Sabine Basin Currents

THE TEXAS CLEAN RIVERS PROGRAM

A Newsletter on Water Quality Issues - Spring 1996

"Treat the earth well. It was not given to you by your parents; it was lent to you by your children." (Kenyan Proverb) It is this sentiment that the Texas Clean Rivers Program (TCRP) personifies so well. The Sabine River Authority (SRA) as a partner in this program has been dedicated to the task of assessing the existing and potential hazards to water quality in the Sabine Basin, and has worked toward solutions to these problems.

We must all be stewards of our environment and as such we must educate ourselves on those things that threaten its safe keeping. It is the intent of SRA's Clean Rivers Program Newsletter to provide the information necessary for all of us to become more aware of conditions in the Sabine Basin and provide an avenue for concerned citizens to make a difference in what legacy we leave our children by making wise decisions concerning the use of water in the Sabine Basin. ✯

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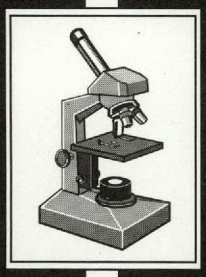
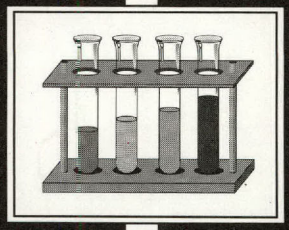
Biological Screening Studies

The SRA Environmental Services Division (ESD) collects surface water quality data as part of its commitment to water quality protection in the Sabine Basin. The water quality data includes monitoring and analyses of physical, chemical, bacteriological, and biological parameters. The emphasis of the Water Quality Monitoring Program (WQMP) has focused on water quality issues concerning water supply as that is the primary function of the agency. Additional monitoring requirements have been brought about through the implementation of the Texas Clean Rivers Program (TCRP). The TCRP monitoring program utilizes biological screening studies in combination with routine physical and chemical parameters to provide data on the health of aquatic life and long range water quality protection.



SRA has adopted a subwatershed approach, in accordance with TCRP, in an effort to locate and identify pollutants and problem areas. This bioscreening approach includes ambient biomonitoring which will identify toxicity concerns in the Sabine Basin. Freshwater organisms used in ambient biomonitoring include *Ceriodaphnia dubia*, a small crustacean and *Pimephales promelas*, the fathead minnow. The organisms are exposed in the laboratory to samples collected from various sites in the Sabine Basin. The test determines if there is a significant effect on the organisms survival and growth or reproduction by comparing the test samples to laboratory prepared water. Very little toxicity information is available in the Sabine Basin and it would be very costly to attempt to analyze extensive numbers of samples for a large number of organic parameters (such as pesticides). Using the biological screening approach, these analyses will generally only be necessary if toxicity results indicate the need to identify a particular toxicant.

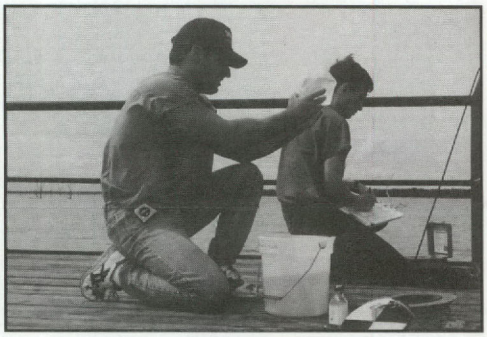


Results of the biological screening tests are reviewed each year and sites not exhibiting problems will be discontinued after one year of testing and automatically fall into a five year sampling cycle unless changing conditions require a schedule revision. Sites which reveal concerns will undergo further evaluation to determine what action will be taken. ✯

Sabine River Authority PO Box 579 Orange, TX 77630 409-746-2192 409-746-3780 Fax http://www.sra.dst.tx.us/

UBFO News

This is the first of a regular column in which we will discuss activities the Sabine River Authority is involved in at the Upper Basin Field Office (UBFO). After years of conducting all of our water quality monitoring program from our Orange office (In the southern end of the Sabine Basin), we have established a field office at the Lake Fork Division Office in the upper basin. Although we still monitor the lower half of the basin from Orange, and most water samples are still sent to our lab in Orange, we are proud to have the field office in the upper basin. Our response time is much shorter now and we believe we are developing a closer relationship with many of you in the Upper Sabine Basin. SRA has always monitored water quality in the whole basin but since the field office was staffed in June, 1993, two employees have monitored an additional 26 upper basin stream sites, and responded to 30 oil-related spills, 7 fish kills, 16 wastewater problems and 8 other miscellaneous complaints. We have also developed a better working relationship with Texas Natural Resource Conservation Commission (TNRCC), Texas Parks & Wildlife Department (TPWD), and Railroad Commission (RRC) employees in the upper reaches of the basin. We have become acquainted with operators at a number of city and industrial wastewater treatment facilities during our stream flow studies. In the future, we hope to have more contact with many of you through increased participation in steering committee and public participation meetings. Look for more information in an upcoming issue.



If you know of an oil spill, fish kill, or other water quality problem contact John Payne and Troy Henry at the Upper Basin Field Office (903) 878-2420 or Mark Howard and Dave Eaves at (409) 746-3284 at the Lower Basin Field Office. ✯

GIS Program

GIS (geographic information systems), is a mushrooming area of technology that allows the management and analysis of large volumes of information. GIS is currently being implemented and applied at all levels of government in Texas. The Sabine River Authority of Texas has implemented a GIS with the installation of a Sun Workstation, Arc/Info software, a Novajet III plotter, and volumes of digital data. The system will function as a repository for all data pertaining to water quality and related issues within the Sabine River Basin.

How does it work? The GIS contains two types of data, one is termed geographic data and the other is termed descriptive. The geographic data includes map features such as roads, railroads, creeks, and the rivers. The descriptive data includes information about the map

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TESTING CORNER

The term "pH" is frequently used as a description of water quality, but many laymen and quite a few water quality professionals do not really understand what pH means. The terms most often used in describing "pH" are "basic" or "alkaline" and "acidic", but a simple definition of pH that is useful and acceptable in all but the most rigorous chemical calculations is **"pH is the negative logarithm of the hydrogen ion concentration".** Before your brain shuts down at the sight of a the word "logarithm", let me say that the definition simply means that the more hydrogen ions (H^+) present in a water sample, the more acidic the water sample is.

The pH scale ranges from 1 to 14 with numbers below 7 being "acidic," 7 being the "neutral" pH, and numbers above 7 being "basic.". An **"acidic"** water sample has more hydrogen ions (H^+) than hydroxide ions (OH^-), a **"basic"** water sample has more hydroxide ions (OH^-) than hydrogen ions (H^+), and a "neutral" water sample has equal concentrations of hydrogen ions and hydroxide ions. The lower the number on the pH scale, the more acidic is the water.

Most plants and animals that live in freshwater can only live in a narrow pH range of about 6.5 to 9. Spills of acidic or basic compounds or untreated discharge of the same can make a water unable to support life simply due to the unfavorable pH range. pH is also important in managing the treatment processes required to make raw water suitable for drinking. ✯

Water Questions? Ask The Sabine River Basin Water Wizard!

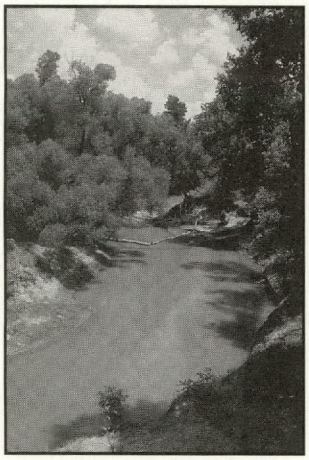
Do you have questions about water? Questions about water quality in some nearby stream or lake? About drinking water? About groundwater? About water quality testing? About aquatic life such as fish, turtles, snakes, insects, etc. in your local waterways? Mr. Wizard can help.

The Sabine River Basin Water Wizard does not pretend to know all the answers. However, most everyone seems to be impressed with his broad range of resources!! We feel sure if Mr. Wizard does not know, he will make every effort to give you as much information as possible.

Let Mr. Wizard hear from you. Address your questions to ask Mr. Wizard, Sabine River Authority of Texas, P.O. Box 579, Orange, Texas 77630. ✯

River Facts

Welcome to "River Facts," the first of a series of articles that will provide interesting facts about the Sabine River Basin, a diverse area of land that is steeped with a rich heritage, abundant in natural resources, and occupied by many people whose lives are influenced daily by the waters of the Sabine Basin. We will explore facts related to the geography of the land, the biological diversity of the plants and animals, the various cities and industries throughout the Basin.



The Cowleech Fork of the Sabine River begins the 580 river mile journey at the watershed divide in northwestern Hunt County, from where the River flows southeasterly through the City of Greenville for a distance of approximately 60 miles to join Caddo Creek and the South Fork within Lake Tawakoni. From Iron Bridge Dam, which forms Lake Tawakoni, the River flows a distance of about 250 miles across Texas to the boundary between Texas and Louisiana and the headwaters of Toledo Bend Reservoir near the town of Logansport, Louisiana, then southerly along the state line for a distance of about 265 miles to Sabine Lake, and thence into the Gulf of Mexico. At the point where it becomes the state line, the Sabine River drains an area of approximately 4,846 square miles. The state line reach has a contributing area of some 4,910 square miles, of which approximately 2,550 square miles lie within Texas and 2,360 miles lie within Louisiana. The total area of the watershed is 9,756 square miles of which some 76 percent lies within the boundaries of Texas.✯

GIS Program

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features such as road names, creek lengths, discharge sites, water quality information, water sampling locations, and landuse. In the GIS computer these features can be viewed separately or in groups. When viewed separately, a single feature (can be thought of as a single map layer) is shown on the computer screen. For example, we can pull up a single layer that shows all of the intermittent streams in the entire Basin or in a single county. Other individual layers that we can view include perennial streams, lakes, reservoirs, and river segments. We can also view more than one layer at a time by adding layers together.

Some of the layers in the computer include information that is represented as points instead of lines. Discharge locations, water sampling sites, septic systems, and stormwater permits are examples of point locations. Other layers in the computer include polygons (land areas) representing industrial areas, agricultural land, urban areas, grasslands and forests.

We use the GIS to store these map layers and to store information about the map layers. This is the heart of the system and allows us to ask many questions about the Sabine River Basin. As mentioned above, we can view one map layer and ask questions about it, or we can add map layers together and ask questions about the combined layers. For example, where are oil wells located in the Basin and how close are they to a creek, or the river? What is the distance the

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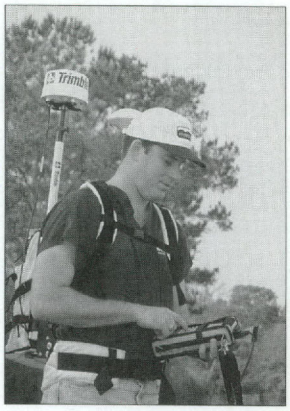

Global Positioning System (GPS)

Global Positioning System (GPS) is a Space Age Technology employed by boaters, marine industry, airlines, and even some trucking companies to navigate or to track cargoes. This technology was developed by the military and uses satellites to pinpoint positions on earth. Until recently (many still do), mariners used a sextant to locate their position on earth.

Using a sextant, mariners would measure the angle of celestial bodies (stars and planets) to their position. Since the mariner knew the position of the celestial body at all times, using the angle measured at the time measured they could calculate their present position. This calculation is called triangulation and requires measurements from several different bodies to have any accuracy.

GPS uses a very similar principle. Instead of using stars and planets, GPS uses manmade satellites. The GPS receiver knows the position of these satellites and receives radio signals from the satellites that measure distance. The GPS Receiver measures the distance from several satellites (at least four to be accurate) and is able to determine its position.

The most obvious use for GPS is for navigation. Examples might be navigating to a favorite fishing hole or to an offshore platform. Other applications of this technology include trucking companies using GPS to keep track of their cargoes and trucks, telephone and power companies keeping track of their poles and lines. Cartographers are using GPS to make more accurate maps and even surveyors are using GPS.

The Sabine River Authority (SRA) plans to use GPS to map the basin geographical and environmental features. These features may include bridge crossings, watershed boundaries, water pollution problem areas, water supply intakes, wastewater discharges, solid waste sites, etc. These GPS locations can then be entered into a computerized map. An example of this work may include an area of the basin that has high bacteriological counts. These counts may be associated with animal feed lots, dairy farms, septic systems, or sewage treatment plants. Contributing sources upstream of a problem area can be identified and steps taken to locate and eliminate the problem. GPS is an amazing technology and can help in determing the extent of water quality problems and working towards solutions to these problems. ✯

Sabine Basin Currents is published by the Sabine River Authority of Texas. This newsletter is produced to keep interested citizens aware of water quality issues and activities in the Basin. This publication is prepared in cooperation with Texas Natural Resource Conservation Commission under the authorization of the Texas Clean Rivers Program. ✯

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River flows through agriculturally intense land? Where are the discharge sites along the River and what type of discharge is released? How all of these factors influence water quality is a priority issue we will address with our GIS.

Water quality is of upmost importance to all people in the Basin. Factors that influence water quality can be very complex and require considerable technology to resolve. With the GIS, we will have greater capability to relate the land areas and events in the Basin that act to influence water quality and thereby better serve the people living and working in the Sabine River Basin. ✯

SRA
SABINE RIVER AUTHORITY OF TEXAS
P. O. Box 579
Orange, Texas 77631-0579
(409) 746-2192

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