Texas Clean Rivers Program Basin Highlights Report
For The

Trinity-San Jacinto Coastal Basin
San Jacinto River Basin
San Jacinto-Brazos Coastal Basin
Brazos-Colorado Coastal Basin

Spring 2000

"The goal of the Texas Clean Rivers Program is to maintain and improve the quality of water resources within each river basin in Texas through an ongoing partnership involving the Texas Natural Resource Conservation Commission, other agencies, river authorities, regional entities, local governments, industry, and citizens. The program will use a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action, and work to implement those actions."
Texas Clean Rivers Long Term Action Plan (1995-2000)

BACKGROUND

The Houston-Galveston Area Council (H-GAC) is the Clean Rivers Program lead agency for the San Jacinto River Basin and three associated coastal basins - the Trinity-San Jacinto, the San Jacinto-Brazos and the Brazos-Colorado. In many of the state's major river basins, a legislatively created river authority exists and is leading the assessment effort for its basin, as intended by the Texas Legislature through the Clean Rivers Act. In other areas not covered by a particular river authority, either a neighboring authority or some other logical regional entity was to be designated to oversee the assessment. H-GAC is the Council of Governments (COG) and regional planning agency for the Gulf Coast State Planning Region, and has been actively involved in regional water quality planning and public outreach activities for over 28 years. In addition, many of the key agencies and individuals involved in water quality matters in the region already participate in environmental committees and programs. In light of H-GAC's experience and capabilities, the San Jacinto River Authority requested that H-GAC take the lead in the San Jacinto River Basin and the Gulf Coast Waste Disposal Authority likewise requested H-GAC to take the lead in the Trinity-San Jacinto and San Jacinto-Brazos Coastal Basins. H-GAC coordinated its initial work plan for the San Jacinto-Brazos Coastal Basin with the Brazos River Authority (BRA) since the Oyster Creek watershed in the westernmost portion of the coastal basin had been an ongoing area of concern for BRA. Similarly, H-GAC agreed to conduct the assessment of the San Bernard River in the Brazos-Colorado Coastal Basin after confirming that the Lower Colorado River Authority would be responsible for assessing Caney Creek and the drainage from the western side of the coastal basin into East Matagorda Bay. This coordination between H-GAC and the river authorities continues.

The four basins under H-GAC's oversight comprise a truly diverse region. The basins encompass three major Ecoregions (South Central Plains, Gulf Coast Plains and Western Gulf Coastal Plains) and are home to over 4 million people. Economic activity includes agriculture (forestry, farming and ranching) petroleum refining, petrochemical production, manufacturing, transportation, water-oriented recreation, aerospace and government. This region has the largest concentration of permitted wastewater discharges (municipal and industrial) in Texas, and most of these discharge to tributaries that eventually flow into Galveston Bay (an estuary of state and national importance) via the San Jacinto River and Houston Ship Channel. In fact, three of the four basins drain into or are part of the Galveston Bay system. The San

Jacinto River Basin contains the most highly urbanized and industrialized portion of the Houston metropolitan area. The Houston Ship Channel is home to one of the world's largest petrochemical complexes. The Ship Channel and the many urban bayous and tributaries which drain into it are also the major carriers of urban runoff to Galveston Bay. The region contains examples of high quality, largely unimpacted waters as well as streams and bays that have clearly been degraded by human activity. The Clean Rivers water quality assessment in the four basins shows an overall trend of good and improving water quality, although there are still problem areas to address and issues on which management agencies and stakeholders must focus.

Ongoing Tasks

H-GAC Regional Water Quality Data Clearinghouse

H-GAC has expanded its website to include educational resources and valuable water quality data from over 350 monitoring stations throughout the region. Collectively, there are over 40 parameters collected by local agencies.
These agencies include

- Galveston County Health District
- Harris County Pollution Control
- City of Houston Health and Human Services
- City of Houston Public Works and Engineering
- San Jacinto River Authority
- Texas Natural Resource Conservation Commission
- City of Houston Water Quality Control (soon to be added)

Users who may not be familiar with water quality information can retrieve simple explanations and examples of what each parameter indicates about the health of the waterbody. The site also contains state water quality standards by segment, pollution complaint contact information, and a wide variety of links to additional watershed and water quality information, contacts, and data.

Within the data clearinghouse, users can find data quality objectives, such as sampling method and minimum analytical levels, for each local monitoring agency as well as the status of the data for each agency.

Users can interactively map monitoring stations and perform simple queries on the data. Information can be viewed, downloaded, and graphed for a user-defined time period by selecting a station number, monitoring agency, or TNRCC-designated stream segment. Users may also query data based on a station number and parameter. Raw data may be downloaded for statistical analysis.

All stations are available in spreadsheet format by basin, agency, and station name. In addition, current and completed projects are summarized on the site.

Coordinated Monitoring

The purpose of the Clean Rivers monitoring is to identify significant issues affecting water quality within each watershed and river basin of the state. All Clean Rivers program (CRP) partners are required to develop an maintain a basin-wide water quality monitoring program that minimizes duplicative monitoring, facilitates the assessment process, and targets monitoring to support the permitting and standards process as well as identifying water quality problems and known pollution sources. The CRP rules call for, whenever feasible, the monitoring program be a cooperative partnership between the CRP lead agencies and other political subdivisions, state agencies, and the TNRCC. There is no single, regional entity that comprehensively monitors water quality across the San Jacinto River Basin and associated coastal basin. The regional approach taken by H-GAC is a coordinated effort among local agencies that monitor water quality in some portion of the region. The Regional Monitoring Group guides all monitoring activities. The group includes participation by local agencies and well as TNRCC and other state and federal agencies and organizations. Monitoring conducted by the Clean Rivers program involves collection of baseline water quality data to support trend analyses and development of the statewide water quality inventory; and watershed specific data to address priority water quality problems identified by trend analyses or steering committee input.

All benefits to fee payers flow through the Clean Rivers Steering Committee, which gives "hands on" program direction to stakeholders and is the focal point of program coordination. Participants include local, state, and federal agencies involved in water quality monitoring. There are six local agencies involved in the coordinated monitoring under the Clean Rivers Program: City of Houston Department of Health and Human Services, City of Houston Water Quality Control, Galveston County Health District, Harris County Pollution Control, Harris County Flood Control, the City of Pearland, and the San Jacinto River Authority. The total number of monitoring sites is presently 349. The agencies follow a regional Quality Assurance Project Plan (QAPP) that is approved by the TNRCC and signed by each of the local agencies involved in water quality monitoring. Following the regional QAPP ensures that the data collected can be used in assessment of water quality and used for management decisions, including TMDLs. Each agency submits the data from parameters they collect to H-GAC and the data is then placed on the H-GAC web page. In addition, data that are listed in the Data Quality Objectives of the QAPP are submitted to TNRCC where they are used in management and regulatory decisions. The parameters that are currently measured by the various agencies under the data quality objectives are shown in Table xx.

Each participating agency is a volunteering member of the coordinated monitoring program. The monitoring conducted by the agencies is generally left to their discretion, and they decide upon establishing a monitoring plan based upon agency goals. A major benefit of H-GAC's partnership with the local agencies is the ability to leverage dollars from the Clean Rivers Program to provide a more effective monitoring program for the region. The combined in-kind support provided by local monitoring in 1998 -1999 was $1.3 million. These dollars and those provided by the Clean Rivers Program will also be used as matching funds to pursue grants from federal agencies and the private sector.

In appreciation of the dedicated efforts of the regional agencies in water quality monitoring, H-GAC is sponsoring GPS training sessions to provide TNRCC GPS certification. H-GAC pays the required fees of the training for the local agencies as support for their contributions to the Coordinated Monitoring Program. The most recent GPS workshop was held March 15 – March 17 where 10 individuals from local agencies and sub-contractors attended and were certified.

Parameter	Agency						
	City of Houston, Health and Human Services	City of Houston, Water Quality Control	Galveston County Health District	Harris County Pollution Control	San Jacinto River Authority	Harris County Flood Control	City of Pearland
Conductivity	X		X	X	X		X
Days since last significant rainfall	X	X	X	X	X		X
DO	X	X	X	X	X		X
Flow severity	X	X	X	X	X		X
pH	X	X	X	X	X		X
Temperature	X	X	X	X			X
Salinity			X	X	X		X
Secchi Depth			X	X			X
Turbidity			X		X		X
Nitrate-N		X	X		X		X
Ammonia-N	X	X	X	X	X		X
Alkalinity		X			X		
Hardness		X			X		
BOD_5	X		X		X		X
CBOD	X			X			
Sulfate		X			X		
Calcium		X					
Chloride		X			X		
TDS	X			X			
TSS	X	X	X	X	X		X
o-Phosphorus		X			X		
Total Phosphorus		X	X		X		X
TOC		X		X	X		
E coli		X	X		X		X
Fecal coliform	X	X	X	X	X		X
Enterococci			X				X
Total Coliform					X		
Total iron		X			X		
Total Manganese		X			X		
Total copper					X		
Total mercury					X		

Texas Watch

The Houston-Galveston Area Council (H-GAC) supports and trains volunteers throughout the 13-county region to test ambient water quality on a monthly basis. Information is collected for tidally influenced and above tidal waterbodies. The Texas Watch program provides a mechanism for ongoing outreach activities. It is an excellent example of a "hands on" approach geared toward individual stakeholder involvement in addressing water quality issues. In the past two months, H-GAC has conducted two monitoring sessions where 12 people have been trained for Phases I and II of a three phase program. Efforts are presently underway for Phase III training. This encompasses a certified trainer testing those successfully completing the first two phases at the site for which the volunteer will be monitoring. Once Phase III training is completed, the sampling site(s) of the monitors are sent to TNRCC where the site is given a station number.

H-GAC is also identifying monitors to become part of our regional Quality Assurance Project Plan for the Texas Clean Rivers Program. Monitoring site selection is done in consultation between H-GAC Clean Rivers Program staff and the volunteer. This will enable data collected by volunteers to be used by the TNRCC in Total Maximum Daily Load development.

On April 18, 2000, there will be a statewide Texas Watch monitoring event to describe a day in the life in water bodies across the state in celebration of Earth Day. H-GAC has encouraged local volunteers to partake in the event. All data collected will be submitted to H-GAC and subsequently to the Texas Watch Office at Southwest Texas State. H-GAC (as well as other planning agencies statewide) will prepare a report of the data that will be submitted to Texas Watch. They will then compile the reports of all the planning agencies into a document that will be made available to the public.

Parameters measured by the volunteers include:

Water temp
pH
Flow/water level
Turbidity
Dissolved oxygen
Rainfall
Secchi transparency
Macroinvertebrates
Fecal coliform
Habitat assessments

Other activities that the volunteers undertake include debris cleanups and storm drain stenciling.

TOTAL MAXIMUM DAILY LOAD STUDIES
PUBLIC PARTICIPATION AND OUTREACH

A number of Total Maximum Daily Load (TMDL) studies have been scheduled by TNRCC for the San Jacinto River Basin and San Jacinto – Brazos Coastal Basin. The targeted watersheds include: Buffalo Bayou (Segments 1013 & 1014); White Oak Bayou Above Tidal (Segment 1017) Houston Ship Channel (Segments 1005, 1006 & 1007); Patrick Bayou (Segment 1006A); Upper Galveston Bay (Segment 2421); Tabbs Bay (Segment 2426); San Jacinto Bay (Segment 2427); Black Duck Bay (Segment 2428); Scott Bay (Segment 2429); Burnet Bay (Segment 2430); Barbours Cut (Segment 2436); Armand Bayou (Segment 1113); and Dickinson Bayou (Segments 1103 & 1104). The parameters of concern include dissolved oxygen in Armand and Dickinson Bayous; bacteria in Buffalo & White Oak Bayous; dioxin in the Houston Ship Channel, associated side bays and Upper Galveston Bay; and water toxicity, temperature, sediment toxicity and dissolved copper in Patrick Bayou.

These studies are in various stages of development. Armand Bayou is farthest along, but at least a year away from a watershed action plan and additional data is to be collected under the Clean Rivers program. Dickinson Bayou is just beginning with data collection scheduled under the FY 2000-2001Clean Rivers program. Also just beginning are the dioxin and bacterial TMDLs. For these TMDL studies, H-GAC, in partnership with the Environmental Institute of Houston will direct public participation activities. The objective is to assist the TNRCC and lead agency (University of Houston) in gaining local participation to craft a consensus plan to restore the beneficial uses of the targeted watersheds.

Stakeholder groups are being created for each of the TMDL studies and first meetings are scheduled for March and April 2000. Membership on the stakeholder groups will be representative of those who: are significant contributors of pollutant loadings; affected by water quality problems; required by statute or regulation to undertake control measures; have statutory or regulatory responsibilities closely linked to water; can help to develop or implement actions to fix water quality problems; or are members of the general public who live in the watershed or use the water resource.

Results of Selected Past Projects

Greens Bayou Intensive Survey and Wasteload Evaluation Results Summary

A historical water quality data review performed by PBS&J, through contract with the City of Houston, revealed that certain parameter values in Greens Bayou have improved over the last 30 years. Most likely as a result of improvements in wastewater treatment, dissolved oxygen levels have increased to some extent, there have been marked decreased levels of indicator bacteria and ammonia-N concentrations, and nitrate-N concentrations have increased since nitrification became required of new and expanded wastewater plants.

PBS&J and the City of Houston conducted an intensive survey August 17-19, 1999. The results of the study indicated excellent dissolved oxygen levels and low levels of oxygen-demanding waste. Limited aquatic habitat throughout the bayou can be attributed to the level of channelization, which has resulted in limited cover and diversity, in the area. Trace metals (copper, lead, and mercury) were well below chronic criteria values.

Dissolved oxygen levels were modeled with TNRCC's QUAL-TX model and were based on realistic conditions as well as actual maximum permit levels. Even when using permitted levels, the dissolved oxygen concentrations were projected to be above the TNRCC criterion, except in a short headwater reach.

Although nutrient concentrations were above TNRCC's screening levels, aquatic habitats do not appear to be adversely affected, and previous studies indicate the nutrient loadings to Galveston Bay are not optimal; therefore, reductions of current levels is discouraged.

Indicator bacteria levels, though overall decreasing, are still above contact recreational standards, especially under warm, dry conditions. During the intensive study, several domestic treatment plants' effluent was found to have unusually high concentrations of indicator bacteria, thus a review of point source disinfection in these plants was recommended.

Biological Monitoring

The United States Geological Survey (USGS) has completed Phases I and II of a three Phase biological study in waterbodies within the H-GAC Service Area to define the status of in-stream biological resources including fish and benthic macroinvertebrte community structure, and stream habitat conditions. The objectives of Phases I and II were to: (1) conduct a status assessment of in-stream biological and habitat sources at above tidal stream segments throughout the H-GAC Service Area; (2) establish reference-condition sites for comparison to non-reference sites; and (3) develop a multivariate predictive model for statistical comparisons of sites to determine levels of disturbance of in-stream biological resources.

This report summary of the USGS work does not specifically duplicate their results presented in two separate reports (Moring et al. 1998; Moring *In Press*). Waterbodies with there associated segment number discussed in this summary are shown Table *xx*. This summary attempts to provide a foundation for the biological and physical makeup of segments in the H-GAC Service Area. The USGS biological work was conducted on a reach basis, where as the results here are presented on a segment basis. Because some of the segments had only one or two sampling reaches, this summary should be interpreted with caution. However, results can be interpreted as an initial foundation for biological and habitat work, provide a measure of variability in macroinvertebrate and habitat data, and indicate the potential importance of biological and habitat sampling to identify stream health. In addition, biological variables give a direct measure of the aquatic communities and may aid in improving data interpretation of aquatic life use.

Biological integrity scores were computed using benthic macroinvertebrate data because they are more indicative of the status of a stream habitat then are fish, which are more mobile and tend to move from one habitat to another. Macroinvertebrate measures included richness measures,

composition measures, and tolerance/intolerance measures (Table *xx*). Stream features used in constructing integrity indices were based on physical and hydrological metrics (Table *xx*). See Moring et al. (1998) and Moring (*In Press)* for a complete description of the methods.

The metrics found to be most important, of those measured, were determined using Principal Component Analysis (PCA). Significant variables from the PCA were then used to construct biotic and habitat integrity indices. Habitat variables that were used to compute the stream habitat integrity score were structural index and Riparian, Community, and Environmental Index (RCE) (Table xx). The proportion of Chironomidae, proportion of EPT (Ephemeroptera, Plecoptera, Trichoptera), Hilsenhoff Index, and the number of aquatic insect taxa (richness) were used to compute the biological integrity score for each reach. Scores for each variable were assigned according to percentile exceedence criteria. For structural index, RCE, %EPT, and species richness, the following scoring was used: 6, 5, and 4 points were assigned for values greater than or equal to the 90^{th}, 75^{th}, or 50^{th} percentile, respectively. Scores of 3, 2, or 1 were assigned for values less than or equal to the 50^{th}, 25^{th}, or 10^{th} percentile, respectively. For the Hilsenhoff index and % Chironomidae, scoring was reversed based on the assumption that the larger the value, the lower the integrity score should be (see Moring *In Press* for further discussion of percentile exceedence methods).

Table *xx*. List of waterbodies and their respective segment number.

Waterbody	**Segment number**
Cedar Bayou	0902
East Fork San Jacinto River	1003
West Fork San Jacinto River	1004
Spring Creek	1008
Cypress Creek	1009
Caney Creek	1110
Buffalo Bayou Above Tidal	1014
Greens Bayou	1016
Whiteoak Bayou	1017
Clear Creek Above Tidal	1102
Dickinson Bayou Above Tidal	1104
Chocolate Bayou Above Tidal	1108
San Bernard River Above Tidal	1302

Table *xx*. Definitions of benthic and predicted direction of metric response used to develop biological and habitat integrity indices

Category	Metric	Definition	Predicted response to increasing perturbation
Richness	Total number of taxa	Measures the overall variety of the macroinvertebrate assemblage	Decrease
Composition	% EPT	Percent of the composite of mayfly, stonefly, and caddisfly larvae	Decrease
	% Chironomidae	Percentage of midge larvae	Increase
Tolerance/Intolerance	Hilsenhoff Biotic Index	Uses tolerance values to weight abundance in an estimate of overall pollution. Originally designed to evaluate organic pollution	Increase
Physical stream characteristics	RCEmax	Unitless score comprised of 16 metrics ranging from adjacent land use, continuity and vegetative makeup of the riparian and flood zones, channel structure, channel sediments, bank undercutting, aquatic vegetation, and type and frequency of geomorphic channel units. The score can be used to compare the physical and biological conditions between different streams in the same level of site classification.	Decrease
	Structural index	Unitless score consisting of the ratio of in-channel structures of a reach to its curvilinear length and indicates the structural complexity for a reach.	Decrease

The total number of taxa was the metric reported as a richness measure. The results indicate that all of the 303(d) listed segments were below the reference condition for richness. Nine of the listed segments had richness values that indicate a potential concern, with richness values ranging from 33% to 80% less than the reference condition. Those segments include Cedar Bayou (segment 0902), Cypress Creek (segment 1009), Buffalo Bayou (segment 1014), Green's Bayou (segment 1016), Whiteoak Bayou (segment 1017), Clear Creek (segment 1102), Dickinson Bayou (segment 1104), Chocolate Bayou (segment 1108), and the San Bernard River (segment 1302) (Figure *xx*). A non 303(d) listed segment, West Fork of the San Jacinto River (segment 1004) also had a richness value 20% below that established for the reference condition (Figure *xx*). Six of the segments also had Hilsenhoff indices that were 33% to 60% greater than that established for the reference conditions (Figure *xx*). Those segments include Green's

Bayou, Whiteoak Bayou, Clear Creek, Dickinson Bayou, Chocolate Bayou, and the San Bernard River.

The two metrics used to describe composition in the USGS study were percent EPT and percent Chironomidae. Six of 303(d) listed segments had % EPT values that indicate a potential concern: Buffalo Bayou, Green's Bayou, Whiteoak Bayou, Clear Creek, Dickinson Bayou, and the San Bernard River as indicated by % EPT values ranging from 30% to 90% less than the reference condition (Figure *xx*). One non 303(d) listed segment, Caney Creek (segment 1010) also had a % EPT value of potential concern compared to the reference condition (Figure xx). Seven 303(d) listed segments had % Chironomidae values higher than the established reference conditions and indicate a potential concern, with values ranging from 1.6- to 3-fold higher than that established for the reference condition. Those segments include Spring Creek (segment 1008), Buffalo Bayou, Green's Bayou, Whiteoak Bayou, Clear Creek, Dickinson Bayou, and the San Bernard River (Figure *xx*). One non 303(d) listed segment, West Fork of the San Jacinto River also had a % Chironomidae value of potential concern (Figure *xx*).

The structural index indicated potential concern for all the 303(d) listed segments, except Clear Creek and Dickinson Bayou, with structural index values of 33% to 100% of the reference condition values (Figure *xx*). The RCE value indicated a potential concern for Green's and Whiteoak Bayou with values about 65% lower than of those established for the reference condition (Figure *xx*).

Biological integrity scores indicate that eight segments are below the established reference condition (Figure xx). Developing the biological integrity scores underlines the importance of using more than one biological metric in describing the biological integrity of the streams in the H-GAC Service Area. For instance, Cedar Bayou and Chocolate Bayou were 50% and 30% below the reference condition value for species richness. However, both bayous scored relatively close to the reference condition for biological integrity (Figure *xx*). This was likely the result of near reference levels for percent EPT and percent Chironomidae for the two bayous. Buffalo Bayou scored near reference conditions for percent Chironomidae, but it had a biological integrity score about 25% less than that for reference conditions. The West Fork of the San Jacinto River, had a percent Chironomidae value 1.6-fold greater and a species richness level of about 30% less than their respective reference condition. However, the biological integrity score for the West Fork of the San Jacinto was only 10% less than the established reference level, which are likely not significantly different from one-another.

Habitat integrity scores indicate that three of the 303(d) listed sites fall between 30% and 65% less than the established reference condition. Those segments are Green's Bayou, Whiteoak Bayou, and Chocolate Bayou (Figure *xx*). Three other segments, Cypress Creek, Buffalo Bayou, and Clear Creek, had habitat integrity values that may be approaching those of potential concern. There was a significant correlation between habitat integrity and biological integrity ($r=0.68$; $p<0.05$), indicating that as the biological integrity increases with increasing stream complexity.

Development of biological and habitat indices of integrity for the H-GAC Service Area by the USGS in Phases I and II has provided an excellent initial starting point for relating aquatic

communities to habitat integrity. Phase III of the work by USGS will focus on Spring Creek, a segment listed on the 303(d) list due to not meeting the dissolved oxygen requirement for aquatic life use. The goal of Phase III will be to provide data and information that can assist in the development of a Total Maximum Daily Load (TMDL) for Spring Creek. There are three major objectives of Phase III:

1. To provide a detailed assessment of seasonal and diel dissolved oxygen concentrations at several sites in the Spring Creek 303(d)-listed segment, and to compare these data to dissolved oxygen concentrations from several reference-condition sites in the same watershed.
2. To establish if the biointegrity of Spring Creek and reference-condition sites corroborate findings from the comparison of dissolved oxygen concentrations from the two groups of sites.

To determine to what extent stream habitat, stream flow, and/or land use conditions can account for the differences in biointegrity among Spring Creek and reference-condition sites.

Copper WER and Trace Metals Study

This summary was not complete at the time of submittal. The summary will be provided as soon as it is complete.

3.

Special Studies Underway for FY2000-2001

The following section provides a summary of three of ten special studies that are underway in H-GAC's area. Summaries of all H-GAC water quality projects can be found on our website: www.hgac.cog.tx.us.

Bayou Bacteria

Bacteria levels in the urban bayous have declined substantially in the last decade in response to improvements in wastewater collection systems, but they are still markedly higher than the levels in more rural streams. Part of the reason may be the effect of runoff from impervious cover, part may be due to the high population density of urban areas, and part is simply unknown. Work is underway at the state level to develop improved methods of bacterial characterization for contact recreation. Work that leads to a better ability to differentiate between human and non-human sources may be important to developing an improved understanding. This project will be a study of urban bayou bacteria levels in Segment 1013, 1014, and 1017, with the goal of developing an improved understanding of the factors influencing bacteria levels in these urban bayous. The effort will involve field surveys in conjunction with routine water quality monitoring; analysis of samples for a broad range of bacterial indicators; and the use of DNA hybridization and polymerase chain reactions (PCR) techniques, antibiotic resistance profiles, or other established methods to better differentiate between human and nonhuman sources of fecal bacteria in the watershed.

Contact Information:

Todd Running
Houston-Galveston Area Council
(713) 993-4549
trunning@hgac.cog.tx.us

Paul Jensen
PBS&J
(512) 329-8342 ext. 9584
pajensen@pbsj.com

Dickinson Bayou Study

Dickinson Bayou is listed on the 303d list for low dissolved oxygen. H-GAC will fund a study that will help to address the low DO problem. Dickinson Bayou is a slow moving, tidally influenced water body. Problems that are found in Dickinson Bayou are characteristic to a number of coastal bayous. It is hoped that the results of this study can be applied to future studies of other coastal bayous. The project, as defined under this contract, will include monthly monitoring at four-six sites in Dickinson Bayou. Monitoring will be done every fifteen minutes

for a 48-hour period each month. Parameters measured will include - DO, pH, conductivity/salinity, and temperature.

Additional monitoring needs for the Total Maximum Daily Load includes the collection of stratified water quality data to account for the presence of oxygen demanding substances, measurements of flow magnitude and direction at each depth, and biological data to determine support of existing aquatic life uses at the sampling locations. This project is a coordinated effort between H-GAC, TNRCC, Galveston County Health District and the USGS.

Contact Information:

Todd Running
Houston-Galveston Area Council
(713) 993-4549
trunning@hgac.cog.tx.us

Jeff East
United States Geological Survey
(713) 718-3655 ext. 26
jweast@usgs.gov

Jean Wright
Galveston County Health District
(409) 938-2301
jwright@gchd.org

San Bernard River Monitoring

In the past, the San Bernard River has not been monitored to any great extent. The watershed is mostly rural with a few small urban areas. Therefore, local agency monitoring does not exist. The only monitoring that has been done recently is by the TNRCC Region 12 office. That monitoring consists of quarterly monitoring at two sites. H-GAC has contracted with the USGS to set up a monitoring program for the next two years that will help establish status and trends for basic water quality parameters through monthly monitoring, establish flow information, stream morphometry, and will include a biological assessment. Sampling and analysis will also be conducted for pertinent toxic parameters. Texas Watch volunteer data will also be collected at two sites in the watershed.

H-GAC will evaluate baseline monitoring data that is collected throughout the next biennium to determine where systematic monitoring will be conducted in the FY2002-2003 contract period. H-GAC will begin rotating the systematic (intensive) monitoring through watersheds where there is a lack of data or there is an indication of a problem with certain parameters in the watershed.

Contact Information:

Todd Running
Houston-Galveston Area Council
(713) 993-4549
trunning@hgac.cog.tx.us

Jeff East
United States Geological Survey
(713) 718-3655 ext. 26
jweast@usgs.gov