atrazine
MTL-9	4/4/2013	0.20	<	UG/L	Atrazine
MTL-9	6/6/2013	1.4		UG/L	Atrazine
MTL-9	9/5/2013	0.20	<	UG/L	Atrazine
MTL-15-0	5/6/2013	2.0	<	MG/CU.M.	Chlorophyll a

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-15-0	6/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-15-0	9/5/2013	4.2		MG/CU.M.	Chlorophyll a
MTL-22-0	5/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-22-0	6/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-22-0	9/5/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-33-0	5/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-33-0	6/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-33-0	9/5/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-66-0	5/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-66-0	6/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-66-0	9/5/2013	2.5		MG/CU.M.	Chlorophyll a
MTL-77-0	5/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-77-0	6/6/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-77-0	9/5/2013	2.0	<	MG/CU.M.	Chlorophyll a
MTL-1	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-1	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-1	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-11	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-11	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-11	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-12	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-12	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-12	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-15-0	5/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-15-0	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-15-0	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-22-0	5/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-22-0	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-22-0	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-33-0	5/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-33-0	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-33-0	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-5	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-5	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-5	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-66-0	5/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-66-0	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-66-0	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-77-0	5/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-77-0	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-77-0	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-8	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-8	6/6/2013	0.20	<	UG/L	Chloropyrifos
MTL-8	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-9	4/4/2013	0.20	<	UG/L	Chloropyrifos
MTL-9	6/6/2013	0.22	<	UG/L	Chloropyrifos
MTL-9	9/5/2013	0.20	<	UG/L	Chloropyrifos
MTL-1	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-1	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-1	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-11	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-11	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-11	9/5/2013	0.20	<	UG/L	Cyanazine

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-12	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-12	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-12	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-15-0	5/6/2013	0.20	<	UG/L	Cyanazine
MTL-15-0	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-15-0	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-22-0	5/6/2013	0.20	<	UG/L	Cyanazine
MTL-22-0	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-22-0	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-33-0	5/6/2013	0.20	<	UG/L	Cyanazine
MTL-33-0	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-33-0	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-5	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-5	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-5	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-66-0	5/6/2013	0.20	<	UG/L	Cyanazine
MTL-66-0	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-66-0	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-77-0	5/6/2013	0.20	<	UG/L	Cyanazine
MTL-77-0	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-77-0	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-8	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-8	6/6/2013	0.20	<	UG/L	Cyanazine
MTL-8	9/5/2013	0.20	<	UG/L	Cyanazine
MTL-9	4/4/2013	0.20	<	UG/L	Cyanazine
MTL-9	6/6/2013	0.22	<	UG/L	Cyanazine
MTL-9	9/5/2013	0.20	<	UG/L	Cyanazine
BJ MARINA	6/6/2013	25.0		COL/100 ML	E. Coliform
BJ-MARINA	9/5/2013	25.0	<	COL/100 ML	E. Coliform
IC MARINA	6/6/2013	25.0		COL/100 ML	E. Coliform
IC-MARINA	9/5/2013	25.0	<	COL/100 ML	E. Coliform
MTL-1	4/4/2013	1.5		MG/L	Iron
MTL-1	6/6/2013	4.4		MG/L	Iron
MTL-1	9/5/2013	0.52		MG/L	Iron
MTL-12	4/4/2013	1.7		MG/L	Iron
MTL-12	6/6/2013	4.1		MG/L	Iron
MTL-12	9/5/2013	0.72		MG/L	Iron
MTL-22-15	5/6/2013	4.0		MG/L	Iron
MTL-22-15	6/6/2013	4.3		MG/L	Iron
MTL-22-15	9/5/2013	2.7		MG/L	Iron
MTL-1	4/4/2013	0.066		MG/L	Manganese
MTL-1	6/6/2013	0.062		MG/L	Manganese
MTL-1	9/5/2013	0.11		MG/L	Manganese
MTL-12	4/4/2013	0.13		MG/L	Manganese
MTL-12	6/6/2013	0.073		MG/L	Manganese
MTL-12	9/5/2013	0.13		MG/L	Manganese
MTL-22-15	5/6/2013	0.046		MG/L	Manganese
MTL-22-15	6/6/2013	0.070		MG/L	Manganese
MTL-22-15	9/5/2013	0.82		MG/L	Manganese

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-1	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-1	6/6/2013	0.35		UG/L	Metolachlor
MTL-1	9/5/2013	1.3		UG/L	Metolachlor
MTL-11	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-11	6/6/2013	1.0		UG/L	Metolachlor
MTL-11	9/5/2013	0.20	<	UG/L	Metolachlor
MTL-12	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-12	6/6/2013	0.20	<	UG/L	Metolachlor
MTL-12	9/5/2013	1.0		UG/L	Metolachlor
MTL-15-0	5/6/2013	0.20	<	UG/L	Metolachlor
MTL-15-0	6/6/2013	0.74		UG/L	Metolachlor
MTL-15-0	9/5/2013	1.2		UG/L	Metolachlor
MTL-22-0	5/6/2013	0.20	<	UG/L	Metolachlor
MTL-22-0	6/6/2013	0.20	<	UG/L	Metolachlor
MTL-22-0	9/5/2013	1.3		UG/L	Metolachlor
MTL-33-0	5/6/2013	0.20	<	UG/L	Metolachlor
MTL-33-0	6/6/2013	0.20	<	UG/L	Metolachlor
MTL-33-0	9/5/2013	1.1		UG/L	Metolachlor
MTL-5	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-5	6/6/2013	0.48		UG/L	Metolachlor
MTL-5	9/5/2013	0.20	<	UG/L	Metolachlor
MTL-66-0	5/6/2013	0.20	<	UG/L	Metolachlor
MTL-66-0	6/6/2013	0.79		UG/L	Metolachlor
MTL-66-0	9/5/2013	1.3		UG/L	Metolachlor
MTL-77-0	5/6/2013	0.20	<	UG/L	Metolachlor
MTL-77-0	6/6/2013	0.93		UG/L	Metolachlor
MTL-77-0	9/5/2013	1.2		UG/L	Metolachlor
MTL-8	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-8	6/6/2013	0.20	<	UG/L	Metolachlor
MTL-8	9/5/2013	0.20	<	UG/L	Metolachlor
MTL-9	4/4/2013	0.20	<	UG/L	Metolachlor
MTL-9	6/6/2013	0.73		UG/L	Metolachlor
MTL-9	9/5/2013	0.20	<	UG/L	Metolachlor
MTL-1	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-1	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-1	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-11	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-11	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-11	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-12	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-12	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-12	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-15-0	5/6/2013	0.20	<	UG/L	Metribuzin
MTL-15-0	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-15-0	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-22-0	5/6/2013	0.20	<	UG/L	Metribuzin
MTL-22-0	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-22-0	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-33-0	5/6/2013	0.20	<	UG/L	Metribuzin
MTL-33-0	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-33-0	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-5	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-5	6/6/2013	0.20	<	UG/L	Metribuzin

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-5	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-66-0	5/6/2013	0.20	<	UG/L	Metribuzin
MTL-66-0	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-66-0	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-77-0	5/6/2013	0.20	<	UG/L	Metribuzin
MTL-77-0	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-77-0	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-8	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-8	6/6/2013	0.20	<	UG/L	Metribuzin
MTL-8	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-9	4/4/2013	0.20	<	UG/L	Metribuzin
MTL-9	6/6/2013	0.22	<	UG/L	Metribuzin
MTL-9	9/5/2013	0.20	<	UG/L	Metribuzin
MTL-1	4/4/2013	0.87		MG/L	Nitrate as Nitrogen
MTL-1	6/6/2013	1.2		MG/L	Nitrate as Nitrogen
MTL-1	9/5/2013	0.38		MG/L	Nitrate as Nitrogen
MTL-11	4/4/2013	0.60		MG/L	Nitrate as Nitrogen
MTL-11	6/6/2013	0.41		MG/L	Nitrate as Nitrogen
MTL-11	9/5/2013	0.020	<	MG/L	Nitrate as Nitrogen
MTL-12	4/4/2013	0.76		MG/L	Nitrate as Nitrogen
MTL-12	6/6/2013	0.35		MG/L	Nitrate as Nitrogen
MTL-12	9/5/2013	0.32		MG/L	Nitrate as Nitrogen
MTL-15-0	5/6/2013	0.53		MG/L	Nitrate as Nitrogen
MTL-15-0	6/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-15-0	9/5/2013	0.18		MG/L	Nitrate as Nitrogen
MTL-22-0	5/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-22-0	6/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-22-0	9/5/2013	0.35		MG/L	Nitrate as Nitrogen
MTL-22-15	5/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-22-15	6/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-22-15	9/5/2013	0.27		MG/L	Nitrate as Nitrogen
MTL-33-0	5/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-33-0	6/6/2013	1.1		MG/L	Nitrate as Nitrogen
MTL-33-0	9/5/2013	0.32		MG/L	Nitrate as Nitrogen
MTL-5	4/4/2013	1.3		MG/L	Nitrate as Nitrogen
MTL-5	6/6/2013	0.64		MG/L	Nitrate as Nitrogen
MTL-5	9/5/2013	0.020	<	MG/L	Nitrate as Nitrogen
MTL-66-0	5/6/2013	0.52		MG/L	Nitrate as Nitrogen
MTL-66-0	6/6/2013	1.1		MG/L	Nitrate as Nitrogen
MTL-66-0	9/5/2013	0.16		MG/L	Nitrate as Nitrogen
MTL-77-0	5/6/2013	0.73		MG/L	Nitrate as Nitrogen
MTL-77-0	6/6/2013	1.1		MG/L	Nitrate as Nitrogen
MTL-77-0	9/5/2013	0.23		MG/L	Nitrate as Nitrogen
MTL-8	4/4/2013	0.84		MG/L	Nitrate as Nitrogen
MTL-8	6/6/2013	1.0		MG/L	Nitrate as Nitrogen
MTL-8	9/5/2013	0.020		MG/L	Nitrate as Nitrogen
MTL-9	4/4/2013	0.48		MG/L	Nitrate as Nitrogen
MTL-9	6/6/2013	0.58		MG/L	Nitrate as Nitrogen
MTL-9	9/5/2013	0.041		MG/L	Nitrate as Nitrogen
MTL-1	4/4/2013	0.20	<	UG/L	Pendimethalin
MTL-1	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-1	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-11	4/4/2013	0.20	<	UG/L	Pendimethalin

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-11	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-11	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-12	4/4/2013	0.20	<	UG/L	Pendimethalin
MTL-12	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-12	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-15-0	5/6/2013	0.20	<	UG/L	Pendimethalin
MTL-15-0	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-15-0	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-22-0	5/6/2013	0.20	<	UG/L	Pendimethalin
MTL-22-0	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-22-0	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-33-0	5/6/2013	0.20	<	UG/L	Pendimethalin
MTL-33-0	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-33-0	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-5	4/4/2013	0.20	<	UG/L	Pendimethalin
MTL-5	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-5	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-66-0	5/6/2013	0.20	<	UG/L	Pendimethalin
MTL-66-0	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-66-0	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-77-0	5/6/2013	0.20	<	UG/L	Pendimethalin
MTL-77-0	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-77-0	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-8	4/4/2013	0.20	<	UG/L	Pendimethalin
MTL-8	6/6/2013	0.20	<	UG/L	Pendimethalin
MTL-8	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-9	4/4/2013	0.20	<	UG/L	Pendimethalin
MTL-9	6/6/2013	0.22	<	UG/L	Pendimethalin
MTL-9	9/5/2013	0.20	<	UG/L	Pendimethalin
MTL-15-0	5/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-15-0	6/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-15-0	9/5/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-22-0	5/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-22-0	6/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-22-0	9/5/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-33-0	5/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-33-0	6/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-33-0	9/5/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-66-0	5/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-66-0	6/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-66-0	9/5/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-77-0	5/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-77-0	6/6/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-77-0	9/5/2013	2.0	<	MG/CU.M.	Pheophytin a
MTL-1	4/4/2013	0.21		MG/L	Phosphorus
MTL-1	6/6/2013	0.34		MG/L	Phosphorus
MTL-1	9/5/2013	0.061		MG/L	Phosphorus
MTL-11	4/4/2013	0.20		MG/L	Phosphorus
MTL-11	6/6/2013	0.35		MG/L	Phosphorus
MTL-11	9/5/2013	0.21		MG/L	Phosphorus
MTL-12	4/4/2013	0.16		MG/L	Phosphorus
MTL-12	6/6/2013	0.30		MG/L	Phosphorus
MTL-12	9/5/2013	0.080		MG/L	Phosphorus

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-15-0	5/6/2013	0.38		MG/L	Phosphorus
MTL-15-0	6/6/2013	0.31		MG/L	Phosphorus
MTL-15-0	9/5/2013	0.051		MG/L	Phosphorus
MTL-22-0	5/6/2013	0.34		MG/L	Phosphorus
MTL-22-0	6/6/2013	0.30		MG/L	Phosphorus
MTL-22-0	9/5/2013	0.037		MG/L	Phosphorus
MTL-22-15	5/6/2013	0.38		MG/L	Phosphorus
MTL-22-15	6/6/2013	0.31		MG/L	Phosphorus
MTL-22-15	9/5/2013	0.14		MG/L	Phosphorus
MTL-33-0	5/6/2013	0.36		MG/L	Phosphorus
MTL-33-0	6/6/2013	0.30		MG/L	Phosphorus
MTL-33-0	9/5/2013	0.027		MG/L	Phosphorus
MTL-5	4/4/2013	0.49		MG/L	Phosphorus
MTL-5	6/6/2013	0.34		MG/L	Phosphorus
MTL-5	9/5/2013	0.31		MG/L	Phosphorus
MTL-66-0	5/6/2013	0.46		MG/L	Phosphorus
MTL-66-0	6/6/2013	0.36		MG/L	Phosphorus
MTL-66-0	9/5/2013	0.042		MG/L	Phosphorus
MTL-77-0	5/6/2013	0.45		MG/L	Phosphorus
MTL-77-0	6/6/2013	0.41		MG/L	Phosphorus
MTL-77-0	9/5/2013	0.027		MG/L	Phosphorus
MTL-8	4/4/2013	0.38		MG/L	Phosphorus
MTL-8	6/6/2013	0.20		MG/L	Phosphorus
MTL-8	9/5/2013	0.065		MG/L	Phosphorus
MTL-9	4/4/2013	0.20		MG/L	Phosphorus
MTL-9	6/6/2013	0.21		MG/L	Phosphorus
MTL-9	9/5/2013	0.10		MG/L	Phosphorus
MTL-1	4/4/2013	0.072		MG/L	Phosphorus, -ortho
MTL-1	6/6/2013	0.15		MG/L	Phosphorus, -ortho
MTL-1	9/5/2013	0.015		MG/L	Phosphorus, -ortho
MTL-11	4/4/2013	0.025		MG/L	Phosphorus, -ortho
MTL-11	6/6/2013	0.062		MG/L	Phosphorus, -ortho
MTL-11	9/5/2013	0.018		MG/L	Phosphorus, -ortho
MTL-12	4/4/2013	0.064		MG/L	Phosphorus, -ortho
MTL-12	6/6/2013	0.14		MG/L	Phosphorus, -ortho
MTL-12	9/5/2013	0.024		MG/L	Phosphorus, -ortho
MTL-15-0	5/6/2013	0.15		MG/L	Phosphorus, -ortho
MTL-15-0	6/6/2013	0.12		MG/L	Phosphorus, -ortho
MTL-15-0	9/5/2013	0.012		MG/L	Phosphorus, -ortho
MTL-22-0	5/6/2013	0.15		MG/L	Phosphorus, -ortho
MTL-22-0	6/6/2013	0.12		MG/L	Phosphorus, -ortho
MTL-22-0	9/5/2013	0.010	<	MG/L	Phosphorus, -ortho
MTL-22-15	5/6/2013	0.11		MG/L	Phosphorus, -ortho
MTL-22-15	6/6/2013	0.13		MG/L	Phosphorus, -ortho
MTL-22-15	9/5/2013	0.035		MG/L	Phosphorus, -ortho
MTL-33-0	5/6/2013	0.11		MG/L	Phosphorus, -ortho
MTL-33-0	6/6/2013	0.17		MG/L	Phosphorus, -ortho
MTL-33-0	9/5/2013	0.015		MG/L	Phosphorus, -ortho
MTL-5	4/4/2013	0.17		MG/L	Phosphorus, -ortho
MTL-5	6/6/2013	0.11		MG/L	Phosphorus, -ortho
MTL-5	9/5/2013	0.092		MG/L	Phosphorus, -ortho
MTL-66-0	5/6/2013	0.14		MG/L	Phosphorus, -ortho
MTL-66-0	6/6/2013	0.14		MG/L	Phosphorus, -ortho

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-66-0	9/5/2013	0.018		MG/L	Phosphorus, -ortho
MTL-77-0	5/6/2013	0.13		MG/L	Phosphorus, -ortho
MTL-77-0	6/6/2013	0.13		MG/L	Phosphorus, -ortho
MTL-77-0	9/5/2013	0.015		MG/L	Phosphorus, -ortho
MTL-8	4/4/2013	0.12		MG/L	Phosphorus, -ortho
MTL-8	6/6/2013	0.071		MG/L	Phosphorus, -ortho
MTL-8	9/5/2013	0.018		MG/L	Phosphorus, -ortho
MTL-9	4/4/2013	0.044		MG/L	Phosphorus, -ortho
MTL-9	6/6/2013	0.051		MG/L	Phosphorus, -ortho
MTL-9	9/5/2013	0.018		MG/L	Phosphorus, -ortho
MTL-1	4/4/2013	5.9		MG/L	Solids, Total Suspended
MTL-1	6/6/2013	12.1		MG/L	Solids, Total Suspended
MTL-1	9/5/2013	4.4		MG/L	Solids, Total Suspended
MTL-11	4/4/2013	23.8		MG/L	Solids, Total Suspended
MTL-11	6/6/2013	36.5		MG/L	Solids, Total Suspended
MTL-11	9/5/2013	36.8		MG/L	Solids, Total Suspended
MTL-12	4/4/2013	12.6		MG/L	Solids, Total Suspended
MTL-12	6/6/2013	14.5		MG/L	Solids, Total Suspended
MTL-12	9/5/2013	8.0		MG/L	Solids, Total Suspended
MTL-15-0	5/6/2013	23.0		MG/L	Solids, Total Suspended
MTL-15-0	6/6/2013	16.0		MG/L	Solids, Total Suspended
MTL-15-0	9/5/2013	4.4		MG/L	Solids, Total Suspended
MTL-22-0	5/6/2013	11.1		MG/L	Solids, Total Suspended
MTL-22-0	6/6/2013	8.1		MG/L	Solids, Total Suspended
MTL-22-0	9/5/2013	2.5		MG/L	Solids, Total Suspended
MTL-22-15	5/6/2013	16.9		MG/L	Solids, Total Suspended
MTL-22-15	6/6/2013	13.9		MG/L	Solids, Total Suspended
MTL-22-15	9/5/2013	13.2		MG/L	Solids, Total Suspended
MTL-33-0	5/6/2013	20.2		MG/L	Solids, Total Suspended
MTL-33-0	6/6/2013	7.3		MG/L	Solids, Total Suspended
MTL-33-0	9/5/2013	3.0		MG/L	Solids, Total Suspended
MTL-5	4/4/2013	43.0		MG/L	Solids, Total Suspended
MTL-5	6/6/2013	36.0		MG/L	Solids, Total Suspended
MTL-5	9/5/2013	39.6		MG/L	Solids, Total Suspended
MTL-66-0	5/6/2013	20.2		MG/L	Solids, Total Suspended
MTL-66-0	6/6/2013	18.7		MG/L	Solids, Total Suspended
MTL-66-0	9/5/2013	4.4		MG/L	Solids, Total Suspended
MTL-77-0	5/6/2013	63.5		MG/L	Solids, Total Suspended
MTL-77-0	6/6/2013	26.4		MG/L	Solids, Total Suspended
MTL-77-0	9/5/2013	3.1		MG/L	Solids, Total Suspended
MTL-8	4/4/2013	32.4		MG/L	Solids, Total Suspended
MTL-8	6/6/2013	15.9		MG/L	Solids, Total Suspended
MTL-8	9/5/2013	4.5		MG/L	Solids, Total Suspended
MTL-9	4/4/2013	20.0		MG/L	Solids, Total Suspended
MTL-9	6/6/2013	21.8		MG/L	Solids, Total Suspended
MTL-9	9/5/2013	16.0		MG/L	Solids, Total Suspended
MTL-1	4/4/2013	1.0	<	MG/L	Solids, Volatile Suspended
MTL-1	6/6/2013	1.4		MG/L	Solids, Volatile Suspended
MTL-1	9/5/2013	1.8		MG/L	Solids, Volatile Suspended
MTL-11	4/4/2013	4.2		MG/L	Solids, Volatile Suspended
MTL-11	6/6/2013	4.9		MG/L	Solids, Volatile Suspended
MTL-11	9/5/2013	6.4		MG/L	Solids, Volatile Suspended
MTL-12	4/4/2013	1.7		MG/L	Solids, Volatile Suspended

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-12	6/6/2013	1.5		MG/L	Solids, Volatile Suspended
MTL-12	9/5/2013	1.8		MG/L	Solids, Volatile Suspended
MTL-15-0	5/6/2013	3.2		MG/L	Solids, Volatile Suspended
MTL-15-0	6/6/2013	2.0		MG/L	Solids, Volatile Suspended
MTL-15-0	9/5/2013	2.0		MG/L	Solids, Volatile Suspended
MTL-22-0	5/6/2013	1.5		MG/L	Solids, Volatile Suspended
MTL-22-0	6/6/2013	1.0		MG/L	Solids, Volatile Suspended
MTL-22-0	9/5/2013	1.0		MG/L	Solids, Volatile Suspended
MTL-22-15	5/6/2013	2.2		MG/L	Solids, Volatile Suspended
MTL-22-15	6/6/2013	2.1		MG/L	Solids, Volatile Suspended
MTL-22-15	9/5/2013	2.0		MG/L	Solids, Volatile Suspended
MTL-33-0	5/6/2013	3.1		MG/L	Solids, Volatile Suspended
MTL-33-0	6/6/2013	1.1		MG/L	Solids, Volatile Suspended
MTL-33-0	9/5/2013	1.4		MG/L	Solids, Volatile Suspended
MTL-5	4/4/2013	5.0		MG/L	Solids, Volatile Suspended
MTL-5	6/6/2013	5.2		MG/L	Solids, Volatile Suspended
MTL-5	9/5/2013	6.8		MG/L	Solids, Volatile Suspended
MTL-66-0	5/6/2013	2.8		MG/L	Solids, Volatile Suspended
MTL-66-0	6/6/2013	2.7		MG/L	Solids, Volatile Suspended
MTL-66-0	9/5/2013	1.9		MG/L	Solids, Volatile Suspended
MTL-77-0	5/6/2013	8.8		MG/L	Solids, Volatile Suspended
MTL-77-0	6/6/2013	3.6		MG/L	Solids, Volatile Suspended
MTL-77-0	9/5/2013	1.3		MG/L	Solids, Volatile Suspended
MTL-8	4/4/2013	5.0		MG/L	Solids, Volatile Suspended
MTL-8	6/6/2013	2.1		MG/L	Solids, Volatile Suspended
MTL-8	9/5/2013	1.7		MG/L	Solids, Volatile Suspended
MTL-9	4/4/2013	2.9		MG/L	Solids, Volatile Suspended
MTL-9	6/6/2013	2.8		MG/L	Solids, Volatile Suspended
MTL-9	9/5/2013	2.6		MG/L	Solids, Volatile Suspended
MTL-1	4/4/2013	5.2		MG/L	Total Organic Carbon
MTL-1	6/6/2013	6.0		MG/L	Total Organic Carbon
MTL-1	9/5/2013	6.5		MG/L	Total Organic Carbon
MTL-11	4/4/2013	5.3		MG/L	Total Organic Carbon
MTL-11	6/6/2013	6.6		MG/L	Total Organic Carbon
MTL-11	9/5/2013	10.0		MG/L	Total Organic Carbon
MTL-12	4/4/2013	5.4		MG/L	Total Organic Carbon
MTL-12	6/6/2013	10.0		MG/L	Total Organic Carbon
MTL-12	9/5/2013	9.0		MG/L	Total Organic Carbon
MTL-15-0	5/6/2013	6.3		MG/L	Total Organic Carbon
MTL-15-0	6/6/2013	6.8		MG/L	Total Organic Carbon
MTL-15-0	9/5/2013	7.0		MG/L	Total Organic Carbon
MTL-22-0	5/6/2013	6.3		MG/L	Total Organic Carbon
MTL-22-0	6/6/2013	5.9		MG/L	Total Organic Carbon
MTL-22-0	9/5/2013	6.3		MG/L	Total Organic Carbon
MTL-22-15	5/6/2013	6.2		MG/L	Total Organic Carbon
MTL-22-15	6/6/2013	6.3		MG/L	Total Organic Carbon
MTL-22-15	9/5/2013	7.1		MG/L	Total Organic Carbon
MTL-33-0	5/6/2013	6.1		MG/L	Total Organic Carbon
MTL-33-0	6/6/2013	7.7		MG/L	Total Organic Carbon
MTL-33-0	9/5/2013	9.3		MG/L	Total Organic Carbon
MTL-5	4/4/2013	7.7		MG/L	Total Organic Carbon
MTL-5	6/6/2013	13.0		MG/L	Total Organic Carbon
MTL-5	9/5/2013	10.0		MG/L	Total Organic Carbon

Site	Collection Date	Reported Result	Flag	Units	Parameter
MTL-66-0	5/6/2013	6.0		MG/L	Total Organic Carbon
MTL-66-0	6/6/2013	6.9		MG/L	Total Organic Carbon
MTL-66-0	9/5/2013	6.5		MG/L	Total Organic Carbon
MTL-77-0	5/6/2013	5.7		MG/L	Total Organic Carbon
MTL-77-0	6/6/2013	8.8		MG/L	Total Organic Carbon
MTL-77-0	9/5/2013	6.7		MG/L	Total Organic Carbon
MTL-8	4/4/2013	7.2		MG/L	Total Organic Carbon
MTL-8	6/6/2013	6.5		MG/L	Total Organic Carbon
MTL-8	9/5/2013	8.7		MG/L	Total Organic Carbon
MTL-9	4/4/2013	6.3		MG/L	Total Organic Carbon
MTL-9	6/6/2013	10.0		MG/L	Total Organic Carbon
MTL-9	9/5/2013	7.3		MG/L	Total Organic Carbon
MTL-1	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-1	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-1	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-11	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-11	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-11	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-12	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-12	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-12	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-15-0	5/6/2013	0.20	<	UG/L	Trifluralin
MTL-15-0	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-15-0	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-22-0	5/6/2013	0.20	<	UG/L	Trifluralin
MTL-22-0	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-22-0	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-33-0	5/6/2013	0.20	<	UG/L	Trifluralin
MTL-33-0	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-33-0	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-5	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-5	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-5	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-66-0	5/6/2013	0.20	<	UG/L	Trifluralin
MTL-66-0	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-66-0	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-77-0	5/6/2013	0.20	<	UG/L	Trifluralin
MTL-77-0	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-77-0	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-8	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-8	6/6/2013	0.20	<	UG/L	Trifluralin
MTL-8	9/5/2013	0.20	<	UG/L	Trifluralin
MTL-9	4/4/2013	0.20	<	UG/L	Trifluralin
MTL-9	6/6/2013	0.22	<	UG/L	Trifluralin
MTL-9	9/5/2013	0.20	<	UG/L	Trifluralin

U Analyte was not detected
J Estimated value between Method Detection Limit (MDL) and Practical Quantitation Limit (PQL)

FIELD DATA

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-1	4/4/2013	1.3	5.68	578	207	88.8	11.2	7.62	958	
MTL-1	6/6/2013	1.1	18.08	363	152.3	48.9	4.6	7.44	1044	
MTL-1	9/5/2013	0.5	25.33	500	169	129.7	10.62	8.08	915	
MTL-11	4/4/2013	0.6	10.49	451	356	103.1	11.4	7.77	1043	
MTL-11	6/6/2013	0.8	20.47	479	236	78.8	7.04	7.72	1149	
MTL-11	9/5/2013	0.5	24.43	311	505	119	10	7.72	1020	
MTL-12	4/4/2013	0.8	5.66	533	217	96.7	12.17	7.61	858	
MTL-12	6/6/2013	1.1	18.08	363	152.3	48.9	4.6	7.44	1044	
MTL-12	6/6/2013	1.5	17.86	367	154	64.3	6.07	7.55	937	8
MTL-12	9/5/2013	0.5	25.71	501	171	137.8	11.16	8.08	845	
MTL-22	5/6/2013	0.1	13.39	465	151.4	84.4	8.86	7.34	1055	6
MTL-22	5/6/2013	1	12.25	465	151.5	81.8	8.84	7.31		
MTL-22	5/6/2013	2	12.19	467	153.5	81.1	8.8	7.27		
MTL-22	5/6/2013	3	12.18	468	152.6	80.8	8.76	7.25		
MTL-22	5/6/2013	4	12.14	468	148.3	79.4	8.57	7.24		
MTL-22	5/6/2013	5	11.96	468	153	78.5	8.56	7.2		
MTL-22	5/6/2013	6	11.74	469	155.7	78.5	8.59	7.18		
MTL-22	5/6/2013	7	11.59	470	157.4	78	8.57	7.16		
MTL-22	5/6/2013	8	11.46	471	157.8	77.5	8.59	7.14		
MTL-22	5/6/2013	9	11.39	471	159.8	77.6	8.56	7.13		
MTL-22	5/6/2013	10	11.36	471	160.3	77.6	8.56	7.11		
MTL-22	5/6/2013	11	11.11	472	160.6	76.3	8.47	7.1		
MTL-22	6/6/2013	0.2	20.76	357	150.9	70.9	6.28	7.23	1205	7
MTL-22	6/6/2013	1.2	19.77	358	150.1	68.7	6.21	7.13	1206	
MTL-22	6/6/2013	2.1	19.31	360	150.3	62.8	5.75	7.11	1208	
MTL-22	6/6/2013	3.1	19.16	363	156.3	57.9	5.07	7.04	1209	
MTL-22	6/6/2013	4.1	19.15	364	158.4	49.6	5.06	7.01	1210	
MTL-22	6/6/2013	5	19.15	364	158.4	56	5.05	6.97	1212	

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-22	6/6/2013	6.1	19.15	365	157.9	56.8	5.1	6.97	1213	
MTL-22	6/6/2013	7.2	19.14	366	158.3	54.6	4.95	6.97	1214	
MTL-22	6/6/2013	8.1	19.09	366	158.3	53.7	4.93	6.96	1215	
MTL-22	6/6/2013	9.1	19.03	366	157.7	52.7	5.05	6.96	1217	
MTL-22	6/6/2013	10.2	18.95	366	156.1	46.7	5	6.95	1218	
MTL-22	6/6/2013	11.3	18.38	368	153.1	49.6	4.63	6.9	1222	
MTL-22	6/6/2013	12.2	17.15	370	148.2	46.9	4.42	6.91	1223	
MTL-22	6/6/2013	13.1	13.76	376	149	28.9	2.95	6.86	1223	
MTL-22	6/6/2013	14.2	12.09	379	150.1	28	3.04	6.77	1226	
MTL-22	9/5/2013	0.5	27.6	284	163	105.7	8.4	8.7	1034	
MTL-22	9/5/2013	1	27.3	292	163	104.8	8.3	8.7	1035	
MTL-22	9/5/2013	2	27.2	298	163	99	7.9	8.6	1036	
MTL-22	9/5/2013	3	27.2	303	163	96	7.6	8.5	1037	
MTL-22	9/5/2013	4	26.8	308	163	81	6.3	8.1	1038	
MTL-22	9/5/2013	5	25.2	331	163	23	1.8	7.3	1039	
MTL-22	9/5/2013	6	21.8	319	161	0	0	6.9	1040	
MTL-22	9/5/2013	7	18.5	298	164	0	0	6.9	1041	
MTL-22	9/5/2013	8	16.9	292	162	0	0	6.9	1042	
MTL-22	9/5/2013	9	14.6	290	164	0	0	6.8	1043	
MTL-22	9/5/2013	10	12.6	290	163	0	0	6.8	1045	
MTL-33	5/6/2013	0.1	12.86	484	158.1	82.7	8.83	7.33	1032	7
MTL-33	5/6/2013	1	12.76	482	158.3	81.6	8.73	7.23	1034	
MTL-33	5/6/2013	2	12.37	488	157.8	79.8	8.61	7.05	1035	
MTL-33	5/6/2013	3	12.35	489	158.3	79.5	8.57	6.99	1037	
MTL-33	5/6/2013	4	12.33	489	158.3	79.1	8.54	6.98	1039	
MTL-33	5/6/2013	5	12.26	489	158.2	79	8.55	6.97	1040	
MTL-33	5/6/2013	6	12.25	490	157.7	78.8	8.53	6.94	1041	
MTL-33	5/6/2013	7	12.22	490	158.1	78.6	8.51	6.93	1042	
MTL-33	5/6/2013	8	12.17	489	158.3	77.9	8.44	6.93	1043	
MTL-33	5/6/2013	9	12.1	489	158.8	76.4	8.27	6.92	1043	
MTL-33	5/6/2013	10	11.54	490	160.1	72.3	7.92	6.9	1044	

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-33	5/6/2013	11	11.1	491	162.4	67.2	7.39	6.87	1045	
MTL-33	6/6/2013	0.1	20.81	351	153	70.7	6.28	7.43	1133	
MTL-33	6/6/2013	1.1	20.69	353	152.1	52.4	6.25	7.33	1135	
MTL-33	6/6/2013	2.1	20.64	354	153	69.9	6.2	7.26	1136	
MTL-33	6/6/2013	3.1	20.33	357	153.4	68.3	6.1	7.12	1139	
MTL-33	6/6/2013	4.1	20.17	358	151.7	67.4	6.91	7.1	1140	
MTL-33	6/6/2013	5.1	20.01	359	153.2	64.8	5.95	7.08	1141	
MTL-33	6/6/2013	6	19.57	360	153.1	61.8	5.97	7.04	1142	
MTL-33	6/6/2013	7	19.36	361	151.6	60.7	5.53	7	1145	
MTL-33	6/6/2013	8	19.18	363	153.4	59.1	5.45	6.97	1148	
MTL-33	6/6/2013	9	19.03	363	154.2	56	5.11	6.96	1149	
MTL-33	6/6/2013	10.2	18.71	368	147.1	21.5	2.71	6.88	1150	
MTL-33	6/6/2013	11.1	18.35	371	133.8	21.8	2.25	6.82	1151	
MTL-33	9/5/2013	0.5	27.4	312	164	97.3	7.75	8.6	1009	48
MTL-33	9/5/2013	1	27.3	313	164	97.6	7.74	8.6	1010	
MTL-33	9/5/2013	2	27.3	315	164	95.6	7.61	8.5	1011	
MTL-33	9/5/2013	3	27.3	316	164	95.6	7.62	8.5	1012	
MTL-33	9/5/2013	4	26.6	343	164	47.1	3.65	7.4	1013	
MTL-33	9/5/2013	5	24.5	360	164	4	0.3	7	1014	
MTL-33	9/5/2013	6	21.8	352	164	0	0	6.9	1015	
MTL-33	9/5/2013	7	19.8	331	164	0	0	6.9	1016	
MTL-33	9/5/2013	8	16.3	314	164	0	0	6.8	1017	
MTL-33	9/5/2013	9	13.5	313	166	0	0	6.8	1018	
MTL-33	9/5/2013	10	11.9	313	165	0	0	6.7	1019	
MTL-5	4/4/2013	0.3	10.93	431	274	99.3	10.97	7.7	1308	
MTL-5	6/6/2013	0.3	22.54	395	234	65.7	5.67	7.6	1322	
MTL-5	9/5/2013	0.5	24.37	300	665	117.5	9.98	8.27	1205	
MTL-66	5/6/2013	0.1	14.3	453	115	78.8	8.14	7.15	1154	4
MTL-66	5/6/2013	1	13.29	452	114.5	76.1	8.05	7.15		
MTL-66	5/6/2013	2	12.98	454	114.7	74.2	7.9	7.09		
MTL-66	5/6/2013	3	12.75	457	114.7	72.5	7.75	7.01		

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-66	5/6/2013	4	12.67	457	115	71.7	7.69	7		
MTL-66	5/6/2013	5	12.42	457	115.4	70.4	7.59	7		
MTL-66	5/6/2013	6	12.32	457	115.6	69.3	7.49	6.98		
MTL-66	5/6/2013	7	12.27	457	116.3	68.8	7.45	6.98		
MTL-66	5/6/2013	8	12.01	457	115.2	67.8	7.38	6.95		
MTL-66	5/6/2013	9	11.77	459	118.7	64.3	7.04	6.9		
MTL-66	5/6/2013	10	11.64	459	119.8	64.1	7.04	6.9		
MTL-66	5/6/2013	11	11.24	461	132.9	64	7.07	6.86		
MTL-66	6/6/2013	0.4	22.25	350	157	59.6	5.16	7.33	1335	8
MTL-66	6/6/2013	1.1	21.71	349	157.3	58.4	5.05	7.39	1340	
MTL-66	6/6/2013	2.2	20.99	350	157	55.5	4.85	7.37	1340	
MTL-66	6/6/2013	3.2	20.44	352	157.1	48.9	4.35	7.35	1341	
MTL-66	6/6/2013	4.2	20.4	352	158.1	48.8	4.35	7.33	1342	
MTL-66	6/6/2013	5	20.16	354	158.4	43.9	3.92	7.3	1343	
MTL-66	6/6/2013	6.1	19.74	355	157.7	38.2	3.47	7.27	1344	
MTL-66	6/6/2013	6.2	19.74	356	157.9	37.2	3.38	7.22	1346	
MTL-66	6/6/2013	7	19.45	356	160.6	35.4	3.21	7.21	1347	
MTL-66	6/6/2013	8.1	19.33	356	159.3	34	3.09	7.21	1348	
MTL-66	6/6/2013	9.1	19.27	356	154.8	32	2.9	7.21	1349	
MTL-66	6/6/2013	10	19.21	357	183.4	31	2.82	7.18	1350	
MTL-66	9/5/2013	0.5	27.3	280	170	109	8.7	8.6	1140	48
MTL-66	9/5/2013	1	27	287	170	108	8.6	8.5	1141	
MTL-66	9/5/2013	2	26.7	306	170	80.3	6.3	7.8	1142	
MTL-66	9/5/2013	3	26.3	317	171	38.3	3.07	7.4	1143	
MTL-66	9/5/2013	4	25.8	316	170	19.6	1.6	7.2	1144	
MTL-66	9/5/2013	5	25.4	315	171	3.1	0.2	7.1	1145	
MTL-66	9/5/2013	6	22.8	303	181	0	0	6.9	1146	
MTL-66	9/5/2013	7	20.9	108	194	0	0	6.9	1147	
MTL-66	9/5/2013	8	15.9	61	220	0	0	6.9	1148	
MTL-66	9/5/2013	9	13.9	55	217	0	0	6.9	1149	
MTL-66	9/5/2013	10	11.9	52	204	0	0	6.7	1150	

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-77	5/6/2013	0.1	13.73	452	107.2	80.8	8.43	7.31	1136	4
MTL-77	5/6/2013	1	13.1	454	107.4	78.5	8.32	7.21		
MTL-77	5/6/2013	2	12.62	455	106.7	76.5	8.21	7.18		
MTL-77	5/6/2013	3	12.61	456	105.9	75.9	8.15	7.15		
MTL-77	5/6/2013	4	12.53	456	105.8	75.2	8.09	7.11		
MTL-77	5/6/2013	5	12.44	457	105.5	74.1	7.99	7.08		
MTL-77	5/6/2013	6	12.39	458	105.2	73.3	7.91	7.04		
MTL-77	5/6/2013	7	12.33	459	106	72.7	7.85	7.02		
MTL-77	5/6/2013	8	12.23	460	106.6	71.9	7.78	6.98		
MTL-77	5/6/2013	9	12.21	461	106.9	71.5	7.75	6.94		
MTL-77	5/6/2013	10	12	462	112.5	70.1	7.56	6.91		
MTL-77	6/6/2013	0.4	21.85	351	152.6	56.1	4.88	7.3	1304	
MTL-77	6/6/2013	1.1	21.17	352	151.6	53.3	4.67	7.24	1305	
MTL-77	6/6/2013	2	20.85	353	147.9	53.4	4.54	7.21	1307	
MTL-77	6/6/2013	3	20.3	355	146.4	48.6	4.34	7.16	1309	
MTL-77	6/6/2013	4	20.06	357	142.6	49.6	3.87	7.11	1312	
MTL-77	6/6/2013	5.1	20	358	141.6	42	3.9	7.06	1314	
MTL-77	6/6/2013	6	19.96	359	141.3	42.1	3.72	7.08	1316	
MTL-77	6/6/2013	7	19.63	360	136.1	37.1	3.38	7.06	1320	
MTL-77	6/6/2013	8.1	19.55	362	131.1	35.6	3.25	7.03	1321	
MTL-77	6/6/2013	9.1	19.27	363	131.2	30.2	2.74	7.01	1322	
MTL-77	6/6/2013	10.1	19.22	364	130.7	34.8	3.55	7	1323	
MTL-77	6/6/2013	11.6	16.88	367	144	23.4	1.91	6.94	1325	
MTL-77	9/5/2013	0.5	27.4	313	167	111.6	8.9	8.7	1121	53
MTL-77	9/5/2013	1	27.1	313	166	113.8	9.2	8.7	1122	
MTL-77	9/5/2013	2	26.7	319	167	108	8.6	8.6	1123	
MTL-77	9/5/2013	3	26.6	325	167	98	7.9	8.5	1124	
MTL-77	9/5/2013	4	26.5	335	168	75	6.1	7.9	1125	
MTL-77	9/5/2013	5	25.8	351	167	33	2.7	7.3	1126	
MTL-77	9/5/2013	6	22.3	353	177	0	0	6.9	1127	
MTL-77	9/5/2013	7	18.7	123	198	0	0	6.9	1128	

Site	Date	Depth	Water Temp (oC)	Redox (mv)	Cond (uS)	DO %	DO mg/l	pH	Time	Seechi (in)
MTL-77	9/5/2013	8	16.3	90	194	0	0	6.9	1129	
MTL-77	9/5/2013	9	14.5	92	196	0	0	6.9	1130	
MTL-77	9/5/2013	10	13.3	101	196	0	0	6.8	1131	
MTL-8	4/4/2013	0.3	9.78	440	308.1	101.7	11.32	7.68	1236	
MTL-8	6/6/2013	0.3	21.1	498	342	94.2	8.3	7.88	1248	
MTL-8	9/5/2013	0.5	23.75	469	413	110.5	9.44	8.35	1140	
MTL-9	4/4/2013	0.3	9.62	451	306.5	96.4	10.96	7.67	1217	
MTL-9	6/6/2013	0.1	20.07	497	285	83.1	7.47	7.71	1225	
MTL-9	9/5/2013	0.5	25.8	457	441	110.3	9.38	8.15	1115	

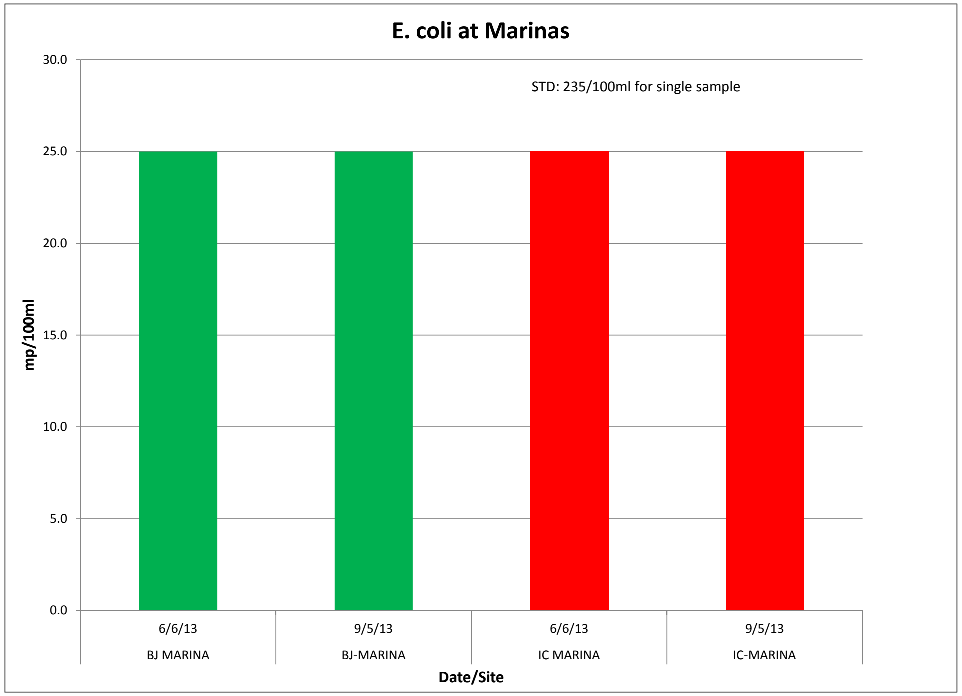
Depth sensor not working on 9/5/13 at MTL-12, 1, 11, 9, 8, & 5

Marina Data

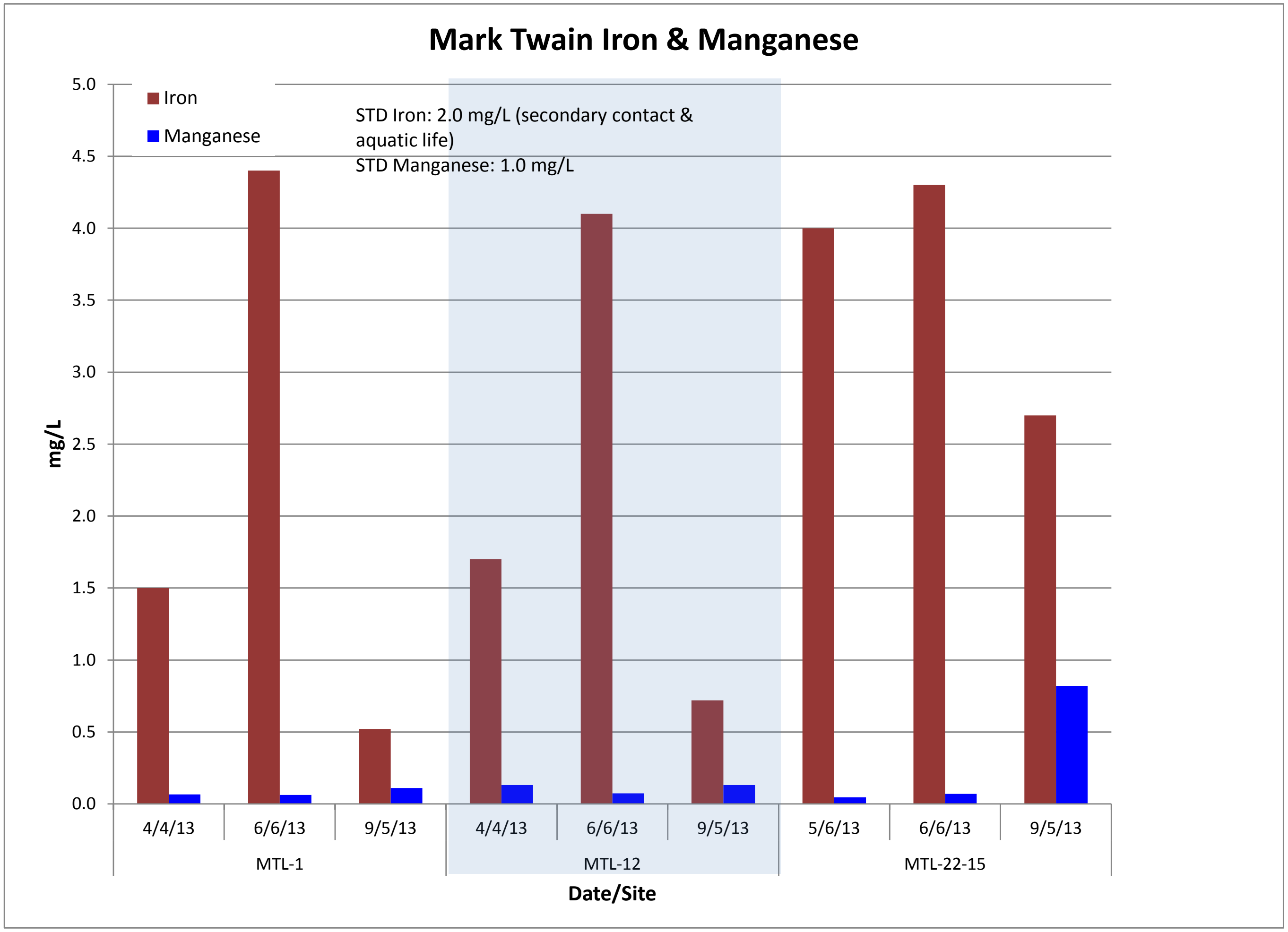
Marina	Date	Result	Qualifier	Units	Parameter
BJ MARINA	6/6/2013	25.0		COL/100 ML	E. Coliform
BJ-MARINA	9/5/2013	25.0	<	COL/100 ML	E. Coliform
IC MARINA	6/6/2013	25.0		COL/100 ML	E. Coliform
IC-MARINA	9/5/2013	25.0	<	COL/100 ML	E. Coliform

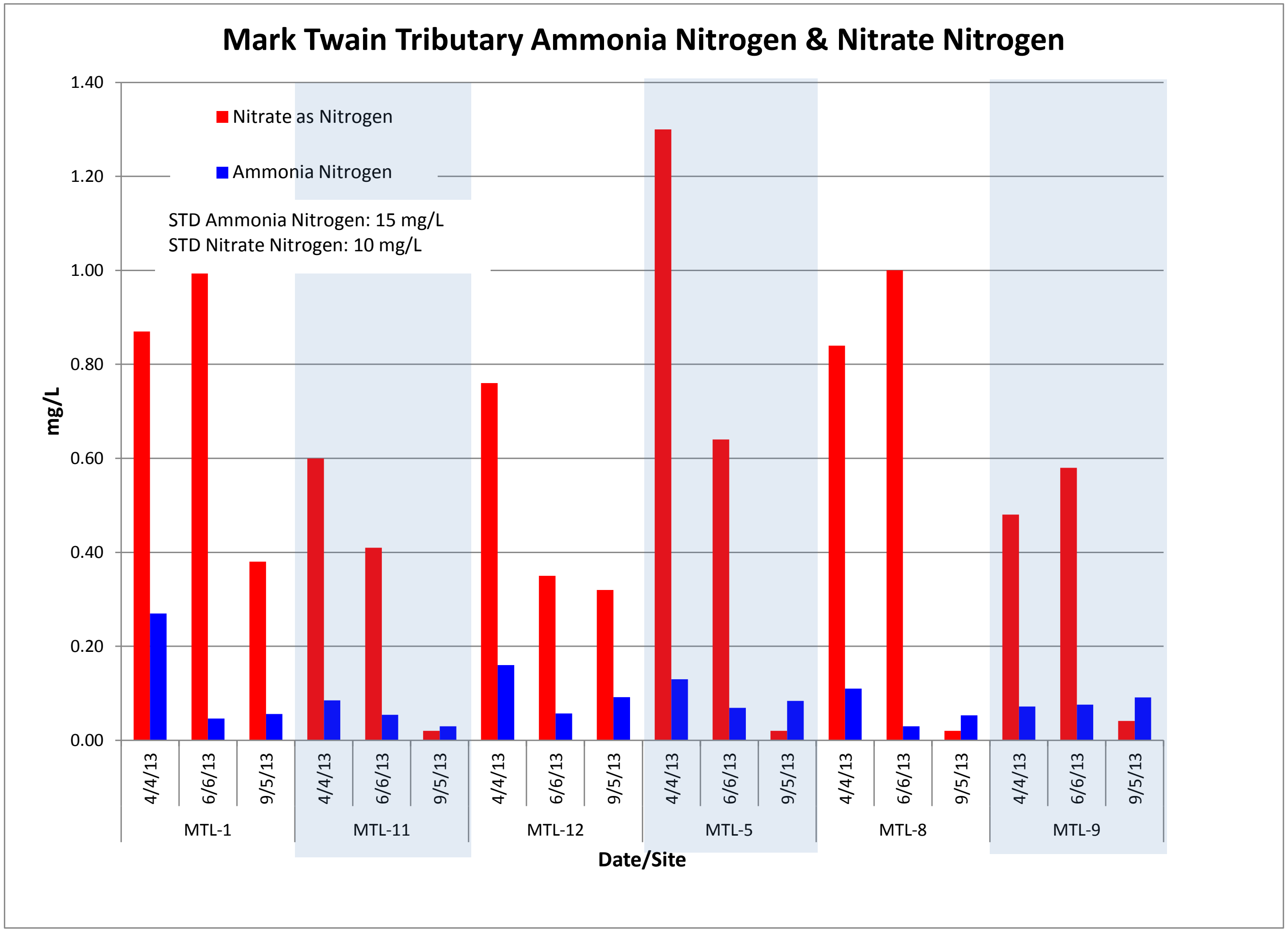
APPENDIX B

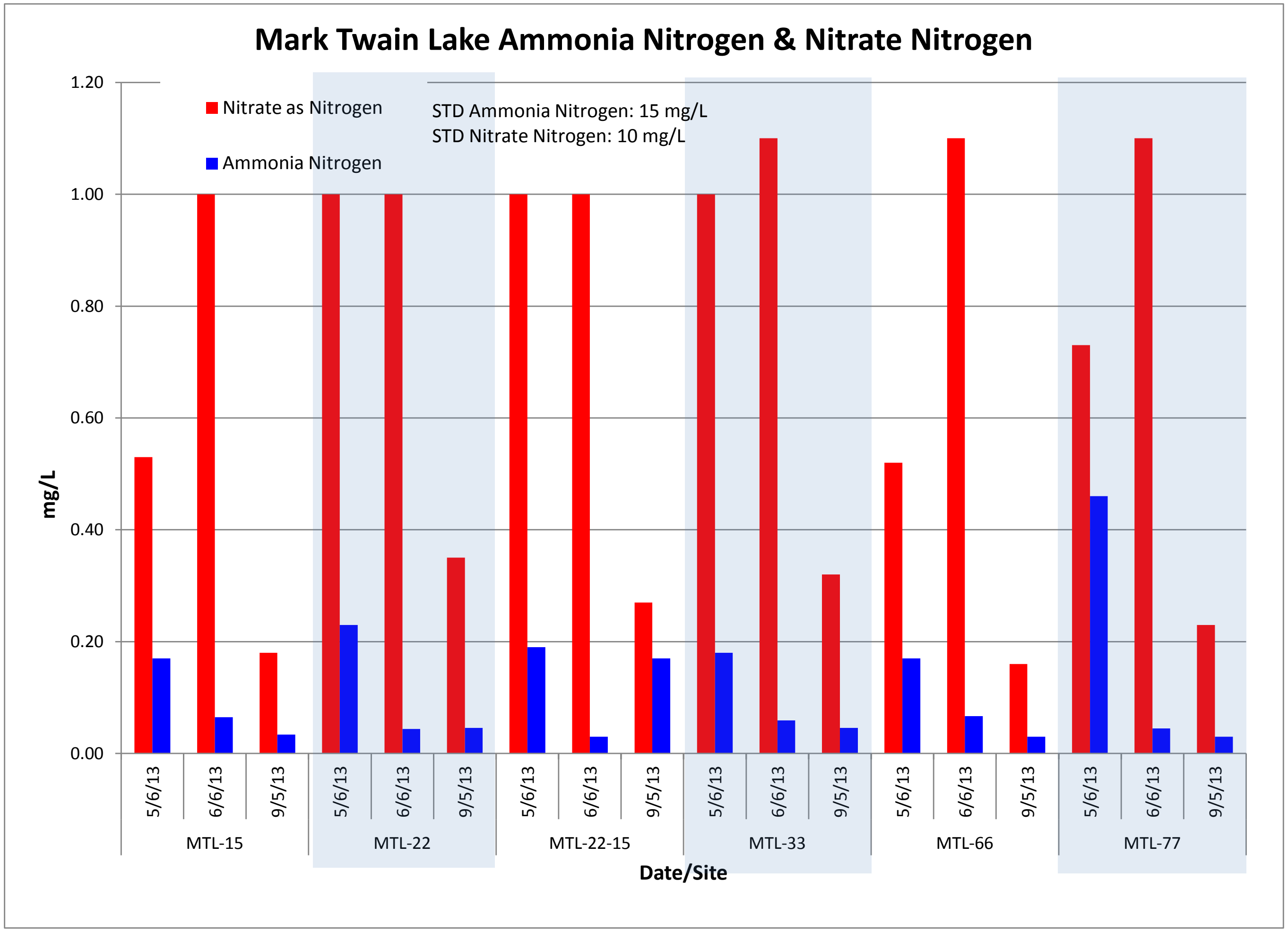
LAB DATA
GRAPHS



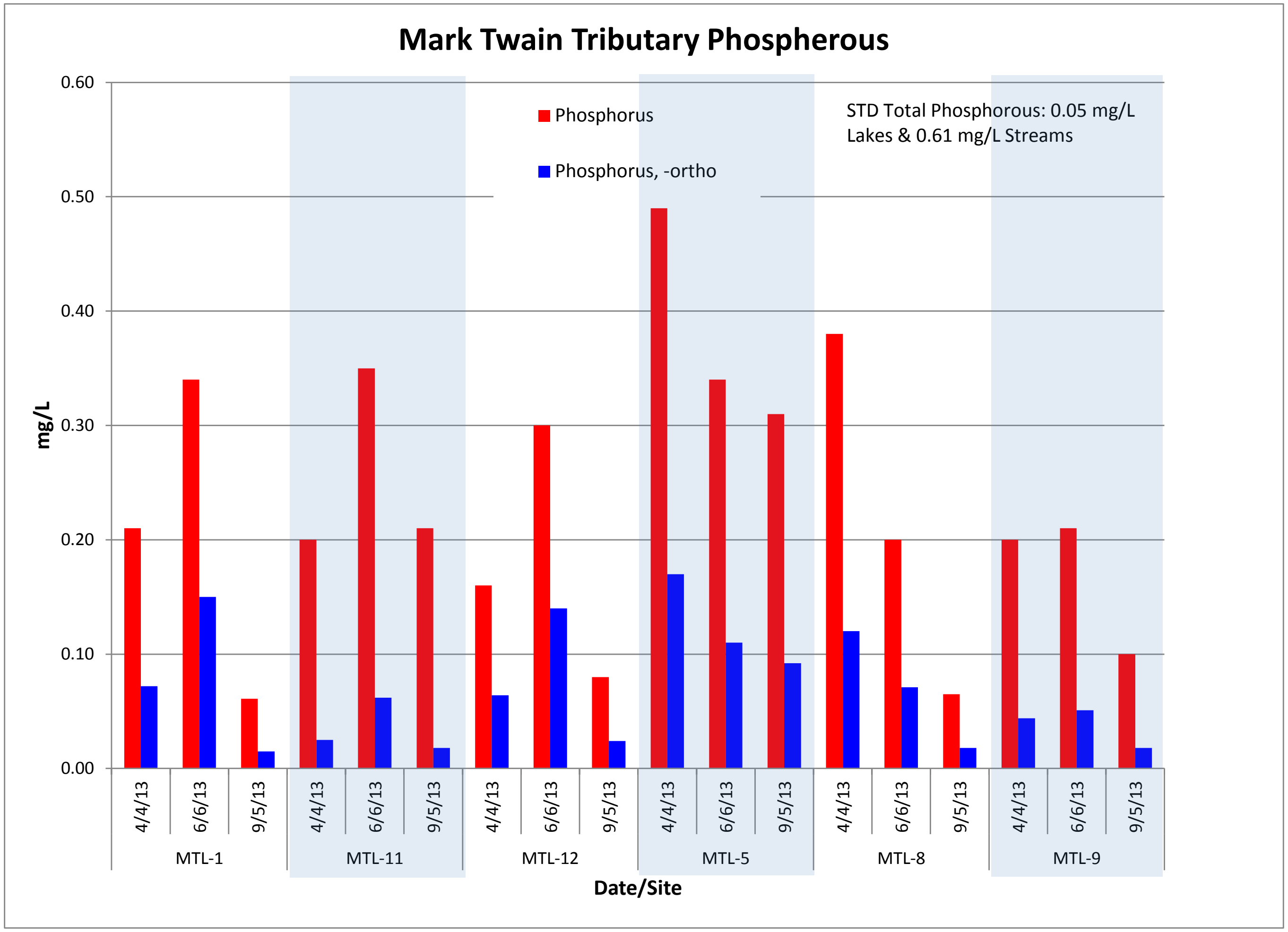
E. coli at Marinas
STD: 235/100ml for single sample
30.0
25.0
20.0
15.0
10.0
5.0
0.0
mp/100ml
6/6/13
BJ MARINA
9/5/13
BJ-MARINA
6/6/13
IC MARINA
9/5/13
IC-MARINA
Date/Site


Mark Twain Iron & Manganese
Iron
Manganese
STD Iron: 2.0 mg/L (secondary contact & aquatic life)
STD Manganese: 1.0 mg/L
mg/L
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
4/4/13
6/6/13
9/5/13
4/4/13
6/6/13
9/5/13
5/6/13
6/6/13
9/5/13
MTL-1
MTL-12
MTL-22-15
Date/Site

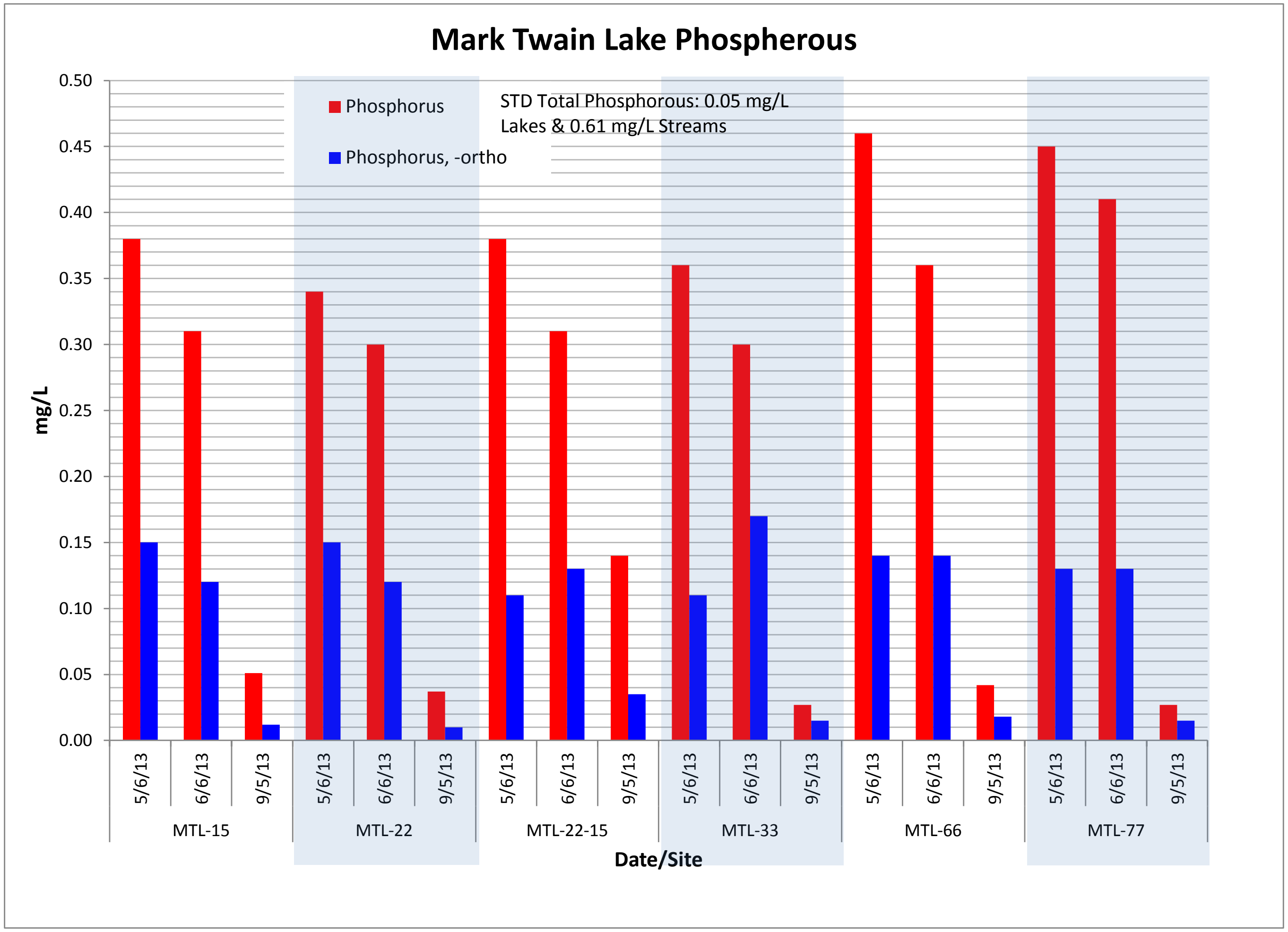

Mark Twain Tributary Ammonia Nitrogen & Nitrate Nitrogen
Nitrate as Nitrogen
Ammonia Nitrogen
STD Ammonia Nitrogen: 15 mg/L
STD Nitrate Nitrogen: 10 mg/L
mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
4/4/13
6/6/13
9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site

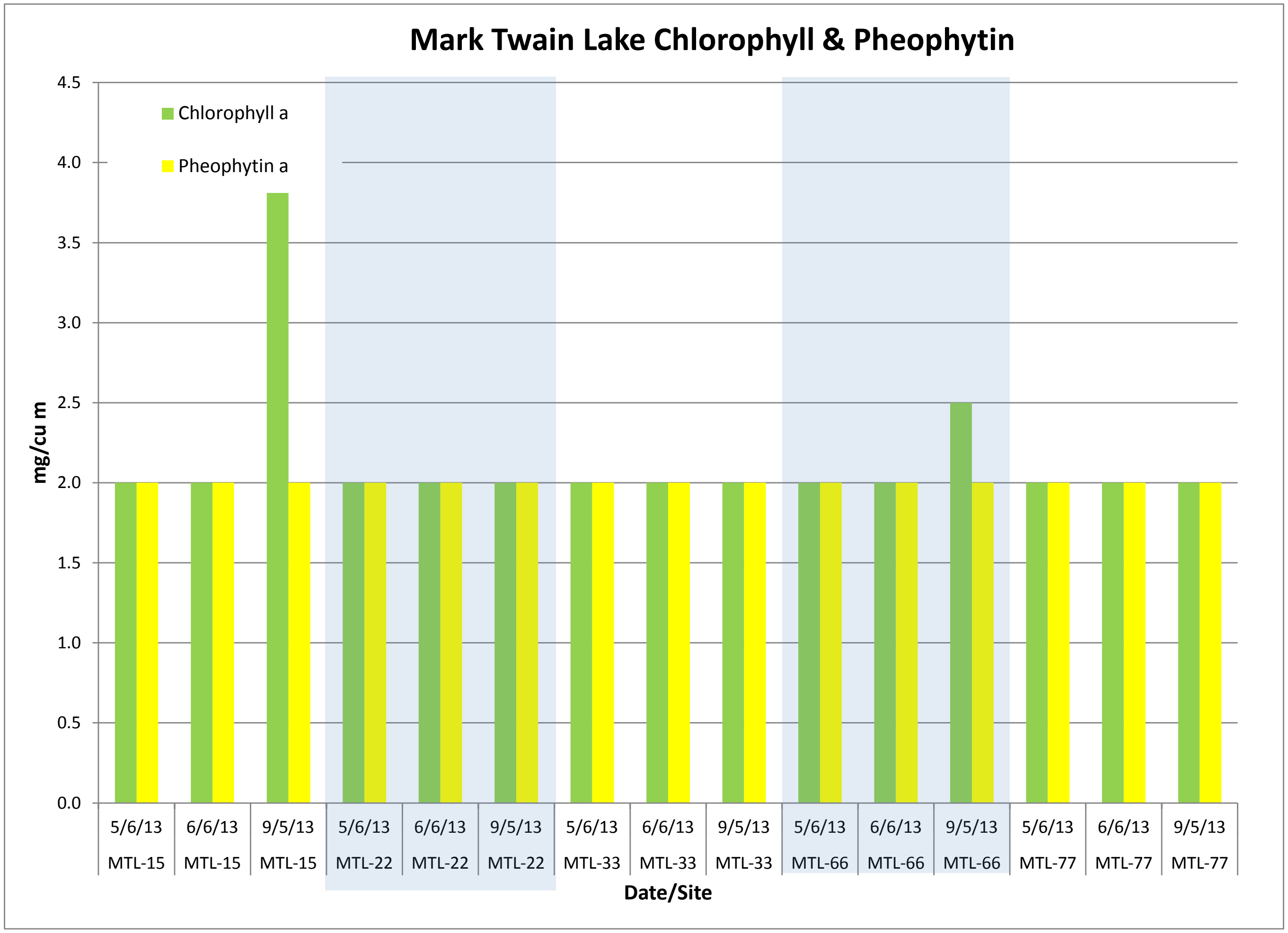


Mark Twain Lake Ammonia Nitrogen & Nitrate Nitrogen
Nitrate as Nitrogen
Ammonia Nitrogen
STD Ammonia Nitrogen: 15 mg/L
STD Nitrate Nitrogen: 10 mg/L
mg/L
1.20
1.00
0.80
0.60
0.40
0.20
0.00
5/6/13
6/6/13
9/5/13
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

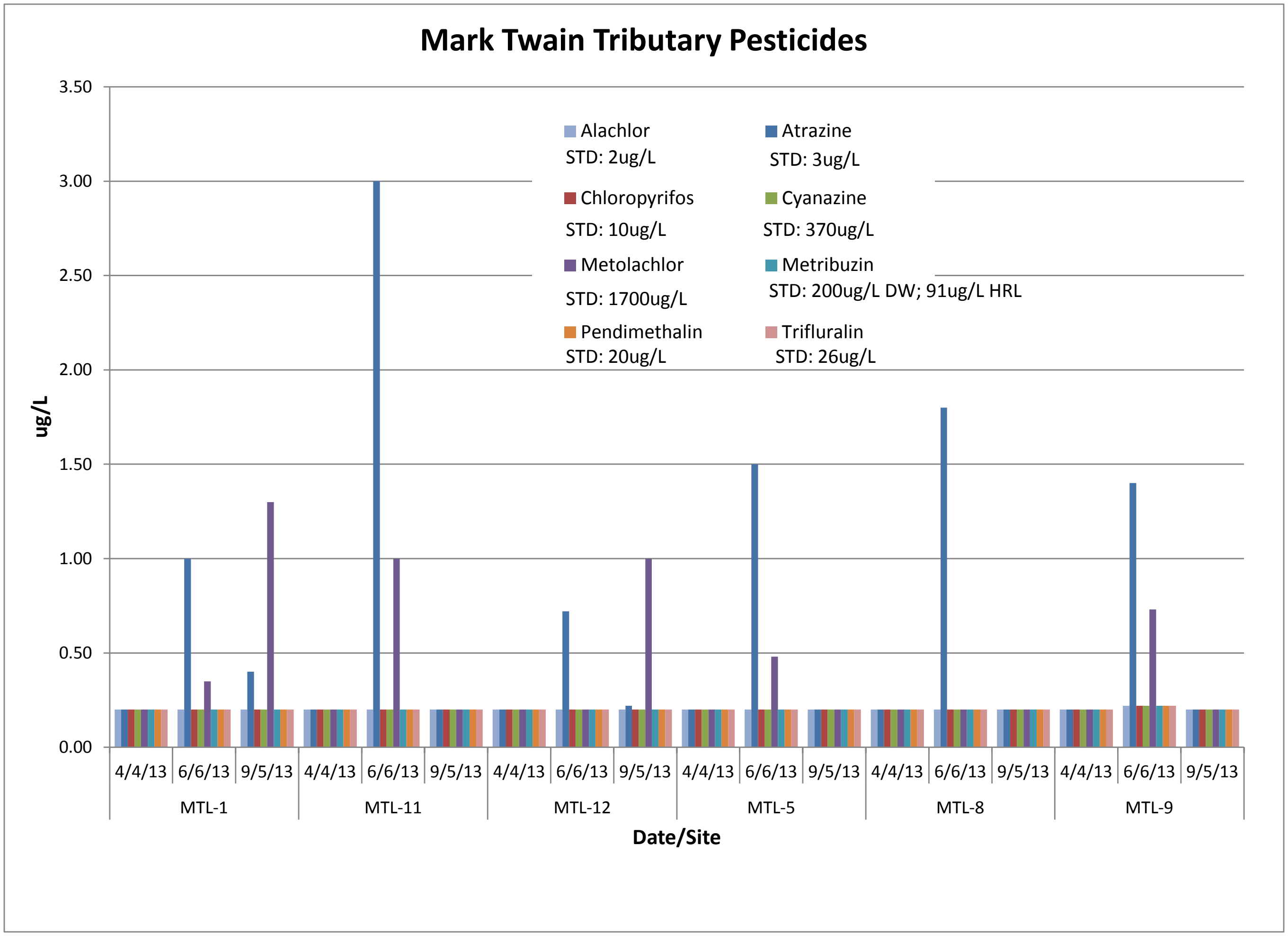


Mark Twain Tributary Phospherous
0.60
0.50
0.40
0.30
0.20
0.10
0.00
mg/L
Phosphorus
Phosphorus, -ortho
STD Total Phosphorous: 0.05 mg/L Lakes & 0.61 mg/L Streams
4/4/13
6/6/13
9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site

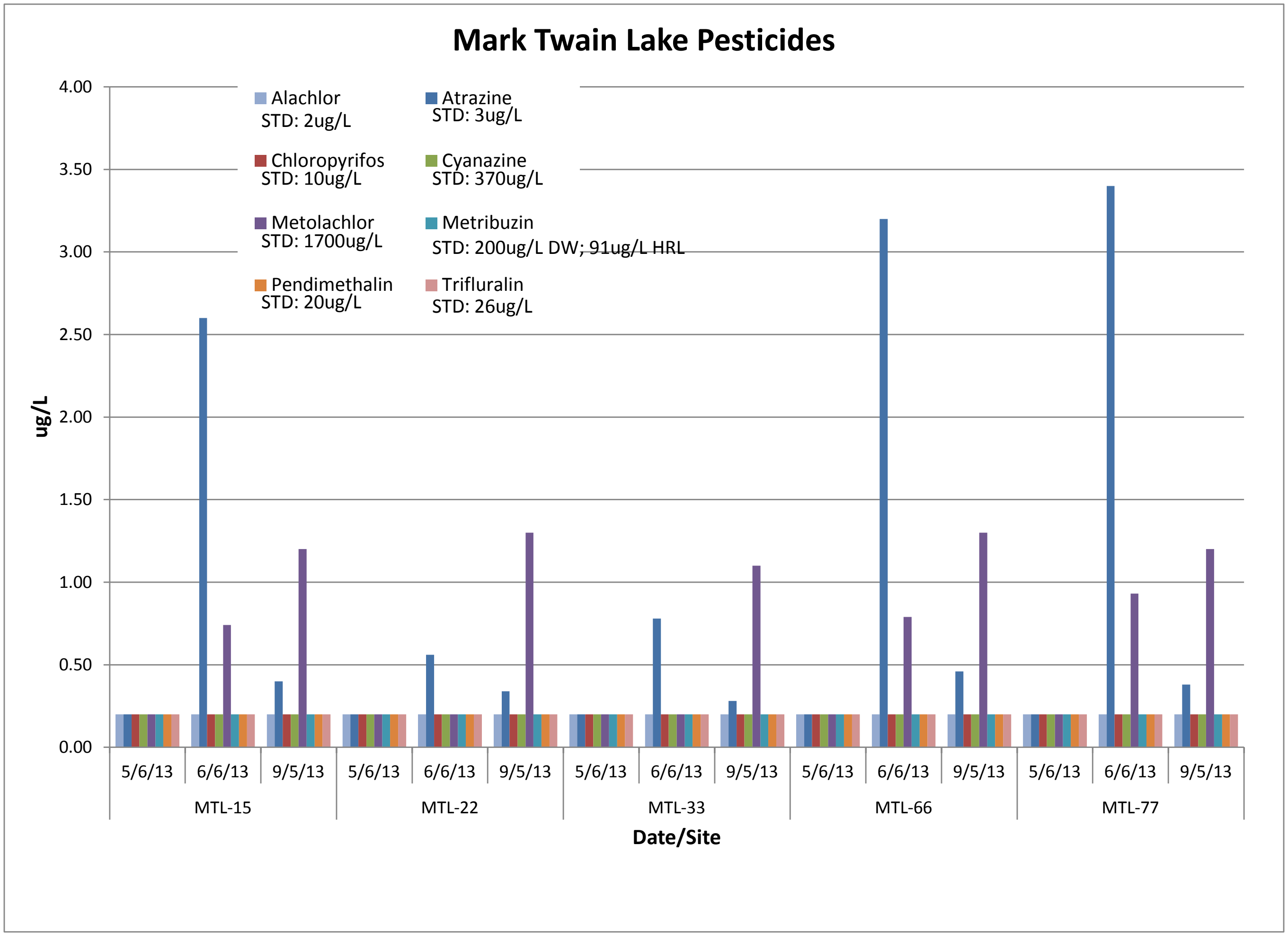

Mark Twain Lake Phospherous
Phosphorus
Phosphorus, -ortho
STD Total Phosphorous: 0.05 mg/L
Lakes & 0.61 mg/L Streams
mg/L
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
5/6/13
6/6/13
9/5/13
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

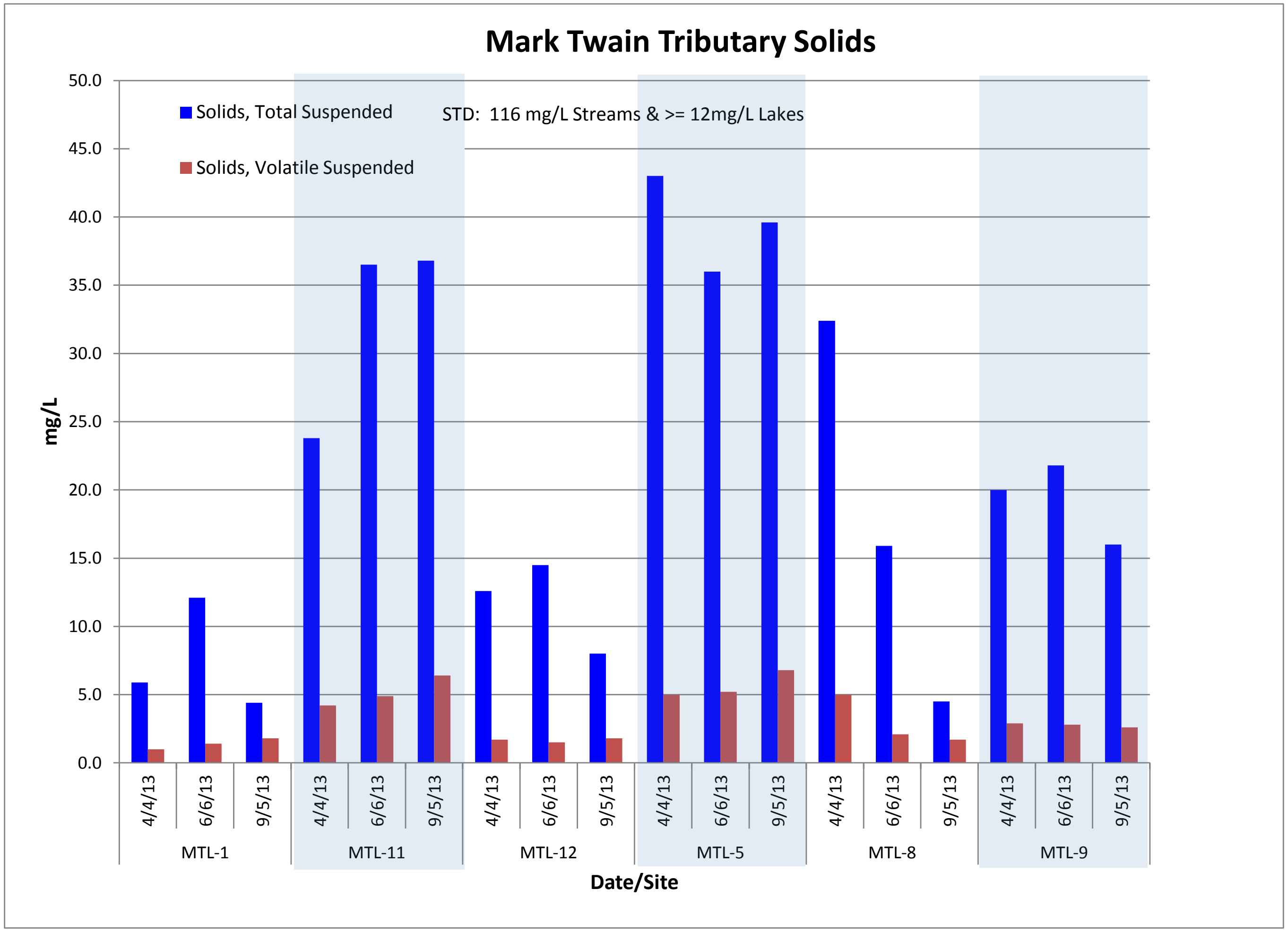


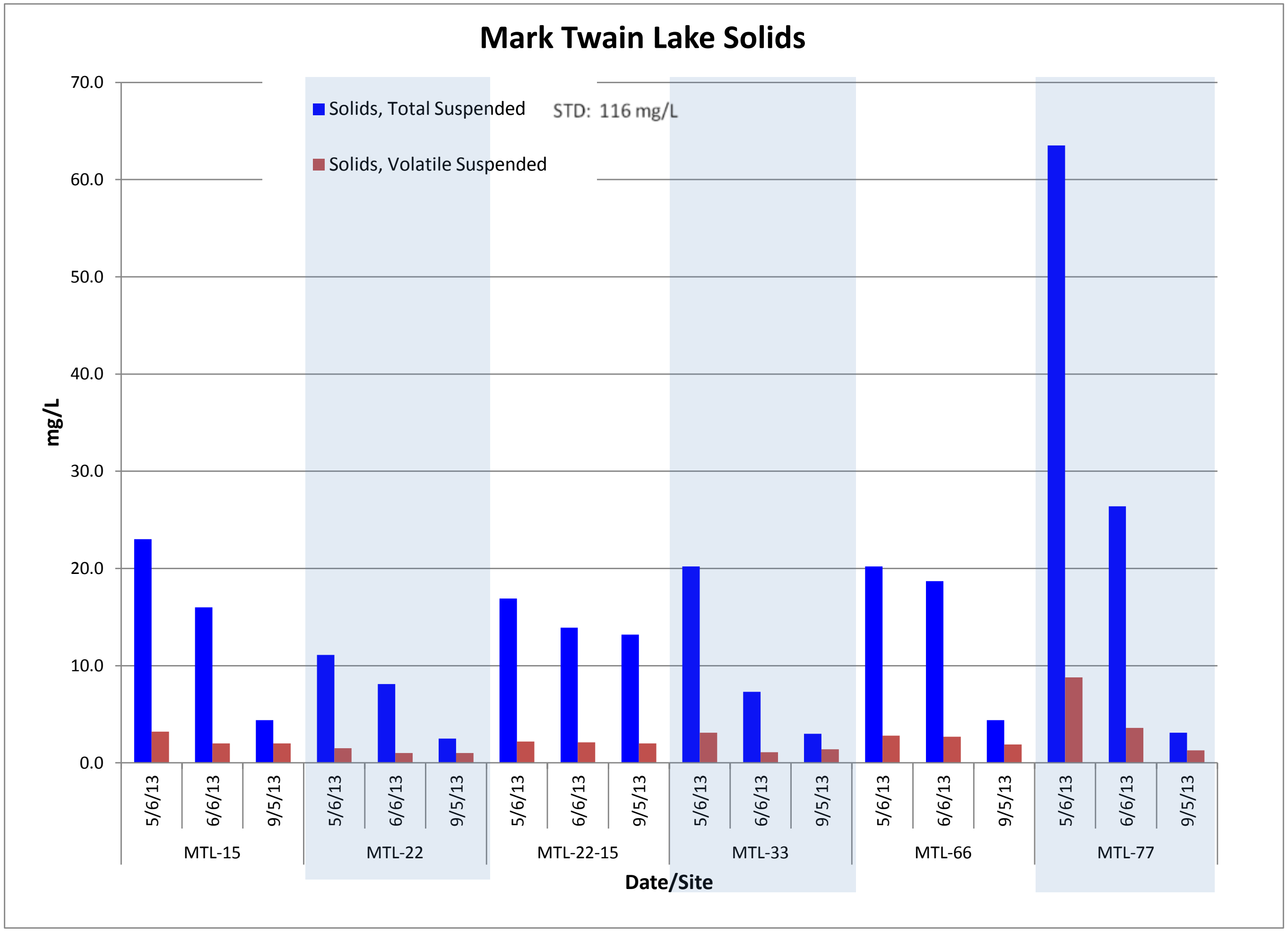
Mark Twain Lake Chlorophyll & Pheophytin
Chlorophyll a
Pheophytin a
mg/cu m
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5/6/13 MTL-15
6/6/13 MTL-15
9/5/13 MTL-15
5/6/13 MTL-22
6/6/13 MTL-22
9/5/13 MTL-22
5/6/13 MTL-33
6/6/13 MTL-33
9/5/13 MTL-33
5/6/13 MTL-66
6/6/13 MTL-66
9/5/13 MTL-66
5/6/13 MTL-77
6/6/13 MTL-77
9/5/13 MTL-77
Date/Site

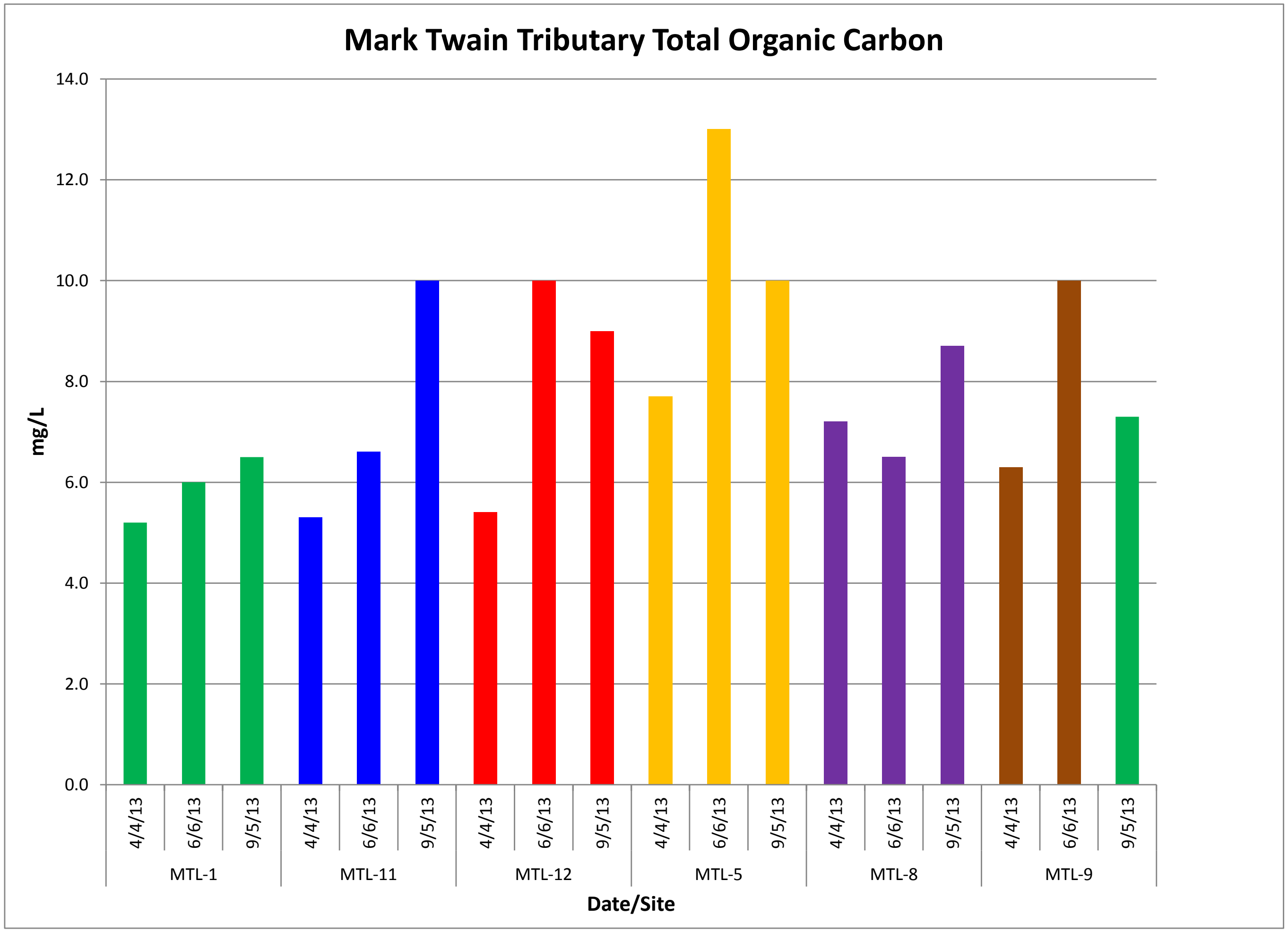


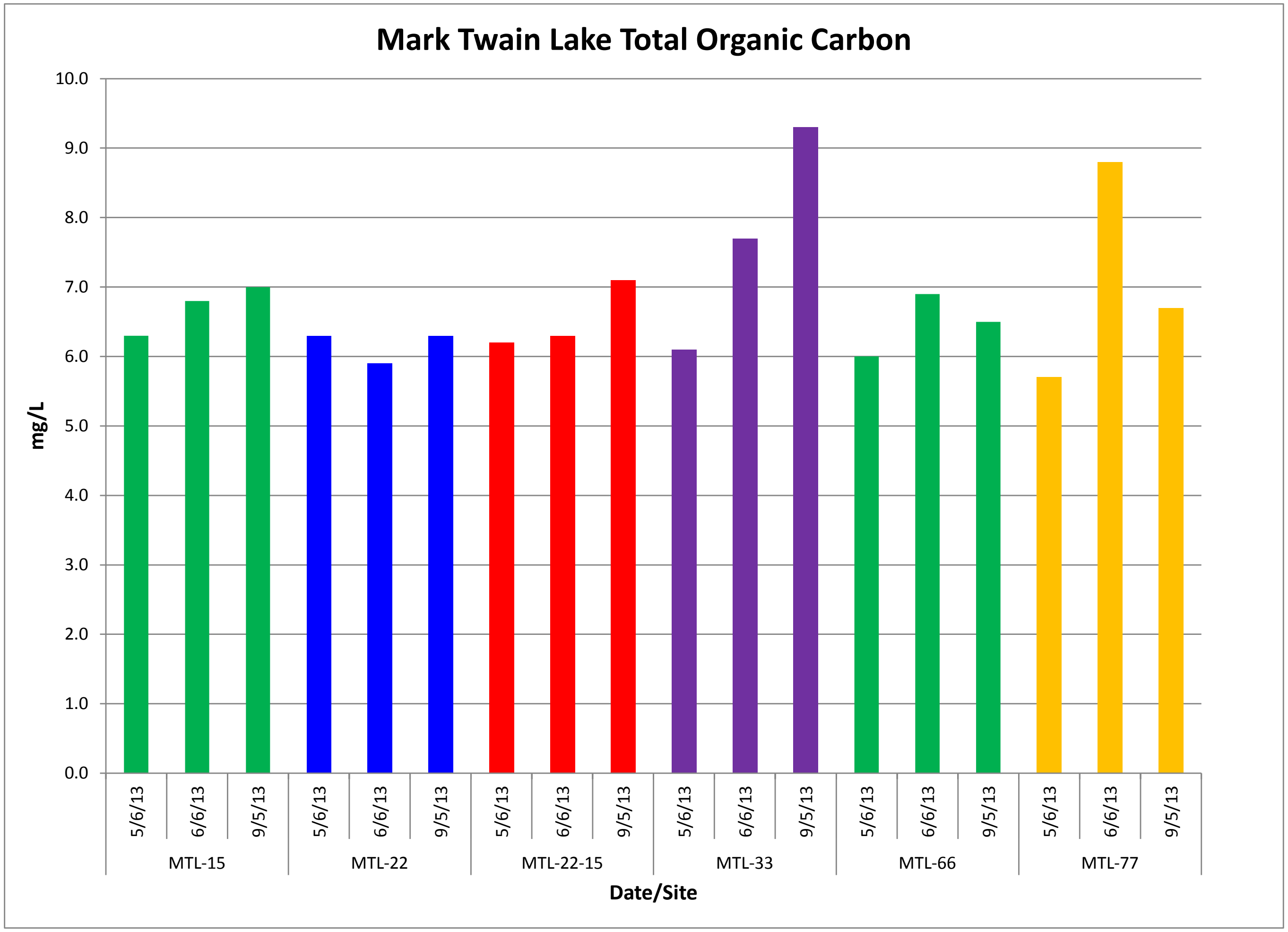
Mark Twain Tributary Pesticides
Alachlor STD: 2ug/L
Atrazine STD: 3ug/L
Chloropyrifos STD: 10ug/L
Cyanazine STD: 370ug/L
Metolachlor STD: 1700ug/L
Metribuzin STD: 200ug/L DW; 91ug/L HRL
Pendimethalin STD: 20ug/L
Trifluralin STD: 26ug/L
ug/L
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
4/4/13 6/6/13 9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site


Mark Twain Lake Pesticides
Alachlor STD: 2ug/L
Atrazine STD: 3ug/L
Chloropyrifos 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
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
5/6/13
6/6/13
9/5/13
MTL-15
MTL-22
MTL-33
MTL-66
MTL-77
Date/Site


Mark Twain Tributary Solids
Solids, Total Suspended
Solids, Volatile Suspended
STD: 116 mg/L Streams & >= 12mg/L Lakes
mg/L
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
4/4/13
6/6/13
9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site

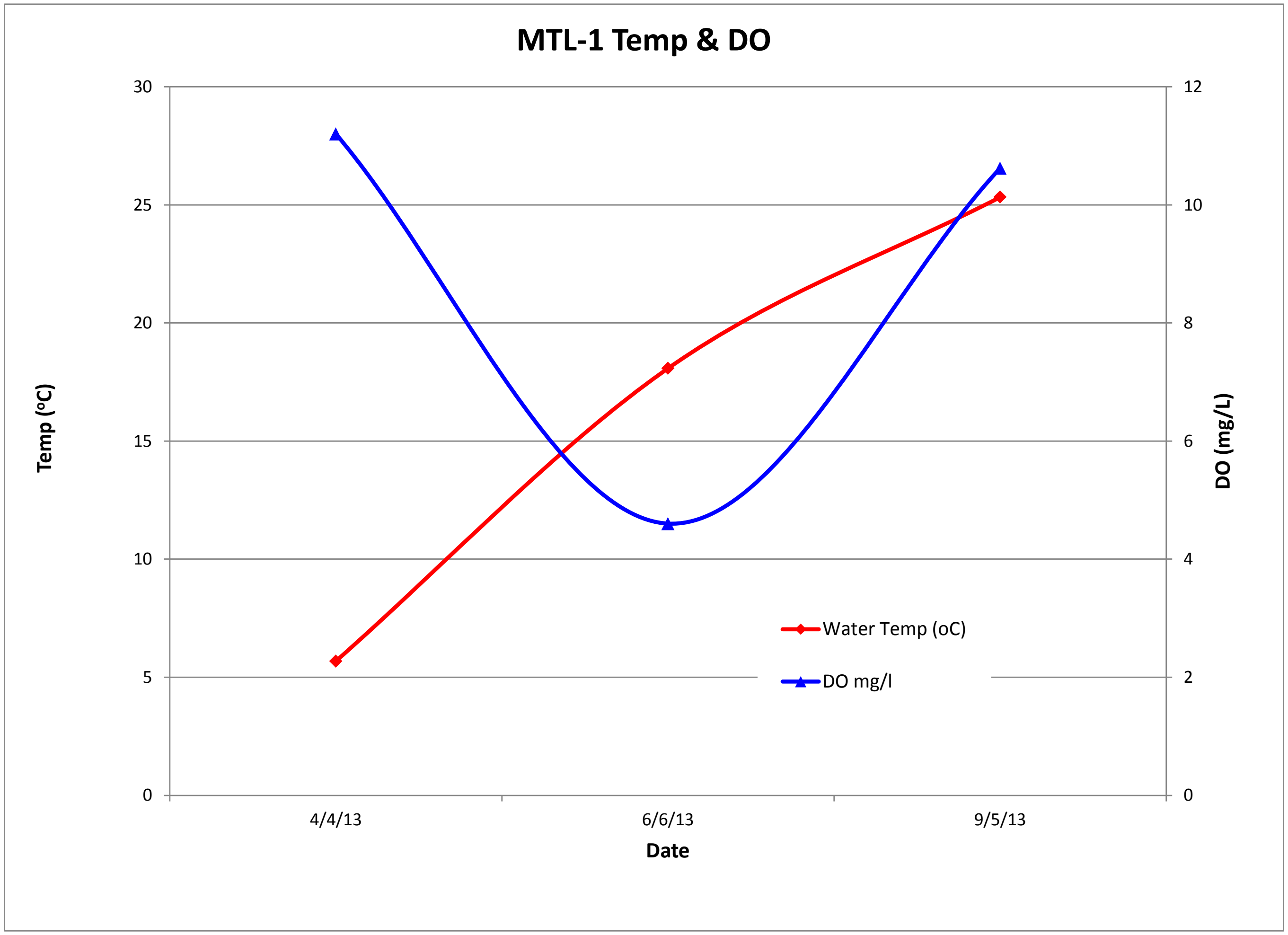

Mark Twain Lake Solids
Solids, Total Suspended
STD: 116 mg/L
Solids, Volatile Suspended
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
mg/L
5/6/13
6/6/13
9/5/13
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

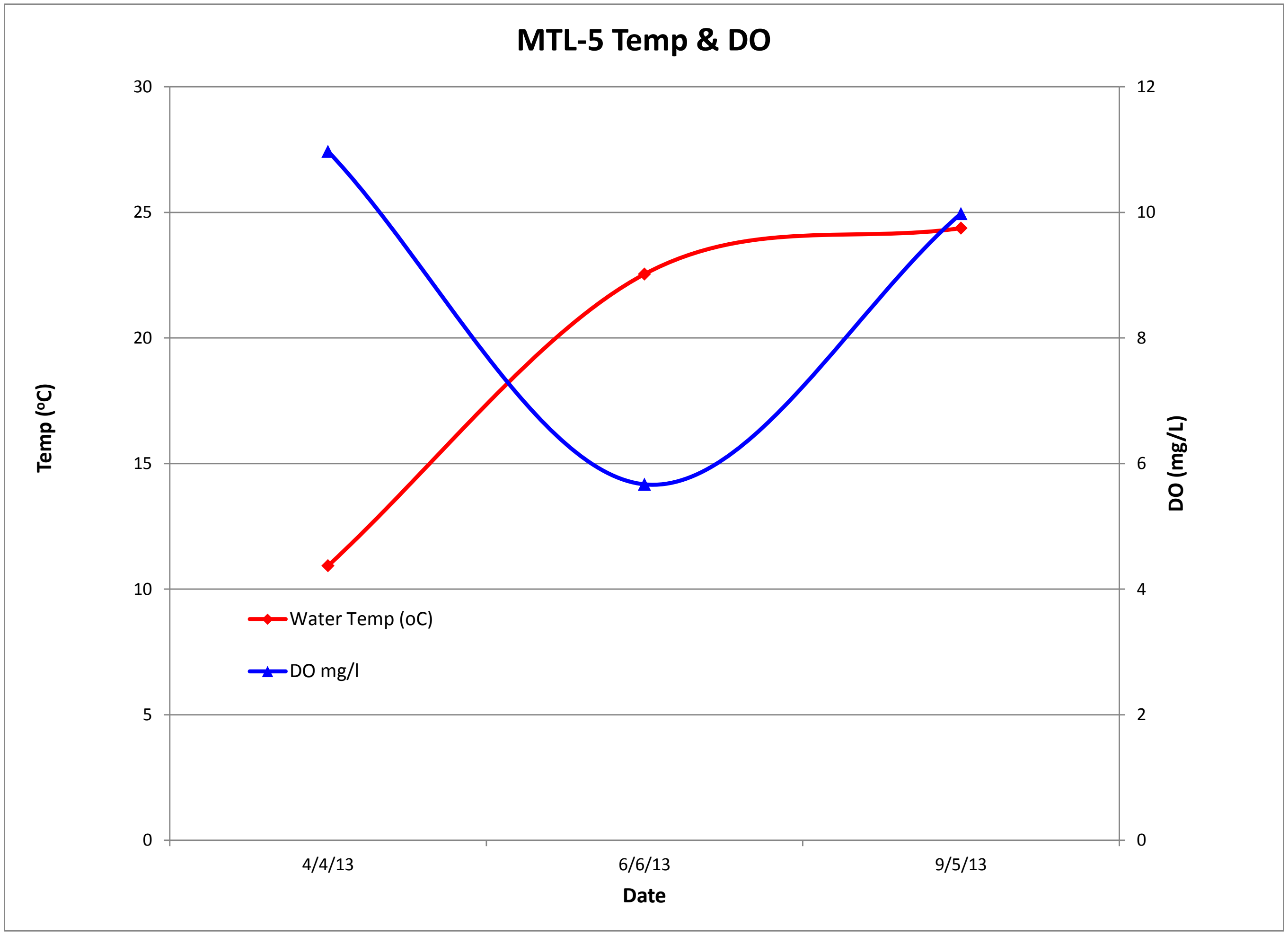

Mark Twain Tributary Total Organic Carbon
mg/L
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
4/4/13
6/6/13
9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site


Mark Twain Lake Total Organic Carbon
mg/L
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
5/6/13
6/6/13
9/5/13
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

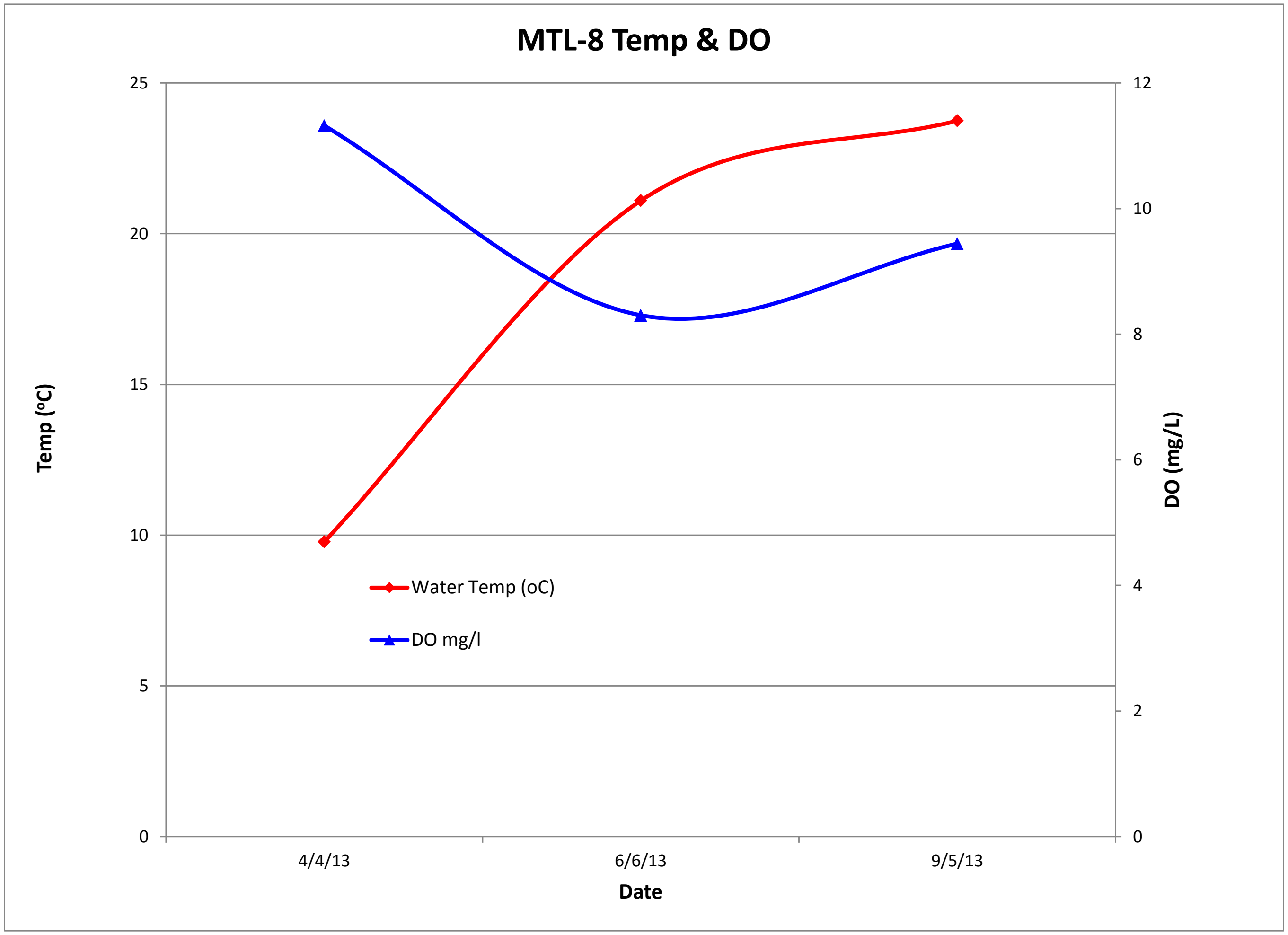
APPENDIX C

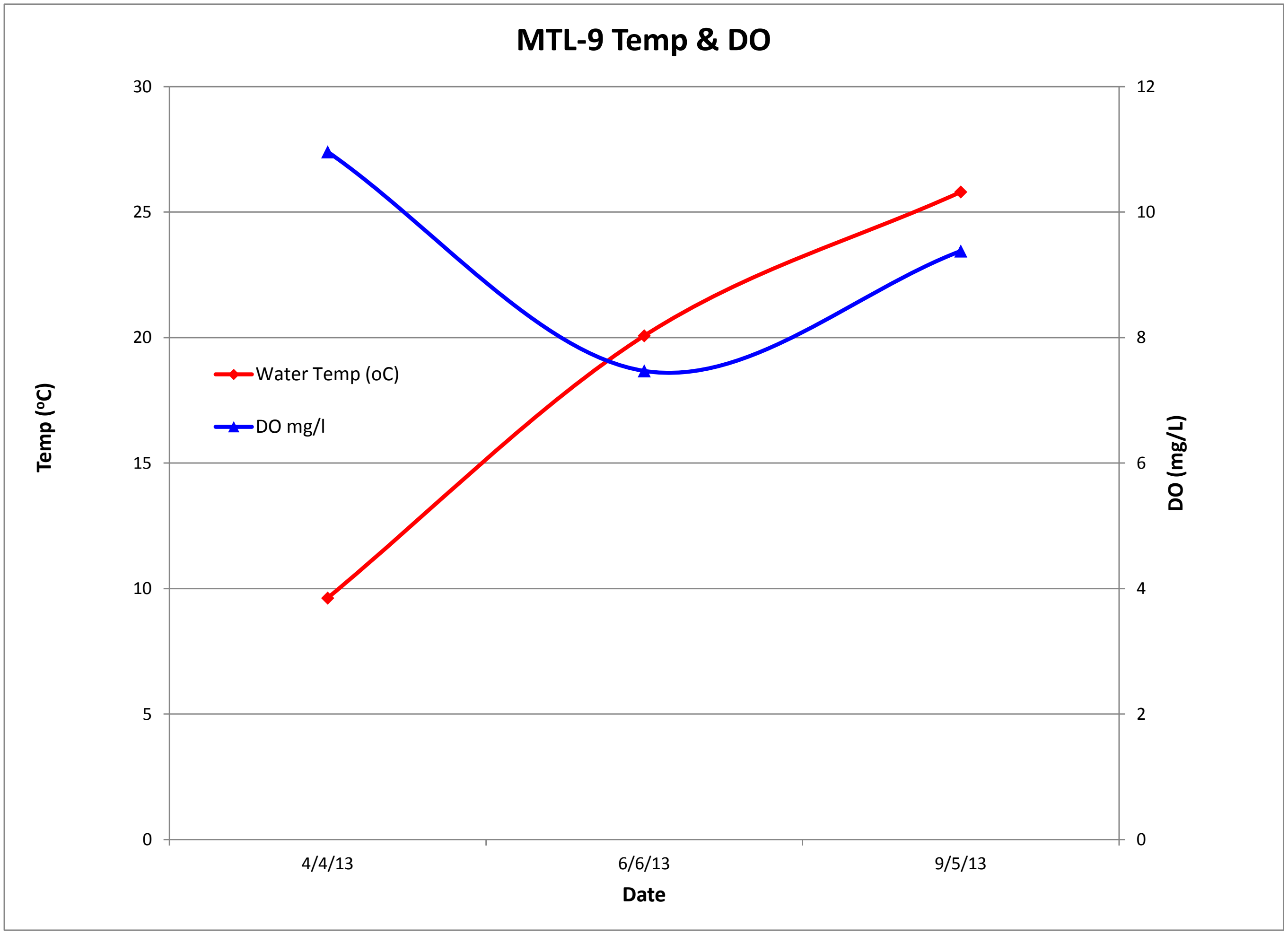
FIELD DATA GRAPHS


MTL-1 Temp & DO
30
25
20
15
10
5
0
12
10
8
6
4
2
0
Temp (ºC)
DO (mg/L)
Water Temp (oC)
DO mg/l
4/4/13
6/6/13
9/5/13
Date

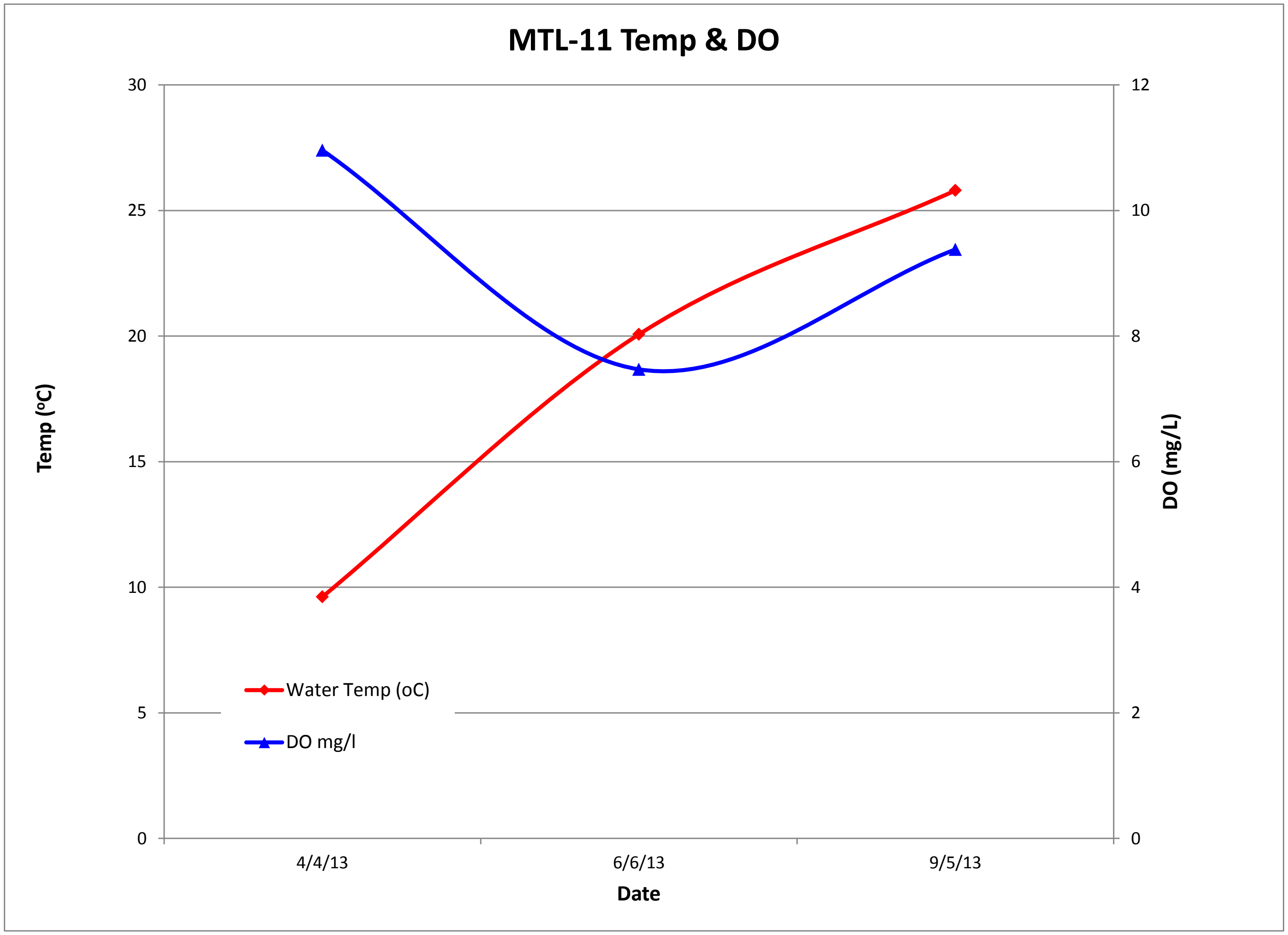


MTL-5 Temp & DO
Temp (ºC)
DO (mg/L)
30
25
20
15
10
5
0
12
10
8
6
4
2
0
Water Temp (oC)
DO mg/l
4/4/13
6/6/13
9/5/13
Date

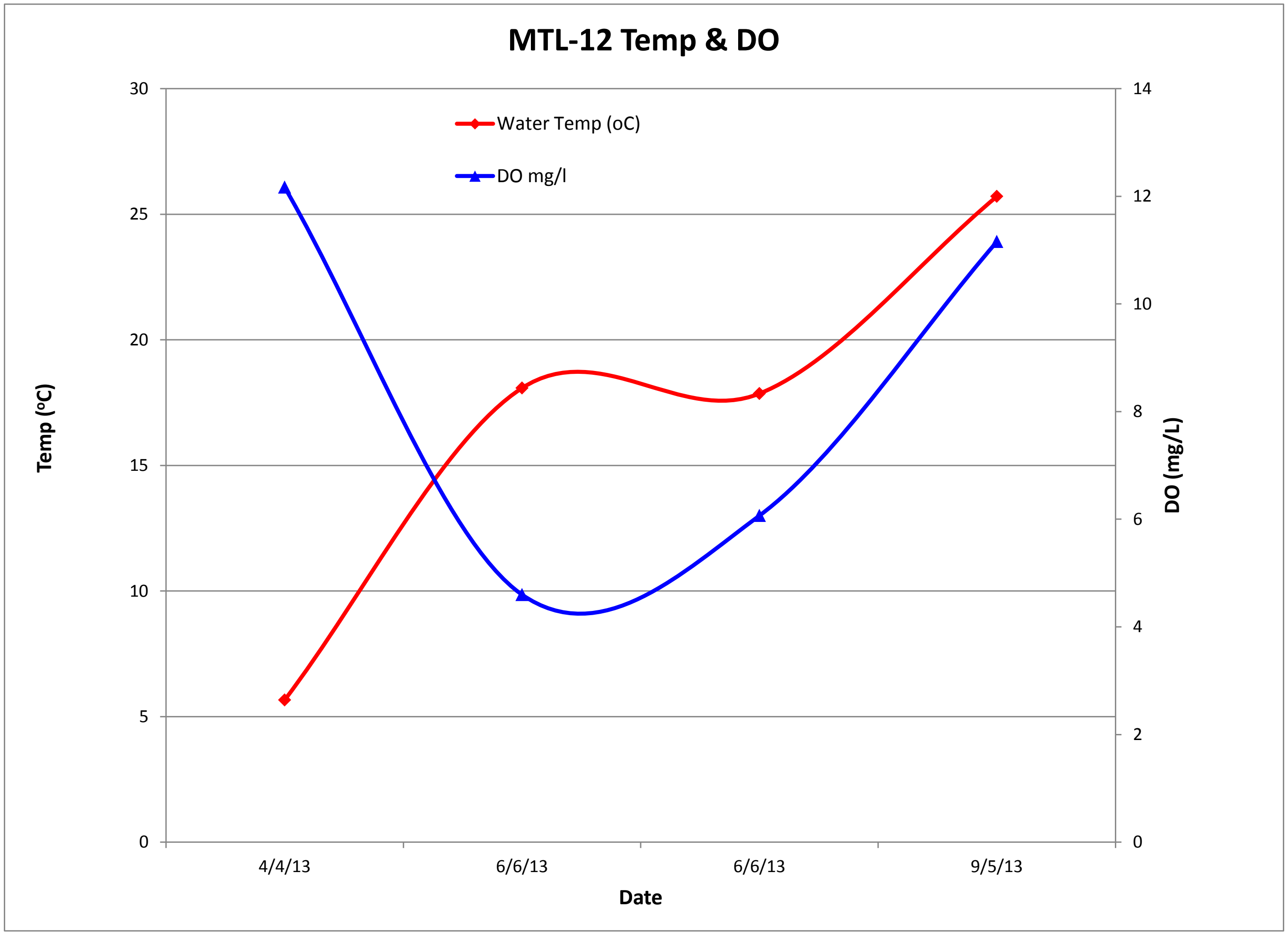

MTL-8 Temp & DO
Temp (ºC)
DO (mg/L)
Date
4/4/13
6/6/13
9/5/13
Water Temp (oC)
DO mg/l
0
5
10
15
20
25
0
2
4
6
8
10
12

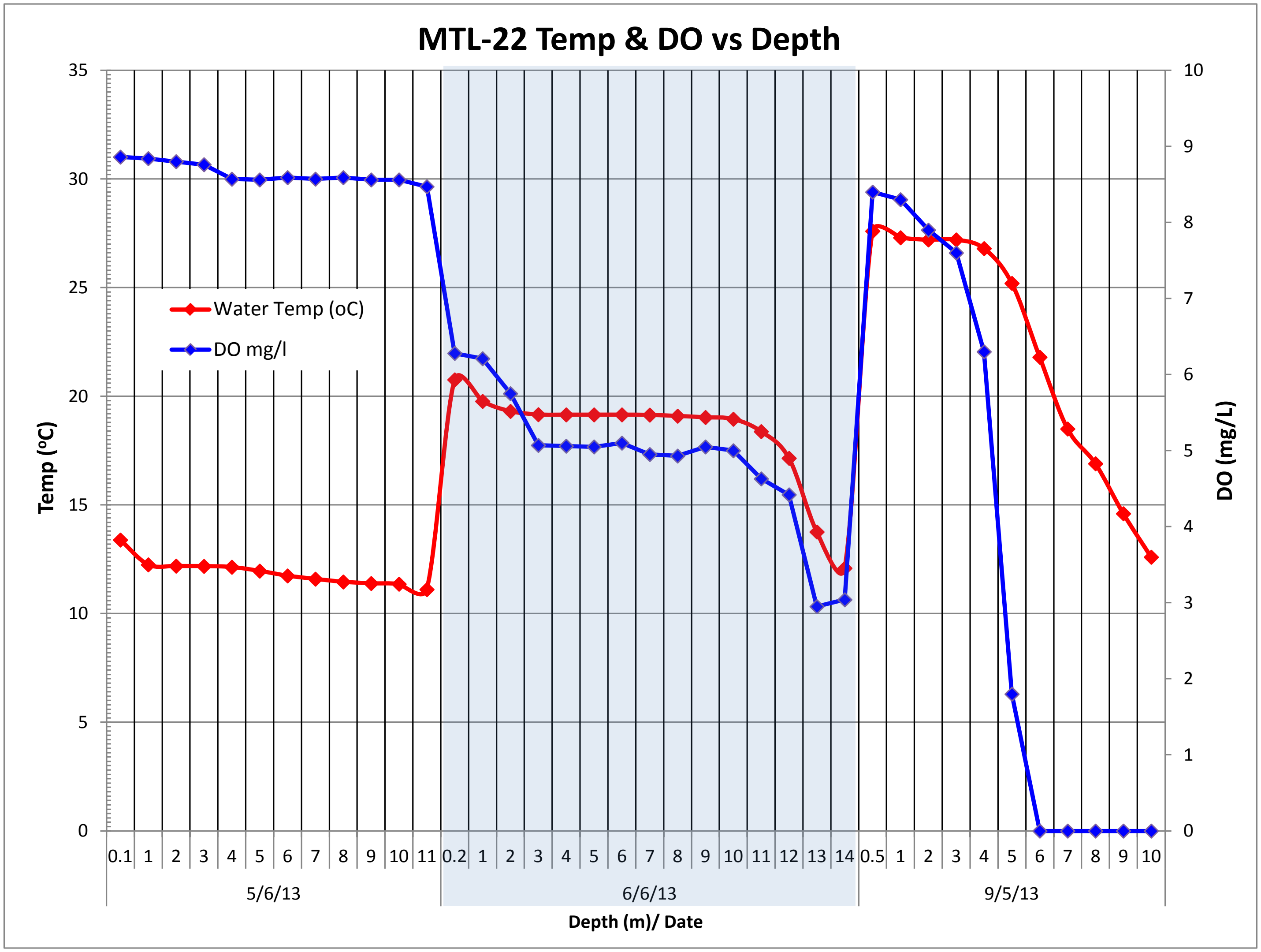


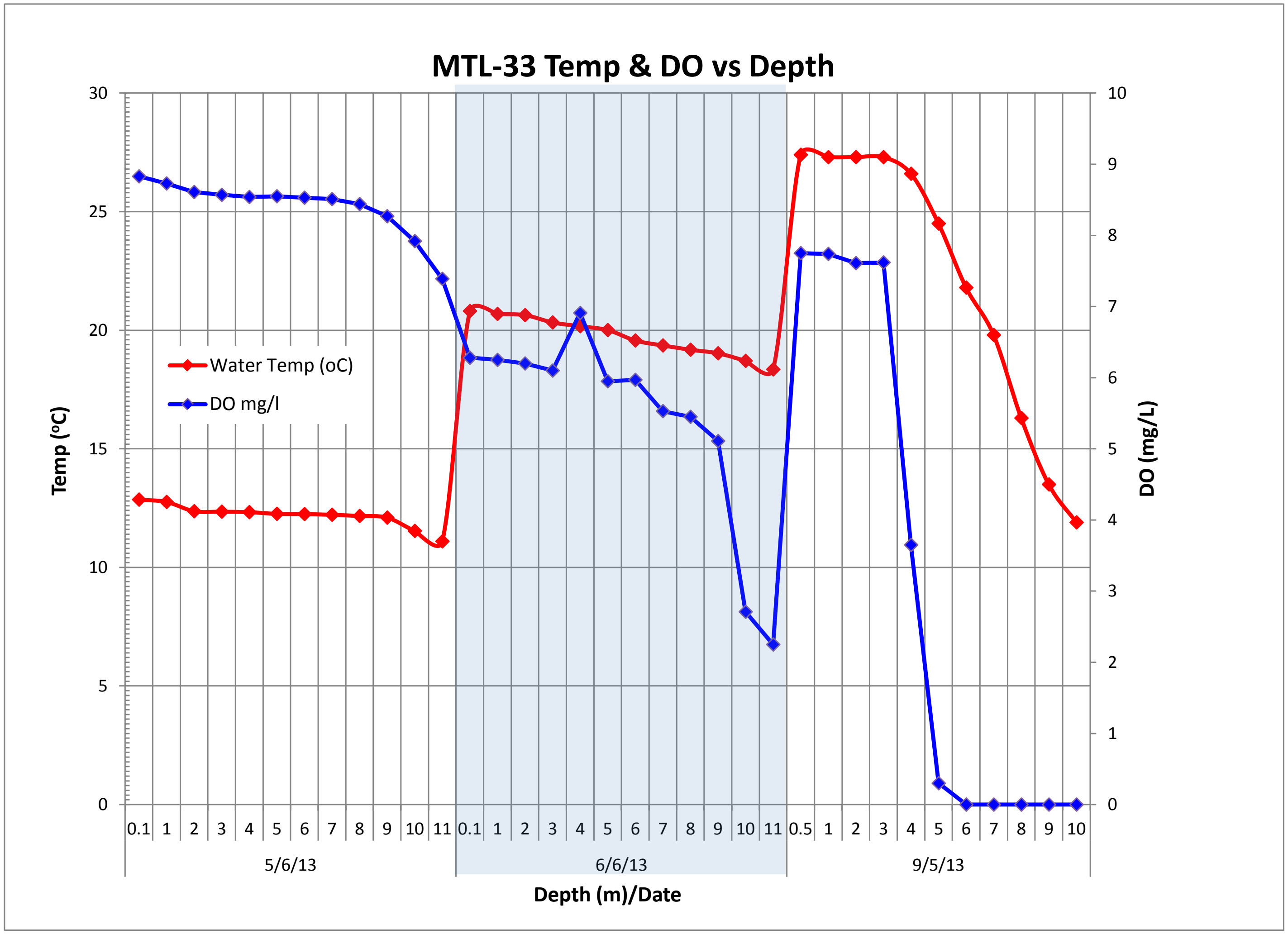
MTL-9 Temp & DO
30
25
20
15
10
5
0
12
10
8
6
4
2
0
Temp (ºC)
DO (mg/L)
Water Temp (oC)
DO mg/l
4/4/13
6/6/13
9/5/13
Date



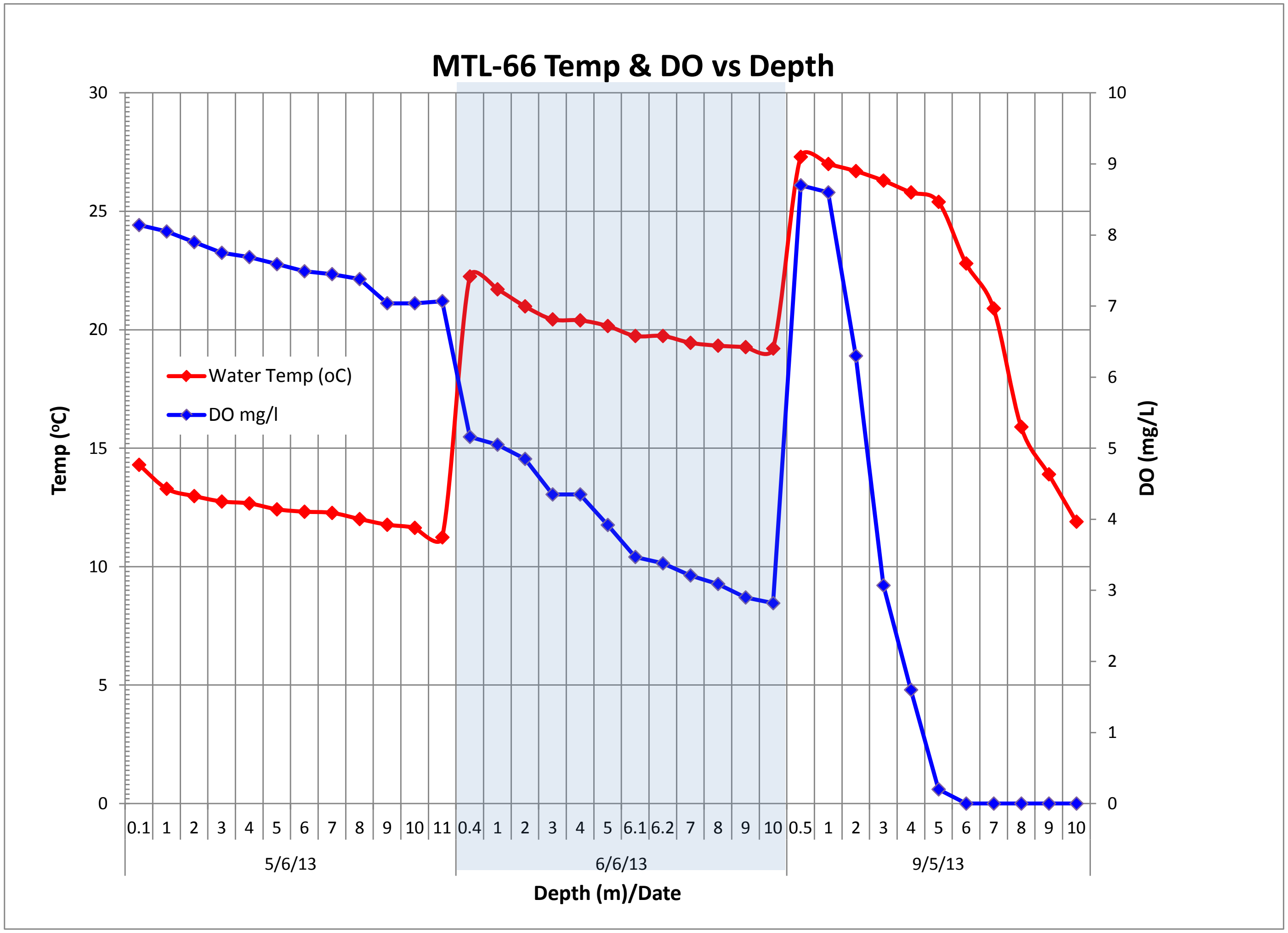
MTL-11 Temp & DO
30
25
20
15
10
5
0
12
10
8
6
4
2
0
Temp (ºC)
DO (mg/L)
Water Temp (oC)
DO mg/l
4/4/13
6/6/13
9/5/13
Date

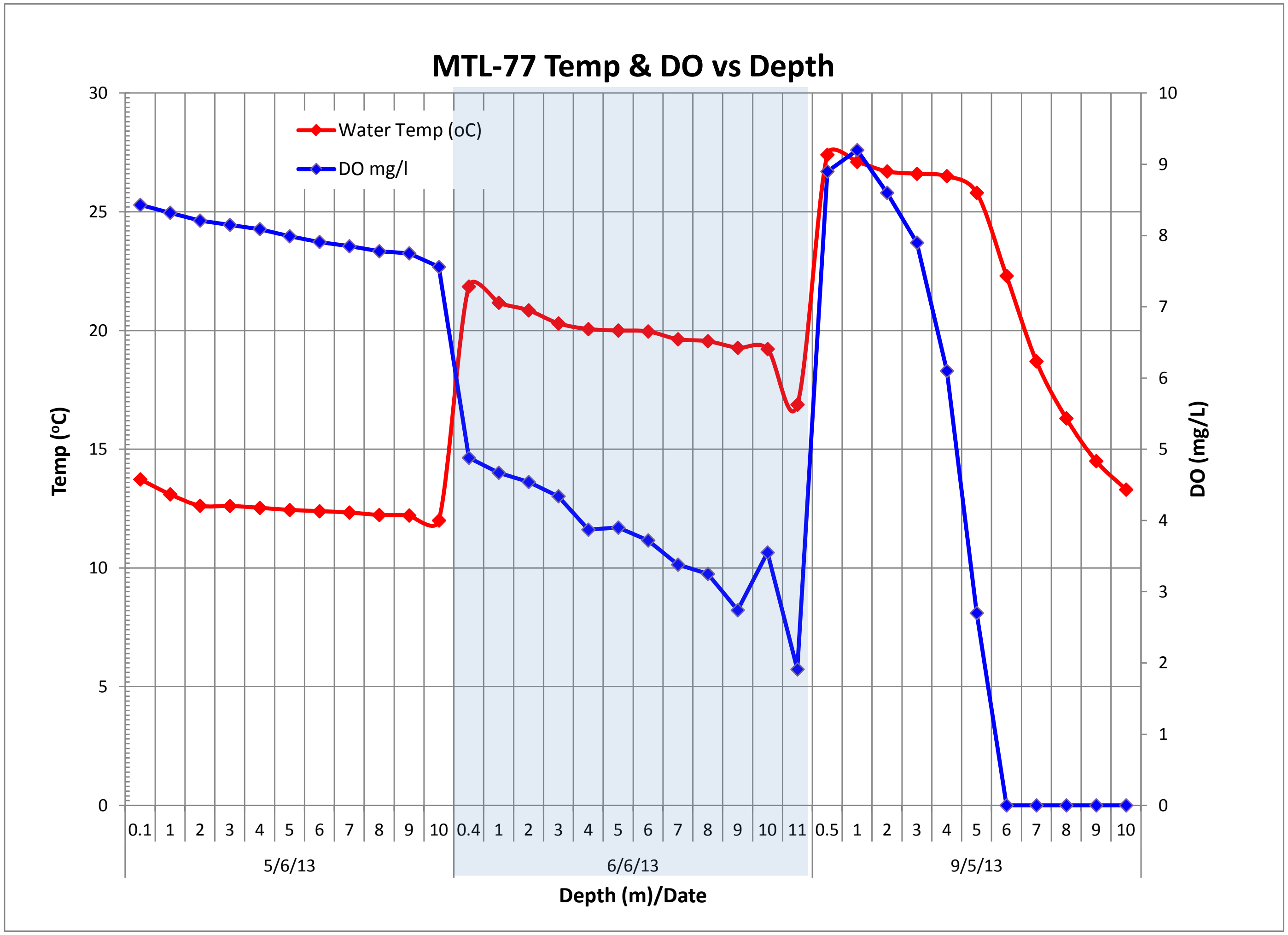

MTL-12 Temp & DO
Water Temp (oC)
DO mg/l
Temp (ºC)
DO (mg/L)
Date
30
25
20
15
10
5
0
14
12
10
8
6
4
2
0
4/4/13
6/6/13
6/6/13
9/5/13

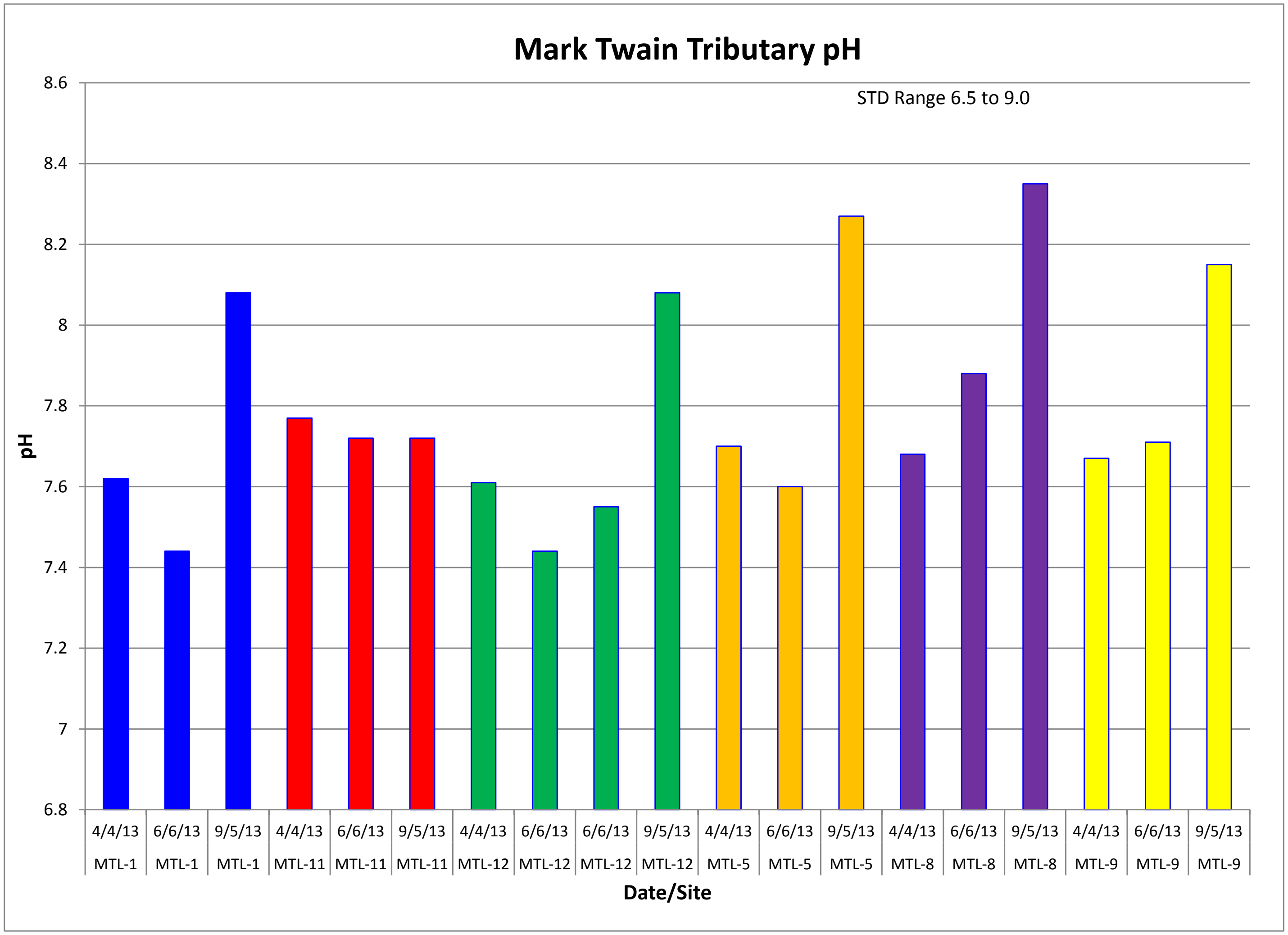

MTL-22 Temp & DO vs Depth
Water Temp (oC)
DO mg/l
Temp (ºC)
DO (mg/L)
35
30
25
20
15
10
5
0
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 11
5/6/13
0.2 1 2 3 4 5 6 7 8 9 10 11 12 13 14
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/ Date

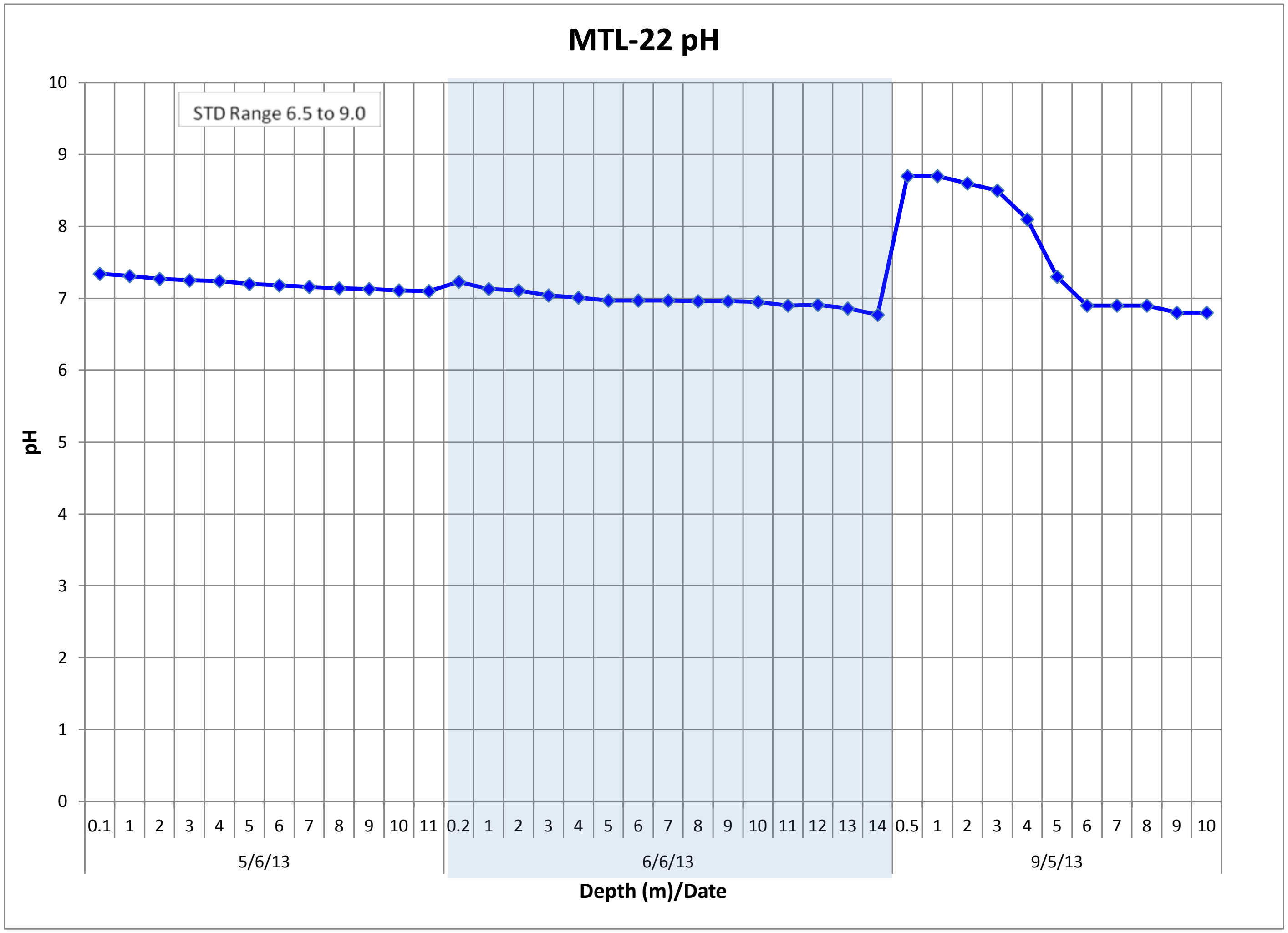


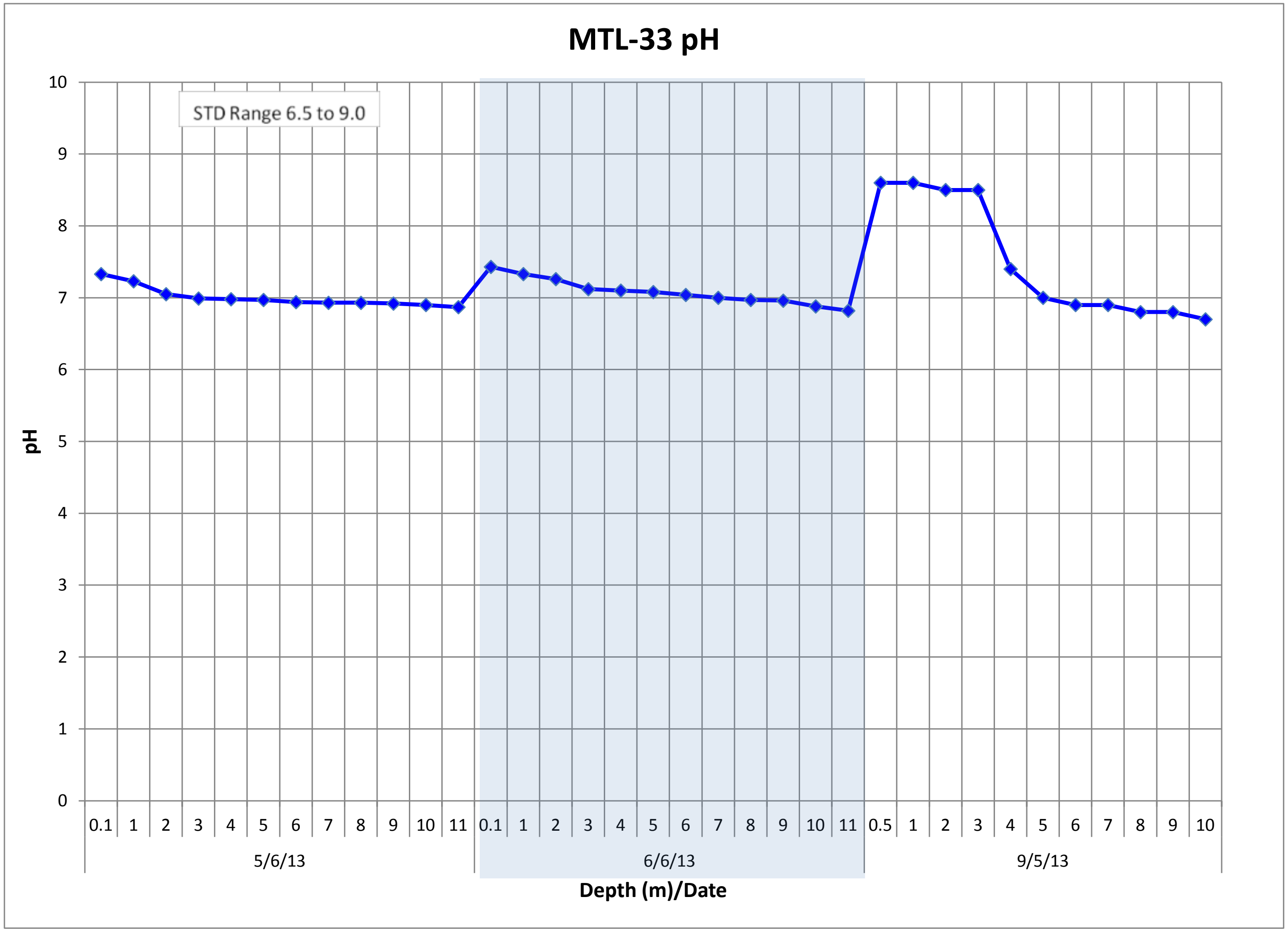
MTL-33 Temp & DO vs Depth
Temp (oC)
DO (mg/L)
Water Temp (oC)
DO mg/l
30
25
20
15
10
5
0
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 11
0.1 1 2 3 4 5 6 7 8 9 10 11
0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date

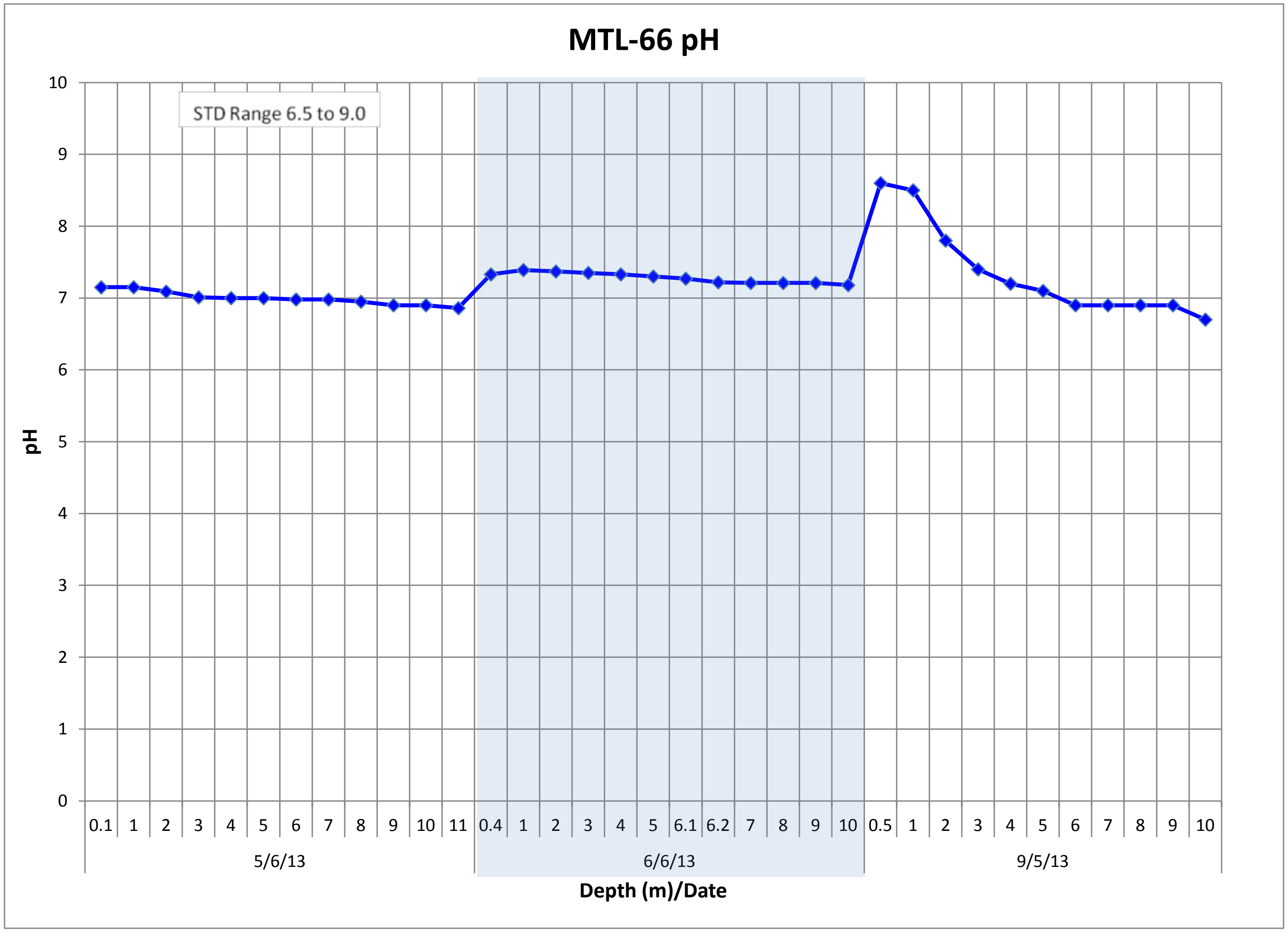

MTL-66 Temp & DO vs Depth
Temp (ºC)
DO (mg/L)
Water Temp (oC)
DO mg/l
0 5 10 15 20 25 30
0 1 2 3 4 5 6 7 8 9 10
0.1 1 2 3 4 5 6 7 8 9 10 11
5/6/13
0.4 1 2 3 4 5 6.1 6.2 7 8 9 10
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/Date


MTL-77 Temp & DO vs Depth
Water Temp (oC)
DO mg/l
Temp (°C)
DO (mg/L)
30
25
20
15
10
5
0
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 0.4 1 2 3 4 5 6 7 8 9 10 11 0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date

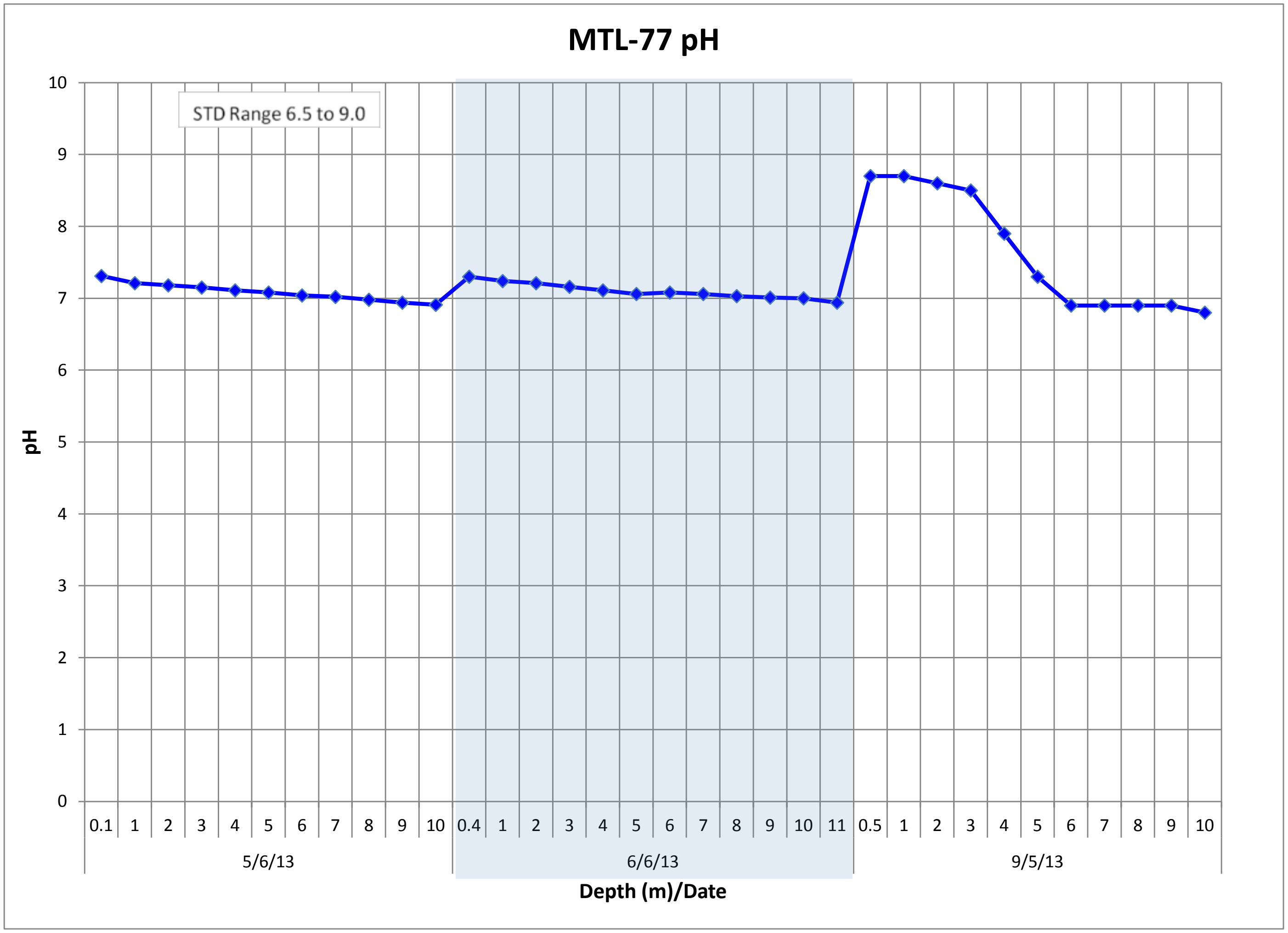

Mark Twain Tributary pH
STD Range 6.5 to 9.0
pH
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
4/4/13 MTL-1
6/6/13 MTL-1
9/5/13 MTL-1
4/4/13 MTL-11
6/6/13 MTL-11
9/5/13 MTL-11
4/4/13 MTL-12
6/6/13 MTL-12
6/6/13 MTL-12
9/5/13 MTL-12
4/4/13 MTL-5
6/6/13 MTL-5
9/5/13 MTL-5
4/4/13 MTL-8
6/6/13 MTL-8
9/5/13 MTL-8
4/4/13 MTL-9
6/6/13 MTL-9
9/5/13 MTL-9
Date/Site

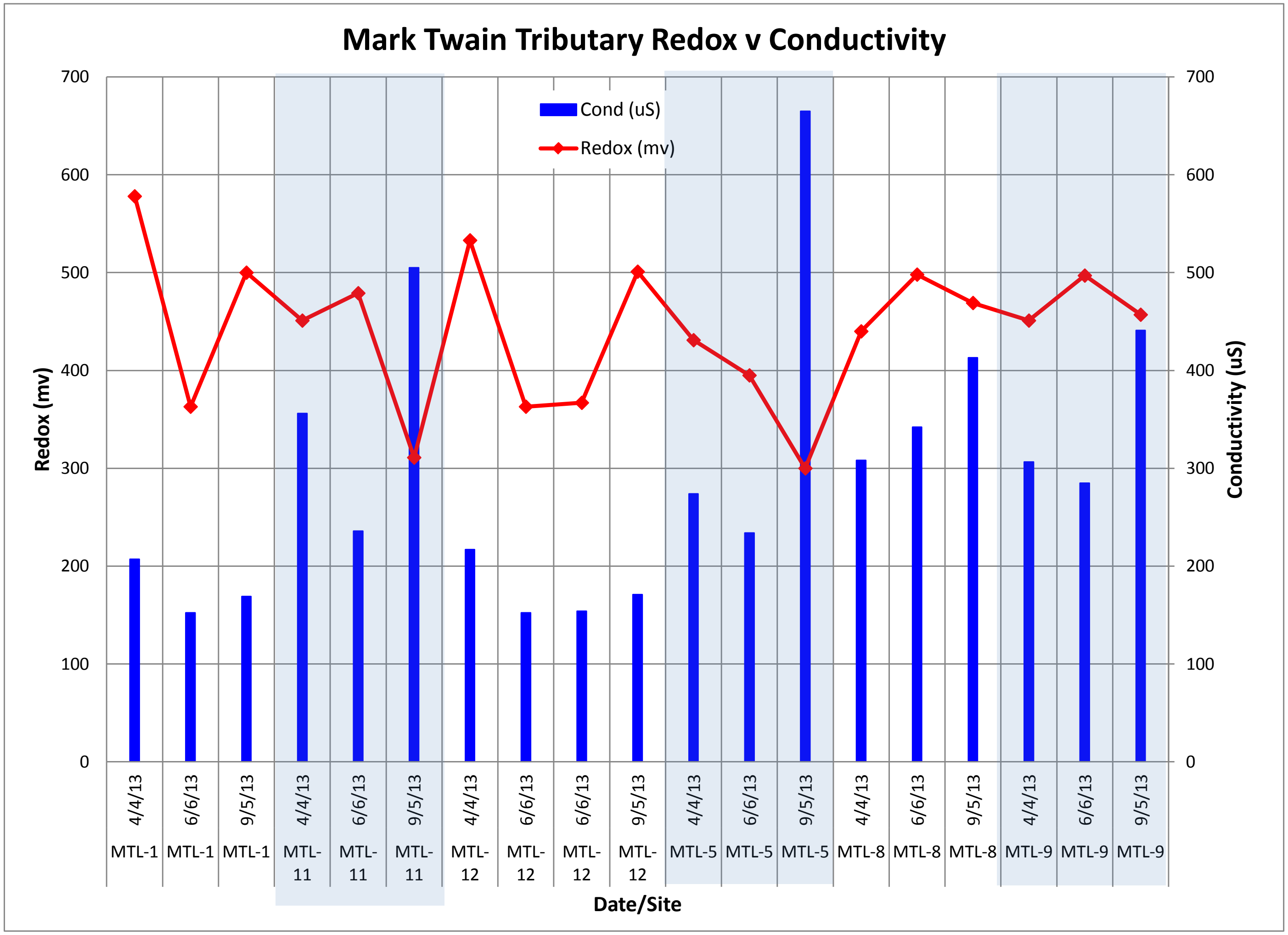

MTL-22 pH
STD Range 6.5 to 9.0
pH
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 11
5/6/13
0.2 1 2 3 4 5 6 7 8 9 10 11 12 13 14
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/Date


MTL-33 pH
STD Range 6.5 to 9.0
pH
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 11
5/6/13
0.1 1 2 3 4 5 6 7 8 9 10 11
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/Date

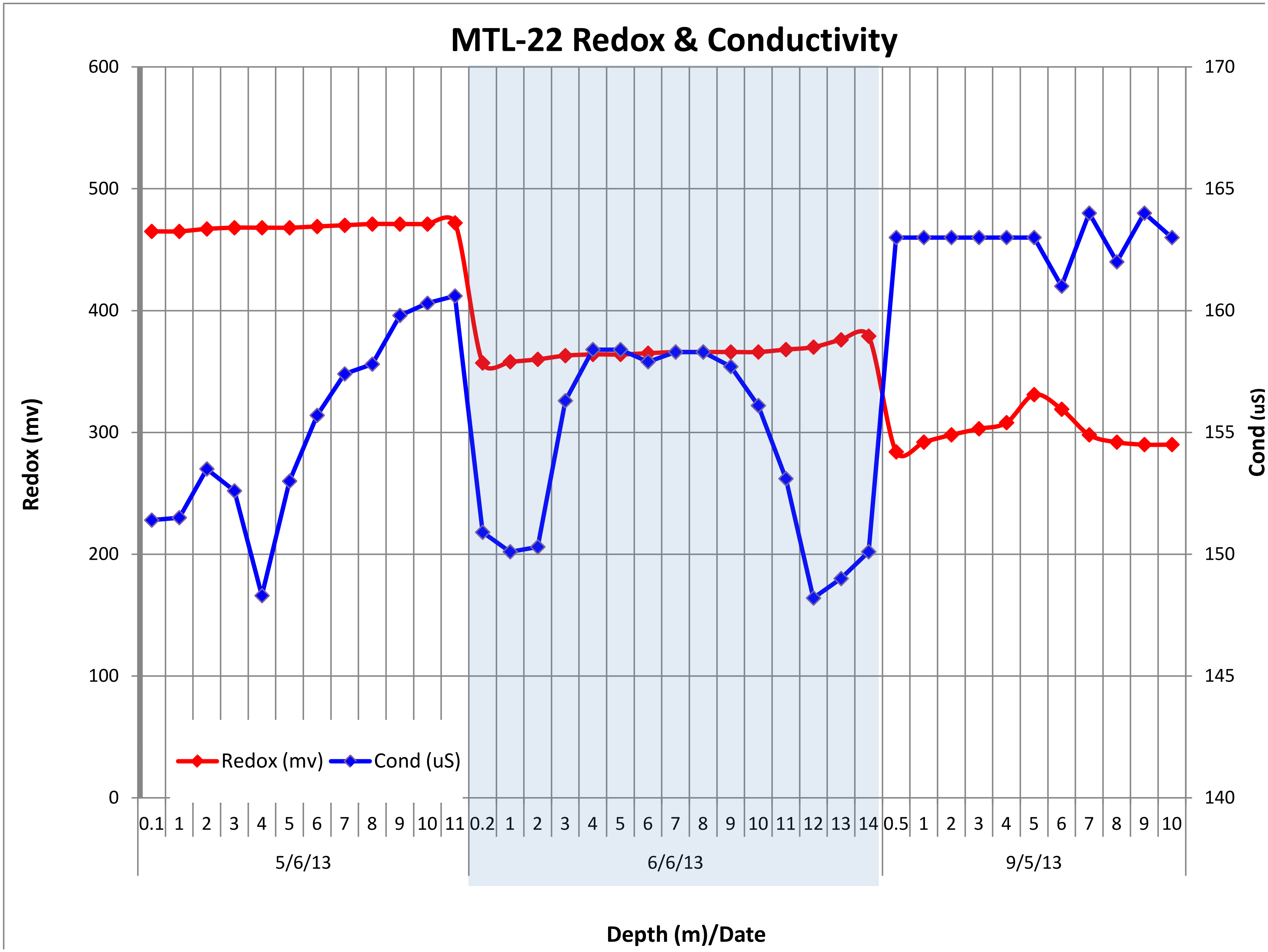


MTL-66 pH
STD Range 6.5 to 9.0
pH
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10 11
0.4 1 2 3 4 5 6.1 6.2 7 8 9 10
0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date

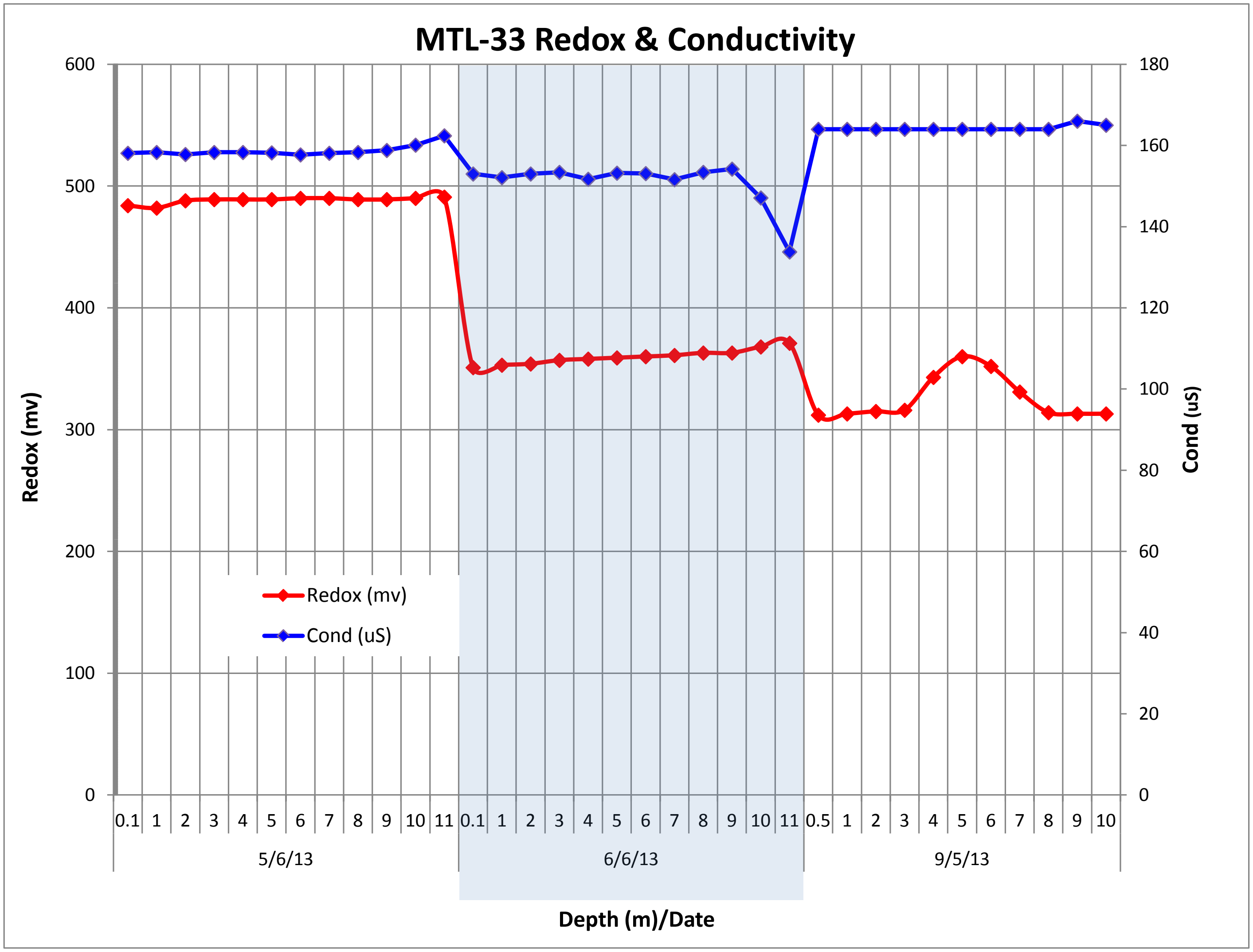

MTL-77 pH
STD Range 6.5 to 9.0
pH
10
9
8
7
6
5
4
3
2
1
0
0.1 1 2 3 4 5 6 7 8 9 10
5/6/13
0.4 1 2 3 4 5 6 7 8 9 10 11
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/Date



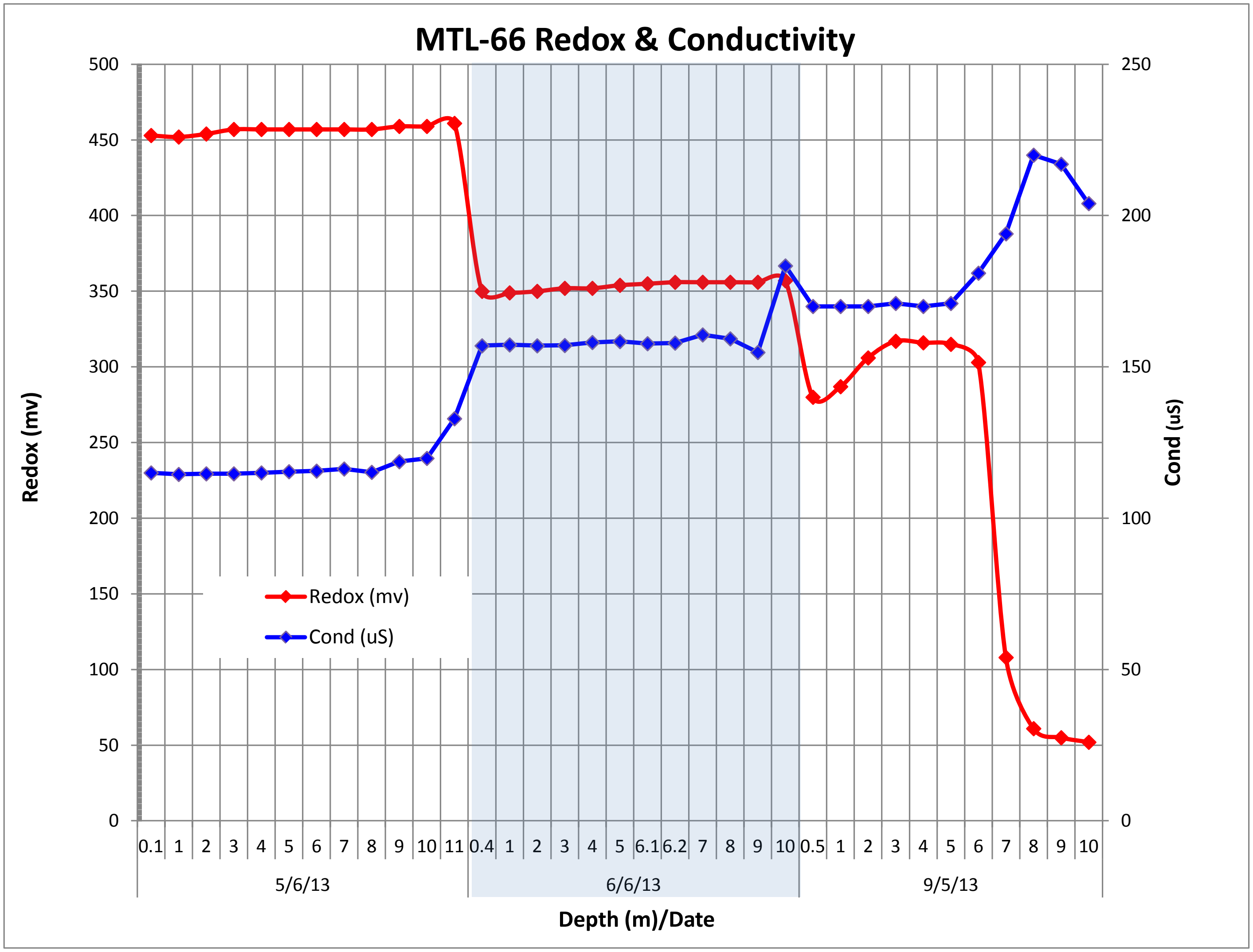
Mark Twain Tributary Redox v Conductivity
Cond (uS)
Redox (mv)
Redox (mv)
Conductivity (uS)
700
600
500
400
300
200
100
0
4/4/13
6/6/13
9/5/13
MTL-1
MTL-11
MTL-12
MTL-5
MTL-8
MTL-9
Date/Site



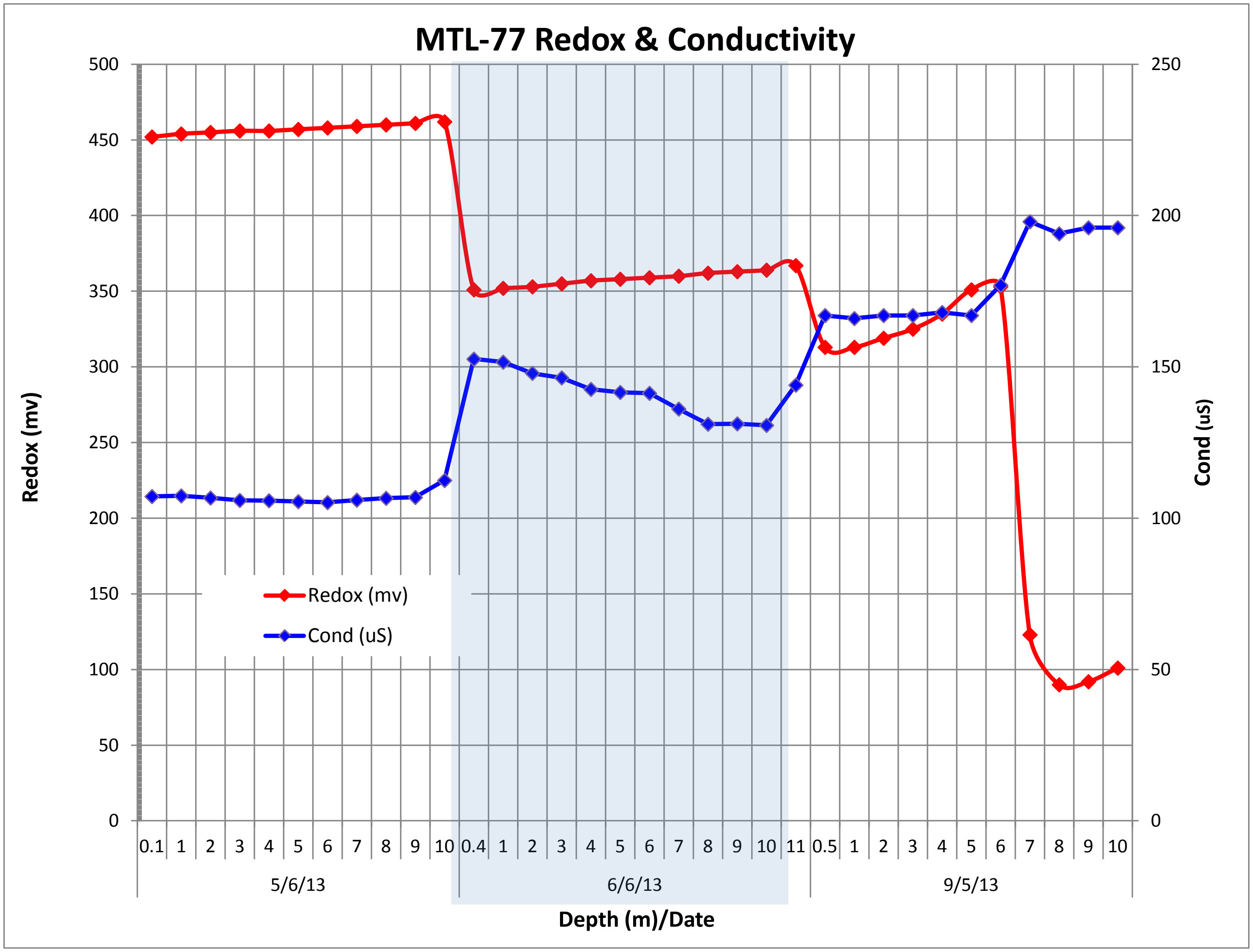
MTL-22 Redox & Conductivity
Redox (mv)
600
500
400
300
200
100
0
Cond (uS)
170
165
160
155
150
145
140
Redox (mv)
Cond (uS)
0.1 1 2 3 4 5 6 7 8 9 10 11
5/6/13
0.2 1 2 3 4 5 6 7 8 9 10 11 12 13 14
6/6/13
0.5 1 2 3 4 5 6 7 8 9 10
9/5/13
Depth (m)/Date

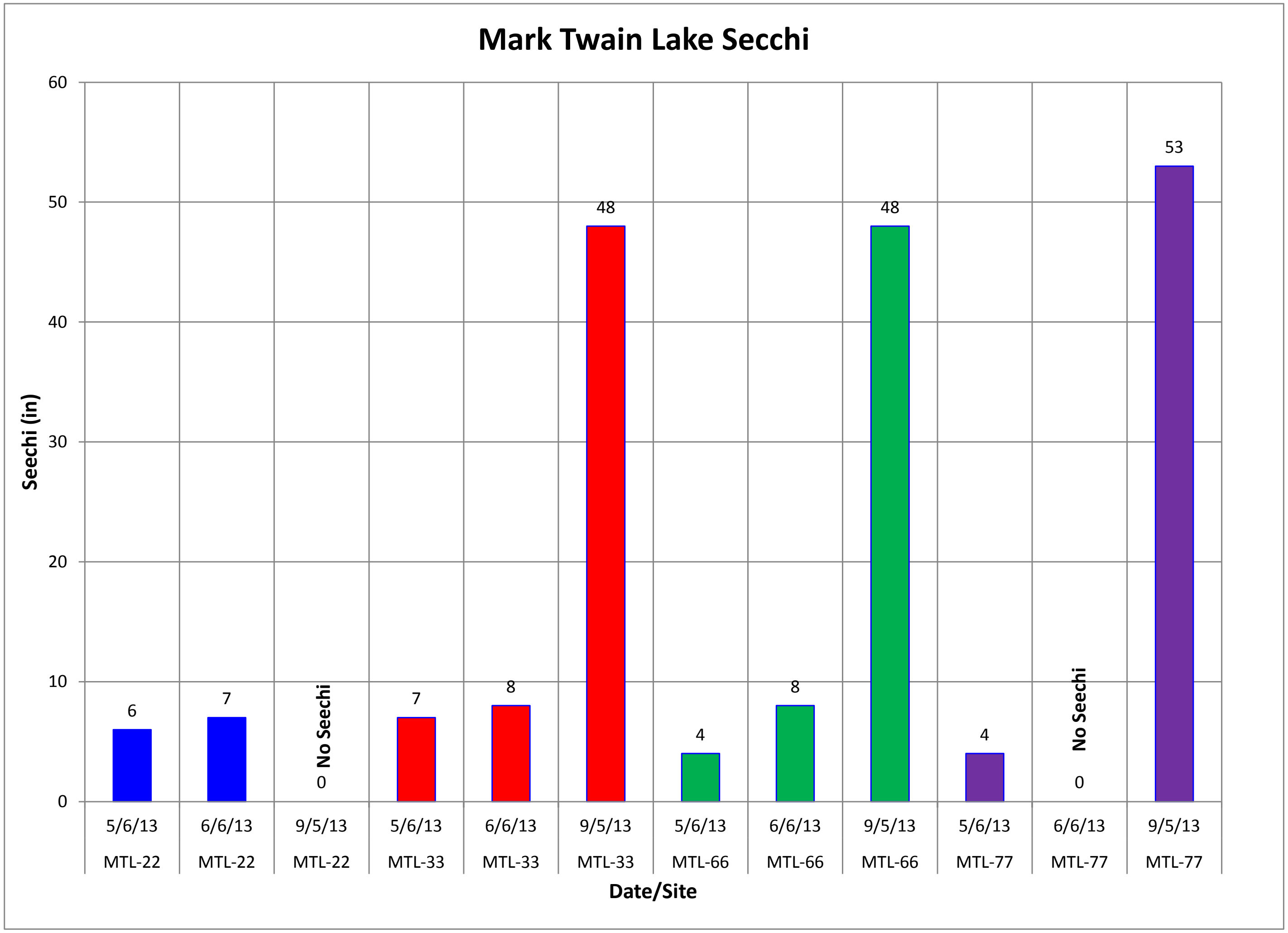


MTL-33 Redox & Conductivity
Redox (mv)
Cond (uS)
600
500
400
300
200
100
0
180
160
140
120
100
80
60
40
20
0
Redox (mv)
Cond (us)
0.1 1 2 3 4 5 6 7 8 9 10 11 0.1 1 2 3 4 5 6 7 8 9 10 11 0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date

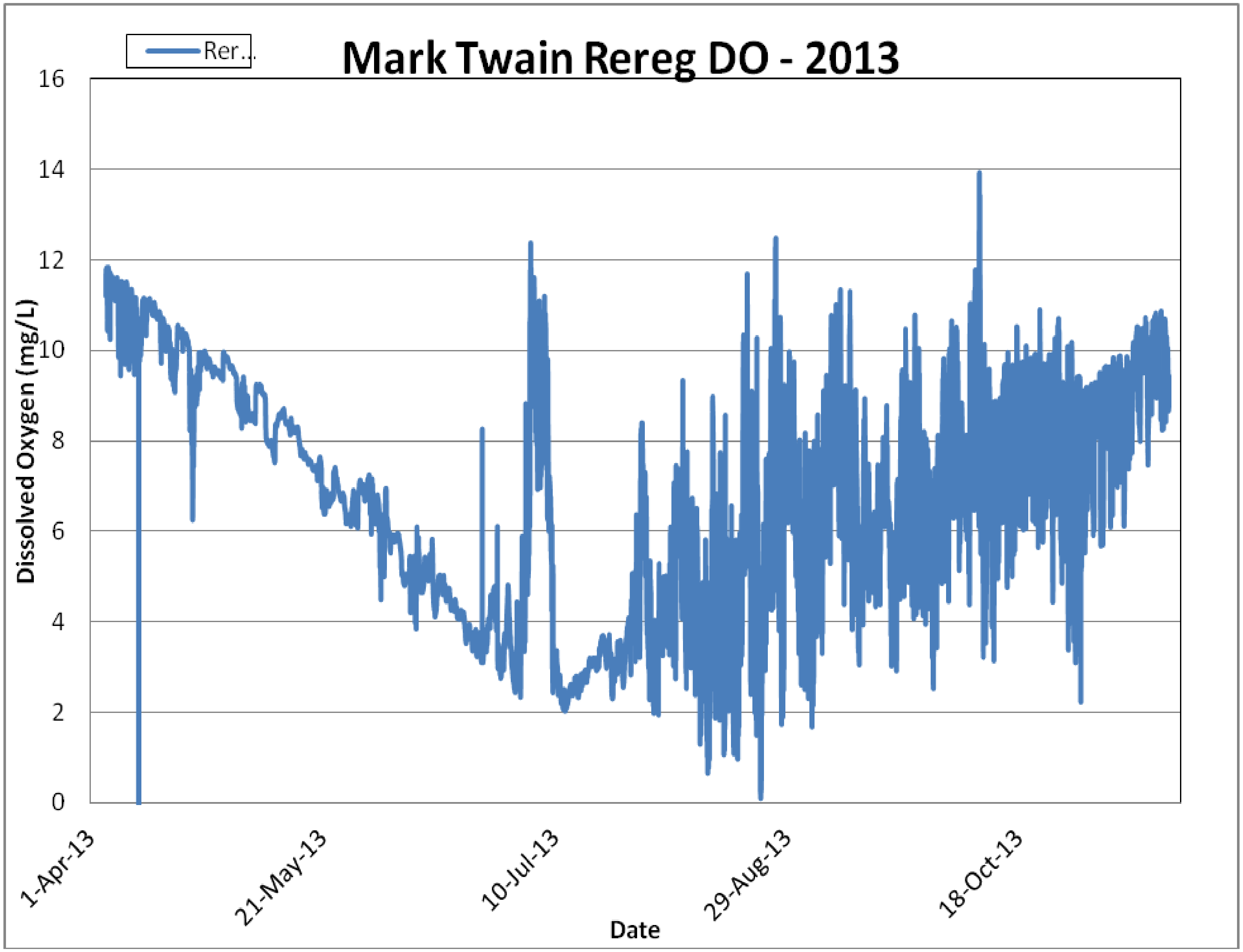


MTL-66 Redox & Conductivity
Redox (mv)
Cond (uS)
Redox (mv)
Cond (uS)
500
450
400
350
300
250
200
150
100
50
0
250
200
150
100
50
0
0.1 1 2 3 4 5 6 7 8 9 10 11 0.4 1 2 3 4 5 6.1 6.2 7 8 9 10 0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date

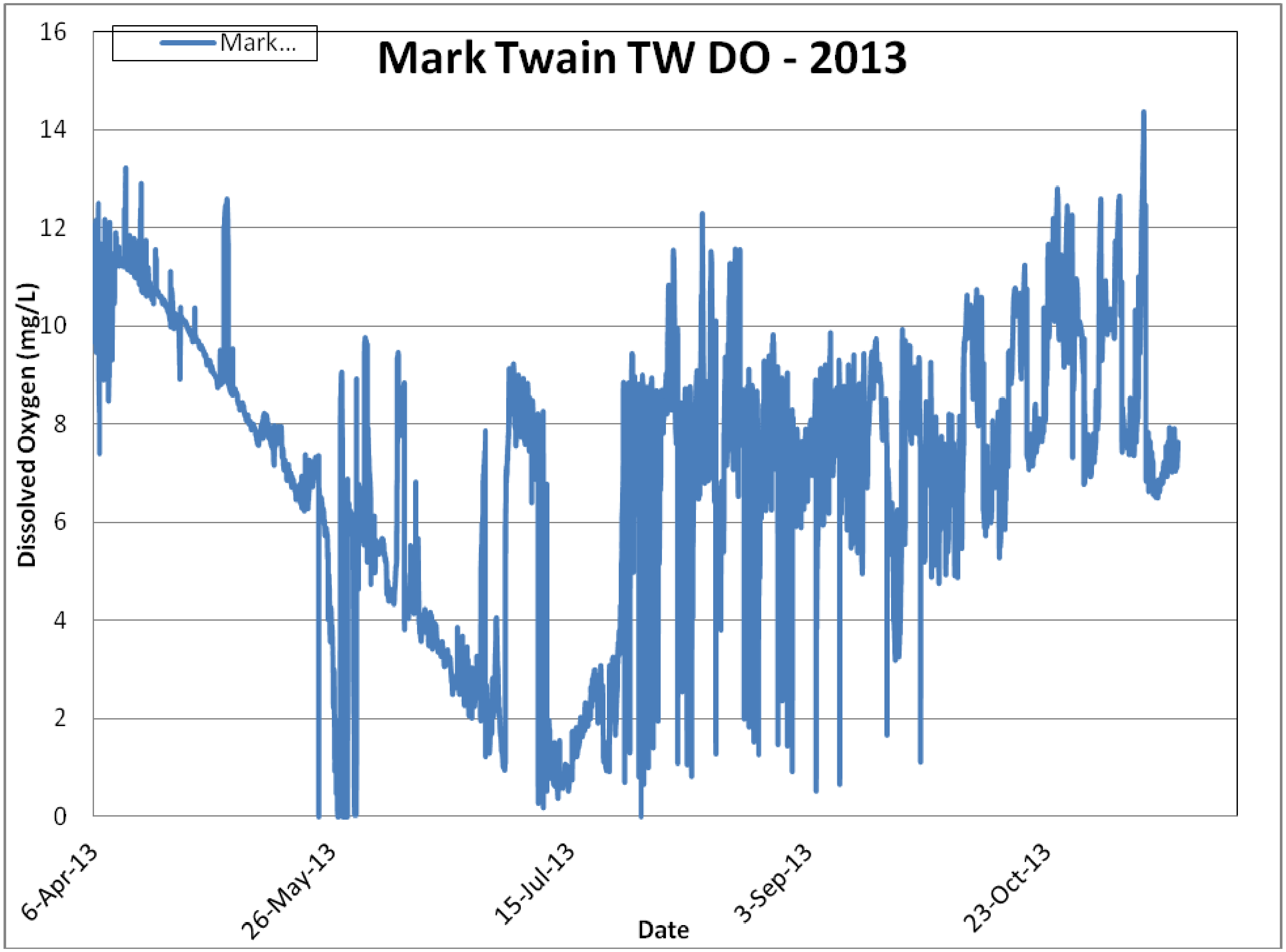

MTL-77 Redox & Conductivity
Redox (mv)
Cond (us)
Redox (mv)
Cond (uS)
500
450
400
350
300
250
200
150
100
50
0
250
200
150
100
50
0
0.1 1 2 3 4 5 6 7 8 9 10 0.4 1 2 3 4 5 6 7 8 9 10 11 0.5 1 2 3 4 5 6 7 8 9 10
5/6/13
6/6/13
9/5/13
Depth (m)/Date



Mark Twain Lake Secchi
Seechi (in)
60
50
40
30
20
10
0
6
7
No Seechi
0
7
8
48
4
8
48
4
No Seechi
0
53
5/6/13
MTL-22
6/6/13
MTL-22
9/5/13
MTL-22
5/6/13
MTL-33
6/6/13
MTL-33
9/5/13
MTL-33
5/6/13
MTL-66
6/6/13
MTL-66
9/5/13
MTL-66
5/6/13
MTL-77
6/6/13
MTL-77
9/5/13
MTL-77
Date/Site



Mark Twain Rereg DO - 2013
Rer...
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
0
1-Apr-13
21-May-13
10-Jul-13
29-Aug-13
18-Oct-13
Date


Mark Twain TW DO - 2013
Mark...
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
0
6-Apr-13
26-May-13
15-Jul-13
3-Sep-13
23-Oct-13
Date

APPENDIX D

Lakes of Missouri Volunteer Program (LMVP) Data

2013 Lakes of Missouri Volunteer Program (LMVP) Data

Site	Date	TempF	Secchi	TP	TN	TCHLA	CHLA	PHEO	ISS	OSS	TSS	Comments
1	4/28/2013	50	11	212	2520	4.0	3.2	2.1	15.5	2.4	17.9	Lake really high, lots of trash in water, overcast.
1	5/21/2013	66	10	234	690	6.4	6.4	0.1	15.6	3.0	18.6	rippled, pt. cloudy
1	6/8/2013	67	11	210	1750	3.8	3.6	0.6	10.2	2.0	12.2	High water. Actual Coords: N 39 31.563 W 091 38.781
1	6/29/2013	75	14	182	1730	5.6	4.7	2.4	7.8	1.7	9.5	Storms earlier in day. Storm clouds. Site 1: storms approaching
1	7/13/2013	81	21	152	1730	13.7	13.0	1.7	7.0	2.5	9.5	Calm, overcast. Circular "floaties" in samples. Insect eggs??
1	8/10/2013	68	30	50	1290	10.2	9.0	3.2	3.7	2.5	6.2	Sunny, wind 12-15 knots.
1	9/1/2013	82	46	33	880	12.3	10.9	3.4	2.0	2.2	4.2	
2	4/28/2013	51	10	196	2680	4.1	4.0	0.3	15.8	2.6	18.4	
2	5/21/2013	67	11	221	1790	3.0	2.9	0.2	12.7	2.0	14.7	
2	6/8/2013	69	11	205	1680	4.1	3.9	0.5	9.9	2.0	11.9	Actual coords: N 39 32.569 W 091 42.348
2	6/29/2013	74	16	189	1670	6.6	5.5	2.7	8.8	1.9	10.7	Storms earlier in day
2	7/13/2013	82	20	150	1780	9.2	8.6	1.6	6.1	1.9	8.0	
2	8/10/2013	71	34	41	1140	17.6	16.1	4.0	4.6	3.4	8.0	
2	9/1/2013	82	51	28	830	8.3	7.5	2.0	1.7	1.6	3.3	
5	4/28/2013	51	6	269	2420	11.6	11.6	0.1	30.7	5.6	36.3	
5	5/21/2013	64	12	255	1720	4.3	4.3	0.1	17.6	3.1	20.7	

Site	Date	TempF	Secchi	TP	TN	TCHLA	CHLA	PHEO	ISS	OSS	TSS	Comments
5	6/8/2013	70	12	248	1940	2.9	2.6	0.6	23.5	3.7	27.2	Actual Coords: N39 30.322 W 091 43.578
5	6/29/2013	74	11	204	1910	5.8	4.8	2.6	10.4	2.1	12.5	
5	7/13/2013	82	24	169	1760	6.8	6.3	1.4	4.7	1.4	6.1	
5	8/10/2013	70	31	50	1140	14.2	12.8	3.6	4.9	2.5	7.4	
5	9/1/2013	82	56	30	860	8.6	7.6	2.4	1.3	3.0	4.3	Site 5 mixing container busted after sampling 9/1.

Site 1 - near dam

Site 2 - Indian Creek

Site 5 - Confluence of North Fork & South Fork

Parameter	Abreviation	Unit of Measure
Water Clarity (using Secchi disk)	Secchi	Inches (")
Total Phosphorus	TP	Micrograms per liter (ug/L) or parts per billion (ppb)
Total Nitrogen	TN	Micrograms per liter (ug/L) or parts per billion (ppb)
Chlorophyll A	TCHLA	Micrograms per liter (ug/L) or parts per billion (ppb) (uncorrected for pheophytin)
Chlorophyll A	CHLA	ug/L (pheophytin corrected)
Pheophytin	Pheo	ug/L
Inorganic Suspended Sediments	ISS	Milligrams per liter (mg/L), or parts per million (ppm)
Organic Suspended Solids	OSS	mg/L
Total Suspended Sediments	TSS	Milligrams per liter (mg/L), or parts per million (ppm)

Full report for all lakes in the LMVP can be found at http://www.lmvp.org/lakes.htm.

APPENDIX E

United Water Services
Clarence Cannon WTP Data

HIGH SERVICE
Jan-2013

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
	PLANT EFFLUENT														
1	4.31	7.81	117	0.05	0.09	3.24	176	0.002		0.09		211	0.0	9	
2	4.35	7.89	115	0.07	0.10	3.84	177	0.004	0.010	0.11		212	0.0	8	A
3	4.48	7.90	114	0.08	0.07	3.66	169	0.042		0.12		210	0.0	9	
4	4.43	7.89	113	0.07	0.08	3.40	181	0.004		0.13		209	0.0	7	A
5	4.33	7.96	122	0.05	0.09	3.33	175	0.002		0.11		209	0.0	8	
6	4.33	7.91	121	0.05	0.07	3.32	182	0.001		0.14		212	0.0	9	
7	4.56	7.89	117	0.07	0.09	3.52	178	0.006		0.11		210	0.0	10	A
8	4.40	7.87	116	0.07	0.09	3.52	175	0.003		0.10		214	0.0	8	
9	4.70	7.88	120	0.05	0.07	3.44	183	0.002	0.019	0.05	0.008	213	0.0	10	A
10	4.05	7.86	122	0.05	0.08	3.29	182	0.002		0.07		213	0.0	10	
11	4.56	7.81	121	0.05	0.09	3.67	180	0.003		0.02		209	0.0	10	A
12	4.15	7.76	112	0.07	0.10	3.59	178	0.002		0.08		216	0.0	7	
13	4.53	7.79	115	0.08	0.09	3.32	177	0.003		0.06		215	0.0	8	
14	4.51	7.87	119	0.07	0.08	3.29	183	0.003		0.07		212	0.0	9	A
15	4.40	7.87	120	0.07	0.08	3.44	179	0.004		0.05		212	0.0	10	
16	4.35	7.81	115	0.07	0.08	3.51	183	0.004	0.020	0.08	0.005	206	0.0	8	A
17	4.30	7.82	118	0.08	0.08	3.36	183	0.005		0.10		214	0.0	8	
18	4.50	7.92	122	0.07	0.07	3.40	179	0.003		0.07		217	0.0	7	A
19	4.29	7.93	123	0.05	0.08	3.38	184	0.002		0.05		212	0.0	9	
20	4.35	7.78	120	0.05	0.08	3.36	182	0.003		0.18		209	0.0	9	
21	4.45	7.79	115	0.06	0.08	3.42	180	0.002		0.10		216	0.0	9	A
22	4.56	7.80	116	0.07	0.07	3.57	179	0.003		0.10		214	0.0	7	
23	3.93	7.87	118	0.06	0.08	3.32	184	0.002	0.015	0.06	0.009	212	0.0	9	A
24	4.42	7.93	118	0.06	0.07	3.49	185	0.002		0.08		206	0.0	5	
25	4.46	7.82	121	0.06	0.09	3.50	186	0.003		0.05		200	0.0	8	A
26	4.25	7.78	111	0.07	0.07	3.56	191	0.008		0.14		200	0.0	10	
27	4.09	7.76	113	0.06	0.08	3.37	189	0.005		0.20		196	0.0	6	
28	4.37	7.83	118	0.07	0.07	3.48	181	0.014		0.06		216	0.0	8	A

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
29	4.33	7.86	116	0.06	0.07	3.35	195	0.005		0.11		196	0.0	6	
30	4.09	7.85	117	0.07	0.09	3.32	173	0.015	0.019	0.13	0.003	198	0.0	7	A
31	4.23	7.87	116	0.08	0.07	3.38	169	0.011		0.12		202	0.0	6	
AVG	**4.36**	**7.85**	**117**	**0.06**	**0.08**	**3.44**	**181**	**0.005**	**0.017**	**0.09**	**0.006**	**209**	**0.0**	**8**	
TOTAL	**135.06**														

HIGH SERVICE
February 2013

	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	4.17	7.79	118	0.08	0.07	3.21	180	0.041		0.16		206	0.0	6	A
2	4.35	7.83	116	0.06	0.08	3.26	184	0.008		0.14		205	0.0	5	
3	4.39	7.85	114	0.06	0.08	3.43	181	0.005		0.10		199	0.0	5	
4	4.64	7.86	113	0.07	0.10	3.67	175	0.003		0.06		210	0.0	6	A
5	4.13	7.92	112	0.07	0.08	3.64	176	0.008		0.10		202	0.0	6	
6	4.54	7.89	112	0.07	0.08	3.27	181	0.003	0.032	0.24	0.013	202	0.0	6	A
7	4.27	7.84	112	0.07	0.07	3.29	178	0.007		0.11		203	0.0	9	
8	3.83	7.81	110	0.08	0.10	3.66	174	0.002		0.25		207	0.0	11	A
9	4.51	7.87	108	0.09	0.09	2.89	169	0.004		0.22		210	0.0	9	
10	4.02	7.88	103	0.09	0.08	3.11	170	0.005		0.20		212	0.0	9	
11	4.00	7.82	104	0.09	0.10	3.47	166	0.002		0.04		205	0.0	9	A
12	4.31	7.97	103	0.08	0.10	3.54	174	0.002		0.07		198	0.0	9	
13	4.29	7.87	101	0.08	0.08	3.51	169	0.004	0.020	0.08	0.004	199	0.0	8	A
14	3.99	7.94	101	0.08	0.09	3.43	161	0.005		0.10		200	0.0	7	
15	4.59	7.96	101	0.07	0.08	3.30	165	0.004		0.10		203	0.0	8	A
16	4.04	7.85	101	0.06	0.09	3.27	170	0.003		0.04		195	0.0	9	
17	4.26	7.93	102	0.06	0.09	3.27	169	0.005		0.02		195	0.0	11	
18	4.36	7.89	100	0.07	0.08	3.12	171	0.004		0.10		204	0.0	9	A
19	4.09	7.79	98	0.08	0.07	1.97	167	0.002		0.07		201	0.0	8	
20	3.73	7.89	98	0.06	0.10	3.10	179	0.005	0.012	0.13	0.005	184	0.0	7	A

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
21	4.64	7.90	98	0.06	0.08	3.44	171	0.002		0.06		200	0.0	6	
22	4.22	7.84	94	0.06	0.08	3.49	185	0.005		0.11		200	0.0	6	A
23	4.03	7.87	99	0.07	0.07	3.45	169	0.007		0.09		195	0.0	8	
24	4.38	7.82	99	0.07	0.08	3.46	164	0.005		0.11		200	0.0	8	
25	4.26	7.82	97	0.06	0.09	3.36	171	0.008		0.14		194	0.0	7	A
26	3.25	7.81	99	0.05	0.09	3.38	168	0.007		0.14		156	0.0	7	
27	4.53	7.79	98	0.07	0.09	3.37	178	0.004	0.009	0.11	0.002	195	0.0	8	A
28	4.35	7.79	98	0.08	0.08	3.43	163	0.007		0.14		195	0.0	8	
AVG	**4.22**	**7.86**	**104**	**0.07**	**0.09**	**3.31**	**172**	**0.006**	**0.018**	**0.11**	**0.006**	**199**	**0.0**	**7**	**A**
TOTAL	**118.17**														

HIGH SERVICE
March 2013

	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	4.56	7.84	95	0.07	0.07	3.64	169	0.005		0.10		196	0.0	7	A
2	4.14	7.81	100	0.06	0.08	3.42	172	0.010		0.06		208	0.0	6	
3	4.13	7.81	99	0.05	0.08	3.36	169	0.008		0.07		204	0.0	5	
4	4.14	7.78	96	0.07	0.10	3.30	164	0.004		0.12		200	0.0	7	A
5	4.30	7.78	95	0.07	0.10	3.24	164	0.004		0.15		203	0.0	7	
6	4.14	7.84	101	0.06	0.09	3.36	169	0.027	0.017	0.10	0.009	199	0.0	6	A
7	4.23	7.92	103	0.06	0.09	3.50	173	0.004		0.13		202	0.0	5	
8	4.12	7.95	106	0.05	0.11	3.62	176	0.002		0.08		200	0.0	6	A
9	4.48	7.96	97	0.16	0.19	3.74	173	0.022		0.10		200	10.0	8	
10	3.38	8.03	95	0.20	0.10	3.53	170	0.001		0.04		196	9.0	8	
11	4.96	7.91	103	0.12	0.09	3.62	176	0.010		0.03		206	0.0	7	A
12	4.20	7.82	92	0.06	0.12	3.85	166	0.003		0.01		198	0.0	6	
13	4.29	7.81	82	0.07	0.11	3.59	164	0.003	0.007	0.04	0.002	170	0.0	9	A
14	3.96	7.95	79	0.06	0.09	3.66	150	0.001		0.03		174	0.0	8	
15	4.32	7.83	83	0.06	0.10	3.60	150	0.002		0.07		177	0.0	7	A

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
16	4.55	7.83	91	0.06	0.10	3.49	150	0.001		0.18		173	0.0	7	
17	4.48	7.83	91	0.05	0.08	3.46	154	0.008		0.16		174	0.0	7	
18	3.95	7.80	85	0.07	0.08	3.44	154	0.003		0.15		185	0.0	9	A
19	4.11	7.78	88	0.07	0.07	3.55	154	0.004		0.09		178	0.0	7	
20	4.09	7.90	93	0.06	0.09	3.47	157	0.009	0.017	0.09	0.010	174	0.0	7	A
21	3.95	7.88	92	0.05	0.08	3.54	154	0.004		0.06		172	0.0	6	
22	3.98	7.88	92	0.05	0.08	3.54	154	0.004		0.06		172	0.0	6	A
23	4.57	7.82	89	0.07	0.09	3.72	150	0.005		0.11		172	0.0	7	
24	3.94	7.78	88	0.07	0.08	3.61	150	0.006		0.10		178	0.0	8	
25	4.14	7.82	91	0.05	0.10	3.71	150	0.005		0.03		176	0.0	9	A
26	4.39	7.83	92	0.05	0.08	3.61	156	0.007		0.09		169	0.0	8	
27	4.00	7.95	89	0.06	0.07	3.55	155	0.004	0.017	0.05	0.001	180	0.0	8	A
28	3.87	7.75	86	0.06	0.10	3.69	152	0.005		0.08		178	0.0	8	
29	4.98	7.77	89	0.06	0.08	3.61	156	0.004		0.09		180	0.0	8	A
30	4.07	7.84	95	0.05	0.08	3.44	157	0.004		0.11		181	0.0	8	
31	4.32	7.85	95	0.05	0.08	3.48	158	0.006		0.09		179	0.0	8	
AVG	**4.22**	**7.85**	**93**	**0.07**	**0.09**	**3.55**	**160**	**0.006**	**0.015**	**0.08**	**0.005**	**185**	**0.6**	**7**	
TOTAL	**130.74**														

HIGH SERVICE
April 2013

	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	4.18	7.82	94	0.07	0.07	3.40	150	0.006		0.10		186	0.0	8	A
2	4.21	7.81	90	0.06	0.09	3.54	153	0.007		0.11		177	0.0	9	
3	4.39	7.81	99	0.05	0.07	3.47	159	0.002	0.019	0.14	0.008	174	0.0	8	A
4	4.11	7.80	97	0.05	0.09	3.54	158	0.004		0.10		178	0.0	10	
5	4.25	7.79	98	0.05	0.10	3.52	162	0.005		0.09		183	0.0	10	A
6	4.03	7.82	96	0.06	0.08	3.70	157	0.004		0.10		181	0.0	9	
7	4.63	7.69	96	0.06	0.08	3.57	157	0.004		0.07		182	0.0	9	

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
8	4.45	7.71	98	0.05	0.10	3.63	161	0.004		0.09		180	0.0	11	A
9	4.34	7.89	95	0.04	0.09	3.57	163	0.002		0.04		171	0.0	12	
10	3.99	7.83	94	0.06	0.07	3.67	155	0.006	0.006	0.09	0.004	177	0.0	11	A
11	4.35	7.82	101	0.06	0.09	3.91	160	0.003		0.11		178	0.0	10	
12	3.87	7.97	105	0.07	0.07	3.72	172	0.007		0.09		192	0.0	13	A
13	4.21	7.90	107	0.06	0.06	3.40	172	0.002		0.08		199	0.0	14	
14	4.01	7.72	102	0.07	0.08	3.29	168	0.003		0.09		218	0.0	14	
15	3.75	7.70	98	0.07	0.08	3.48	169	0.004		0.11		197	0.0	14	A
16	4.06	7.87	100	0.07	0.08	3.18	166	0.005		0.10		203	0.0	13	
17	4.23	7.92	101	0.06	0.08	3.42	178	0.004	0.020	0.11	0.004	190	0.0	13	A
18	4.27	7.87	102	0.05	0.08	3.36	171	0.008		0.11		181	0.0	12	
19	4.14	7.84	102	0.06	0.07	3.53	168	0.004		0.13		194	0.0	12	A
20	4.00	7.85	96	0.08	0.07	3.86	164	0.005		0.07		186	0.0	13	
21	4.58	7.86	90	0.08	0.06	3.81	160	0.005		0.06		185	0.0	12	
22	4.09	7.89	92	0.07	0.08	3.79	157	0.004		0.06		184	0.0	13	A
23	3.98	8.04	90	0.07	0.07	3.55	159	0.010		0.06		172	0.0	14	
24	4.31	8.01	89	0.09	0.08	3.39	151	0.004	0.030	0.06	0.002	188	0.0	13	A
25	3.84	7.82	86	0.07	0.07	3.60	156	0.004		0.10		200	0.0	13	
26	4.34	7.69	89	0.07	0.06	3.62	157	0.006		0.10		186	0.0	14	A
27	4.02	7.89	92	0.06	0.06	3.53	158	0.003		0.06		177	0.0	15	
28	4.23	7.82	91	0.06	0.07	3.49	154	0.006		0.09		173	0.0	15	
29	4.19	7.83	89	0.07	0.06	3.42	155	0.005		0.08		180	0.0	15	A
30	4.69	7.92	91	0.07	0.06	3.45	150	0.003		0.07		180	0.0	16	
AVG	**4.19**	**7.84**	**96**	**0.06**	**0.07**	**3.55**	**161**	**0.004**	**0.019**	**0.09**	**0.005**	**185**	**0.0**	**12**	
TOTAL	**125.74**														

HIGH SERVICE
May 2013

	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	4.43	7.96	91	0.06	0.07	3.25	157	0.005	0.021	0.12	0.004	172	0.0	14	A
2	3.89	7.99	93	0.05	0.06	3.39	156	0.004		0.03		176	0.0	15	
3	4.31	7.87	91	0.06	0.06	3.52	155	0.003		0.08		188	0.0	15	A
4	3.76	7.86	91	0.07	0.06	3.44	148	0.005		0.04		178	0.0	13	
5	4.36	7.85	91	0.07	0.06	3.49	148	0.005		0.04		180	0.0	13	
6	4.09	7.94	93	0.07	0.06	3.54	153	0.009		0.10		211	0.0	17	A
7	4.09	8.00	94	0.06	0.07	3.65	160	0.008		0.08		195	0.0	16	
8	4.35	7.97	95	0.07	0.06	3.65	153	0.006	0.020	0.09	0.004	194	0.0	15	A
9	4.01	7.90	206	0.08	0.05	3.57	155	0.006		0.09		191	0.0	15	
10	4.10	7.89	93	0.07	0.05	3.47	158	0.005		0.10		203	0.0	16	A
11	3.94	7.93	97	0.06	0.05	3.40	155	0.007		0.19		224	0.0	17	
12	4.43	7.89	98	0.06	0.05	3.46	159	0.005		0.10		235	0.0	17	
13	4.08	7.87	98	0.07	0.05	3.44	157	0.006	0.004	0.12	0.003	248	0.0	17	A
14	4.80	7.81	100	0.07	0.04	3.42	158	0.006		0.11		186	0.0	16	
15	4.57	7.92	99	0.06	0.06	3.45	167	0.004	0.016	0.04	0.001	177	0.0	15	A
16	4.54	7.92	99	0.07	0.06	3.44	157	0.003		0.10		176	0.0	17	
17	5.23	7.90	103	0.06	0.05	3.45	159	0.008		0.04		176	0.0	18	A
18	4.86	7.93	102	0.07	0.05	3.46	160	0.007		0.07		172	0.0	17	
19	4.36	8.00	101	0.07	0.06	3.66	160	0.006		0.07		175	0.0	18	
20	4.81	7.93	99	0.06	0.07	3.49	168	0.003		0.04		181	0.0	20	A
21	4.28	7.79	97	0.06	0.04	3.48	161	0.016		0.12		175	0.0	22	
22	4.27	7.80	98	0.06	0.06	3.43	162	0.009	0.020	0.12	0.003	177	0.0	21	A
23	4.14	7.88	100	0.06	0.05	3.30	157	0.014		0.11		180	0.0	22	
24	4.70	7.81	102	0.07	0.05	3.37	157	0.012		0.14		178	0.0	21	A
25	4.36	7.86	106	0.06	0.04	3.37	164	0.006		0.06		178	0.0	20	
26	4.23	7.96	105	0.06	0.04	3.33	162	0.003		0.09		178	0.0	20	
27	4.37	7.98	102	0.06	0.04	3.38	156	0.053		0.13		180	0.0	20	A
28	4.14	7.89	101	0.08	0.06	3.39	155	0.007		0.12		200	8.0	20	

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
29	3.88	7.80	106	0.06	0.05	3.37	161	0.008		0.14	0.006	170	0.0	22	A
30	4.15	7.78	105	0.07	0.05	3.36	163	0.003		0.18		177	0.0	22	
31	3.92	7.84	98	0.07	0.05	3.29	167	0.005	0.013	0.19		176	0.0	21	A
AVG	**4.30**	**7.89**	**102**	**0.07**	**0.05**	**3.44**	**158**	**0.008**	**0.016**	**0.10**	**0.004**	**187**	**0.3**	**18**	
TOTAL	**133.45**														

HIGH SERVICE
June 2013

	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	3.73	7.81	89	0.07	0.06	3.31	170	0.007		0.10		188	0.0	21	
2	3.77	7.81	92	0.07	0.07	3.38	174	0.007		0.12		174	0.0	21	
3	4.67	7.84	92	0.07	0.07	3.44	164	0.008		0.13		171	0.0	22	A
4	4.20	7.86	93	0.07	0.06	3.48	165	0.009		0.13		168	0.0	22	
5	4.80	7.89	96	0.07	0.05	3.45	156	0.009	0.008	0.12	0.002	172	0.0	22	A
6	4.22	7.93	99	0.07	0.06	3.47	155	0.008		0.11		177	0.0	23	
7	4.49	7.98	100	0.08	0.04	3.44	156	0.009		0.13		175	0.0	22	A
8	4.37	7.86	98	0.06	0.07	3.31	184	0.008		0.09		182	0.0	21	
9	4.56	7.87	97	0.06	0.07	3.41	165	0.007		0.11		179	0.0	21	
10	4.21	7.90	101	0.08	0.06	3.44	156	0.006		0.11		180	0.0	22	A
11	5.00	7.94	101	0.08	0.07	3.31	157	0.005		0.12		178	0.0	21	
12	4.52	8.00	99	0.07	0.06	3.13	168	0.005	0.018	0.10	0.030	182	0.0	22	A
13	4.65	7.94	100	0.07	0.08	3.09	168	0.002		0.11		180	0.0	22	
14	4.42	7.80	98	0.06	0.07	3.01	167	0.009		0.08		178	0.0	22	A
15	4.92	7.82	99	0.07	0.06	3.38	156	0.012		0.12		182	0.0	22	
16	4.37	7.89	100	0.07	0.06	3.44	151	0.003		0.12		182	0.0	22	
17	4.60	7.93	103	0.06	0.07	3.30	162	0.010		0.07		183	0.0	23	A
18	4.36	7.90	103	0.06	0.09	3.33	168	0.005		0.06		182	0.0	23	
19	4.25	8.01	100	0.06	0.08	3.36	160	0.004	0.012	0.05	0.005	185	0.0	22	A

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
20	4.82	8.11	100	0.07	0.07	3.48	155	0.004		0.09		182	0.0	23	
21	5.12	7.93	100	0.06	0.09	3.47	154	0.005		0.11		177	0.0	23	A
22	4.64	7.78	104	0.06	0.06	3.28	157	0.019		0.18		181	0.0	25	
23	5.12	7.74	106	0.06	0.08	3.32	157	0.006		0.08		179	0.0	23	
24	4.32	7.91	102	0.06	0.08	3.33	162	0.004		0.11		178	0.0	25	A
25	4.69	7.91	102	0.06	0.06	3.38	161	0.004		0.08		185	0.0	25	
26	4.83	7.90	107	0.07	0.08	3.58	162	0.004	0.015	0.07	0.004	180	0.0	23	A
27	4.64	8.00	107	0.07	0.07	3.53	163	0.008		0.16		184	0.0	25	
28	4.33	7.89	109	0.07	0.07	3.40	161	0.003		0.10		182	0.0	26	A
29	4.73	7.94	107	0.07	0.07	3.42	156	0.006		0.09		188	0.0	25	
30	3.84	7.97	106	0.07	0.07	3.45	156	0.006		0.11		188	0.0	25	
AVG	**4.51**	**7.90**	**100**	**0.07**	**0.07**	**3.37**	**161**	**0.006**	**0.013**	**0.10**	**0.010**	**180**	**0.0**	**23**	
TOTAL	**135.19**														

HIGH SERVICE
July 2013

	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	4.86	7.90	106	0.06	0.07	3.57	155	0.005		0.07		174	0.0	25	A
2	4.36	7.95	103	0.07	0.08	3.60	163	0.008		0.06		182	0.0	25	
3	4.96	7.99	102	0.08	0.07	3.53	152	0.005	0.012	0.04	0.006	185	0.0	25	A
4	4.58	8.00	100	0.08	0.07	3.62	150	0.008		0.06		186	0.0	26	
5	4.61	7.92	101	0.08	0.06	3.55	147	0.010		0.05		179	0.0	25	A
6	5.04	7.91	103	0.06	0.07	3.42	150	0.010		0.12		176	0.0	25	
7	4.75	7.95	104	0.06	0.08	3.48	153	0.007		0.07		175	0.0	25	
8	4.74	7.85	102	0.08	0.08	3.55	148	0.006		0.07		180	0.0	25	A
9	4.90	7.92	101	0.07	0.07	3.49	149	0.005		0.11		175	0.0	25	
10	4.99	7.85	105	0.06	0.08	3.45	154	0.004	0.017	0.12	0.005	172	0.0	26	A
11	4.64	7.84	103	0.06	0.07	3.40	151	0.007		0.10		176	0.0	26	

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
12	4.87	7.88	102	0.06	0.09	3.50	151	0.007		0.08		170	0.0	26	A
13	4.53	7.99	100	0.08	0.07	3.52	147	0.007		0.08		186	0.0	26	
14	4.71	7.91	98	0.09	0.06	3.53	149	0.007		0.09		160	0.0	26	
15	5.50	7.89	100	0.06	0.08	3.63	150	0.005		0.16		171	0.0	27	A
16	5.02	8.01	101	0.07	0.08	3.86	147	0.006		0.21		166	0.0	27	
17	4.86	8.00	97	0.08	0.08	3.64	146	0.005	0.012	0.09	0.004	176	0.0	27	A
18	5.18	7.87	101	0.08	0.06	3.52	144	0.006		0.11		172	0.0	27	
19	5.31	7.80	99	0.06	0.08	3.51	148	0.008		0.11		165	0.0	27	A
20	5.16	7.85	100	0.06	0.08	3.43	151	0.007		0.14		180	0.0	28	
21	4.49	7.90	99	0.06	0.08	3.35	148	0.004		0.15		174	0.0	28	
22	3.88	7.87	95	0.08	0.07	3.35	144	0.006		0.13		176	0.0	28	A
23	4.87	7.84	95	0.07	0.06	3.51	145	0.009		0.14		170	0.0	28	
24	4.70	7.87	99	0.05	0.06	3.47	155	0.006	0.017	0.10	0.009	168	0.0	27	A
25	4.81	7.90	100	0.05	0.07	3.44	146	0.005		0.06		174	0.0	27	
26	3.71	7.95	100	0.07	0.07	3.53	170	0.004		0.11		176	0.0	26	A
27	4.81	7.87	100	0.07	0.07	3.64	148	0.006		0.11		180	0.0	28	
28	4.06	7.87	100	0.08	0.06	3.60	148	0.006		0.10		180	0.0	27	
29	4.62	7.96	103	0.06	0.07	3.51	151	0.006		0.13		172	0.0	26	A
30	4.30	7.99	101	0.05	0.06	3.67	154	0.002		0.05		176	0.0	24	
31	3.78	7.97	103	0.06	0.06	3.58	158	0.004	0.006	0.06	0.004	173	0.0	25	A
AVG	**4.70**	**7.91**	**101**	**0.07**	**0.07**	**3.53**	**151**	**0.006**	**0.013**	**0.10**	**0.006**	**175**	**0.0**	**26**	
TOTAL	**145.60**														

HIGH SERVICE
August 2013

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
	PLANT EFFLUENT														
1	4.84	8.00	103	0.06	0.08	3.61	150	0.006		0.08		174	0.0	25	
2	4.28	7.98	102	0.06	0.07	3.53	150	0.006		0.05		176	0.0	26	A
3	4.04	7.85	104	0.05	0.05	3.43	152	0.004		0.12		176	0.0	25	
4	4.10	7.90	103	0.05	0.07	3.51	152	0.021		0.13		176	0.0	25	
5	4.58	7.90	102	0.06	0.04	3.49	151	0.006		0.11		178	0.0	25	A
6	4.28	7.87	102	0.07	0.06	3.52	151	0.005		0.09		179	0.0	25	
7	4.26	7.88	105	0.05	0.08	3.62	152	0.006	0.012	0.12	0.007	167	0.0	26	A
8	4.74	7.94	106	0.05	0.07	3.62	150	0.005		0.23		165	0.0	25	
9	3.87	7.97	106	0.05	0.07	3.64	155	0.005		0.12		170	0.0	25	A
10	4.56	8.01	103	0.07	0.06	3.52	152	0.005		0.12		176	0.0	25	
11	4.12	7.99	99	0.06	0.05	3.49	144	0.006		0.18		174	0.0	25	
12	4.69	7.83	101	0.05	0.06	3.45	151	0.004		0.16		164	0.0	25	A
13	4.15	7.80	101	0.06	0.06	3.51	148	0.001		0.13		165	0.0	24	
14	3.92	7.83	99	0.06	0.07	3.55	140	0.005	0.002	0.15	0.006	174	0.0	25	A
15	5.21	7.84	101	0.07	0.05	3.38	145	0.006		0.14		176	0.0	25	
16	4.50	7.82	101	0.07	0.05	3.36	147	0.004		0.16		173	0.0	26	A
17	4.65	7.81	103	0.06	0.05	3.42	148	0.004		0.07		171	0.0	26	
18	4.36	7.81	101	0.06	0.05	3.36	150	0.007		0.13		173	0.0	26	
19	5.04	7.81	100	0.06	0.04	3.45	150	0.006		0.13		178	0.0	21	A
20	5.10	7.88	101	0.07	0.06	3.48	145	0.005		0.15		174	0.0	26	
21	4.87	7.87	101	0.06	0.07	3.56	154	0.005	0.011	0.13	0.008	175	0.0	26	A
22	4.93	7.79	104	0.07	0.06	3.40	157	0.007		0.12		174	0.0	26	
23	4.79	7.73	105	0.07	0.06	3.37	154	0.003		0.08		182	0.0	27	A
24	4.53	7.80	104	0.07	0.05	3.46	156	0.004		0.03		170	0.0	26	
25	5.19	7.87	102	0.07	0.05	3.47	156	0.006		0.08		176	0.0	26	
26	5.20	7.92	104	0.07	0.06	3.55	152	0.008		0.12		176	0.0	28	A
27	4.99	7.84	105	0.08	0.08	3.54	156	0.011		0.11		174	0.0	27	
28	4.93	7.78	101	0.07	0.06	3.35	150	0.007	0.020	0.09	0.004	175	0.0	28	A

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
29	5.14	7.71	101	0.08	0.05	3.47	141	0.006		0.09		176	5.0	27	
30	5.29	7.79	103	0.09	0.06	3.41	146	0.006		0.11		179	1.0	28	A
31	5.09	7.81	107	0.07	0.06	3.42	153	0.023		0.13		177	0.0	28	
AVG	**4.65**	**7.86**	**102**	**0.06**	**0.06**	**3.48**	**150**	**0.006**	**0.011**	**0.12**	**0.006**	**174**	**0.2**	**26**	
TOTAL	**144.24**														

HIGH SERVICE
September 2013

	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	5.27	7.80	108	0.06	0.06	3.30	153	0.008		0.11		172	0.0	27	
2	4.78	7.85	106	0.07	0.06	3.38	149	0.079		0.10		176	0.0	27	A
3	5.13	7.95	105	0.07	0.06	3.44	152	0.042		0.13		178	1.0	27	
4	4.75	7.88	106	0.06	0.06	3.60	158	0.006	0.017	0.09	0.006	170	0.0	27	A
5	4.75	7.76	105	0.06	0.06	3.56	152	0.007		0.18		172	0.0	26	
6	5.09	7.74	104	0.06	0.05	3.40	154	0.006		0.09		179	0.0	26	A
7	4.49	7.72	101	0.05	0.10	3.04	149	0.005		0.04		174	0.0	27	
8	5.10	7.70	97	0.05	0.06	3.44	162	0.003		0.11		170	0.0	26	
9	5.39	7.64	105	0.06	0.07	3.54	149	0.005		0.16		180	0.0	27	A
10	4.70	7.74	106	0.06	0.07	3.66	162	0.005		0.09		172	0.0	27	
11	5.14	7.86	102	0.06	0.06	3.76	167	0.005	0.009	0.10	0.003	170	0.0	27	A
12	4.58	7.85	101	0.07	0.06	3.51	165	0.004		0.07		176	0.0	26	
13	4.38	7.91	102	0.06	0.07	3.63	158	0.001		0.09		168	0.0	27	A
14	4.47	7.87	102	0.07	0.05	3.55	156	0.005		0.12		172	0.0	26	
15	4.34	7.80	103	0.06	0.05	3.47	155	0.004		0.18		174	0.0	26	
16	4.16	7.72	101	0.07	0.04	3.31	151	0.009		0.15		170	0.0	25	A
17	4.32	7.86	102	0.07	0.04	3.33	153	0.006		0.15		178	1.0	25	
18	4.15	7.88	105	0.06	0.06	3.43	155	0.003	0.008	0.15	0.007	180	0.0	24	A
19	4.30	7.77	102	0.05	0.06	3.39	155	0.002		0.14		179	0.0	24	

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
20	4.14	7.75	104	0.05	0.05	3.38	153	0.008		0.14		178	0.0	24	A
21	4.33	7.84	102	0.06	0.05	3.40	150	0.007		0.13		182	2.0	24	
22	4.13	7.83	101	0.07	0.06	3.47	150	0.007		0.14		181	0.0	24	
23	4.33	7.73	103	0.06	0.06	3.47	153	0.005		0.16		176	0.0	23	A
24	4.19	7.71	103	0.05	0.05	3.44	156	0.004		0.12		167	0.0	24	
25	4.35	7.71	103	0.06	0.06	3.29	149	0.005	0.010	0.11	0.002	170	0.0	24	A
26	4.34	7.74	101	0.06	0.04	3.33	148	0.006		0.11		172	0.0	24	
27	4.04	7.84	101	0.06	0.06	3.40	151	0.009		0.11		179	1.0	24	A
28	4.27	7.89	105	0.05	0.06	3.32	154	0.005		0.08		177	0.0	22	
29	4.23	7.92	105	0.05	0.05	3.49	152	0.008		0.08		176	0.0	22	
30	3.90	7.89	101	0.06	0.05	3.50	152	0.005		0.09		177	0.0	22	A
AVG	**4.52**	**7.80**	**103**	**0.06**	**0.06**	**3.44**	**154**	**0.009**	**0.011**	**0.12**	**0.005**	**175**	**0.2**	**25**	
TOTAL	**135.54**														

HIGH SERVICE
October 2013

	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	4.87	7.85	100	0.07	0.06	3.46	148	0.006		0.13		173	0.0	23	
2	4.32	7.85	103	0.06	0.06	3.36	150	0.007	0.011	0.12	0.009	173	0.0	23	A
3	4.54	7.85	101	0.05	0.05	3.34	168	0.002		0.11		174	0.0	23	
4	3.59	7.79	99	0.05	1.58	2.83	161	0.005		0.00		177	0.0	22	A
5	4.56	7.79	98	0.07	3.02	3.61	147	0.004		0.00		180	0.0	22	
6	4.45	7.81	100	0.06	2.89	3.48	150	0.006		0.00		176	0.0	22	
7	4.85	7.88	105	0.07	2.84	3.42	151	0.009		0.00		176	0.0	22	A
8	3.43	7.88	101	0.05	2.82	3.36	153	0.003		0.00		176	0.0	22	
9	4.04	7.88	100	0.06	3.20	3.72	158	0.006	0.017	0.00	0.010	156	1.0	20	A
10	4.15	7.89	101	0.07	2.85	3.31	156	0.006		0.00		160	0.0	20	
11	4.06	7.90	101	0.06	2.69	3.22	152	0.005		0.00		171	0.0	21	A

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
12	4.75	7.86	101	0.06	2.39	3.15	155	0.007		0.00		177	0.0	21	
13	4.37	7.80	102	0.05	2.48	3.15	152	0.013		0.00		170	0.0	21	
14	4.10	7.84	102	0.06	2.56	3.17	147	0.010		0.00		168	0.0	20	A
15	4.28	7.79	101	0.06	2.67	3.17	149	0.010		0.00		177	0.0	20	
16	4.02	7.86	103	0.06	2.52	3.10	157	0.002	0.009	0.00	0.003	174	0.0	20	A
17	3.91	7.97	104	0.05	2.55	3.12	156	0.007		0.00		171	0.0	20	
18	4.37	7.89	101	0.06	2.87	3.52	153	0.003		0.00		170	0.0	20	A
19	4.33	7.89	102	0.06	2.91	3.46	149	0.003		0.00		176	0.0	19	
20	4.23	7.90	100	0.07	2.85	3.39	150	0.004		0.00		176	0.0	19	
21	4.48	7.84	102	0.05	2.71	3.45	153	0.013		0.00		176	0.0	17	A
22	4.00	7.78	102	0.05	2.71	3.53	142	0.004		0.00		169	0.0	17	
23	4.63	7.74	103	0.05	2.91	3.76	152	0.005	0.018	0.00	0.002	179	1.5	18	A
24	4.91	7.75	106	0.06	3.13	3.76	153	0.005		0.00		173	1.5	17	
25	3.73	7.73	102	0.06	3.02	3.79	150	0.002		0.00		185	1.5	16	A
26	4.46	7.77	103	0.05	2.89	3.96	157	0.007		0.00		181	0.0	16	
27	4.37	7.87	106	0.06	2.91	3.83	157	0.009		0.00		181	0.0	16	
28	4.30	7.86	102	0.06	3.08	3.83	163	0.004		0.00		179	1.0	18	A
29	4.73	7.82	104	0.06	3.09	3.86	154	0.026		0.00		180	0.0	16	
30	3.77	7.84	105	0.05	3.23	4.05	156	0.003	0.029	0.00	0.001	186	0.0	18	A
31	4.73	7.83	106	0.05	3.32	4.22	162	0.004		0.00		174	0.0	17	
AVG	**4.30**	**7.84**	**102**	**0.06**	**2.54**	**3.50**	**154**	**0.006**	**0.017**	**0.01**	**0.005**	**175**	**0.2**	**19**	
TOTAL	**133.33**														

HIGH SERVICE
November 2013

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
	PLANT EFFLUENT														
1	3.45	7.82	105	0.05	3.36	4.29	153	0.005		0.00		177	0.0	17	A
2	4.61	7.87	104	0.06	3.37	3.94	153	0.004		0.00		172	0.0	17	
3	4.45	7.86	105	0.06	3.14	3.68	156	0.005		0.00		172	0.0	16	
4	4.37	7.90	106	0.05	0.07	2.36	162	0.002		0.09		182	0.0	15	A
5	4.18	7.78	103	0.05	0.09	3.51	151	0.005		0.11		176	1.0	18	
6	4.40	7.95	107	0.06	0.06	3.36	152	0.005	0.036	0.11	0.002	182	0.0	16	A
7	4.45	7.97	107	0.06	0.07	3.47	161	0.006		0.15		178	0.0	15	
8	4.10	7.93	104	0.05	0.08	3.45	155	0.003		0.07		180	2.5	15	A
9	4.16	7.99	105	0.05	0.08	3.37	156	0.006		0.11		179	0.0	13	
10	4.33	8.03	108	0.04	0.07	3.35	154	0.006		0.12		179	0.0	14	
11	4.39	7.90	105	0.05	0.06	3.22	160	0.004		0.12		169	1.5	12	A
12	4.26	7.83	102	0.06	0.08	3.57	149	0.006		0.12		175	0.0	14	
13	4.27	7.81	104	0.05	0.09	3.73	151	0.003	0.018	0.11	0.009	172	0.0	14	A
14	3.93	7.77	103	0.06	0.10	3.98	157	0.003		0.12		176	0.0	15	
15	3.89	7.76	102	0.06	0.07	3.61	159	0.006		0.11		176	0.0	12	A
16	4.99	7.76	98	0.06	0.07	3.61	159	0.004		0.11		177	0.0	12	
17	4.71	7.88	102	0.06	0.07	3.64	172	0.004		0.08		170	0.0	11	
18	4.28	7.98	104	0.06	0.09	3.64	149	0.002		0.10		178	0.0	12	A
19	4.31	7.95	104	0.05	0.08	3.58	157	0.006		0.29		175	3.0	14	
20	4.27	7.89	104	0.07	0.07	3.85	149	0.003	0.006	0.11	0.004	176	0.0	14	A
21	4.02	7.82	100	0.06	0.08	3.88	156	0.004		0.10		175	0.0	13	
22	4.74	7.78	101	0.06	0.08	3.69	154	0.006		0.12		176	0.0	11	A
23	4.28	7.83	101	0.05	0.10	3.47	153	0.007		0.12		176	0.0	11	
24	4.12	7.93	100	0.05	0.08	3.59	153	0.005		0.08		177	0.0	12	
25	4.43	7.92	99	0.07	0.08	3.68	70	0.007		0.07		175	0.0	13	A
26	4.50	7.72	98	0.06	0.09	3.70	149	0.006		0.10		177	0.0	12	
27	4.59	7.80	100	0.06	0.06	3.58	149	0.007	0.017	0.07	0.004	173	0.0	11	A
28	4.18	7.83	96	0.06	0.06	3.46	149	0.004		0.11		178	0.0	9	

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
29	4.46	7.85	100	0.05	0.10	3.80	149	0.007		0.09		177	0.0	8	A
30	4.40	7.85	98	0.07	0.06	3.49	147	0.007		0.11		176	0.0	8	
AVG	**4.32**	**7.86**	**102**	**0.06**	**0.40**	**3.58**	**151**	**0.005**	**0.019**	**0.10**	**0.005**	**176**	**0.3**	**13**	
TOTAL	**129.52**														

HIGH SERVICE
December 2013

	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	4.42	7.84	93	0.07	0.09	3.70	149	0.006		0.10		177	0.0	8	
2	4.47	7.86	98	0.05	0.08	3.50	155	0.003		0.19		173	0.0	11	A
3	4.18	7.87	100	0.05	0.07	3.63	153	0.005		0.06		174	3.0	11	
4	4.52	7.89	97	0.07	0.07	3.61	149	0.004	0.004	0.08	0.002	180	0.0	12	A
5	3.76	7.91	101	0.07	0.07	3.61	150	0.005		0.11		180	0.0	10	
6	4.51	7.87	99	0.07	0.08	3.65	148	0.008		0.08		178	0.0	9	A
7	4.18	7.88	100	0.05	0.08	3.66	154	0.001		0.08		176	0.0	9	
8	3.94	7.82	98	0.05	0.09	3.56	145	0.002		0.04		174	0.0	7	
9	4.55	7.79	95	0.06	0.07	3.61	147	0.002		0.06		170	0.0	9	A
10	4.35	7.79	98	0.06	0.09	3.62	142	0.005		0.09		167	0.0	11	
11	4.39	7.84	99	0.06	0.08	3.43	152	0.004	0.017	0.08	0.005	174	0.0	13	A
12	4.35	7.90	101	0.07	0.11	3.58	151	0.008		0.04		171	0.0	10	
13	4.00	7.88	101	0.05	0.10	3.57	150	0.004		0.05		170	0.0	11	A
14	4.32	7.90	100	0.06	0.07	3.45	170	0.003		0.42		178	0.0	3	
15	4.54	7.95	101	0.07	0.07	3.39	152	0.004		0.12		170	0.0	4	
16	4.42	7.93	101	0.07	0.08	3.40	152	0.004		0.08		178	0.0	5	A
17	3.63	7.88	98	0.06	0.09	3.54	157	0.002		0.08		178	0.0	5	
18	4.39	7.89	100	0.06	0.07	3.59	152	0.004	0.020	0.09	0.004	173	0.0	11	A
19	4.83	7.92	101	0.06	0.06	3.62	150	0.004		0.06		176	0.0	5	
20	4.68	7.94	100	0.06	0.07	3.51	149	0.005		0.06		182	0.0	6	A

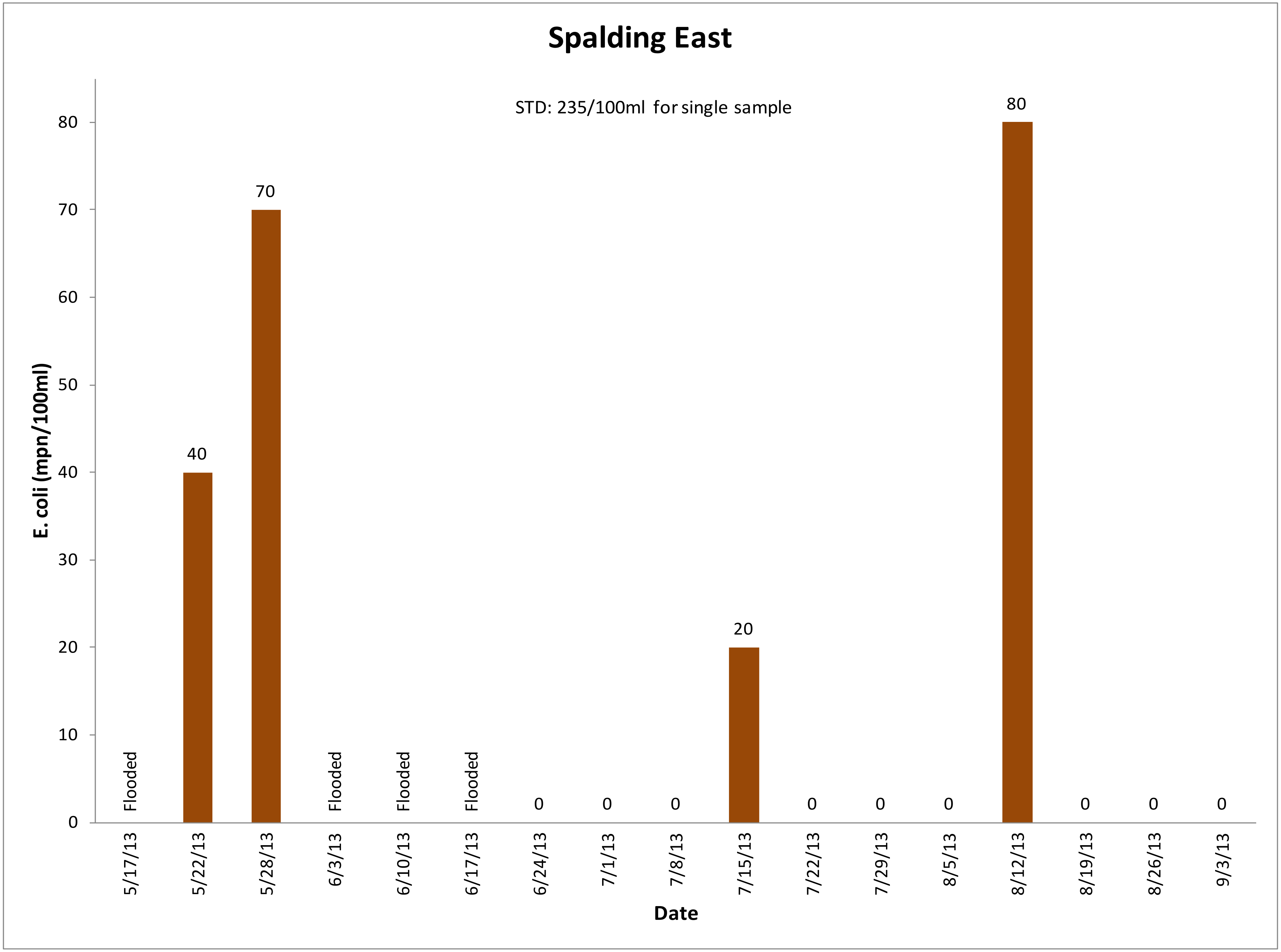
DATE	Flow (mgd)	pH -	Alkalinity (mg/l)	Turbidity (NTU)	Free Cl2 (mg/l)	Total Cl2 (mg/l)	Hardness (mg/l)	Iron (mg/l)	Mn (mg/l)	NH_3 (mg/l)	NO_2 (mg/l)	TDS (mg/l)	Color (u)	Temp (°C)	Total Coliforms
21	4.25	7.97	101	0.05	0.07	3.42	153	0.001		0.22		182	0.0	6	
22	4.37	8.01	102	0.05	0.07	3.46	154	0.005		0.06		180	0.0	5	
23	4.16	7.90	98	0.06	0.08	3.51	158	0.002		0.10		186	0.0	4	A
24	4.53	7.86	100	0.05	0.07	3.54	152	0.072		0.11		184	0.0	4	
25	4.25	7.82	100	0.06	0.08	3.34	150	0.004		0.11	0.004	183	0.0	5	A
26	4.34	7.84	100	0.06	0.08	3.48	153	0.007	0.023	0.19		185	0.0	6	
27	4.95	7.91	101	0.07	0.07	3.56	159	0.003		0.08		180	0.0	4	A
28	4.72	8.07	102	0.07	0.08	3.69	152	0.004		0.08		182	0.0	4	
29	4.38	7.98	101	0.07	0.07	3.58	151	0.004		0.09		180	0.0	4	
30	4.78	7.98	100	0.05	0.07	3.45	156	0.004		0.09		182	0.0	5	A
31	4.36	7.88	101	0.05	0.07	3.42	157	0.005		0.09		182	0.0	4	
AVG	**4.37**	**7.89**	**99**	**0.06**	**0.08**	**3.54**	**152**	**0.006**	**0.016**	**0.10**	**0.004**	**177**	**0.1**	**7**	
TOTAL	**135.52**														

APPENDIX F

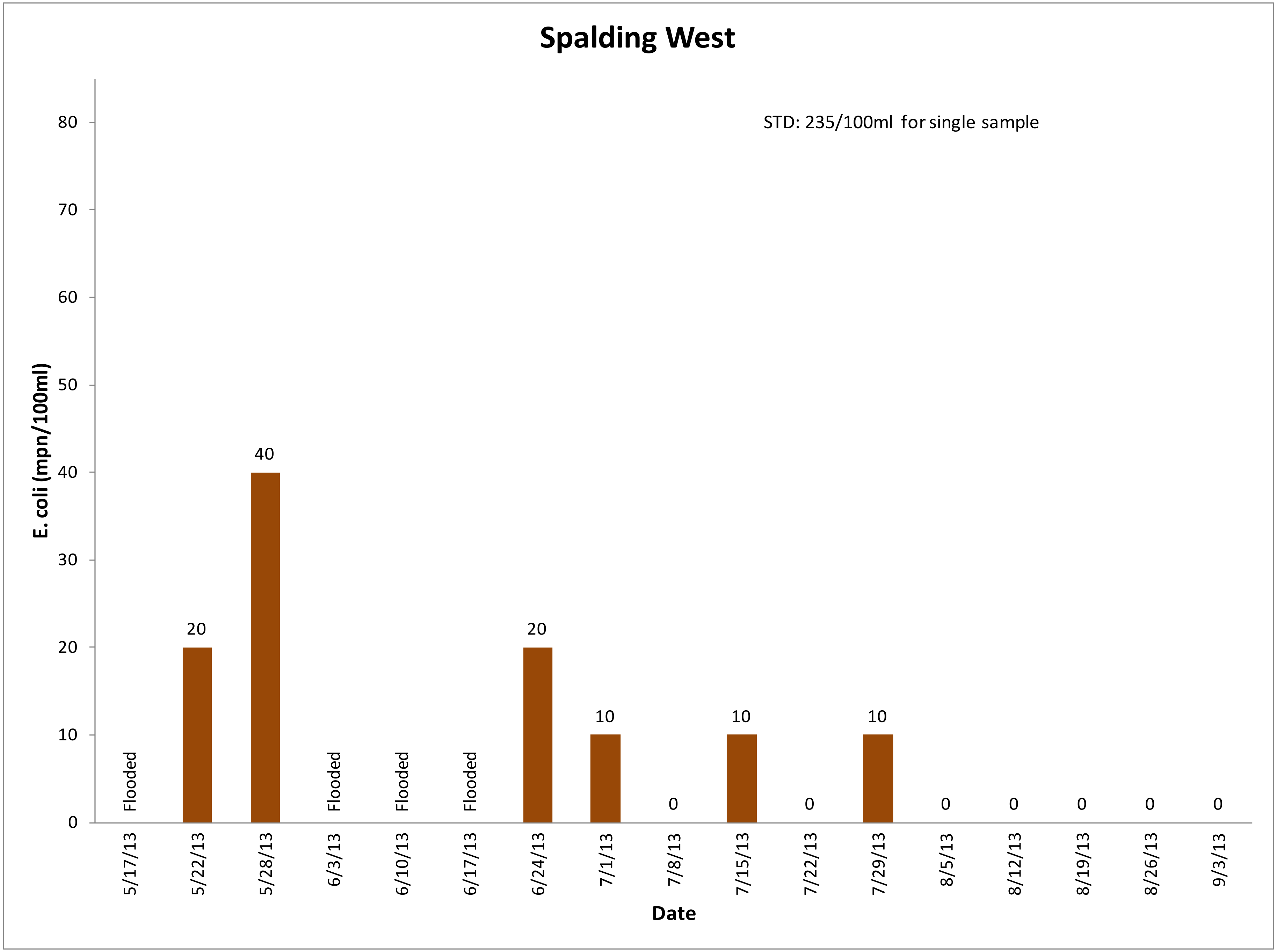
Beach Data & Graphs

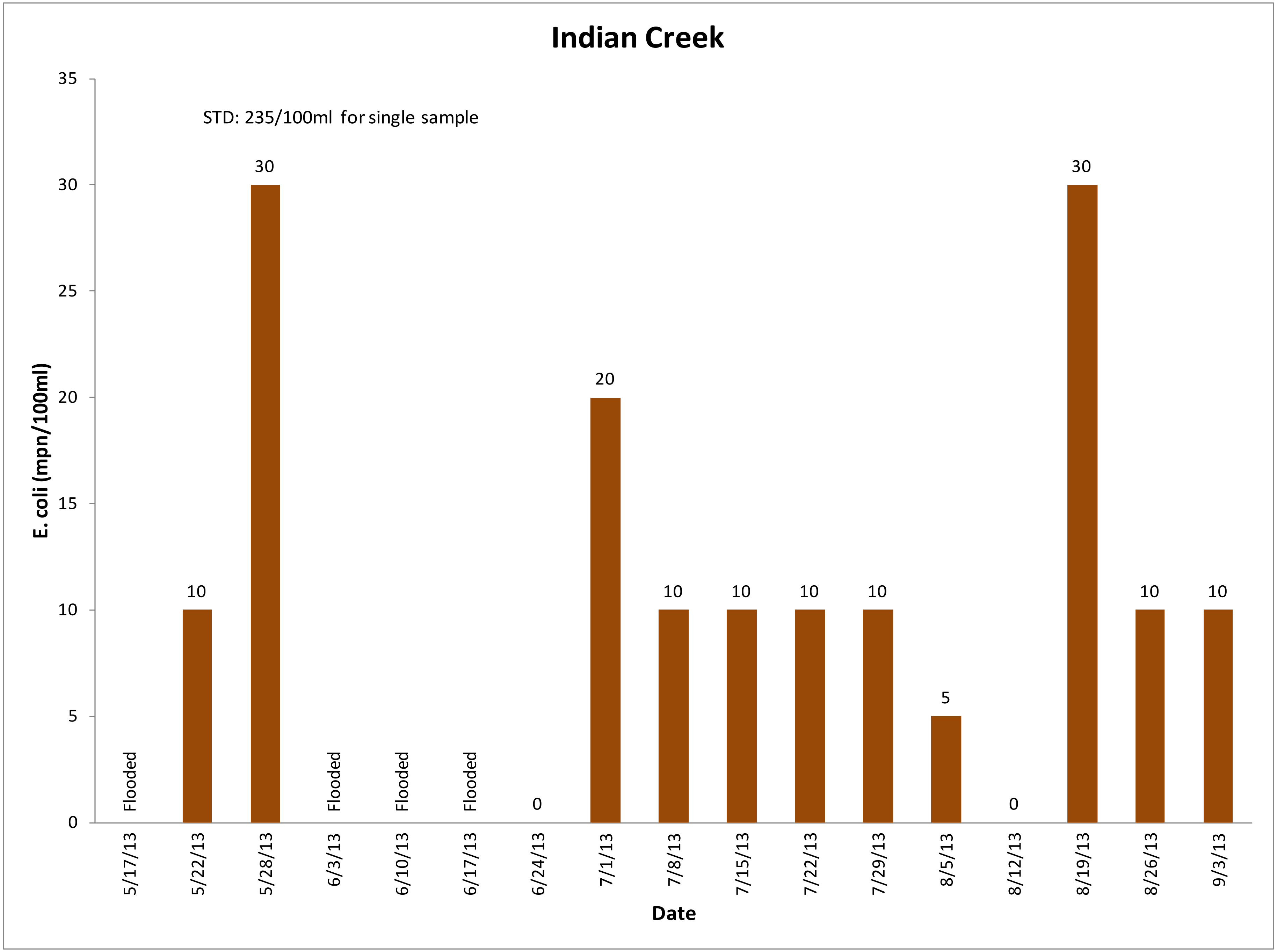
Beach Data

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)
5/17/2013		FLOODED		FLOODED		FLOODED
5/22/2013	5046	40	5093	20	5176	10
5/28/2013	5090	70	5094	40	5095	30
6/3/2013		FLOODED		FLOODED		FLOODED
6/10/2013		FLOODED		FLOODED		FLOODED
6/17/2013		FLOODED		FLOODED		FLOODED
6/24/2013	5047	0	5051	20	5052	0
7/1/2013	5075	0	5122	10	5162	20
7/8/2013	5242	0	5330	0	5339	10
7/15/2013	5289	20	5326	10	5336	10
7/22/2013	5104	0	5109	0	5212	10
7/29/2013	5202	0	5287	10	5322	10
8/5/2013	5106	0	5125	0	5161	5
8/12/2013	5105	80	5140	0	5237	0
8/19/2013	5325	0	5346	0	5363	30
8/26/2013	5284	0	5292	0	5294	10
9/3/2013	5286	0	5299	0	5312	10



Spalding East
STD: 235/100ml for single sample
E. coli (mpn/100ml)
0
10
20
30
40
50
60
70
80
Flooded
40
70
Flooded
Flooded
Flooded
0
0
0
20
0
0
0
80
0
0
0
5/17/13
5/22/13
5/28/13
6/3/13
6/10/13
6/17/13
6/24/13
7/1/13
7/8/13
7/15/13
7/22/13
7/29/13
8/5/13
8/12/13
8/19/13
8/26/13
9/3/13
Date


Spalding West
STD: 235/100ml for single sample
E. coli (mpn/100ml)
80
70
60
50
40
30
20
10
0
Flooded
20
40
Flooded
Flooded
Flooded
20
10
0
10
0
10
0
0
0
0
0
5/17/13
5/22/13
5/28/13
6/3/13
6/10/13
6/17/13
6/24/13
7/1/13
7/8/13
7/15/13
7/22/13
7/29/13
8/5/13
8/12/13
8/19/13
8/26/13
9/3/13
Date



Indian Creek
STD: 235/100ml for single sample
E. coli (mpn/100ml)
35
30
25
20
15
10
5
0
Flooded
10
30
Flooded
Flooded
Flooded
0
20
10
10
10
10
5
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8/19/13
8/26/13
9/3/13
Date

Mark Twain State Park Beach Data

Date/Time Collected	Comments	Sample #	E. coli	Date/Time Analyzed
4/22/13 8:50	Public Beach - Left Duplicate	AB96239	110.0	4/23/13 10:45
4/22/13 8:51	Public Beach - Left	AB96237	145.5	4/23/13 10:45
4/22/13 8:52	Public Beach - Right	AB96238	104.6	4/23/13 10:45
4/29/13 9:00	Public Beach - Left - DUPLICATE	AB97621	29.2	4/30/13 11:44
4/29/13 9:01	Public Beach - Right	AB97622	16.1	4/30/13 11:44
4/29/13 9:05	Public Beach - Left	AB97620	16.1	4/30/13 11:44
5/6/13 10:45	Public Beach - Left	AB97719	5.2	5/7/13 11:18
5/6/13 10:46	Public Beach - Right	AB97720	50.4	5/7/13 11:18
5/13/13 10:52	Public Beach - Left	AB97984	39.3	5/14/13 10:45
5/13/13 10:53	Public Beach - Right	AB97985	35.5	5/14/13 10:45
5/20/13 11:02	Public Beach - Right	AB98108	8.5	5/21/13 10:55
5/20/13 11:04	Public Beach - Left	AB98107	5.2	5/21/13 10:55
5/28/13 8:50	Public Beach - Right	AB98202	72.2	5/29/13 10:58
5/28/13 8:55	Public Beach - Left	AB98200	101.7	5/29/13 10:58
5/28/13 8:55	Public Beach - Left - DUPLICATE	AB98201	75.4	5/29/13 10:58
6/3/13 11:00	Public Beach - Right	AC01996	344.8	6/4/13 11:08
6/3/13 11:04	Public Beach - Left	AC01995	186.0	6/4/13 11:08
6/10/13 11:00	Public Beach left	AC02387	123.6	6/11/13 10:43
6/10/13 11:05	Public Beach right	AC02388	54.5	6/11/13 10:43
6/17/13 11:00	Public Beach - Left	AC03695	133.4	6/18/13 10:45
6/17/13 11:00	Public Beach - Right	AC03696	17.9	6/18/13 10:45
6/24/13 10:30	Public Beach - Right	AC03872	10.8	6/25/13 10:38
6/24/13 10:32	Public Beach - Left	AC03871	13.2	6/25/13 10:38
7/1/13 13:27	Public Beach - Left	AC04025	15.8	7/2/13 10:26
7/1/13 13:30	Public Beach - Left - DUPLICATE	AC04026	24.6	7/2/13 10:26
7/1/13 13:38	Public Beach - Right	AC04027	20.1	7/2/13 10:26
7/8/13 10:40	Public Beach - Right	AC05629	8.5	7/9/13 10:35
7/8/13 10:50	Public Beach - Left	AC05628	4.1	7/9/13 10:35
7/15/13 13:00	Public Beach - Left	AC06659	1.0	7/16/13 11:12
7/15/13 13:00	Public Beach - Right	AC06660	1.0	7/16/13 11:12

Date/Time Collected	Comments	Sample #	E. coli	Date/Time Analyzed
7/22/13 10:32	Public Beach - Right	AC06841	1.0	7/23/13 10:49
7/22/13 10:38	Public Beach - Left	AC06840	4.1	7/23/13 10:49
7/29/13 8:40	Public Beach - Right	AC08232	<1	7/30/13 10:32
7/29/13 8:45	Public Beach - Left	AC08230	387.3	7/30/13 10:32
7/29/13 8:45	Public Beach - Left - DUPLICATE	AC08231	<1	7/30/13 10:32
8/5/13 9:20	Public Beach - Right	AC08338	7.4	8/6/13 10:40
8/5/13 9:25	Public Beach - Left	AC08337	5.1	8/6/13 10:40
8/12/13 8:20	Public Beach - Left	AC08608	2.0	8/13/13 11:01
8/12/13 8:25	Public Beach - Right	AC08609	<1	8/13/13 11:01
8/19/13 8:30	Public Beach - Right	AC08722	7.4	8/20/13 11:05
8/19/13 8:35	Public Beach - Left	AC08721	1.0	8/20/13 11:05
8/26/13 9:35	Public Beach - Left	AC09038	<1	8/27/13 11:10
8/26/13 9:35	Public Beach - Left - DUPLICATE	AC09039	<1	8/27/13 11:10
8/26/13 9:35	Public Beach - Right	AC09040	<1	8/27/13 11:10