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Implementation Plan for One Total Maximum Daily Load for Nitrate-Nitrogen in the Lower Sabinal River

Segment 2110

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Prepared by the:
Chief Engineer's Office, Water Programs, TMDL Section

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Implementation Plan for One TMDL for the Lower Sabinal River



Implementation Plan for One TMDL for Nitrate-Nitrogen in the Lower Sabinal River

EXECUTIVE SUMMARY

On August 10, 2005, the Texas Commission on Environmental Quality adopted *One Total Maximum Daily Load for Nitrate-Nitrogen in the Lower Sabinal River* (Segment 2110). The TMDL was approved by the U.S. Environmental Protection Agency (USEPA) on October 13, 2005.

This implementation plan, or I-Plan:

- describes the steps the TCEQ and its stakeholders will take to achieve the pollutant reductions identified in the TMDL report, and
- outlines the schedule for implementation activities.

The ultimate goal of this I-Plan is the reduction of nitrate-nitrogen concentrations in Segment 2110, the Lower Sabinal River, to levels that meet the criterion defined in the state water quality standards.

The TMDL identified the existing wastewater treatment facility of the City of Sabinal as responsible for the elevated concentrations of nitrate-nitrogen observed in the Lower Sabinal River. Controlling the discharge from this facility will result in ambient levels of nitrate-nitrogen that comply with the criterion. The City of Sabinal is securing funding to relocate its wastewater treatment facility to a new location above the 100-year floodplain. The proposed facility will convert from an Imhoff tank and lagoon system to a system with a mechanical screen, looped aeration basin, two clarifiers, and an ultraviolet disinfection system.

The TCEQ will track the progress of programmatic activities specified in this I-Plan — monitoring the status of grant funding for the new wastewater treatment facility, the issuance of a discharge permit for the new facility, the construction of the new facility, and the decommissioning of the existing facility. Water quality improvement will be tracked by collecting water quality samples from a station located downstream of both the old and the new wastewater facilities. Data will be collected for two to three years to determine compliance with applicable water quality standards. If standards are not attained by the end of the three-year monitoring period, the TMDL and the I-Plan will be re-evaluated. The results of the implementation, tracking, and evaluation activities will be reported in the state's TMDL program report and at regional forums.

INTRODUCTION

In order to keep Texas' commitment to restore and maintain water quality in impaired rivers, lakes, and bays, the TCEQ recognizes that implementation plans must be established for each TMDL. The TMDL is a technical analysis that:

- determines the amount of a particular pollutant that a water body can receive and still meet applicable water quality standards, and
- estimates how much the pollutant load must be reduced to comply with water quality standards.

An I-Plan based on the TMDL serves as a guide for remediation activities. The I-Plan includes a detailed description of regulatory and voluntary management measures that are intended to achieve the pollutant reductions identified in the TMDL, and a schedule for their implementation. The plan is a flexible tool that governmental and nongovernmental organizations involved in the implementation use to guide their program management. Actual implementation will be accomplished by the participating organizations through rule, order, guidance, or other appropriate formal or informal action.

This I-Plan contains the following components:

- 1) a description of control actions and management measures¹ that will be implemented to achieve the water quality target;
- 2) a schedule for implementing activities to achieve TMDL objectives;
- 3) the legal authority under which the participating agencies may require implementation of the control actions;
- 4) a follow-up tracking and monitoring plan to determine the effectiveness of the control actions and management measures undertaken;
- 5) identification of measurable outcomes and other considerations the TCEQ will use to determine whether the I-Plan has been properly executed, water quality standards are being achieved, or the plan needs to be modified; and
- 6) identification of the communication strategies the TCEQ will use to disseminate information to stakeholders and other interested parties.

This I-Plan includes all the nine key elements for watershed-based plans as prescribed in the *FY 2004 Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories* (USEPA, 2004). Consequently, projects developed to implement nonpoint source elements of the control actions of this plan and which meet the grant program conditions are eligible for funding under the USEPA's Section 319(h) incremental grant program.

This I-Plan is designed to guide activities that will reduce nitrate-nitrogen concentrations in the Lower Sabinal River in Uvalde County, as defined in the adopted TMDL. The ultimate goal is the reduction of nitrate-nitrogen concentrations to a level that meets the criterion established in the state's water quality standards. Reduction of nitrate-nitrogen concentrations will restore the beneficial public water supply use to the Lower Sabinal River.

¹ Control actions refer to regulated point source pollutant reduction strategies, generally TPDES permits. Management measures refer to nonpoint source pollutant reduction strategies, generally voluntary best management practices.

This I-Plan was prepared by the TMDL Program in the Chief Engineer's Office of the TCEQ. The I-Plan was approved by the commission on August 23, 2006. This implementation plan, combined with the TMDL, provides local, regional, and state organizations with a comprehensive strategy for restoring and maintaining water quality in an impaired water body. The TCEQ has primary responsibility for ensuring that water quality standards are restored and maintained in impaired water bodies.

SUMMARY OF THE TMDL

On August 10, 2005, the TCEQ adopted one TMDL for nitrate-nitrogen in the Lower Sabinal River (Segment 2110). The Lower Sabinal River lies within the Nueces River basin (see Figure 1). It is a tributary of the Frio River, which in turn flows into the Nueces River above Lake Corpus Christi. The Lower Sabinal River runs from north of the city of Sabinal in Uvalde County to the confluence with the Frio River in Uvalde County. The watershed for the entire Lower Sabinal River is 222.4 square miles. The land within the watershed is a mixture of live oak, ashe juniper, mesquite, and grasslands. The watershed supports limited row crop and cattle production. The city of Sabinal is located in the eastern portion of Uvalde County and serves just over 700 customers in a wastewater service area of approximately 760 acres.

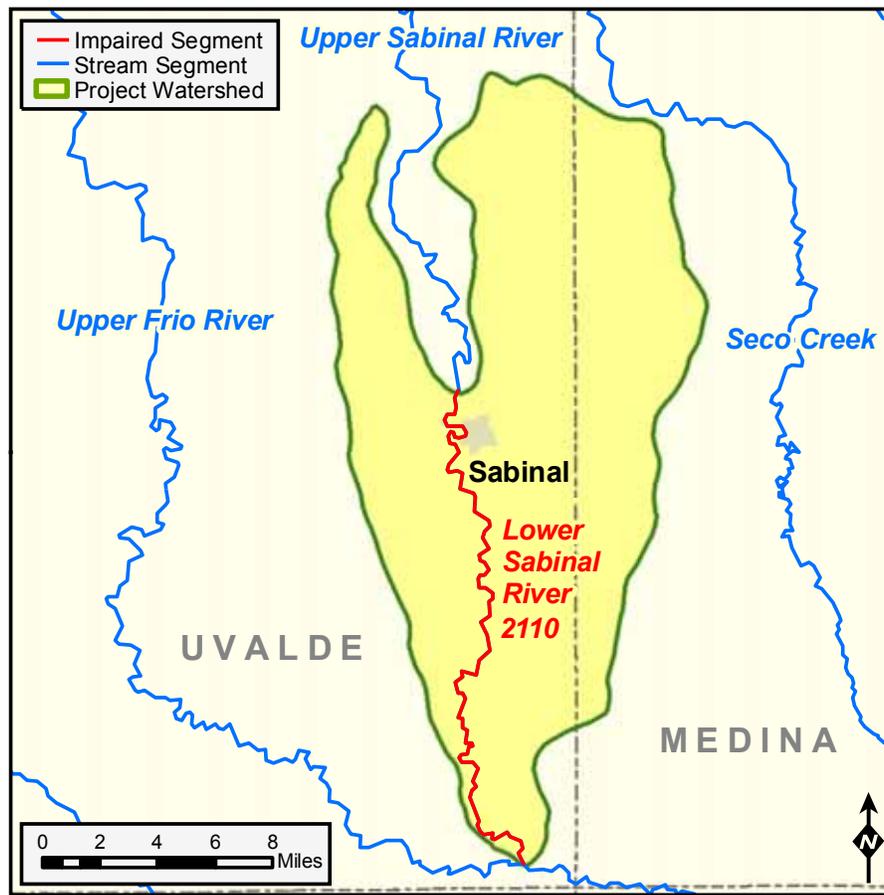


Figure 1. Project Area

The Lower Sabinal River is a classified segment; its designated uses are contact recreation, high aquatic life use, and public water supply. The *Texas Water Quality Standards* (Title 30, Texas Administrative Code, Chapter 307) specify a criterion of 10 milligrams per liter (mg/L) for nitrate-nitrogen in order to ensure that water quality in the river is suitable as a source of water for utilities or districts that supply drinking water to the public [30 TAC 307.6(d)]. The Lower Sabinal River was identified in the 2002 *Texas Water Quality Inventory and 303(d) List* for nonsupport of the public water supply use due to elevated concentrations of nitrate-nitrogen.

Nitrogen compounds are common components of discharges from municipal wastewater treatment facilities and are some of the main ingredients in agricultural and lawn fertilizers. There is only one permitted discharger upstream of the sampling station for the impaired segment. The City of Sabinal wastewater treatment facility (WWTF) was constructed in the 100-year flood plain of the Lower Sabinal River in 1967. Since the original construction, the facility has been inundated numerous times with floodwaters. Due to the scouring nature of these floods, it is likely that the clay liners originally installed in the oxidation ponds have since been compromised. The Sabinal streambed and surrounding soils have moderate permeability. This permeability would provide a conduit for seepage down through the riverbed to the water table that feeds the Lower Sabinal River. A requirement of the current Sabinal WWTF permit is to test the lining to verify its integrity. However, the City has not performed this testing. Without this certification, the WWTF is considered a major source of nitrogen input to the Lower Sabinal River.

The final TMDL allocation equation presented in the approved TMDL is:

$$\frac{\text{WLA}}{41.7 \text{ lb/day}} + \frac{\text{LA}}{58.5 \text{ lb/day}} + \frac{\text{AFG}}{6.6 \text{ lb/day}} = \frac{\text{TMDL}}{106.8 \text{ lb/day tot-Nitrogen}}$$

where WLA represents the wasteload allocation for point sources, LA represents the load allocation for nonpoint sources, and AFG represents an allocation for anticipated future growth.

The wasteload allocation was calculated from the permitted flow rate and an assumed concentration of total nitrogen. The TMDL was calculated using the median stream flow plus the permitted wastewater flow and the state drinking water criterion for nitrate-nitrogen. The anticipated future growth allocation was calculated as the difference between the low-flow allocation and an assumed background load at low flow. The load allocation for nonpoint sources was calculated as the difference between the TMDL, the wasteload allocation, and the anticipated future growth allocation.

IMPLEMENTATION STRATEGY

The implementation strategy describes the actions that will be undertaken to achieve water quality standards. Actions are specified to meet the load allocations assigned to all point sources and nonpoint sources identified in the TMDL. Action strategies may be selected from a menu of possible measures based on an evaluation of feasibility, costs, support, timing, and other factors. Actions may be implemented in phases based on an assessment of progress.

Control Action 1.0

The TMDL identified the City of Sabinal WWTF as a major source of nitrogen input to the Lower Sabinal River due to seepage from oxidation ponds. The reduction goals specified in the TMDL can be achieved by relocating and upgrading the City of Sabinal's WWTF. Relocating and upgrading this facility should restore the use impaired by elevated levels of nitrate-nitrogen. The time required to achieve water quality goals may be influenced by saturated soils in the existing oxidation ponds that may continue to seep into the river for an extended period of time.

The City of Sabinal is securing funding to relocate the WWTF to a new location above the 100-year floodplain. The proposed facility will convert from an Imhoff tank and lagoon system to a system with a mechanical screen, looped aeration basin, two clarifiers, and an ultraviolet disinfection system.

The TCEQ is able to fund the activities specified in this control action within its general appropriation from the Texas Legislature. The TCEQ has the legal authority to implement these actions under Chapter 26 of the Texas Water Code.

The City of Sabinal will be able to implement this control action with grant funding from the USDA Rural Development Program. The City of Sabinal has the legal authority to implement this action under powers authorized in the Texas Local Government Code.

IMPLEMENTATION TRACKING

The TMDL I-Plan includes provisions to track progress in both programmatic and water quality indicators resulting from the implementation of the Plan. These terms are further defined as:

- Programmatic Indicators – A measure of administrative actions undertaken to effect an improvement in water quality
- Water Quality Indicators – A measure of water quality conditions for comparison to pre-existing conditions, constituent loadings, and water quality standards.

Implementation tracking provides information that can be used to determine if progress is being made toward meeting goals. Tracking also allows stakeholders to evaluate actions taken, identify those which may not be working, and make any changes that may be necessary to get the plan back on target. The action specified in the I-Plan will be tracked by personnel in the TCEQ Region 13 Office and in TMDL Program.

Programmatic Indicators

For Control Action 1, the TCEQ will track the following programmatic activities:

1) Grant for Wastewater System Improvements

The City of Sabinal submitted an application to the U.S. Department of Agriculture (USDA) Rural Development-Rural Utilities Services for grant funding to construct a new wastewater treatment facility. The USDA administers a water and wastewater

loan and grant program to improve the quality of life and promote economic development in rural America. The grant application requested approximately \$2.6 million for the construction of a new wastewater treatment plant, lift station, force main, and sanitary sewer outfall line. The proposal was approved by the Middle Rio Grande Development Council and submitted to USDA in December of 2003. The receipt of these grant funds will allow the City to begin construction of the new facility and purchase the necessary land. It is not known when the USDA will act on the funding request.

2) TPDES Permit

The City of Sabinal has submitted an application for a new wastewater discharge permit under the Texas Pollutant Discharge Elimination System (TPDES), as required by state and federal law. The TCEQ has completed its review of the permit application. It is currently under review by the USEPA. Approval of the new permit will be required before the new treatment plant begins operations.

3) Construction of the New Wastewater Treatment Plant and Associated Infrastructure

Upon approval of its grant application and receipt of funding, the City will procure engineering and construction services for the construction of the new facility. The schedule for construction is dependent on the receipt of the grant funding.

4) New Plant Becomes Operational and Old Plant is Decommissioned

Upon completion of construction, wastewater flows will be diverted from the existing wastewater treatment facility to the new one. The old facility will be decommissioned by the removal, remediation, and disposal of the treatment works at the facility grounds.

Water Quality Indicators

Water quality monitoring staff of the TCEQ's Region 13 office will track the status of water quality during implementation. As part of the state's coordinated monitoring program, Region 13 personnel will collect samples quarterly in the Lower Sabinal River to track levels of nitrate-nitrogen following the removal of the existing wastewater treatment facility. The data will be used to evaluate the instream response to changes made in the existing point source loading.

Data will be collected at Station Number 12993, which is located at the U.S. Highway 90 bridge crossing west of Sabinal (see Figure 2). Data will be collected for a three-year period in order to determine whether there are appreciable changes to the average nitrate-nitrogen levels.

REVIEW STRATEGY

The I-Plan is a flexible tool that permits stakeholders to adapt to changing circumstances and to apply the lessons learned from experience. Stakeholders in TMDL implementation projects periodically assess the results of the planned activities and other sources of information to evaluate the adequacy of the I-Plan. Project stakeholders evaluate several

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factors such as the pace of implementation, the effectiveness of best management practices, load reductions, and progress toward meeting water quality standards.

The I-Plan presents a general process and timetable that specifies how and when the I-Plan will be evaluated and may be revised. The results of these evaluations will be documented and the rationale for maintaining or revising elements of the I-Plan will be presented as part of the state's normal reporting processes.

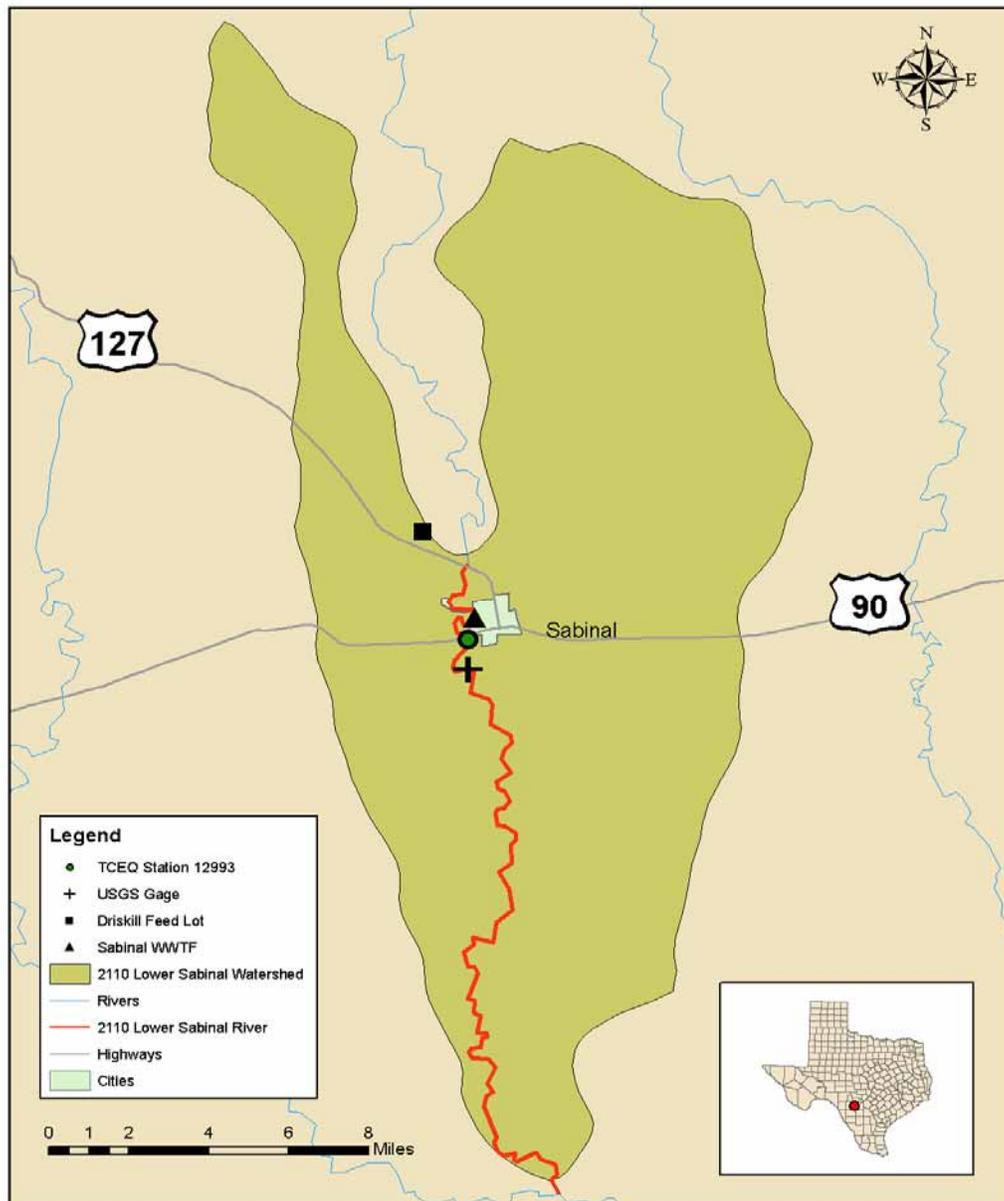


Figure 2. Monitoring Site on the Lower Sabinal River, Segment 2110

The ultimate goal of the I-Plan is to restore the designated use by reducing concentrations of nitrate-nitrogen to levels that are below the criterion. After the cause of the impairment has been removed, the TCEQ will annually evaluate the data collected during routine

monitoring. This data will provide an indication of the instream response to the removal and/or limitation of the discharge.

In the absence of the discharge from the existing facility, concentrations of nitrate-nitrogen should fall below the applicable criterion of 10mg/L within a three-year period after the new facility complies with its new TPDES permit requirements. If sufficient reductions in instream nitrate-nitrogen concentrations are not observed by the end of the three-year monitoring period, the TCEQ will reevaluate the TMDL and adapt the I-Plan as appropriate.

COMMUNICATION STRATEGY

Communication is necessary to ensure that stakeholders understand the I-Plan and its progress in restoring water quality conditions. The TCEQ will disseminate the information derived from tracking I-Plan activities to interested parties, including watershed stakeholders, state leadership, government agencies, non-governmental organizations, and individuals.

Results and progress on the reduction will be documented in the TMDL Program's annual status report. This report will summarize all actions taken to address the discharge causing the impairment and the water quality data collected to demonstrate trends in water quality. At the local level, the progress of this implementation plan will be reported in the Basin Highlights report prepared annually by the Nueces River Authority under provisions of the Texas Clean Rivers Program.