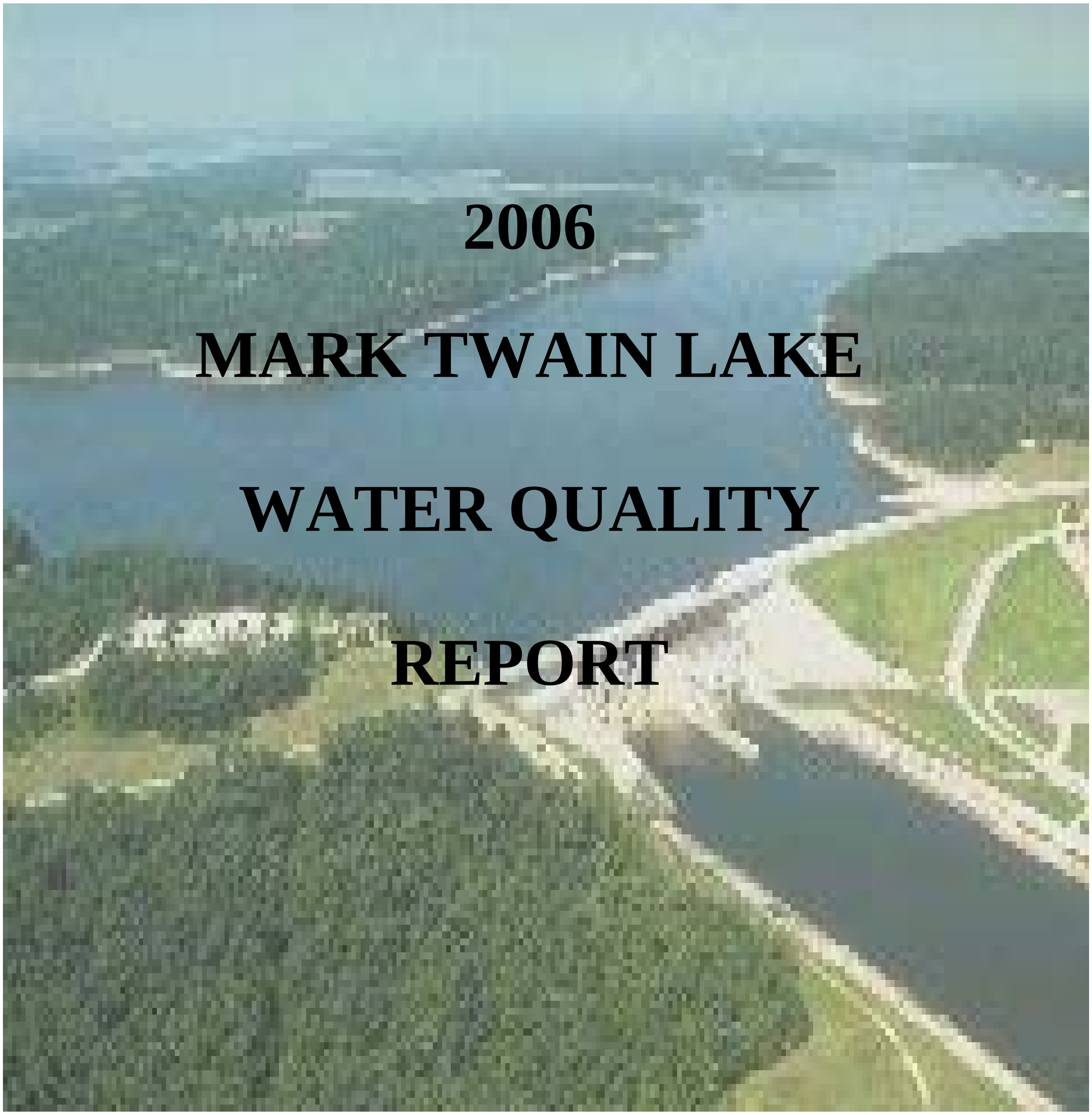

2006

MARK TWAIN LAKE

WATER QUALITY

REPORT

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

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WATER QUALITY MONITORING PROGRAM

1.0 GENERAL OVERVIEW

This report summarizes water quality activities of the St. Louis District for Fiscal Year 2006 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.

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 University of Missouri-Columbia has been taking 4 samples per year in the forebay of the lake 1989.

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 2004 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 Manganese. Mark Twain Lake is impaired by Mercury, and Atrazine. 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 2006 to assure safe conditions for human recreation, wildlife and aquatic life as maintained and managed within the lake system. The 2006 water quality monitoring program began in March and continued through September. Five sampling events were conducted. During each sampling period one site was selected for quality control duplication and denoted as MTL-15. The locations of the ten sampling sites are depicted on the lake map in Figure 1.

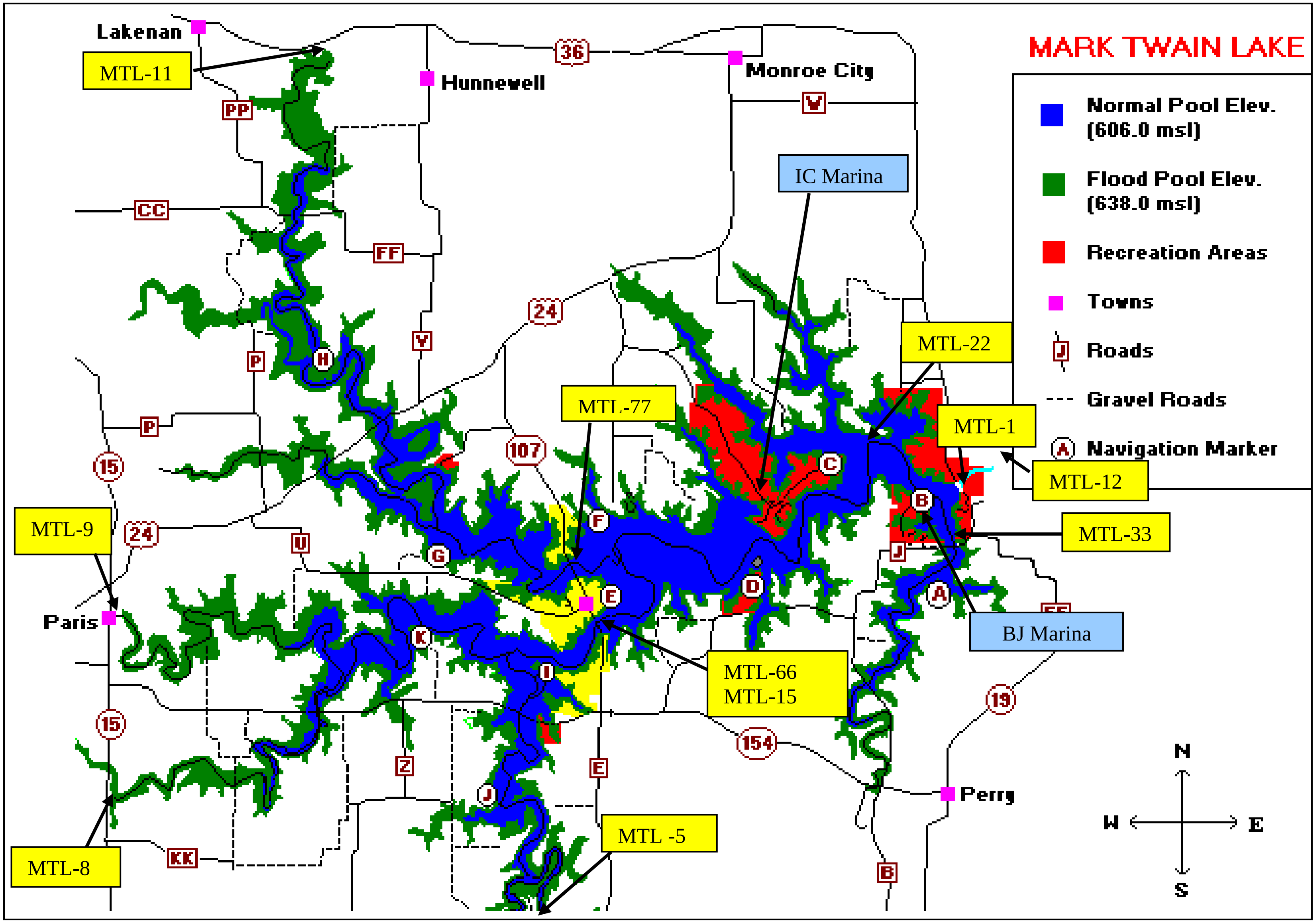


Figure 1
Location of sample sites

2.0 WATER QUALITY ASSESSMENT CRITERIA

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 2006 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^{o}C - 33^{o}C (68^{o}F - 90^{o}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
Fecal Coliform	< 200 colonies/100 ml (geometric mean)
pH	Range: 6.5 to 9.0
DO	> 5.0 mg/L
Atrazine	0.003 mg/L (Drinking Water Standard)
Alachlor	0.002 mg/L (Drinking Water Standard)

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 of organic (volatile) and inorganic (non-volatile) 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.

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. Although E. coli and enterococci are more costly they may become the standard in the near furure.

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.

3.0 SUMMARY OF MONITORING RESULTS

The seasonal change brought on gradual lake stratification during the summer months. Fecal coli are sampled at the marinas to ensure that the marina areas are not being contaminated by boats with restroom facilities. Bacteria levels for all the marinas were below the Missouri standard of 200 colonies/100ml of sample water for the entire sampling period, February through September.

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 did not exceed the Missouri Water Quality Standard at any of the sites. However, manganese did exceed the drinking water and ground water standard of 0.05 mg/L at all sites on September 12 and on March 28, April 13, and May 18 at Site 12 (below re-regulation dam). Iron cycling is a function of oxidation-reduction processes. This elevated level of manganese below the re-regulation dam is not detrimental to the overall lake system at this time. Iron oxidizes relatively rapidly (minutes to hours); therefore any iron released through the spillway will normally be oxidized in a short period of time. 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. The 2006 total phosphate results at all sites are above the 0.05 mg/L standard. 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. However, 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. Site 33 Lick Creek Arm at Hwy J exceed the 10mg/L standard on April 13, 2006. This high reading appears to be an anomaly and could possibly be from improper preservation. 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 throughout 2006.

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. 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. Missouri does not currently have a standard for chlorophyll. The data indicates a normal increase in chlorophyll levels during the warmer summer months, which is not a concern.

Seventy percent of the Mark Twain Lake watershed is used for agriculture and 50% of this is used for cropland. Atrazine and Alachlor are pesticides that were sampled at all sites. These chemicals are herbicides used to control weed growth. All sites were below the Missouri atrazine standard. These substances can enter water bodies as a result of drift during spraying, surface runoff, and leaching through soil. In order to eliminate pesticide contamination of waters it is important for the public to be educated and institute best 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 effects the clarity of the water. This can then effect the amount of oxygen in the water. Missouri does not currently have a standard for TSS or TVSS.

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 except lake site 33 Lick Creek Arm on 6/22/06 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. Missouri does not currently have a standard for conductivity or 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.

The monitoring program for Mark Twain Lake during Fiscal Year 2006 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 have been working continuously with lake personnel, area communities and other agencies in the implementation of educational programs and implementation planning to bring about the use of better management techniques to improve the lake's water quality.

4.0 PLANNED 2007 STUDIES

The Mark Twain Lake water quality monitoring will continue in Fiscal Year 2007. A total of five sampling events will be conducted between February and September in 2007. Mark Twain Lake provides water supplies 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 plan will involve an intensive trend analysis of the contaminants entering Mark Twain Lake. 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 in the spillway to allow the project as well as water quality personnel to monitor temperature and oxygen readings to avoid fish kills. During low flow, water is discharged through the afterbay. 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.

APPENDIX A

DATA

LAB DATA

SITE	DEPTH (m)	DATE	TIME	Total Organic Carbon (mg/L)	Total Iron (mg/L)	Total Manganese (mg/L)	NH_3N	NO_3-NO_2	Ortho Phospherous (mg/L)	Total Phospherous (mg/L)	Total Suspended Solids (mg/L)	Total Volatile Suspended Solids (mg/L)
MTL-1	0	3/28/2006	1019	7.6	0.22	0.04	0.04	0.32	<0.01	0.04	4	1
MTL-1	0	4/13/2006	0948	5.4	0.15	0.02	<0.03	0.30	<0.01	0.03	4	<1
MTL-1	0	5/18/2006	0958	6.9	0.10	0.04	0.04	0.17	<0.01	0.03	1	<1
MTL-1	0	6/22/2006	1033	6.8	0.11	0.03	0.04	0.27	<0.01	0.04	3	1
MTL-1	0	9/12/2006		5.6	0.08	0.06	<0.03	0.06	<0.01	0.03	2	1
MTL-11	0	3/28/2006	1135	7.0			0.48	0.62	0.07	0.26	36	6
MTL-11	0	4/13/2006	1054	8.0			<0.03	0.17	0.04	0.32	52	7
MTL-11	0	5/18/2006	1102	8.0			0.05	0.06	0.03	0.19	30	5
MTL-11	0	6/22/2006	1151	10.5			<0.03	0.02	0.03	0.23	31	8
MTL-11	0	9/12/2006	1345	8.1			<0.03	0.04	0.03	0.20	40	6
MTL-12	0	3/28/2006	1051	5.1	0.34	0.10	0.03	0.08	<0.01	0.06	7	2
MTL-12	0	4/13/2006	1015	6.4	0.49	0.12	<0.03	0.29	<0.01	0.07	12	2
MTL-12	0	5/18/2006	1038	6.0	0.46	0.12	0.04	0.04	<0.01	0.08	12	3
MTL-12	0	6/22/2006	1112	7.5	0.19	0.04	0.04	0.22	<0.01	0.06	6	2
MTL-12	0	9/12/2006	1440	8.6	0.52	0.20	0.12	0.08	0.01	0.08	8	<2
MTL-15-0	0	3/28/2006	1044	5.8			<0.03	0.32	<0.01	0.08	11	3
MTL-15-0	0	4/13/2006	1014	7.3			0.07	0.62	<0.01	0.13	15	3
MTL-15-0	0	5/18/2006	1030	6.1			<0.03	0.55	0.01	0.07	4	1
MTL-15-0	0	6/22/2006	1322	7.8			<0.03	0.05	<0.01	0.06	4	2
MTL-15-0	0	9/12/2006	1030	5.6			0.06	0.02	<0.01	0.04	4	<2
MTL-22-0	0	3/28/2006	1147	<5.0			<0.03	0.30	<0.01	0.05	4	<1
MTL-22-0	0	4/13/2006	1206	5.4			<0.03	2.30	<0.01	0.04	4	1
MTL-22-0	0	5/18/2006	1240	5.7			0.05	0.17	<0.01	0.04	2	<1
MTL-22-0	0	6/22/2006	1245	7.3			<0.03	0.20	<0.01	0.04	3	1
MTL-22-0	0	9/12/2006	1300	5.9			<0.03	0.03	<0.01	0.03	2	1
MTL-22-15	15	3/28/2006	1151	7.4	0.25	0.05	<0.03	0.28	<0.01	0.05	5	1
MTL-22-15	15	4/13/2006	1211	5.3	0.16	0.03	<0.03	0.30	<0.01	0.05	6	2
MTL-22-15	15	5/18/2006	1248	25.3	0.15	0.03	0.04	0.15	<0.01	0.03	2	<1

SITE	DEPTH (m)	DATE	TIME	Total Organic Carbon (mg/L)	Total Iron (mg/L)	Total Manganese (mg/L)	NH_3N	NO_3-NO_2	Ortho Phospherous (mg/L)	Total Phospherous (mg/L)	Total Suspended Solids (mg/L)	Total Volatile Suspended Solids (mg/L)
MTL-22-15	15	6/22/2006	1257	8.0	0.13	0.02	<0.03	0.32	<0.01	0.04	3	1
MTL-22-15	15	9/12/2006	1320	5.5	0.05	0.07	<0.03	0.02	<0.01	0.03	2	1
MTL-33-0	0	3/28/2006	1220	5.3			<0.03	0.31	<0.01	0.05	5	1
MTL-33-0	0	4/13/2006	1244	5.3			<0.03	55.60	<0.01	0.03	4	1
MTL-33-0	0	5/18/2006	1310	5.8			0.04	0.13	<0.01	0.04	2	<1
MTL-33-0	0	6/22/2006	1314	8.6			<0.03	0.06	<0.01	0.06	3	2
MTL-33-0	0	9/12/2006	1223	7.0			<0.03	0.02	<0.01	0.03	2	1
MTL-5	0	3/28/2006	1321	12.1			0.61	1.30	0.09	0.34	18	3
MTL-5	0	4/13/2006	1219	11.7			<0.03	0.22	0.02	0.34	42	10
MTL-5	0	5/18/2006	1244	9.5			0.04	1.10	0.06	0.03	33	5
MTL-5	0	6/22/2006	1312	9.9			<0.03	0.54	0.06	0.23	14	5
MTL-5	0	9/12/2006	1205	11.1			0.06	0.34	0.12	0.44	57	<5
MTL-66-0	0	3/28/2006	1042	5.5			<0.03	0.32	<0.01	0.08	12	3
MTL-66-0	0	4/13/2006	1000	6.9			0.09	0.69	<0.01	0.13	14	3
MTL-66-0	0	5/18/2006	1026	7.4			<0.03	0.49	0.01	0.07	3	<1
MTL-66-0	0	6/22/2006	1100	9.2			0.04	0.79	0.04	0.14	6	2
MTL-66-0	0	9/13/2006	0950	5.7			0.10	0.04	<0.01	0.04	3	1
MTL-77-0	0	3/28/2006	1105	8.6			<0.03	0.29	<0.01	0.09	14	3
MTL-77-0	0	4/13/2006	1039	6.3			<0.03	0.47	<0.01	0.10	17	4
MTL-77-0	0	5/18/2006	1120	5.9			<0.03	0.43	<0.01	0.07	4	<1
MTL-77-0	0	6/22/2006	1145	6.9			<0.03	0.65	0.01	0.08	5	2
MTL-77-0	0	9/13/2006	1030	5.9			0.05	0.02	<0.01	0.05	4	1
MTL-8	0	3/28/2006	1245	7.6			0.04	0.74	0.03	0.19	15	4
MTL-8	0	4/13/2006	1150	9.9			<0.03	0.18	0.03	0.22	40	<4
MTL-8	0	5/18/2006	1214	6.9			0.03	0.72	0.02	0.09	8	1
MTL-8	0	6/22/2006	1246	8.8			<0.03	0.30	0.04	0.11	5	<1
MTL-8	0	9/12/2006	1230	12.8			0.12	0.83	0.23	1.00	256	30
MTL-9	0	3/28/2006	1213	8.3			0.06	0.78	0.03	0.21	16	3
MTL-9	0	4/13/2006	1130	13.7			<0.03	0.60	0.03	0.44	116	12
MTL-9	0	5/18/2006	1153	9.8			0.03	0.76	0.01	0.21	28	6
MTL-9	0	6/22/2006	1227	9.3			<0.03	0.03	<0.01	0.14	17	5
MTL-9	0	9/12/2006	1255	12.0			0.04	0.32	0.09	0.55	81	10

SITE	DEPTH (m)	DATE	TIME	Chlorophyll (mg/m^3)	Pheophytin (mg/m^3)	Atrazine (ug/L)	Alachlor (ug/L)
MTL-1	0	3/28/2006	1019			<1.0	<1.0
MTL-1	0	4/13/2006	0948			<1.1	<1.1
MTL-1	0	5/18/2006	0958			<1.0	<1.0
MTL-1	0	6/22/2006	1033			<1.1	<1.1
MTL-1	0	9/12/2006				J0.6	<1.0
MTL-11	0	3/28/2006	1135			<1.0	<1.0
MTL-11	0	4/13/2006	1054			<1.1	<1.1
MTL-11	0	5/18/2006	1102			4.9	<1.0
MTL-11	0	6/22/2006	1151			1.7	<1.1
MTL-11	0	9/12/2006	1345			<1.1	<1.1
MTL-12	0	3/28/2006	1051			<1.0	<1.0
MTL-12	0	4/13/2006	1015			<1.1	<1.1
MTL-12	0	5/18/2006	1038			<1.0	<1.0
MTL-12	0	6/22/2006	1112			J0.8	<1.1
MTL-12	0	9/12/2006	1440			<1.0	<1.0
MTL-15-0	0	3/28/2006	1044	19.6	<5.0	<1.0	<1.0
MTL-15-0	0	4/13/2006	1014	14.6	6.6	<1.1	<1.1
MTL-15-0	0	5/18/2006	1030	5.0	5.0	J0.7	<1.0
MTL-15-0	0	6/22/2006	1322	17.3	5.0	<1.1	<1.1
MTL-15-0	0	9/12/2006	1030	5.7	5.0	J0.8	<1.0
MTL-22-0	0	3/28/2006	1147	7.7	<5.0	<1.0	<1.0
MTL-22-0	0	4/13/2006	1206	6.4	5.0	<1.1	<1.1
MTL-22-0	0	5/18/2006	1240	5.0	5.0	<1.0	<1.0
MTL-22-0	0	6/22/2006	1245	5.1	5.0	J0.7	<1.1
MTL-22-0	0	9/12/2006	1300	5.0	5.0	J0.6	<1.0
MTL-22-15	15	3/28/2006	1151				
MTL-22-15	15	4/13/2006	1211				
MTL-22-15	15	5/18/2006	1248				
MTL-22-15	15	6/22/2006	1257				
MTL-22-15	15	9/12/2006	1320				

SITE	DEPTH (m)	DATE	TIME	Chlorophyll (mg/m^3)	Pheophytin (mg/m^3)	Atrazine (ug/L)	Alachlor (ug/L)
MTL-33-0	0	3/28/2006	1220	9.1	5.0	<1.0	<1.0
MTL-33-0	0	4/13/2006	1244	5.0	5.0	<1.1	<1.1
MTL-33-0	0	5/18/2006	1310	5.0	5.0	<1.0	<1.0
MTL-33-0	0	6/22/2006	1314	17.8	5.0	J0.6	<1.1
MTL-33-0	0	9/12/2006	1223	5.0	5.0	J0.7	<1.0
MTL-5	0	3/28/2006	1321			<1.0	<1.0
MTL-5	0	4/13/2006	1219			<1.1	<1.1
MTL-5	0	5/18/2006	1244			10.1	<1.0
MTL-5	0	6/22/2006	1312			1.8	<1.1
MTL-5	0	9/12/2006	1205			<1.1	<1.1
MTL-66-0	0	3/28/2006	1042	21.4	5.0	<1.0	<1.0
MTL-66-0	0	4/13/2006	1000	13.9	5.0	<1.1	<1.1
MTL-66-0	0	5/18/2006	1026	5.0	5.0	J0.7	<1.0
MTL-66-0	0	6/22/2006	1100	7.8	5.0	<1.1	<1.1
MTL-66-0	0	9/13/2006	0950	5.0	5.0	J0.6	<1.0
MTL-77-0	0	3/28/2006	1105	20.4	5.0	<1.0	<1.0
MTL-77-0	0	4/13/2006	1039	18.9	5.3	<1.1	<1.1
MTL-77-0	0	5/18/2006	1120	5.0	5.0	<1.0	<1.0
MTL-77-0	0	6/22/2006	1145	7.9	5.0	J1.0	<1.1
MTL-77-0	0	9/13/2006	1030	5.4	5.0	J0.5	<1.0
MTL-8	0	3/28/2006	1245			<1.0	<1.0
MTL-8	0	4/13/2006	1150			<1.1	<1.1
MTL-8	0	5/18/2006	1214			2.4	<1.0
MTL-8	0	6/22/2006	1246			1.3	<1.1
MTL-8	0	9/12/2006	1230			<1.1	<1.1
MTL-9	0	3/28/2006	1213			<1.0	<1.0
MTL-9	0	4/13/2006	1130			<1.1	<1.1
MTL-9	0	5/18/2006	1153			7.1	<1.0
MTL-9	0	6/22/2006	1227			<1.1	<1.1
MTL-9	0	9/12/2006	1255			<1.1	<1.1

LAB DATA

SITE	DEPTH (m)	DATE	STIME	FECALCOL (colonies/100ml)
BJ MARINA	0	4/13/2006	0930	2
BJ MARINA	0	6/22/2006	1420	4
BJ MARINA	0	9/13/2006		18
IC MARINA	0	4/13/2006	1110	2
IC MARINA	0	6/22/2006	1205	6
IC MARINA	0	9/13/2006		14

FIELD DATA

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
66	3/28/2006	0.159	6.97	252	353	8.94	115	12.96	1042	19 in.	41	Cloudy	Light
66	3/28/2006	1	6.84	252	354	8.79	112	13.65	1042			Cloudy	Light
66	3/28/2006	2	6.80	248	349	8.73	110.9	13.5	1043			Cloudy	Light
66	3/28/2006	3	6.90	249	348	8.69	110.3	13.4	1043			Cloudy	Light
66	3/28/2006	4	6.75	246.5	338	8.69	109.9	13.43	1044			Cloudy	Light
66	3/28/2006	5	6.55	245	331	8.66	110.6	13.56	1045			Cloudy	Light
66	3/28/2006	6	6.54	245	328	8.65	110.7	13.6	1045			Cloudy	Light
66	3/28/2006	7	6.30	244.8	319	8.67	110.3	13.63	1046			Cloudy	Light
66	3/28/2006	8	6.24	247	317	8.64	109.7	13.57	1046			Cloudy	Light
66	3/28/2006	9	6.31	246	323	8.61	108.5	13.36	1047			Cloudy	Light
66	3/28/2006	10	6.57	236	347	8.53	73.7	9.41	1048			Cloudy	Light
66	3/28/2006	11	6.31	236	313	8.58	108	13.77	1048			Cloudy	Light
66	3/28/2006	12	6.60	240	328	8.52	104.7	12.45	1050			Cloudy	Light
66	3/28/2006	13	6.73	240	358	8.47	100	12.12	1050			Cloudy	Light
66	3/28/2006	14	6.79	239	360	8.46	93.3	11.29	1051			Cloudy	Light
66	3/28/2006	15	6.79	235	360	8.41	88.9	10.78	1051			Cloudy	Light
77	3/28/2006	0.189	6.57	255.4	300	9.05	115.3	14.14	1105	19	41	Cloudy	Light
77	3/28/2006	1	6.55	253.2	299	8.90	116.0	14.23	1105			Cloudy	Light
77	3/28/2006	2	6.54	252	298	8.81	115.7	14.19	1106			Cloudy	Light
77	3/28/2006	3	6.51	251.3	297	8.76	115.3	14.17	1106			Cloudy	Light
77	3/28/2006	4	6.50	250	296	8.73	114.1	14.00	1107			Cloudy	Light
77	3/28/2006	5	6.50	247.3	297	8.68	113.7	13.97	1108			Cloudy	Light
77	3/28/2006	6	6.47	247	295	8.67	112.6	13.84	1108			Cloudy	Light
77	3/28/2006	7	6.47	246	295	8.65	112	13.77	1109			Cloudy	Light
77	3/28/2006	8	6.46	246	295	8.64	111.9	13.75	1110		42	Cloudy	Light
77	3/28/2006	9	6.45	245.9	295	8.64	111.6	13.72	1110			Cloudy	Light
77	3/28/2006	10	6.45	245	295	8.63	111.2	13.68	1111			Cloudy	Light
77	3/28/2006	11	6.45	245	295	8.63	110.8	13.63	1111			Cloudy	Light
77	3/28/2006	12	6.45	244	294	8.62	111.0	13.66	1113			Cloudy	Light
77	3/28/2006	13	6.46	244	294	8.62	111.0	13.68	1113			Cloudy	Light

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
22	3/28/2006	0.049	6.01	271.5	273	8.46	114	14.18	1147	36		Cloudy	Light
22	3/28/2006	1	5.98	269	272	8.21	111.7	13.91	1148			Cloudy	Light
22	3/28/2006	2	5.97	266	271	8.09	111.5	13.87	1148			Cloudy	Light
22	3/28/2006	3	5.96	265.5	270	7.98	111.3	13.86	1149			Cloudy	Light
22	3/28/2006	4	5.94	264.4	270	7.74	111.0	13.83	1149			Cloudy	Light
22	3/28/2006	5	5.94	263.3	269	7.53	110.7	13.79	1150			Cloudy	Light
22	3/28/2006	6	5.93	263	269	7.48	110.5	13.77	1150			Cloudy	Light
22	3/28/2006	7	5.92	262	268	7.45	110.3	13.74	1151			Cloudy	Light
22	3/28/2006	8	5.91	262	268	7.46	110.0	13.72	1152			Cloudy	Light
22	3/28/2006	9	5.90	261	267	7.42	109.8	13.69	1152			Cloudy	Light
22	3/28/2006	10	5.89	260	267	7.40	109.5	13.65	1153			Cloudy	Light
22	3/28/2006	11	5.90	259.9	266	7.38	109.3	13.64	1153			Cloudy	Light
22	3/28/2006	12	5.90	259	266	7.36	109.3	13.63	1154			Cloudy	Light
22	3/28/2006	13	5.90	258	265	7.49	109.4	13.64	1155			Cloudy	Light
33	3/28/2006	0.088	6.01	287.5	266	8.71	112.8	13.98	1220	36		Cloudy	Light
33	3/28/2006	1	6.02	283.0	264	8.51	111.1	13.81	1221			Cloudy	Light
33	3/28/2006	2	6.02	282	264	8.46	110.7	13.77	1221			Cloudy	Light
33	3/28/2006	3	6.03	280.6	264	8.43	110.4	13.71	1222			Cloudy	Light
33	3/28/2006	4	6.03	279.6	264	8.39	109.9	13.67	1222			Cloudy	Light
33	3/28/2006	5	5.98	277	264	8.36	109	13.56	1223			Cloudy	Light
33	3/28/2006	6	5.95	276	263	8.32	108.5	13.52	1223			Cloudy	Light
33	3/28/2006	7	5.94	275.5	262	8.32	108.6	13.53	1224			Cloudy	Light
33	3/28/2006	8	5.94	275.5	262	8.31	108.5	13.52	1223			Cloudy	Light
33	3/28/2006	9	5.95	274.5	262	8.31	108.3	13.49	1225			Cloudy	Light
33	3/28/2006	10	5.94	274.1	262	8.30	108.2	13.48	1226			Cloudy	Light
33	3/28/2006	11	5.94	273.4	262	8.30	108.2	13.49	1227			Cloudy	Light
33	3/28/2006	12	5.93	273	262	8.30	108.4	13.50	1228			Cloudy	Light
1	3/28/2006	0.75	6.31	353	212	7.98	103	12.6	1019			Cloudy	6-8 mph
12	3/28/2006	0.79	8.24	284	219	8.11	104	12.2	1051			Cloudy	5-6 mph
11	3/28/2006	0.28	8.01	356	410	7.63	91.6	10.7	1135			Cloudy	2-4 mph

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
9	3/28/2006	0.35	8.05	360	440	7.47	92	10.7	1213			Cloudy	4-5 mph
8	3/28/2006	0.16	8.38	356	378	8.06	110	12.8	1245			Cloudy	2-3 mph
5	3/28/2006	0.38	8.60	375	367	7.52	92	10.7	1321			Cloudy	0 mph
66	4/13/2006	0.17	13.65	405	263	8.21	110.5	11.39	1000	12	78	Clear	Light
66	4/13/2006	1	13.67	402	263	8.27	110.5	11.38	1002				
66	4/13/2006	2	13.59	402	263	8.29	110.2	11.36	1002				
66	4/13/2006	3	13.27	401	255	8.32	108.5	11.28	1003				
66	4/13/2006	4	13.08	398	250.5	8.48	111.2	11.62	1004				
66	4/13/2006	5	12.69	405	256	8.22	194.0	11.01	1005				
66	4/13/2006	6	12.14	406	253	8.20	102.3	10.88	1006				
66	4/13/2006	7	11.90	406	250.5	8.22	101.4	10.87	1007				
66	4/13/2006	8	11.37	409	244	8.12	96.4	10.45	1008				
66	4/13/2006	9	10.07	414	237	8.00	89.2	9.97	1008				
66	4/13/2006	10	9.76	417	236.9	7.91	85.4	9.62	1009				
66	4/13/2006	11	10.93	419	237	7.87	83.3	9.41	1011				
66	4/13/2006	12	9.62	420	236	7.88	82.7	9.35	1012				
66	4/13/2006	13	9.50	422	235	7.87	81.9	9.29	1014				
66	4/13/2006	14	9.40	424	236	7.84	78.3	8.90	1015				
66	4/13/2006	15	9.38	424	236.8	7.76	77.4	8.76	1016				
77	4/13/2006	0.53	14.46	387	259	8.70	119.0	12.06	1039	18			
77	4/13/2006	1	14.22	386	258	8.70	117.3	11.94	1040				
77	4/13/2006	2	13.78	386	256	8.69	114.3	11.72	1041				
77	4/13/2006	3	13.25	387	252	8.66	111.2	11.58	1042				
77	4/13/2006	4	11.65	393	239	8.51	104.5	11.27	1043				
77	4/13/2006	5	11.23	395	238.5	8.47	102.4	11.15	1043				
77	4/13/2006	6	11.18	396	238	8.47	101.7	11.09	1044				
77	4/13/2006	7	11.02	397	236	8.42	100.5	10.99	1045				
77	4/13/2006	8	10.40	401	234	8.32	97.7	10.84	1046				
77	4/13/2006	9	10.17	404	233	8.25	95.7	10.16	1047				
77	4/13/2006	10	9.62	412	234	8.04	86.3	9.76	1048				

Site	Date	Depth (m)	H2OTemp (^{o}C)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^{o}F)	Weather	Wind
77	4/13/2006	11	9.52	413	234	8.02	85.7	9.7	1049				
77	4/13/2006	12	9.55	414	233	8.01	85.1	9.63	1049				
77	4/13/2006	13	9.42	416	234.8	7.89	80.0	9.09	1050				
77	4/13/2006	14	9.43	417	235	7.87	77.8	8.86	1051				
77	4/13/2006	15	9.33	417	235	7.87	77.6	8.87	1051				
									1206				
22	4/13/2006	0.53	12.73	418	217	8.58	120.4	12.65	1026				
22	4/13/2006	1	12.73	403	217	8.64	119.9	12.62	1207				
22	4/13/2006	2	12.71	404	217	8.62	120.5	12.68	1207				
22	4/13/2006	3	12.71	405	217	8.62	120.1	12.63					
22	4/13/2006	4	12.67	401	217	8.71	120.1	12.64					
22	4/13/2006	5	12.59	392	217	8.76	119.5	12.63	1209				
22	4/13/2006	6	11.15	402	217	8.43	112.0	12.11	1210				
22	4/13/2006	7	10.98	408	217	8.42	107.0	11.70	1210				
22	4/13/2006	8	10.85	409	218	8.41	106.0	11.67	1210				
22	4/13/2006	9	10.83	409	218	8.43	106.0	11.68	1212				
22	4/13/2006	10	10.71	410	218	8.42	106.0	11.7	1212				
22	4/13/2006	11	10.37	412	218	8.36	105.0	11.67	1212				
22	4/13/2006	12	10.17	414	218	8.30	104.0	11.67	1212				
22	4/13/2006	13	9.11	420	217	8.09	99.0	11.32	1213				
22	4/13/2006	14	8.61	424	216	7.99	95.5	11.02	1213				
22	4/13/2006	15	8.18	427	216	7.91	92.5	10.82	1213				
22	4/13/2006	16	7.94	430	217	7.85	89.4	10.52	1214				
33	4/13/2006	0.21	12.74	413	219	8.43	117.8	12.42	1244	45			
33	4/13/2006	1	12.49	408	219	8.50	117.9	12.45	1245				
33	4/13/2006	2	12.41	404	218	8.55	117.6	12.45	1245				
33	4/13/2006	3	12.41	403	219	8.56	117.6	12.48	1246				
33	4/13/2006	4	12.32	403	219	8.56	117.2	12.45	1247				
33	4/13/2006	5	12.15	403	219	8.55	115.4	12.29	1247				
33	4/13/2006	6	11.67	406	218	8.46	112.3	12.13	1248				
33	4/13/2006	7	11.15	409	220	8.36	108.6	11.83	1249				
33	4/13/2006	8	9.85	416	220	8.16	104.0	11.68	1250				
33	4/13/2006	9	9.58	419	220	8.11	100.5	11.37	1251				
33	4/13/2006	10	9.49	420	220	8.07	99.9	11.33	1251				

Site	Date	Depth (m)	H2OTemp (^{o}C)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^{o}F)	Weather	Wind
33	4/13/2006	11	9.34	422	220	8.04	98.9	11.24	1252				
33	4/13/2006	12	8.86	425	219	7.98	96.3	11.14	1253				
33	4/13/2006	13	8.38	428	218	7.89	93.6	10.88	1254				
33	4/13/2006	14	8.26	430	218	7.84	91.0	10.64	1254				
33	4/13/2006	15	8.01	432	218	7.91	89.5	10.56	1255				
1	4/13/2006	0.425	13.03	-11.3	277	8.95	123.1	12.95	948			sunny/warm	0-5 mph
12	4/13/2006	0.571	17.05	-21.5	278	8.96	170.0	11.3	1015				
11	4/13/2006	0.284	17.53	-16.9	457	8.88	107.6	12.28	1054				
9	4/13/2006	0.147	17.45	-19.3	428	8.82	101.2	9.66	1130				
8	4/13/2006	0.234	8.66	-16.6	466	8.87	116.7	10.92	1150				
5	4/13/2006	0.237	19.59	-36.5	465	8.72	165	15.19	1219				
66	5/18/06	0.66	16.01	369	283	7.59	89.3	8.59	1026	36	67	Partly Cloudy	Breezy
66	5/18/06	1.87	15.93	368	283	7.74	89.2	8.58					
66	5/18/06	2.85	15.92	367	283	7.77	89.2	8.60					
66	5/18/06	3.86	15.9	369	283	7.76	88.6	8.56					
66	5/18/06	4.86	15.9	367	281	7.78	88.6	8.56					
66	5/18/06	5.82	15.8	369	280	7.80	87.9	8.49					
66	5/18/06	6.8	15.6	372	277	7.78	86.3	8.37					
66	5/18/06	7.8	15.5	371	277	7.77	85.4	8.30					
66	5/18/06	8.8	15.1	374	274	7.68	77.6	7.56					
66	5/18/06	9.8	13.6	390	271	7.27	23.4	2.38					
66	5/18/06	10.8	11.9	393	261	7.06	8.9	0.9					
77	5/18/06	0.3	15.4	382	274	7.6	88.1	8.60	1120	32	67	Mostly Cloudy	10-Aug
77	5/18/06	1.4	15.3	373	274	7.7	87.8	8.56					
77	5/18/06	2.4	15.3	372	274	7.7	87.5	8.55					
77	5/18/06	3.4	15.2	372	274	7.7	87.1	8.51					

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
77	5/18/06	4.4	15.2	373	273	7.7	87.0	8.50					
77	5/18/06	5.4	15.2	375	273	7.7	86.4	8.47					
77	5/18/06	6.4	14.8	376	269	7.7	79.6	7.86					
77	5/18/06	7.4	14.8	377	269	7.7	80.0	7.9					
77	5/18/06	8.4	14.7	380	268	7.6	74.2	7.3					
77	5/18/06	9.4	14.1	387	265	7.5	60.8	6.1					
77	5/18/06	10.4	13.8	389	265	7.5	50.9	5.1					
22	5/18/06	0.2	16.2	352	253	8.2	99.6	9.5	1240	76	65	Cloudy	18-20
22	5/18/06	1.2	16.1	344	253	8.3	99.5	9.5					
22	5/18/06	2.2	16.0	339	253	8.4	99.3	9.5					
22	5/18/06	3.2	16.0	342	253	8.2	98.4	9.4					
22	5/18/06	4.2	15.9	343	253	8.3	97.8	9.4					
22	5/18/06	5.2	16.0	348	253	8.3	98.5	9.4					
22	5/18/06	6.2	15.8	350	253	8.2	96.6	9.3					
22	5/18/06	7.2	*										
33	5/18/06	0.2	17.04	337	251	8.4	106.1	9.99	1310	82	65	Cloudy	25
33	5/18/06	1.2	17.01	332	251	8.5	105.2	9.96					
33	5/18/06	2.2	16.9	332	251	8.5	104	9.8					
33	5/18/06	3.2	16.9	328	251	8.5	103	9.7					
33	5/18/06	4.2	16.8	328	251	8.5	101	9.6					
33	5/18/06	5.2	16.7	327	251	8.5	99	9.4					
33	5/18/06	6.2	16.5	334	251	8.4	96.1	9.1					
33	5/18/06	7.2	16.4	334	252	8.4	95.3	9.0					
33	5/18/06	8.2	16.4	333	252	8.4	94.7	9.0					
33	5/18/06	9.2	16.2	336	252	8.3	92.8	8.8					
33	5/18/06	10.2	16.1	336	252	8.3	91.3	8.7					
1	5/18/06	0.168	16.66	-4.4	231	6.55	120	12.0			62		
12	5/18/06	0.208	18.88	-4.1	237	6.91	110.6	10.25					

Site	Date	Depth (m)	H2OTemp (^{o}C)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^{o}F)	Weather	Wind
11	5/18/06	0.021	17.76	-15.8	353	7.10	87.4	8.31					
9	5/18/06	0.085	17.06	-11.9	299	6.99	119.9	11.57					
8	5/18/06	0.106	17.52	-7.6	358	7.04	112	10.69					
5	5/18/06	0.035	19.18	-15.5	319	7.16	123.7	11.42			76		
66	6/22/06	0.77	25.79	390	181	7.45	115	9.12	1100	8	84	Partly Cloudy	1-2 m.p.h.
66	6/22/06	1.5	25.53	381	179	7.55	107	8.6					
66	6/22/06	2.5	25.50	381	180	7.56	106	8.58					
66	6/22/06	3.5	25.48	380	180	7.59	106	8.58					
66	6/22/06	4.5	25.48	380	181	7.58	106	8.57					
66	6/22/06	5.5	23.90	380	199	7.42	88.7	7.34					
66	6/22/06	6.5	22.21	394	180	7.25	73.4	6.21					
66	6/22/06	7.5	21.02	399	155.7	7.13	60.6	5.30					
66	6/22/06	8.5	19.69	359	135.1	7.02	49.1	4.42					
66	6/22/06	9.5	19.30	300	145	7.01	46.2	4.18					
66	6/22/06	10.5	19.28	246	144	6.98	46.3	4.19					
77	6/22/06	0.5	26.6	335	222	8.03	116.5	9.23	1145	36	85	Mostly Cloudy	0-1 m.p.h.
77	6/22/06	1.5	25.7	329	227	8.19	108	8.67					
77	6/22/06	2.5	25.6	333	226	8.08	106	8.59					
77	6/22/06	3.5	25.5	336	226	8.11	107	8.60					
77	6/22/06	4.5	25.2	343	223	7.96	103	8.35					
77	6/22/06	5.5	25.0	348	222	7.91	101	8.21					
77	6/22/06	6.5	23.4	359	207	7.57	84	7.01					
77	6/22/06	7.5	21.4	366	174	7.39	64	5.57					
77	6/22/06	8.5	20.0	337	155	7.21	52	4.65					
77	6/22/06	9.5	19.3	259	155	7.11	45	4.16					
77	6/22/06	10.5	17.8	222	204	7.06	35	3.27					
22	6/22/06	0.5	27.63	291	254	8.91	10.41	8.91	1245	69	82	Cloudy	3-4

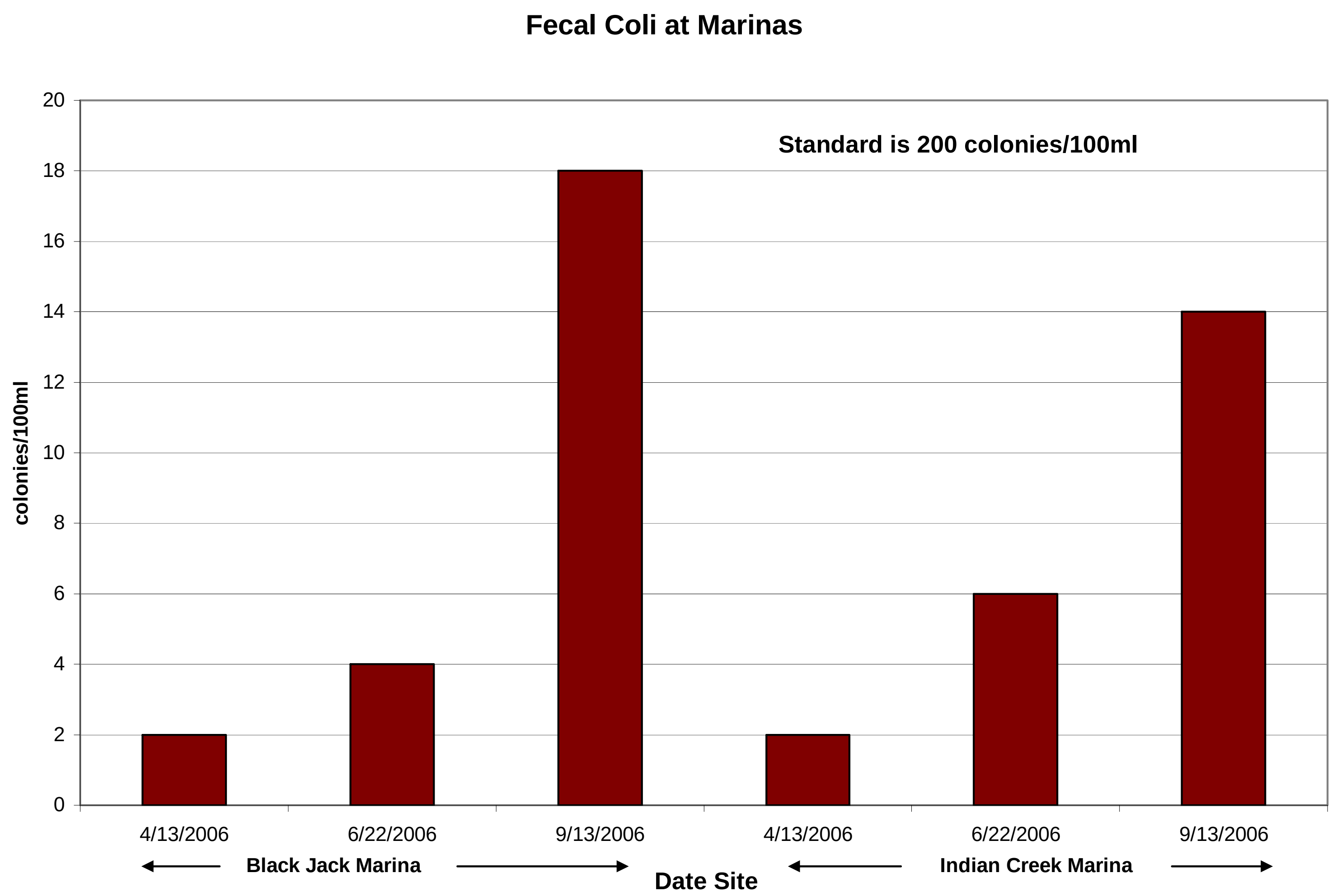
Site	Date	Depth (m)	H2OTemp (°C)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (°F)	Weather	Wind
22	6/22/06	1.5	26.91	288	251	8.95	9.8	8.95					
22	6/22/06	2.5	26.39	293	250	8.75	9.3	8.78					
22	6/22/06	3.5	26.21	299	250	8.64	9.2	8.64					
22	6/22/06	4.5	25.38	318	251	8.23	8.4	8.23					
22	6/22/06	5.5	25.1	320	251	7.99	8.3	7.99					
22	6/22/06	6.5	22.9	333	247	7.6	6.8	7.6					
22	6/22/06	7.5	22.3	339	246	7.5	5.9	7.5					
22	6/22/06	8.5	20.6	342	241	7.3	5.2	7.3					
22	6/22/06	9.5	16.5	345	263	7.3	3.2	7.3					
22	6/22/06	10.5	16.2	345	262	7.3	2.3	7.3					
33	6/22/06	0.5	27.2	301	256	9.07	129	10.1	1314		78	Full Clouds	5-6
33	6/22/06	1.5	27.3	295	256	9.1	128	9.1					
33	6/22/06	2.5	26.8	393	255	9.1	122	8.6					
33	6/22/06	3.5	26.5	295	256	9.0	119	8.4					
33	6/22/06	4.5	25.4	300	258	8.7	107	8.1					
33	6/22/06	5.5	24.8	321	259	8.2	99	8.0					
33	6/22/06	6.5	23.5	336	251	7.8	85	7.0					
33	6/22/06	7.5	22.1	345	232	7.6	69	5.9					
33	6/22/06	8.5	21.2	348	213	7.5	59	4.9					
33	6/22/06	9.5	19.3	350	212	7.4	45	4.1					
33	6/22/06	10.5	17.5	351	299	7.3	30	2.8					
1	6/22/06	0.412	25.17	67.4	246	8.16	94.9	7.82	1033		78	Partly Cloudy	light
12	6/22/06	0.423	26.08	-34	243	8.35	113.7	9.20	1112				
11	6/22/06	0.290	27.85	-20.7	266	7.83	96	7.52	1151				
9	6/22/06	0.225	26.43	-19.5	300	7.81	119.1	9.58	1227				
8	6/22/06	0.571	27.15	-21.5	315	7.91	117.3	9.32	1246				
5	6/22/06	0.383	28.32	-31.2	293	8.05	117	9.13	1312				

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
66	9/12/06	0.5	23.52	-3.2	203	7.48	77.4	6.5	1008		68	M. Sunny	Breezy
66	9/12/06	1.5	23.48	-9.8	205	7.40	71.0	6.04					
66	9/12/06	2.5	23.46	-12.3	205	7.58	69.5	5.91					
66	9/12/06	3.5	23.48	-14.5	203	7.30	60.5	5.08					
66	9/12/06	4.5	23.48	-15.8	203	7.27	63.8	5.41					
66	9/12/06	5.5	23.40	-20.0	204	7.24	52.0	4.61					
66	9/12/06	6.5	23.2	-21.0	207	7.23	36.6	3.14					
77	9/12/06	0.5	23.04	-11	207	7.46	72.2	6.18					
77	9/12/06	1.5	22.96	-13	207	7.44	69.5	5.87					
77	9/12/06	2.5	22.9	-15	207	7.41	68.1	5.84					
77	9/12/06	3.5	22.9	-16.7	207	7.38	66.4	5.69					
77	9/12/06	4.5	22.8	-18	207	7.36	64.1	5.51					
77	9/12/06	5.5	22.8	-18.6	208	7.35	61.1	5.26					
77	9/12/06	6.5	22.17	-26	216	7.30	30.0	2.64					
77	9/12/06	7.5	19.5	-32.2	237	7.5	3.9	0.36					
77	9/12/06	8.5	17.07	-33.6	251	7.62	3.6	0.33					
33	9/12/06	0.5	23.6	-29.8	209	7.43	88.4	7.49					
33	9/12/06	1.5	23.6	-28.8	209	7.43	87.4	7.4					
33	9/12/06	2.5	23.6		208	7.43	86.4	7.32					
33	9/12/06	3.5	23.6		209	7.43	86.6	7.26					
33	9/12/06	4.5	23.6		208	7.43	85.2	7.23					
33	9/12/06	5.5	23.6		209	7.42	86.4	7.23					
33	9/12/06	6.5	23.6		208	7.42	84.4	7.16					
33	9/12/06	7.5	23.5		209	7.42	84.9	7.2					
33	9/12/06	8.5	23.3		210	7.40	77.4	6.52					
33	9/12/06	9.5	22.1		214	7.35	44.2	3.63					
33	9/12/06	10.5	15.8		249	7.28	5.0	0.46					
22	9/12/06	0.5	23.36		207	7.49	86.6	7.28	1300				
22	9/12/06	1.5	23.37		208	7.47	80.3	6.32					
22	9/12/06	2.5	23.35		208	7.44	78.2	6.65					
22	9/12/06	3.5	23.33		208	7.43	78.6	6.74					

Site	Date	Depth (m)	H2OTemp (^oC)	Redox (mV)	Cond (uS/cm)	pH	D.0.%	D.O.(mg/L)	Time	Seechi (in.)	Air Temp (^oF)	Weather	Wind
22	9/12/06	4.5	23.3		207	7.42	81.0	6.9					
22	9/12/06	5.5	23.3		208	7.41	80.8	6.88					
22	9/12/06	6.5	23.3		208	7.40	80.2	6.84					
22	9/12/06	7.5	23.2		209	7.38	72.1	6.16					
22	9/12/06	8.5	20.8		218	7.28	44.9	3.58					
22	9/12/06	9.5	16.4		246	7.41	14.6	1.23					
1	9/12/06	0.675	21.93	2.0	217	7.54	69.2	6.07	1610		64	Breeezy Cloudy	
12	9/12/06	0.467	24.23	-5.3	224	7.11	67.1	5.63	1440				
11	9/12/06	0.988	22.72	5.2	270	6.97	69.4	5.99	1355		66	Breeezy Cloudy	
9	9/12/06	0.468	21.20	8.8	229	6.94	73.3	6.47	1245		64	Breeezy Cloudy	
8	9/12/06	0.766	20.97	8.2	135	7.10	64.7	5.55	1231		61	Breeezy Cloudy	
5	9/12/06	0.171	21.53	13	281	7.00	77.3	6.80	1201		60	Breeezy	

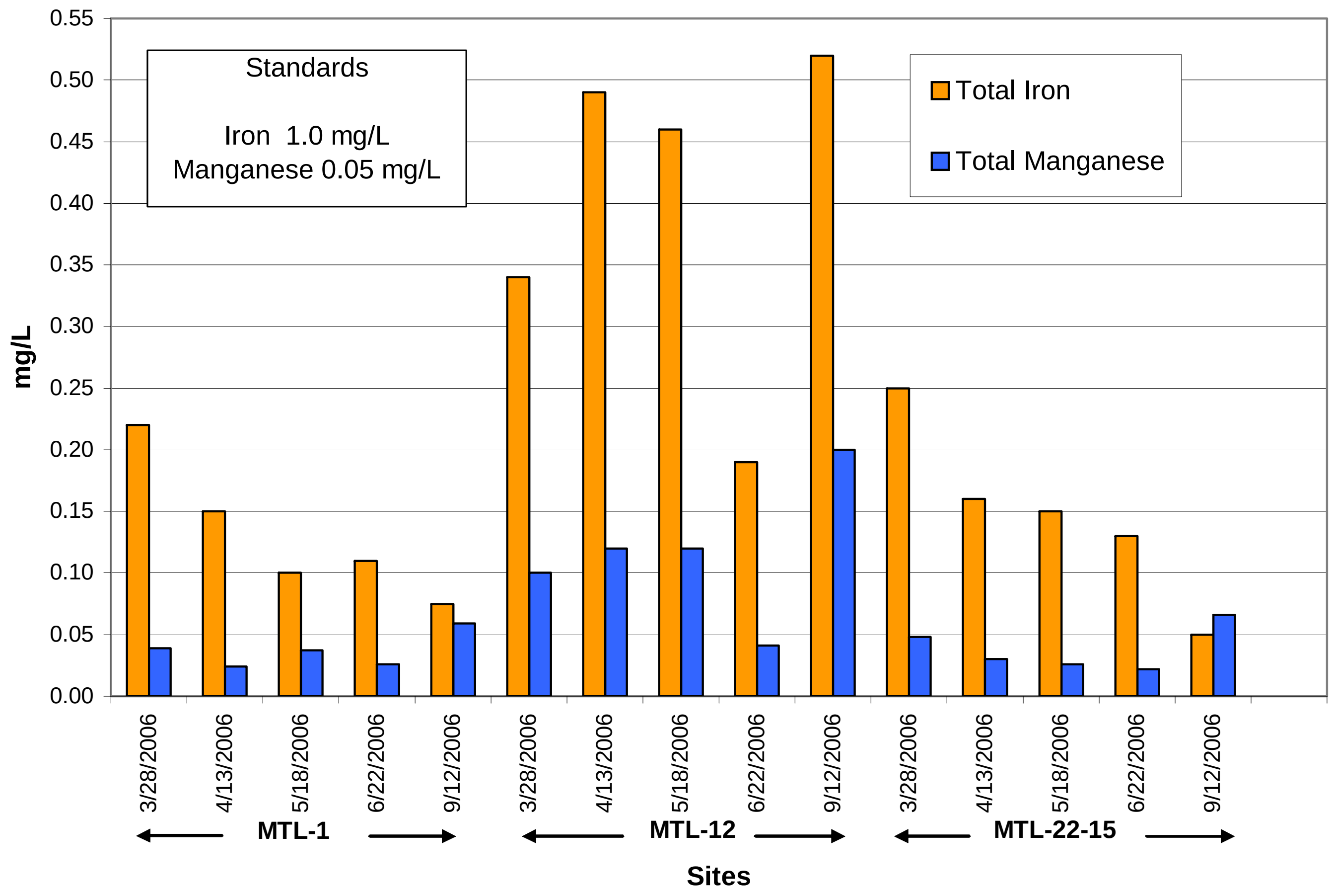
APPENDIX B

LAB DATA
GRAPHS



Fecal Coli at Marinas
Standard is 200 colonies/100ml
colonies/100ml
20
18
16
14
12
10
8
6
4
2
0
4/13/2006
6/22/2006
9/13/2006
4/13/2006
6/22/2006
9/13/2006
Black Jack Marina
Indian Creek Marina
Date Site

Metals


Standards
Iron 1.0 mg/L
Manganese 0.05 mg/L
Total Iron
Total Manganese
mg/L
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
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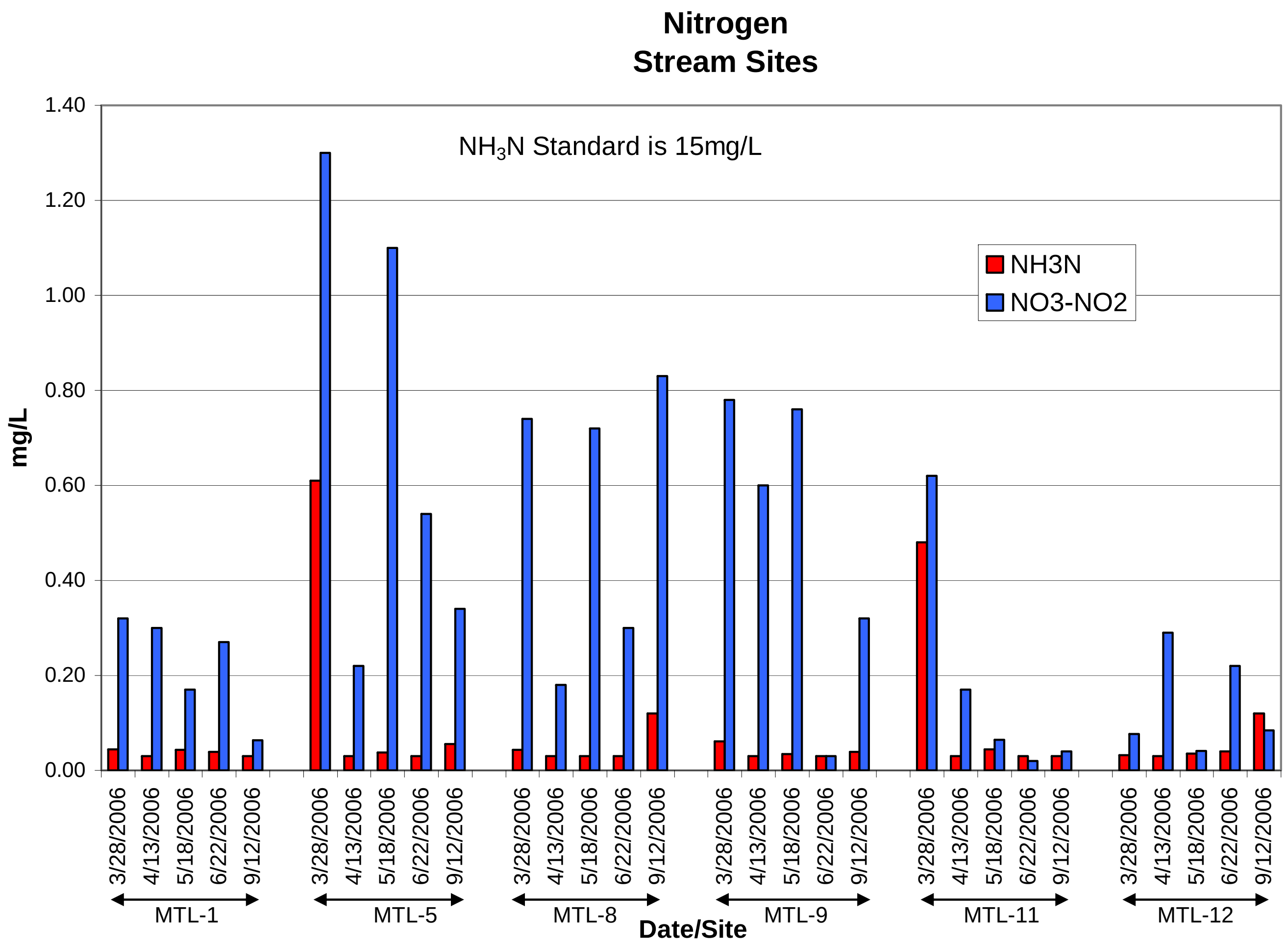
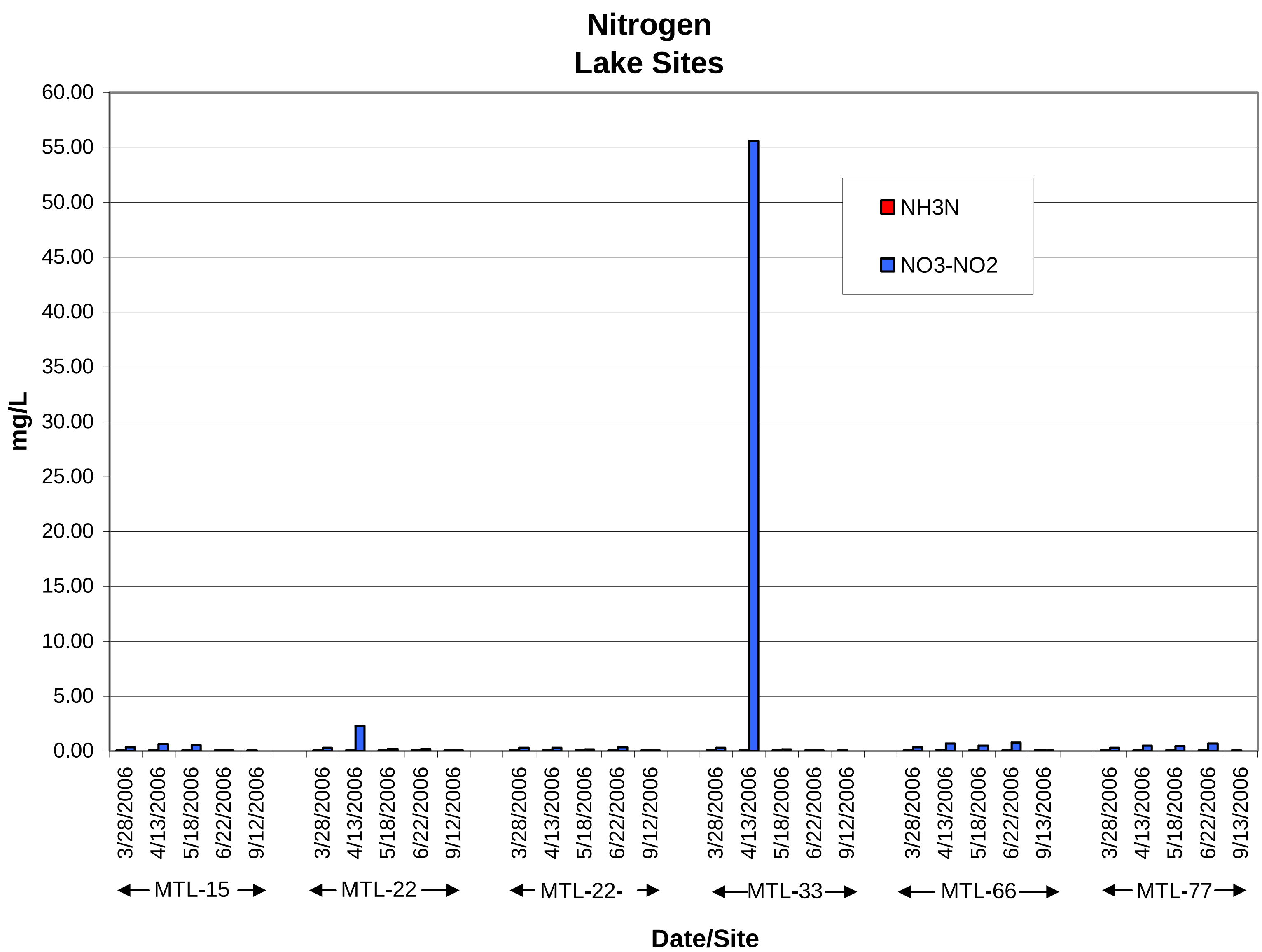
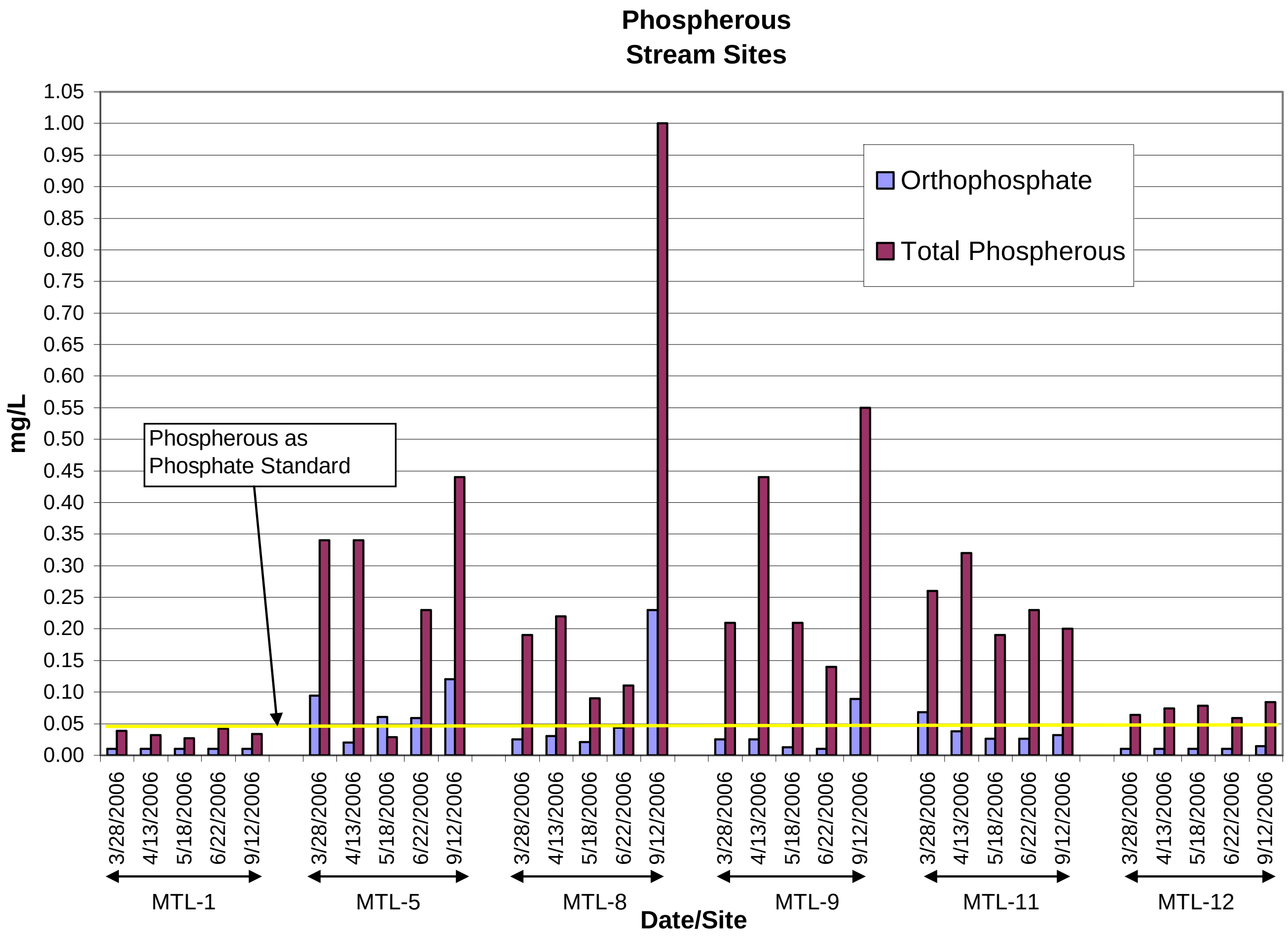
9/12/2006
MTL-1
MTL-12
MTL-22-15
Sites

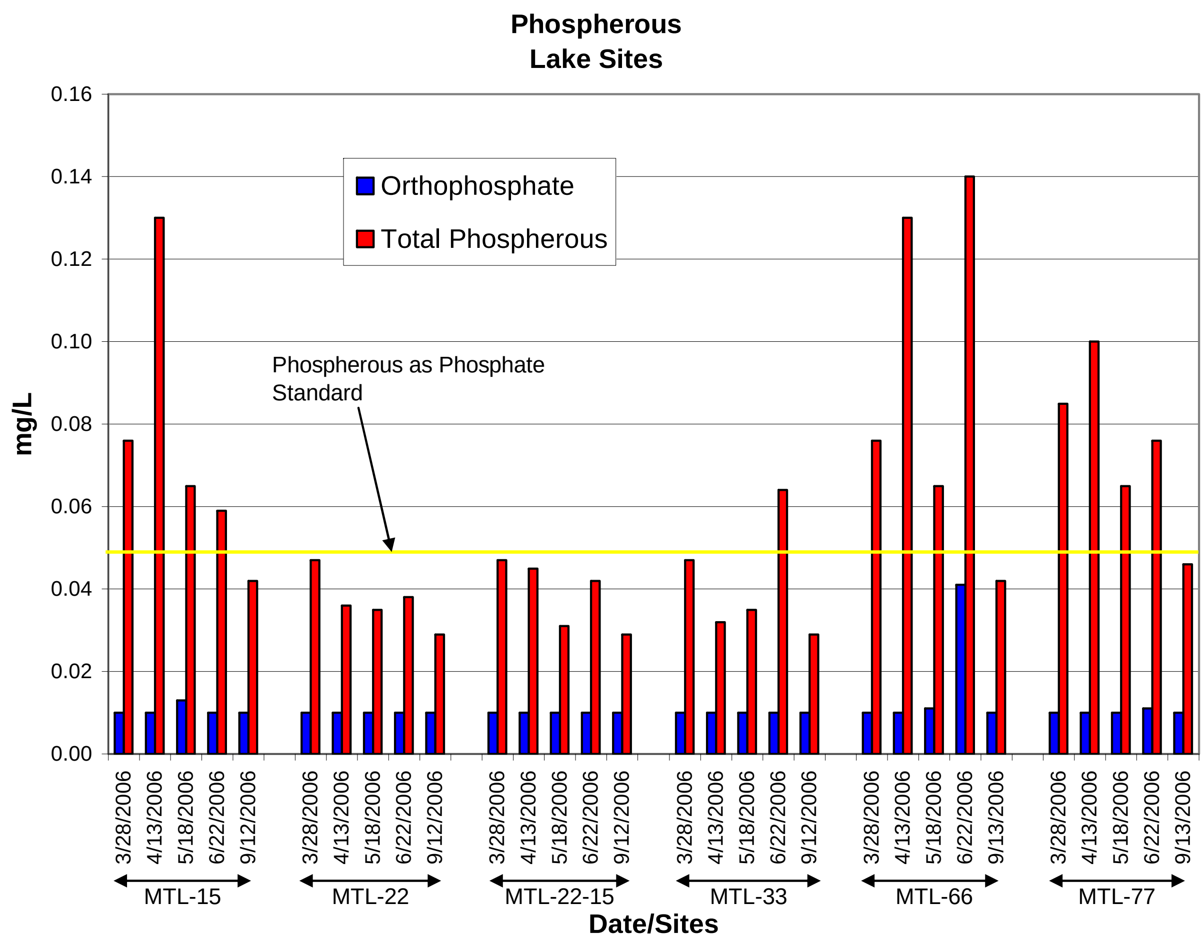


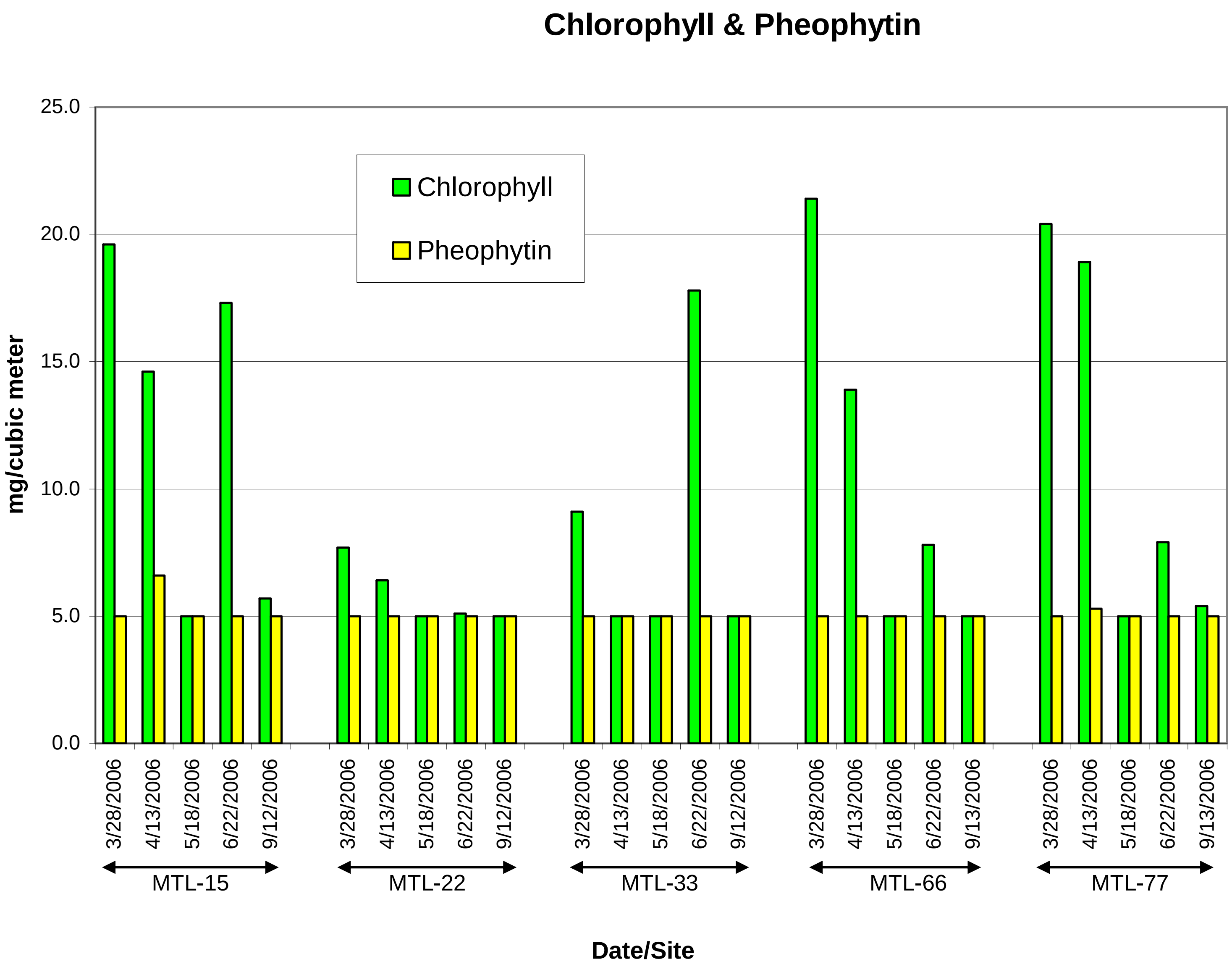
Nitrogen
Stream Sites
NH3N Standard is 15mg/L
NH3N
NO3-NO2
mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-1
MTL-5
MTL-8
MTL-9
MTL-11
MTL-12
Date/Site

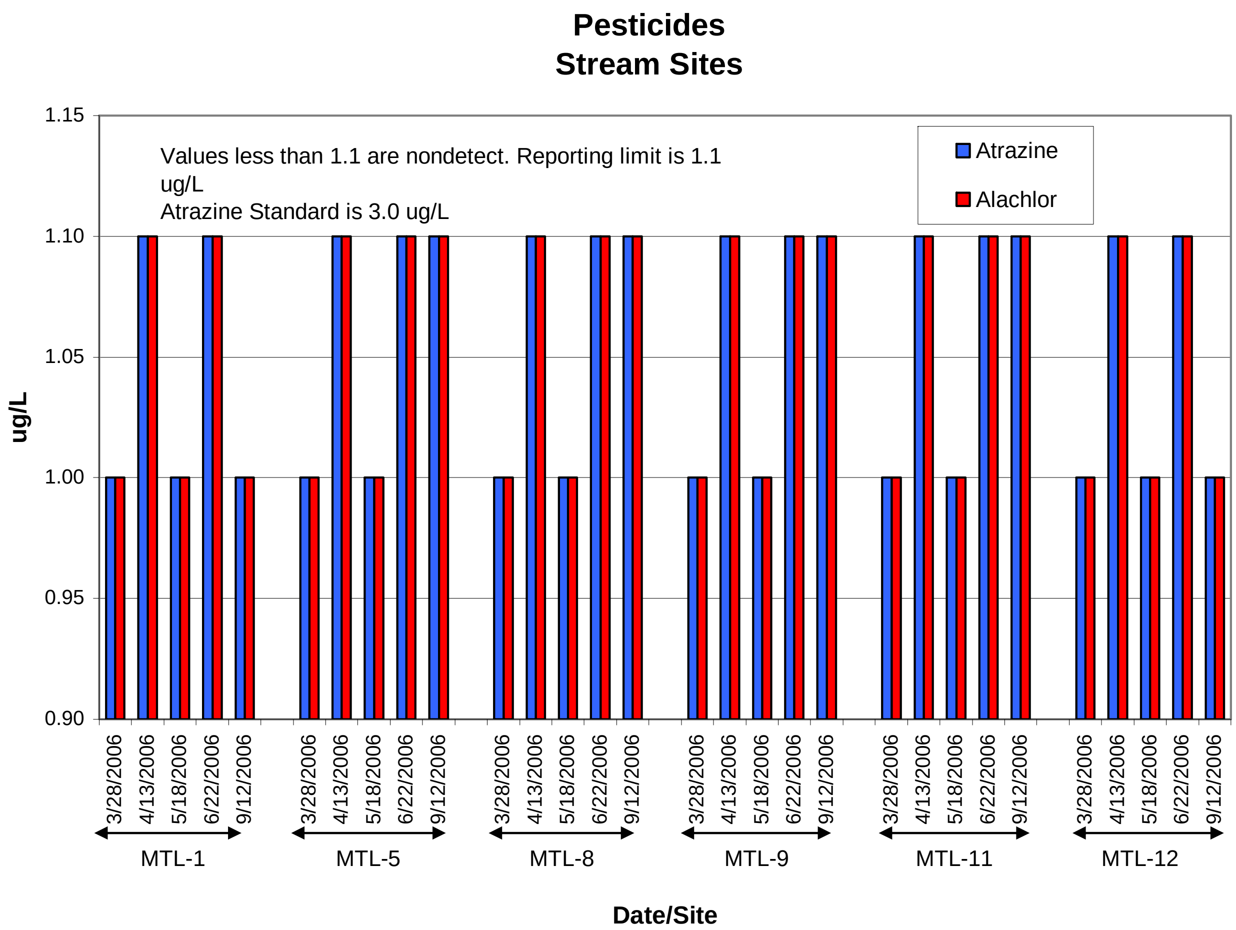


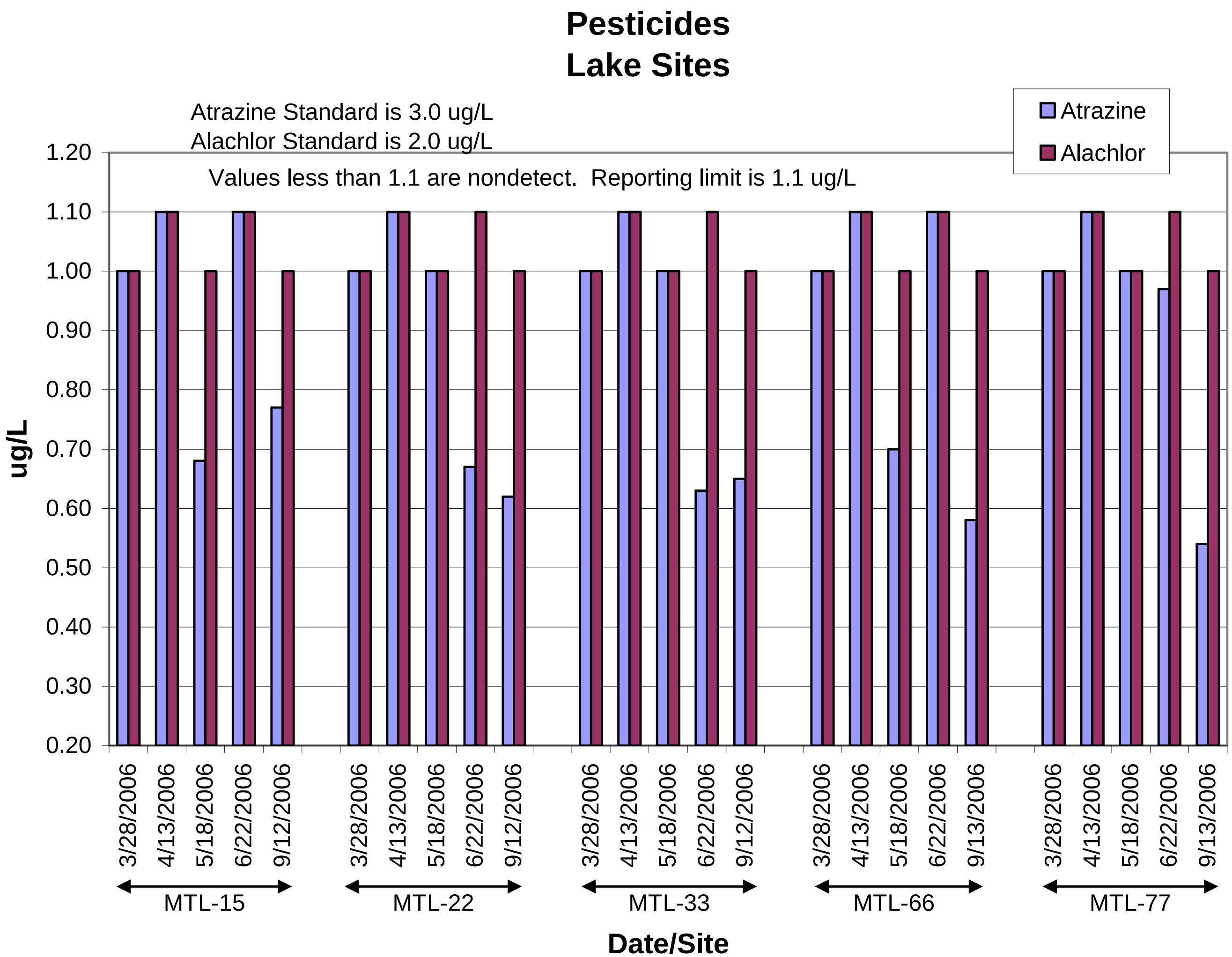
Nitrogen
Lake Sites
60.00
55.00
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
mg/L
NH3N
NO3-NO2
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/13/2006
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/13/2006
MTL-15
MTL-22
MTL-22-
MTL-33
MTL-66
MTL-77
Date/Site


Phospherous
Stream Sites
mg/L
Orthophosphate
Total Phospherous
Phospherous as
Phosphate Standard
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-1
MTL-5
MTL-8
MTL-9
MTL-11
MTL-12
Date/Site

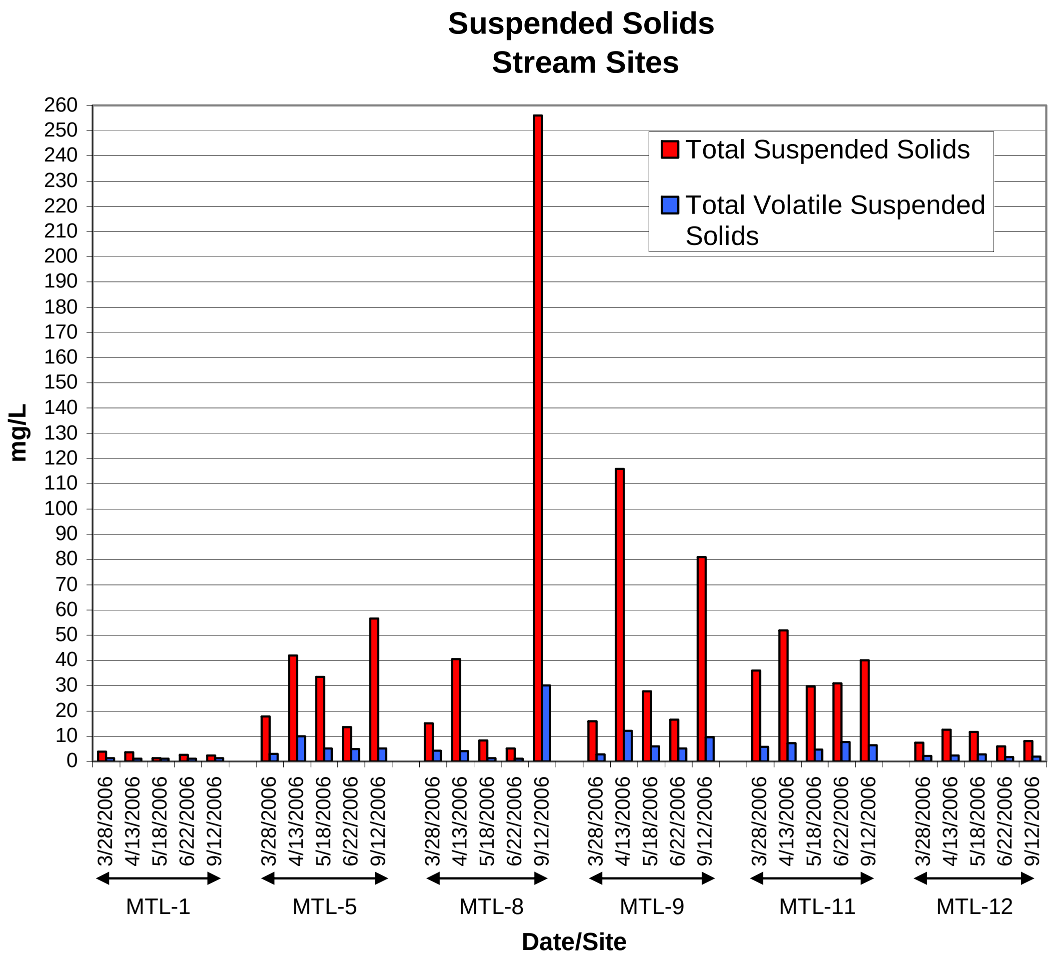

Phospherous
Lake Sites
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
mg/L
Orthophosphate
Total Phospherous
Phospherous as Phosphate
Standard
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
9/13/2006
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Sites

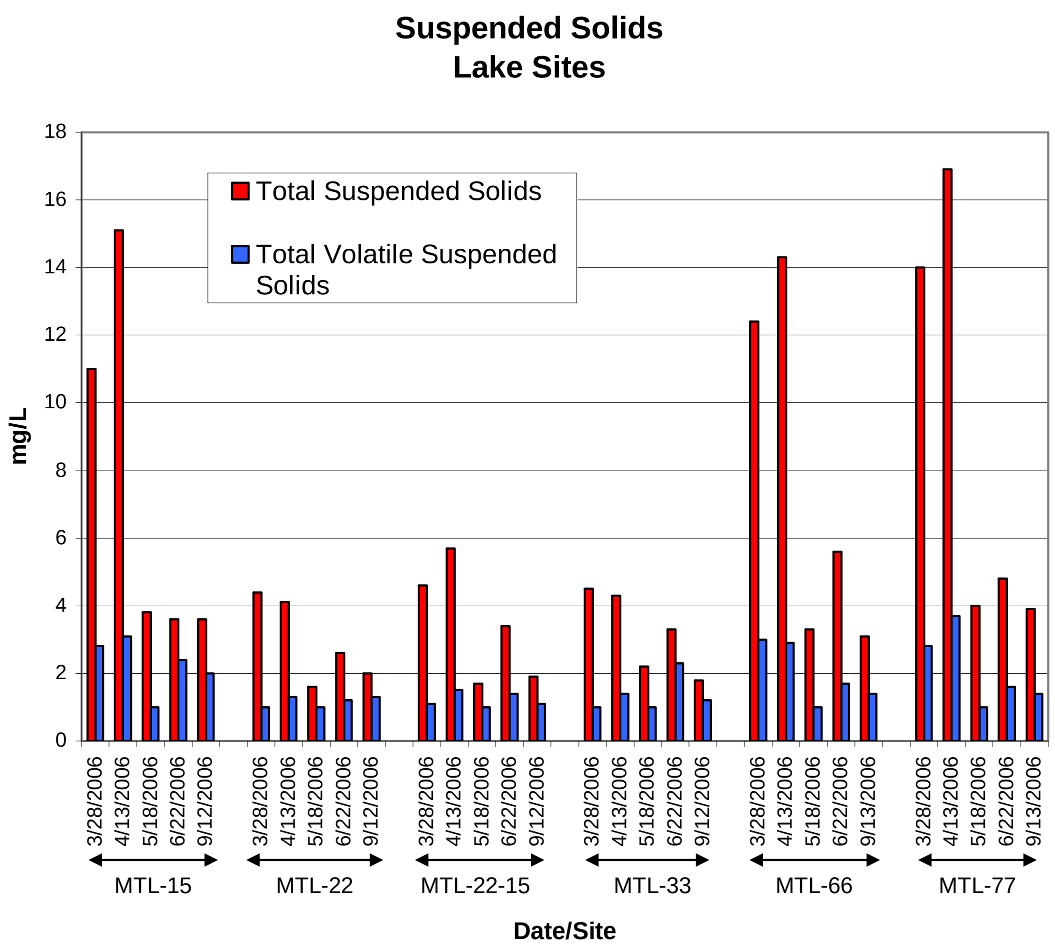

Chlorophyll & Pheophytin
mg/cubic meter
25.0
20.0
15.0
10.0
5.0
0.0
Chlorophyll
Pheophytin
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-15
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-22
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-33
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/13/2006
MTL-66
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/13/2006
MTL-77
Date/Site


Pesticides
Stream Sites
Values less than 1.1 are nondetect. Reporting limit is 1.1 ug/L
Atrazine Standard is 3.0 ug/L
Atrazine
Alachlor
ug/L
1.15
1.10
1.05
1.00
0.95
0.90
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-1
MTL-5
MTL-8
MTL-9
MTL-11
MTL-12
Date/Site

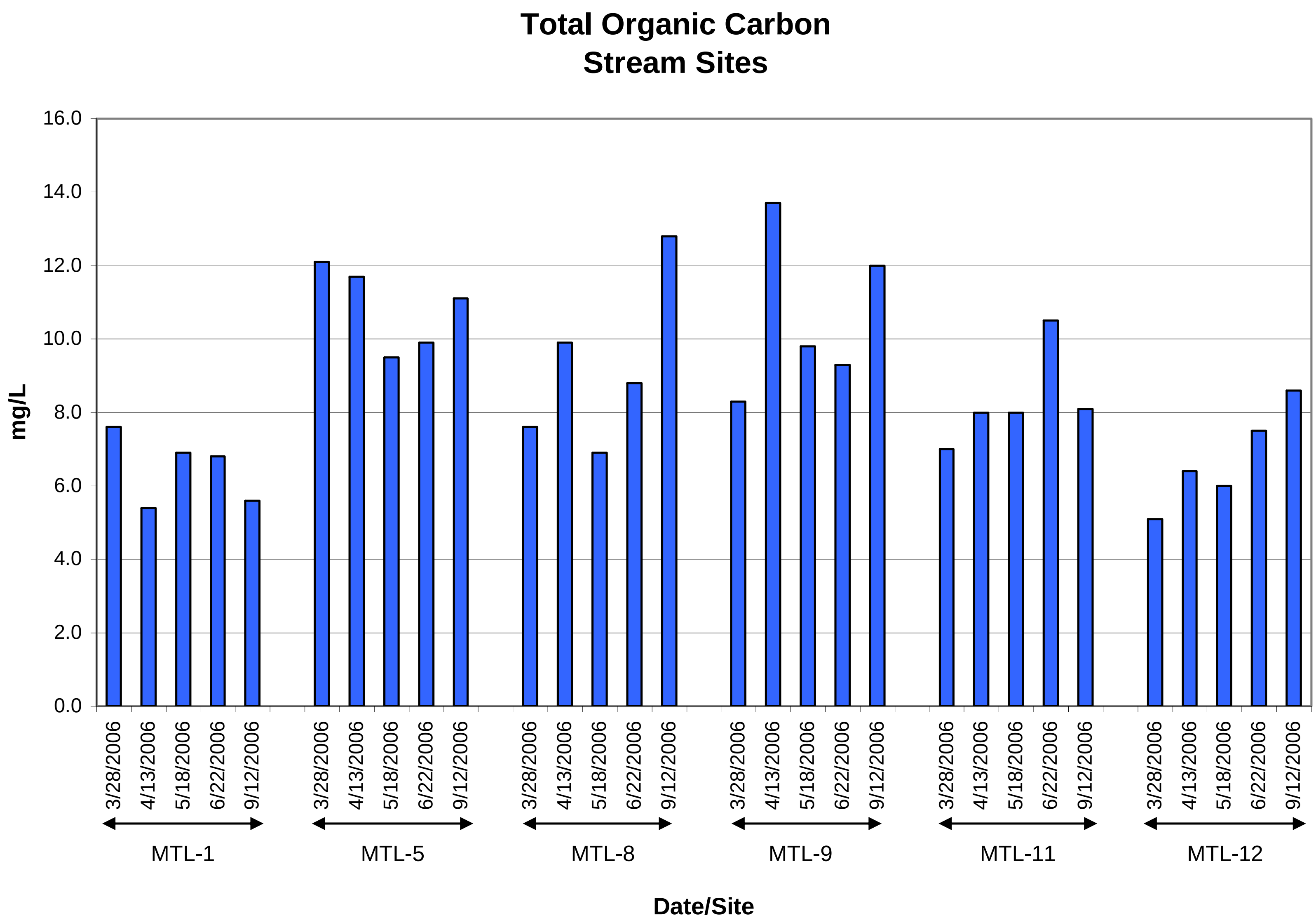


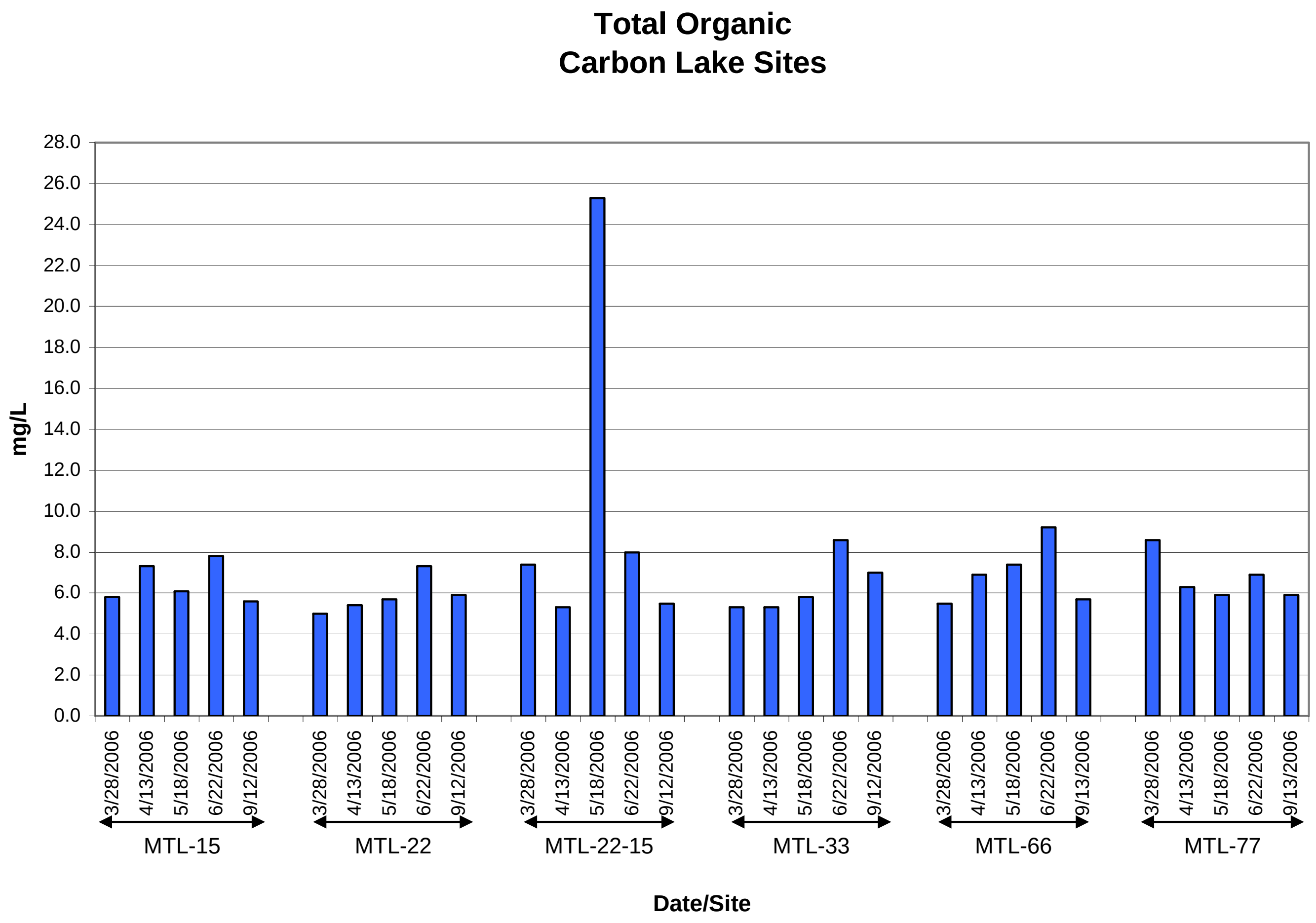
Pesticides
Lake Sites
Atrazine Standard is 3.0 ug/L
Alachlor Standard is 2.0 ug/L
Values less than 1.1 are nondetect. Reporting limit is 1.1 ug/L
Atrazine
Alachlor
ug/L
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-15
MTL-22
MTL-33
9/13/2006
MTL-66
MTL-77
Date/Site


Suspended Solids
Stream Sites
mg/L
Total Suspended Solids
Total Volatile Suspended Solids
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-1
MTL-5
MTL-8
MTL-9
MTL-11
MTL-12
Date/Site



Suspended Solids
Lake Sites
Total Suspended Solids
Total Volatile Suspended Solids
mg/L
0
2
4
6
8
10
12
14
16
18
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
9/13/2006
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

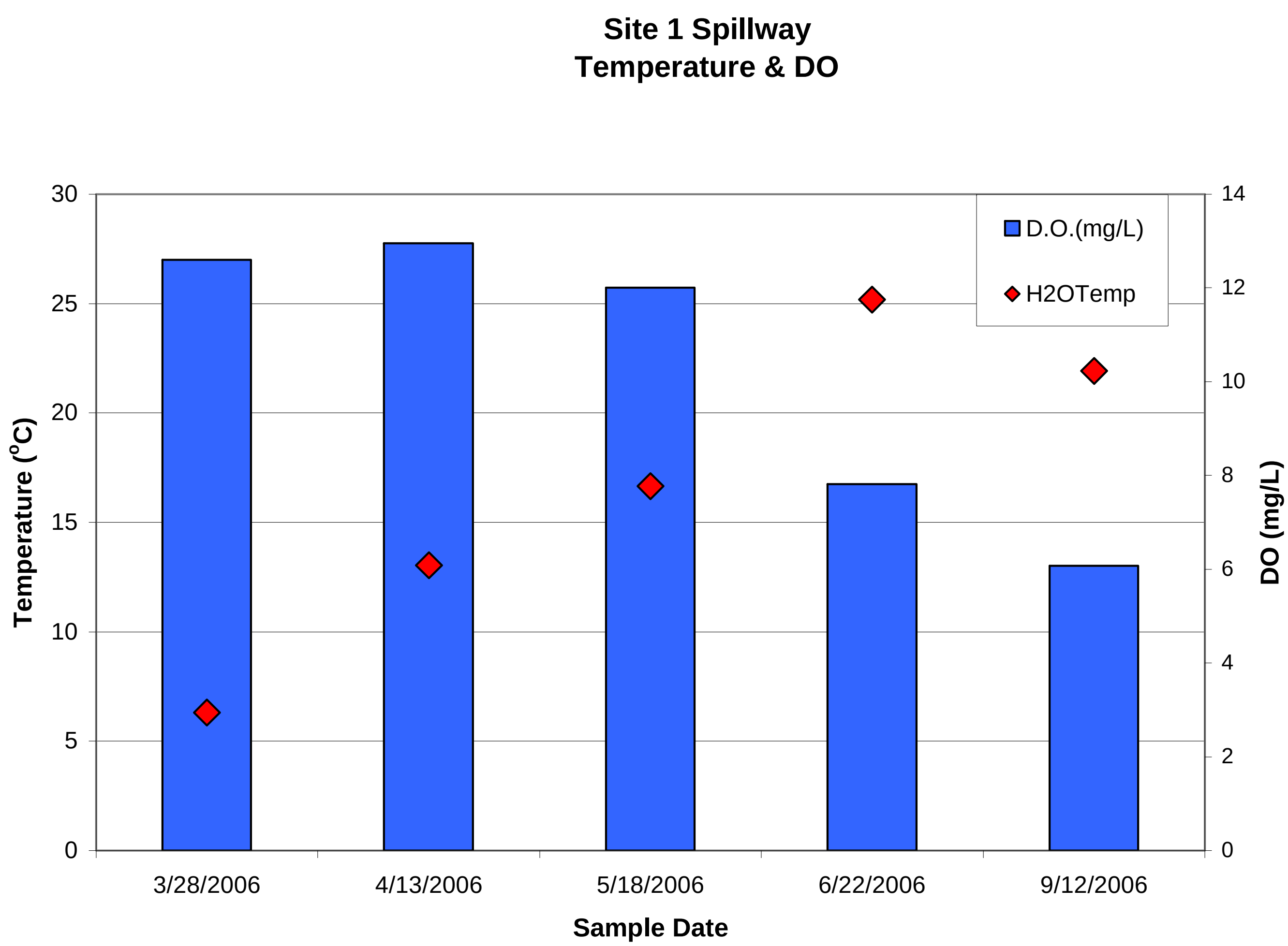

Total Organic Carbon
Stream Sites
mg/L
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
MTL-1
MTL-5
MTL-8
MTL-9
MTL-11
MTL-12
Date/Site



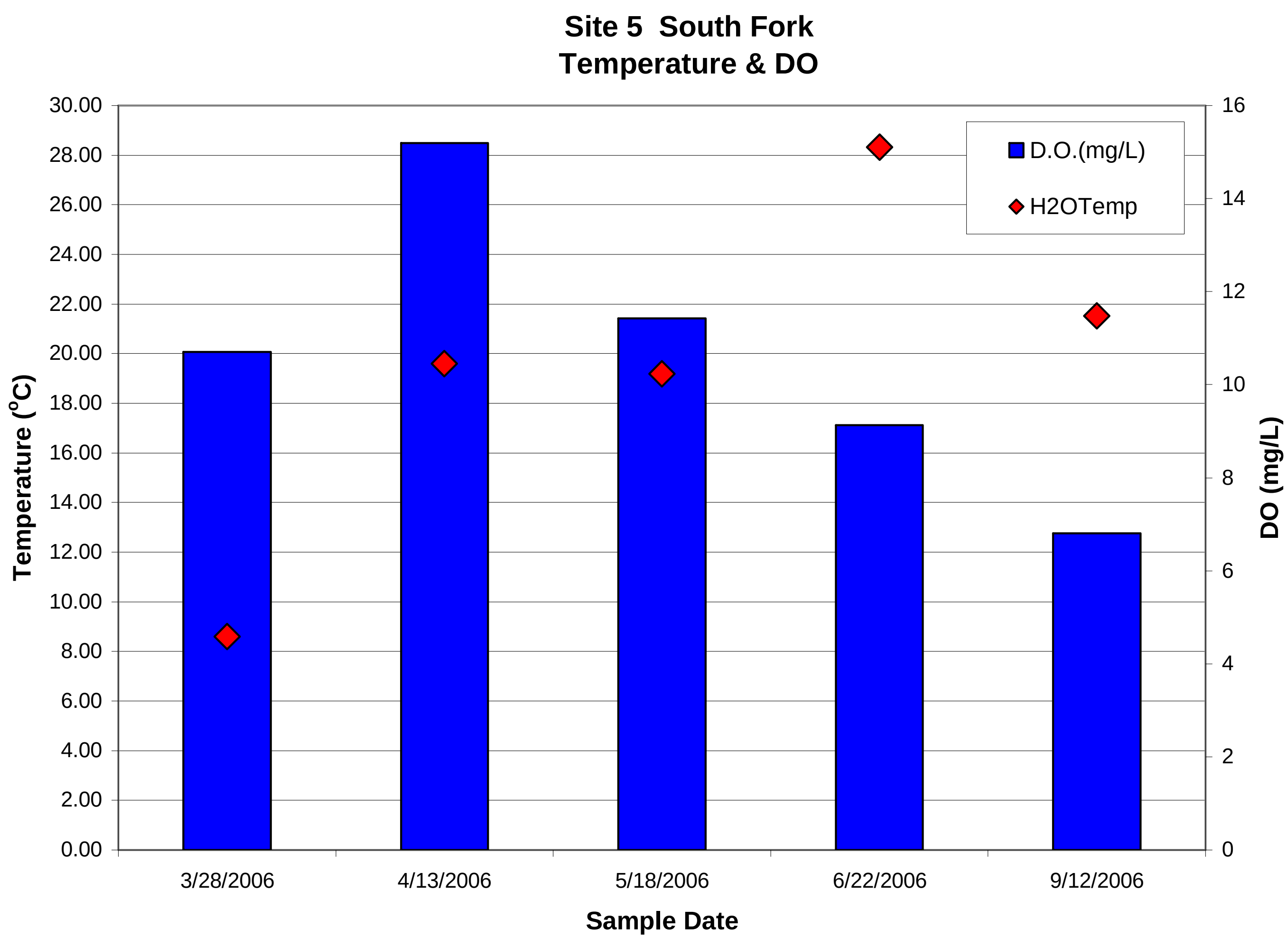
Total Organic
Carbon Lake Sites
mg/L
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
9/13/2006
MTL-15
MTL-22
MTL-22-15
MTL-33
MTL-66
MTL-77
Date/Site

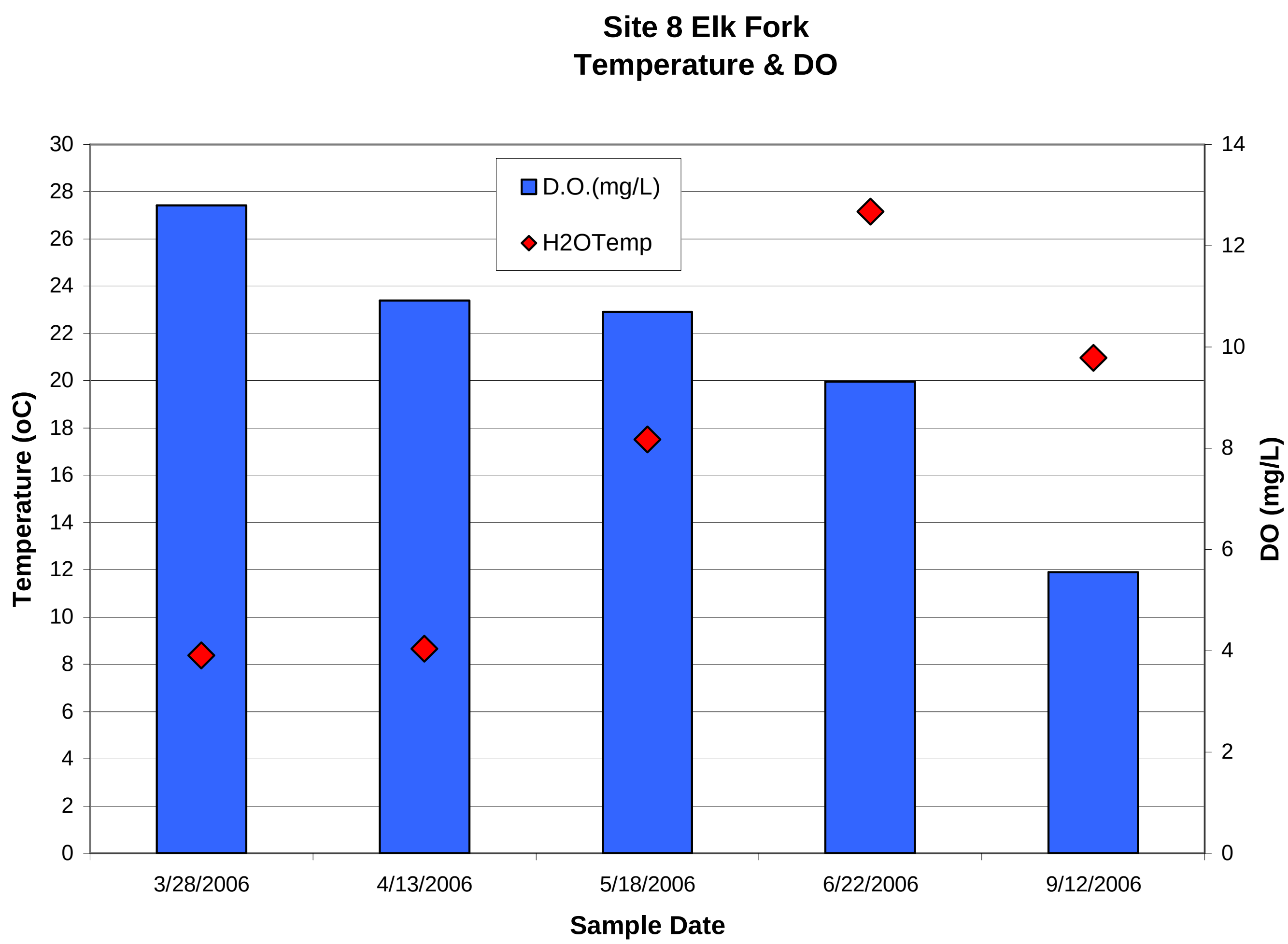
APPENDIX C

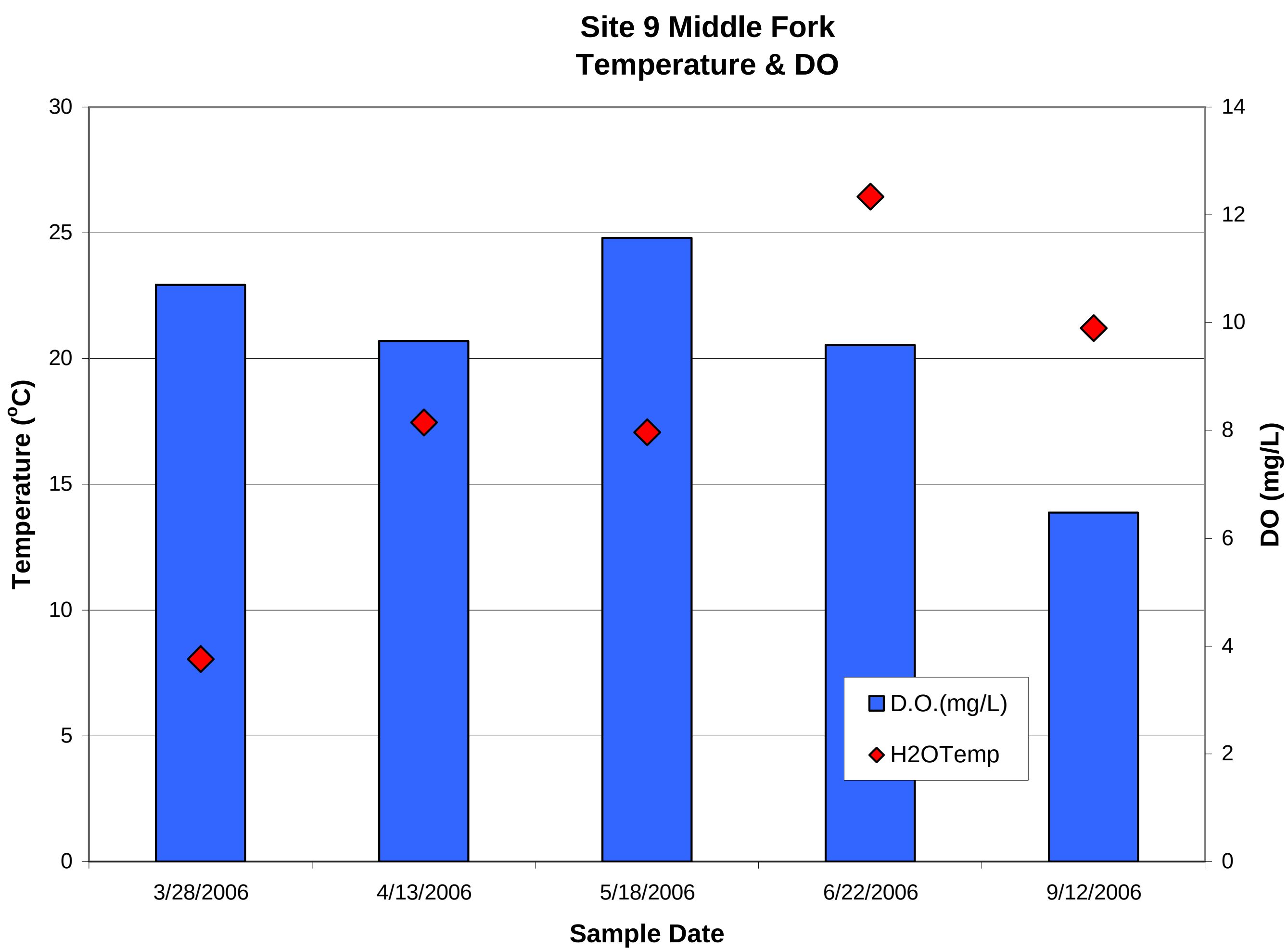
FIELD DATA
GRAPHS

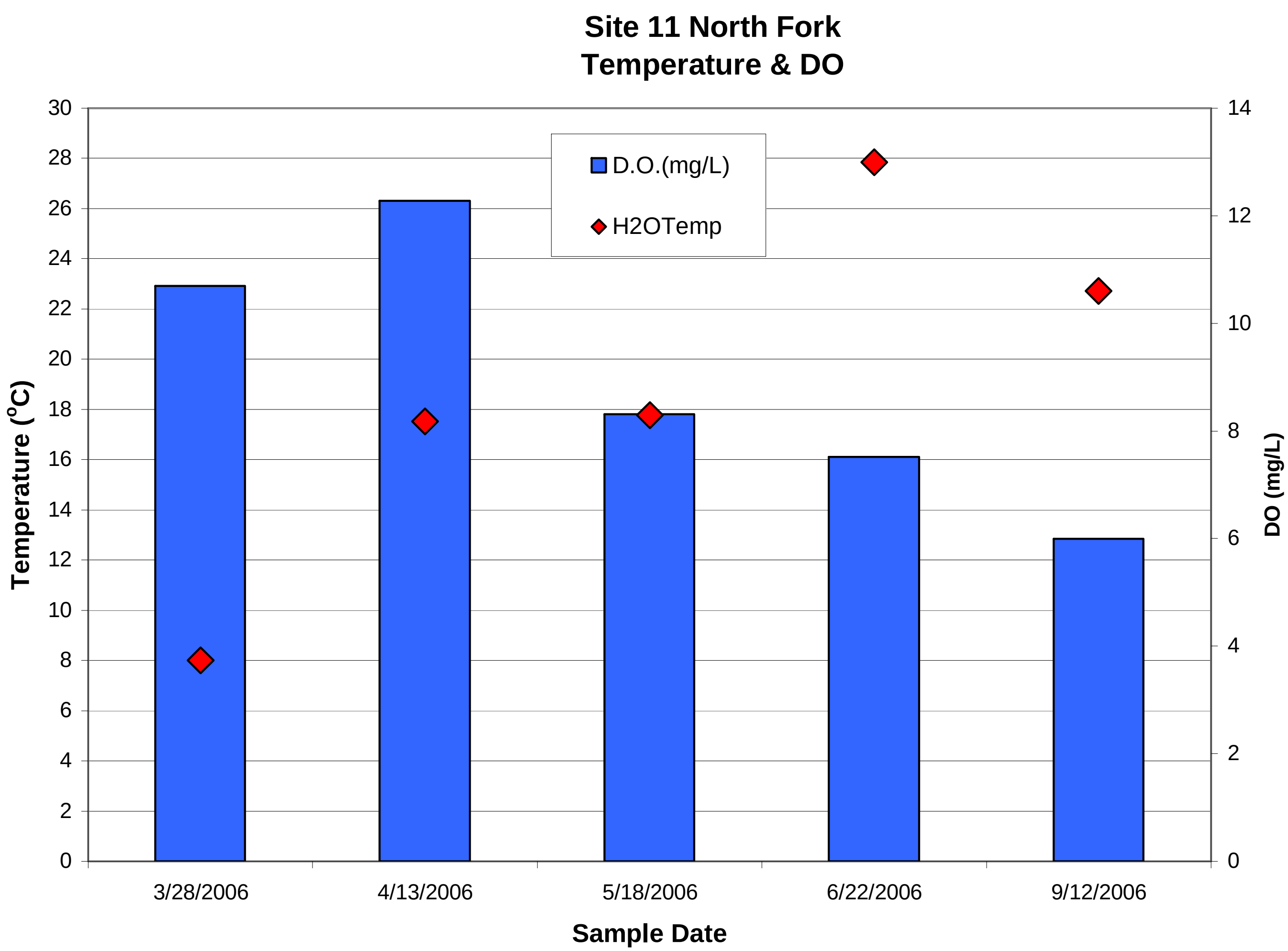


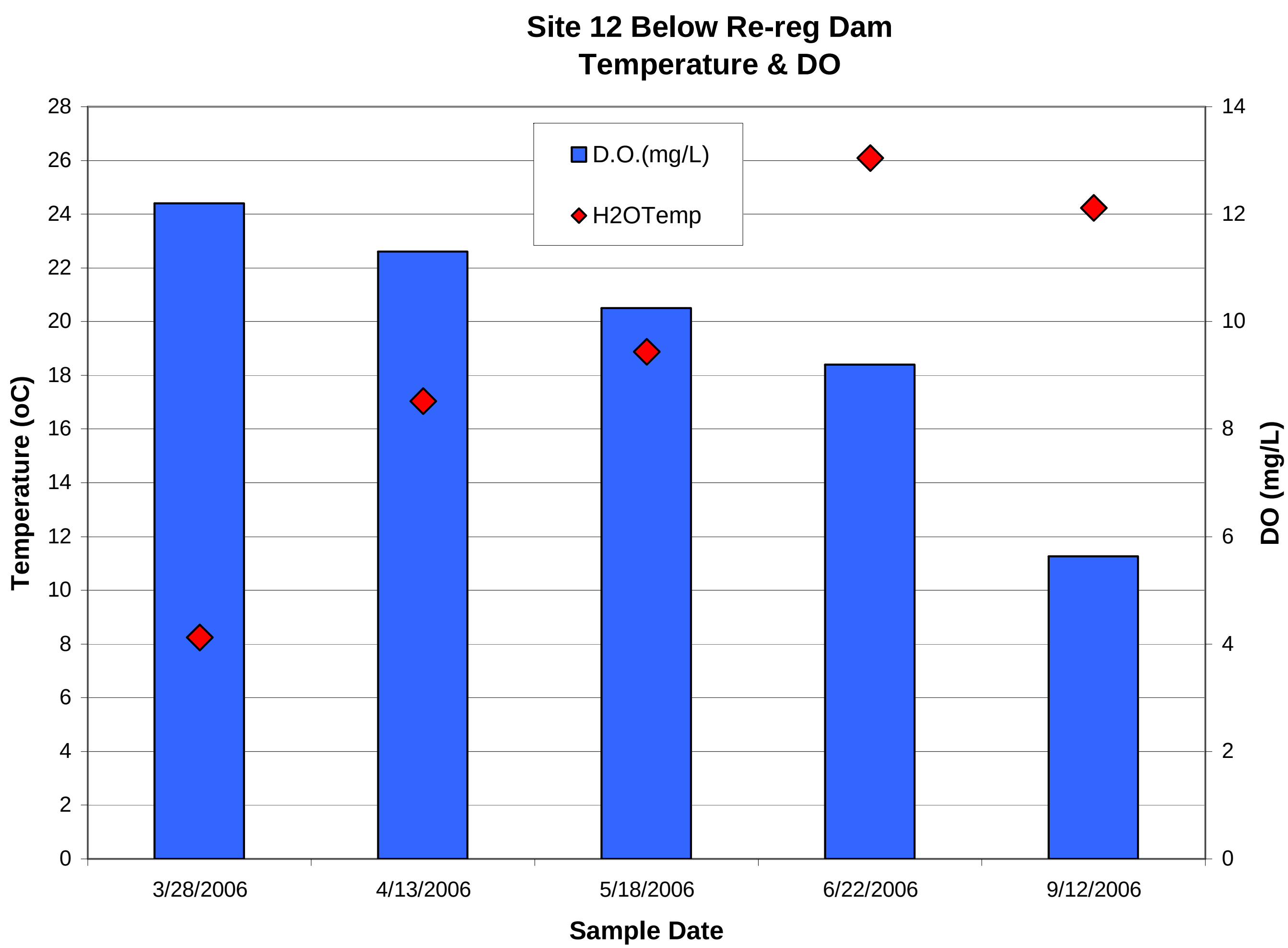
Site 1 Spillway
Temperature & DO
Temperature (°C)
DO (mg/L)
Sample Date
D.O.(mg/L)
H2OTemp
30
25
20
15
10
5
0
14
12
10
8
6
4
2
0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006

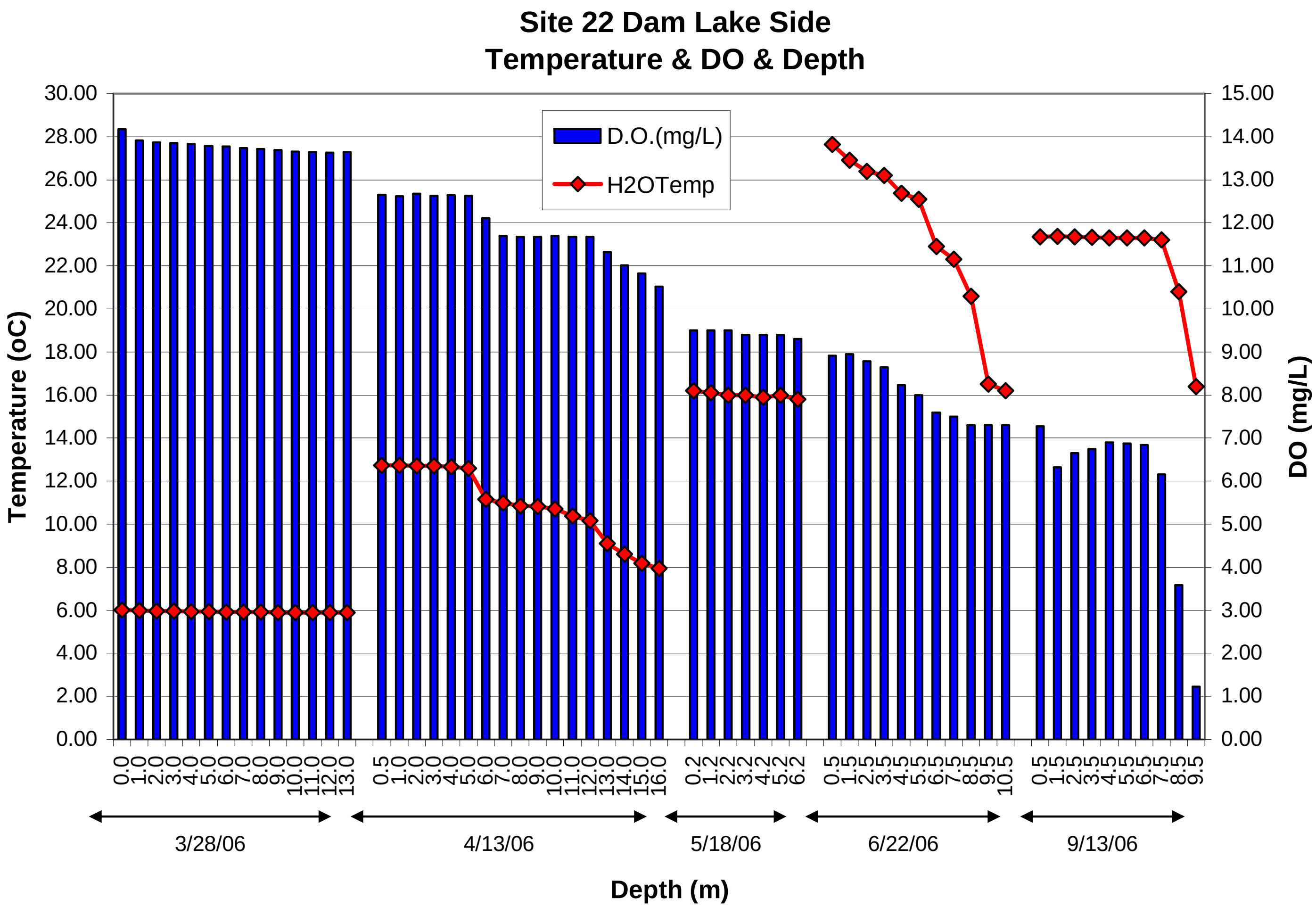

Site 5 South Fork
Temperature & DO
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Temperature (°C)
16
14
12
10
8
6
4
2
0
DO (mg/L)
D.O.(mg/L)
H2OTemp
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

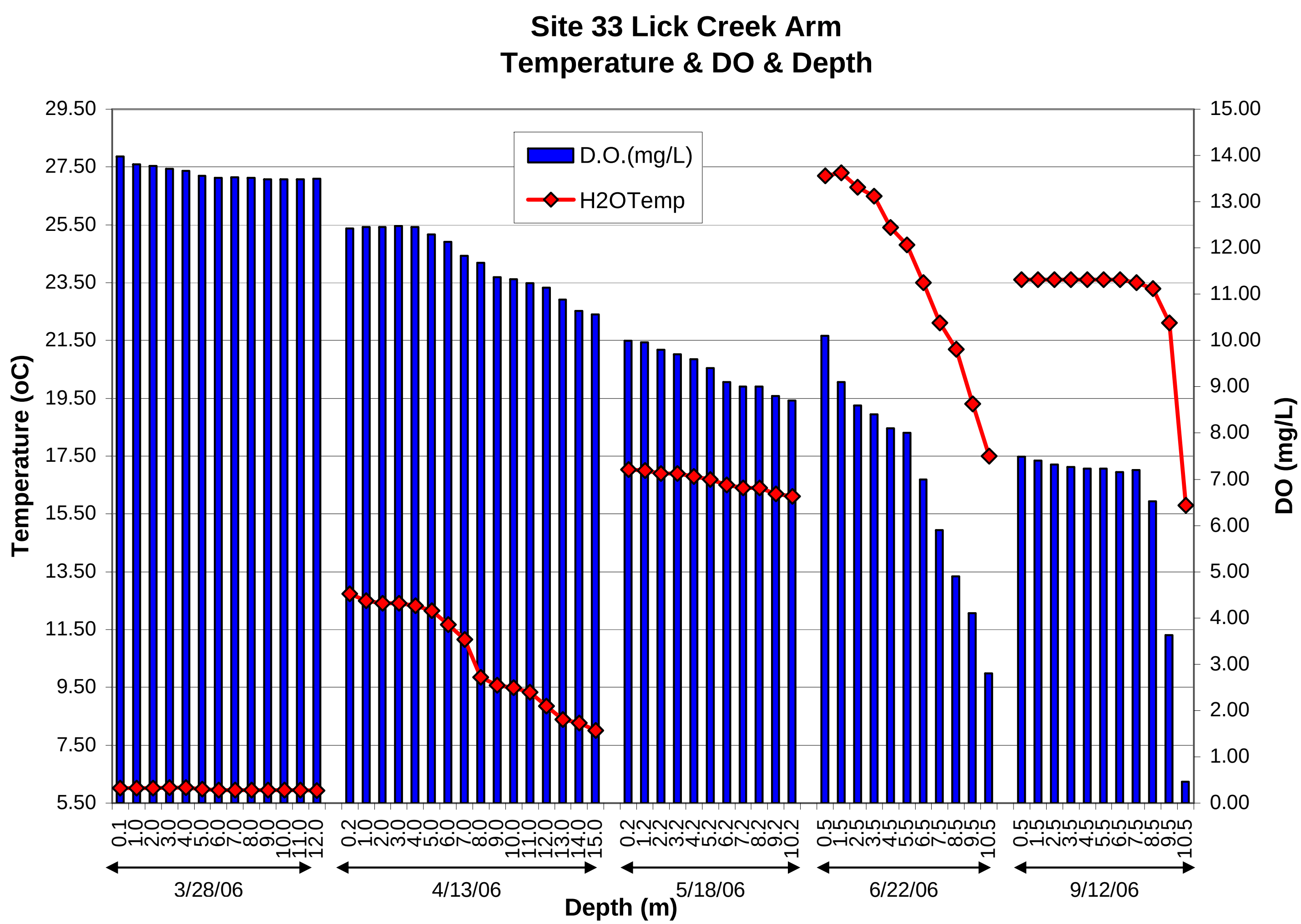

Site 8 Elk Fork
Temperature & DO
D.O.(mg/L)
H2OTemp
Temperature (oC)
DO (mg/L)
Sample Date
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30


Site 9 Middle Fork
Temperature & DO
Temperature (°C)
DO (mg/L)
30
25
20
15
10
5
0
14
12
10
8
6
4
2
0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date
D.O.(mg/L)
H2OTemp

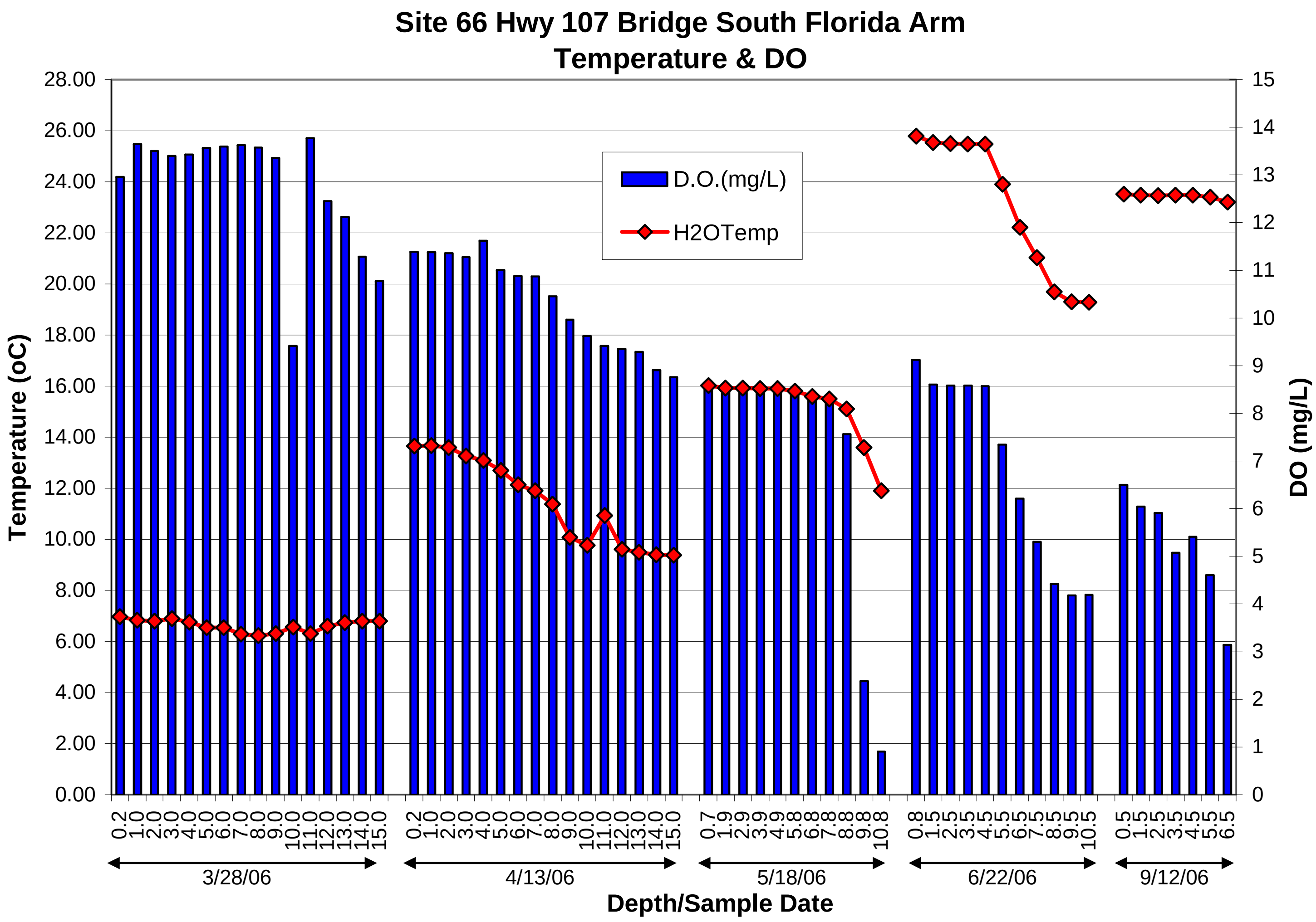

Site 11 North Fork
Temperature & DO
D.O.(mg/L)
H2OTemp
Temperature (°C)
DO (mg/L)
Sample Date
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
14
12
10
8
6
4
2
0


Site 12 Below Re-reg Dam
Temperature & DO
D.O.(mg/L)
H2OTemp
Temperature (oC)
DO (mg/L)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
0
2
4
6
8
10
12
14
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

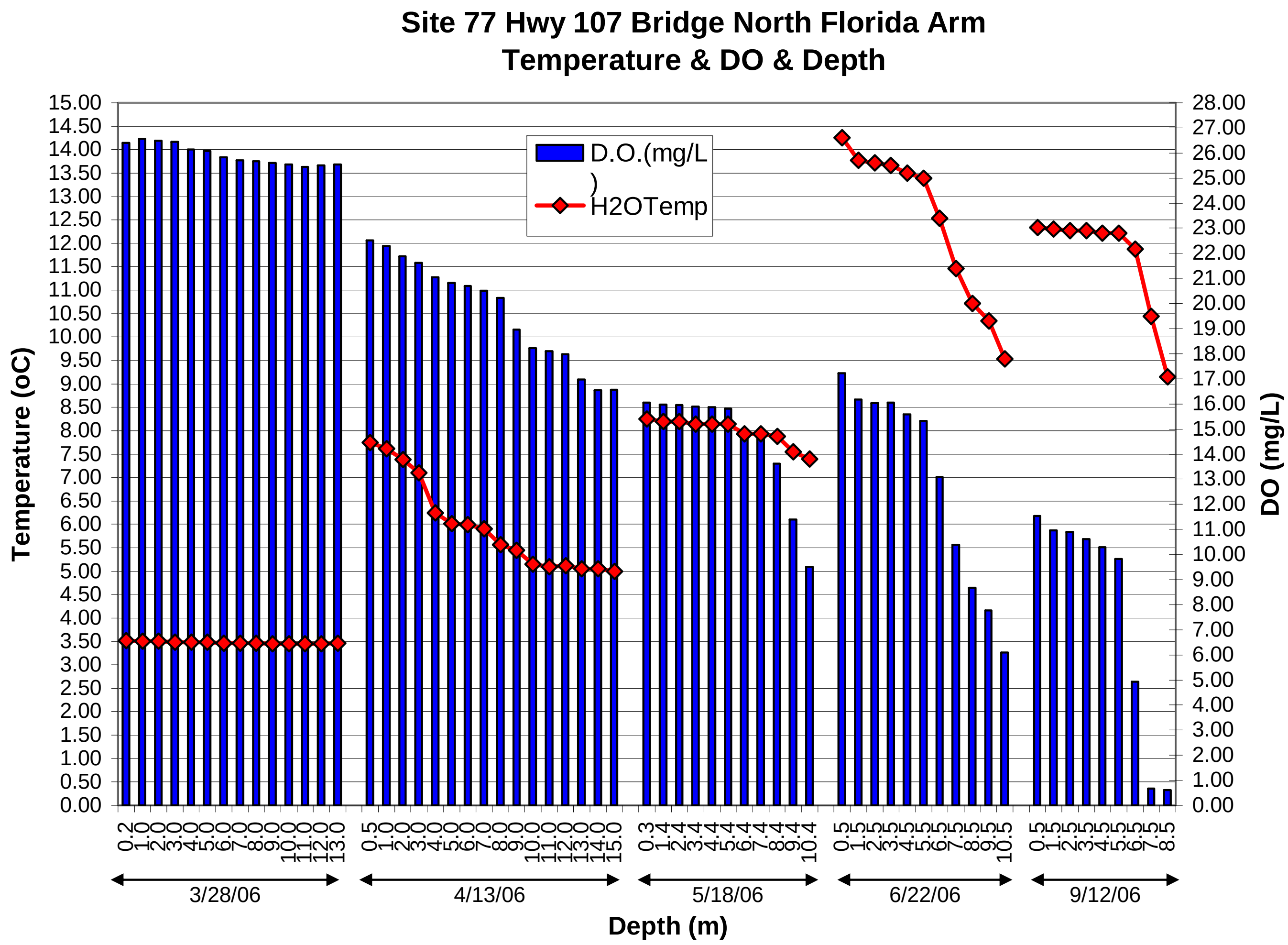

Site 22 Dam Lake Side
Temperature & DO & Depth
Temperature (oC)
DO (mg/L)
D.O.(mg/L)
H2OTemp
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
3/28/06
4/13/06
5/18/06
6/22/06
9/13/06
Depth (m)



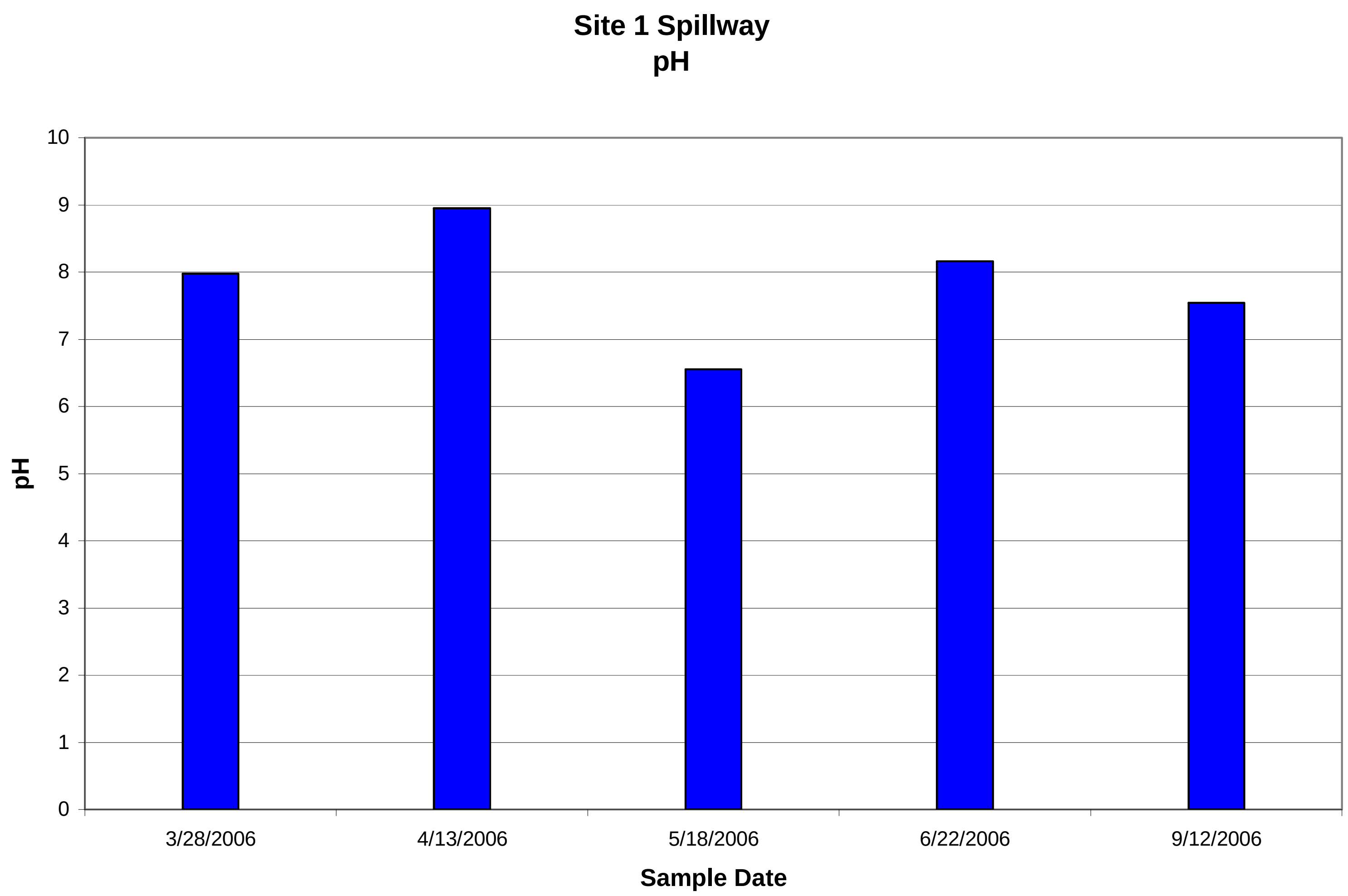
Site 33 Lick Creek Arm
Temperature & DO & Depth
D.O.(mg/L)
H2OTemp
Temperature (oC)
DO (mg/L)
29.50
27.50
25.50
23.50
21.50
19.50
17.50
15.50
13.50
11.50
9.50
7.50
5.50
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.1 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0
0.2 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0
0.2 1.2 2.2 3.2 4.2 5.2 6.2 7.2 8.2 9.2 10.2
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)

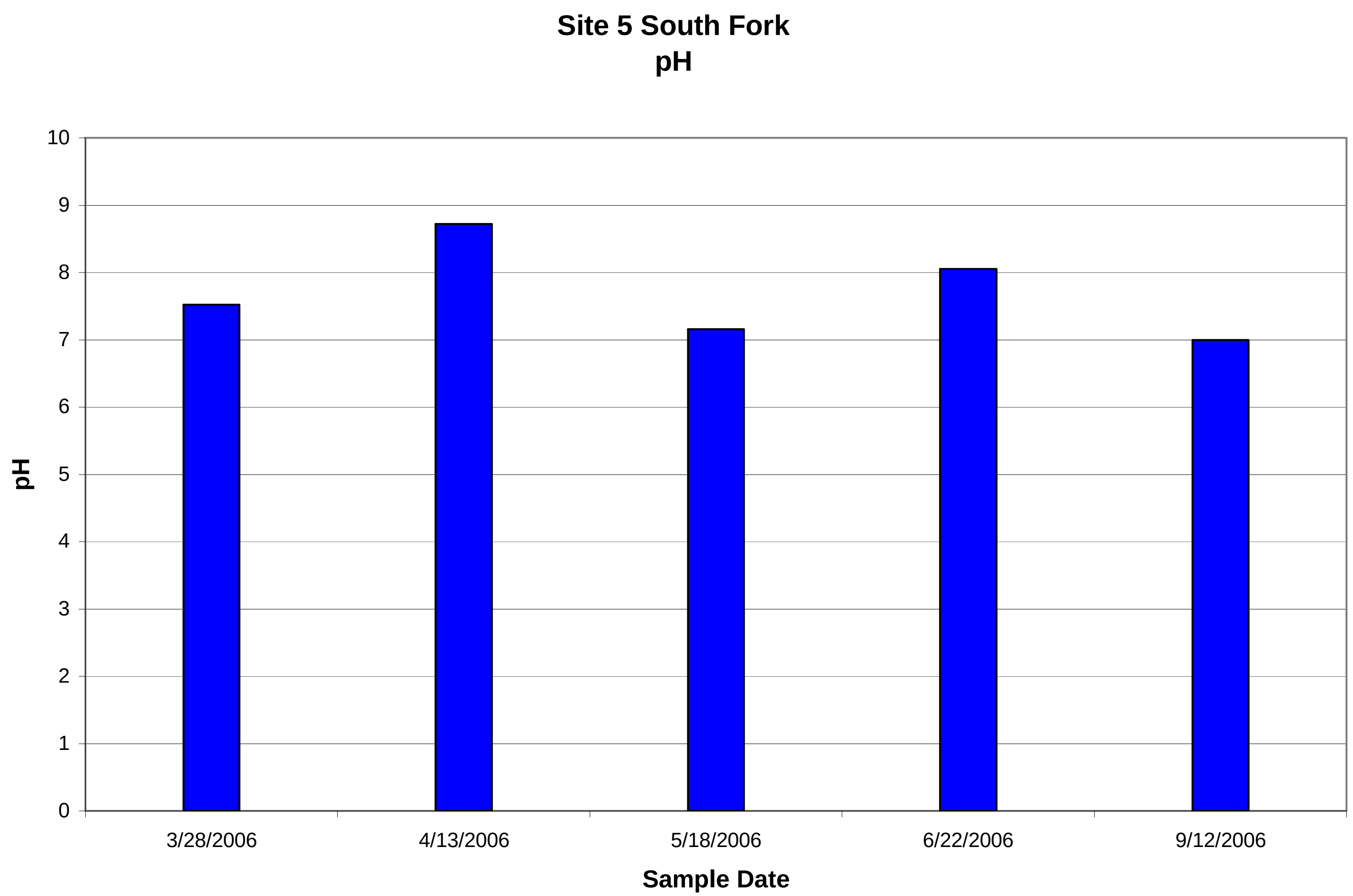


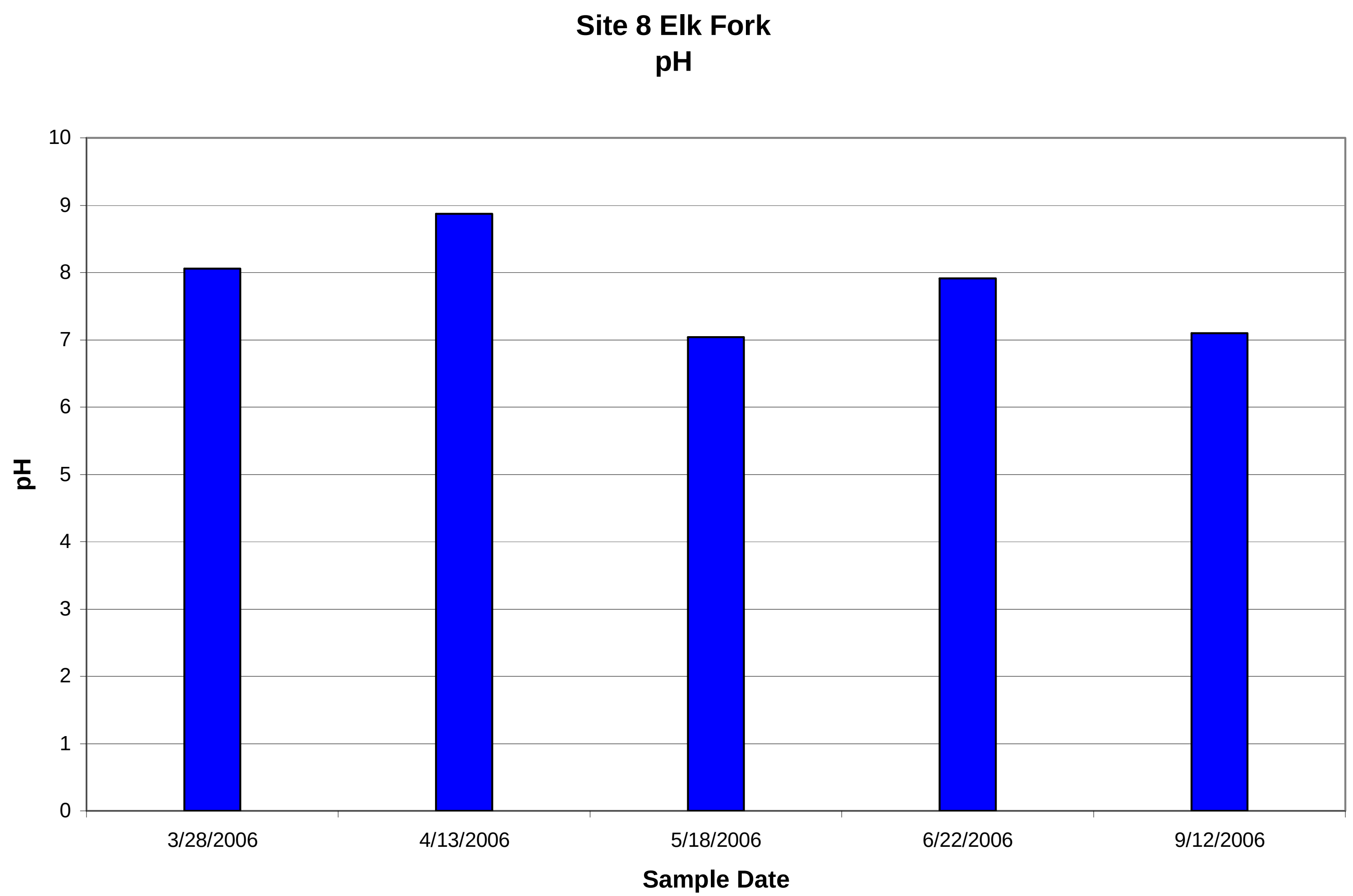
Site 66 Hwy 107 Bridge South Florida Arm
Temperature & DO
D.O.(mg/L)
H2OTemp
Temperature (oC)
DO (mg/L)
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth/Sample Date

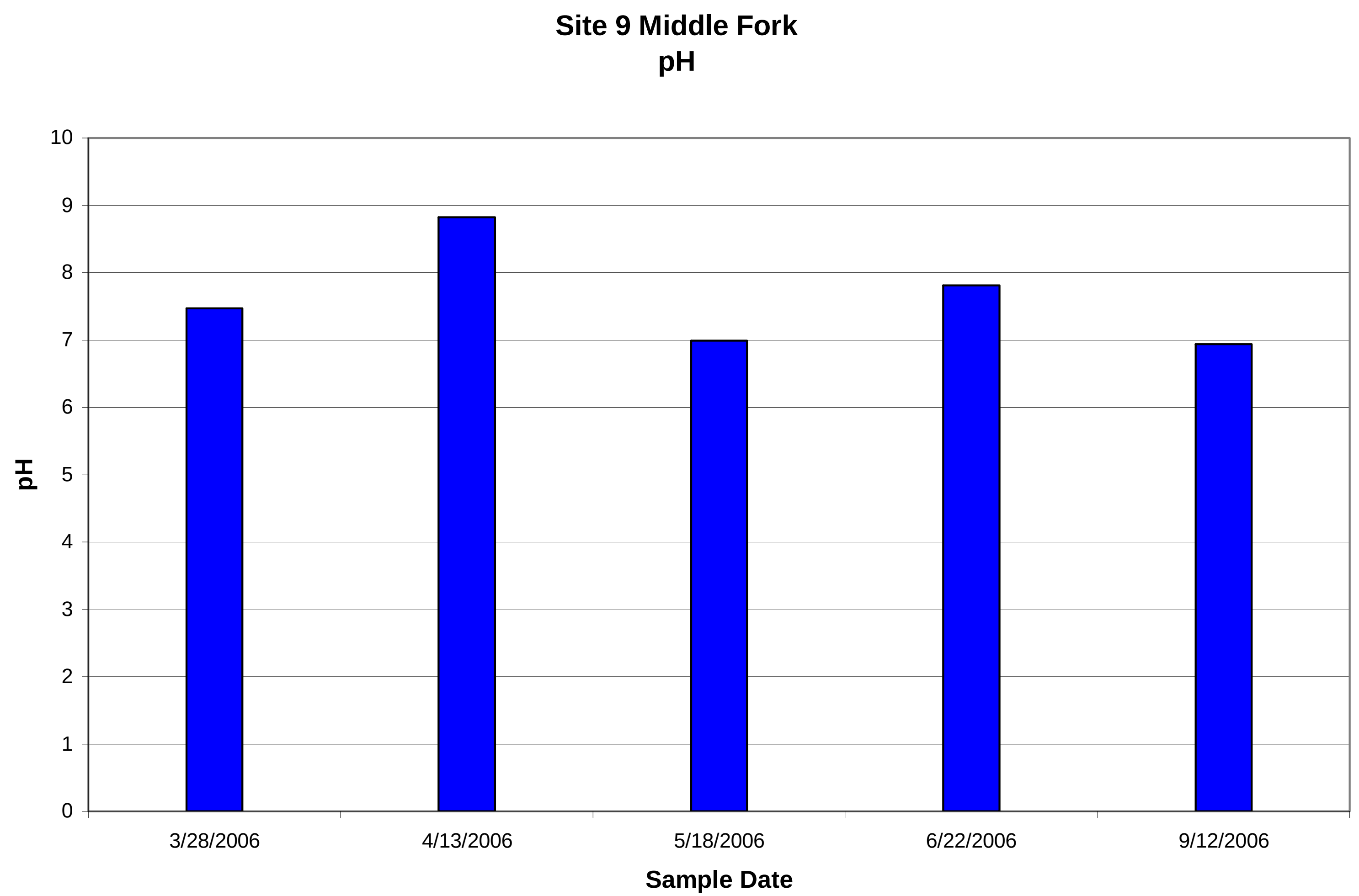


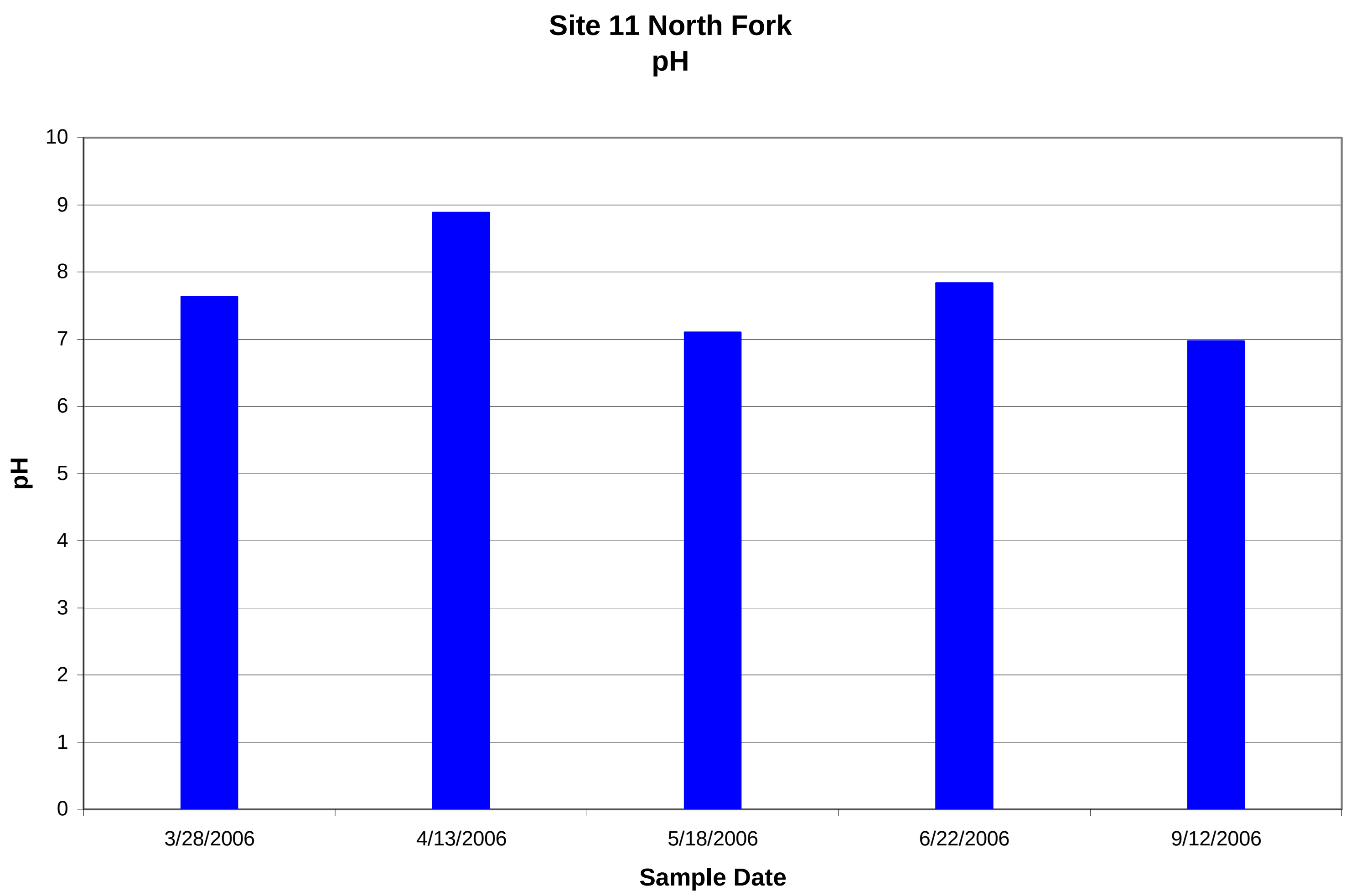
Site 77 Hwy 107 Bridge North Florida Arm
Temperature & DO & Depth
Temperature (oC)
DO (mg/L)
D.O.(mg/L)
H2OTemp
Depth (m)
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06

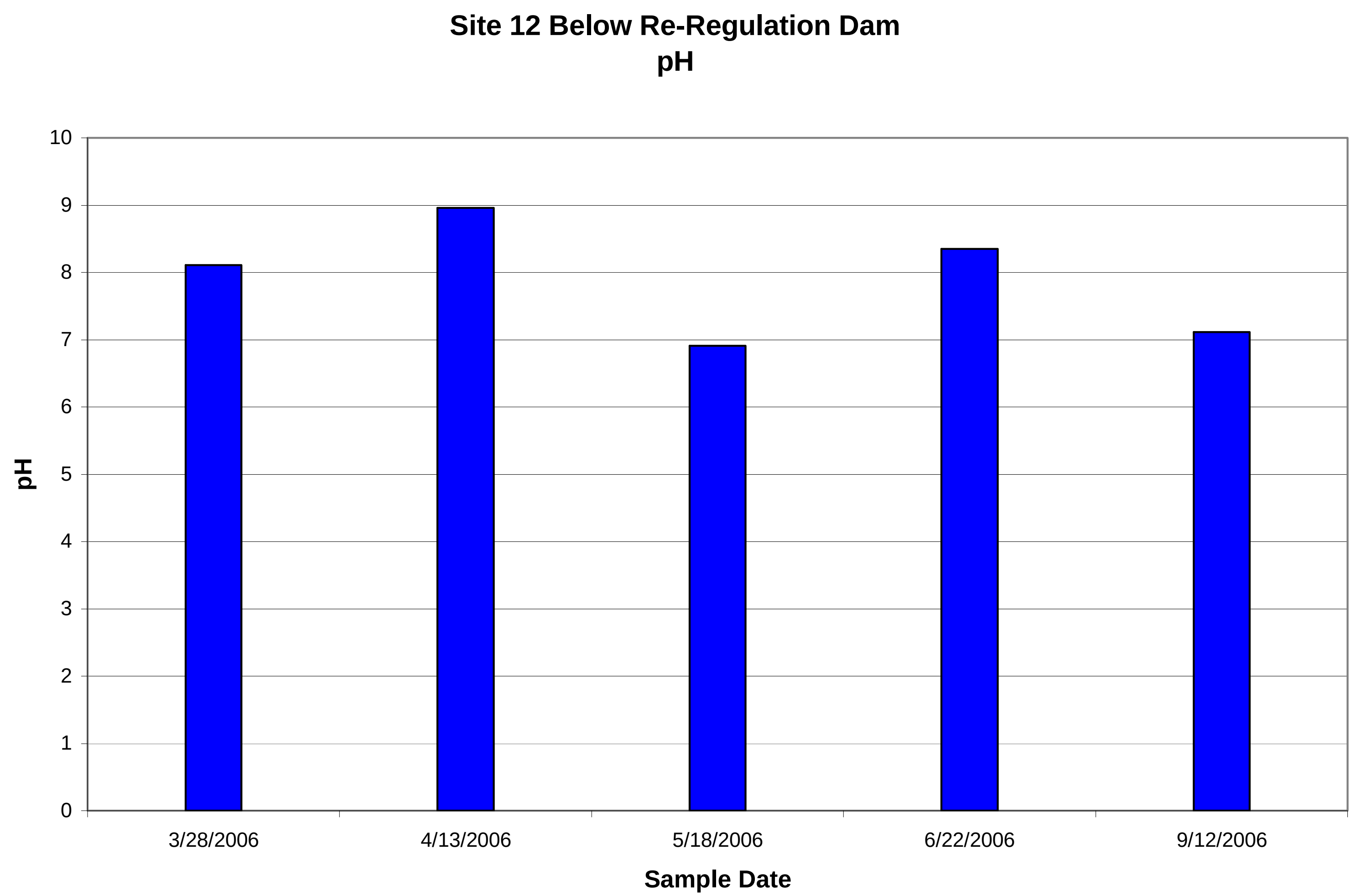

Site 1 Spillway
pH
10
9
8
7
6
5
4
3
2
1
0
pH
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date


Site 5 South Fork
pH
10
9
8
7
6
5
4
3
2
1
0
pH
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

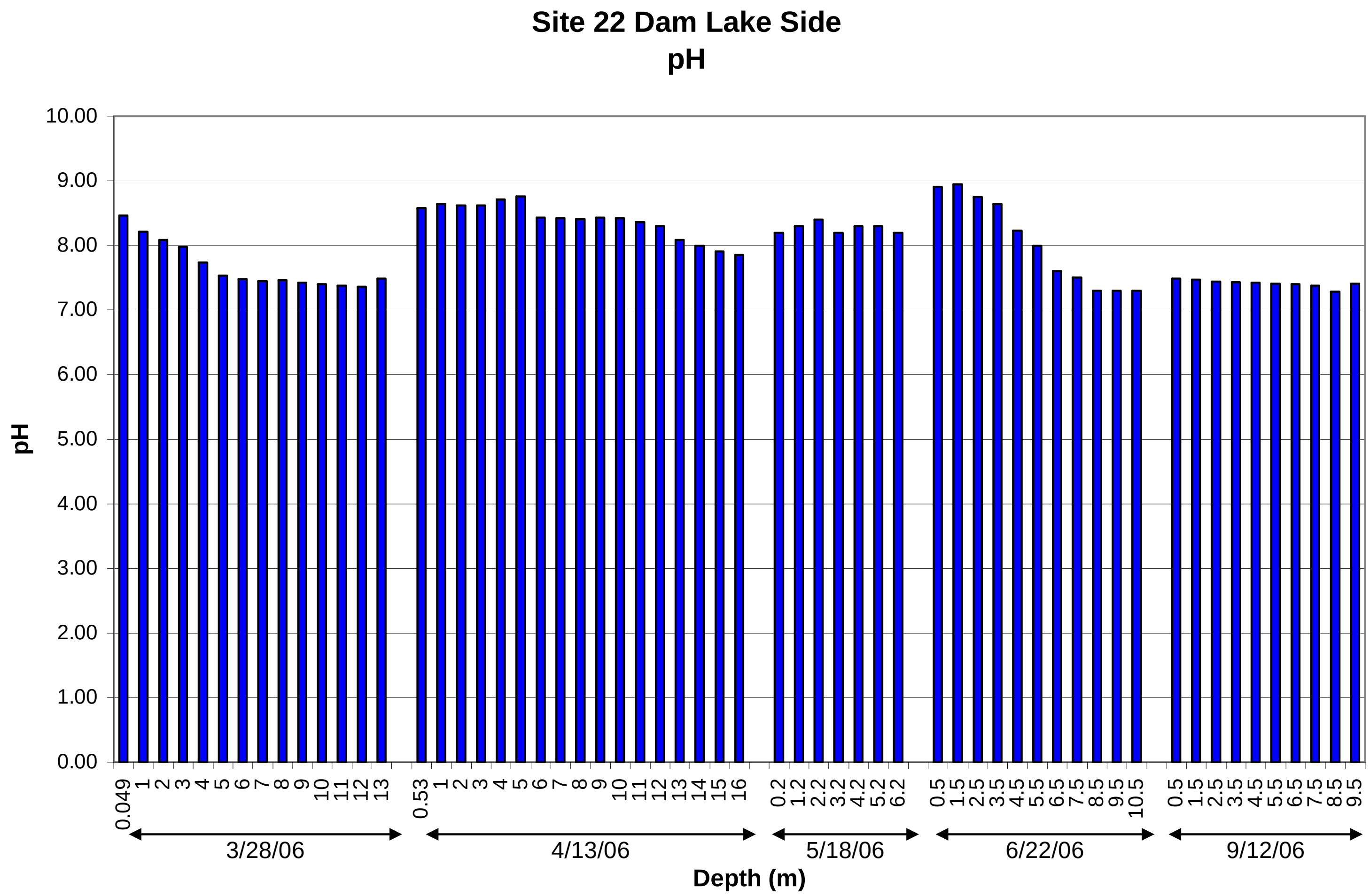

Site 8 Elk Fork
pH
10
9
8
7
6
5
4
3
2
1
0
pH
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date


Site 9 Middle Fork
pH
10
9
8
7
6
5
4
3
2
1
0
pH
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

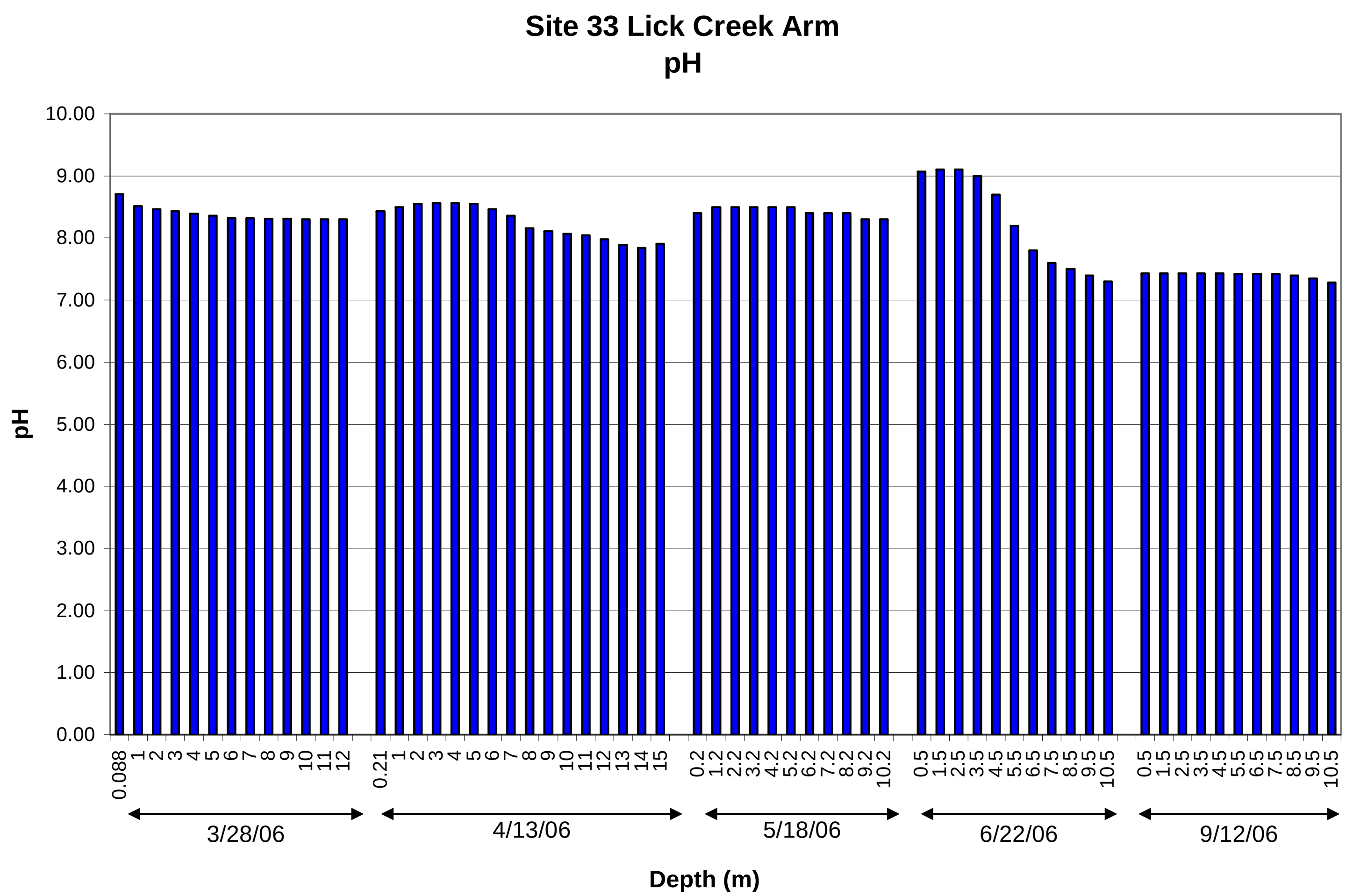

Site 11 North Fork
pH
10
9
8
7
6
5
4
3
2
1
0
pH
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

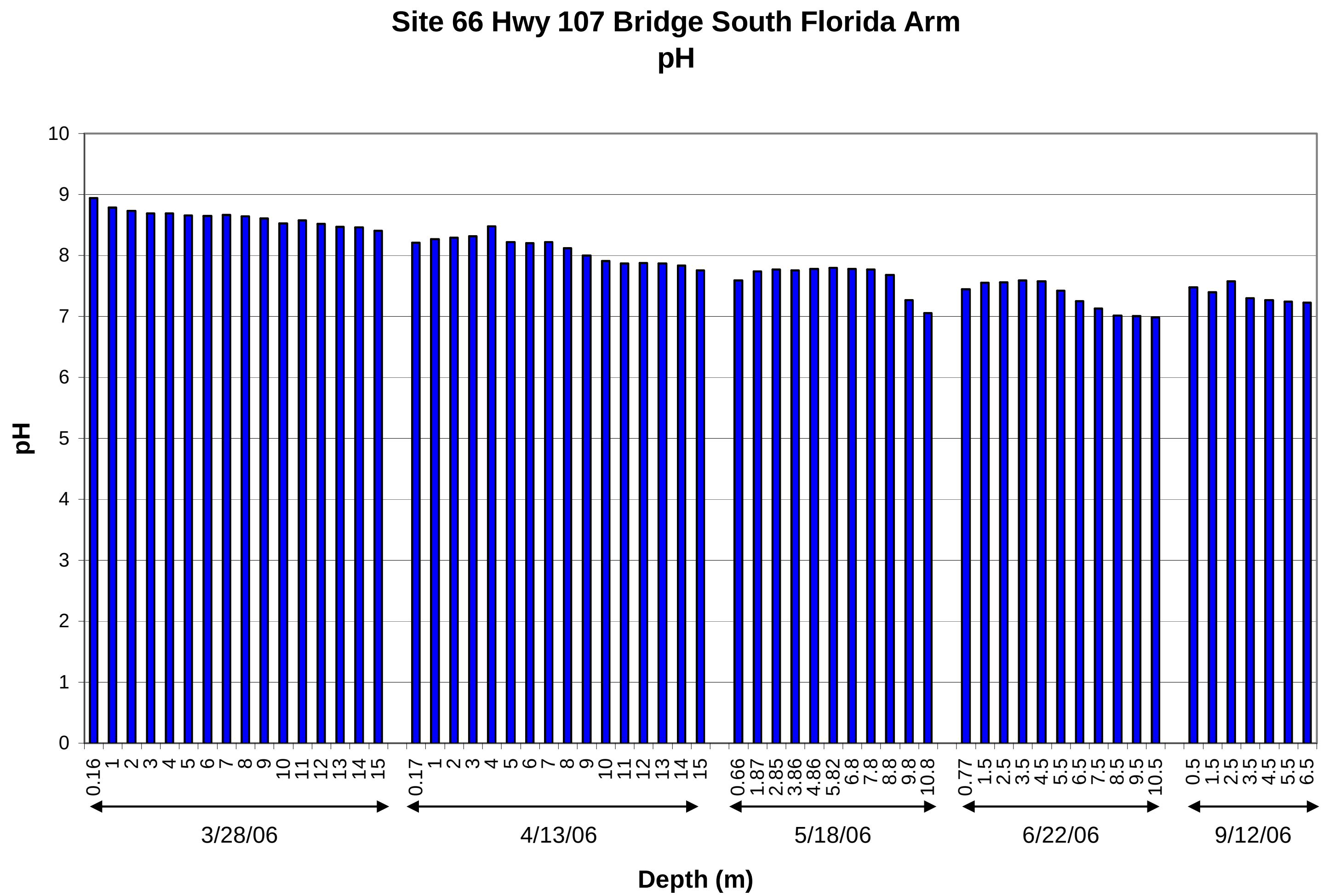


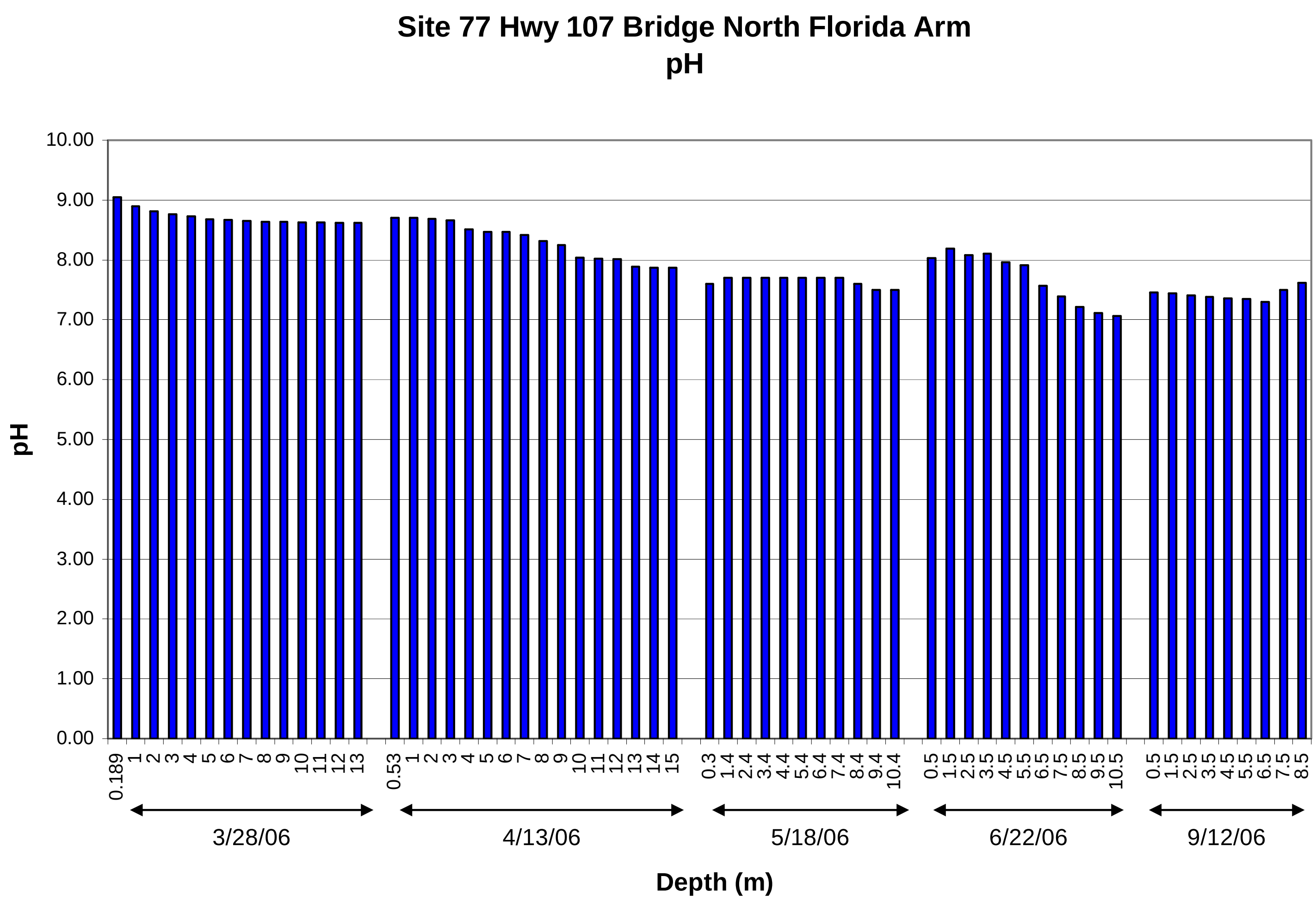
Site 12 Below Re-Regulation Dam
pH
pH
Sample Date
0
1
2
3
4
5
6
7
8
9
10
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006

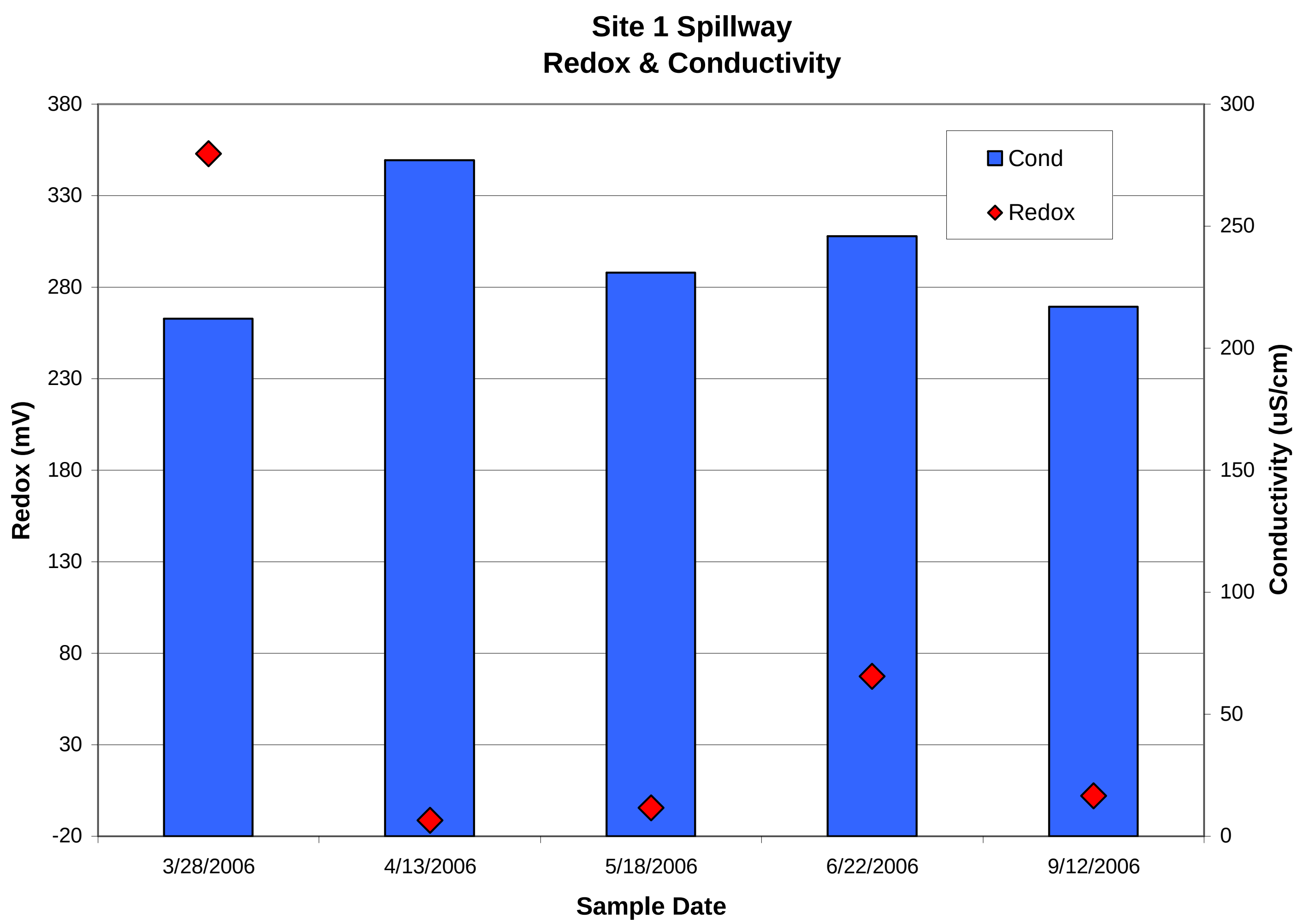


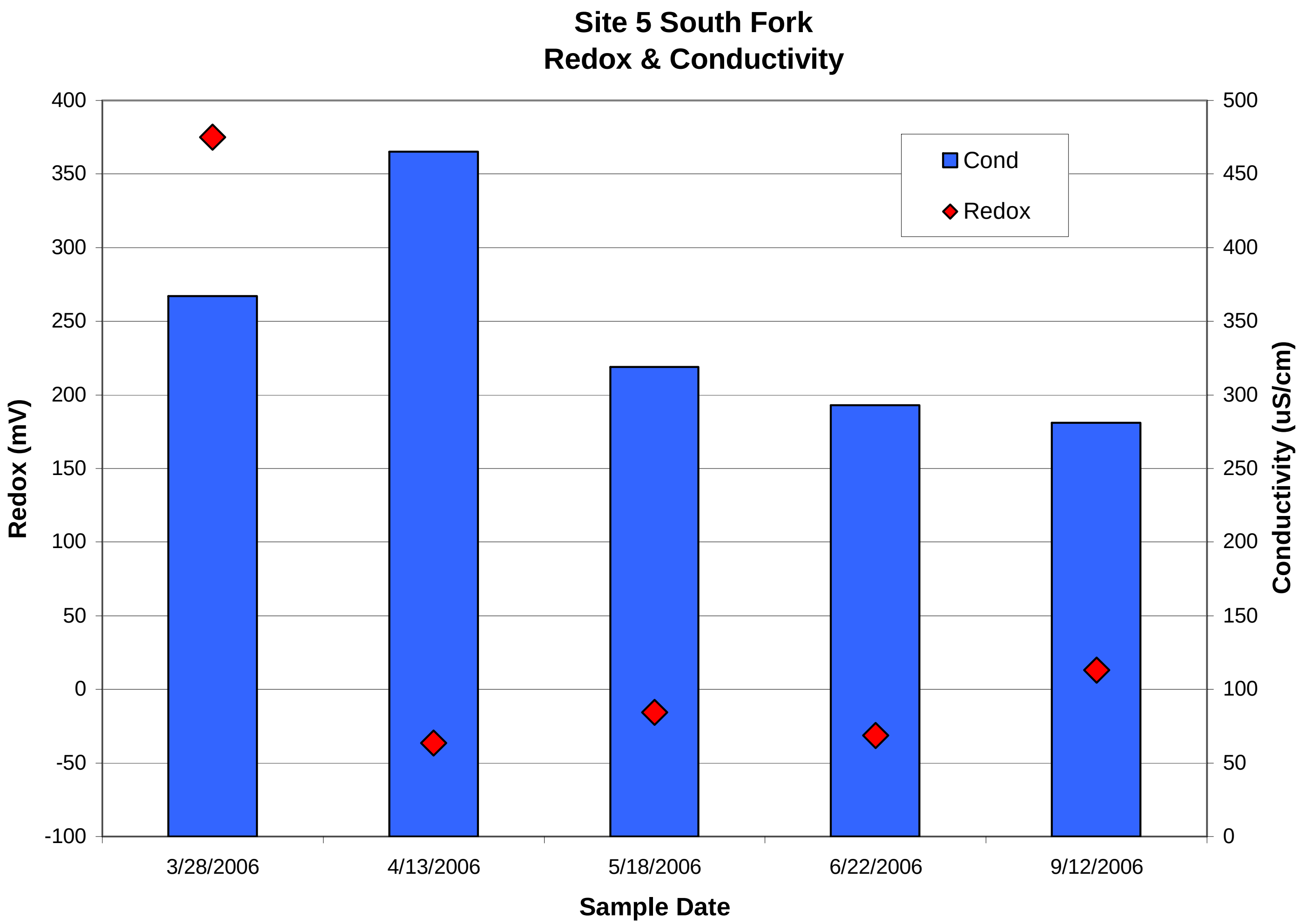
Site 22 Dam Lake Side
pH
pH
Depth (m)
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06


Site 33 Lick Creek Arm
pH
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
pH
0.088 1 2 3 4 5 6 7 8 9 10 11 12
0.21 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0.2 1.2 2.2 3.2 4.2 5.2 6.2 7.2 8.2 9.2 10.2
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)

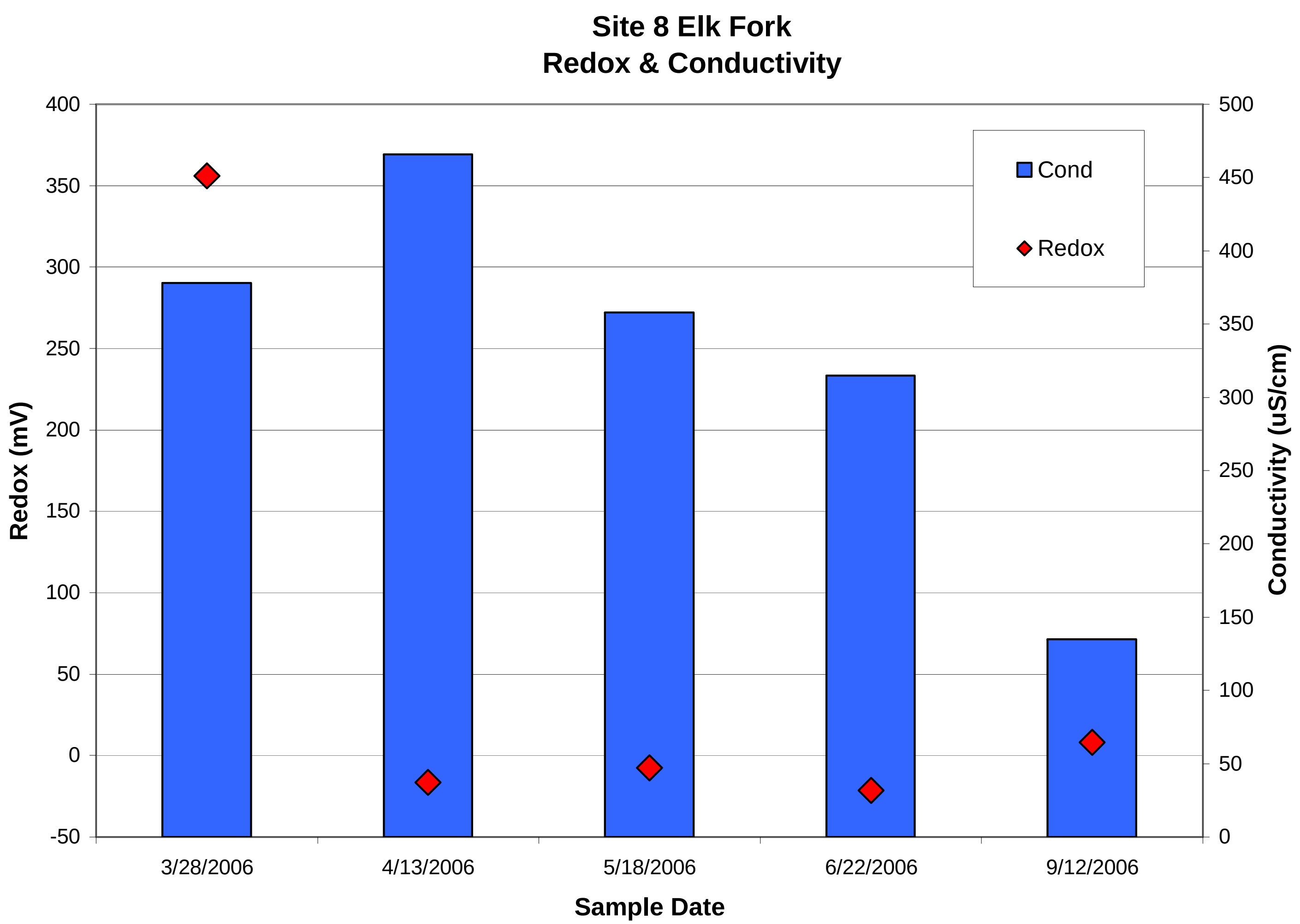

Site 66 Hwy 107 Bridge South Florida Arm
pH
pH
0
1
2
3
4
5
6
7
8
9
10
0.16 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0.17 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0.66 1.87 2.85 3.86 4.86 5.82 6.8 7.8 8.8 9.8 10.8
0.77 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
0.5 1.5 2.5 3.5 4.5 5.5 6.5
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)

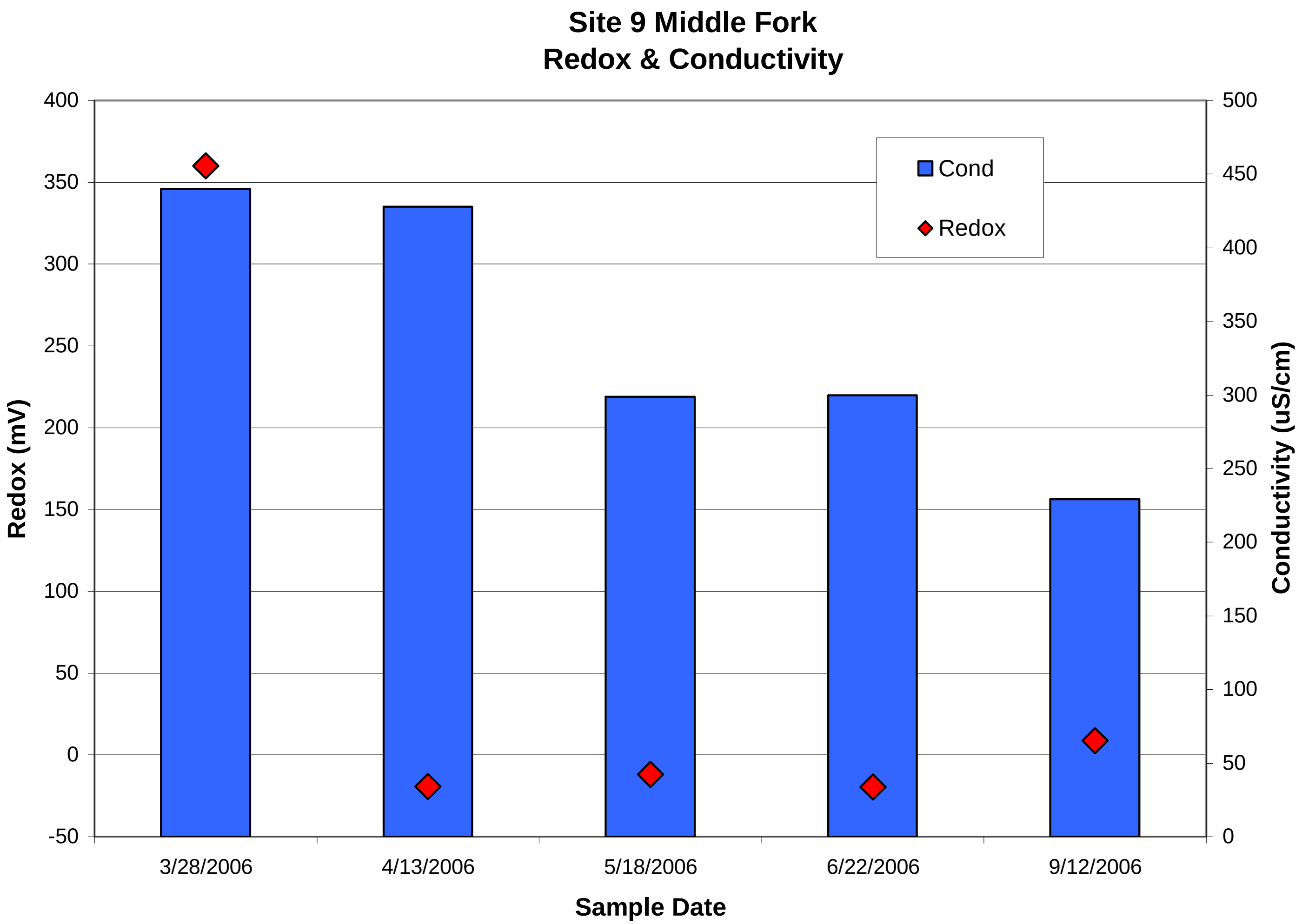

Site 77 Hwy 107 Bridge North Florida Arm
pH
pH
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.189 1 2 3 4 5 6 7 8 9 10 11 12 13
0.53 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0.3 1.4 2.4 3.4 4.4 5.4 6.4 7.4 8.4 9.4 10.4
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)


Site 1 Spillway
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
380
330
280
230
180
130
80
30
-20
300
250
200
150
100
50
0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

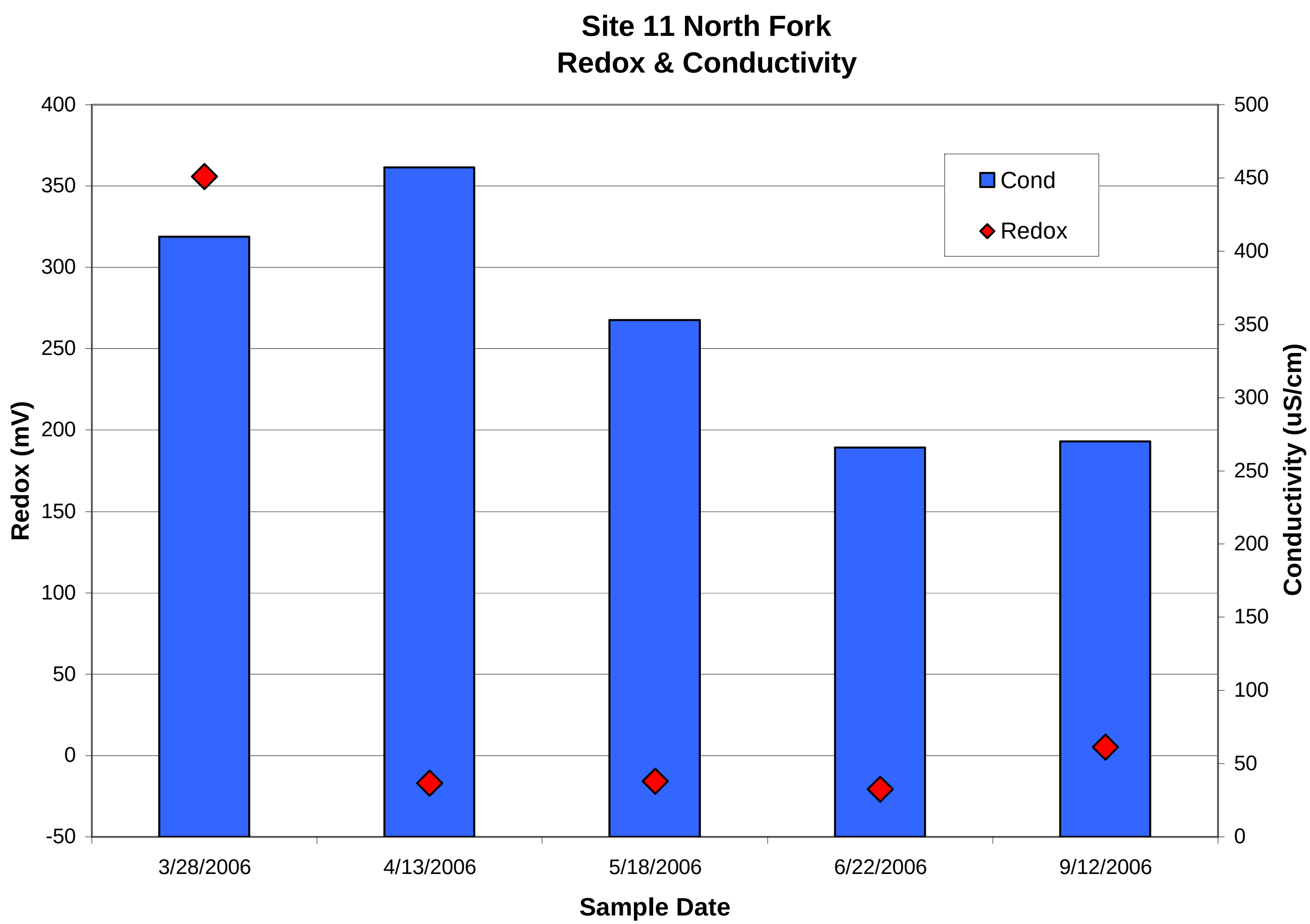


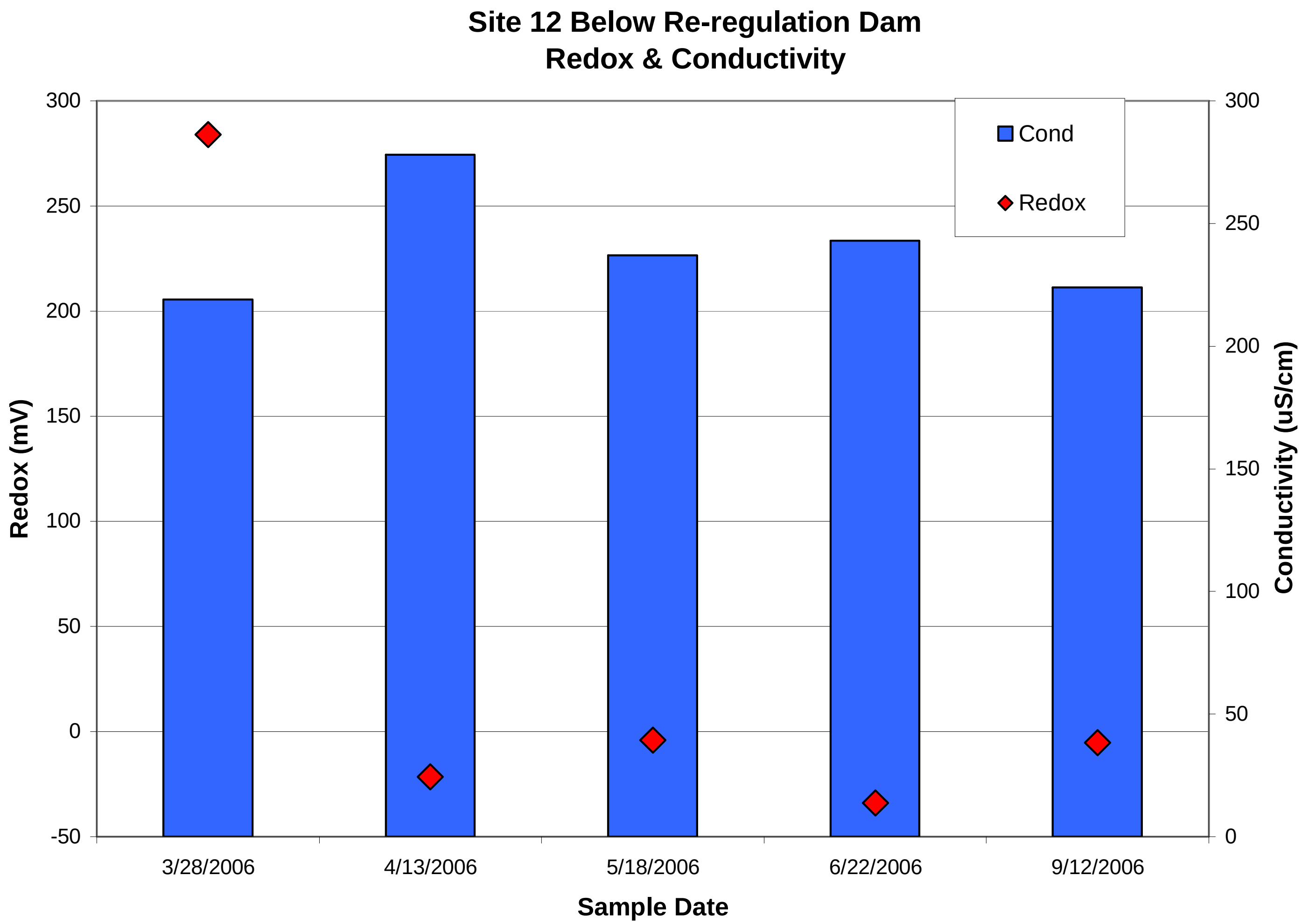
Site 5 South Fork
Redox & Conductivity
Redox (mV)
400
350
300
250
200
150
100
50
0
-50
-100
Conductivity (uS/cm)
500
450
400
350
300
250
200
150
100
50
0
Cond
Redox
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

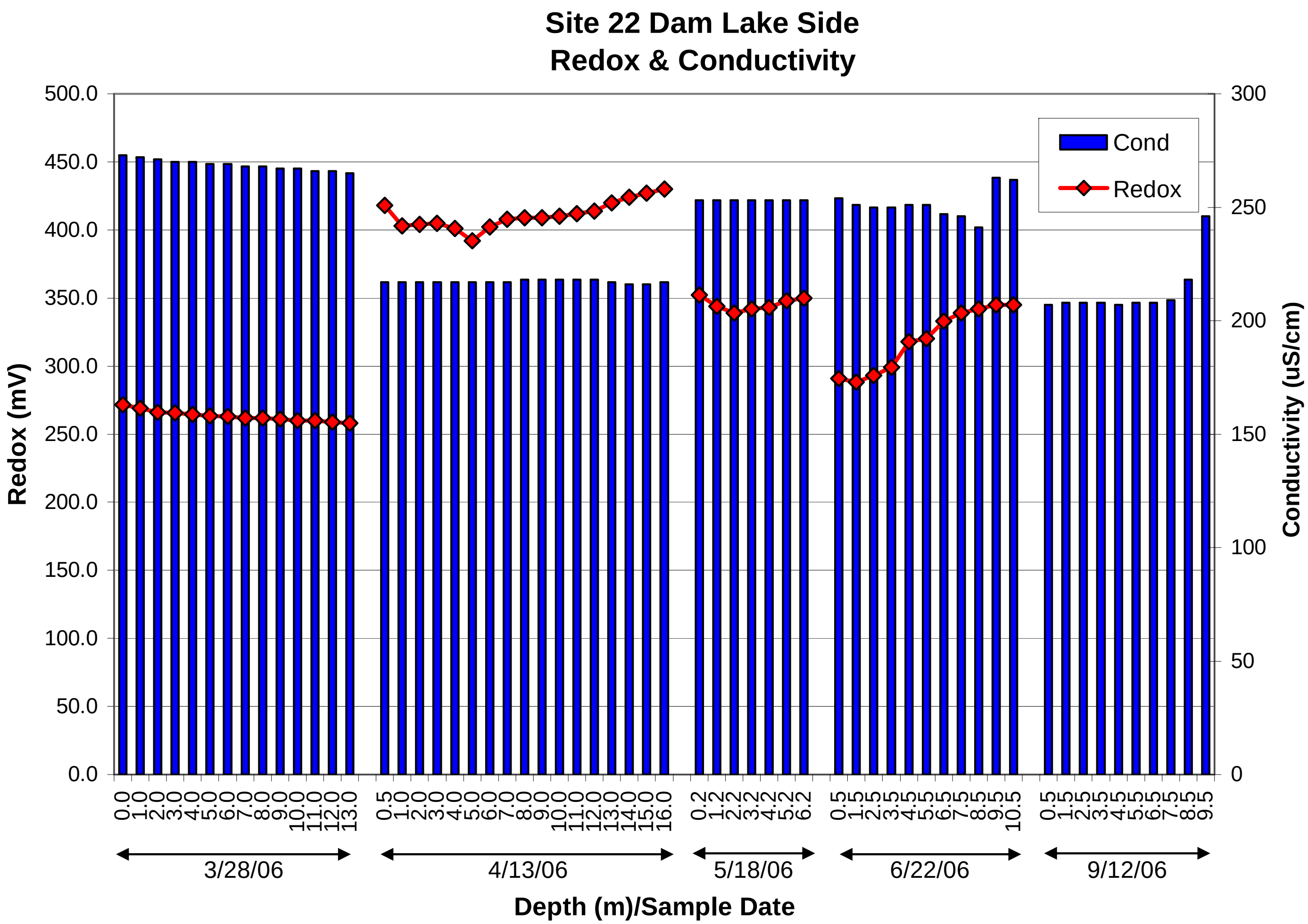

Site 8 Elk Fork
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
400
350
300
250
200
150
100
50
0
-50
500
450
400
350
300
250
200
150
100
50
0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

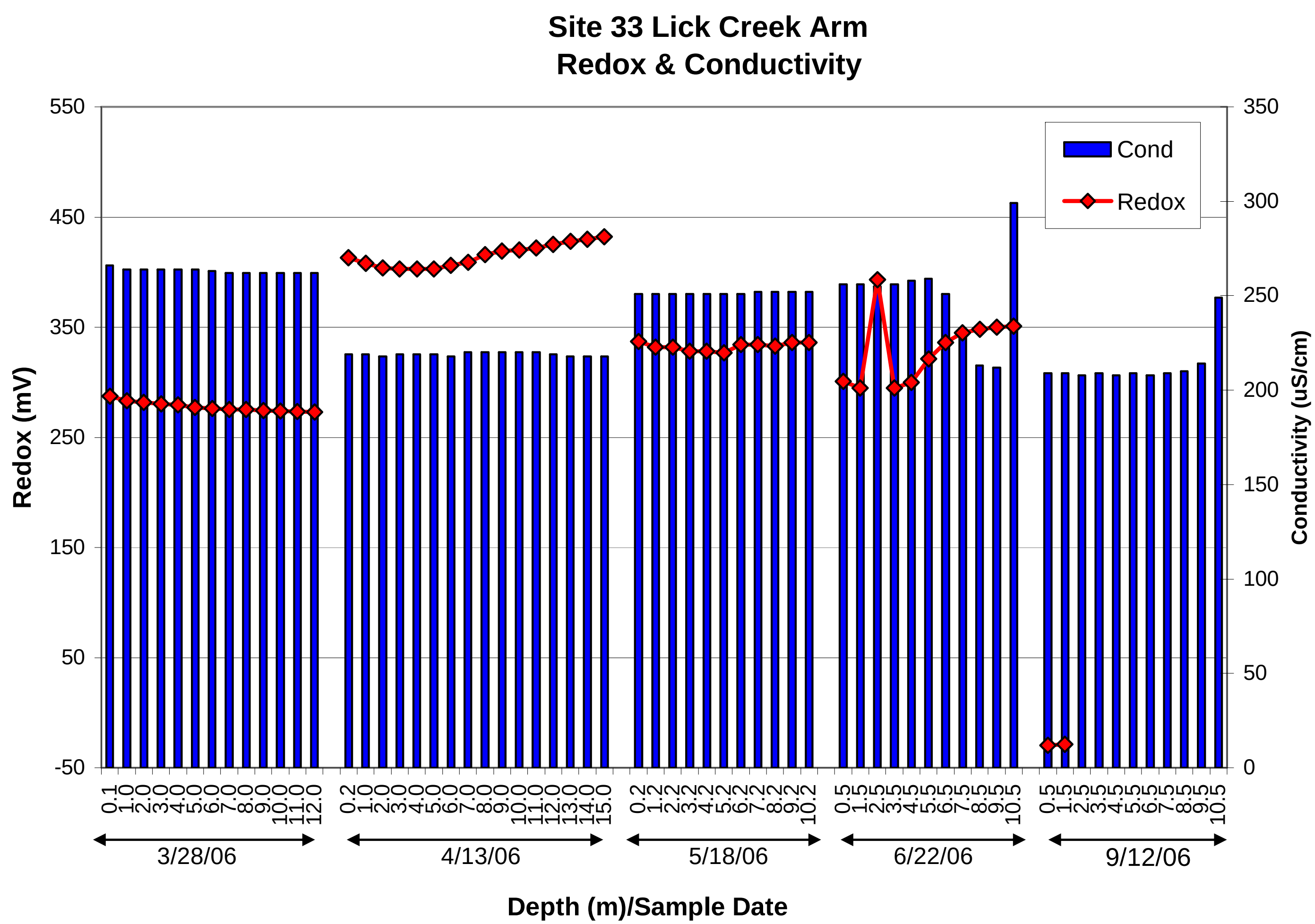


Site 9 Middle Fork
Redox & Conductivity
Cond
Redox
Redox (mV)
Conductivity (uS/cm)
400
350
300
250
200
150
100
50
0
-50
500
450
400
350
300
250
200
150
100
50
0
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

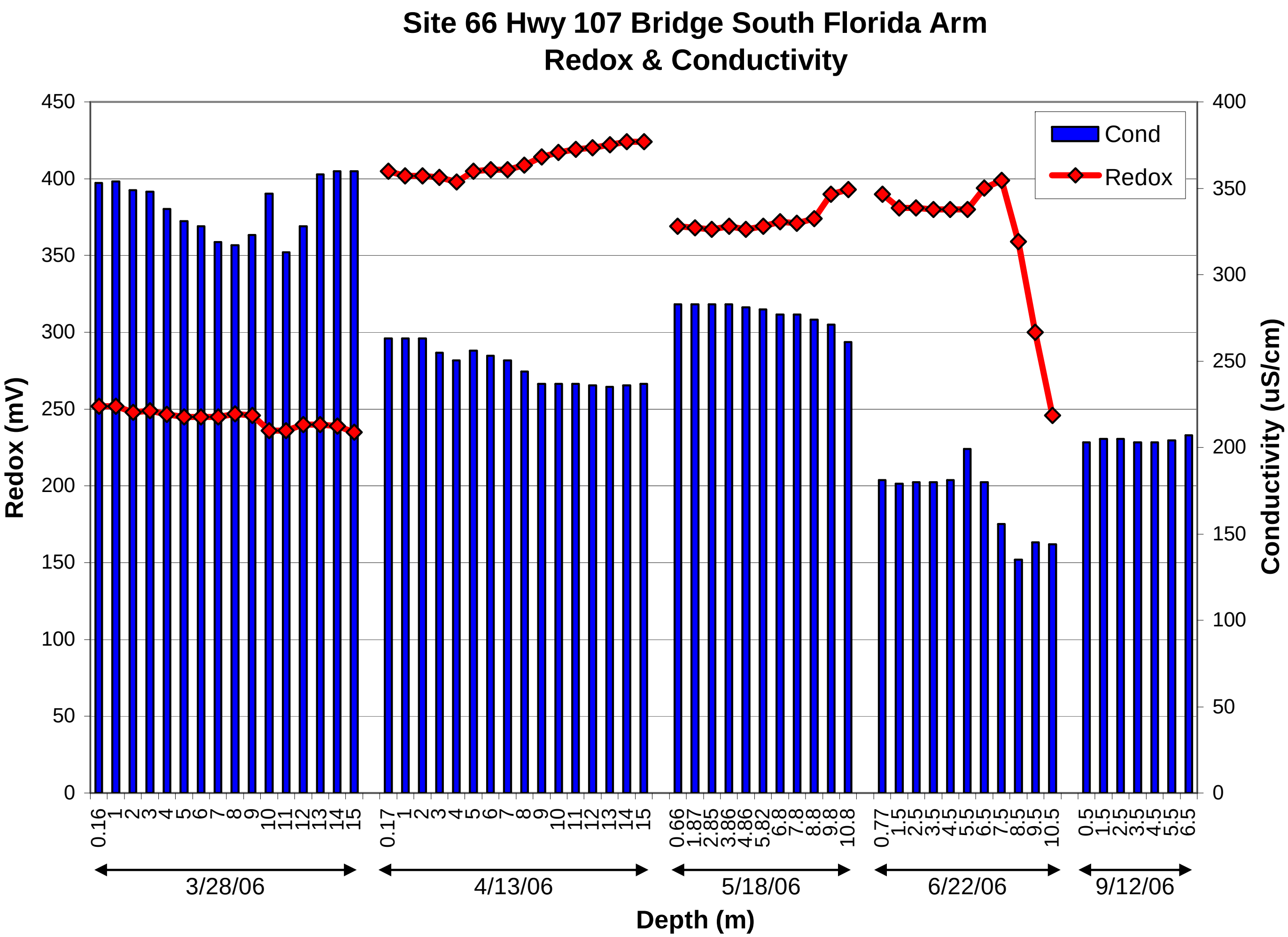

Site 11 North Fork
Redox & Conductivity
Redox (mV)
400
350
300
250
200
150
100
50
0
-50
Conductivity (uS/cm)
500
450
400
350
300
250
200
150
100
50
0
Cond
Redox
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date


Site 12 Below Re-regulation Dam
Redox & Conductivity
Cond
Redox
Redox (mV)
Conductivity (uS/cm)
300
250
200
150
100
50
0
-50
3/28/2006
4/13/2006
5/18/2006
6/22/2006
9/12/2006
Sample Date

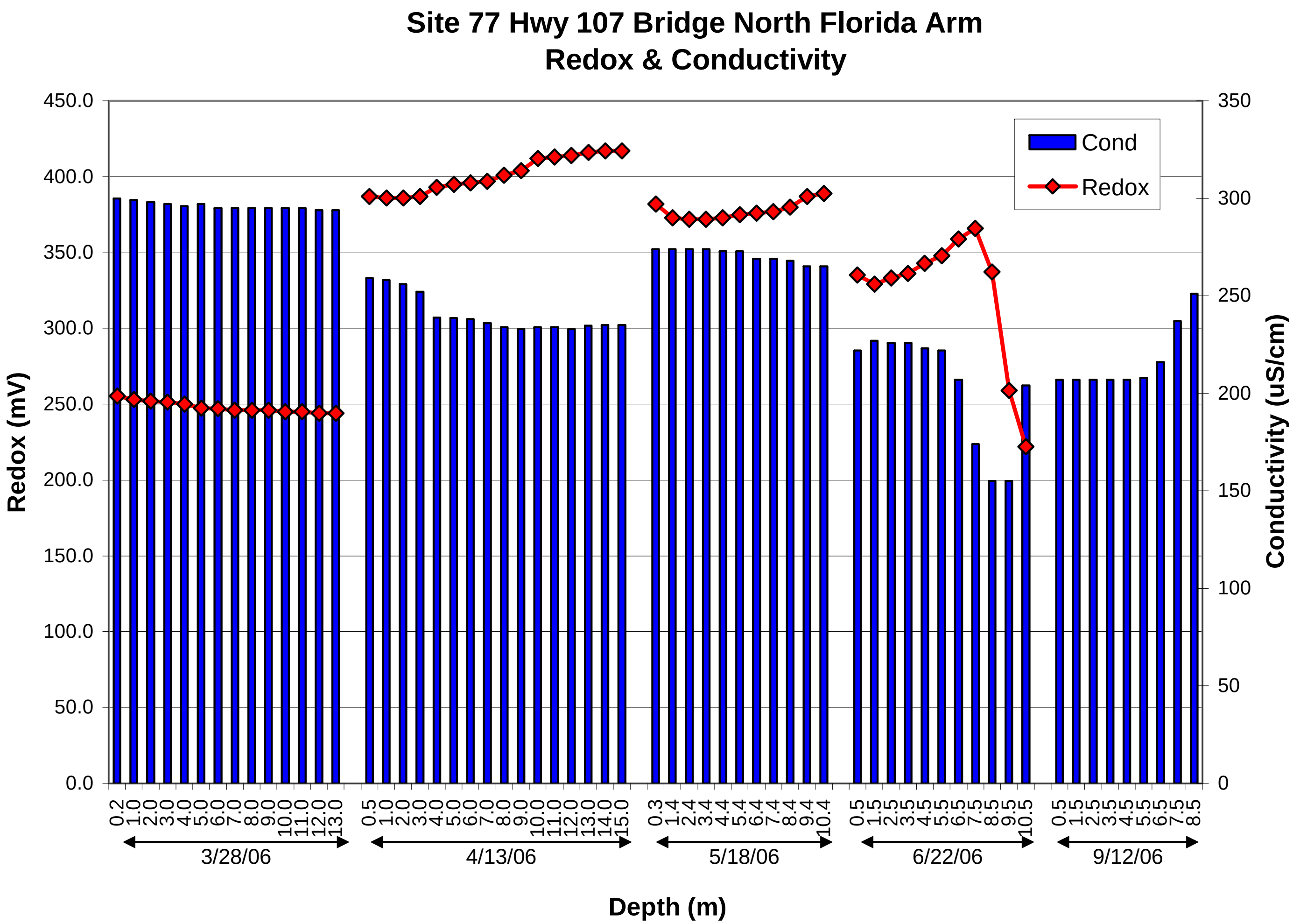

Site 22 Dam Lake Side
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
300
250
200
150
100
50
0
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)/Sample Date

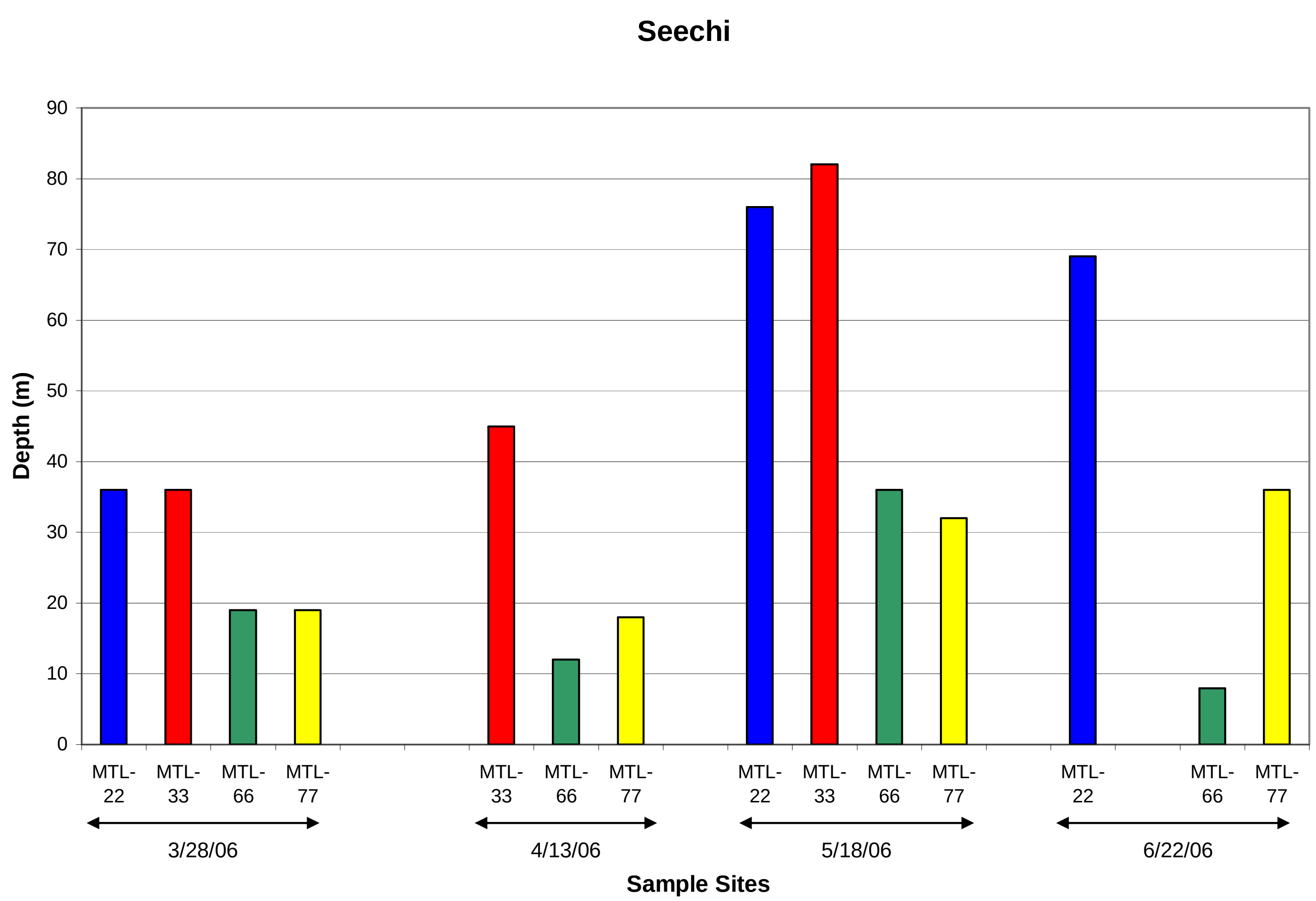


Site 33 Lick Creek Arm
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)/Sample Date



Site 66 Hwy 107 Bridge South Florida Arm
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
450
400
350
300
250
200
150
100
50
0
0.16
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
0.17
0.66
1.87
2.85
3.86
4.86
5.82
6.8
7.8
8.8
9.8
10.8
0.77
1.5
2.5
3.5
4.5
5.5
6.5
7.5
8.5
9.5
10.5
0.5
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06
Depth (m)


Site 77 Hwy 107 Bridge North Florida Arm
Redox & Conductivity
Redox (mV)
Conductivity (uS/cm)
Cond
Redox
Depth (m)
3/28/06
4/13/06
5/18/06
6/22/06
9/12/06


Seechi
Depth (m)
0
10
20
30
40
50
60
70
80
90
MTL-22
MTL-33
MTL-66
MTL-77
3/28/06
MTL-33
MTL-66
MTL-77
4/13/06
MTL-22
MTL-33
MTL-66
MTL-77
5/18/06
MTL-22
MTL-66
MTL-77
6/22/06
Sample Sites