

**SOIL AND WATER CONSERVATION DISTRICT
WATER QUALITY MANAGEMENT PLAN
DEVELOPMENT, IMPLEMENTATION, AND/OR
MAINTENANCE ASSISTANCE**

**IMPLEMENTATION SUPPORT PROJECT IN THE
ARROYO COLORADO WATERSHED**

**FINAL REPORT
TSSWCB PROJECT #02-12A & #02-16**



**SOUTHMOST, WILLACY, AND HIDALGO SOIL AND WATER
CONSERVATION DISTRICTS**

**FUNDING PROVIDED THROUGH A CLEAN WATER ACT §319(h) NONPOINT
SOURCE GRANT FROM THE TEXAS STATE SOIL AND WATER CONSERVATION
BOARD AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY**

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EXECUTIVE SUMMARY

The Southmost, Hidalgo, and Willacy Soil and Water Conservation Districts (SWCDs), working cooperatively with the Texas State Soil and Water Conservation Board (TSSWCB) Harlingen Regional Office and the United States Department of Agriculture- Natural Resources Conservation Service (NRCS), provided technical and financial assistance to agricultural producers in the Arroyo Colorado watershed.

The development, installation, and maintenance of water quality management plans (WQMPs) in the Arroyo Colorado watershed was and continues to be a success. A District Technician was hired and worked cooperatively with the TSSWCB Harlingen Regional Office and NRCS to provide agricultural producers with the opportunity to voluntarily implement best management practices (BMPs) that would have a positive impact on the Arroyo Colorado.

Through this project, a total of 85 WQMPs were developed and implemented on approximately 5,100 acres. A majority of the practices installed were related to the installation and management of irrigation. In addition, nutrient, residue, and pest management was applied to almost all 5,100 acres. The District Technician and TSSWCB Harlingen Regional Office worked with the SWCDs and local producers to educate them on their operation, the WQMP program, proper soil sampling, and water quality. They also presented at field events, field days, and were active in the development of the Arroyo Colorado Watershed Protection Plan (WPP).

Implementation of WQMPs has and will continue to be a key component in the overall effort reduce nutrients and sedimentation and improve water quality in the Arroyo Colorado watershed.

INTRODUCTION

The Arroyo Colorado, an ancient distributary channel of the Rio Grande, extends 90 miles from Mission, Texas to the Laguna Madre in the Rio Grande Valley. The watershed of the Arroyo Colorado is approximately 1,828 square kilometers (706 square miles) bounded on the west and south by the drainage divide to the Rio Grande, on the north by the drainage divide to the North Floodway and on the east side by the Lower Laguna Madre. Flow in the Arroyo Colorado is sustained by waste water discharges, agricultural irrigation return flows, urban runoff, and base flows from shallow groundwater. The Arroyo is the major source of fresh water to the lower Laguna Madre, an economically and ecologically important resource to the region. The Laguna Atascosa National Wildlife Refuge and several county and city parks are located within the Arroyo Colorado watershed. One third of the stream is used for shipping from the Gulf Intracoastal Waterway to the Port of Harlingen.

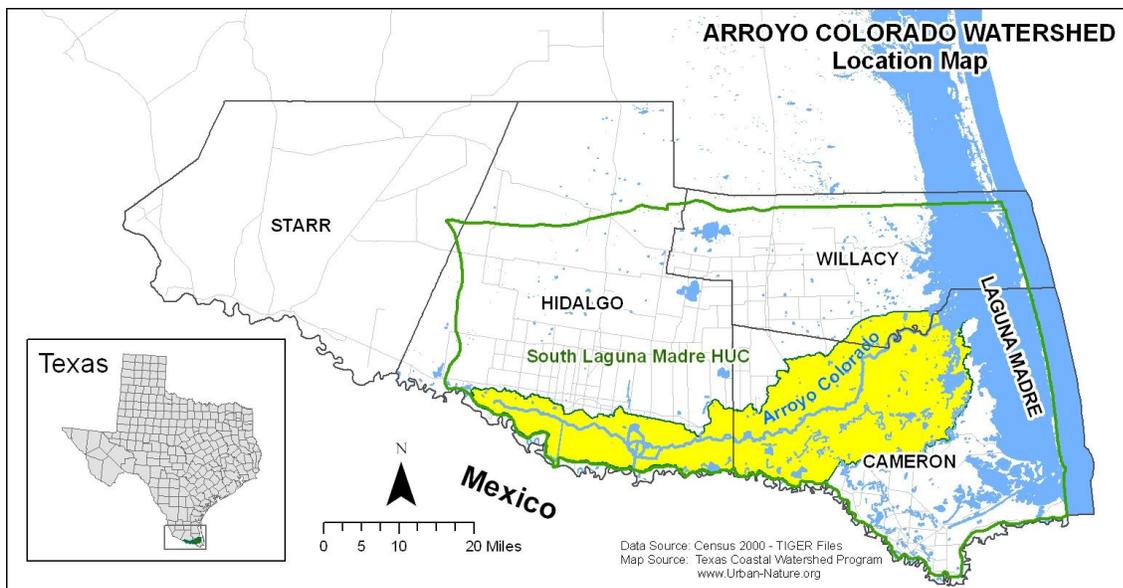


Figure 1. Arroyo Colorado Watershed

Agriculture is the dominate land use within the Arroyo Colorado, with approximately 330,000 acres under cultivation. The fertile farmland, long growing season, and access to water from the Rio Grande for irrigation make this region one of the most productive agricultural areas in the U.S. Cotton and grain sorghum are the most prominent crops in the three-county region with corn, sugarcane, citrus, and vegetables representing other important crops in the area.

Surface waters serve almost exclusively as the source of irrigation water for the vast agriculture enterprise of the area. The surface water derives primarily from stream flow diverted from the Rio Grande through leveed floodways and stored in constructed reservoirs in the Arroyo Colorado watershed. Although it is typically of poorer quality than the surface, a limited amount of groundwater, from the shallow Gulf Coast aquifer, is used in the western part of the watershed. No major or minor aquifers underlie the eastern half of Arroyo Colorado watershed, although shallow, variably saline groundwater is found in the area. In years of insufficient flow

in the Rio Grande, however, up to 25 percent of the total water demand has been supplied by groundwater (USACE, 1990).

The Arroyo Colorado is one of the more complex watercourses in the state from its headwaters to its mouth; it has been extensively modified by human activity, which affects both its hydrology and water quality. The low-relief, arid watershed is artificially plumbed by canals, aqueducts, siphons and pumping stations to provide irrigation water for the vast agriculture enterprise of the region. Similarly, the drainage of the urban area consist of rectified leveed intersecting channels with gates for controlling and directing flow to alleviate chronic flooding problems common to the area.

Water quality analyses have shown water quality in the Arroyo Colorado is poor. The 1996 Texas Water Quality Inventory and 303(d) List indicated the Arroyo Colorado Tidal, Segment 2201, was not supporting aquatic life use because of low dissolved oxygen (DO) levels. The Arroyo Colorado above Tidal, Segment 2202, was also not meeting its designated use of contact recreation because of elevated bacteria levels. Nutrient concentrations (nitrogen and phosphorus compounds) are high in both segments.

In 1998, the Texas Commission on Environmental Quality (TCEQ) initiated an effort to develop a Total Maximum Daily Load (TMDL) for pollutants causing low DO. Results of a TMDL analysis indicated that the dissolved oxygen problem in the tidal segment is related as much to the physical setting and geomorphology of the Arroyo Colorado as it is to the loading of nutrients and oxygen-demanding substances from the non-tidal segment. However, there was still lingering uncertainty surrounding cause-and-effect relationships associated with the observed DO impairment, the TMDL analysis was unable to support a quantitative, water quality target-based allocation of loadings of constituents associated with DO dynamics in the tidal segment of the Arroyo Colorado.

In response, the TCEQ initiated a comprehensive strategy to address low DO through the development of an Arroyo Colorado WPP. A WPP is a holistic, locally driven plan that combines scientific and regulatory water quality factors with social and economic considerations to coordinate activities and resources to manage water quality. The Arroyo Colorado Watershed Partnership, made up of private individuals, local organizations, county and municipal governments, and state and federal agencies, worked together to address issues identified in the TMDL and develop recommendations for improving water quality. "*A Watershed Protection Plan for the Arroyo Colorado: Phase I*" was approved by stakeholders in January 2007.

TCEQ (2003) estimated that between 1989 and 1999, agricultural nonpoint source (NPS) runoff was responsible for 87% of the suspended sediment, 41% of the BOD, 68% of the nitrate, 64% of the ammonia, and 49% of the phosphate load in the Arroyo (Segment 2201). Through the use of state cost-share funds and TSSWCB project 99-03 "*WQMP Implementation Assistance in the Arroyo Colorado River Basin*", the TSSWCB and the Southmost, Hidalgo, and Willacy SWCDs have begun addressing the loading attributed to the approximately 290,000 acres of irrigated cropland in the watershed through the implementation of WQMPs.

A WQMP is a site-specific plan developed through and approved by SWCDs for agricultural or silvicultural lands. The plan includes appropriate land treatment practices, production practices, management measures, technologies or combinations thereof. The purpose of WQMPs is to achieve a level of pollution prevention or abatement determined by the TSSWCB, in consultation with local SWCDs, to be consistent with state water quality standards.

This project was incorporated into the WPP in order to address the potential agricultural sources of NPS pollution and will be coordinated with educational and assessment activities planned within the Arroyo Colorado watershed.

PROGRAM DEVELOPMENT

This project consisted of the TSSWCB working with the Southmost SWCD #319 and Hidalgo SWCD #350 to provide technical and financial assistance to landowners for the development, implementation, and/or maintenance of WQMPs.

Through this project, a District Technician was hired by the Southmost SWCD to coordinate technical and financial assistance activities between the TSSWCB, cooperating SWCDs, NRCS and all other interested parties in the Arroyo Colorado watershed. The District Technician promoted the availability of assistance through the local SWCDs and an announcement in the Farm Service Agency's newsletter (Appendix A).

After compiling the list of producers who were interested in assistance, they were ranked based on priority. A three-tier system was established based on land units that are in the greatest need of WQMP implementation in targeted subwatersheds. They also targeted the three dominant land activities in the watershed. Highest priority was given to the implementation of the most cost effective and most needed pollution abatement practices. The three-tier system included the following:

- 1st priority: Irrigated Cropland/Citrus with tile drains
- 2nd priority: Irrigated Cropland/Citrus without tile drains
- 3rd priority: Areas of cropland conversion to grassland

The District Technician, working in cooperation with the NRCS, developed WQMPs based on the criteria outlined in the Field Office Technical Guide (FOTG), a publication of the NRCS. The FOTG represents the best available technology and is already tailored to meet the needs of SWCDs all over the nation. A WQMP includes the following:

- Conservation plan map showing boundaries, fields, land use, acres and facilities
- Soils map
- Soils description
- Topography map
- Conservation Plan of Operation
- Soil test (required when nutrients are applied)

Once the WQMP was developed and approved by NRCS and the local district, it was then sent to the TSSWCB Harlingen Regional Office for technical review and certification. Upon certification of the WQMP, the plan could be implemented.

The District Technician worked with landowners to implement BMPs laid out in the WQMP. The major BMPs installed included:

Irrigation Land Leveling (464)

- This practice is for the reshaping of land to be irrigated to planned grade. Land to be leveled shall be suitable for irrigation and for the proposed methods of water application. Water supplies and irrigation deliveries to the area to be leveled shall be sufficient to make irrigation practical for the crops to be grown and the irrigation water application method to be used.
- 2,270 acres were leveled for irrigation.



Irrigation Pipeline (430)

- Irrigation pipelines are installed to replace open ditches, increase irrigation efficiency and protect water quality.
- 35,748 feet of irrigation pipeline were installed through this project.



Residue Management (seasonal) (344)

- Manage amount, orientation and distribution of organic residue to maximize soil protection until immediately prior to planting the following crop.
- Tillage will be limited to those operations that meet the standard for SCI (see RUSLE2). Leaving residues on or near the surface to within 6 weeks of the recommended planting date of the next crop will aid in preventing wind and water erosion. This practice was applied annually.
- 4,186 acres were placed under residue management.

Nutrient Management (590)

- Managing the amount, source, placement, form, and timing of the application of plant nutrients and soil amendments.
- 4,912 acres were placed under nutrient management.
- Soil sampling occurred on an annual basis on WQMPs that included nutrient management.

Other BMPs installed were surface roughening (609), conservation crop rotation (328), pest management (595), irrigation water management (449), and irrigation system, surface and subsurface (443). The District Technician helped landowners acquire any cost-share assistance available. Once the practice was implemented and certified, the cost-share was paid on. Status reviews were conducted annually on all WQMPs developed and certified through this project to ensure the BMPs were installed and maintained properly.

In addition to the development, installation, and maintenance of WQMPs, the District Technician and TSSWCB Harlingen Regional Office worked with the SWCDs and local producers to educate them on their operation, the WQMP program, proper soil sampling, and water quality. The District Technician and TSSWCB Harlingen Regional Office attended field days and educational events in the Arroyo Colorado watershed disseminating information on this project and other agricultural related issues. They were also active in the development of the Arroyo Colorado WPP by serving on the Agricultural Issues Workgroup and Steering Committee.

CONCLUSIONS

The development, installation, and maintenance of WQMPs in the Arroyo Colorado watershed was and continues to be a success. The District Technician, working cooperatively with the TSSWCB Harlingen Regional Office and NRCS, provided agricultural producers with the opportunity to voluntarily implement BMPs that would have a positive impact on the Arroyo Colorado.

Through this project, a total of 85 WQMPs were developed and implemented on approximately 5,100 acres. A majority of the practices installed were related to the installation and management of irrigation. In addition, nutrient, residue, and pest management was applied to almost all 5,100 acres.

There is still a need to address agricultural NPS issues in the Arroyo Colorado watershed. In 2005, the TSSWCB funded “*WQMP Implementation Assistance in the Arroyo Colorado Watershed*” (project 05-12) to continue efforts in providing local landowners with technical and financial assistance. Through these efforts, there will be a continued reduction in nutrient and sediment loads and help improve water quality in the Arroyo Colorado.

**APPENDIX A: ANNOUNCEMENT IN THE FARM
SERVICE AGENCY NEWSLETTER**

ATTENTION FARMERS

**The Southmost Soil and Water
Conservation District is currently is
administering programs that offer cost
- share assistance for implementation
of conservation practice such as
irrigation pipeline, irrigation land
leveling, tile drain, ect.**

**For more information contact USDA -
NRCS in San Benito, TX
at (956) 399 - 2522 ext 3**

APPENDIX B: INVENTORY OF COST-SHARED BMPS