

DRAFT

**Texas Stream Team Volunteer Water Quality Monitoring Program
2008 Taylor Lake at Nasa 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

Taylor Lake is located between TCEQ stream segments Bayport Channel (segment 2438) and Clear Lake (segment 2425). Taylor Lake flows into Clear Lake from the north, and Clear Lake then feeds directly into Galveston Bay from the west. Nasa Road crosses over Taylor Lake in an east-west orientation, just at the confluence of Taylor Lake and Clear Lake.

DATA

The following information summarizes water quality data collected on Taylor Lake at Nasa Road in Harris 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, flow severity, days since last precipitation, total depth, Secchi depth, field observations, and others.

There were 13 samples taken from Taylor Lake at Nasa Road from December 30th, 2006 to February 29th, 2008. Sampling times ranged from 7:50 am to 1:00 pm with the average sampling time occurring at 10:15 am. Monitoring was conducted by Texas Stream Team Volunteer Victor Madamba and Gib Larson of the Galveston County Master Naturalists in partnership with the Houston-Galveston Area Council.

NOTE: There were no values recorded for Specific Conductivity in the dataset.

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 the Nasa Road site, pH values ranged from 5 to 9.5 su with an average value of 7.4 su. Both the minimum and maximum values are at the outer ends of the range of acceptable pH values for aquatic life and human recreational usage. The maximum value of 9.5 su is actually slightly outside of the acceptable range. With this wide range of values, there is some concern for the pH balance at this site.

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 the Nasa Road site, water temperature values ranged from 9°C to 30° with an average of 19.6°. As expected, the values fluctuate with the time of year. The minimum of 9° was recorded in January and the maximum of 30° was recorded in August.

Secchi Depth Summary

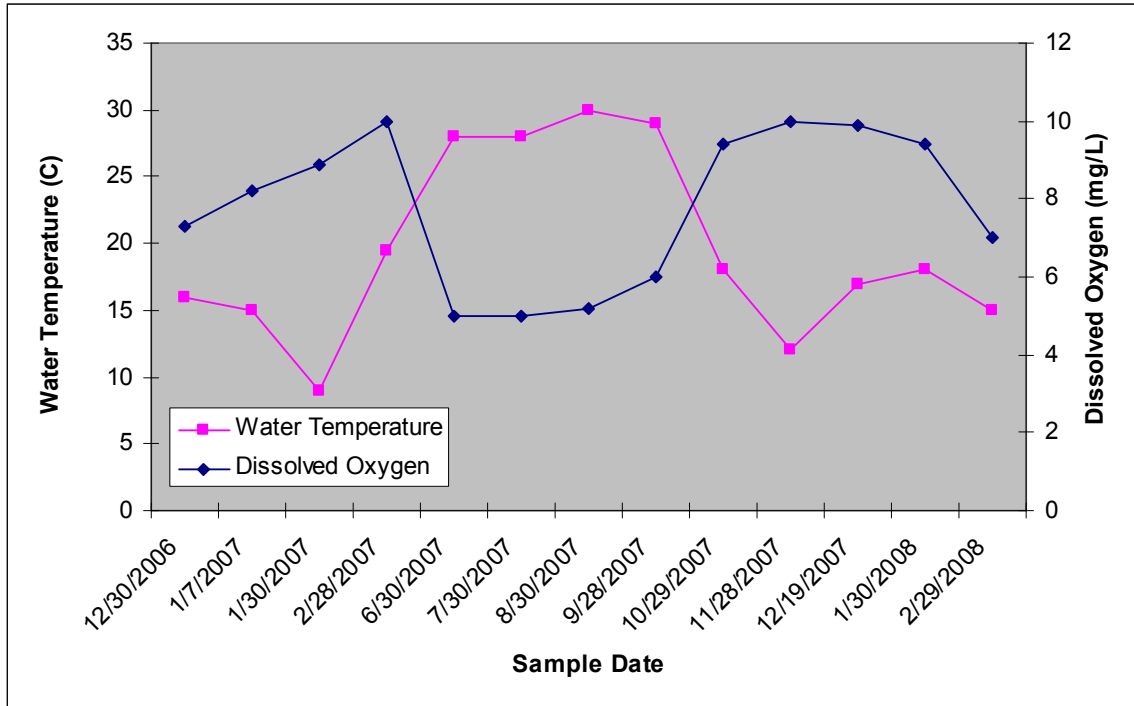
Secchi depth is a measurement of how transparent or turbid the water body is. Water transparency is important because it determines how far into the water body sunlight can penetrate; affecting photosynthesis and aquatic life behavior. At the Nasa Road site, Secchi depth values ranged from 0.17 to 0.97 m with an average value of 0.37 m. Total depth values ranged from 1 to 2.4 m with an average of 1.9 m. These readings indicate low water transparency.

Dissolved Oxygen Summary

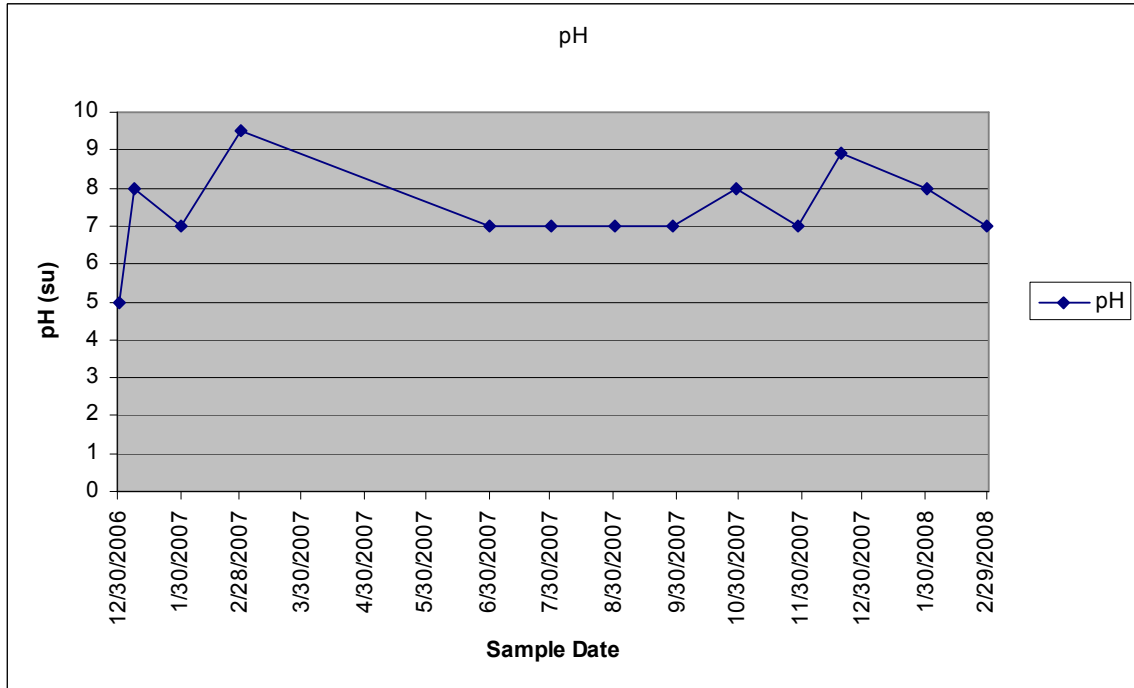
Dissolved Oxygen (DO) is the oxygen freely available to fish and other aquatic life. Traditionally, the level of DO has been accepted as the single most important indicator of a water body's ability to support desirable aquatic life. It is measured in milligrams per liter (mg/L). When DO levels drop below 6.0 mg/L, it is deemed in exceedence of safe DO levels, thus, dangerous for aquatic life. At the Nasa Road site, DO values ranged from 5 to 10 mg/L with an average value of 7.8 mg/L. While this average value is above the 6.0 mg/L criteria, 3 of 13 sampling events yielded a result below this standard, giving the site a 23% exceedence rate. These 3 low DO values were recorded during the summer months of June, July, and August. The minimum value of 5 mg/L was recorded on both June and July 30th, 2007. It is an observed trend that low DO values can be linked to high temperatures, the two usually form an inverse relationship. This relationship is demonstrated by the corresponding graph below.

Taylor Lake at Nasa Road						
Parameter	N	% complete	Min	Mean	Max	Std. Dev.
Sample Time	12	92	7:50	10:15	13:00	1:26
Total Depth (m)	13	100	1	1.9	2.4	0.4
Secchi Depth (m)	13	100	0.17	0.37	0.97	0.24
SC (µS/cm)	0	0				
Air Temp (C)	13	100	12.5	21	32	6.5
Water Temp (C)	13	100	9	19.6	30	6.9
DO (mg/L)	13	100	5	7.8	10	2
pH (su)	13	100	5	7.4	9.5	1.1
DO exceedence [< 6.0 mg/L]		3 of 13	23%			

Water Temperature and Dissolved Oxygen



pH



Secchi and Total depth



CONCLUSIONS

There are two issues for immediate concern in this dataset. First, the reason for the complete absence of Specific Conductivity records is unknown. This data report would be more comprehensive with this parameter intact.

The data for pH levels also presents a concern. While the average pH value of 7.4 su is acceptable, the minimum of 5 su and maximum of 9.5 su are both pushing on the outer limits of a healthy pH balance in the water body. If the values were to register outside of this range, it could present problems in Taylor Lake.

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 Taylor Lake at Nasa Road. From December 2006 to February 2008, only 3 months went without a monitoring event: March, April, and May 2007. These months without a monitoring event correspond identically with the other Taylor Lake site (refer to *Taylor Lake at Red Bluff Road Data Summary*).

Sampling times revealed a standard deviation of 1 hour and 26 minutes. Texas Stream Team monitors are asked to monitor once a month at the same time of day. Therefore, this standard deviation of the average sampling time is desirable. As long as sampling times are not becoming increasingly inconsistent, there should be even more established baseline data for this site in a short time. If monitoring is kept consistent, and Specific Conductivity added into the monitoring schedule, another data summary report for this site should reveal many trends in a matter of a few years.