DRAFT

Texas Stream Team Volunteer Water Quality Monitoring Program
2008 Grace Creek at Fairmont Street Data Summary

This data summary report includes general basin volunteer monitoring activity, general water quality descriptive statistics, tables and graphs, and comparisons to stream standards as related to "aquatic life use" criteria.

In alignment with Texas Stream Team'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 Stream Team 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 Stream Team 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 and river authority water specialists; and, 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 Stream Team 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 that Texas agencies use to keep water resources healthy and sustainable.

In general, Texas Stream Team 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 Stream Team Data Viewer
8. Participate in professional coordinated monitoring processes to raise awareness of areas of concern

Information collected by Texas Stream Team 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 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. The "y1" or "y2" axes contain the constituent(s) of interest. 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.

SITE DESCRIPTION

Grace Creek is labeled by the Texas Commission on Environmental Quality (TCEQ) as stream segment 0505B in the Sabine River Basin. Grace Creek flows through Longview, Texas into the Sabine River from the north in Gregg County. Fairmont Street crosses Grace Creek in an east-west orientation approximately 6 miles upstream of the confluence of the Sabine River. Grace Creek has been listed on the TCEQ 303 (d) list of impaired water bodies since 2000 with concern for depressed dissolved oxygen and bacteria levels.

DATA

The following information summarizes water quality data collected on Lake Creek at Montgomery Trace Park in Montgomery County, Texas. Information presented in this report will be accompanied by corresponding charts and graphs.
For all graphs, site name or sample date is located on the "x" or horizontal axis. This axis represents the independent variable, location of site or time. The data points on the "x" axis progress from upstream to downstream or chronologically from oldest to most recent sampling. The "y1" or "y2" axes contain the constituent(s) of interest. There is also an "R" squared correlation coefficient equation accompanied by a trend line that indicates the strength and direction of a linear relationship between two variables. This coefficient is used to determine if an independent variable is related to a dependent variable. While correlation does not represent causation, there is sometimes a demonstrated cause and effect relationship.

Data collected by Texas Stream Team monitors include: pH, specific conductivity, water and air temperature, dissolved oxygen, total depth, Secchi depth, field observations, flow severity, days since last precipitation, and others.

There were 44 samples taken from Grace Creek at Fairmont Street from November 19th, 2004 to September 19th, 2008. Sampling times ranged from 9:45 am to 4:05 pm with the average sampling time occurring at 12:10 pm. Monitoring was conducted by Texas Stream Team volunteer Clyde Foltz in partnership with the Upper Sabine River Authority.

pH Summary

pH levels measure how acidic or alkaline the water sample is. A reading is taken on a 0 – 14 scale measured in standard units (su). When pH levels fall out of the 5 – 9 su range, it begins to become a problem for aquatic life. At Fairmont Street, pH values ranged from 6.5 to 7.5 su with an average value of 7 su. These pH readings are extremely stable and present no cause for concern.

Specific Conductivity Summary

Specific Conductivity (SC) levels measure the amount of Total Dissolved Solids (TDS) that are present in a water sample. These can be a wide variety of inorganic substances such as sodium, chloride, nitrates, and phosphates. Generally, high SC values indicate salt water, while lower values are usually observed in fresh water. SC is

measured using micro Siemens per centimeter (µS/cm). At Fairmont Street, SC values ranged from 90 to 550 µS/cm with an average value of 279.5 µS/cm.

Water Temperature Summary

Water temperature affects many different aspects of water quality. It can effect feeding, reproduction, and the metabolism of aquatic animals as well as the rate of chemical reactions and solubility of compounds in the water. At Fairmont Street, water temperature values ranged from 5.8°C to 28° with an average value of 18.5°. As expected, the values fluctuate with the air temperature at the time of the year. The minimum of 5.8° was recorded in December 2005 and the maximum of 28° was recorded in July 2005.

Secchi Depth Summary

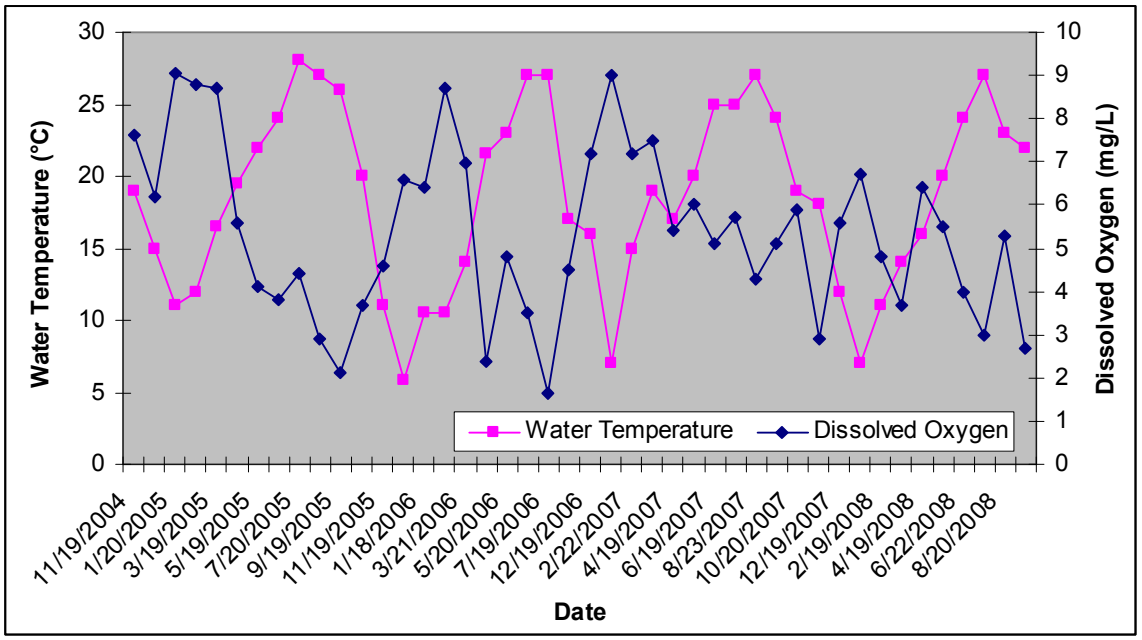
Secchi depth is a measurement of how transparent or turbid the water body is. Water transparency is important because it determines how far into the water body sunlight can penetrate; affecting photosynthesis and aquatic life behavior. At Fairmont Street, Secchi depth values ranged from 0.09 m to 0.6 m with an average value of 0.36 m. Total depth values ranged from 0.09 m to 0.78 m with an average value of 0.47 m. Since Secchi depth and total depth values are close in comparison, the indication is for high water transparency.

Dissolved Oxygen Summary

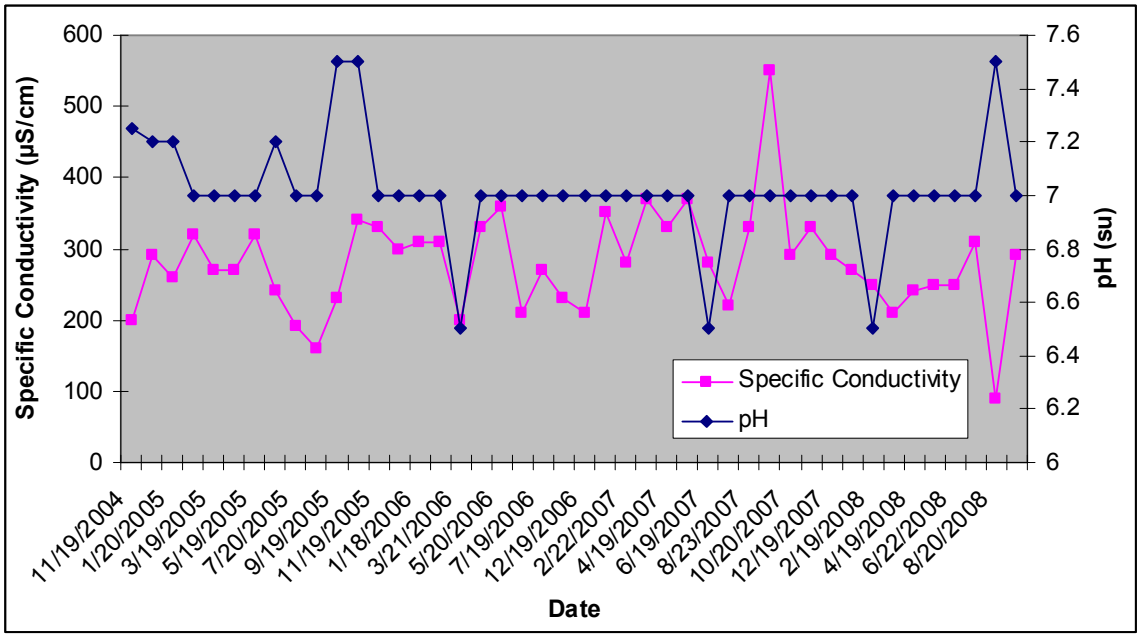
Dissolved Oxygen (DO) is the oxygen freely available to fish and other aquatic life. Traditionally, the level of DO has been accepted as the single most important indicator of a water body's ability to support desirable aquatic life. It is measured in milligrams per liter (mg/L). When DO levels drop below 6.0 mg/L, it is deemed in exceedance of safe DO levels, thus, dangerous for aquatic life. At Fairmont Street, DO values ranged from 1.65 to 9.05 mg/L with an average value of 5.4 mg/L. With 28 of 44 samples yielding a value below the 6.0 mg/L standard, the site has a 64% exceedance rate. The low DO values present a cause for concern for Grace Creek and supports this water body's listing on the TCEQ 303 (d) list of impaired water bodies since 2000. The low value of 1.65 mg/L is extremely low and in some instances can not support aquatic life, leading to fish kills.

Grace Creek at Fairmont Street						
Parameter	**N**	**% complete**	**Min**	**Mean**	**Max**	**Std. Dev.**
Sample Time	44	100	9:45	12:10	16:05	1:05
Total Depth (m)	30	68	0.09	0.47	0.78	0.17
Secchi Depth (m)	26	59	0.09	0.36	0.6	0.14
Specific Conductivity	44	100	90	279.5	550	72.27
Air Temperature (C)	44	100	5	22.5	34	7.5
Water Temperature (C)	44	100	5.8	18.5	28	6.21
Dissolved Oxygen (mg/L)	44	100	1.65	5.4	9.05	1.95
pH (su)	44	100	6.5	7	7.5	0.2
DO exceedance [< 6.0 mg/L]		28 of 44	64%			

Water Temperature and Dissolved Oxygen



Specific Conductivity and pH



CONCLUSIONS

As evidenced in the TCEQ 303 (d) list of impaired water bodies, there is a cause for concern for depressed dissolved oxygen levels in Grace Creek. The data presented in this report is concurrent with the 303 (d) listing.

There is a correlation found between dissolved oxygen levels and water temperature. These two parameters typically exhibit an inverse relationship as the low value of 1.65 mg/L was observed in July 2006 and the high value of 9.05 mg/L was observed in January 2005. The graph 'Water Temperature and Dissolved Oxygen' above displays this relationship.

The other graph titled 'Specific Conductivity and pH' examines the correlation between the two parameters. The extremely stable nature of the pH value seems to be unmoved by the fluctuating SC value. SC is an indicator of total dissolved solids and this graph was generated to seek possible relationships between pH and total dissolved solids. In this dataset, there does not seem to be a strong correlation between the two.

A positive note to this data set is the consistency of monitoring conducted at Fairmont Street. From November 2004 to September 2008, only three months lack recorded data. In addition, sampling times are consistent, with only a 1 hour and 5 minute standard deviation from the average. With a consistent and thorough data set such as this one, it is easy to identify water quality issues on Grace Creek, thus making it easier to solve them.