DRAFT

Texas Stream Team Volunteer Water Quality Monitoring Program
2008 Grand Harbor Cove at Walden Road 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

Grand Harbor Cove flows into Lake Conroe in Montgomery County, TX. Conroe Dam impounds the West Fork of the San Jacinto River for the 19,320 acres of surface water that constitute Lake Conroe, which flows at a south-easterly angle. Grand Harbor Cove feeds into Lake Conroe on the south-west side of the reservoir. Walden Road crosses over Grand Harbor Cove in a north-south orientation approximately 6 miles from Conroe Dam.

DATA

The following information summarizes water quality data collected on Grand Harbor Cove of Lake Conroe 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 13 samples taken from Grand Harbor Cove from February 26th, 2007 to April 25th, 2008. Sampling times ranged from 8:55 am to 10:01 am with the average sampling time occurring at 9:23 am. Monitoring was conducted by Texas Stream Team volunteers Gene Zetka and Brent Nelson in partnership with the Houston-Galveston Area Council.

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 Grand Harbor Cove, pH values ranged from 7 to 7.8 su with an average value of 7.5 su. These pH levels are very stable and suitable for all usage criteria.

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 Grand Harbor Cove, SC values ranged from 180 to 270 µS/cm with an average value of 232.3 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 Grand Harbor Cove, water temperature values ranged from 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 8° was recorded in January and the maximum of 28° in July.

Secchi Depth Summary

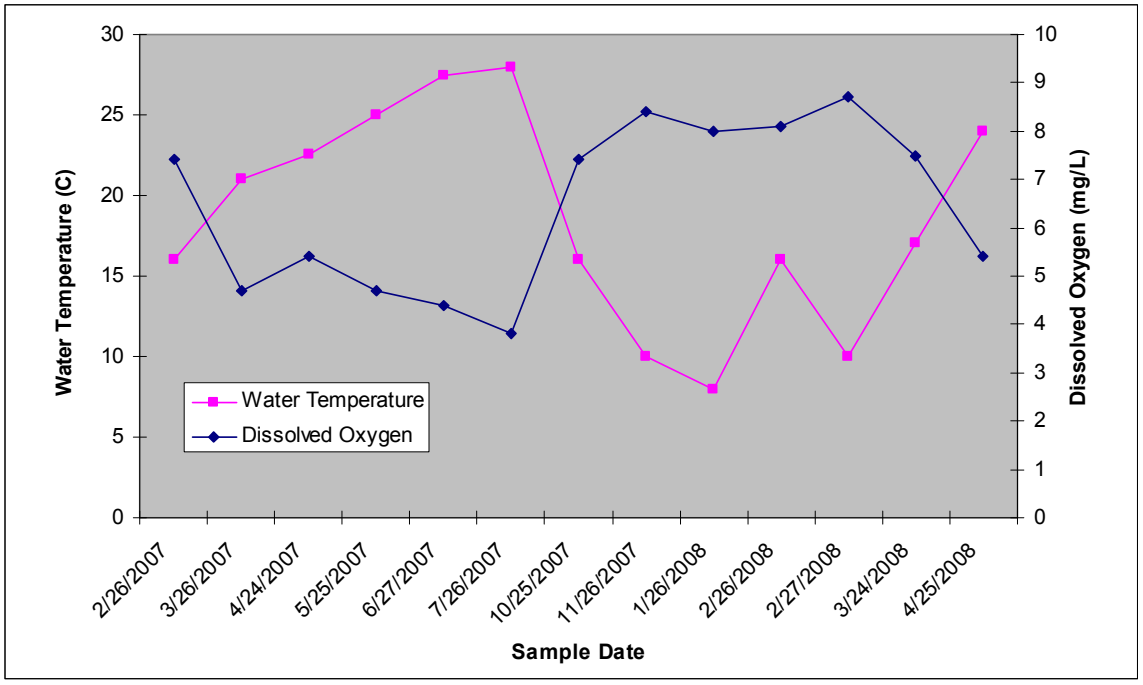
Secchi depth is a measurement of how transparent or turbid the water body is. Water transparency is important because it determines how far into the water body sunlight can penetrate; affecting photosynthesis and aquatic life behavior. At Grand Harbor Cove, Secchi depth values ranged from 0.12 to 0.4 m with an average value of 0.26 m. Total depth values ranged from 1.2 to 1.6 m with an average value of 1.4 m. These readings indicate low water transparency.

Dissolved Oxygen Summary

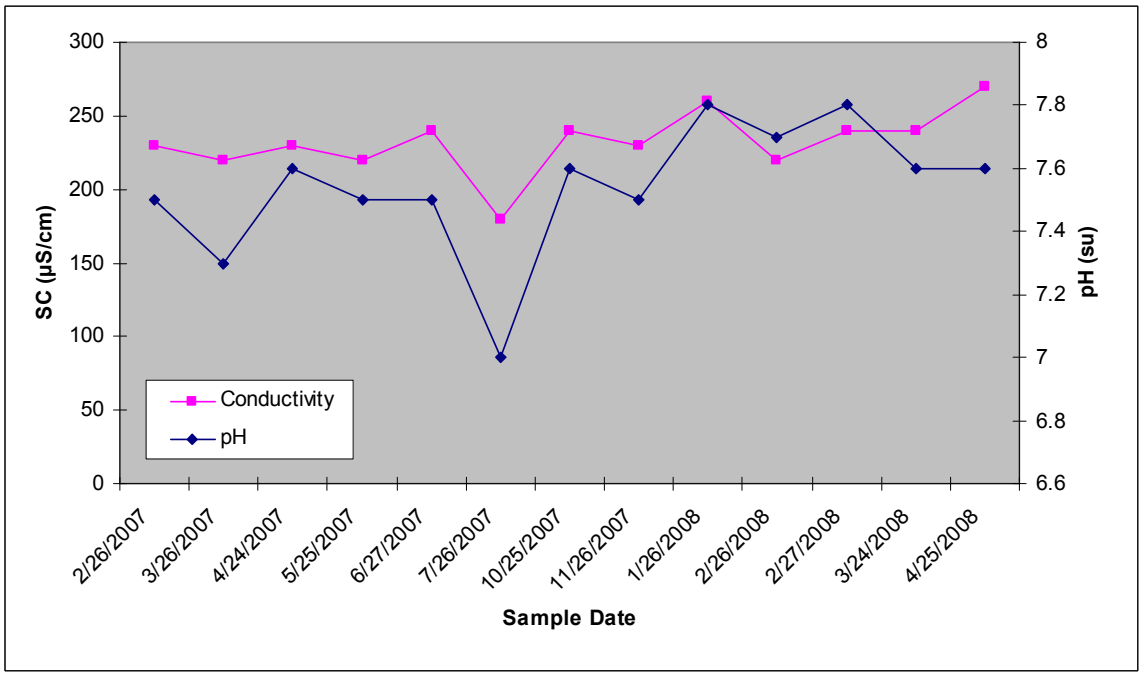
Dissolved Oxygen (DO) is the oxygen freely available to fish and other aquatic life. Traditionally, the level of DO has been accepted as the single most important indicator of a water body's ability to support desirable aquatic life. It is measured in milligrams per liter (mg/L). When DO levels drop below 6.0 mg/L, it is deemed in exceedence of safe DO levels, thus, dangerous for aquatic life. At Grand Harbor Cove, DO values ranged from 3.9 to 8.7 mg/L with an average value of 6.5 mg/L. While this average value is above the 6.0 mg/L criteria, 6 of the 13 sampling events yielded a result below this standard, giving the site a 46% DO exceedence rate. This can present problems for aquatic life in the water body. These exceedences were observed almost entirely in sequence with each other; from March to July 2007, every monitoring event yielded an exceedence. This trend could possibly have been the cause of higher temperatures, as it is common for temperature and DO to exhibit an inverse relationship.

Grand Harbor Cove at Walden Rd.						
Parameter	N	% complete	Min	Mean	Max	Std. Dev.
Sample Time	13	100	8:55	9:23	10:01	0:19
Total Depth (m)	13	100	1.2	1.4	1.6	0.13
Secchi Depth (m)	13	100	0.12	0.26	0.4	0.09
SC (µS/cm)	13	100	180	232.3	270	21.7
Air Temp (C)	13	100	5	16.3	28	8.1
Water Temp (C)	13	100	8	18.5	28	6.7
DO (mg/L)	13	100	3.9	6.5	8.7	1.7
pH (su)	13	100	7	7.5	7.8	0.2
DO exceedence [< 6.0 mg/L]		6 of 13	46%			

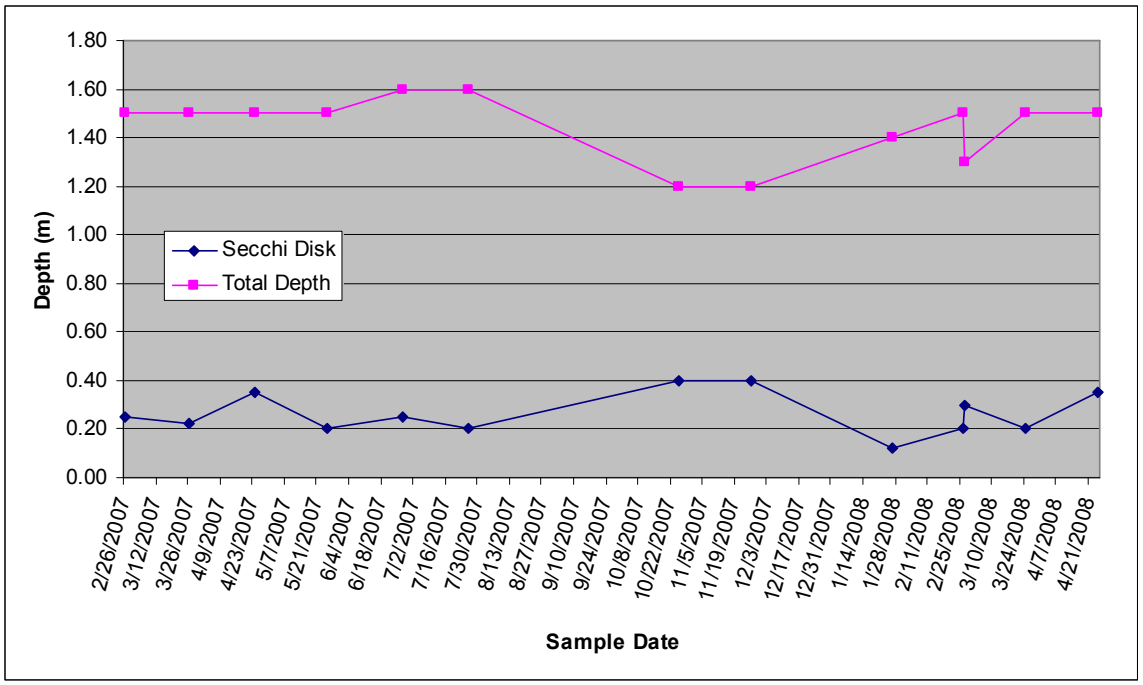
Water Temperature and Dissolved Oxygen



Specific Conductivity and pH



Secchi and Total depth



CONCLUSIONS

Only one data parameter statistically presents a concern to water quality in this dataset for the Grand Harbor Cove at Walden Road site. Dissolved Oxygen levels appear below the acceptable 6.0 mg/L criteria for healthy aquatic life environments at a rate of 46%. The minimum value of 3.9 mg/L is considered low and if this DO level is to drop lower in the future, it could lead to fish kills.

On a positive note, this dataset is a good beginning and on track to starting a consistent and reliable database of water quality information on Grand Harbor at Walden Road. This is shown by the fact that from February 2007 to April 2008, there were only 3 months that went without a monitoring event: August, September, and December 2007. On top of that, monitoring event times tended to fall with a tight range and reveal a standard deviation of only 19 minutes. This is desirable due to the possible water quality conditions changing with the time of day; therefore, Texas Stream Team monitors are asked to monitor at the same time of day, once a month. If monitoring is continued in the fashion it has been at this site thus far, there will be well established baseline data for the area.