

Basin Highlights Report
for the
Nueces River Basin
and the
San Antonio-Nueces and Nueces-Rio Grande
Coastal Basins



Nueces River Authority

May 2000

INTRODUCTION

In 1991 the Texas Legislature passed the Texas Clean Rivers Act in response to growing concerns that water resource issues were not being addressed in a holistic manner. This legislation requires that water quality assessments be conducted for each river basin in Texas using an approach that integrates water quality issues within a river basin or watershed. To fund the program, the Texas Natural Resource Conservation Commission (TNRCC) assesses a fee from permit holders for water use and wastewater discharges. The legislation directs the TNRCC to summarize basin-wide assessments into a comprehensive statewide assessment.

The Clean Rivers Program (CRP) developed as a partnership involving TNRCC, other state agencies, river authorities, local governments, industry, and citizens. Using a watershed management approach, the Nueces River Authority (NRA) and the TNRCC work together to identify and evaluate surface water quality issues and to establish priorities for corrective action.

BASINS OVERVIEW

Nueces River Basin

The Nueces River Basin covers approximately 17,000 square miles, encompassing all or part of 23 counties. The basin extends from the hill country of central Texas to the mouth of the Nueces River at Nueces Bay along the coast. The western half of the Edwards Aquifer lies within in the basin. The two major reservoirs within the basin are Choke Canyon Reservoir and Lake Corpus Christi Reservoir. The major rivers of the basin are the Nueces River, Frio River, and Atascosa River. There are no major metropolitan areas in the basin (just the northwestern most tip of Corpus Christi falls within the basin). Some of the larger communities include Uvalde, Pleasanton, George West, and Three Rivers.

Farming and ranching industries dominate throughout the Nueces River Basin. However, petrochemical refineries are located in George West and Three Rivers. The basin is also home to several state parks (SP): Choke Canyon SP on the south side of Choke Canyon Reservoir near Three Rivers, Tips SP on the Frio River in Three Rivers, Lake Corpus Christi SP on the southeast bank of Lake Corpus Christi Reservoir near Mathis, and Lipantitlan SP near Sandia.

San Antonio – Nueces Coastal Basin

The San Antonio – Nueces Coastal Basin covers approximately 3100 square miles, encompassing all or part of seven counties. The basin is predominately coastal plain, bordering or including Hynes Bay, St. Charles Bay, Copano Bay, Aransas Bay, Mesquite Bay, Redfish Bay,

Nueces Bay and the northern third of Corpus Christi Bay. There are no major reservoirs in the basin. The major rivers of the basin are the Mission River and the Aransas River. There are no major metropolitan areas in the basin. However, some of the larger communities include Beeville, Rockport, Portland, and Refugio.

Farming and ranching industries dominate throughout the San Antonio - Nueces Coastal Basin, although petrochemical industries are abundant along the northern shoreline of Corpus Christi Bay. The basin is also home to several SPs: Copano Bay Pier SP along State Highway 35 north of Fulton, Fulton Mansion SP in Fulton, Goose Island SP near Rockport, and Mustang Island SP on the beach south of Port Aransas; and the Aransas National Wildlife Refuge in Aransas County.

Nueces – Rio Grande Coastal Basin

The Nueces – Rio Grande Coastal Basin covers approximately 11,400 square miles, encompassing all or part of 12 counties. The basin is predominately brush and coastal plain, bordering or including the southern two-thirds of Corpus Christi Bay, Corpus Christi Ship Channel, Oso Bay, Laguna Madre, and Baffin Bay. There are no major reservoirs or rivers in the basin. However, Petronila Creek and the Arroyo Colorado are classified stream segments. Corpus Christi, Kingsville, and Harlingen are the three largest cities in the basin (Brownsville and McAllen are within the Rio Grande River Basin). Other communities include Alice and Hebbronville.

Farming and ranching industries dominates throughout the Nueces – Rio Grande Coastal Basin, although petrochemical industries are abundant along the Corpus Christi Ship Channel. There are chemical research and development facilities and two four-year universities located within the basin: Texas A&M University-Corpus Christi (A&M-CC) and Texas A&M University-Kingsville. The basin is also home to Port Isabelle Light House SP on South Padre Island and the Padre Island National Seashore.



MONITORING ACTIVITIES

NRA is responsible for coordinating the CRP monitoring activities in the Nueces River Basin, the San Antonio-Nueces Coastal Basin, and the Nueces Rio-Grande Coastal Basin for inclusion in TNRCC's Surface Water Quality Monitoring (SWQM) program database. In addition to the NRA, the TNRCC and the US Geological Survey (USGS) also collect SWQM data from within the three basins.

Clean Rivers Program / Surface Water Quality Monitoring

NRA intends to conduct Fixed Station Monitoring at a total of 21 stations (including 9 stations in the Nueces River Basin and 12 stations in the Nueces Coastal Basins) on a quarterly basis (minimum 4 times per year). Field and chemical parameters monitored will include water temperature, pH, conductance, flow (on non-tidal segments), and air temperature. The NRA will also monitor for bacteria, dissolved oxygen, nitrate, ammonia, TKN, phosphorus, phosphate, chloride, sulfate, hardness, alkalinity, total suspended solids, and total dissolved solids. The NRA will also coordinate activities with the TNRCC, USGS, and other entities operating under NRA's Quality Assurance Project Plan (QAPP) avoid duplication of effort.

The monitoring is subcontracted to the Center for Coastal Studies (CCS) at A&M-CC. The City of Corpus Christi assists with the monitoring of Lake Corpus Christi by providing a boat and driver for the lake site. Several TNRCC regions also assist with CRP/SWQM: Region 13 monitors the upper Nueces River Basin; Region 14 monitors the creeks flowing into Baffin Bay and the coastal waters from Baffin Bay to Aransas Bay; Region 15 monitors the coastal waters south of Baffin Bay; and the USGS monitors within the lower Nueces River Basin.

Tables 1, 2, and 3 list the fixed stations being monitored in the Nueces River Basin, the San Antonio-Nueces Coastal Basin, and the Nueces Rio-Grande Coastal Basin, respectively, during FY2000. Stations located in the bays and estuaries, (Basin 24), are included in with the adjacent inland basin. Additional information in the tables include: the monitoring agency, segment #, and water body. Figure 1 is a map of these stations. The "Map #" in the tables refers to the monitoring site number on the map.

WATER QUALITY DATA

NRA will continue to develop, implement, and maintain the data management program for the Nueces River Basin and the Nueces Coastal Basins. The NRA will receive all water quality data collected by the NRA within the study area, process these data in accordance with the approved data management plan, maintain the data electronically,



and make the data available to interested parties upon request.

To compliment water quality data, NRA collects locational information of municipal and industrial wastewater treatment plant outfalls, population centers, row crop agricultural areas, and Concentrated Animal Feeding Operations areas which are placed in a geographical information systems (GIS) database. Other factors influencing water quality such as oil and fuel spills and fish kills will also be included. NRA will maintain an inventory of these locations electronically, and make the data available to interested parties upon request. Additional GIS layers include contours, recharge zones of major and minor aquifers, and land-use data.

Figure 2 is a map of the three basins which shows: the approximate locations of wastewater treatment plants and concentrated animal feeding operations (in the vicinity of the river segments on the 303(d) list) based on wastewater discharge permits; and landfills, superfund sites, hazardous waste sites, and population centers based on Texas Natural Resource Information Systems geographic information systems (GIS) coverages.

Screening Analysis Results

Water quality data collected throughout the Nueces River Basin are reviewed periodically to identify areas of potential concern. Utilizing data which covered a five year period, screening analysis was performed following TNRCC guidance. Results of this analysis are used to describe and identify water quality concerns and forms the basis for developing the 303(d) priority list. This list is a compilation of Texas water bodies that do not meet, or not expected to meet applicable water quality standards.

Table 2 summarizes the screening analysis performed for the 1995-1999 SWQM dataset. Only the stations that had any exceedances for a given parameter are listed.

Tables 5, 6, and 7 are the Basin Action Summaries for the Nueces River Basin, the San Antonio-Nueces Coastal Basin, and the Nueces Rio-Grande Coastal Basin, respectively. Each table lists the segments that are included in the April 2000 draft 303(d) list, the reason for concern, possible causes for the concern, and possible solutions.

SPECIAL STUDIES

Oso Bay / Oso Creek Watershed System Study

Oso Bay (Segment 2485) is an enclosed, secondary bay located on the southern shore of Corpus Christi Bay that exchanges water only with Corpus Christi Bay and receives freshwater inflows only from Oso Creek (undesignated). This unique urban watershed is highly productive, yet subject to both natural and anthropogenic stresses that potentially impair water quality. This project will address the conclusions of the June 26, 1998 final 303(d) list and the 1996 TNRCC Regional Assessment of Water Quality in the Nueces Coastal Basins report. Both documents list this segment as an impaired water body with identifiable “concerns” and “possible concerns” for various water quality standard indicators.

The primary project objective is to characterize and assess the water quality and biota of the Oso Creek/Oso Bay Watershed System. As an accurate assessment of the watershed for potential water quality problems is important, a secondary objective will provide for sampling and data collection during and after several significant rainfall events in an attempt to assess the influence of “pulsed” inputs from potential pollutant sources to the system. Examples of inputs include, but are not limited to, agricultural nonpoint source runoff, municipal point source discharges, and residential nonpoint source runoff. In addition, to further define the system, baseline data depicting land usage within the watershed will be collected and compiled for integration into basic GIS information layers. The project objectives are in support of the Coastal Bend Bays Estuary Program (CBBEP) comprehensive conservation and management plan titled

the *Coastal Bend Bays Plan*. The study is being conducted by CCS and is funded by a National Oceanic and Atmospheric Administration grant used with Coastal Coordination Council participation through the Texas General Land Office and the TNRCC.

The project design includes sampling within the Oso Creek/Oso Bay Watershed System at eight locations monthly, for a six-month period. The analysis includes routine field and chemical parameters, macroinvertebrate organisms, and microbial indicator organisms. Additional information will also be provided by the collection and analysis of routine field and chemical parameters, and microbiological organisms, during and after four significant rainfall events and through the collection and compilation of baseline land use data.

The frequency and intensity of this sampling effort is designed to provide spatial and temporal information on existing water quality conditions within this watershed and to provide the necessary water quality, biological community composition, and land use data to evaluate the effectiveness of current management practices. Data analysis is intended to provide sufficient information for accurately assessing this water body and determining if further management measures are necessary to ensure beneficial uses are met.

The project is organized into three phases. Phase I included the development of the QAPP and sampling plan design, which was approved in September 1999. Phase II encompassed the sampling program, which began in October 1999 and concluded in March 2000, and the analyses of data collection results as well as the collection and compilation of the baseline data for creating the GIS information layers. Phase III includes the development of the comprehensive final report which is due July 2000. Currently, negotiations are underway to continue the sampling program for an additional six months with final report completion scheduled for January 2001.



Coastal Bend Bays Monitoring Program

Even though Corpus Christi Bay has been removed from the 1999 303(d) draft list for dissolved copper, the local stakeholders are still concerned about whether or not there is a dissolved metals problem in the bay. Therefore, NRA contacted TNRCC and the Environmental Protection Agency (EPA) to help develop a monitoring program to address that concern. With funding through the CBBEP, this project partnership between NRA, federal and state agencies, and stakeholder entities will provide an intensive, targeted water quality monitoring and assessment of the Coastal Bend Bays system (including Corpus Christi Bay, Nueces Bay, Corpus Christi Inner Harbor, Aransas Bay, and Oso Bay).

The monitoring plan will incorporate both the Environmental Monitoring and Assessment Program (EMAP) probabilistic sampling design, contributed by the EPA Office of Research and Development, and a targeted monitoring plan (Figure 2). The EMAP sampling design established 30 randomly selected sites per quarter (for a total of 120 random sites) in the CBBEP project area. Routine field and chemical parameters, and total and dissolved metals will be monitored at these sites on a quarterly basis. In addition, six previously established TNRCC monitoring stations have been selected for targeted monitoring of the same parameters on a bi-monthly basis. Additional sites will be monitored by splitting samples obtained during TNRCC's quarterly SWQM monitoring and by splitting samples collected during the Oso Bay/Oso Creek special study currently underway. This unique monitoring design will provide for intensive temporal and spatial considerations which are necessary to meet the project objectives of addressing metals concerns in Corpus Christi Bay, characterization of water quality, and development of a screening process for future long-term monitoring in the CBBEP project area.

Coastal Bend Bays Monitoring Program Supports A&M-CC Graduate Project

The Coastal Bend Bays Monitoring Program, discussed above, will also support a graduate research project for Mr. Alex Nunez, an Environmental Science graduate student at A&M-CC. Mr. Nunez will collect sediment samples for the purpose of developing a species characterization of macroinvertebrates for the Coastal Bend Bays (Nueces Bay, Copano Bay, Mission Bay, Aransas Bay, Redfish Bay, and Corpus Christi Bay) in relation to salinity and dissolved oxygen levels. Development and sampling will be conducted on a quarterly basis in conjunction with water sampling.

Protocols for the collection of marine benthic macroinvertebrates will follow the procedures specified in the *TNRCC Surface Water Quality Monitoring Procedures Manual*. When conditions are optimal, a PVC cylindrical

push corer will be used to sample benthic infauna, when not feasible, an Ekman dredge will be used. The organisms will be identified to the lowest taxonomic level, and the results will be compared to the water quality results. Additional trends other than salinity and dissolved oxygen levels, if any, will also be noted.

Arroyo Colorado - Total Maximum Daily Load Study

The TNRCC has included segments 2201, 2202, and 2202A in the Arroyo Colorado watershed, on the list of impaired water bodies for the state of Texas (Clean Water Act 303(d) list). A Total Maximum Daily Load (TMDL), required for these segments, is scheduled to be completed in FY 2000. The TMDL is required because of low dissolved oxygen and elevated levels of pollutants, including pesticides, polychlorinated biphenyls (PCBs), and other organic compounds. The USGS has been selected to conduct the study.

USGS will provide advice, guidance, and technical assistance to NRA and TNRCC staff in the mathematical modeling of in-stream flow, contaminant fate and transport, and sediment transport in the Arroyo Colorado watershed, revision of model input parameters for mathematical simulation of in-stream flow and water quality conditions, guidance in the interpretation of model output, and revision(s) of model input parameters and setup commensurate with model application needs. The USGS's work will support TMDL development and the establishment of a pollutant load allocation strategy in the Arroyo Colorado watershed.

USGS will also provide assistance to NRA and TNRCC that will include participating in watershed stakeholder meetings; providing guidance regarding data collection (flow and water quality) and use; and reviewing and providing comments on workplans, technical reports, and other documents as requested by NRA and TNRCC.



NONPOINT SOURCE PROGRAMS AND BEST MANAGEMENT PRACTICES

The following paragraphs summarize the nonpoint source (NPS) and best management practices (BMP) currently underway in the Nueces River and Nueces Coastal Basins.

Arroyo Colorado, Segments 2201, 2202, and 2202A

As previously mentioned, a TMDL is currently being conducted to develop and apply model(s) to determine numerical load allocations for dissolved oxygen, pesticides, and PCBs. The follow up to this study will be:

- to coordinate with the Soil and Water Conservation District, US Department of Agriculture-Natural Resource Conservation Service, and Texas State Soil and Water Conservation Board Regional Office personnel to most efficiently provide technical and financial BMP assistance to the landowners in the targeted area
- to implement Water Quality Management Plans with landowners in the Arroyo Colorado Watershed

CBBEP Coastal Bend Bays Plan

In addition to the Coastal Bend Bays Monitoring Program, the CBBEP is also moving forward with the following projects:

- *Characterize Septic System Problems:* to characterize and develop a plan to reduce septic system problems in Aransas, Nueces, Reguio, and San Patricio counties
- *Study of Atmospheric Deposition to Bays:* to study the contribution of atmospheric deposition (wetfall and dryfall) to the total pollutant loadings of the bay system
- *Implementation / Demonstration Projects:* sponsorship of projects near Edroy, Ingleside, and Refugio that will examine the control of agricultural and urban NPS runoff
- *King Ranch Project:* to examine the relationship between agricultural loadings and Brown Tide events in the Baffin Bay and Laguna Madre estuary system
- *Estimating Total Pollutant Loadings:* to develop a total constituent loadings model for the CBBEP study area, building on an earlier pilot project conducted for the San Antonio-Nueces Coastal Basin

Edwards Aquifer Program

The Edwards Aquifer Protection Program requires that new construction over the Edwards Aquifer receive review and approval of the TNRCC prior to the start of any construction. The review process includes site inspections prior to, during, and after construction to ensure

compliance with storm water mitigation requirements and to evaluate and determine BMPs.

Adopt-A-Beach Program

The Texas General Land Office has initiated the Adopt-A-Beach program to focus public awareness on the problem of trash on public beaches. This all-volunteer program helps to educate citizens about the sources of marine debris and beach litter and generates public support for state, national, and international action to clean up beaches and coastal water. Cleanups are conducted each September and April.

COORDINATED MONITORING MEETING for FY 2001

NRA held its Coordinated Monitoring Meeting on March 17, 2000 at the A&M-CC Natural Resources Center. In attendance were personnel from NRA, TNRCC, CCS, Coastal Bend Council of Governments, CBBEP, USGS, and the Lavaca Navidad River Authority. The TNRCC personnel included members of the CRP team, SWQM team, TMDL team, and Regions 13, 14, and 15.

Monitoring Plans

The group reviewed the monitoring plan for each station listed in the 38 segments of the three basins. For each segment, the group discussed whether the following criteria were being met:

- at least one station per segment
- enough stations to cover the entire length of the segment
- enough samples for assessment
- appropriate sampling for the site

Other Issues

In addition to the segment-by-segment, station-by-station review, several additional topics were discussed.

Tidal Boundary Change

Segment 2004 (Aransas River Above Tidal) is on the 303(d) list for total dissolved solids and sulfates based on sampling from SWQM station 12948 (Aransas River At US 77 Bridge between Woodsboro and Sinton). However, an FY1999 salinity study concludes that the location of the boundary between segments 2003 (Aransas River Tidal) and 2004 should be moved from "a point 5.3 km (3.3 miles) upstream of Chiltipin Creek in Refugio/San Patricio County" to "a point 1.6 km (1 mile) upstream from US 77 in Refugio/San Patricio County." This change is in the proposed standards revision and should be approved later this year.

Segment 2004 will remain on the 303(d) list until the change is approved. As a result of the change, SWQM station 12948 will most likely be removed from the monitoring plan since it will be so close to the tidal

boundary. Two existing stations on the river, 12945 on Segment 2003 and 12952 on Segment 2004, will remain.

Segment 2112 - Upper Nueces River

Segment 2112 flows across the Edwards Aquifer Recharge Zone in Uvalde County. According to Mr. Augie De La Cruz of TNRCC Region 13, the river has very different characteristics above and below the recharge zone. As a result of the discussion, a suggestion was made that the segment should be divided into two segments. Further discussions are needed to determine if a formal letter requesting such a change should be submitted to the Water Quality Standards Team.

USGS Data

The USGS also collects data within the Nueces River Basin. The sampling stations consist of five sites on segment 2103 (Lake Corpus Christi), six sites on 2116 (Choke Canyon Reservoir), and one site each on 2104 (Nueces River Above Frio River), 2106 (Nueces / Lower Frio River), and 2117 (Frio River above Choke Canyon Reservoir). These sites will be added to the coordinated monitoring plan, and the data collected by the USGS will be incorporated into the SWQM database.

Data Discrepancies

The TNRCC SWQM team had several segments listed as non-assessed, and the sample history summaries for those segments indicated that a less than minimum number of samples had been collected to perform an assessment. According to Mr. De La Cruz, these segments have been sampled for years. The SWQM team will investigate these discrepancies.

PROSPECTIVE TMDLs

NRA is interested in pursuing three potential TMDL projects based on the Draft Schedule for TMDL Candidates for Basin Group E. (January 6, 2000) The following paragraphs summarize these projects. See Figure 4 for the location of the segments.

Oso Bay: Segment 2485

This segment is on candidate list for dissolved oxygen (DO). NRA intends on monitoring the current special study taking place in Oso Bay / Oso Creek by CCS at A&M-CC. NRA intends to work with CCS and area stakeholders to develop a TMDL should the results of this study indicate that one is necessary.

Petronila Creek Above Tidal: Segment 2204

This segment is on the candidate list for chloride, sulfate, and total dissolved solids. NRA intends to be the lead organization for this TMDL and to subcontract with local universities (to conduct the targeted monitoring) and consultants (to assist with the data analysis and evaluation of the appropriateness of the water quality criteria). It is

suspected that a full TMDL will be necessary on this segment.

Atascosa, Frio, and Nueces Rivers: Segments 2104, 2107, 2113, and 2117

These segments are on the TMDL candidate list for pH and/or DO. The NRA proposes grouping these three projects into a single contract for data collection purposes. The initial problem that will be addressed is the appropriateness of the current water quality standards for each of the segments listed above. NRA intends to be the lead organization for the project. A subcontract will be developed for use and attainability analyses (UAA) on the segments. It is suspected that these segments will be removed from the 303(d) list as a result of the UAAs. However, the NRA will follow through with the TMDL process for any particular stream segment and contaminant should any of the UAAs indicate that TMDL allocations are necessary.



PUBLIC OUTREACH

Meetings

The NRA will conduct at least one basin-wide steering committee meeting annually. NRA will endeavor to ensure the meeting includes reasonable representation from fee-payers, private citizens, political subdivisions, agencies, and interested parties.

NRA will continue to combine steering committee and public meetings when applicable for the Nueces River Basin and the Nueces Coastal Basins. The meetings will serve to inform, discuss, and obtain input with regards to the Basin Highlights Report, the basin action summary, water quality issues such as the 303(d) list, the monitoring plan, results of data analyses, and other issues such as potential funding sources for projects in the basins. The NRA will use these meetings to encourage, but not commit to, funding for volunteer monitoring efforts.

The NRA will conduct other public outreach efforts including environmental education efforts, news releases, newsletters, public meetings, participation in community action projects, and attendance at Water Quality Issues meetings.

Web Site

The NRA will continue improving and expanding its web site (www.sci.tamucc.edu/nra). The site will continue to provide user access to electronic maps, water quality and quantity databases, and reports. The site will also provide opportunity for user comments and links to related sites of interest.



Texas Watch

In an effort to create a more complete database of water quality for the state of Texas, the TNRCC created the Texas Watch Program. This program was developed to “facilitate environmental stewardship by empowering a statewide network of concerned volunteers, partners, and institutions in a collaborative effort to promote a healthy and safe environment through environmental education, data collection, and community action.” Recently, the Texas Watch Program moved to Southwest Texas University (SWT) in San Marcos where it is administered through a cooperative partnership of SWT, TNRCC, and EPA. The program is very active in educating the public on water quality standards and issues as well as training their volunteers in proper water quality data collection techniques.

Texas Watch has been a major participant and coordinator of several environmental events. One such event, Earth Day 2000 - A Day in the Life of Texas Waters, took place on April 18, 2000 statewide. This event was designed to promote Earth Day awareness and celebrate Earth Day’s 30th anniversary. During this day, thousands of volunteers associated with Texas Watch performed a statewide sampling initiative. The volunteers sampled several surface and ground water sites and reported their results to the staff at Texas Watch. Members of water quality professions were also invited to send in their results for the day. Locally, the Earth Day festivities were held at Hazel Bazemore Park along the Nueces River at the

western city limits of Corpus Christi. The NRA provided a water-quality sampling demonstration for the public.

The NRA is currently working towards expanding their relationship with the Texas Watch program by providing local data management services and continuing to coordinate volunteer meetings and training sessions. For more information about Texas Watch, visit their website at www.texaswatch.geo.swt.edu.

ADDITIONAL ACTIVITIES

A&M-CC Offers Graduate Courses in Water Resources Management

Students at TAMU-CC are learning that Water Resources Management is certainly not a “dry” subject. The course is being taught by James Dodson, the Deputy Executive Director for the NRA and an adjunct faculty member at A&M-CC. The Spring 2000 semester is the second time the course has been offered. Mr. Dodson also taught a course on Water Conservation and Drought Contingency Planning during the Spring 1999 semester. These courses are offered as part of the graduate degree program in Environmental Sciences.

Dodson states that “since the Coastal Bend Division offices of the NRA are in the Natural Resources Building on the A&M-CC campus, the opportunity to provide graduate coursework related to water resources is a natural outgrowth of our outreach efforts. Having these courses offered on a regular basis prepares graduates to work in the field of water resources planning and management,” adding that “we also provide opportunities for students to get field experience and conduct research on water-related issues through our presence on campus.”

A&M-CC Offers Undergraduate Courses in Geographic Information Systems

Ms. Rocky Freund, Director of Environmental and Information Programs for the Coastal Bend Division of the NRA, is also an adjunct faculty member at A&M-CC and teaches courses in the Geographic Information Science department. GIS provides a method of relating spatial information and data to allow graphical display and analysis of complex natural systems.

REGIONAL NEWS

Koch Settlement

As part of a \$35 million settlement of an enforcement action brought by the State of Texas and TNRCC, Koch Pipeline Company, L. P. has voluntarily agreed to contribute \$1.5 million to CBBEP for preservation and conservation projects. The agreement emphasizes that priority be given to environmental projects in San Patricio and Nueces Counties, because spills which impacted natural resources in these areas were the basis for legal action. The CBBEP agreement with the TNRCC specifies

that the funds be used for habitat protection (fee simple and conservation easements) and restoration of reefs and islands to provide fish habitat and colonial waterbird nesting sites.

Nueces River Diversion Project

If you look to the right as you cross the Nueces River Bridge on IH 37 driving out of Corpus Christi, you'll see a breach in the riverbank and an evenly shaped channel running north from the river channel itself. Often there will only be a small amount of water in the channel, with no discernible flow. But on occasion, when the Nueces River is flowing over the Calallen saltwater barrier dam just upstream, or the tide is "way up" on the tidal reach below the saltwater barrier dam, this channel will be obviously flowing -- one direction or the other. This structure is the Rincon Bayou Diversion Demonstration Project, designed and constructed by the U.S. Bureau of Reclamation in order to increase the opportunity for freshwater flow events in the upper Nueces Estuary by diverting water through the overflow channel into Rincon Bayou, an old river channel that runs through the middle of the Nueces Delta.

The Bureau of Reclamation is the federal agency that designed, built, and still owns Choke Canyon Reservoir on the Frio River near Three Rivers. Choke Canyon Reservoir, which is jointly sponsored by the City of Corpus Christi ("the City") and NRA, is one of the principal water supply reservoirs for the Coastal Bend area. Concerns over the impacts of the construction of Choke Canyon Reservoir on freshwater inflows have led to both a freshwater inflow operating plan, implemented under the water rights permit held by the City and the NRA, and the construction of the Rincon Bayou Diversion Project.

As a "demonstration project," fully funded by the Bureau of Reclamation, the Rincon Bayou Diversion Project was designed to evaluate the frequency of potential overflows and to monitor the resulting changes in productivity in the Nueces Delta marsh systems as a result of these increased freshwater inflow events. Data collected from several events that sent freshwater through the diversion channel indicate a significant potential for these flows to enhance the productivity of the Nueces Delta wetlands.

Unfortunately, the federal funding mechanism also carried with it a five-year period of authorization for the project. All land easements for the project, obtained from private landowners, and water rights permits, obtained from the TNRCC were scheduled to expire at the end of the five year "demonstration" period, around October 2001.

The Bureau of Reclamation is trying to determine if the landowners will consider renewing the current easements

so that the diversion project may continue under the sponsorship of state and local entities. If the easements can be successfully re-negotiated, and the project supported by non-federal funding, then the Rincon Bayou Diversion channel will remain open. If not, then when you cross the Nueces River Bridge next year, you may see a freshly leveled and planted area along the riverbank where the diversion channel now exists.

For more information on the status of the Rincon Bayou Diversion Project, contact James Dodson at 361-825-3193 or jdodson@falcon.tamucc.edu.

Lower Nueces River Dissolved Minerals Study - Senate Bill 1

This particular study is focusing on segment 2102 of the Nueces River; specifically between the Wesley Seale Dam and the Calallen Saltwater Barrier Dam. The purpose of the study is to analyze the increase of mineral concentrations in the Nueces River and to identify the probable source(s) of the increase. The project began in August of 1999 with a preliminary series of samples to determine sampling locations. Currently, monthly samples are being taken which include both routine field data and lab analyses. The project goals are aimed towards (1) identifying potential water supply intake modifications and/or river management strategies to minimize further withdrawal of highly mineralized water, and (2) evaluation of blending Nueces River water with other water supplies such as Lake Texana water, Colorado River water, and other sources.



NUECES RIVER AUTHORITY NEWS

Board of Directors

The annual election of officers was held at the December 10, 1999 NRA Board of Directors Meeting in Uvalde. The new officers are:

President:

Mrs. Ernestine Carson Barksdale

First Vice President:

Mr. Thomas Reding, Jr. Portland

Second Vice President:

Mr. August Linnartz, Jr. Carrizo Springs

Secretary-Treasurer:

Mr. William Dillard Uvalde

Executive Committee:

Mrs. Patty Mueller Corpus Christi

NRA Creates Associate Water Resource Analyst Position in the Coastal Bend Division Office

As the new Associate Water Resource Analyst, Ms. Gabrielle Grunkemeyer has a variety of environmental, planning, and administrative duties. Currently, she coordinates monitoring with CCS at A&M-CC with regards to the CRP and the Coastal Bend Bays water quality monitoring program. Gabrielle also works with consultants for the Senate Bill 1 (SB1) regional water planning program to perform the monthly sampling for the Lower Nueces River Dissolved Mineral Study. She is the CRP Project Manager and facilitator for several planning activities related to SB1.

Information and Contacts

Visit the NRA's web site at www.sci.tamucc.edu/nra.

For additional information, questions, or comments, contact:

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Acknowledgement

The document was prepared in cooperation with the TNRCC under authorization of the Clean Rivers Act.



**Tables
and
Figures**

Table 1. Nueces River Basin

Map #	Station	Segment	Water Body	Monitoring Agency
1	12960	2101	Nueces River Tidal	Region 14
2	12964	2102	Nueces River	NRA
3	12965	2102	Nueces River	NRA
4	12967	2103	Lake Corpus Christi	NRA
5	AL	2103	Lake Corpus Christi	USGS
6	BC1	2103	Lake Corpus Christi	USGS
7	CC1	2103	Lake Corpus Christi	USGS
8	DC1	2103	Lake Corpus Christi	USGS
9	EC1	2103	Lake Corpus Christi	USGS
10	12973	2104	Nueces River	NRA
11	12975	2105	Nueces River	Region 13
12	12977	2106	Frio River	NRA
13	12978	2106	Nueces River	NRA
14	12980	2107	Atascosa River	NRA
15	12982	2107	Atascosa River	Region 13
16	12983	2108	San Miguel Creek	NRA
17	12985	2109	Leona River	Region 13
18	12993	2110	Sabinal River	Region 13
19	12994	2110	Sabinal River	Region 13
20	12996	2112	Nueces River	Region 13
21	12999	2112	Nueces River	Region 13
22	13006	2113	Frio River	Region 13
23	13007	2113	Frio River	Region 13
24	13010	2114	Hondo River	Region 13
25	13013	2115	Seco River	Region 13
26	AC	2116	Choke Canyon Reservoir	USGS
27	BC2	2116	Choke Canyon Reservoir	USGS
28	CC2	2116	Choke Canyon Reservoir	USGS
29	DC2	2116	Choke Canyon Reservoir	USGS
30	EC2	2116	Choke Canyon Reservoir	USGS
31	FC	2116	Choke Canyon Reservoir	USGS
32	13023	2117	Frio River	NRA
33	13024	2117	Frio River	Region 13

Table 2. San Antonio - Nueces Coastal Basin

Map #	Station	Segment	Water Body	Monitoring Agency
34	12943	2001	Mission River Tidal	NRA
35	12944	2002	Mission River	NRA
36	12945	2003	Aransas River Tidal	NRA
37	12948	2004	Aransas River	NRA
38	12952	2004	Aransas River	NRA
39	14956	2462	Hynes Bay	NRA
40	13400	2463	Mesquite Bay	Region 14
41	13402	2471	Aransas Bay	Region 14
42	16942	2471	Aransas Bay	Region 14
43	13404	2472	Copano Bay	NRA
44	13405	2472	Port Bay	NRA

45	14783	2472	Copano Bay	Region 14
46	14784	2472	Copano Bay	Region 14
47	13406	2473	St. Charles Bay	NRA
48	13407	2481	Corpus Christi Bay	Region 14
49	13425	2482	Nueces Bay	Region 14
50	13426	2483	Redfish Bay	NRA
51	14801	2483	Redfish Bay	Region 14
52	14803	2483	Redfish Bay	Region 14

Table 3. Nueces - Rio Grande Coastal Basin

Map #	Station	Segment	Water Body	Monitoring Agency
53	13071	2201	Arroyo Colorado Tidal	Region 15
54	13072	2201	Arroyo Colorado Tidal	Region 15
55	13073	2201	Arroyo Colorado Tidal	Region 15
56	13559	2201	Arroyo Colorado Tidal	Region 15
57	13782	2201	Arroyo Colorado Tidal	Region 15
58	13074	2202	Arroyo Colorado	Region 15
59	13081	2202	Arroyo Colorado	Region 15
60	13084	2202	Arroyo Colorado	Region 15
61	13090	2203	Petronila Creek Tidal	Region 14
62	13094	2204	Petronila Creek	Region 14
63	13410	2481	Corpus Christi Bay	Region 14
64	13411	2481	Corpus Christi Bay	Region 14
65	14355	2481	Corpus Christi Bay	Region 14
66	13421	2482	Nueces Bay	Region 14
67	13422	2482	Nueces Bay	Region 14
68	13430	2484	Corpus Christi Inner Harbor	Region 14
69	13432	2484	Corpus Christi Inner Harbor	Region 14
70	13439	2484	Corpus Christi Inner Harbor	Region 14
71	13028	2485	Oso Creek	NRA
72	13440	2485	Oso Bay	NRA
73	13443	2491	Laguna Madre	Region 14
74	13444	2491	Laguna Madre	Region 14
75	13445	2491	Laguna Madre	Region 14
76	13447	2491	Laguna Madre	Region 14
77	13448	2491	Laguna Madre	Region 14
78	13033	2492	San Fernando Creek	Region 14
79	13450	2492	Baffin Bay	Region 14
80	13452	2492	Baffin Bay	Region 14

Table 4. Screening Analysis Results

Segment	Station	Parameter	# samples / # exceedances	% exceedances	Concern / Possible Concern
2004 Aransas River Above Tidal	12952	Dissolved Oxygen	5 / 10	50	Concern*
		Total Phosphorus	3 / 11	27	Concern
		Ortho Phosphorus	3 / 10	30	Concern
		Total Residue	9 / 10	90	Concern
		Chloride	1 / 4	25	Not enough samples**
		Sufate	8 / 11	73	Concern
	12948	Total Phosphorus	1 / 11	9	No concern***
		Ortho Phosphorus	2 / 11	18	No concern
		Total Residue	7 / 10	70	Concern
		Chloride	2 / 8	25	Not enough samples
2101 Nueces River Tidal	12960	Sufate	6 / 11	55	Concern
		Arsenic	1 / 2	50	Not enough samples
		Barium	2 / 2	100	Not enough samples
		Cadmium	1 / 2	50	Not enough samples
		Oil and Grease	1 / 1	100	Not enough samples
2105 Nueces River Above Holland Dam	12975	Dissolved Oxygen	1 / 4	25	Not enough samples
		Fecal Coliform	1 / 4	25	Not enough samples
2106 Nueces / Lower Frio River	12977	Total Residue	1 / 7	14	Not enough samples
	12079	Total Residue	2 / 7	29	Not enough samples
	12978	Total Residue	11 / 27	41	Concern
2107 Atascosa River	12982	Dissolved Oxygen	1 / 1	100	Not enough samples
		Chlorophyll a	1 / 2	50	Not enough samples
	12981	Dissolved Oxygen	2 / 9	22	No concern
		Fecal Coliform	3 / 7	43	Not enough samples
		Chlorophyll a	2 / 9	22	No concern
		Ammonia	5 / 9	55	Concern
		Nitrate+ Nitrite	6 / 9	67	Concern
		Total Phosphorus	7 / 9	78	Concern
		Copper	1 / 2	50	Not enough samples
		Nickel	1 / 2	50	Not enough samples
		Zinc	1 / 2	50	Not enough samples
		Oil and Grease	1 / 2	50	Not enough samples
	12980	Dissolved Oxygen	1 / 7	14	Not enough samples
		Chlorophyll a	2 / 10	10	No concern
Ammonia		1 / 10	10	No concern	
Total Phosphorus		1 / 10	10	No concern	

Table 4. Screening Analysis Results Continued

2109	12987	Nitrate+Nitrite	4 / 6	67	Not enough samples
Leona River	12985	Nitrate+Nitrite	1 / 1	100	Not enough samples
2110	12993	Fecal Coliform	3 / 12	25	Concern
Lower Sabinal River	14254	Nitrate+Nitrite	8 / 16	50	Concern
2112	14253	Total Residue	4 / 11	36	Concern
Upper Nueces River	12996	Ammonia	1 / 3	33	Not enough samples
2113	15751	Dissolved Oxygen	1 / 3	33	Not enough samples
Upper Frio River	13007	Dissolved Oxygen	4 / 4	100	Not enough samples
2117	15449	Fecal Coliform	1 / 15	7	No concern
Frio River Above Choke Canyon Reservoir	13024	Dissolved Oxygen	2 / 15	13	No concern
		Fecal Coliform	2 / 15	13	No concern
	15448	Fecal Coliform	1 / 6	17	Not enough samples
	15637	Dissolved Oxygen	1 / 8	13	Not enough samples
		Fecal Coliform	5 / 8	63	Not enough samples
	13023	Dissolved Oxygen	1 / 13	7	No concern
		Fecal Coliform	5 / 7	71	Not enough samples
		Chlorophyll a	3 / 7	43	Not enough samples
2203	13090	Dissolved Oxygen	2 / 5	40	Not enough samples
Petronila Creek Tidal					
2204	13099	Chlorophyll a	1 / 3	33	Not enough samples
Petronila Creek Above Tidal	13096	Barium			
		Chlorophyll a	3 / 4	75	Not enough samples
		Total Residue	3 / 4	75	Not enough samples
		Chloride	3 / 4	75	Not enough samples
		Sulfate	3 / 4	75	Not enough samples

Table 5. Nueces River Basin

Segment	Impaired Use	Cause	Possible Sources	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
2104 Nueces River Above Frio River	Aquatic life, general water quality use	DO, pH	Low Flows	TMDL proposed (combined with segments 2107, 2113, 2117)	Conduct UAA to determine appropriateness of current water quality standards	M	TNRCC - TMDL	NRA
2107 Atascoas River	Aquatic life, contact recreation	DO, pathogens	Low Flows, NPS	TMDL proposed (combined with segments 2104, 2113, 2117)	Conduct UAA to determine appropriateness of current water quality standards	L	TNRCC - TMDL	NRA
2110 Lower Sabinal River	Contact recreation	Pathogens	NPS	None	Additional studies	L	TNRCC	Unknown
2113 Upper Frio River	Aquatic life	DO	Low Flows	TMDL proposed (combined with segments 2104, 2107, 2117)	Conduct UAA to determine appropriateness of current water quality standards	M	TNRCC - TMDL	NRA
2116 Choke Canyon Reservoir	Contact recreation	Pathogens	NPS	None	Additional studies	M	TNRCC	Unknown
2117 Frio River Above Choke Canyon Reservoir	Aquatic life, contact recreation	DO, pathogens	Low Flows, NPS	TMDL proposed (combined with segments 2104, 2107, 2113)	Conduct UAA to determine appropriateness of current water quality standards	M	TNRCC - TMDL	NRA

Table 6. San Antonio – Nueces Coastal Basin

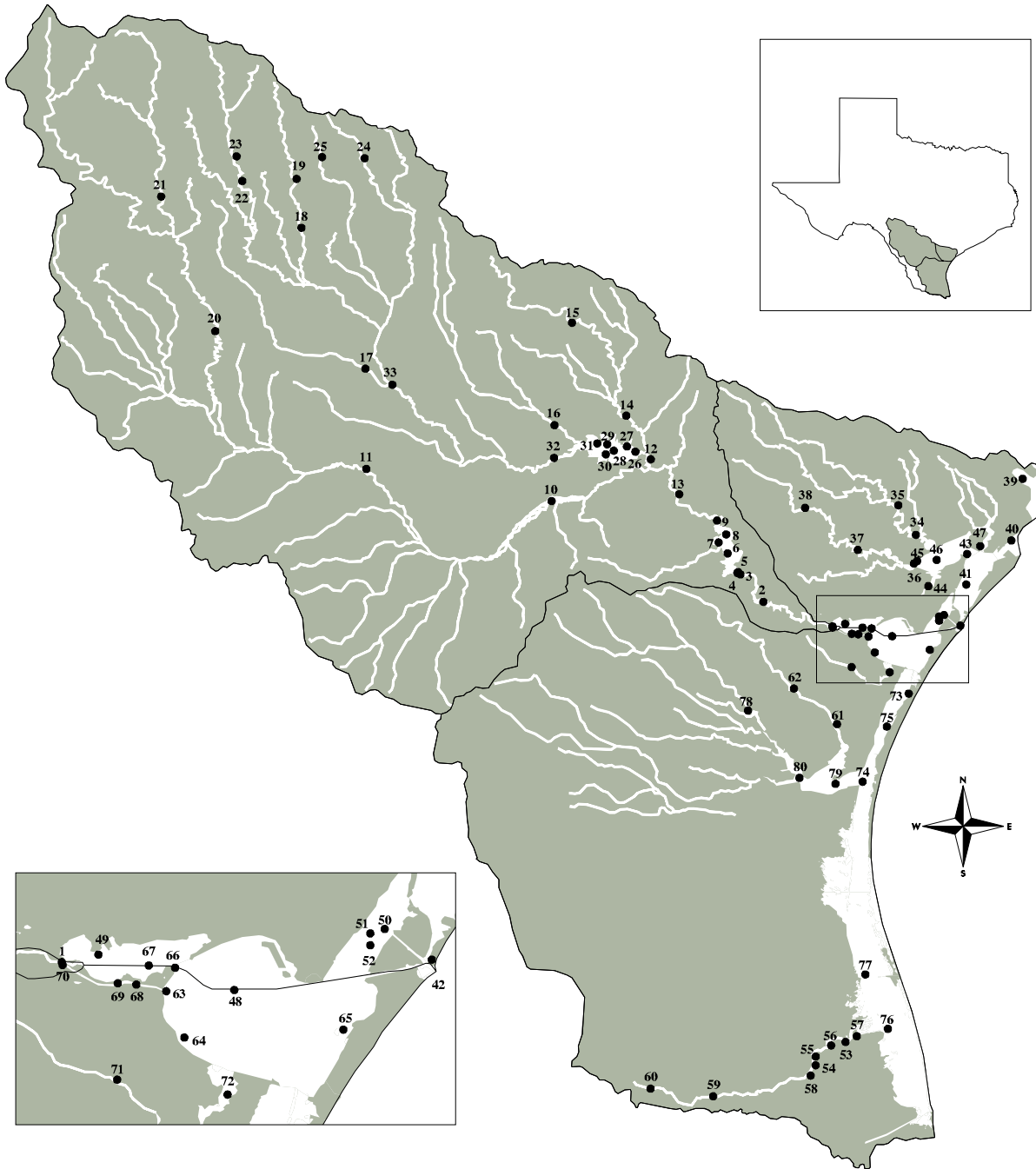
Segment	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
2004 Aransas River Above Tidal	General water quality uses	TDS, sulfate	Encroachment of tidal waters	Survey for limits of tidal water	Redefine tidal boundary	L	None	NRA, CCS, TNRCC
2462 San Antonio Bay / Hynes Bay / Guadalupe Bay	Oyster consumption	Pathogens	NPS	None	Additional studies	L	TNRCC	Unknown
2471 Aransas Bay	Oyster consumption	Pathogens	NPS	None	Additional studies	L	TNRCC	Unknown

Table 7. Nueces-Rio Grande Coastal Basin

Segment	Impaired Use	Cause	Source	Actions Taken	Recommended Action	Rank	Funding Source(s)	Active Participants
2201 Arroyo Colorado Tidal	Aquatic life	DO, ambient toxicity in sediment	Point sources, NPS	TMDL in progress	Continue TMDL	H	TNRCC	TNRCC, IBWC, USGS
2202 Arroyo Colorado Above Tidal	Fish consumption, contact recreation	Toxaphen, DDE, chlordane, pathogens	NPS	TMDL in progress	Continue TMDL	H	TNRCC	TNRCC, IBWC, USGS
2202A Donna Reservoir	Fish consumption	PCBs	Point sources, NPS	TMDL in progress	Continue TMDL	H	TNRCC	TNRCC, IBWC, USGS
2204 Petronila Creek Above Tidal	General water quality uses	TDS, sulfate, chloide	Oil field brine discharge	Proposed TMDL	Additional studies	M	TNRCC - TMDL	NRA
2481 Corpus Christi Bay	Oyster consumption	Pathogens	Point sources, NPS	None	Additional studies	L	TNRCC	Unknown
2485 Oso Bay	Aquatic life, oyster consumption	DO, pathogens	Waterfowl, colonial waterbirds	Special study conducted	Additional studies	L	TNRCC	Unknown
2491 Laguna Madre	Aquatic life, oyster consumption	DO, pathogens	NPS	None	Additional studies	L	TNRCC	Unknown

Monitoring Sites

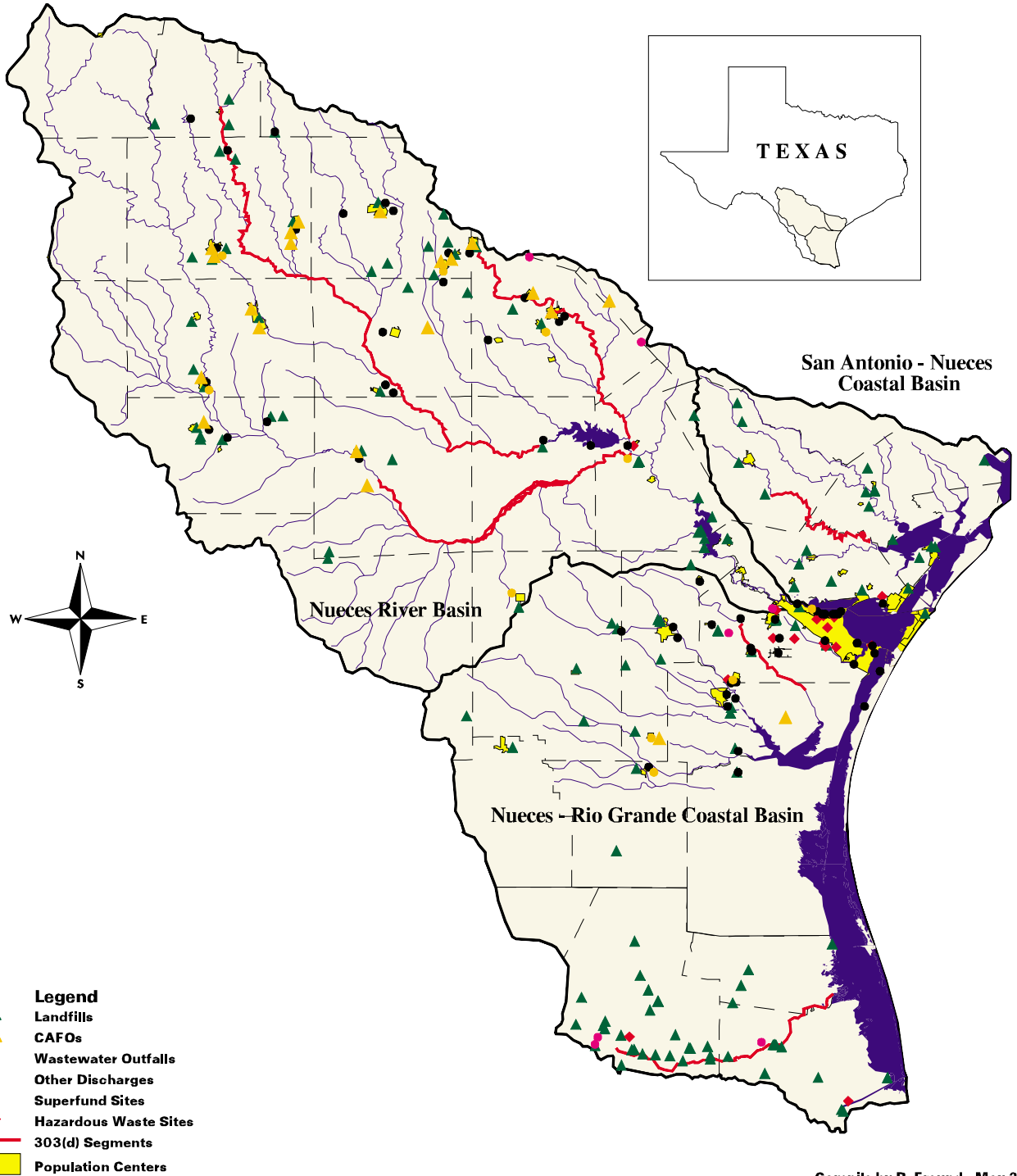
(Excluding southern Cameron County)



Compiled by R. Freund
Nueces River Authority - Coastal Bend Division
May 2000

Figure 1. Monitoring Stations

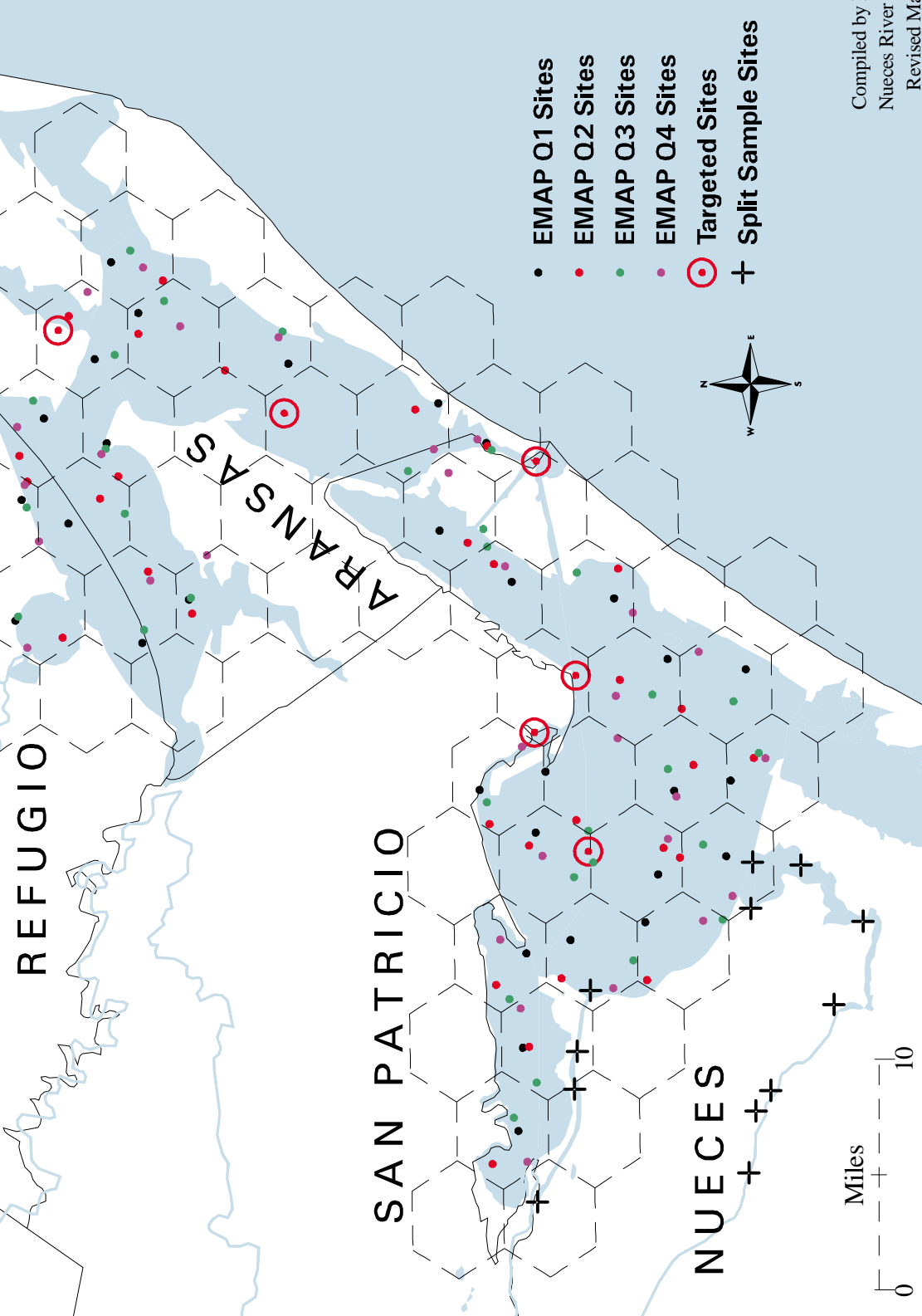
Factors Influencing Water Quality in the Nueces River and Nueces Coastal Basins



Compile by R. Freund - May 2000

Figure 2. Factors Influencing Water Quality

Coastal Bend Bays Water Quality Monitoring Project



- EMAP Q1 Sites
- EMAP Q2 Sites
- EMAP Q3 Sites
- EMAP Q4 Sites
- ⊙ Targeted Sites
- + Split Sample Sites

Compiled by R. Freund
Nueces River Authority
Revised May 2000

Figure 3. Corpus Christi Bay Water Quality Monitoring Project

