

Texas Watch Volunteer Water Quality Monitoring Program Data Summary - 2006 Selected Sites on the Upper Brazos River

A small Texas Watch volunteer water quality monitoring group has been actively collecting environmental information from several sites in the upper portion of the Brazos River in Palo Pinto and Parker Counties. Since 2004 the monitoring team has sampled three sites on the Brazos River. 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 exceptional “aquatic life use” criteria.

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. From “backyard” concerns to state or regional issues, 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. 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 good 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 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.

When assessing any surface water quality data, it is important to clarify the segment’s official “designated and aquatic life use” categories. The “aquatic life use” designation, which ranges from “exceptional and high to intermediate or limited,” sets the standards for aquatic inhabitants of the water body. For instance, an “exceptional” aquatic life use designation for a stream segment establishes a dissolved oxygen standard of 6.0 mg/L. A “high” designation for dissolved oxygen is 5.0 mg/L. Similar standards are set for pH, chlorides, dissolved solids, bacteria, temperature, and so on. These standards are important when calculating point source effluent discharge permit limitations for nutrients and other key constituents that are released into surface waters.

Data summary reports are typically generated for sites with a minimum of 9 samples over the last five years. For more information about data summary reports please read the Texas Watch Summer 2005 issue and look for the article entitled, "Monitors often ask, 'How are you using my data?'".

BACKGROUND

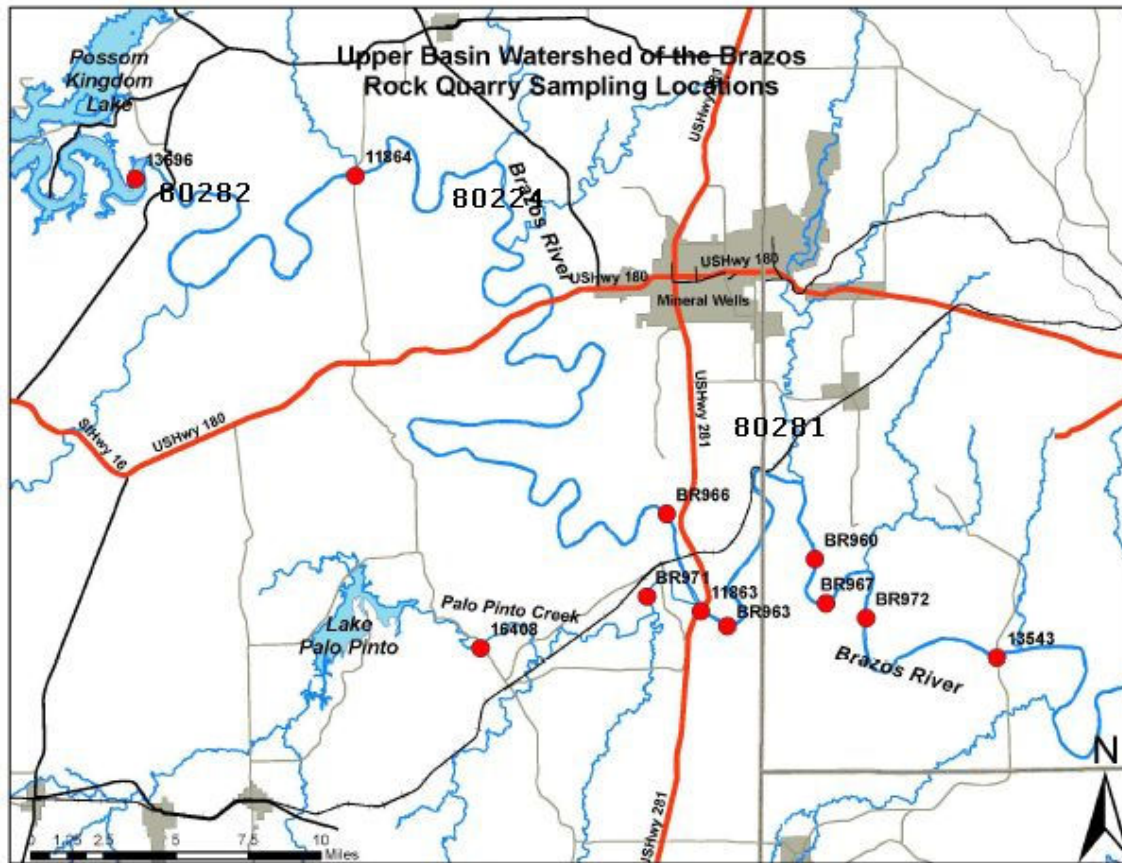
Region Background and Description: These three segments are in the upper watershed of the Brazos River and lie within Palo Pinto County and Parker County on the Texas plains ecoregion. The predominant vegetation type is Ashe-Juniper Parks/Woods. The average rainfall is 33 inches/year with a peak rainfall in the spring. Land use in this area includes the following: row-crop agriculture, range and pasture land and urban areas. Soils range from coarse-grained loamy sands to fine-grained clays.

Segment 1208 (above Possum Kingdom Lake): This segment is classified as a freshwater stream (189 miles) and has the following use classifications: aquatic life, contact recreation, general and fish consumption use. The Brazos River Authority (BRA) data show non-supporting conditions for contact recreation due to elevated bacteria levels, and data analysis trends show an increase in chloride and sulfate levels. There are also concerns for algal growths, siltation, and heavy metals in the sediments. Much of this concern is a result of the salt producing area upstream from this segment (mentioned above). The Basin Highlight Report stated that the watershed above Possum Kingdom Lake contributes only 14-18% of flow, but also high percentages of TDS, chloride and sulfate, 45-55%, 75-85% and 65-75%, respectively. The status of use for all of following is fully supported: dissolved oxygen, temperature, pH, chloride, sulfate and TDS.

Segment 1207 (Possum Kingdom Lake): This segment of the Brazos River is a reservoir (area: 19,800 acres) with following uses: aquatic life, contact recreation, general, fish consumption and public water supply use. All of the water body uses are fully supported, except for the fish consumption use which was not assessed. It is impaired with chloride, sulfate and total dissolved solids (TDS), all of which have a concern status for finished public drinking water. Salt pollution from the Salt and Double Mountain Forks (northwest of Abilene) impact the reservoir. Petroleum and resource extraction activities also contribute to the high chloride, sulfate and TDS. Recent data show an increasing trend in the amount of nitrate and nitrite in the lake.

Segment 1206 (below Possum Kingdom Lake): Water body uses for this segment are aquatic life use, general use, contact recreation use and fish consumption use. Currently, "all data has indicated fully supporting conditions for its designated use" (2005 Basin Highlight Report, p. III-13). However, mining and rock quarry operations near the watershed have initiated concern for this segment of the river. The mines show a lack of stormwater management and there is concern for elevated total suspended solids (TSS). There is also concern for high temperatures in this part of the river. New monitoring sites were established in 2003 and 2004, but not enough new data is available to conduct an analysis.

According to the BRA Clean Rivers Program 2006 Basin Highlights Report, stakeholders raised concerns in 2004 regarding silt accumulation in the river between Possum Kingdom Lake and Lake Granbury. Investigations resulted in regulatory action against two rock quarry operations. The below BRA map shows rock quarry sampling locations with Texas Watch volunteer monitoring sites (80282, 80224, 80281).



This map is part of the BRA Clean Rivers Program 2006 Basin Highlights Report. Possum Kingdom Lake is in the upper left hand corner and the Brazos River flows downstream towards the southeast. The red circles indicate BRA and/or TCEQ monitoring locations.

DATA

Each parameter will have series of corresponding graphs and charts. There are two sets of graphs. For all graphs, site name or sample date is located on the “x” or horizontal axis and is shown moving from upstream to downstream or is chronologically listed from oldest to most recent sampling. The “y1” or “y2” axes contain the constituent(s) of interest. 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, field observations, and others.

The following information was taken from volunteer monitoring activities at three locations in the upper Brazos River. The most upstream site, Brazos River at State Highway 16, is fairly close to Possum Kingdom Lake’s dam release outfall. Information

from this site exhibit similar characteristics of other sites where water is released from the hypolimnion (water from the bottom of the lake) portion from the upstream lake. Volunteer monitors report extremely low dissolved oxygen values, reference a strong sulphur smell, and often describe interesting algal growth along the river bed. These traits are often expected from sizable lakes where thermal stratification and other processes heavily influence water chemistry. Data collected while there are no releases upstream show acceptable oxygen levels. Oxygen data shows there are aquatic life use concerns for this portion of the stream. There are instances where the managing authority has installed devices to introduce aeration as a part of the lake release process. While costly, this method seems to increase oxygen levels in the receiving waters. As expected, the average oxygen value is about 1.0 mg/L less than the other two downstream sites. Data indicate potential concerns for exceptional aquatic life use due to depressed oxygen. Water temperature values are also lower at this upstream site.

Brazos River at State Highway 16 (upper site)					
Site ID# 80282	N	% complete	min	mean	max
Sample Time	9	100%	12:10	14:12	16:42
Sample Depth (m)	9	100%	0.3	0.3	0.5
Conductivity (µS)	8	89%	270.0	355.0	430.0
Air Temperature (°C)	9	100%	14.0	24.9	38.0
Water Temp. (°C)	9	100%	10.0	17.5	22.5
Dissolved Oxygen (mg/l)	9	100%	1.5	7.9	10.8
pH	9	100%	7.0	7.8	8.5
Secchi Disk (m)	9	100%	0.2	0.9	1.5
DO exceedence (<6 mg/L)		22%			

As one moves downstream, the next site is 80224, Brazos River 3.2 miles downstream Possum Kingdom Lake. Nine samples were collected from this site in the last two years. This site exhibits healthy water chemistry with all data meeting and exceeding water quality criteria for exceptional aquatic life use. As noted in the BRA 2006 Basin Highlights Report, suspended solids could be of concern. Secchi depth transparency values are significantly lower at this middle site. There are numerous documented issues associated with excessive sedimentation in streams.

Brazos River 3.2 miles Downstream of Possum Kingdom Lake (middle site)					
Site ID# 80224	N	% complete	min	mean	max
Sample Time	9	100%	7:55	13:02	16:15
Sample Depth (m)	9	100%	0.2	0.3	0.4
Conductivity (µS)	8	89%	280.0	361.3	420.0
Air Temperature (°C)	9	100%	12.0	25.7	37.0
Water Temp. (°C)	9	100%	9.0	21.7	31.0
Dissolved Oxygen (mg/l)	9	100%	6.3	8.8	11.6
pH	9	100%	7.5	8.1	8.5
Secchi Disk (m)	9	100%	0.2	0.4	0.6
DO exceedence (<6 mg/L)		0%			

Brazos River at Mt. River Community Park (downstream site)					
Site ID# 80281	N	% complete	min	mean	max
Sample Time	9	100%	11:30	13:49	15:45
Sample Depth (m)	9	100%	0	1	3
Conductivity (µS)	8	89%	270.0	370.0	430.0
Air Temperature (°C)	9	100%	14.0	26.0	32.0
Water Temp. (°C)	9	100%	10.0	23.1	29.0
Dissolved Oxygen (mg/l)	9	100%	7.1	8.9	11.0
pH	9	100%	8.0	8.2	8.5
Secchi Disk (m)	9	100%	0.3	0.8	1.5
DO exceedence (<6 mg/L)		0%			

The downstream site, 80281, Brazos River at Mountain River Community Park, has been sampled nine times in the last two years. Data exhibit healthy water chemistry conditions with all data meeting and exceeding water quality criteria for exceptional aquatic life use. Secchi depth transparency values rebound and are closer to expected ranges in this portion of the Brazos River.

