Sabine River Basin Volunteer Water Quality Monitoring Data Summary Report compiled by Texas Watch

This data summary report includes general basin volunteer monitoring activity, general water quality descriptive statistics, tables and graphs. Data from sites, which have been sampled more than nine times between 2000 and 2004, were queried from the Texas Watch Environmental Monitoring Database and are included in this document. Since 1992, Texas Watch volunteer water quality monitors have collected environmental data at 75 sites in the Sabine River basin.

In alignment with Texas Watch's core mission, monitors attempt to collect data that can be used in decision-making processes, to promote a healthier and safer environment for people and aquatic inhabitants. While many assume it is the responsibility of Texas Watch to serve as the main advocate for volunteer monitor data use, it has become increasingly important for monitors to be accountable for their monitoring information and how it can be infused into the decision-making process, from "backyard" concerns to state or regional issues. To assist with this effort, Texas Watch is coordinating with monitoring groups and government agencies to propagate numerous data use options.

Among these options, volunteer monitors can directly participate by communicating their data to various stakeholders. Some options include: participating in the Clean Rivers Program (CRP) Steering Committee Process (see box insert on this page); providing information during "public comment" periods; attending city council and advisory panel meetings; developing relations with local Texas Commission on Environmental Quality (TCEQ) and river authority water specialists; if necessary, filing complaints with environmental agencies; contacting elected representatives and media; or starting organizing local efforts to address areas of concern.

The Texas Clean Rivers Act established a way for the citizens of Texas to participate in building the foundation for effective statewide watershed planning activities. Each CRP partner agency has established a steering committee to set priorities within its basin. These committees bring together the diverse interests in each basin and watershed. Steering committee participants include representatives from the public, government, industry, business, agriculture, and environmental groups. The steering committee is designed to allow local concerns to be addressed and regional solutions are recommended. For more information about participating in these steering committee meetings and to contribute your views about water quality, contact the appropriate CRP partner agency for your river basin at: http://www.tnrcc.state.tx.us/water/quality/data/wmt/contract.html.

Currently, Texas Watch is working with various public and private organizations to facilitate data and information sharing. One component of this process includes interacting with watershed stakeholders at CRP steering committee meetings. A major function of these meetings is to discuss water quality issues and to obtain input from the general public. While participation in this process may not bring about instantaneous results, it is a great place to begin making institutional connections and to learn how to "work" the assessment and protection system Texas agencies use to keep water resources healthy and sustainable.

In general, Texas Watch efforts to use volunteer data may include the following:

1. Assist monitors with data analysis and interpretation
2. Analyze watershed-level or site-by-site data for monitors and partners
3. Screen all data annually for values outside expected ranges
4. Network with monitors and pertinent agencies to communicate data
5. Attend meetings and conferences to communicate data
6. Participate in CRP stakeholder meetings
7. Provide a data viewing forum via the Texas Watch Data Viewer
8. Participate in professional coordinated monitoring processes to raise awareness of areas of concern

Information collected by Texas Watch volunteers utilizes a TCEQ and EPA approved quality assurance project plan (QAPP) to ensure data are correct and accurately reflects the environmental conditions being monitored. All data are screened for completeness, precision and accuracy where applicable, and scrutinized with data quality objective and data validation screening techniques. Sample results are intended to be used for education and research, baseline, local decision making, problem identification, and others uses deemed appropriate by the data user. Graphs are compiled and situated to assist the data user in obtaining information from the collected data. Where applicable, "time" is located on the "x" or horizontal axis and is chronologically listed from oldest to most recent sampling (left to right respectively). The "y1" or "y2" axes contain the constituent(s) of interest and these scales may be different. Data collected by Texas Watch monitors include: pH, specific conductivity, water and air temperature, dissolved oxygen, flow severity, days since last precipitation, total depth, sample depth, Secchi depth, field observations, and others. Note: pH values were not transformed for graphing purposes or for developing mean statistics; data collection events may not be evenly distributed over time (through seasons and years); sampling events may occur at different times of the day; sample collection and results documentation may have been completed by different monitors over time at each site; data collected by school groups should undergo additional scrutiny before use; data summary information is subject to change.

Sabine River Basin Narrative Summary

The Texas Commission on Environmental Quality has provided the following summary information. The Sabine River is formed by three tributaries which arise in Collin and Hunt counties. The Sabine River flows eastward and is joined by the South Fork Sabine River. The river then turns southward and becomes the Texas-Louisiana boundary near Logansport, Louisiana, and continues southward to Sabine Lake on the Gulf Coast. Total basin drainage area is 9,756 square miles, of which 7,426 square miles are in Texas. The Sabine River has the largest water discharge at its mouth of any Texas river.

The economy is diversified throughout the basin and is based principally on mineral production, agriculture, manufacturing, recreation, and tourism. The Port of Orange serves as a distribution and shipping center for many of the products produced in the Sabine River Basin.

The Sabine River Basin has been divided into 15 classified segments, including ten stream segments encompassing 496 stream miles and five reservoirs encompassing 253,798 acres. In addition, 21 unclassified water bodies were evaluated for the year 2002 assessment, including 19 stream segments encompassing 249.5 stream miles and two reservoirs encompassing 6,260 acres.

Low dissolved oxygen concentrations occur in three classified segments and five unclassified water bodies. Point source discharges of treated wastewater, coupled with natural organic loading and sluggish flow, contribute to this problem. pH values that do not conform to criteria ranges occur in one classified segment. Elevated fecal coliform levels occur in four classified segments and nine unclassified water bodies. Chronic toxicity in water occurs in two unclassified water bodies. Concerns exist for nutrients in one classified segment and four unclassified water bodies, and for excessive algal growth in two classified segments.

The Texas Department of Health has issued fish consumption advisories for one classified segment due to elevated levels of mercury in fish tissue (Toledo Bend Reservoir), and for two unclassified water bodies due to elevated levels of selenium in fish tissue (Brandy Branch and Martin Creek reservoirs). The advisories apply to largemouth bass and freshwater drum in Toledo Bend, and to all species in Brandy Branch and Martin Creek reservoirs.

LC-M HIGH SCHOOL & Little Cypress Creek Bayou at Bear Path Road site

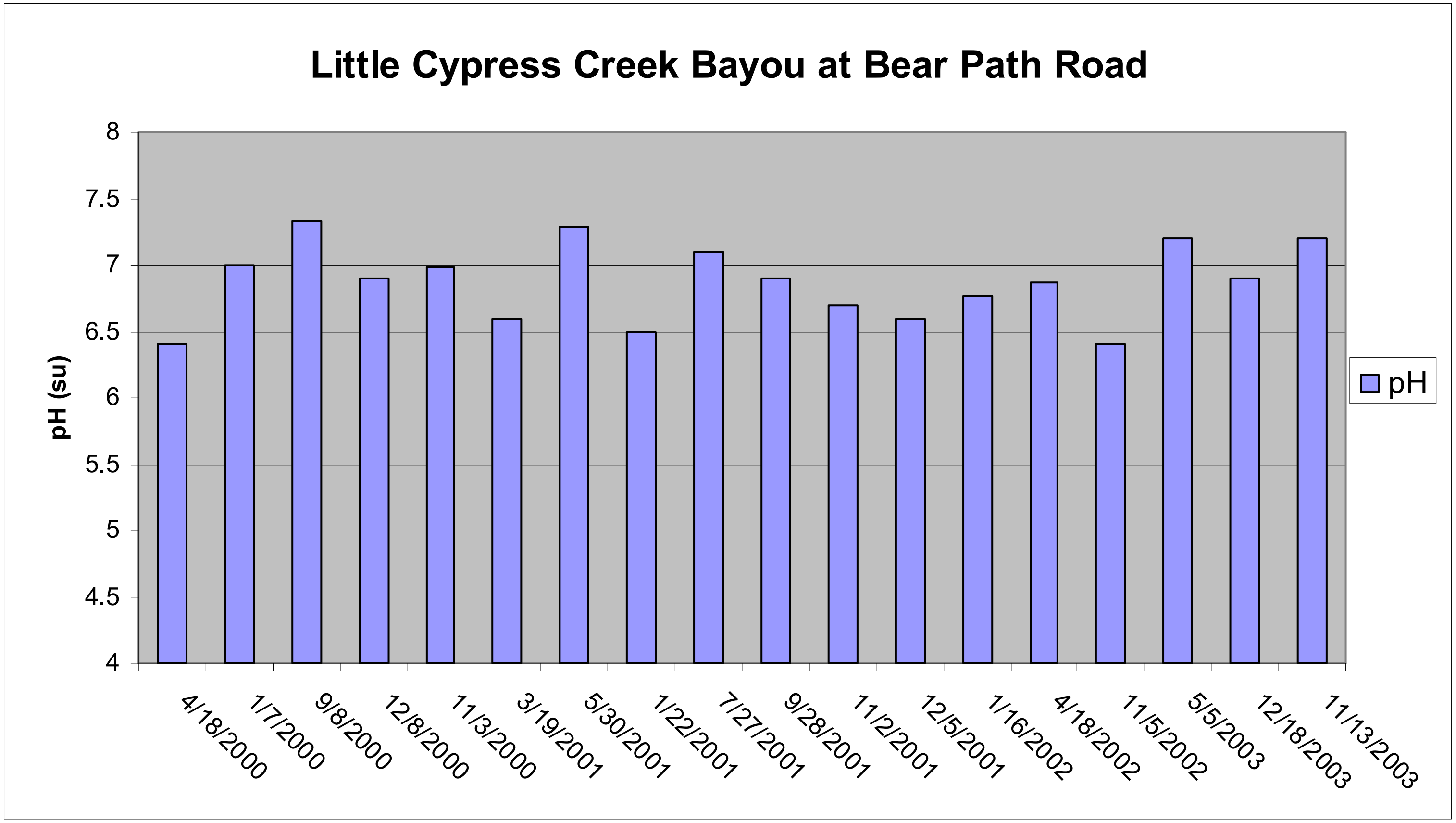
Data collected at the Little Cypress Creek Bayou at Bear Path Road site were gathered by the LC-M High School student monitoring group under the direct supervision of Mr. Cox. The teacher, Lockwood “Woody” Cox, led an average of 14 students to the site for their routine water quality monitoring.

While the water quality data at the Little Cypress Creek Bayou at Bear Path Road site do not demonstrate direct influences from nonpoint source pollution, monitor field notes document these concerns. Issues from trash and floatables to septic systems and construction runoff may be of concern. pH values are within an expected range as the values fluctuated between 6.4 su and 7.3 su. The specific conductivity values resemble expected ranges one typically sees in the east Texas region. Most conductivity values were within the 200 µS/cm to 500 µS/cm range with one very high anomalous reading at 3700 µS/cm. This high reading, taken on 12/8/2000, was also observed at another monitoring location, Little Cypress Creek Bayou at U.S. Hwy 87, was also documented on 11/3/2000. A very low dissolved oxygen reading, .76 mg/L, was also documented during the 11/3/2000 monitoring visit. Dissolved oxygen readings range from a low of .23 mg/L to levels at 8.6 mg/L. While temperature does influence water oxygen levels, this only accounts for a small amount of the variance. Seventy-eight percent of all samples are below the “exceptional” dissolved oxygen numeric criteria of 6.0 mg/L. Total depth readings at this site vary from .5 meters to 1.6 meters while Secchi depth readings range from .16 meters to .90 meters. This indicates high levels of suspended solids and turbidity.

TABLE 1: Descriptive Statistics

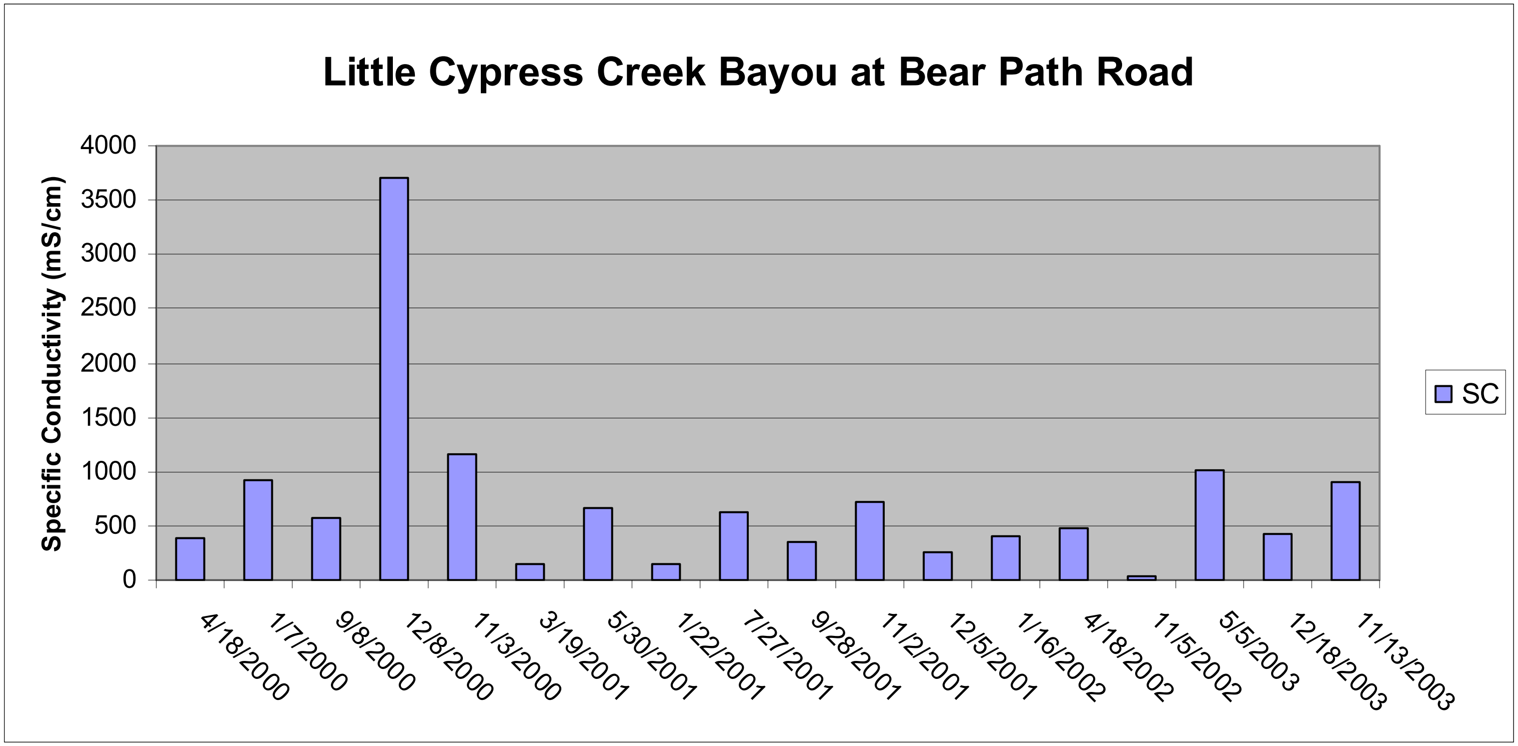
PARAMETER (SAMPLE ID# 15520) Little Cypress Creek Bayou at Bear Path Rd.	**N**	**% Complete**	**MIN**	**MEAN**	**MAX**
Sample TIME	18	100	8:30	12:57	15:00
Total Depth (m)	16	89	0.5	0.86	1.6
SC (µS/cm)	18	100	38	716.61	3700
Air T (C)	18	100	8	22.24	34
Water T (C)	18	100	7.3	17.63	26.3
DO (C)	18	100	0.23	3.16	8.6
pH (su)	18	100	6.4	6.87	7.34
Secchi Depth (m)	16	89	0.16	0.44	0.9
DO exceedence [< 6.0 mg/L]		14 of 18	78%		

GRAPH 1: pH

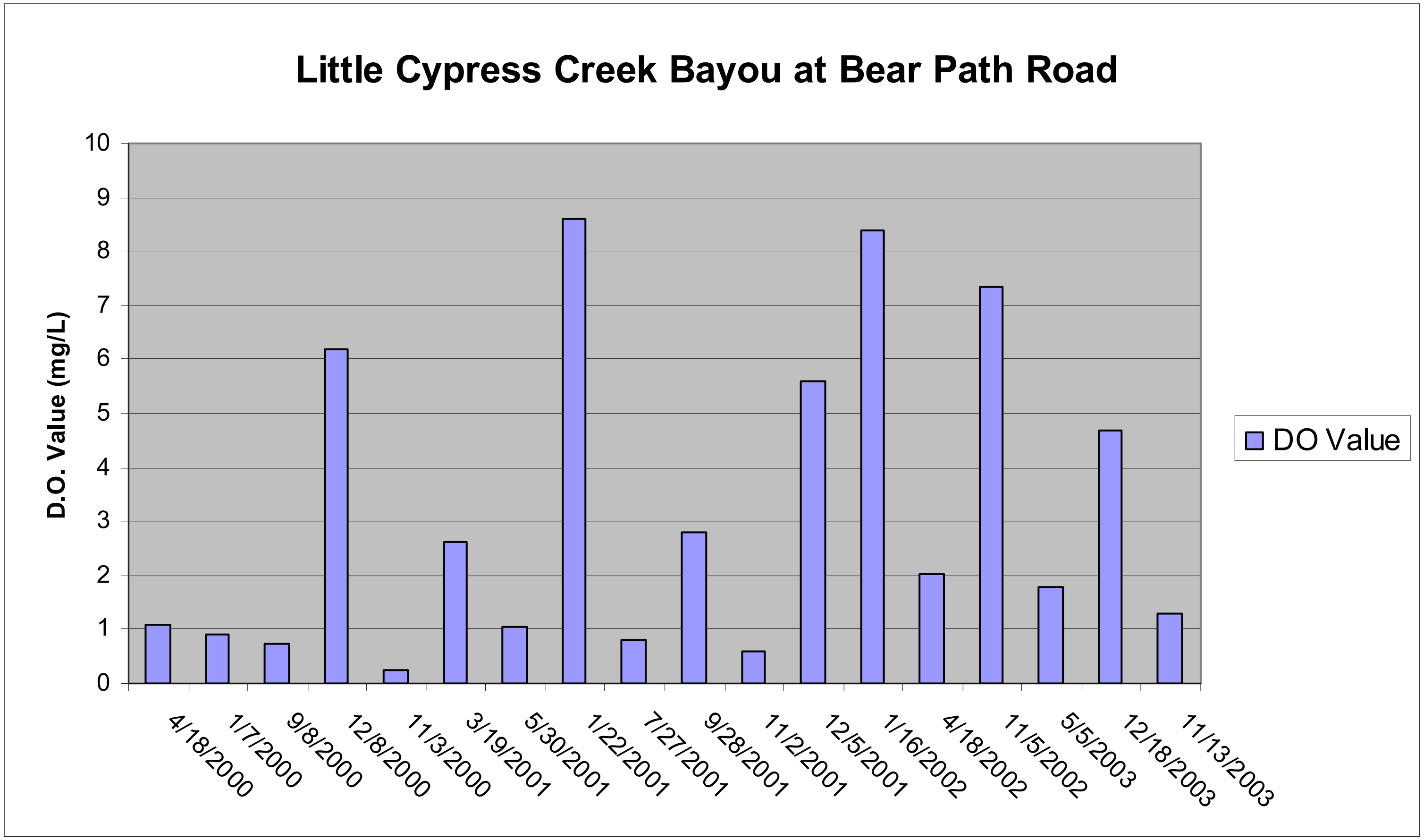


Little Cypress Creek Bayou at Bear Path Road
pH (su)
8
7.5
7
6.5
6
5.5
5
4.5
4
4/18/2000
1/7/2000
9/8/2000
12/8/2000
11/3/2000
3/19/2001
5/30/2001
1/22/2001
7/27/2001
9/28/2001
11/2/2001
12/5/2001
1/16/2002
4/18/2002
11/5/2002
5/5/2003
12/18/2003
11/13/2003
pH

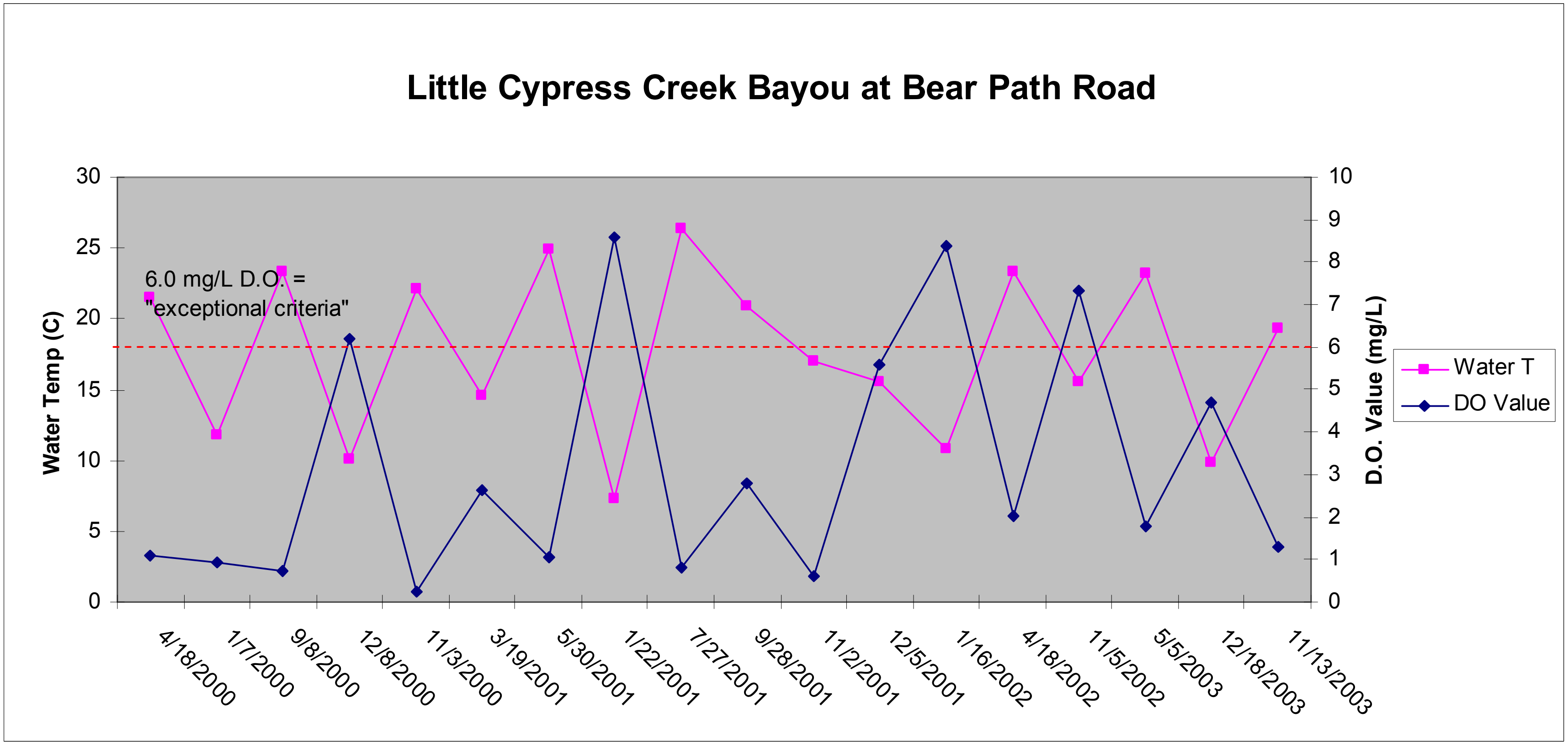
GRAPH 2: Specific Conductivity



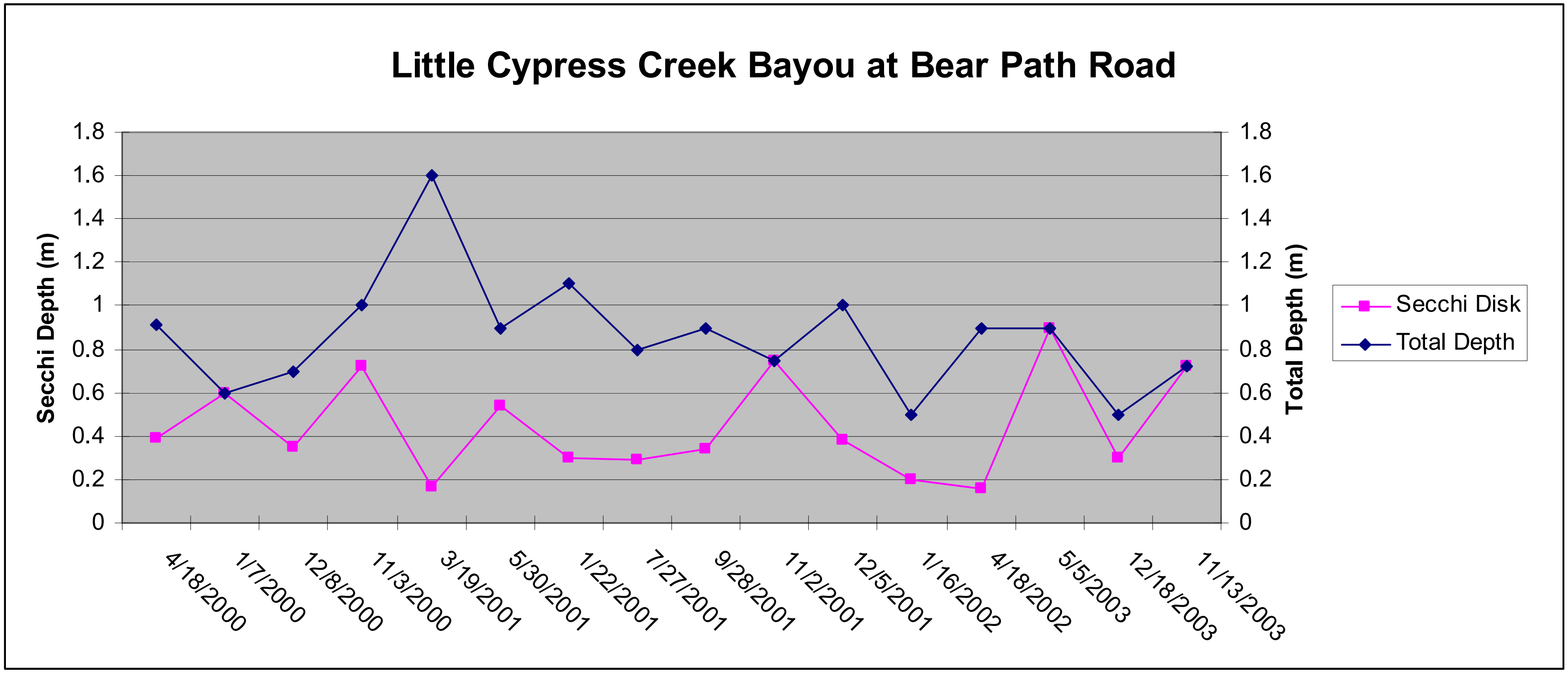
GRAPH 3: Dissolved Oxygen



GRAPH 4: Dissolved Oxygen and Temperature



GRAPH 5: Secchi Depth and Total Depth



LC-M HIGH SCHOOL & Little Cypress Creek Bayou at U.S.Hwy 87

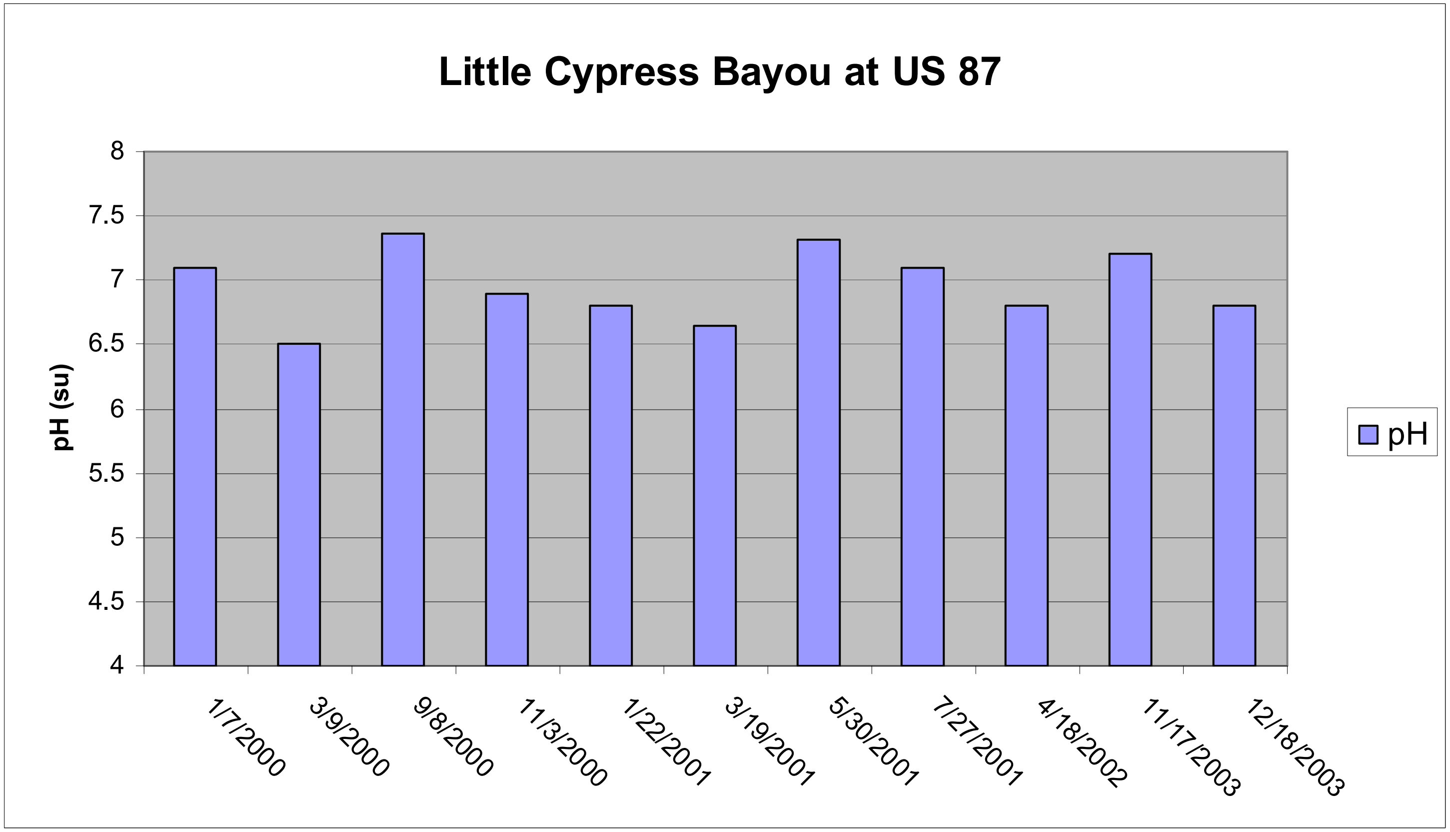
Data collected at the Little Cypress Creek Bayou at U.S. Hwy 87 site were gathered by the LC-M High School student monitoring group under the direct supervision of Mr. Cox. The teacher, Lockwood "Woody" Cox, led an average of 5 students to the site for their routine water quality monitoring.

pH levels are slightly acidic with an average of 6.9 su and values ranging from 6.5 su to 7.3 su . This reflects typical east Texas water quality conditions. Specific conductivity values range from 181 µS/cm to 3002 µS/cm with an average of 745 µS/cm. The very high 3002 µS reading was observed on 11/3/2000. Another very high conductivity reading was also observed at the Little Cypress Creek Bayou at Bear Path Road site on 12/8/2000. A very low dissolved oxygen reading, .76 mg/L, was also documented during the 11/3/2000 monitoring visit. It appears as though an acute, anomalous variable heavily influenced water quality conditions in the creek during this time period. Dissolved oxygen levels are relatively low with values ranging from .26 mg/L to 7.3 mg/L. While temperature does influence water oxygen levels, this accounts for a small amount of the variance. Ninety-one percent of all samples are below the "exceptional" dissolved oxygen numeric criteria of 6.0 mg/L. Total depth readings at this site vary from .9 meters to 2.6 meters while Secchi depth readings range from .18 meters to 1.5 meters.

TABLE 1: Descriptive Statistics

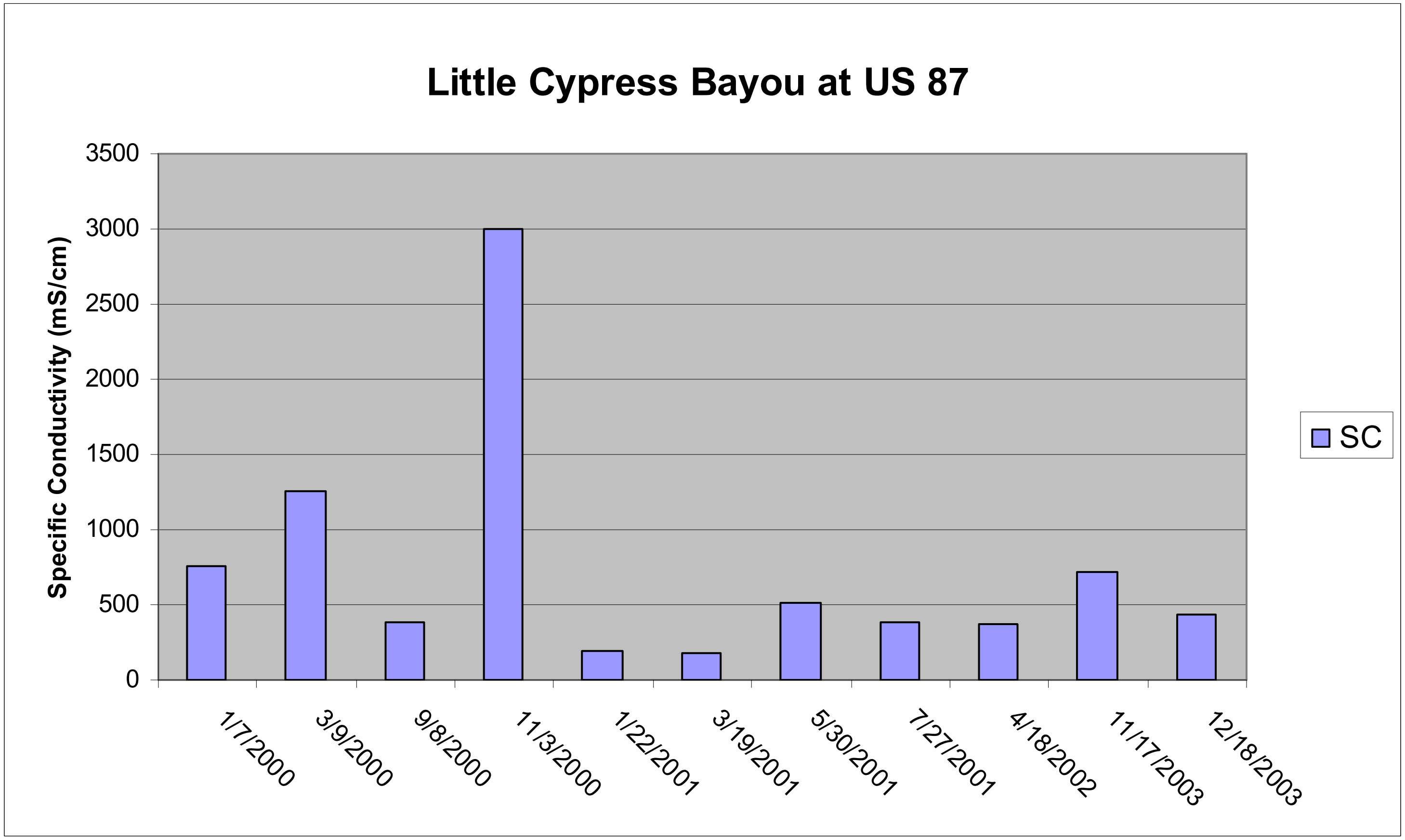
PARAMETER (SAMPLE ID# 15787) Little Cypress Bayou at US 87	**N**	**% Complete**	**MIN**	**MEAN**	**MAX**
Sample TIME	11	100	8:50	13:00	15:51
Total Depth (m)	10	91	0.9	1.49	2.6
SC (µS/cm)	11	100	181	745.00	3002
Air T (C)	11	100	14	22.82	32.5
Water T (C)	11	100	9.7	19.15	27
DO (C)	11	100	0.26	2.02	7.3
pH (su)	11	100	6.5	6.96	7.36
Secchi Depth (m)	10	91	0.18	0.64	1.5
DO exceedence [< 6.0 mg/L]		10 of 11	91%		

GRAPH 1: pH

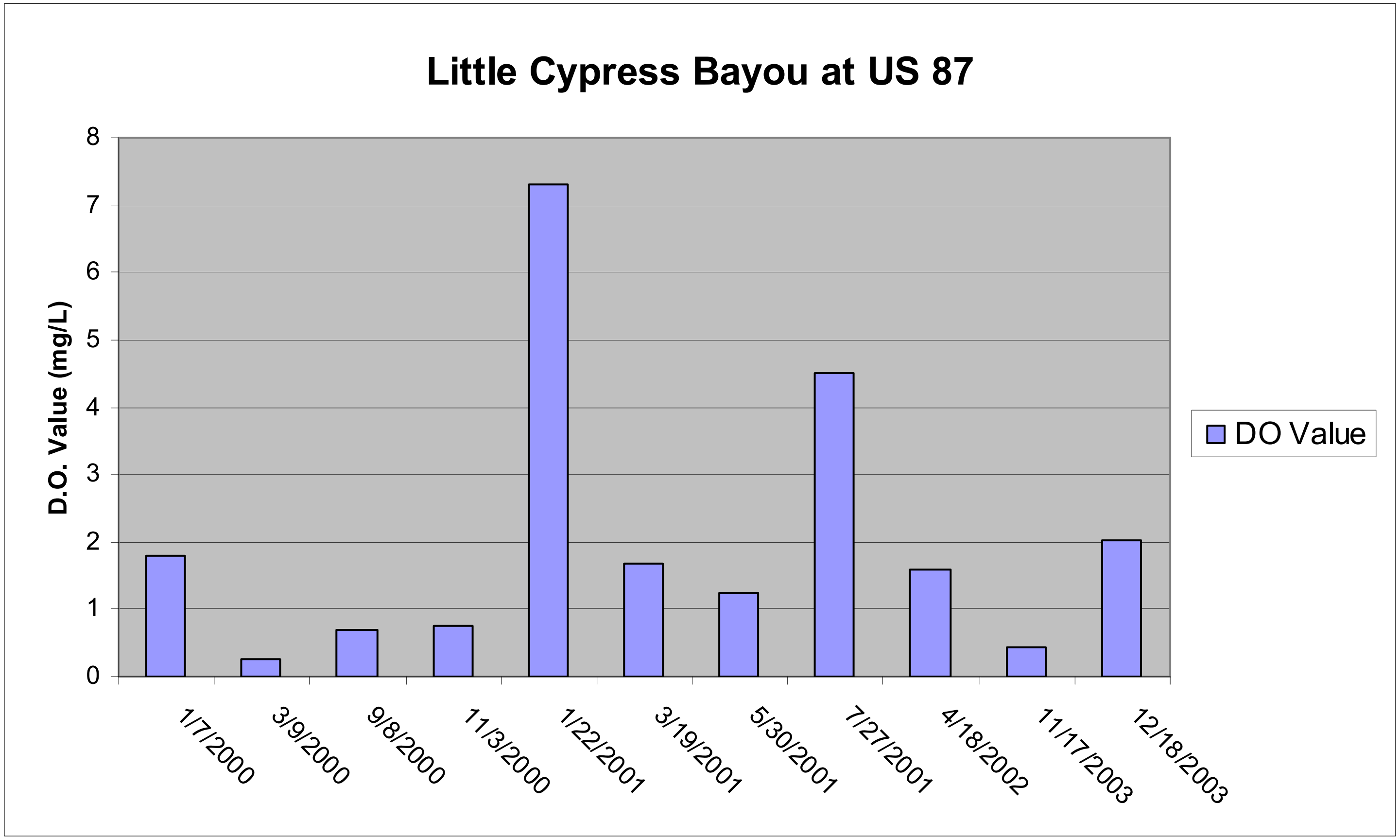


Little Cypress Bayou at US 87
pH (su)
8
7.5
7
6.5
6
5.5
5
4.5
4
1/7/2000
3/9/2000
9/8/2000
11/3/2000
1/22/2001
3/19/2001
5/30/2001
7/27/2001
4/18/2002
11/17/2003
12/18/2003
pH

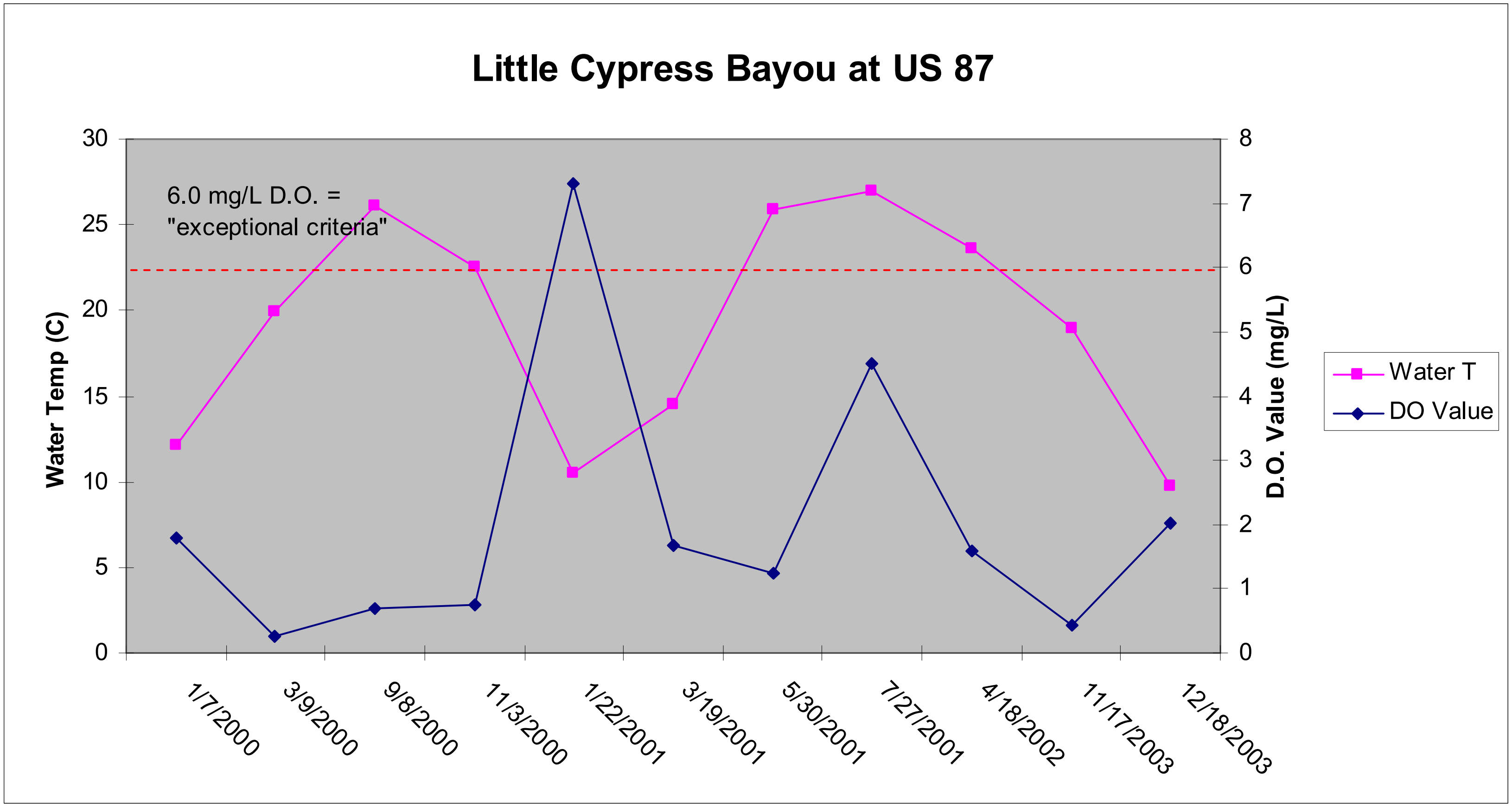
GRAPH 2: Specific Conductivity



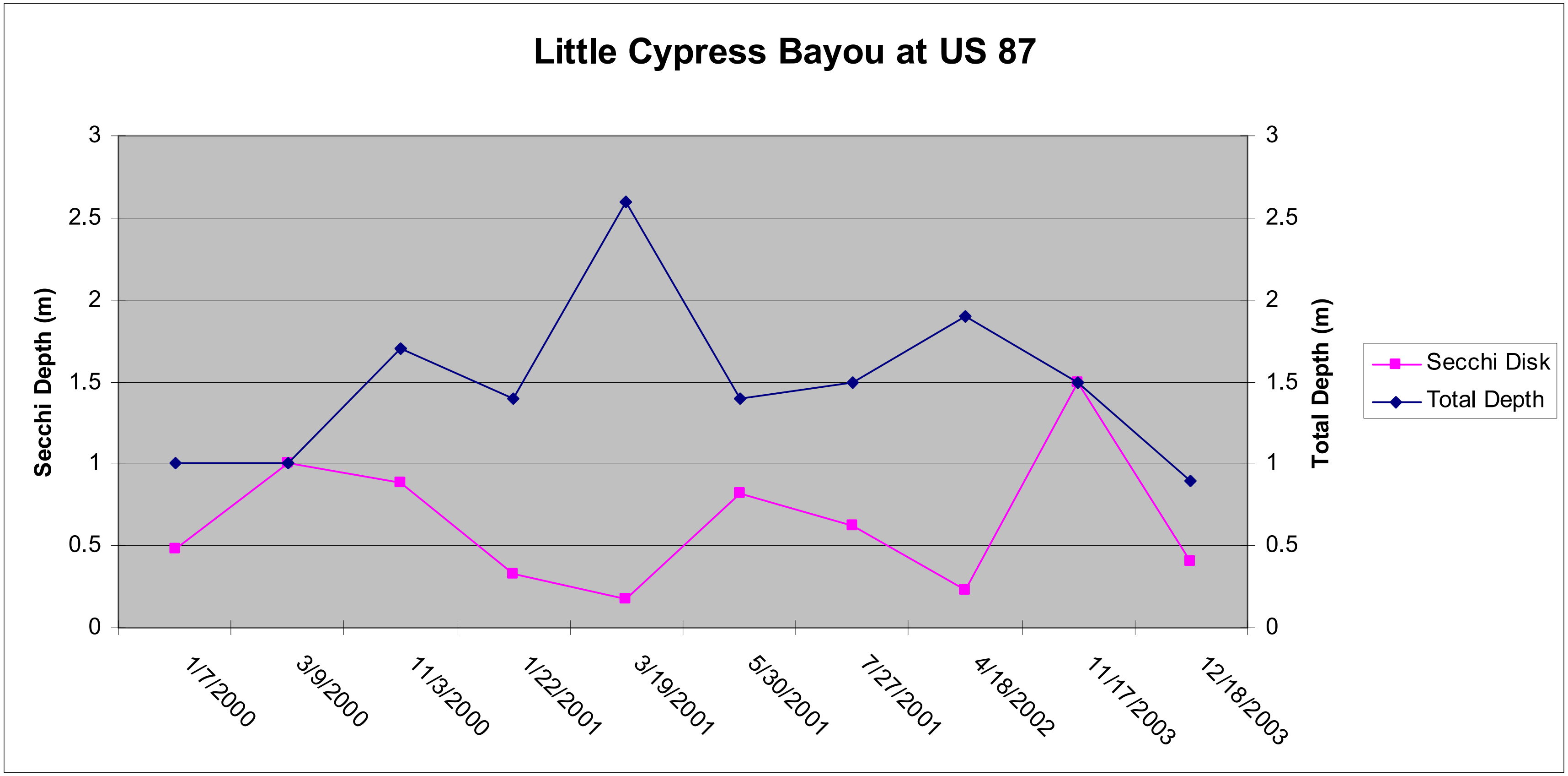
GRAPH 3: Dissolved Oxygen



GRAPH 4: Dissolved Oxygen and Temperature



GRAPH 5: Secchi Depth and Total Depth



HALLSVILLE HIGH SCHOOL C.L.I.P.S. & "Potter's Creek at Red Oak Road" Site

Data collected at the Potter's Creek at Red Oak Road site were collected by the HALLSVILLE HIGH SCHOOL C.L.I.P.S. group. The teacher, Cynthia Ward, led an average of 18 students to the site for their routine water quality monitoring.

Potter's Creek at Red Oak Road data illustrates a typical east Texas creek with moderately slow flow and depths. Some pH values were somewhat low with readings ranging from 4.2 su to 6.5 su. Given the log scale and nature of pH, this is an extensive range of pH readings.

Specific conductivity readings are also typical of some east Texas streams as the readings range from 140 µS/cm - 190 µS/cm. A high percentage of specific conductivity readings were not included in this report due to inadequate calibration documentation.

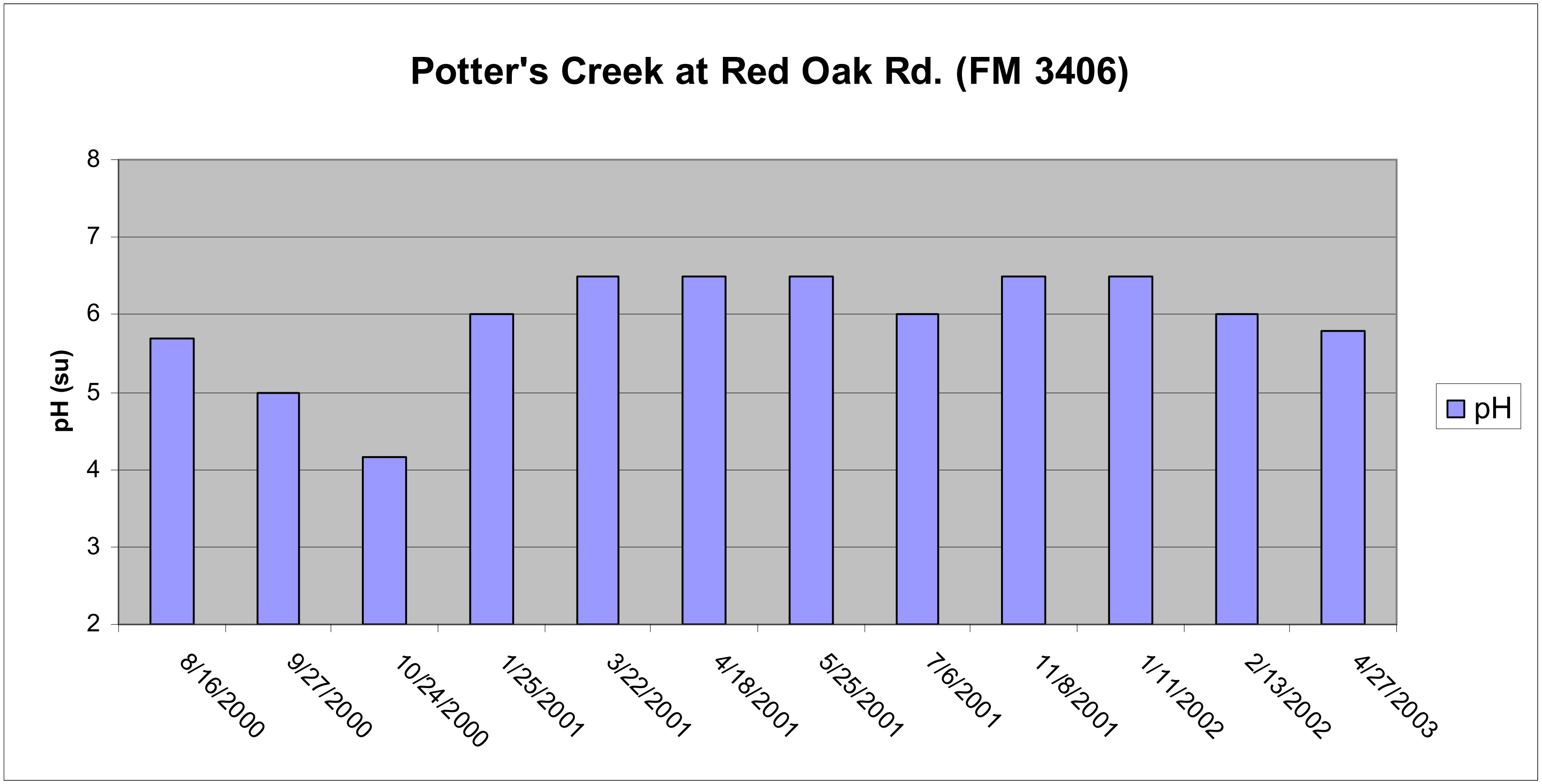
Dissolved oxygen readings seem to be significantly influenced by temperature and the highest values are typically observed in winter months with the coldest temperatures. The lowest dissolved oxygen readings are observed in the summer months. A classic inverse relationship between temperature and dissolved oxygen is observed. The dissolved oxygen readings range from around 4.6 mg/L to 10.5 mg/L. Around 1/3 of the dissolved oxygen readings were not included due to duplicate values outside of the data quality objectives range.

The total depth and Secchi depth readings are closely related with values for each ranging from .3 meters to 1.2 meters.

TABLE 1: Descriptive Statistics

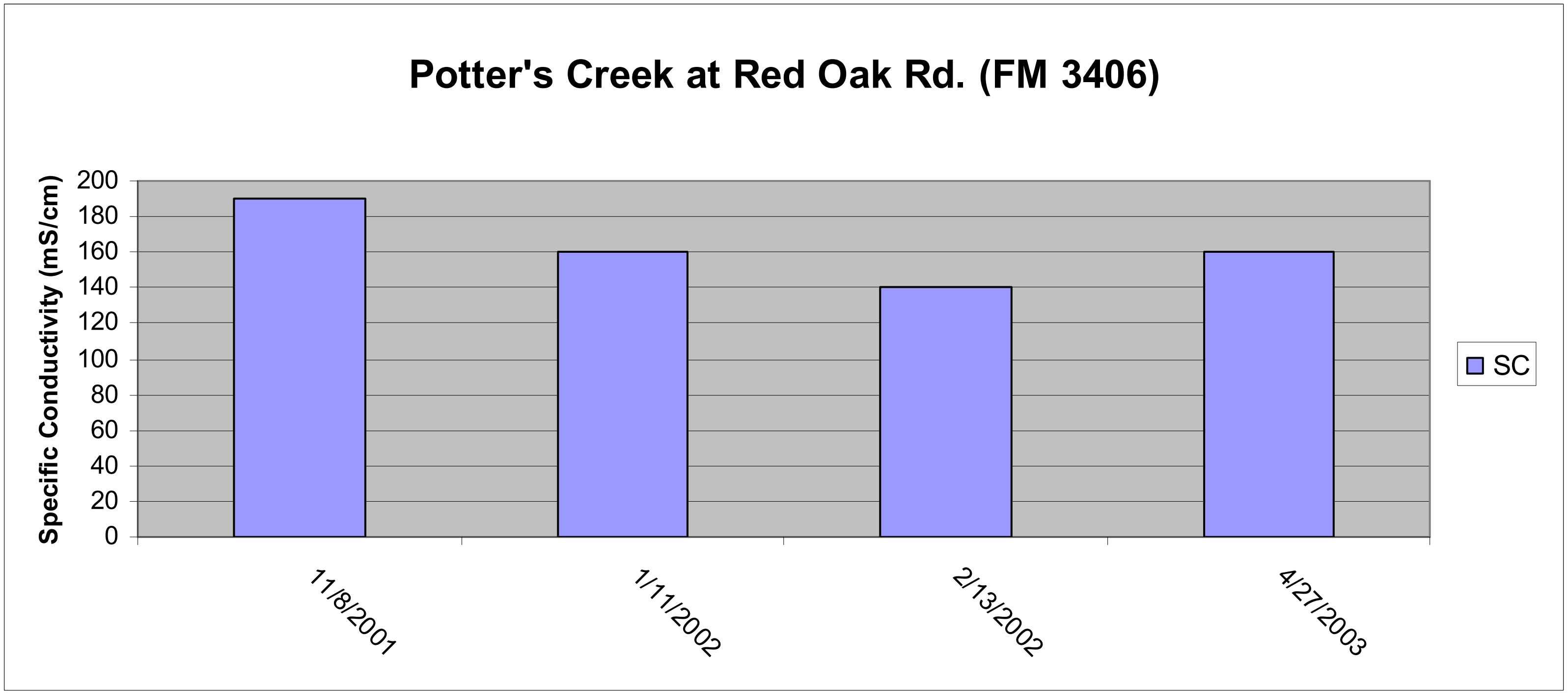
PARAMETER (SAMPLE ID# 15140) Potter's Creek at Red Oak Rd. (FM 3406)	**N**	**% Complete**	**MIN**	**MEAN**	**MAX**
Sample TIME	10	83	7:45	11:56	14:49
Total Depth (m)	12	100	0.26	0.62	1.2
SC (μS/cm)	4	34	140	162.50	190
Air T (C)	12	100	9	20.25	30
Water T (C)	12	100	9	17.27	26
DO (C)	8	67	5.2	8.33	10.6
pH (su)	12	100	4.15	5.93	6.5
Secchi Depth (m)	12	100	0.26	0.60	1.2
DO exceedence [< 6.0 mg/L]		1 of 8	13%		

GRAPH 1: pH

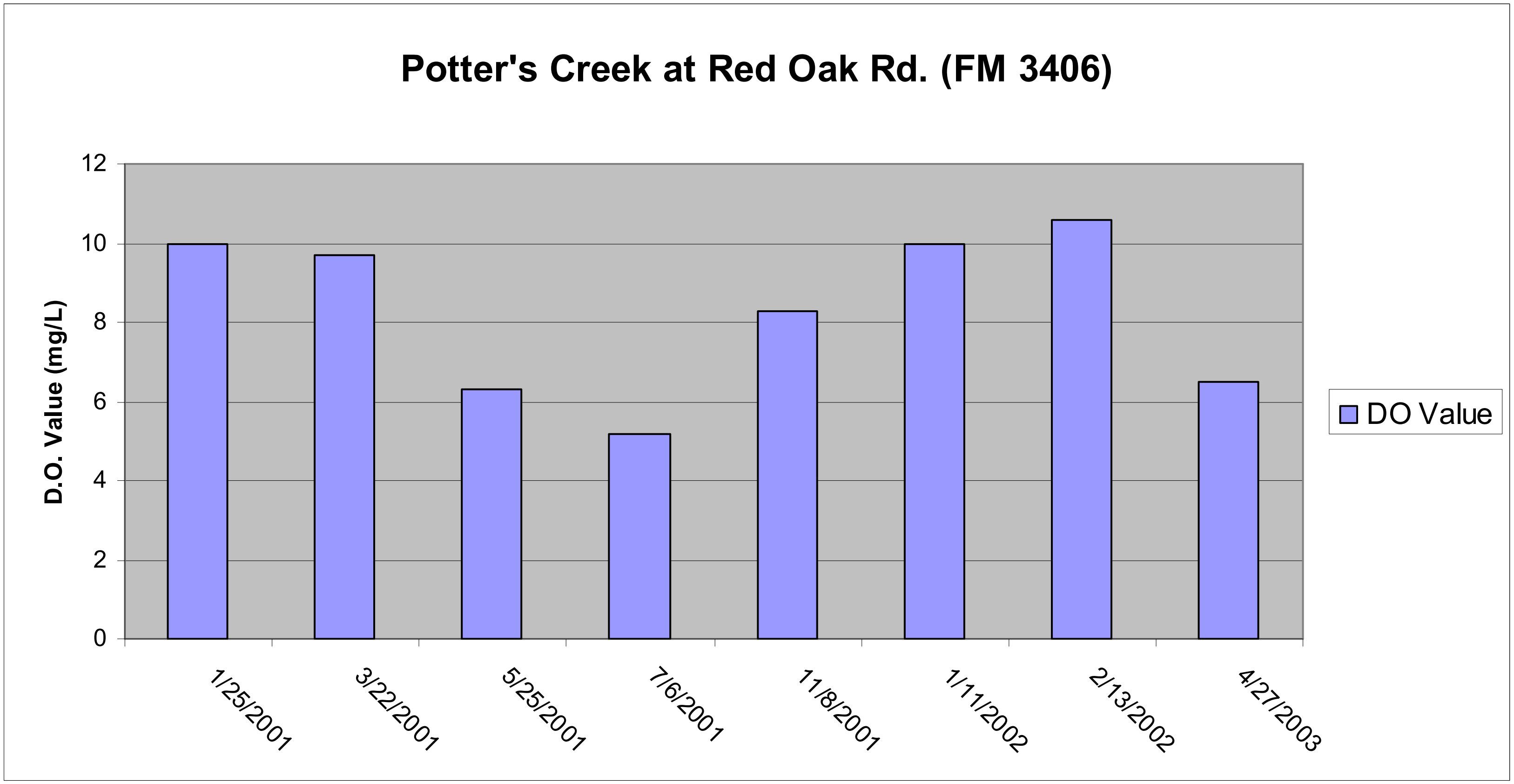


Potter's Creek at Red Oak Rd. (FM 3406)
8
7
6
5
4
3
2
pH (su)
pH
8/16/2000
9/27/2000
10/24/2000
1/25/2001
3/22/2001
4/18/2001
5/25/2001
7/6/2001
11/8/2001
1/11/2002
2/13/2002
4/27/2003

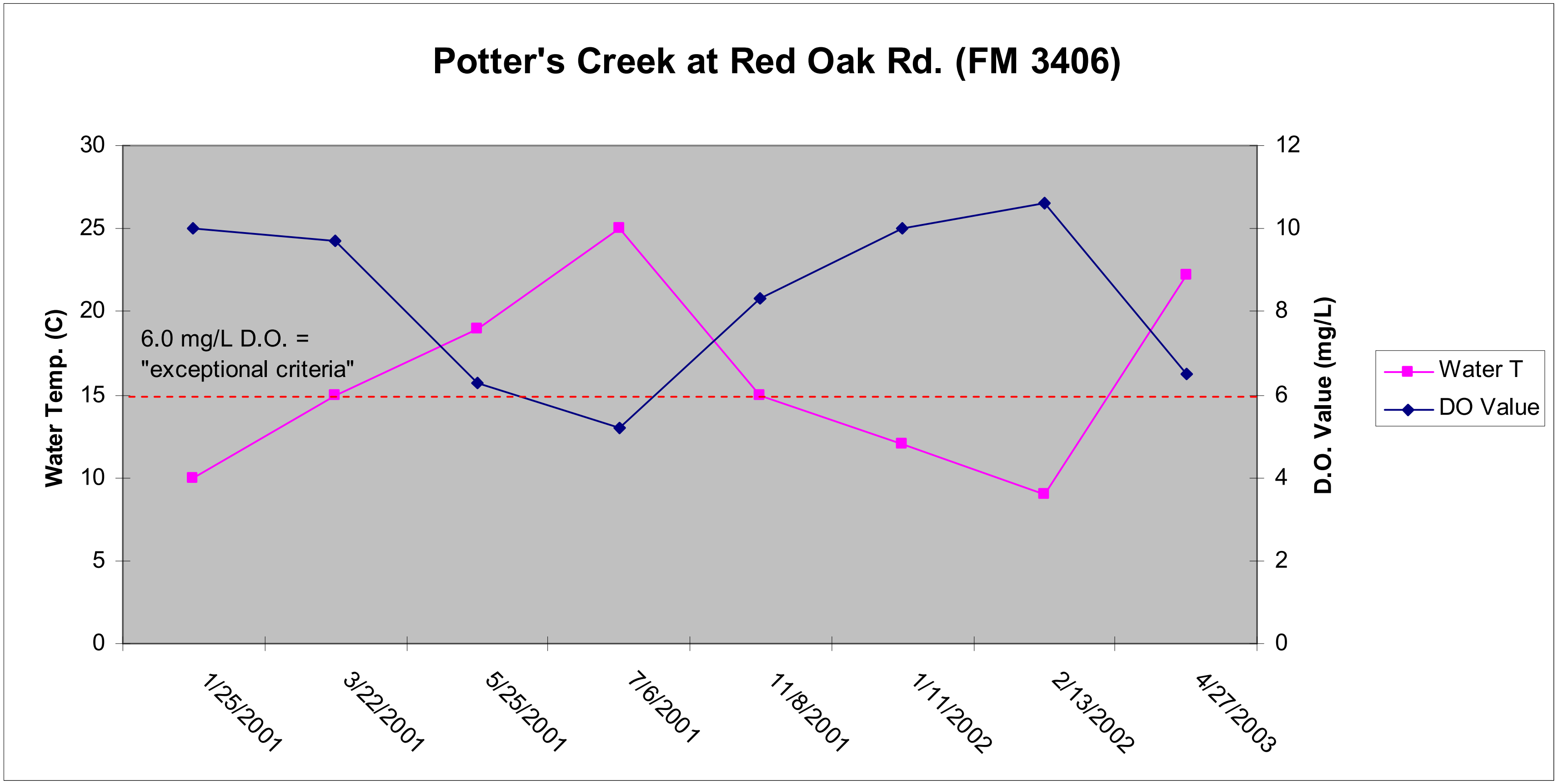
GRAPH 2: Specific Conductivity



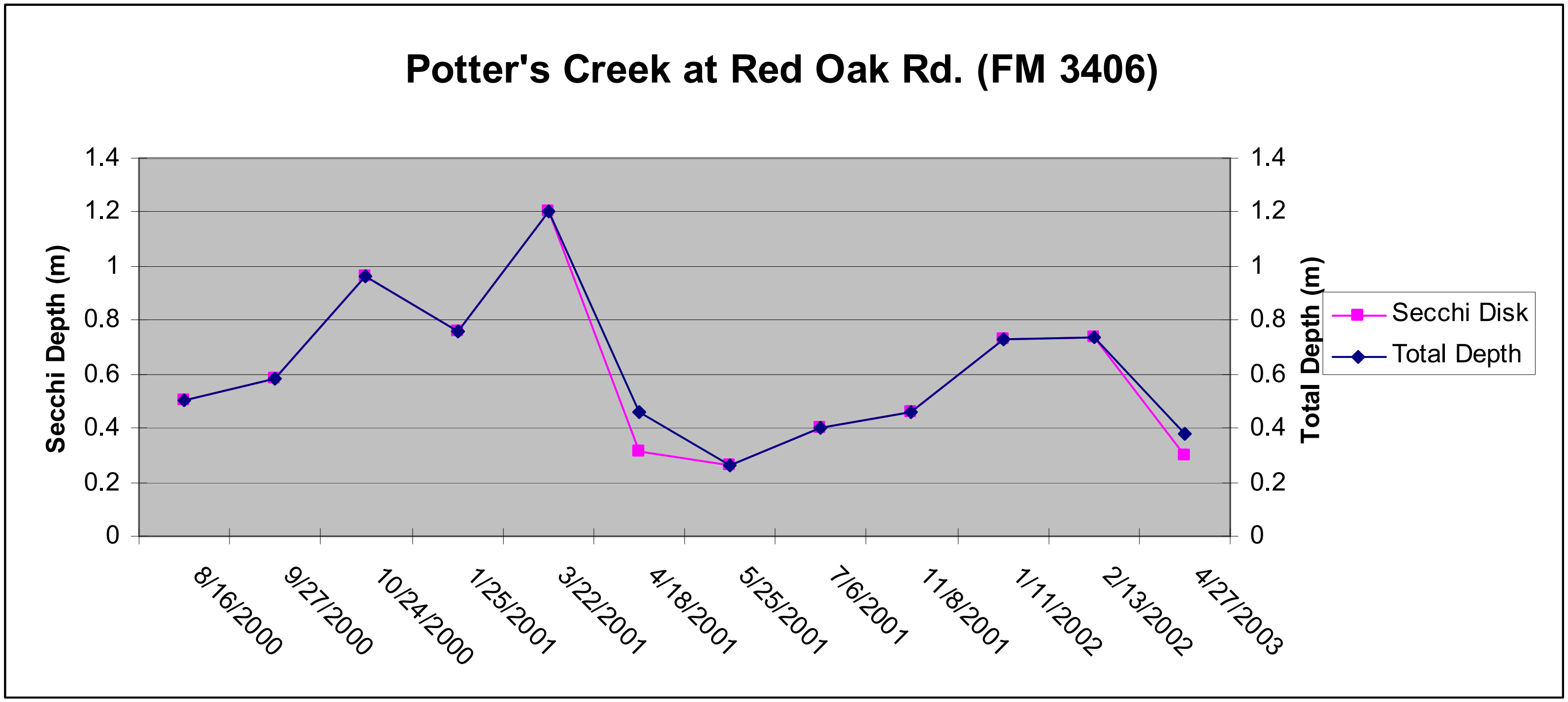
GRAPH 3: Dissolved Oxygen



GRAPH 4: Dissolved Oxygen and Temperature



GRAPH 5: Secchi Depth and Total Depth



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SC (µS/cm)	18	100	38	716.61	3700
Air T (C)	18	100	8	22.24	34
Water T (C)	18	100	7.3	17.63	26.3
DO (C)	18	100	0.23	3.16	8.6
pH (su)	18	100	6.4	6.87	7.34
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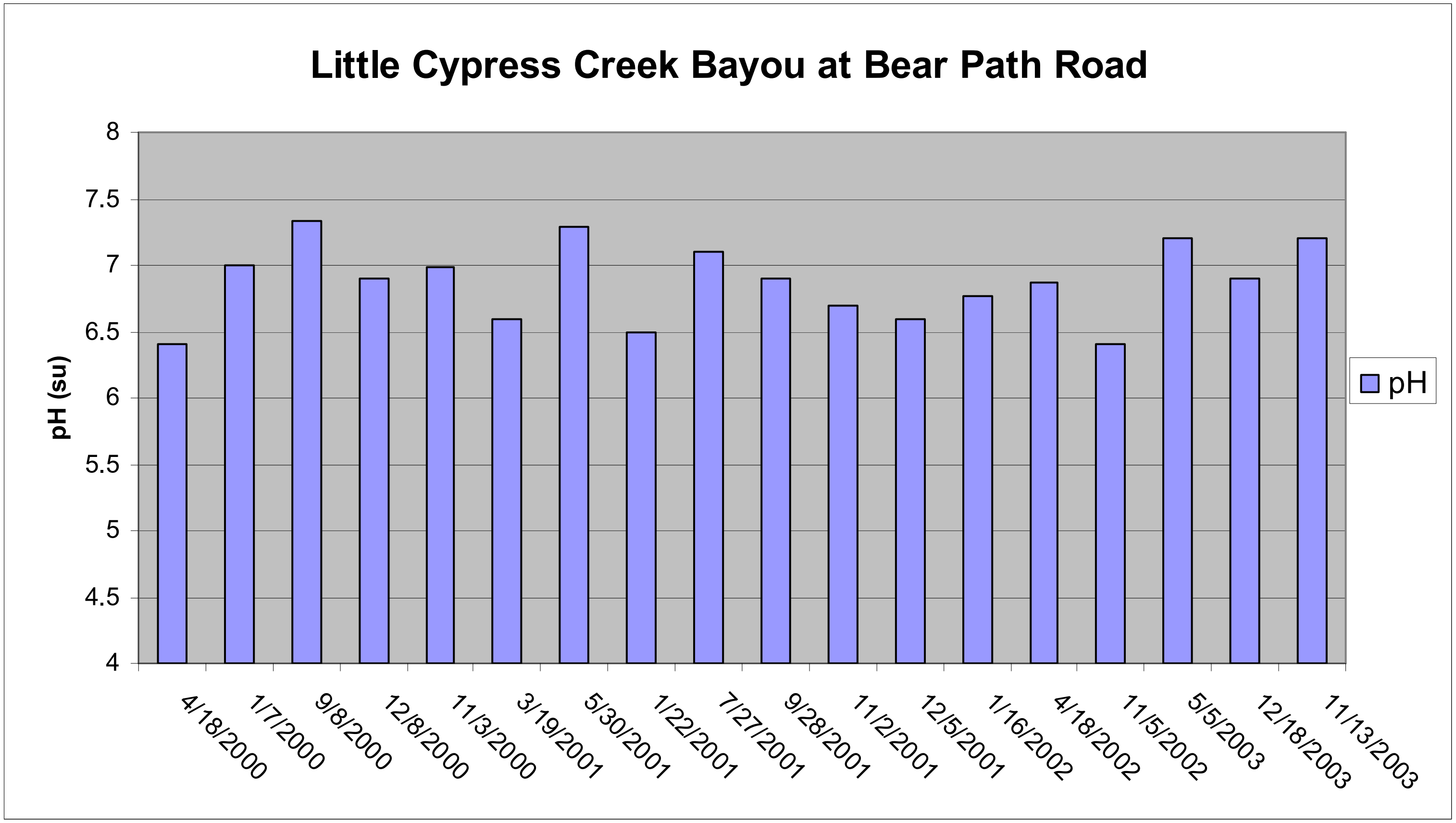
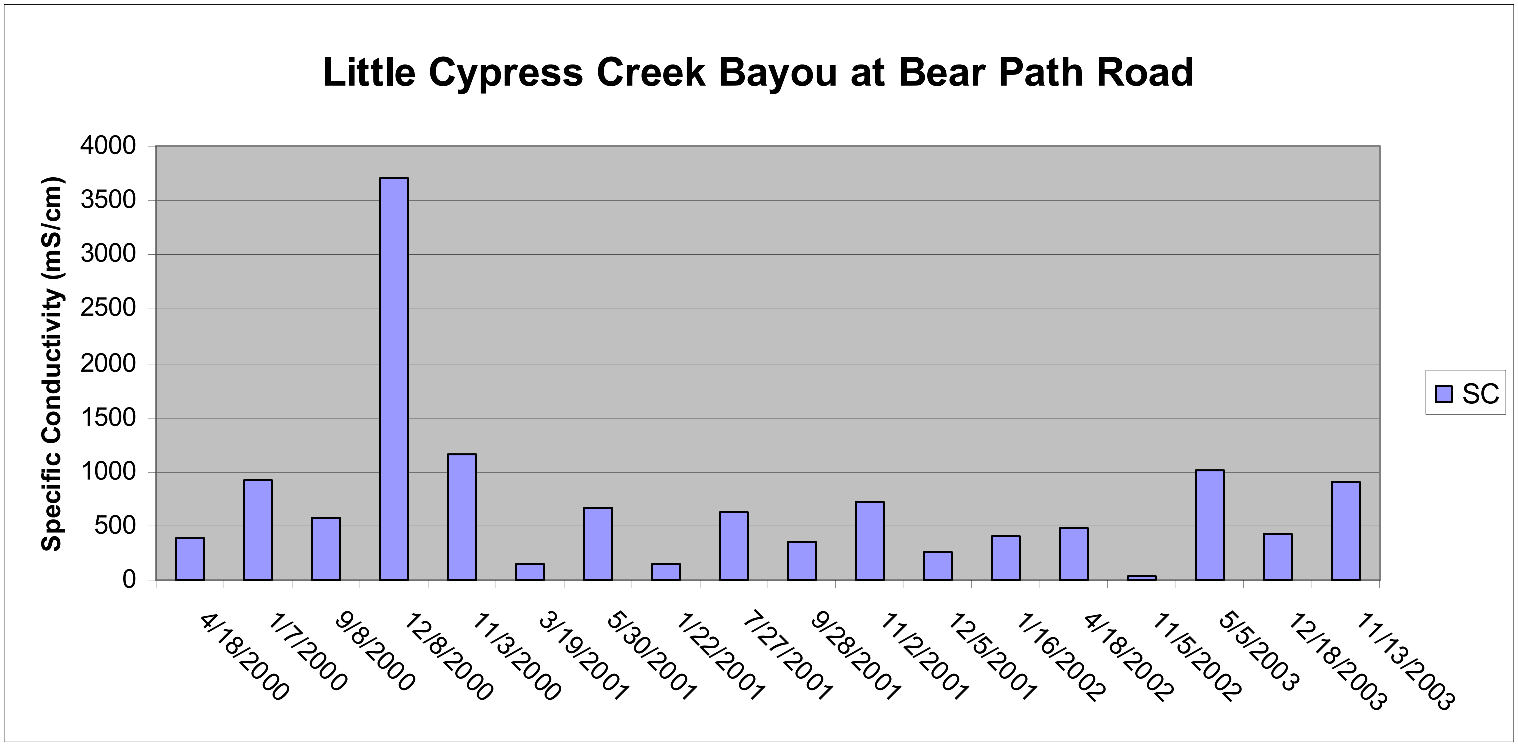
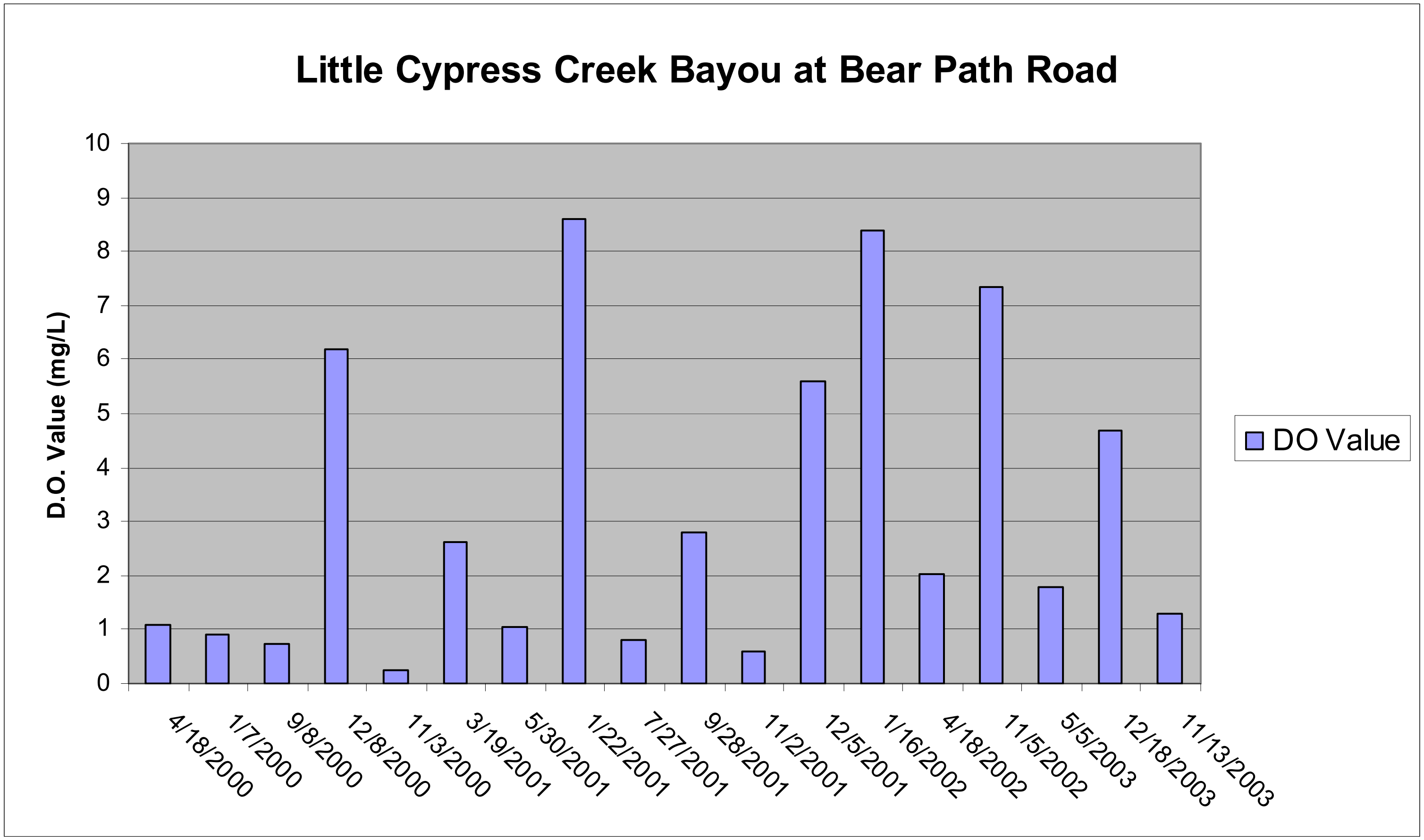
GRAPH 1: pH


Little Cypress Creek Bayou at Bear Path Road
pH (su)
8
7.5
7
6.5
6
5.5
5
4.5
4
4/18/2000
1/7/2000
9/8/2000
12/8/2000
11/3/2000
3/19/2001
5/30/2001
1/22/2001
7/27/2001
9/28/2001
11/2/2001
12/5/2001
1/16/2002
4/18/2002
11/5/2002
5/5/2003
12/18/2003
11/13/2003
pH

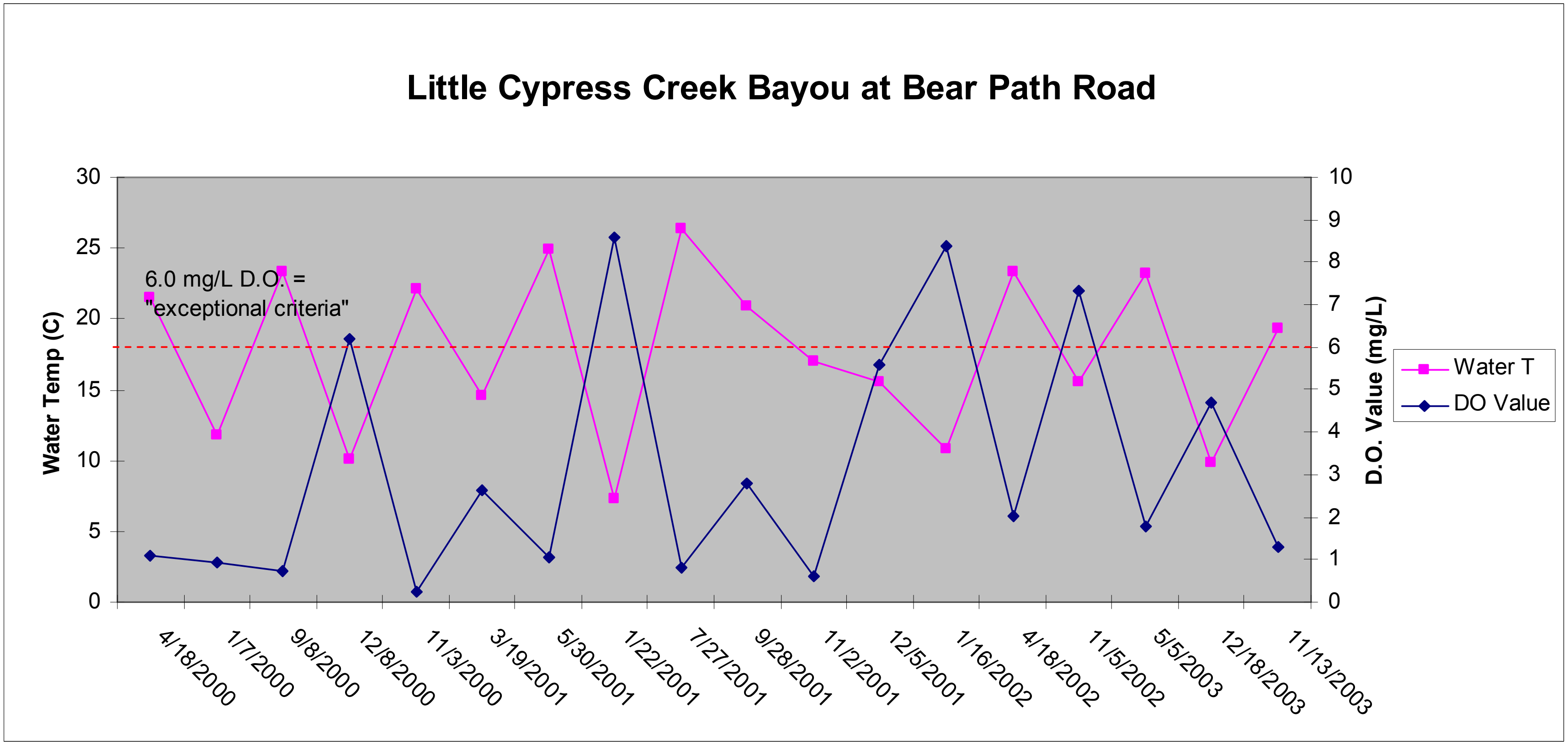
GRAPH 2: Specific Conductivity



GRAPH 3: Dissolved Oxygen



GRAPH 4: Dissolved Oxygen and Temperature



GRAPH 5: Secchi Depth and Total Depth