
EXECUTIVE SUMMARY FOR THE 1999 SUMMARY REPORT

Sabine River Basin, Texas
Sabine River Authority of Texas
July 1, 1999

Prepared in Cooperation with the [Texas Natural Resource Conservation Commission](#) Under the
Authorization of the Texas Clean Rivers Act.

INTRODUCTION

The Sabine River Authority of Texas (SRA) was created by an act of the legislature in 1949, under Article XVI, Section 59 of the Texas Constitution as a Conservation and Reclamation District, a legal subdivision of the State of Texas. As an agency of the State, SRA receives no appropriations and is not empowered to levy or collect any kind of taxes. Operating funds are derived from the sale of water, hydroelectric power, water quality services, and recreational and land use permit fees. The SRA was established with responsibilities to control, store, preserve, and distribute the waters of the Sabine River and its tributary streams for useful purposes.

SRA has taken an active role in water quality matters since initial operational activities began in 1954, and over the years has expanded its services to meet increasing needs throughout the Sabine River Basin.

These water quality laboratory and field programs have evolved into the present Environmental Services Division (ESD) which operates a modern, well-equipped water quality testing laboratory as well as a biomonitoring laboratory at its offices near Orange. In June 1993, an Upper Basin Field Office (UBFO) was established to better serve the needs of the upper Sabine Basin. As a revenue based agency, SRA provides these services because they fulfill demonstrated needs and have proven to be beneficial for the SRA and its customers in managing and protecting the water resources in the Sabine Basin.

Senate Bill 818, known as the "Texas Clean Rivers Act," was enacted in 1991 by the 72nd Legislature to ensure the comprehensive regional assessment of water quality in each watershed and river basin of the State. The Texas Clean Rivers Act (TCRA) provides for river authorities, under the supervision of the Texas Natural Resource Conservation Commission (TNRCC), to conduct regional assessments of their own watersheds. These water quality assessments must include:

- a review of wastewater discharges,
- nonpoint source pollution,
- nutrient loading,
- toxic materials,
- health of aquatic life,
- public education and involvement in water quality issues,
- local and regional pollution prevention efforts,
- and other factors that affect water quality within the watershed.

The SRA is the planning agency for all Clean Rivers Program (CRP) activities in the Sabine Basin. SRA serves as the data clearinghouse for all water quality data in the Sabine Basin and is responsible for analyzing the data to identify and prioritize water quality concerns and causes of pollution. Water quality was determined using data analyses developed from the Guidance for Screening and Assessing Texas Surface and Finished Drinking Water Quality Data developed by the TNRCC. Additional CRP activities include a Sabine River Watershed Monitoring Program, a Basin-wide Steering Committee, enhancement of public involvement in the CRP, and the promotion of water conservation.

CRP AND SABINE BASIN GOALS & OBJECTIVES

The general goals for this assessment include:

- Analyze current and historical (past 5 years) water quality data.
- Maintain the Water Quality Data Clearinghouse and provide it to the TNRCC and other interested parties.
- Continue to coordinate the SRA Water Quality Monitoring Program with other agencies to identify water quality problems.
- Continue the SRA Subwatershed Screening Studies to support effective permit requirements.
- Identify and prioritize water quality impairments and the causes.
- Promote public involvement in the CRP.
- Promote water conservation through the SRA Water Conservation Report (1994) and the Comprehensive Sabine Watershed Management Plan (1999).
- Assess the potential for water pollution from ground water-surface water interactions.
- Continue the development of the SRA Geographic Information System (GIS).
- Continue the development of a World Wide Web Site.
- Continue the development of a Subwatershed inventory of all available water quality information for each Subwatershed in the Sabine Basin.

BENEFITS OF THE CRP TO PUBLIC AND STAKEHOLDERS

All of the citizens in the Sabine Basin are stakeholders in the water resources of the Basin because the public relies on the availability of clean water for agriculture, industry, and domestic use. By providing a forum to involve the public, the CRP creates a sense of ownership of the public for the water resources. This has enabled participants to give input on water quality issues in their respective areas, and it has allowed public input and discussions regarding various phases of the assessment process. This also helps the public to understand how their actions can influence water quality. The promotion of water conservation increases the public's awareness of the value of this resource.

SUMMARY OF SABINE BASIN WATER QUALITY CHARACTERISTICS

The Texas Surface Water Quality Standards (TSWQS) has established 14 classified segments in the Sabine Basin with segment specific criteria for the protection of their designated use. The remainder of the Basin falls under the general criteria, which are applicable to all surface waters throughout the state. To determine whether the designated uses were supported, water quality parameters were examined and compared to screening levels based on criteria in the TSWQS. Water quality throughout most of the Sabine Basin supports the designated uses as established in the TSWQS. Only five of the fourteen designated segments had water quality parameters that did not meet stream standards. In three segments, the screening

criteria were exceeded infrequently, but enough to prevent full support of the stream standards.

SRA has used topography to divide the Basin into 110 Subwatersheds (24 of these are located in Louisiana) which are organized into seven Reaches. The seven main-stem Subwatersheds are essentially equivalent to the main-stem designated segments. Segment 0503 was subdivided into two Reaches. The other eight designated segments are grouped with the tributary Subwatersheds in the appropriate Reaches. The Subwatersheds not classified as segments were assessed using the same criteria established for the associated segments. Water quality in thirteen of these Subwatersheds did not support the stream standards for some parameters. In two unclassified Subwatersheds, the stream standards were not fully supported for a few parameters.

TECHNICAL PROCESS

The SRA Water Quality Monitoring Program (WQMP) has collected water quality data since 1972. The water quality data includes monthly monitoring and analyses of physical, chemical, bacteriological, and biological parameters. The emphasis of the WQMP has focused on water quality issues concerning water supply as that is the primary function of the agency. Data collected from the WQMP is summarized annually and the program is reviewed each year to consider revisions in every aspect of the program.

The SRA CRP Subwatershed Screening program complements the WQMP by providing information on the many Subwatersheds not covered by the WQMP. The SRA CRP Subwatershed Screening 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. The biological screening studies utilize Ambient Toxicity Tests based on the EPA Toxnet Program and Rapid Bioassessments based on EPA protocols. The Subwatershed Screening program also includes field investigations to provide data on Subwatersheds that have never been sampled. The Subwatershed Screening is conducted on a quarterly basis. The SRA Subwatershed Screening program allowed conclusions to be made about the water quality in many of the Subwatersheds where insufficient data was available for the data analysis.

The data analysis program developed by SRA was produced following guidance from the TNRCC. The TNRCC utilizes this procedure to analyze the waters of the State and report the status every two years to EPA under the requirements of the Clean Water Act (Section 305 b). The list of water bodies not meeting their designated use must be reported to EPA under the requirements of the Clean Water Act (Section 303 d).

Data from the past five years of water quality monitoring was compared to screening criteria to assess use support of the surface waters in the Sabine Basin. Full support of the designated use was indicated when no more than 10% of the values exceeded the screening levels. Partial support was indicated when the screening levels were exceeded between 11 and 25% of the time. Nonsupport was indicated when more than 25% of the values exceeded the screening criteria. The data analysis was based on a minimum of nine samples for each parameter analyzed, except for metals. A distinction was made in the final interpretation between insufficient data and no

data. Since the SRA Subwatershed Screening program is conducted quarterly, many of the monitoring sites lacked the nine samples needed for the data analysis.

Data analyses were also conducted to determine impacts due to pollution. Although the TSWQS have not established numerical criteria for nutrients and chlorophyll *a*, the same data analysis process was used to determine whether there were no concerns, possible concerns, or concerns for impacts due to pollution from nutrient enrichment. Screening levels for these parameters were statistically developed from long-term monitoring data.

Additional analyses were performed on parameters that reflect general water quality rather than specific use support. Some of the criteria for these parameters are based on annual averages rather than individual values. In these instances, the averages were compared to the criteria and support was indicated when less than 25% of the averages exceeded the criteria. Partial support was not assessed.

Metals data were analyzed using average hardness values for the Subwatershed or Reach where appropriate. The screening values for metals toxicity used either the acute, chronic, or human health criteria, whichever was more stringent. Metals included for the analysis were aluminum, arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, silver, and zinc. All values were for dissolved metals except selenium and mercury, which is in accordance with TSWQS. The minimum number of samples required for the data analysis of metals was nine.

The following tables contain the criteria for the data analysis used:

Use Support Criteria Table

Use	Parameter/Criteria or Screening Levels	Fully Supporting	Partially Supporting	Not Supporting
Overall Use Support		All uses are fully supported if:	One or more uses are partially supported and remaining uses are fully supported if:	One or more uses are not supported if:
Aquatic Life Support	Dissolved Oxygen	0-10% do not meet screening level.	11-25% do not meet screening level.	>25% do not meet screening level.
	Toxicants	For any individual parameter, 0-10% exceed acute criterion, and/or the mean does not exceed the chronic criterion.	For any individual parameter, 11-25% exceed acute criterion.	For any individual parameter, >25% exceed the acute criterion, and/or the mean exceeds the chronic criterion.
	Ambient Water Toxicity	0-10% have acute or chronic toxicity	11-25% have acute or chronic toxicity	>25% have acute or chronic toxicity
Contact Recreation	Fecal Coliform 400 colonies/100 mL	0-25% exceed screening level.	Partial support is not assessed.	>25% exceed screening level.

Water Quality Concerns Due To Pollution Impacts

Category	Parameter	Screening Levels	No Concern	Potential Concern	Concern
Freshwater Streams	NH ₃ -N NO ₂ -N + NO ₃ -N OP Chlorophyll a	0.3 mg/L 3.1 mg/L 1.4 mg/L 16.5 µg/L	For any one parameter, 0-10% of values exceed the screening level.	For any one parameter, 11-25% of values exceeds the screening level.	For any one parameter, more than 25% of values exceed the screening level.
Reservoirs	NH ₃ -N NO ₂ -N + NO ₃ -N OP Chlorophyll a	0.13 mg/L 0.41 mg/L 0.1 mg/L 20.0 µg/L			
Saltwater Tidal Streams	NH ₃ -N NO ₂ -N + NO ₃ -N OP Chlorophyll a	0.72 mg/L 1.86 mg/L 1.25 mg/L 23.0µg/L			

General Use Support

Parameter	Units/Criteria	Fully Supporting	Partially Supporting	Not Supporting
Water Temperature	°C, segment-specific	0-10% exceed criterion	11-25% exceed criterion	>25% exceed criterion
pH	Standard units,	0-10% do not meet criteria	11-25% do not meet criteria	>25% do not meet criteria
Chloride	mg/L, segment-specific	Segment average less than criterion	Partial support is not assessed	Segment average exceeds criterion
Sulfate	mg/L, segment-specific	Segment average less than criterion	Partial support is not assessed	Segment average exceeds criterion
Total Dissolved Solids (Conductivity)	mg/L (µmhos/cm), segment-specific	Segment average less than criterion	Partial support is not assessed	Segment average exceeds criterion

Trends for water quality were also examined for sites where long term monitoring has occurred. Although the data analysis was conducted using the past five years data, the analysis to determine trends was conducted using the last ten years of data. The historical averages for the parameters monitored were compared to annual averages over the last ten years.

Spatial analyses were conducted using all of the available land use information as well as the other information in the SRA Subwatershed inventory. The primary focus of the spatial analyses was the three Subwatersheds where special studies were conducted. The spatial analyses compared water quality impairments to possible sources of the impairments.

STATUS OF WATER QUALITY IN THE SABINE RIVER BASIN

Water quality was assessed in the Sabine Basin on a Subwatershed basis using guidance provided by TNRCC. The assessment uses screening criteria to determine whether water bodies are supporting their designated use according to TSWQS. The areas included in the assessment were Use Support, Pollution Impacts, and General Use Support. The Use Support includes parameters for Aquatic Life Support and Contact Recreation. Pollution Impacts include nutrients and chlorophyll a. General Use Support includes water temperature, pH, chloride, sulfate, and dissolved solids. In general, the water quality in the Sabine Basin supports the designated uses as specified in TSWQS.

Water quality monitoring stations were located in 53 out of 110 Subwatersheds during the five years assessed for this summary report. Many Subwatersheds indicated full support for all parameters, but some of the Subwatersheds indicated either partial support or nonsupport for a few parameters. Nonsupport for the designated use was indicated in ten Subwatersheds. The water quality parameters that indicated nonsupport include fecal coliform, and dissolved oxygen. Many of the sites lacked sufficient data for some parameters and others had no data for some parameters.

Concerns due to pollution impacts were found in nine Subwatersheds, while possible concerns were indicated in thirteen Subwatersheds. The parameters exceeding the screening criteria were primarily ammonia nitrate & nitrite, and orthophosphate.

The analysis of data for General Use Support showed some Subwatersheds were fully supporting. Nonsupport was indicated in eleven Subwatersheds and partial support was indicated in nine Subwatersheds. The parameters showing less than full support were primarily total dissolved solids, chloride, and sulfate.

The results of the SRA Subwatershed Screening Program were compared to the data analysis results. The Subwatershed Screening Program uses biological data from ambient toxicity tests and rapid bioassessments to determine if there were biological impairments in the water bodies. Twelve Subwatersheds lacked sufficient data for the data analysis, but seven showed some biological impairments and five showed no biological impairments. The biological data also showed impairments in six Subwatersheds where the data analysis indicated water quality problems.

PRELIMINARY BASIN ACTION PLAN

		Watershed	Impaired Use	Cause*	Source	Actions Taken	Recommended Action	Rank for Future Action
511	1.02	Cow Bayou	Aquatic Life Contact Recreation Pollution Impacts General Use	NS (DO, FC)	Nonpoint Source Permits	Special Study	Complete Study	High
508	1.03	Adams Bayou	Aquatic Life Contact Recreation	NS (DO, FC)	Nonpoint Source Permits	Special Study	Complete Study	High
	1.09	Coopers Gully (City of Orange)	Aquatic Life	RBA	Nonpoint Source	Screening Study	No further action is recommended at this time.	Low
	1.10	Little Cypress Bayou	Aquatic Life	AT, RBA	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
503	2.00	Main-stem	Aquatic Life	PS (Lead)	Unknown	Routine Monitoring	Continue monitoring	Low
	2.02	Nichols Creek	Aquatic Life Contact Recreation General Use	NS (DO, FC), NS (pH)	Nonpoint Source	Screening Study	Continue screening study.	Medium
513	2.05	Big Cow Creek	Contact Recreation	NS (FC)	Nonpoint Source Permit	Routine Monitoring	Continue routine monitoring. Sample for aluminum.	Medium
	2.07	Dempsey Creek	Aquatic Life	AT	Nonpoint Source	Screening Study	No further action is recommended at this time.	Low
	3.03	Bayou Anacoco - LA.	Contact Recreation Pollution Impacts General Use	NS (FC), PC (NH3), NS (TDS, Cl, SO4)	Nonpoint Source Permit	Routine Monitoring	Continue routine monitoring.	Medium
504	4.00	Main-stem	Pollution Impacts	PC (Chloro a)	Nonpoint Source	Routine Monitoring	Continue routine monitoring.	Medium

		Watershed	Impaired Use	Cause*	Source	Actions Taken	Recommended Action	Rank for Future Action
	4.10	San Miguel Bayou - LA.	Aquatic Life Contact Recreation Pollution Impacts General Use	NS (DO, FC), PC (OrthoPO4), C (NH3), NS (TDS)	Nonpoint Source Permit	Routine Monitoring	Continue routine monitoring.	Medium
	5.01	Sixmile Creek Hoggs Bayou	Aquatic Life Contact Recreation	NS (DO, FC)	Permits, Large City, Landfills	Screening Study	Intensive monitoring is recommended at this time.	Medium
	5.10	Eightmile Creek Parker Creek	Aquatic Life	AT	Nonpoint Source Permits Large City	Screening Study	Intensive monitoring is recommended at this time.	Medium
	5.16	Mason Creek	Aquatic Life General Use	AT, No Biological Impairments	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at some time in the future.	Low
	5.18	Grace Creek	Aquatic Life Contact Recreation Pollution Impacts General Use	AT, RBA, PS (DO), NS (FC)	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
	5.19	Rabbit Creek Bighead Creek	Aquatic Life Contact Recreation Pollution Impacts General Use	AT, ID, NS (DO, FC), PC (OrthoPO4), C (NO3 & NO2)	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
	5.20	Hawkins Creek	Aquatic Life Pollution Impacts General Use	NS (DO), NS (TDS, Cl)	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
	6.01	Little White Oak Creek Rocky Creek	Aquatic Life	AT	Nonpoint Source Permits	Screening Study	No further action is recommended at this time.	Low
	6.04	Harris Creek Sunstroke Creek Wiggins Creek	Aquatic Life Contact Recreation Pollution Impacts	AT, PS (Ni), NS (DO, FC), ID, PC (OrthoPO4)	Nonpoint Source Permits	Screening Study	Additional monitoring for nickel should be added to routine monitoring.	High

		Watershed	Impaired Use	Cause*	Source	Actions Taken	Recommended Action	Rank for Future Action
	6.05	Little Sandy Creek Rogers Creek	General Use	PS (SO4)	Nonpoint Source	Screening Study	No further action is recommended at this time.	Low
512	6.12	Lake Fork Reservoir	Pollution Impacts	PC (Chloro a), NS (SO4)	Nonpoint Source Permits	Routine Monitoring	Continue routine monitoring.	Medium
	6.15	Running Creek Coffee Creek Caney Creek	Pollution Impacts General Use	PC (Chloro a), C (NH3, NO3 & NO2, OrthoPO4), NS (Cl)	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
	6.18	Elm Creek Garret Creek	Pollution Impacts General Use	PC (NO3 & NO2, Chloro a), C (NH3, OrthoPO4), NS (Cl, SO4)	Nonpoint Source Permits	Screening Study	Intensive monitoring is recommended at this time.	High
507	7.00	Main-stem (Lake Tawakoni)	Pollution Impacts General Use	C (Chloro a), NS (pH)	Nonpoint Source Permits	Routine Monitoring	Continue routine monitoring.	Medium
	7.03	South Fork Sabine River	Aquatic Life Contact Recreation Pollution Impacts General Use	RBA, ID, NS (DO, FC), C (NH3, NO3 & NO2, OrthoPO4), PS (TDS, SO4, Cl)	Nonpoint Source Permits	Routine Monitoring	Routine monitoring.	Medium
	7.06	Little Creek - Fannin Creek / Cedar Creek	Pollution Impacts	PC (NH3), PS (Cl)	Nonpoint Source Permits	Screening Study	No further action is recommended at this time.	Low
	7.07	Caney Creek / Timber Creek / Wolf Creek / Long Branch / Horse Creek / Tidwell Creek / Hickory Creek (Cowleech Fork Subwatershed)	Aquatic Life Contact Recreation Pollution Impacts General Use	RBA, NS (DO, FC), PC (NH3), C (NO3 & NO2, OrthoPO4), NS (TDS, Cl, SO4)	Nonpoint Source Permits	Special Study	Complete Study	Medium

*NS- Nonsupport; PC- Possible Concern; C- Concern; DO- Dissolved Oxygen; FC- Fecal Coliform; NH3- Ammonia; NO3 & NO2- Nitrate and Nitrite; OrthoPO4- Orthophosphate; TDS- Total Dissolved Solids; Cl- Chloride; SO4- Sulfate; Chloro a- Chlorophyll a; Ni- Nickel; RBA- Rapid Bioassessment; ID- Insufficient Data

CONCLUSIONS

Most of the Sabine Basin supports the designated uses as defined by the Texas Surface Water Quality Standards. The 1999 Sabine Basin Summary Report shows significant progress has been made in establishing a comprehensive regional assessment of water quality on a watershed basis as required by Senate Bill 818 (SB 818) - the Texas Clean Rivers Act. The Clean Rivers Program allows the Sabine Basin stakeholders the opportunity to have an active role in protecting the environment and provide input to the permitting process. Permittee's also have an interactive role in protecting the environment through the ability to contribute water quality data to the data clearinghouse used in setting permit limits. Using proven scientific methodology to make decisions to protect the environment benefits all of the stakeholders in the Basin.

Each of the previous assessments has provided the basis for the advancements made in this summary report. The Subwatershed Inventory of the factors that can impact water quality has been added to and improved upon with each assessment. The Subwatershed approach has allowed SRA to gain a better understanding of the interactions between potential impacts in the drainage area and water quality in the river. The data analysis used for this summary report has been refined to provide recommendations for future actions based on the latest available data. Continuing the development of the Sabine River Watershed Management Program will provide the comprehensive tools needed to address water quality problems and issues in the Sabine Basin.

RECOMMENDATIONS

The data analysis and the SRA Subwatershed Screening Program have indicated that additional monitoring efforts are needed in several Subwatersheds. Due to the limited available resources, only the highest priority Subwatersheds will be addressed in the next fiscal year. The priority of the Subwatersheds has been weighted with input from the SRA Steering Committee and those factors that could possibly impact water quality. Those factors include high population areas as well as permitted discharges.

In the upper Sabine Basin, special studies focusing on nonpoint source pollution will be developed for three Subwatersheds in Reach 5. The Subwatersheds will include Grace Creek, Rabbit Creek, and Hawkins Creek. These monitoring efforts will include cooperation from the TNRCC Regional Office as well as other stakeholders from the City of Kilgore, the City of Longview, and area industries. Details of the monitoring plans will be included with the update of the QAPP in September, 1999.

In the lower Sabine Basin, a special study will be conducted on the Little Cypress Bayou (Subwatershed 1.10) to address nonpoint source pollution as well as impairments caused by point sources. This monitoring effort will include a cooperative effort with citizen monitors and any other interested stakeholders. The monitoring plan will be included with the update of the QAPP.

The review of the data analysis indicates the stream standards for pH in Segment 0507 should be addressed in the next revision of the TSWQS. The historical data

shows the pH of this water body is normally higher than the standard listed in TSWQS. SRA will formally recommend a change of this standard to the TNRCC.

The results from the Subwatershed special studies on Cowleech Fork, Adams Bayou, and Cow Bayou will be reported in August. The reports will include recommendations to address the causes for impairments in each of the Subwatersheds.