Sabine Basin Currents

A Newsletter on Water Quality Issues - Vol. III, No. 1 - August 1998

THE TEXAS CLEAN RIVERS PROGRAM

Sabine Basin Highlights Report

The 1998 Sabine River Basin Highlights Report has been completed and is available on the Sabine River Authority (SRA) web site or in hardcopy. This report is prepared in cooperation with the Texas Natural Resource Conservation Commission under the authorization of the Texas Clean Rivers Act. The report summarizes all of the Texas Clean Rivers Program water quality activities for the last year.

The SRA is using an integrated approach to address water quality issues. This comprehensive program includes the following components:

* Public Participation and Basin Steering Committee;
* Data Collection, Management and Analysis;
* Targeted Monitoring;
* Subwatershed Screening;
* Subwatershed Inventory;
* Quality Assurance Project Plan (QAPP);
* Geographic Information System; and
* The World Wide Web Project.

This integrated approach to water quality management provides for the best use of limited resources. This is accomplished through the subwatershed inventory, data analysis, and screening studies, which identify areas of water quality concerns or possible concerns, and focuses additional monitoring on problem areas. The coordination of state, regional, and local entities reduces duplication of effort in addressing water quality issues. Encouraging public participation increases the awareness of the impact of human activities on water quality.

Always available on the SRA web site (www.sra.dst.tx.us) is the latest water quality data for the Basin. The data can be obtained in a report format or as raw data available for downloading.

Special Studies Address Water Quality Concerns

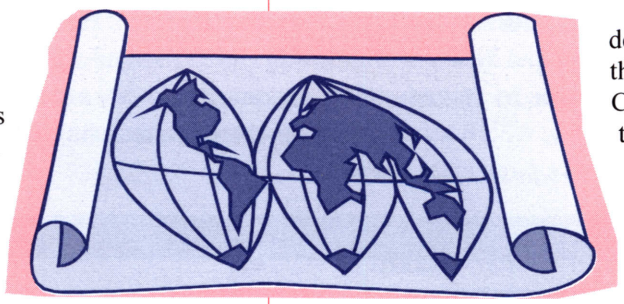
The Sabine River Authority is conducting special studies to address water quality concerns in the Adams Bayou, Cow Bayou, and Cowleech Fork Subwatersheds. These Subwatersheds were identified in the SRA 1996 Assessment of Water Quality as areas of concern. Due to extensive use of these, and other surrounding water bodies, intensive studies are being conducted to identify the sources of water quality impairments. Frequent sampling is being conducted to substantiate non-compliance with the Texas Surface Water Quality Standards. Subcommittees have been formed from the SRA Steering Committee and include public, industry, and local, state, and federal agencies.

Assisting with sampling in the Adams Bayou study are Mike Hoke, with the Nature Classroom at West-Orange Stark-Middle School; Woody Cox, a teacher with Little Cypress-Mauriceville High School; Joe Murphy, with the Sierra Club; and Kendall Barron, a concerned citizen. Other entities cooperating with the study include the City of Pinehurst, Orange County WCID No. 2, and Equitable Bag Company.

A special report will be issued in August 1999 and will include identification of the causes of the impairments, sources of the impairments, and recommendations for actions to alleviate these impairments.

Sabine Basin Internet Mapping System

The Sabine River Authority is developing an Internet Mapping System for the Sabine River Basin, Texas. The system provides access to geospatial data related to water quality. Users can zoom through multiple layers such as water quality monitoring stations, hydrology, vegetation, and highways. It will also provide Texas Orthoimagery Program color infrared digital ortho quarter quads for selected regions of the Basin as these data are made available by the Texas Natural Resources Information System.

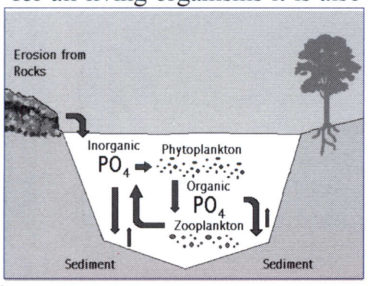


This project is under development in cooperation with the Texas Natural Resource Conservation Commission under the Authorization of the Texas Clean Rivers Act. Please see http://www.sra.dst.tx.us/srwmp/swi/webmaps/ and click on "Sabine River Basin" to view the mapping system.

Testing Corner

The Phosphorus Cycle

Phosphorus (P) is an essential nutrient for all life forms. It is the eleventh-most abundant mineral in the earth's crust. In nature it exists primarily as phosphate, a combination of phosphorus and oxygen. This inorganic form is found in the mineral apatite, which occurs in various types of rocks. Weathering gradually breaks the rocks into small pieces that can be washed into streams and lakes. Since phosphate is one of the key elements necessary for growth for all living organisms it is also used in fertilizer. Rainfall can wash phosphates from farms and garden soils into nearby waterways. In the aquatic environment, phosphorus exists either suspended in solid form or dissolved. The solid or particulate form is found as very small pieces of rock and in living and dead plankton. The dissolved phase includes inorganic and organic phosphorus excreted by organisms. Inorganic phosphate forms compounds including hydrogen phosphate (HPO_4), di-hydrogen phosphate (H_2PO_4) and phosphate ion (PO_4). These phosphates are commonly called "orthophosphate" and are the primary source of phosphate in ecosystems.



In the aquatic environment, the various forms of phosphorus undergo continuous transformations. The dissolved phosphorus (usually as orthophosphate) is taken up by algae (phytoplankton) as nutrients and altered to organic phosphorus. The phytoplankton are then consumed by small animals (zooplankton). Over half of the organic phosphorus taken up by zooplankton is excreted as inorganic phosphorus. Continuing the cycle, the inorganic phosphorus is rapidly absorbed by phytoplankton.

Phosphate "loading" or discharges will stimulate the growth of plankton and aquatic plants that provide food for fish. This increased growth may cause an increase in the fish population and improve the overall water quality. However, if excess phosphate enters the waterway, algae and aquatic plants will grow wildly, choke up the waterway and use up large amounts of oxygen. Plants and animals both consume oxygen, plants give off oxygen during photosynthesis because more is produced than they need. During the night no oxygen is produced and plants can have a higher oxygen demand than the water column can supply. This condition is known as eutrophication or over-fertilization of receiving waters. The rapid growth of aquatic vegetation can cause the death and decay of vegetation and aquatic life because of the decrease in dissolved oxygen levels.

Lake and reservoir sediments serve as phosphorus sinks. Phosphorus-containing particles settle to the bottom and are rapidly covered by sediment. Continuous accumulation of sediment will leave some phosphorus buried too deep to be reintroduced to the water column. Thus, some phosphorus is removed permanently from circulation. Some of the phosphorus in the bottom or substrate may be reintroduced to the water column by activities of

(Continued on page 3)

SEND YOUR QUESTIONS TO: MR. WATER WIZARD; P.O. BOX 579, ORANGE, TX 77630

EMAIL: mrwaterwizard@sra.dst.tx.us

Dear Mr. Wizard:

Why isn't the water in the Sabine River clear instead of brown? Is this because the river is polluted?

Sincerely,
Concerned Citizen

Dear Concerned:

The Sabine River appears brown in color for much of its length due to all of the things either suspended or dissolved in the water. The soil in the Sabine Basin contains large amounts of clay that easily become suspended in moving water. East Texas also is heavily forested with deciduous trees. The leaves that fall into the Sabine River can also discolor the water. The dark color can limit the amount of light and therefore limit the growth of aquatic plants, but that does not mean the River is unhealthy for fish and other wildlife. Reservoirs slow down the water flow, which allows the suspended materials to settle out. This is why the reservoirs have such clear water.

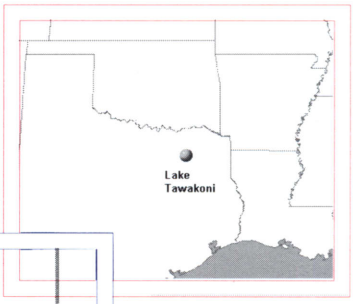
Sincerely,
Mr. Water Wizard

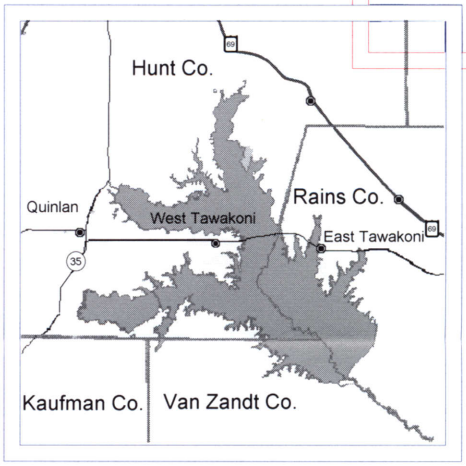
River Facts

Iron Bridge Dam & Lake Tawakoni

The Sabine River Authority's Iron Bridge Dam and Tawakoni Reservoir water supply project is located in Northeast Texas in Hunt, Rains, and Van Zandt Counties. Project construction was begun in 1956 and completed in October 1960. The reservoir reached the conservation pool elevation of 437.50 feet mean sea level on February 11, 1965. The Iron Bridge Dam is a rolled-earth embankment with an ungated concrete spillway. The total length of the dam, including the 480-foot spillway, is approximately 5.5 miles.

Construction of the project was funded through a water supply agreement with the City of Dallas. Lake Tawakoni is also used extensively for recreation. Numerous public and private facilities are located on the lake's 200-mile shoreline. Wind Point Park is the SRA's 350-acre recreation facility that offers a variety of accommodations including cabins, screened shelters, RV hook-ups and tent camping areas.





Lake Tawakoni Statistics	
Surface Area	36,700 surface acres
Drainage Area above the Dam	756 square miles
Annual Rainfall (average)	39.5 inches
Normal Conservation Pool Level	437.5 ft mean sea level
Storage Capacity	927,440 acre-ft (302 bil. gal.)
Dependable Annual Yield	238,100 acre-ft / year (213 mil. gal./day).

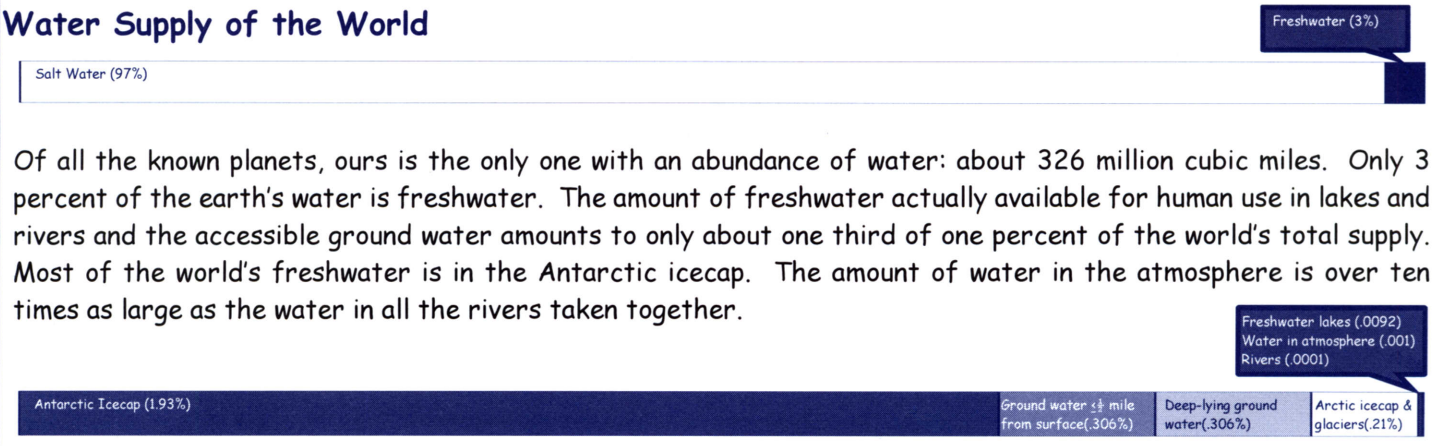
(Continued from page 2)

humans or animals. Phosphorus can also be reintroduced by chemical changes in the water. This sudden recycling of phosphorus often stimulates blooms of phytoplankton. Because of this phenomenon, a reduction in phosphorus loading may not be effective in reducing algal blooms for a number of years.

The natural levels of orthophosphate usually range from 0.005 to 0.05 mg/l. Although levels of 0.08 to 0.10 mg/l orthophosphate may trigger periodic blooms, long-term eutrophication will usually be prevented if orthophosphate levels are below 0.05 mg/l. To protect water systems, the EPA water quality criteria for phosphates in wastewater is as follows:

0.05 mg/l if streams discharge into lakes or reservoirs;
0.25 mg/l within a lake or reservoir;
0.1 mg/l in streams or flowing waters not discharging into lakes or reservoirs.

Water Supply of the World



Of all the known planets, ours is the only one with an abundance of water: about 326 million cubic miles. Only 3 percent of the earth's water is freshwater. The amount of freshwater actually available for human use in lakes and rivers and the accessible ground water amounts to only about one third of one percent of the world's total supply. Most of the world's freshwater is in the Antarctic icecap. The amount of water in the atmosphere is over ten times as large as the water in all the rivers taken together.

Have You Seen This Bird?

Texas Partners in Flight, along with the Texas Parks and Wildlife Department, Temple-Inland and the U. S. Forest Service, are asking for help in determining the extent and concentration of the Swallow-tailed Kite in Texas. Both the range and numbers of the Swallow-tailed Kite have been greatly reduced. Any sightings should be reported to Texas Partners in Flight. A $500 reward is offered for finding a nest. The nest must be *active and unharassed*. To avoid negative impact, it is recommended that a minimal number of approaches be made to the immediate nest area.

The Swallow-tailed Kite is characterized by:

- Striking black and white plumage
- Deeply forked tail
- Long, narrow, pointed wings
- Size : 24" length; 48" wingspan
- Graceful, extraordinary flight
- Habitats: Bottomland forests and associated open lands (marshes, fields, cutovers)
- Breeding in Southeast Texas: mid-March through mid-July

Contact:
State Coordinator
Texas Partners in Flight
4200 Smith School Road
Austin, Texas 78744
(512)389-4970
clifford.shackleford@tpwd.state.tx.us
http://www.tpwd.state.tx.us

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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Sabine River Authority of Texas
P.O. Box 579
Orange, Texas 77631-0579
(409) 746-2192