

Using Soil Sample Analysis to Help Address Nutrient and Sediment Runoff in the Arroyo Colorado Watershed

Final Report

TSSWCB 21-56

**Texas Water Resources Institute Technical Report -
July 2023
College Station, Texas**

By

Jaime Flores and Lucas Gregory

Partners:

Texas State Soil and Water Conservation Board
Texas A&M AgriLife Research, Texas Water Resources Institute
Texas A&M AgriLife, District 12 Research and Extension Center
Texas State Soil and Water Conservation Board, Harlingen Regional Office
Southmost Soil and Water Conservation District #319 and
Hidalgo Soil and Water Conservation District #350

The Texas Water Resources Institute is part of the Texas A&M AgriLife Extension Service, Texas A&M AgriLife Research, and the College of Agriculture and Life Sciences at Texas A&M University.

Funding Provided through a State Nonpoint Source Grant from the Texas State Soil and Water Conservation Board

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Executive Summary

This project provided specific information regarding soil fertility and nutrient management to growers in the LRGV that complemented and enhanced program delivery through the Agricultural Nonpoint Source Education project (TSSWCB #19-05). This project compliments ongoing partnership efforts implementing the Arroyo Colorado Watershed Protection Plan and supports continued education for the agricultural community.

Soil testing is described as a key component of the agricultural NPS pollution reduction strategy in the Arroyo Colorado Watershed Protection Plan (ACWPP). This project provided a free soil testing campaign to implement this portion of the ACWPP and encourage agricultural producers to perform annual soil testing on their fields. The soil testing campaign was available during May 2021 – May 2023. Prior to this project, TWRI had conducted 2 soil testing campaigns in the watershed under the ACWPP. Previous soil testing campaigns were very successful and were well received by producers such that they asked TWRI to host additional projects. In concert with soil testing, Texas Water Resources Institute (TWRI) and Texas A&M AgriLife Extension Service (AgriLife Extension) provided agricultural education programming that highlighted water quality issues in the Arroyo Colorado and discussed how the agricultural community can help reduce NPS pollutants coming from agricultural fields. TWRI/AgriLife Extension worked closely with the TSSWCB, U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) and the local soil and water conservation districts (SWCDs) to conduct educational programs in the three-county Arroyo Colorado watershed area focused on best management practices (BMPs), soil testing/nutrient management, and financial and technical assistance sources. These programs and soil test results provide information and resources to producers to that enables them to implement agriculture NPS pollution prevention BMPs.

During this project, the ACWC gave 40 presentations regarding Arroyo Colorado water quality, impairments, ACWPP implementation, soil testing/nutrient management, agricultural NPS pollution, agricultural education, and financial assistance incentives to various groups and project partners throughout the watershed. The ACWC attended 83 meetings hosted by local groups and partners and distributed 41 ACWP email updates to Arroyo producers/stakeholders. Annual newsletters were developed, published, and distributed that were designed to inform landowners and entities of ongoing WPP implementation activities, including water quality data collection and progress toward achieving milestones in the ACWPP Update. The ACWC collaborated with Dr. Zapata and CEAs from Starr, Hidalgo, Cameron & Willacy counties to facilitate and implement the Disadvantaged Farmer, Small Acreage/Small Farmer Workshop series to deliver agricultural education and financial assistance program information to small acreage and disadvantaged farmers in the Rio Grande Valley. Throughout the grant, the ACWC received positive feedback from meeting attendees and project partners. Agricultural production remains the dominate land use in the Arroyo Colorado Watershed, thus agricultural education programs remain a vital part of accomplishing ACWPP goals.

List of Acronyms and Abbreviations

ACW – Arroyo Colorado Watershed

ACWC – Arroyo Colorado Watershed Coordinator

ACWP - Arroyo Colorado Watershed Partnership

ACWPP - Arroyo Colorado Watershed Protection Plan

AgriLife Extension – Texas A&M AgriLife Extension Service

BMPs – best management practices

CEA – County Extension Agent

CEU – continuing education unit

DO – dissolved oxygen

EPA – U.S. Environmental Protection Agency

LRGV - Lower Rio Grande Valley

NPS – nonpoint source

NRCS – U.S. Department of Agriculture, Natural Resources Conservation Service

SWCD – Soil and Water Conservation District

TCEQ – Texas Commission on Environmental Quality

TMDL – Total Maximum Daily Load

TSSWCB – Texas State Soil and Water Conservation Board

TWRI – Texas Water Resources Institute

USDA – United States Department of Agriculture

WPP – watershed protection plan

WQMP – water quality management plan

Introduction

The 2017 ACWPP Update was developed with local, state, and federal stakeholder input to address water quality issues in the Arroyo Colorado (Flores et al. 2017). The watershed is located in Cameron, Hidalgo, and Willacy counties in the Lower Rio Grande Valley of South Texas. The Arroyo Colorado flows approximately 90 miles starting in Mission, transecting Hidalgo and Cameron counties and forms the boundary between Cameron and Willacy counties until it reaches the Lower Laguna Madre. The Arroyo Colorado is the primary source of fresh water to the Lower Laguna Madre and serves as a nursery for aquatic life. Approximately 706 square miles of land drains into the Arroyo Colorado. Primary land uses include agriculture, including vegetable and fruit crops (54%); range (18.5%); urban (12%); water bodies (6%); and sugarcane (4%) (Kannan, 2012); and some industry. Agriculture and municipalities are the primary water users in the watershed and return flows from these sources largely sustain flows in the Arroyo Colorado. These return flows carry nutrients, sediment, and bacteria into the water body, leading to elevated levels of bacteria and nutrients, resulting in low dissolved oxygen levels.

The tidal segment (SegID 2201) of the Arroyo Colorado was first listed as having low dissolved oxygen concentrations in 1996 and elevated bacteria concentrations in 2006 (TCEQ) while the above tidal segment (SegID 2202) was listed in 1996 for having elevated bacteria concentrations. The Laguna Madre (SegID 2491) is also listed as impaired by bacteria and low dissolved oxygen. Nutrient loading from the watershed was identified as a significant contributor to the low dissolved oxygen concentrations. Irrigated cropland was further identified as a primary nutrient contributor to waterbodies across the watershed.

To address these impairments and concerns, the Arroyo Colorado agricultural issues workgroup, made up of local, state, and federal stakeholders, recommended agricultural BMP adoption supplemented with education and outreach as a high implementation priority. These recommendations included a continual soil testing campaign to encourage growers to test soils prior to nutrient application. This information raises grower awareness of current nutrient availability and planned crop needs, allowing growers to make precise nutrient additions that specifically meet crop needs. This combined with other education and outreach programming such as integrated farm management planning, pesticide education, and cost-share availability education, have been effective in raising water quality awareness.

Objectives

The main objective of the “Using soil sample analysis to help address nutrient and sediment runoff in the Arroyo Colorado Watershed” was to encourage local farmers and producers to take soil tests of their fields prior to nutrient application and to deliver educational programs and resources to agricultural producers regarding NPS pollution issues facing the AC and practices that can be implemented to help reduce nutrient and sediment loading into the AC. To encourage water quality-improving BMP adoption, the project provided free soil testing to producers and

highlighted technical and financial assistance programs available to qualifying producers through NRCS and TSSWCB during education workshops. The WC advertised the soil testing campaign through email, presentations at grower programs, in local agricultural media, and by the airing of a soil testing public service announcement developed under a previous project. The ACWC distributed soil sample bags and forms to each county Extension office, USDA service centers, and the TSSWCB Harlingen Regional Office. CEAs helped promote the soil testing campaign within their respective counties through their educational programs and direct contacts. The ACWC worked with a local Spanish translator to translate the Arroyo Colorado Ag BMP Factsheet and 1 pager to Spanish to improve information transfer to watershed stakeholders. The ACWC was able to make direct contacts through meetings with key stakeholders, and by participation in agriculture focused events, programs and venues across the LRGV.

Project Coordination

Throughout the project, TWRI and project partners regularly communicated and worked to promote the soil testing campaign and ensure that agricultural management measures outlined in the ACWPP were adequately promoted at local events. To facilitate this, the ACWC collaborated with the local TSSWCB and USDA-NRCS field offices to host the ACWP's agricultural issues workgroup meetings to discuss the importance of BMP implementation and financial and technical assistance available to producers. The ACWC coordinated and facilitated the ACWP steering committee meetings throughout the project and participated in the local SWCD meetings to communicate agricultural activities. Numerous presentations were also delivered during meetings hosted by project partners.

Soil Testing Program

The soil testing campaign was initiated shortly after the beginning of the project in late May 2021. Advertising about the campaign began with direct emails and an informational flyer regarding the campaign distributed at agricultural business and published in "The Ag Mag," a local agriculture focused magazine that is published bi-monthly. The flyer and soil testing program articles were published several times throughout the course of the project (See Appendix A). A re-airing of public service announcement videos on local TV station KRGV was conducted in August and September 2022. A combination of English and Spanish language PSAs were aired a total of 236 times during this two month window. A direct mailer regarding the importance of soil testing and announcing the soil testing campaign was also distributed twice to 1,720 addresses in the watershed that were likely to be agricultural properties.

Based on free soil testing program demand from previous projects, this project planned to fund a total of 1,000 soil tests during the project. Despite extensive advertising through multiple platforms and through numerous events, the number of soil samples received and processed was much lower than anticipated. A total of 279 samples (Appendix B) were received and shipped for processing. Results were sent directly to the producer and they used that information to inform

future nutrient applications. We did not collect information on any changes in nutrient application that producers made.

No clear reason for this lower than expected number of soil samples is available. Producers engaged were eager to participate in the program and it was anticipated that the 1,000 sample threshold would be met. Several extreme weather events and producer uncertainty due to high input costs and limited irrigation water availability could have contributed to low program participation. Many producers also utilize certified crop consultants that perform annual soil testing as part of their service. Land conversion is also occurring at a rapid pace across the watershed with many properties transitioning from agricultural production to commercial or residential uses.

Due to the low number of soil samples submitted for nutrient testing, a small set of soil and water samples was collected by TWRI staff across the watershed for informational purposes on emerging contaminant issues. In total, 63 samples were collected randomly where access was available. These samples were analyzed for total organic carbon, total nitrogen, colored dissolved organic matter, a series of pharmaceutical and personal care products and per- and polyfluoroalkyl substances (PFAS). The presence and distribution of PFAS in the watershed was of most interest. In water, at least one PFAS compound was identified in 28 of 30 samples; however, 26 samples had three compounds or more. Not surprisingly, samples with the highest total PFAS presence were from a wastewater treatment plant and from the drainage of an airport. In soil/sediment, all 33 samples had at least three PFAS compounds detected, and one sample had 14 compounds identified. Samples with the highest PFAS load were in sediment from a drainage ditch and salt flat near the Laguna Madre. As is common in soil/sediment samples, concentrations varied widely across all samples. Results from soil/sediment and water samples were expected as PFAS is considered ubiquitous in the environment.

Partnership Engagement

The ACWC hosted watershed steering committee and workgroup meetings throughout the course of the project (Appendix D). These meetings focused largely on providing WPP implementation updates, continued discussions of needs across the watershed and provided a venue to discuss other issues of concern. The soil testing program was discussed at each meeting and resources were provided to attendees to help promote the program.

The winter 2022 ACWP newsletter (Appendix E) was also used to discuss the importance of soil tests and the impacts that they can have on agricultural operation budgets and water quality. The free soil testing program was advertised and producers were encouraged to participate in the program.

Local Education Meetings and Materials

Delivering educational programs and promoting the soil testing campaign to watershed producers to address agricultural NPS pollution in the Arroyo Colorado watershed was accomplished through multiple local meetings. The ACWC worked with project partners to develop and deliver agricultural education workshops, field days, direct mailings and programming targeted to meet educational resource needs of socially disadvantaged and beginning small-acreage producers.

The ACWC attended and spoke at 40 different programs (Appendix C) throughout the Lower Rio Grande Valley. Presentations focused on the Arroyo Colorado water quality and impairments, ACWPP implementation activities, promoting soil testing and the soil testing campaign, nutrient management and soil health, raising awareness of agriculture NPS pollution in the AC and encouraging voluntary adoption of conservation plans. The ACWC also attended 83 meetings hosted by critical watershed groups and project partners.

Agriculture education workshop presentations provided information on financial and technical assistance available from various state and federal agencies to help agricultural producers implement management measures on their farms. At all the educational events, soil test bags and forms were distributed to the farmers and producers.

Throughout the project, all workshops, presentations and the soil testing campaign were well received. Before and after most meetings, attendees would seek out the project partners and presenters to ask additional questions, provide positive feedback and offer ideas and topics that they would like to see covered in future meetings.

Collectively, the programs successfully delivered soil testing, nutrient management and soil health related information to the farmers and producers across the LRGV.

Published information was also refreshed and distributed during the project. A two page factsheet and larger booklet developed about a decade ago that discuss and describe various agricultural BMPs were updated and redistributed. New information and pictures were added where appropriate and both documents were also translated into Spanish. The two page document focuses on combining nutrient and irrigation management to reduce NPS pollution runoff potential (Appendix F). The larger document presents general descriptive and application information on a broad range of practices that are useful in farming and grazing operation. All four of these documents are available on the project website at:

<https://arroyocolorado.org/resources/>

Conclusions

This project successfully delivered educational resources through multiple avenues to agricultural producers across the ACW. Despite the smaller than anticipated number of soil

samples submitted, the farmers and producers that did submit samples covered a wide variety of the producers in the LRGV. Several of the larger producers submitted soil samples for their operations resulting in large portions of the soils in the watershed being sampled; however, the total acreage that samples represent was not documented. An additional subset of 63 samples collected and analyzed to provide additional information on chemical parameters including total organic carbon, total nitrogen, colored dissolved organic matter, pharmaceutical and personal care product compounds, and per- and polyfluoroalkyl compounds throughout the watershed.

Continued educational program delivery focused on addressing agricultural NPS pollution in the ACW will remain a high priority for the ACWC. The majority of land use in the ACW remains as agriculture production but is changing. Despite this trend, voluntary implementation of agricultural BMPs and conservation plans remains important and highlights the need to continue promoting these practices and assistance programs available to agricultural producers. The ACWPP identified nutrient and irrigation water management as two of the most impactful BMPs when it comes to reducing nutrient and sediment loading into the AC, so agricultural education programs will continue to be vital to improving water quality in the AC.

Test soil to save money and improve water quality

BY DR. LUCAS GREGORY *Texas A&M AgriLife, Texas Water Resources Institute*
VICTOR GUTIERREZ *Texas A&M AgriLife Extension Service, Texas Water Resources Institute*

Soil testing is a simple and effective tool agricultural producers and homeowners alike can use to help manage fertilizer and soil amendment applications. It can also help save money and improve water quality.

Basic soil tests provide information about the kind and amount of plant-available nutrients currently in your soil and how much additional fertilizer is needed for growing plants. More detailed soil tests can provide information about soil texture and organic matter content, micronutrient levels, salinity, lime needs and more. Which soil test or tests are best for you depends on what you are growing, how often you soil test and how often you fertilize.

Your local county Extension agent, Natural Resource Conservation Service (NRCS) and Soil and Water Conservation District personnel can provide advice on which soil tests are right for you. They can also provide you with sample bags and instructions on proper soil sampling techniques, sample storage, shipping and a soil sample analysis form.



Marco Ponce and Vidal Saenz, County Extension Agent in Cameron and Hidalgo Counties, prepare for a cotton trial with soil testing.

Saving money and more

Regardless of the soil test you choose, the analysis information you receive is a great tool to help save you money. Knowing the nutritional needs of your crop, lawn, park or sports fields can go a long way to help you plan your nutrient inputs. This can help you save on input costs by not applying too much of a good thing. In crop production systems, soil tests can also help optimize production potential and hopefully yield a better bottom line for that crop.

A good soil testing program also helps protect surface and groundwater quality in addition to saving money. If there are excess nutrients in the soil, natural processes like water runoff and leaching can carry those nutrients into nearby water resources. These leads to pollution and environmental degradation that can risk human and animal health. In surface water, excess nutrients can cause excessive aquatic plant growth and reduced oxygen levels in the water, both of which can lead to fish kills. Excess nutrients leaching into groundwater can pollute drinking water, leading to risks to human health and increased water treatment costs. Soil tests can help

reduce excess nutrients being applied to the soil, thereby keeping them out of the water.

In the Lower Rio Grande Valley, the Arroyo Colorado and other area waterbodies are experiencing nutrient loading issues that have created the problems listed above. These nutrients come from multiple sources across the watershed including agriculture, domestic wastewater, illegal dumping, industrial wastewater and rural/urban runoff among other sources. All sources of excess nutrients collectively contribute to the nutrient loading problem.

No single source is the sole problem, but each can be managed to reduce their potential to influence downstream water quality.

Soil testing and following the tests' recommendations when applying fertilizer is one way to reduce potential nutrient losses from agricultural and urban settings alike.

Free soil testing opportunity

The Texas A&M AgriLife Extension Service and the Texas Water Resources Institute are offering a free soil testing campaign for agricultural producers in the Lower Rio Grande Valley. This program implements part of the Arroyo Colorado Watershed Protection Plan and will result in reduced nutrient loading to area waterbodies and will potentially help producers save on input costs.

Instructions for soil sampling and sample bags can be picked up at the Hidalgo, Cameron and Willacy County AgriLife Extension offices, the Texas State Soil and Water Conservation Board (TSSWCB) Harlingen regional office, or USDA service centers in those three counties. Once soil samples are collected, they can be dropped off

at those same locations for shipping to the Soil Water and Forage testing laboratory at Texas A&M University in College Station. Test results will be sent directly to growers via email address provided on the sample form.

This soil testing campaign is being funded by a state nonpoint source grant from the TSSWCB. Samples will be accepted and analyzed free of charge for agricultural producers from now until the spring of 2023 or until grant funds are expended.

To participate in, or learn more about, the soil testing campaign, please contact **Victor Gutierrez** at: 956-903-1200 or victor.gutierrez@ag.tamu.edu or your local AgriLife County Extension, USDA NRCS, and TSSWCB offices at:

Cameron County Extension Office
1390 W Expressway 83
San Benito, TX 78586-7633
(956) 361-8236, cameron-tx@tamu.edu

Hidalgo County Extension Office
410 N 13th Ave
Edinburg, TX 78541-3582
(956) 383-1026, hidalgo-tx@tamu.edu

Willacy County Extension Office
170 N 3rd Street
Raymondville, TX 78580-1940
(956) 689-2412, willacy-tx@tamu.edu

District 12 Extension Office
2401 East Highway 83
Weslaco, TX 78596-8344
(956) 968-5581, d12south@ag.tamu.edu

Cameron County USDA NRCS Office
2315 W Expy 83 # 103,
San Benito, TX 78586
(956) 399-2522

Hidalgo County USDA NRCS Office
2514 S Veterans Blvd,
Edinburg, TX 78539
(956) 381-0916

Willacy County USDA NRCS Office
255 FM Rd 3168, Ste 2
Raymondville, TX 78580-3608
Phone: 956-689-2542

**Texas State Soil and Water Conservation
Board Office**
1824 W Jefferson Ave STE A,
Harlingen, TX 78550
(956) 421-5841



Lucas Gregory collects a soil sample from a terminated cover crop field while others look on.

Free Soil Testing to save Time & Money

The Texas A&M AgriLife Extension Service and the Texas Water Resources Institute are once again offering a free soil testing campaign for agricultural producers in the Lower Rio Grande Valley. This program supports implementation of the Arroyo Colorado Watershed Protection Plan and will result in reduced nutrient loading to area waterbodies all while saving the producer's input costs.

Instructions for soil sampling and sample bags can be picked up at the Hidalgo, Cameron and Willacy County AgriLife Extension offices, the TSSWCB Harlingen regional Office, or USDA service centers in those three counties. Once soil samples are collected, they can be dropped off at those same locations for shipping to the Soil Water and Forage testing laboratory at Texas A&M University in College Station. Test results will be sent directly to growers via email address provided on the sample form.

This soil testing campaign is being funded by a State Nonpoint Source Grant from the Texas State Soil and Water Conservation Board. Samples will be accepted and analyzed free of charge for agricultural producers from now until the spring of 2023 or until grant funds are expended.

To learn more about the soil testing campaign, please contact Mr. Jaime Flores at: jjflores@ag.tamu.edu your local AgriLife County Extension, USDA NRCS, and TSSWCB Offices at:

Cameron County Extension Office 1390 W Expressway 83 San Benito, TX 78586-7633 (956) 361-8236, cameron-tx@tamu.edu	Cameron County USDA NRCS Office 2315 W Expy 83 # 103, San Benito, TX 78586 (956) 399-2522
Hidalgo County Extension Office 410 N 13th Ave Edinburg, TX 78541-3582 (956) 383-1026, hidalgo-tx@tamu.edu	Hidalgo County USDA NRCS Office 2514 S Veterans Blvd, Edinburg, TX 78539 (956) 381-0916
Willacy County Extension Office 170 N 3rd Street Raymondville, TX 78580-1940 (956) 689-2412, willacy-tx@tamu.edu	Willacy County USDA NRCS Office 255 FM Rd 3168, Ste 2 Raymondville, TX 78580-3608 Phone: 956-689-2542
District 12 Extension Office 2401 East Highway 83 Weslaco, TX 78596-8344 (956) 968-5581, d12south@ag.tamu.edu	Texas State Soil and Water Conservation Board Office 1824 W Jefferson Ave STE A, Harlingen, TX 78550 (956) 421-5841

Free Soil Testing Campaign in the Arroyo Colorado Watershed

BY LUCAS GREGORY



S

oil testing is a simple, effective tool that helps agricultural producers manage fertilizer application.

Basic soil tests provide information about current nutrient content and

planned crop needs. This can help save money and maximize production potential. Local water resources are also protected through nutrient management which minimizes nutrient losses in surface runoff and groundwater recharge.

In the Lower Rio Grande Valley, the Arroyo Colorado is currently impaired with elevated levels of bacteria and excess nutrients that can lead to low levels of dissolved oxygen. Nutrient sources contributing to these problems include agriculture runoff, failing on-site sewage facilities, illegal dumping and urban stormwater runoff. Conducting soil tests and

following their recommendations can reduce potential nutrient runoff from agricultural fields. A free soil testing campaign is being offered to agricultural producers in the Lower Rio Grande Valley by the Texas A&M AgriLife Extension Service and the Texas Water Resources Institute to implement the Arroyo Colorado Watershed Protection Plan and minimize nutrient loading potential. Producers are eligible for multiple soil tests.

Sampling instructions and sample bags can be picked up at the Hidalgo, Cameron, and Willacy County AgriLife Extension offices, the Texas State Soil and Water Conservation Board (TSSWCB) Harlingen regional office, or U.S.

Department of Agriculture (USDA) service centers in those three counties. Once soil samples are collected, they can be dropped off at those locations for shipping to the Soil, Water and Forage Testing Lab-



oratory at Texas A&M University in College Station. Test results will be sent directly to growers via the email address provided on the sample form.

This soil testing campaign is funded by a State Non-point Source Grant from the Texas State Soil and Water Conservation Board. Samples will be accepted and analyzed free of charge for agricultural producers from now until the spring of 2023 or until grant funds are expended.

To learn more about the soil testing campaign, please contact Mr. Jaime Flores at: jjflores@ag.tamu.edu or your local Texas A&M AgriLife Extension, USDA Natural Resources Conservation Service, and TSS-WCB offices at:

Cameron Co. AgriLife Extension Office
1390 W Expressway 83, San Benito (956) 361-8236

Cameron Co. USDA NRCS Office
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Willacy Co. USDA NRCS Office
255 FM 3168 Ste 2, Raymondville (956) 689-2542

District 12 AgriLife Extension Office
2401 E. Hwy 83, Weslaco (956) 968-5581

TSSWCB Regional Office
1824 W Jefferson Ave Ste A, Harlingen (956) 421-5841

Free Soil Testing to Save Money

The Texas A&M AgriLife Extension Service and the Texas Water Resources Institute continue to offer a free soil testing program for agricultural producers in the Lower Rio Grande Valley. This program supports implementation of the Arroyo Colorado Watershed Protection Plan and minimizes nutrient loading to area waterbodies while potentially reducing producer's input costs. Soil tests show what nutrients are needed to produce planned crops and can help producers more accurately plan future nutrient applications.

Soil sampling instructions and sample bags can be picked up at the Hidalgo, Cameron and Willacy County AgriLife Extension offices, the TSSWCB Harlingen regional Office, or USDA service centers in those three counties and area agricultural retailers. Once soil samples are collected, they can be dropped off at the locations below for shipping to the Soil Water and Forage testing laboratory at Texas A&M University in College Station. Test results will be sent directly to growers via email address provided on the sample form.

This soil testing campaign is funded by a State Nonpoint Source Grant from the Texas State Soil and Water Conservation Board. Samples will be accepted and analyzed free of charge for agricultural producers from now until the spring of 2023 or until grant funds are expended.

To learn more about the soil testing campaign, please contact Mr. Jaime Flores at: jjflores@ag.tamu.edu your local AgriLife County Extension, USDA NRCS, and TSSWCB Offices at:

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Willacy County Extension Office 170 N 3rd Street Raymondville, TX 78580-1940 (956) 689-2412, willacy-tx@tamu.edu	Willacy County USDA NRCS Office 255 FM Rd 3168, Ste 2 Raymondville, TX 78580-3608 Phone: 956-689-2542
District 12 Extension Office 2401 East Highway 83 Weslaco, TX 78596-8344 (956) 968-5581, d12south@ag.tamu.edu	Texas State Soil and Water Conservation Board Office 1824 W Jefferson Ave STE A, Harlingen, TX 78550 (956) 421-5841



Postcard Direct Mailed to Owners of Likely Agricultural Properties – August 2022

Don't Guess

DO A SOIL TEST

If you...

- Grow crops or forage
- Apply fertilizer
- Want to maximize yield

Get a FREE Soil Test

See back for instructions

Find out your:

- Current nutrient levels
- Crop-specific nutrient needs
- Soil pH & recommended adjustments
- Customized fertilizer rates (lb/acre)
- Fertilizer N-P-K ratios

Use Soil Testing to:

- Improve crop yield and quality
- Find the right fertilizer for your crop
- Reduce fertilizer costs and waste

TEXAS A&M
AGRI LIFE
EXTENSION

When should you do a soil test?


- Test 3-6 months before any new plantings or applications of fertilizer
- Test once a year to track changes in soil health

How do you get a test for free?

- Pick up a sample bag and instructions at your county Extension or NRCS office
- Follow the instructions to collect a soil sample
- Return the soil sample and completed form to your county Extension or NRCS office
- Results will be sent by email for free
- Review the results with your Extension agent or NRCS conservationist

Visit arroyocolorado.org to read more about the free soil testing program and Arroyo Colorado Watershed Partnership.

OR use your mobile phone camera to scan the QR code below.



For assistance please contact:

Jaime Flores
Texas A&M AgriLife Extension Service
Texas Water Resources Institute

2401 E Hwy 83 | jjflores@ag.tamu.edu
Westlaco, TX 78596 | (956) 903-1199

TEXAS STATE
Soil & Water
CONSERVATION BOARD



USDA United States
Department of
Agriculture
Natural Resources Conservation Service



The Texas State Soil and Water Conservation Board is providing support for this informational mailer and free soil testing campaign to support Arroyo Colorado Watershed Protection Plan implementation activities through a state nonpoint source pollution grant.

Texas A&M AgriLife Extension Service
Texas Water Resources Institute
2118 TAMU
College Station, TX 77843-2118

Return Service Requested

NON PROFIT ORG.
U.S. Postage
PAID
Bryan, TX
Permit No 215

Soil Testing PSA Screenshots from English Version Aired on KRGV in August and September 2022



Appendix B: Soil Samples Received

Soil Samples Received for Analysis

Date	County	Quantity		Date	County	Quantity
8/18/2021	Cameron	2		9/21/2022	Cameron	1
9/22/2021	Cameron	7		9/21/2022	Willacy	5
10/5/2021	Willacy	6		10/11/2022	Hidalgo	1
10/14/2021	Willacy	1		10/11/2022	Willacy	4
10/19/2021	Cameron	1		10/20/2022	Hidalgo	1
11/5/2021	Hidalgo	1		10/20/2022	Hidalgo	2
11/5/2021	Willacy	1		10/26/2022	Cameron	2
11/5/2021	Cameron	1		10/26/2022	Cameron	1
11/10/2021	Hidalgo	10		10/26/2022	Cameron	1
11/18/2021	Cameron	2		11/7/2022	Cameron	2
11/18/2021	Hidalgo	7		11/9/2022	Cameron	1
11/22/2021	Cameron	1		11/9/2022	Hidalgo	10
12/9/2021	Hidalgo	31		12/9/2022	Cameron	1
12/15/2021	Hidalgo	1		12/14/2022	Willacy	2
12/21/2021	Hidalgo	9		12/21/2022	Cameron	1
1/11/2022	Harlingen	1		12/21/2022	Cameron	1
1/20/2022	Cameron	5		12/21/2022	Cameron	1
1/25/2022	Cameron	1		1/5/2023	Cameron	1
2/25/2022	Cameron	2		1/5/2023	Cameron	2
3/8/2022	Cameron	1		1/5/2023	Cameron	6
3/10/2022	Cameron	3		1/5/2023	Cameron	2
3/7/2022	Cameron	2		1/10/2023	Hidalgo	1
3/10/2022	Hidalgo	1		1/13/2023	Hidalgo	3
3/11/2022	Cameron	1		1/19/2023	Cameron	1
3/28/2022	Cameron	3		1/19/2023	Cameron	1
3/28/2022	Hidalgo	2		1/19/2023	Cameron	1
3/31/2022	Hidalgo	1		2/3/2023	Cameron	4
4/5/2022	Cameron	1		2/3/2023	Hidalgo	5
4/5/2022	Cameron	1		2/8/2023	Cameron	2
4/5/2022	Cameron	1		2/16/2023	Hidalgo	5
4/5/2022	Hidalgo	1		2/21/2023	Cameron	5
4/5/2022	Hidalgo	3		4/18/2023	Hidalgo	1
4/11/2022	Hidalgo	4		4/18/2023	Hidalgo	1
4/16/2022	Hidalgo	4		4/18/2023	Cameron	5
6/16/2022	Cameron	8		4/18/2023	Hidalgo	37
8/1/2022	Willacy	4		4/18/2023	Willacy	6
8/4/2022	Cameron	6		5/4/2023	Cameron	1
8/8/2022	Cameron	10				
8/17/2022	Cameron	2		Total Sample Count		279
9/15/2022	Willacy	3				

Appendix C: Meeting Participation & Educational Program List

Presentation Date	Presenter Name	Presentation Title	Event Title	# of people	Location
9/11/2019	Jose Leal	Delta Lake Water reclamation project	Delta Lake Water reclamation project	6	Weslaco, TX
9/19/2019	Alan Johnson	Port of Harlingen Board of Directors Meeting	POH-BOD meeting	6	Harlingen, TX
9/25/2019	Dr. Ren	Water Center SC meeting	Water Center SC Meeting	20	Kingsville, TX
9/28/2019	Jaime Flores	Gelogy of the RGV	TX Master Naturalist Meeting	18	Brownsville, TX
11/13/2019	Ron Garza	RWRAC Meeting	RWRAC Meeting	25	Weslaco, TX
11/14/2019	Jaime Flores	Arroyo Colorado Steering Committee Meeting	ACSC Meeting	17	Weslaco, TX
12/18/2019	Tomas Rodriguez	Region M Planning Meeting	Region M	27	Weslaco, TX
1/8/2020	Ron Garza	RWRAC Meeting	RWRAC Meeting	25	Weslaco, TX
1/14/2020	Vidal Saenz	Cotton/Grain Pre-plant meeting	Cotton/Grain Pre-plant meeting	150	Monte Alto, TX
1/15/2020	Bernard Rodriguez	TPWD Trail Grant proposal meeting	Trails Grant	3	San Benito, TX
2/5/2020	Tomas Rodriguez	Region M Planning Meeting	Region M	33	Weslaco, TX
2/12/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	35	Weslaco, TX
3/11/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	33	Weslaco, TX
4/8/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	35	Weslaco, TX
5/6/2020	Tomas Rodriguez	Region M Planning Meeting	Region M	30	Weslaco, TX
5/13/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	33	Weslaco, TX
6/10/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	30	Weslaco, TX
6/17/2020	Augusto Sanchez	LLM/BSC Watershed	LLM/BSC	12	San Benito, TX
7/1/2020	Tomas Rodriguez	Region M Planning Meeting	Region M	35	Weslaco, TX
7/8/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	30	Weslaco, TX
7/13/2020	Manuel Cruz	LRGVDC-Regional WPP meeting-pre-meeting	Regional WPP meeting	3	Weslaco, TX
7/15/2020	Manuel Cruz	LRGVDC-Regional WPP meeting	Regional WPP meeting	45	Weslaco, TX
8/4/2020	John Smith	TX Well Owners Network-Hurricane Hanna Response	Hurricane Hanna	3	Virtual
8/12/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	25	Virtual-Weslaco, T
9/1/2020	Leah Martinsson	TX Groundwater Summit	TX Groundwater Summit	250	Virtual-San Antoni
9/9/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	25	Virtual-Weslaco, T
9/16/2020	Tomas Rodriguez	Region M Planning Meeting-Special meeting to approve WMS	Region M	40	Virtual-Weslaco, T
10/1/2020	Carlos Sanchez	City of Harlingen Flood Protection Planning	Flood Protection	45	Virtual-Harlingen,
10/7/2020	Tomas Rodriguez	Region M Planning Meeting	Region M	45	Virtual-Weslaco, T
10/15/2020	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	20	Virtual-Weslaco, T
10/20/2020	Hudson Deyoe	UTRGV-LRGV Sustainability Network	LRGV Sustainability Netwo	12	Virtual-Edinburg, T
1/6/2021	Tomas Rodriguez	Region M Planning meeting	Region M	45	Virtual-Weslaco, T
1/14/2021	Vidal Saenz	Cotton/Grain Pre-plant meeting	Cotton/Grain Pre-plant meeting	100	Virtual-Weslaco, T
2/3/2021	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	25	Virtual-Weslaco, T
3/3/2021	Augusto Sanchez	LLM/BSC Watershed	LLM/BSC	25	Virtual-Edinburg, T
3/10/2021	Augusto Sanchez	LLM/BSC Watershed	LLM/BSC	25	Virtual-Edinburg, T
3/10/2021	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	25	Virtual-Weslaco, T
3/24/2021	Melissa Gonzalez	IBWC Citizens Public Forum	IBWC Citizens Public Forum	45	Virtual-Weslaco, T
4/7/2021	Tomas Rodriguez	Region M Planning meeting	Region M	45	Virtual-Weslaco, T
4/21/2021	Manuel Cruz	RWRAC Meeting	RWRAC Meeting	35	Virtual-Weslaco, T
6/2/2021	Robert Saenz	Delta Lake Water reclamation project	Delta Lake Water reclamation project	4	Weslaco, TX
6/24/2021	John Claudio	IBWC Citizens Public Forum	Rio Grande Levee Rehab	30	Virtual-Weslaco, T
7/13/2021	Aspen Navaro	TX Stream Team Coordination Meeting	TX Stream Team Arroyo sampling	3	Virtual-San Marcos
7/22/2021	John Claudio	Llano Grande Lake	Llano Grande Lake	33	Project Location-M
7/28/2021	John Claudio	IBWC Citizens Public Forum	Hidalgo Co Regional Mobility	33	Virtual-Mercedes
7/30/2021	Sam Sugarek	NRA-Clean Rivers Program-Lower Basin	NRA-CRP-Lower Basin	42	Virtual-Corpus
8/4/2021	Tomas Rodriguez	Region M Planning meeting	Region M	35	Virtual-Weslaco, T
7/30-8/2/21	TXAGD	TX Association of Groundwater Districts	TXAGD	400	San Antonio, TX
8/10/2021	Dr. Ren	South Texas Water Center SC Meeting	South TX Water Center	42	Virtual, Kingsville
9/13/2021	Joel Pigg	TX Well Owners Network-South TX Well collaborationw/Northeastern U.	TWON-South Texas	8	Virtual, New Jersey
9/28/2021	Amie West	Lower Laguna Madre Ecosystem Collaboration	LLM Ecosystem Workshop	14	Virtual, Corpus
9/29/2021	Melanie Guzman	TX Well Owners Network-South TX Well collaborationw/Northeastern U.	TWON-South Texas	8	Virtual, New Jersey
9/30/2021	Rolando Zamora	Soil & Forage Management Virtual Workshop	Soil & Forage	42	Virtual, Raymondvi
9/30/2021	Amie West	Lower Laguna Madre Ecosystem Collaboration	LLM Ecosystem Workshop	16	Virtual, Corpus

Presentation Date	Presenter Name	Presentation Title	Event Title	# of people	Location
10/6/2021	Jim Darling	Region M	Region M Meeting	35	Virtual, Weslaco
10/21/2021	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	33	Virtual, Weslaco
11/7/2021	Lori Kuczanski	IBWC Citizens Public Forum	IBWC Citizens Public Forum	42	Virtual, Weslaco
12/9/2021	Claudia Lozano	Border 2025 Regional Water Group Gulf Task Force meeting	Border 2025 RWGGTFM	42	Virtual, Weslaco
1/5/2022	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	33	Virtual, Weslaco
1/5/2022	David Fuentes	Regional Water Resources Advisory Meeting-Cameron County	RWRAC Meeting	45	Virtual, Weslaco
1/12/2022	Jim Darling	Region M	Region M Meeting	32	Virtual, Weslaco
1/13/2022	Vidal Saenz	Cotton/Grain Pre-plant meeting	Cotton/Grain Pre-plant meeting	150	Mercedes, TX
2/16/2022	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	33	Virtual, Weslaco
3/10/2022	Samuel Zapata	RGV Small Acreage Horticulture Workshop	Horticulture Workshop	32	Weslaco, TX
4/6/2022	Jim Darling	Region M	Region M Meeting	45	Weslaco, TX
4/20/2022	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	42	Weslaco, TX
4/26/2022	Claudia Lozano	Border 2025 LRGV Water Quality Initiative	LRGVWQI Meeting	63	Virtual, Weslaco
5/26/2022	Samuel Zapata	RGV Small Acreage Goat & Poultry Workshop	Goat & Poultry Workshop	52	Weslaco, TX
6/30/2022	Jaime Flores	Llano Grande Lake	Llano Grande Lake	3	Weslaco, TX
7/6/2022	Jim Darling	Region M	Region M Meeting	38	Weslaco, TX
7/20/2022	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	40	Weslaco, TX
7/25/2022	Jaime Flores	San Benito Wetlands	San Benito Wetlands Phase IV Meeting	8	San Benito, TX
9/15/2022	Samuel Zapata	Pasture, Range & Forage Workshop	Pasture, Range & Forage Workshop	48	Weslaco, TX
9/15/2022	Jaime Flores	Arroyo Colorado Partnership Steering Committee Meeting	Arroyo Colorado S.C. meeting	22	Virtual, Weslaco
9/21/2022	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	37	Weslaco, TX
9/29/2022	Jim Darling	Region M	Region M Meeting	42	Weslaco, TX
10/11-12/22	Allen Berthold	TWRI Annual Retreat	TWRI Annual Retreat	20	Hearne, TX
10/13/2022	TCEQ	TCEQ Contractor Workshop	TCEQ Contractor	60	Virtual, Austin
10/25/2022	Lucas Gregory	RGV Water Quality Article Meeting	RGV Water Quality Meeting	3	Teams
11/9-13/22	RGV Briding Festival	Arroyo Colorado Water Quality	Arroyo Colorado Water Quality	396	San Benito, TX
11/18/2022	Jaime Flores	San Benito Wetlands Project	VAlley Environmental Summit	38	SPI, TX
11/22/2022	Samuel Zapata	RGV Small Acreage Planning Meeting	RGV Small Acreage Planning Meeting	8	Teams
11/30/2022	Jaime Flores	Soil Test Campaign/Ag Issues	Soil Test Campaign	2	Harlingen, TX
12/6/2022	Roland Zamora	Pasture, Range & Forage Workshop	Pasture, Range & Forage Workshop	14	Ramondville, TX
12/13/2022	Vidal Saenz	Making Sausage from your Harvest	Making Sausage from your Harvest	21	San Manuel, TX
3/1/2023	Jim Darling	Region M	Region M Meeting	35	Weslaco, TX
3/7/2023	David Fuentes	Regional Water Resources Advisory Meeting	RWRAC Meeting	25	Weslaco, TX
4/19/2023	Lucas Gregory	TX Watershed Coordinators Roundtable Meeting	TX Watershed Coordinators Roundtable Meeting	35	Corpus Christi, TX
4/20/2023	David Fuentes	Regional Water Resources Advisory Meeting-Special Meeting	RWRAC Meeting	29	Weslaco, TX
4/27/2023	Ramiro Moreno	Rio Hondo ISD NPS project	Rio Hondo ISD NPS	3	Rio Hondo

Presentation Date	Presenter Name	Presentation Title	Event Title	# of people	Location
9/19/2019	Jaime Flores	Watershed Principles/Overview of Arroyo Colorado Watershed	Edinburg Alternative Academy In-ServiceTeacher	3	Edinburg, TX
9/28/2019	Jaime Flores	Geology of the RGV	TX Master Naturalist Meeting	17	Brownsville, TX
10/18/2019	Jaime Flores	Continued Progress on the Arroyo Colorado Watershed Protection Plan through an Engaged Partnership	Valley Environmental Summit	25	Brownsville, TX
10/19/2019	Jaime Flores	Spooky Science Fest	Spooky Science Fest	800	Weslaco, TX
11/16/2019	Jaime Flores	Los Fresnos Falcon Lake Beautification Project	Los Fresnos Falcon Lake Beautification Project	60	Los Fresnos, TX
1/20/2019	Jaime Flores	Watershed Principles/Overview of Arroyo Colorado Watershed	Watersheds	4	Los Fresnos, TX
1/21/2020	Jaime Flores	Watershed Principles/Overview of Arroyo Colorado Watershed	Watersheds	322	Los Fresnos, TX
2/18/2020	Jaime Flores & Victor Guitierrez	Rain Simulator and Soil Infiltration Demonstration	Coastal Expo	650	Edinburg, TX
2/20/2020	Jaime Flores	San Benito Wetlands Phase III Bird Count	San Benito Wetlands Phase III Bird Count	22	San Benito, TX
3/3-4/20	Jaime Flores & Victor Guitierrez	Coastal Geology/Native Plants & LID Lanscaping	Falcon Lake Project Based Learning	67	Los Fresnos, TX
7/1/2020	Jaime Flores	Arroyo Colorado Watershed Protection Plan-Case Study	TX 4-H Water	30	Virtual-Weslaco, T
7/15/2020	Jaime Flores	Continued Progress on the Arroyo Colorado Watershed Protection Plan through an Engaged Partnership	LRGVDC Annual WPP Update meeting	60	Virtual-Weslaco, T
9/3/2020	Jaime Flores	Arroyo Colorado Watershed Protection Plan-Case Study	Healthy Lawns/Healthy Waters	60	Virtual-Weslaco, T
2/8/2021	Jaime Flores	OSSF Educational Workshop	OSSF Workshop	18	Virtual-Weslaco, T
4/22/2021	Jaime Flores	ACWPP-Project Implementation Update	ACSC Meeting	18	Virtual-Weslaco, T
5/14/2021	Jaime Flores	ACWPP-Project Implementation Update	Border 2020-LRGVWQI	56	Virtual-Weslaco, T
6/8/2021	Jaime Flores	ACWPP-Tracking Tables	LRGVDC-SWAC	52	Virtual-Weslaco, T
6/25/2021	Jaime Flores	ACWPP-Project Implementation Update	LRGVDC Annual WPP Update meeting	42	Virtual-Weslaco, T
7/27/2021	Jaime Flores	ACWPP-Project Implementation Update	TX 4-H Water	18	Weslaco, TX
9/30/2021	Jaime Flores	ACWPP-Implementing Ag Management Measures	Soil & Forage	42	Virtual-Weslaco, T
12/8/2021	Jaime Flores	OSSF Educational Workshop	OSSF Workshop	18	La Feria, TX
1/14/2022	Jaime Flores	Arroyo Colorado Watershed Partnership Annual Newsletter	Annual Newsletter		
1/15/2022	Jaime Flores	ACWPP-San Benito Wetlands Project	San Benito Wetlands Phase III Arroyo Colorado Audobon Society Bird Count	27	San Benito Wetlan
2/15/2022	Jaime Flores	ACWPP-Modeling/Delineating the North Watershed Boundary	Arroyo Watershed Boundary	3	Kingsville, TX
2/26/2022	Jaime Flores	ACWPP-San Benito Wetlands Project	San Benito Wetlands ACAS Monthly Bird Count	8	San Benito Wetlan
3/3/2022	Jaime Flores	ACWPP-San Benito Wetlands Project	Laguna Vista Birding Club Bird Count	25	San Benito Wetlan
4/26/2022	Jaime Flores	LRGVWQI-ACWP Waste Water Infrastructure	Border 2025 LRGVWQI	55	Virtual-Weslaco, T
5/26/2022	Jaime Flores	USDA-FSA Microloan Program	RGV Small Farmers Goat & Poultry workshop	50	Weslaco, TX
7/19/2022	Jaime Flores	San Benito Wetlands Project	TX 4-H Water	20	San Benito, TX
9/15/2022	Jaime Flores	Soil Test Campaign/Arroyo Colorado Water Quality	Pasture, Range & Forage Workshop	48	Weslaco, TX
9/15/2022	Jaime Flores/Jude Benavides	Arroyo Colorado Partnership Steering Committee Meeting	ACWP Steering Committee Meeting	22	Virtual-Weslaco, T
10/12/2022	Jaime Flores	San Benito Wetlands Project	TWRI Annual Retreat	20	Hearne, TX
11/9-13/22	Jaime Flores	San Benito Wetlands/Arroyo Colorado Water Quality Issues	RGV Birding Festival	396	San Benito, TX
11/18/2022	Jaime Flores	San Benito Wetlands Project	Valley Environmental Summit	38	SPI, TX
11/30/2022	Jaime Flores	Arroyo Colorado Watershed-General Information	TSSWCB/FFA Speaking Contest	2	Harlingen, TX
12/13/2022	Jaime Flores	Soil Test Campaign/Arroyo Colorado Water Quality	Making Sausage from your Harvest	22	San Manuel
2/18/2023	Jaime Flores	Arroyo Colorado Water Quality-Reuse projects	San Benito Wetlands Bird Count	24	San Benito
3/2/2023	Jaime Flores	Arroyo Colorado-General Infromation, Water Quality	Healthy Lawns/Healthy Waters	53	Weslaco, TX
3/7/2023	Jaime Flores	Arroyo Colorado-General Infromation & Soil Test Campaign	Soil Fertility Management Workshop	15	Virtual-Ramondvill
3/23/2023	Jaime Flores	Arroyo Colorado Water Quality-Reuse projects	San Benito Wetlands	27	San Benito

Appendix D: Arroyo Colorado Steering Committee & Workgroup Meeting Agendas

Arroyo Colorado Steering Committee Meeting

Virtual Teams Meeting

April 22, 2021 2:00 p.m. – 3:00 p.m.

MEETING AGENDA

Welcome and IntroductionsDr. Jude Benavides, UTRGV

Ag Issues Workgroup Update..... Ronnie Ramirez, TSSWCB

Water Quality Management Plans Update-319 Funding
Ice Storm Uni update on Ag in the Rio Grande Valley
Arroyo Colorado Soil Testing Project 2021-22-Victor Gutierrez

OSSF GIS Database ProjectDr. Jude Benavides, UTRGV

OSSF GIS modeling study-Alvaro Garcia

Habitat Workgroup Jaime Flores, TWRI

Update on San Benito Wetlands Phase IV project
Llano Grande Lake Restoration Project-Anne Whitko, Ambiotec Civil Engineering

Education & Outreach Workgroup Jaime Flores, TWRI

Update of the Arroyo Colorado Website
Arroyo Watershed Model Usage 2021
2 New Arroyo Watershed Models

Upcoming Grant Opportunities

GLO-Coastal Management Program RFP
TCEQ, CWA 319, NPS Program RFP
TSSWCB, CWA 319, NPS Program RFP

Other Business.....Dr. Jude Benavides, UTRGV

Adjourn.....Dr. Jude Benavides, UTRGV

Arroyo Colorado Steering Committee Meeting

Virtual Teams Meeting

September 15, 2022

2:00 p.m. – 3:00 p.m.

MEETING AGENDA

Welcome and Introductions.....Dr. Jude Benavides, UTRGV

Arroyo Colorado Sub-Watershed Database and Delineation..... Pamela Mugisha, TAMUK

Ag Issues Workgroup Update..... Ronnie Ramirez, TSSWCB

Water Quality Management Plans Update-319 Funding

Arroyo Colorado Soil Testing Project Update..... Jaime Flores, TWRI

Wastewater Infrastructure WorkgroupDr. Jude Benavides, UTRGV

Update on OSSF GIS Database project

Habitat Workgroup Jaime Flores, TWRI

Update on San Benito Wetlands Phase IV project

Llano Grande Lake Restoration Project

Education & Outreach Workgroup Jaime Flores, TWRI

Update of the Arroyo Colorado Website

2 New Arroyo Watershed Models, 1st picked up May 21, 2022

Upcoming Grant Opportunities

TCEQ, CWA 319, NPS Program RFP

TSSWCB, CWA 319, NPS Program RFP

Other Business.....Dr. Jude Benavides, UTRGV

Adjourn.....Dr. Jude Benavides, UTRGV

The Arroyo Colorado Watershed Partnership Newsletter



Winter 2022

Soil Testing Campaign in the Arroyo Colorado Watershed

By Jaime Flores

Soil testing is a simple and effective tool that agricultural producers and homeowners alike can use to help manage fertilizer and soil amendment applications. Basic soil tests provide information about the kind and amount of plant-available nutrients currently in the soil and how much additional fertilizer is needed for the growing plants. The information received can help save money. Knowing crops' nutritional needs can help determine the amount of fertilizer to apply, or not apply, to produce a successful yield.

A good soil testing program can lead to other savings as well. For example, surface and groundwater resources are protected through proper nutrient application. Surface runoff and water leaching into the soil and underlying aquifers are natural processes that can lead to pollution. Poor nutrient management combined with these natural processes contributes to environmental degradation that ultimately affects human populations. Excess nutrient leaching into groundwater used for drinking can cause negative health effects and increase potable water treatment costs. Nutrient loading in surface runoff can create excessive aquatic plant growth and low dissolved oxygen in waterbodies that may lead to fish kills. Fish kills are bad for the aquatic system and degrade recreational opportunities for area residents.

In the Lower Rio Grande Valley, the Arroyo Colorado and other area waterbodies are experiencing nutrient loading issues that have created water quality impairments. Some excess nutrients are classified as nonpoint source pollution and may come from agriculture runoff, on-site sewage facilities, illegal dumping and urban stormwater runoff. Soil testing and following the recommendations of the test when applying fertilizer are one way to reduce potential nutrient runoff from agricultural and urban settings alike.

The Texas A&M AgriLife Extension Service and the Texas Water Resources Institute are once again offering a free soil-testing campaign for agricultural producers in the Lower Rio Grande Valley. This program supports implementation of the Arroyo Colorado Watershed Protection Plan and will reduce nutrient loading to area waterbodies and producer's input costs. *(continued on page 6)*



Gabriel Cavazos, Conservation Agronomist, USDA-NRCS Hidalgo Co., demonstrating how to collect a soil sample. Photo by Jaime Flores.

Prepared in cooperation with the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency.



Llano Grande Lake Restoration Preliminary Feasibility Project

By Anne Whitco

Texas Water Resources Institute (TWRI) is investigating the possibility of restoring more natural hydrologic function of Llano Grande Lake by removing excess sediment build up. Siltation in lakes and very slow-moving waterways is a natural process that changes water storage and transport capacity over time. Historically, Llano Grande Lake has served as a source of flood water storage, wildlife habitat and recreation, and as an eight to 10 feet deep navigable channel leading toward the Port of Harlingen. However, changes in hydrology across the Rio Grande Valley and development in the surrounding landscape have contributed to the increased sediment accumulation in the lake.

In September 2020, Ambiotec Civil Engineering Group, Inc. conducted a bathymetric survey of the lake in coordination with TWRI. Based on depth-to-sediment data collected at four lake cross sections, it was found that between five and 12 feet of sediment accumulation exists in the lake. Water depths recorded ranged from less than one to only 4 feet in measured areas. Based on these findings, it is estimated that approximately 1.4 million cubic yards of sediment has accumulated in the lake. This equates to roughly 282.7 million gallons of stormwater capacity that is currently unavailable.

This effort was undertaken as a direct result of the recommendation in the Arroyo Colorado Watershed Protection Plan (WPP) to evaluate restoration activities for Llano Grande Lake. Currently, TWRI is exploring the possibility of dredging accumulated sediment from the water body. This effort involves communicating and coordinating with the U.S. Army Corps of Engineers to determine the potential for acquiring a dredging permit. Cost estimates are also in development to determine the amount of funding needed to complete such a project. Once cost is determined, efforts to identify collaborators and funding opportunities will begin.

Llano Grande Lake is about 5.3 miles long and covers approximately 180 acres within the Arroyo Colorado channel. It sits at the head of the International Boundary and Water Commission North Floodway and is centrally located within the 90-mile length of the Arroyo Colorado that flows from southwest of Mission, Texas to the Laguna Madre near Arroyo City, Texas. Concerns over low dissolved oxygen and elevated bacteria levels in the Arroyo

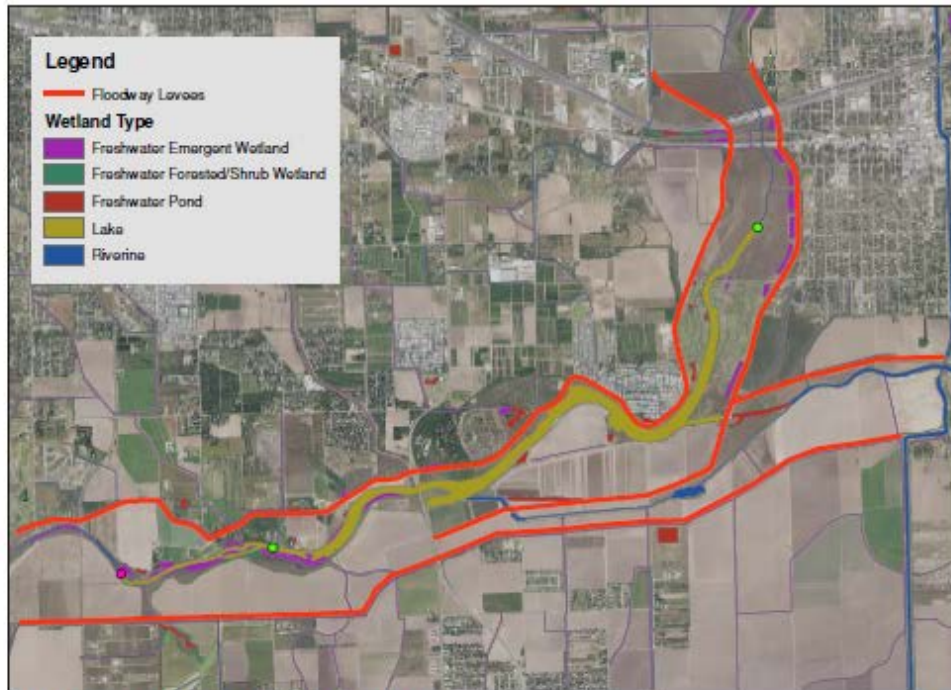
Colorado spurred development of the Arroyo Colorado WPP by numerous concerned watershed stakeholders, organized as the Arroyo Colorado Watershed Partnership. Through a facilitated process, the partnership developed a WPP that identified local water quality concerns and appropriate strategies to address these concerns over time. The Llano Grande Restoration Project is a key project identified in the plan, which is critical to improving water quality standards and flood mitigation in the watershed.



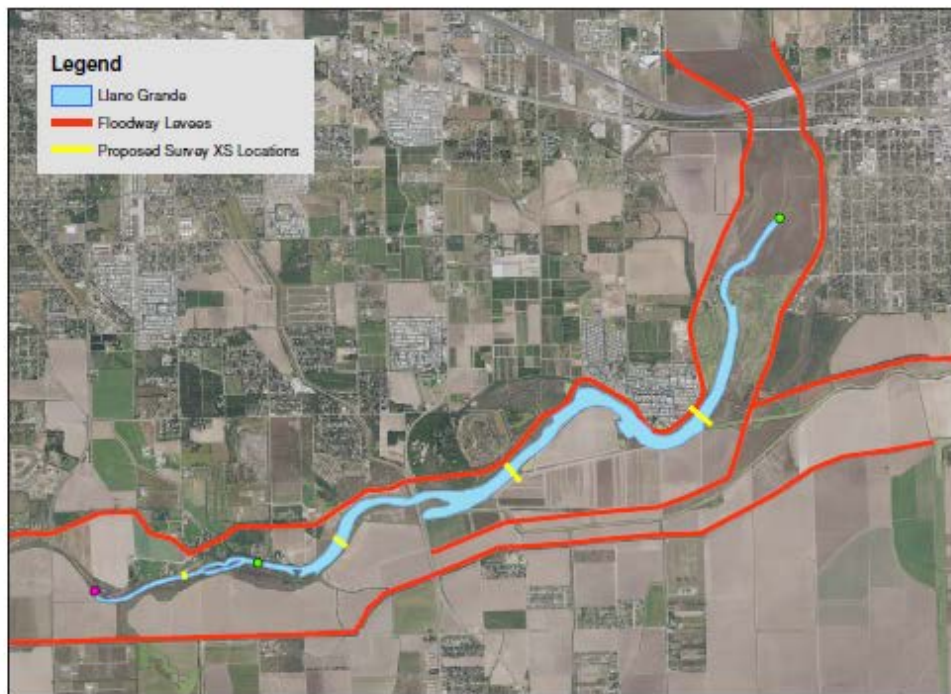
Measuring sediment thickness in Llano Grande Lake. Photo by Jaime Flores.



Motoring to the far side off the lake to take measurements. Photo by Jaime Flores.



Map of the Llano Grande Lake study area and habitat.



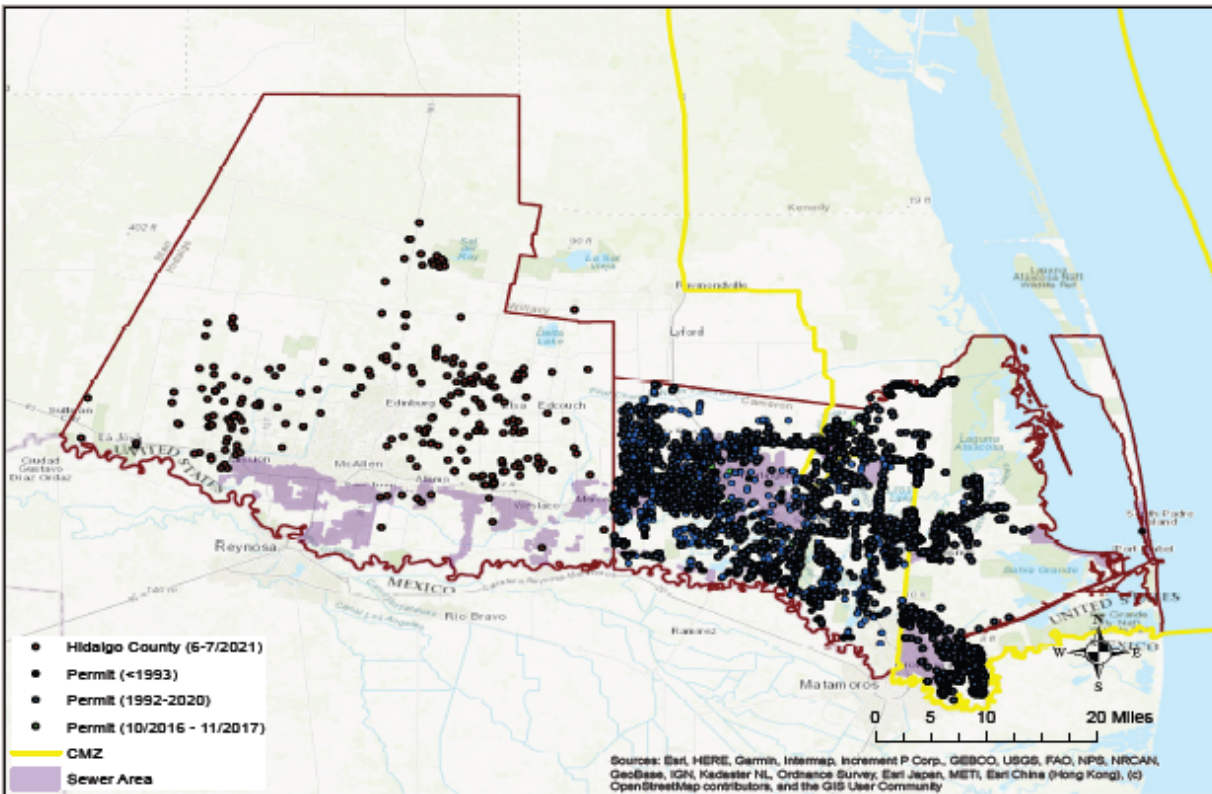
Map of the locations where cross-section surveys occurred.

Know it. Respect it. Enjoy it.



(continued from page 4) To estimate potential water quality risks from OSSFs, numeric risk factors were assigned to OSSF characteristics and environmental factors based on their potential to adversely affect OSSF function. These risk factors were combined into a cumulative contamination risk for surrounding areas and their receiving waterbodies, and the contamination risk was visualized on a GIS for Cameron County. While this assessment does not present actual risks to the environment or the human population from failing OSSFs, it does illustrate what portions of the evaluated area have potentially greater risk based on known information. In the color-coded figure below, red represents the highest potential risk, while green represents the lowest risk. This assessment is not a substitute for onsite inspections to truly assess the functionality of an OSSF, but it can identify areas in the study area where the potential is highest and aid in prioritizing where these types of assessments should be done first.

This assessment was done as an implementation activity for the Arroyo Colorado WPP update and uses information gathered and included in an OSSF inventory and database to prioritize areas in the watershed for future activity. This assessment was conducted with funding from the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency through the Clean Water Act Section 319(h) Nonpoint Source Grant Program. Risk assessment models such as this one can help guide policy and future development within an area. It can also designate high priority areas that are in need of a centralized sewer system.



OSSF GIS map for Hidalgo and Cameron counties and the Coastal Zone.



Arroyo Colorado

(continued from page 1) Instructions for soil sampling and sample bags can be picked up at the Hidalgo, Cameron, and Willacy County AgriLife Extension offices, the Texas State Soil and Water Conservation Board (TSSWCB) Harlingen regional office, or U.S. Department of Agriculture (USDA) service centers in those three counties. Once soil samples are collected, they can be dropped off at those same locations for shipping to the Soil, Water and Forage Testing Laboratory at Texas A&M University in College Station.

Test results will be sent directly to growers via the email address provided on the sample form.

This soil testing campaign is funded by a State Nonpoint Source Grant from the Texas State Soil and Water Conservation Board. Samples will be accepted and analyzed free of charge for agricultural producers from now until the spring of 2023 or until grant funds are expended.



To learn more about the soil testing campaign, please contact Mr. Jaime Flores at: jjflores@ag.tamu.edu or your local Texas A&M AgriLife Extension, USDA Natural Resources Conservation Service, and TSSWCB offices at:

Cameron County Extension office
1390 W Expressway 83
San Benito, TX 78586-7633
(956) 361-8236, cameron-tx@tamu.edu

Cameron County USDA NRCS office
2315 W Expressway 83 # 103,
San Benito, TX 78586
(956) 399-2522

Hidalgo County Extension office
410 N 13th Avenue
Edinburg, TX 78541-3582
(956) 383-1026, hidalgo-tx@tamu.edu

Hidalgo County USDA NRCS office
2514 S Veterans Boulevard,
Edinburg, TX 78539
(956) 381-0916

Willacy County Extension office
170 N 3rd Street
Raymondville, TX 78580-1940
(956) 689-2412, willacy-tx@tamu.edu

Willacy County USDA NRCS office
255 FM Road 3168, Ste 2
Raymondville, TX 78580-3608
Phone: 956-689-2542

District 12 Extension office
2401 East Highway 83
Weslaco, TX 78596-8344
(956) 968-5581, d12south@ag.tamu.edu

TSSWCB office
1824 W Jefferson Avenue STE A,
Harlingen, TX 78550
(956) 421-5841



facebook.com/arroyo.colorado



The Arroyo Colorado Watershed Partnership

2401 E. Hwy 83 • Weslaco, Tx 78596

Phone: 956.903.1199

www.arroyocolorado.org

jjflores@ag.tamu.edu

The Arroyo Colorado Watershed Partnership Newsletter



Spring 2023

San Benito Wetlands drew international crowd during 29th Annual RGV Birding Festival

By Jaime Flores

The restoration of the 65 acres of wetlands and riparian habitat at the San Benito Wetlands is one of the most exciting on-going environmental projects in the Rio Grande Valley, and recently visitors from all over the world experienced it during the 29th Annual RGV Birding Festival.

The wetlands have attracted numerous rare birds in recent years, and in 2022 the RGV Birding Festival got special permission to visit the site during the festival for the first time since the wetlands had been restored. The initiative was a great success, and 386 visitors from 39 states and six countries visited the wetlands during the festival, Nov. 9-13, 2022.

Phase I of the wetland project began in 2009 with the restoration of four 1-acre polishing ponds. Over the course of 12 years and three additional phases, a total of 65 acres have been restored. As soon as the first ponds were completed and filled with water, birds and all types of wildlife began flocking to the wetlands. Since then, it has become a birding hotspot.

Members of the Arroyo Colorado Audubon Society discovered what an attraction the wetlands can be in November 2021 when they spotted a Fork-tailed Flycatcher in the area. The Fork-tailed Flycatcher is mainly found in Mexico, Yucatan and South America, and is a rare bird to be seen in the United States. For the next two weeks, birders from all over the world flocked to catch a glimpse of the flycatcher.

Additionally, a pair of Groove-billed Ani spent the 2021 winter, spring and most of summer close to the road bridge and were viewed at every bird count. *(continued on page 4)*



Birders flocking to view the Fork-tailed flycatcher. Photo by Jaime Flores.



Fork-tailed Flycatcher. Photo by Alicia Cavazos.

Prepared in cooperation with the Texas State Soil and Water Conservation Board and the U.S. Environmental Protection Agency.



New project serving socially disadvantaged farmers saw successful first year in 2022

By Jaime Flores

This past year, Texas A&M AgriLife Extension economist Dr. Samuel Zapata collaborated with the Texas Water Resources Institute and county extension agents Vidal Saenz, Ashley Gregory, Hidalgo Co., Marco Ponce, Jennifer Herrera, Cameron Co., Rolando Zamora, Willacy Co., Omar Montemayor, Starr Co., and Dr. Juan Enciso to apply for a USDA-OPPE grant.

The team was awarded a 3-year grant, and the purpose of the grant program is to train socially disadvantaged farmers

and ranchers in sustainable agricultural production and management practices through a series of workshops.


A total of six workshops were held in 2022:

- Grow Your Farm, March 10, 2022 - 30 participants
- Goats and Poultry, May 26, 2022 - 60 participants
- Citrus Health, July 14, 2022 - 30 participants
- Pasture, Range and Forage, Sept. 15, 2022 - 75 participants
- Medicinal Herbs, Dec. 6, 2022 - 63 participants
- Making Sausage from your Harvest, Dec. 13, 2022 - 21 participants



Making sausage by filling casing with seasoned meat. Photo by Jaime Flores.

Each workshop also included an educational section focused on business planning. Landowners were informed about how to apply for cost share assistance programs through the TSSWCB and USDA-NRCS, as well as how to apply for USDA and FSA loans.

The project team is working on planning and developing more workshops for 2023, and currently 5 workshops are planned, including business planning and marketing, crop production, irrigation management, small livestock production, and value-added practices. The training workshops will be held at the Texas A&M AgriLife Research and Extension Center in Weslaco, and at the Texas A&M Higher Education Center at McAllen. 



Seasoning the pork and beef cuts to make sausage. Photo by Jaime Flores.



Grinding seasoned meat. Photo by Jaime Flores.



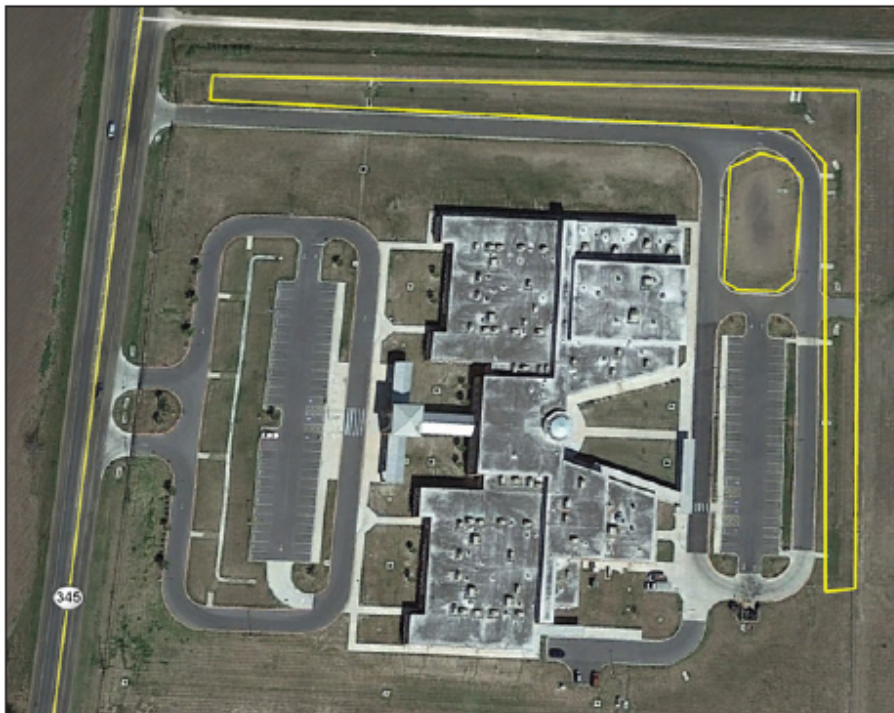
Rio Hondo ISD NPS Education and Coastal Stormwater BMP/LID Installation

By Jaime Flores

TWRI was awarded a TCEQ, CWA 319, NPS grant to provide the Rio Hondo Middle School students information on NPS pollution, water quality education and to install coastal stormwater enhancement BMPs and low impact development (LID) elements at the Rio Hondo ISD middle school to implement BMPs identified in the Arroyo Colorado WPP.

TWRI will work with native plant expert, Mike Heep, and Rio Hondo ISD to select native coastal vegetation to be planted in existing stormwater swales and detention ponds at the middle school that will reduce NPS stormwater pollution. Currently there is no native vegetation in the swales and ponds except for coastal Bermuda grass and the stormwater is starting to erode the base of the swales and ponds. The native vegetation will be planted by the middle school students and local volunteers during 2 planting day workshops. The native vegetation will not only remove NPS pollution from the stormwater but will also serve as

an outdoor classroom for the students at the middle school. Interpretive signage identifying the native vegetation planted and information on NPS pollution and pollution prevention will be installed in and around the stormwater swales and ponds. Science teachers will be able to use the area to provide project-based learning with an emphasis on key middle school earth science concepts such as erosion, sedimentation, deposition, stormwater, watersheds, ecosystems, weather and atmosphere, Point and NP Sources of pollution and BMPs to mitigate pollution. TWRI will also work with the Meadows Center for Water and the Environment at Texas State University to provide the Rio Hondo Middle School Science Teachers with Texas Stream Team certification training. Once they receive the training, the teachers will then be able to train the students to use the Texas Stream Team water quality sampling kits to determine water quality. This will provide the students will real world, hands-on training by performing physical and chemical testing. The project will begin in the Spring of 2023.



Yellow polygons represent proposed stormwater planting areas around Rio Hondo ISD Middle School.



Arroyo Colorado

(continued from page 1) The Fork-tailed Flycatcher returned to the wetlands during the 2022 festival and was a huge draw to area. The total number of bird species officially documented at the wetlands increased to 219 during the festival, and it is now considered a must-visit location when birding in the Rio Grande Valley.

Read more about the festival:

- [Birding festival to offer first tours of San Benito wetlands](http://bit.ly/40mCaBv) | <http://bit.ly/40mCaBv>
- [Registration now open for Rio Grande Valley Birding Festival field trips](http://bit.ly/42VLa2m) | <http://bit.ly/42VLa2m>
- [TV celebrity 'Bee Czar' called in after city worker stung multiple times](http://bit.ly/3zd6S42) | <http://bit.ly/3zd6S42>
- [Swarm of bees almost cancels RGV Birding Festival field trip location](http://bit.ly/40Ji5VX) | <http://bit.ly/40Ji5VX>



Birders bird watching during the 29th Annual RGV Birding Festival. Photo by Jaime Flores.



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Appendix F: Agriculture BMP Factsheet



Best Management Practices (BMPs) and Water Quality Parameters of Selected Farms Located in the Arroyo Colorado Watershed

Agriculture in the Arroyo Colorado Watershed

The Arroyo Colorado watershed extends from western Hidalgo County through Cameron and Willacy counties before reaching the Laguna Madre. The land draining to the Arroyo includes city landscapes, cropland, coastal prairies/wetlands, grassland, and riparian corridors. The Laguna Atascosa National Wildlife Refuge and several parks are located within the watershed providing native habitat for several endangered semi-tropical plants and animal species. The Arroyo Colorado also provides numerous recreational opportunities and attracts a large number of tourists annually. Agriculture, municipal and industrial activities all contribute to water quality concerns and impairments in the Arroyo Colorado. Irrigation return flows from agricultural fields were identified as a major pollution source to the watershed because they can carry excess sediment, fertilizers and pesticides into the Arroyo Colorado. Agricultural producers can improve water quality of the Arroyo Colorado by implementing best management practices (BMPs) that reduce nonpoint source (NPS) pollution from their land. Several demonstration projects implemented since 2006 have characterized irrigation return flow quality and BMP effectiveness at field and sub-watershed scales. These activities were conducted to spur BMP implementation described in the Arroyo Colorado Watershed Protection Plan.



Objectives

A main source of pollution from agricultural runoff is nutrient leachate. One demonstration project focused on identifying the effect of agricultural management practices on NPS pollution from surface irrigated farms in the Arroyo Colorado watershed. The objective of the study was to obtain water quality information (parameters including: total dissolved solids, nitrates and nitrites, orthophosphate phosphorus, total phosphorus, and total Kjeldahl nitrogen) from irrigation water runoff in six agricultural fields during the 2009 and 2010 growing seasons.

Irrigation poly pipe used during an irrigation event.

BMPs Implemented at Demonstration Sites

Crop rotation	Irrigation management
Crop residue management	Irrigation with poly-pipe
Nutrient management	Subsurface drainage
Pest management	Vegetation filter strips
Irrigation land leveling	

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Best Management Practices (BMPs) and Water Quality Parameters of Selected Farms Located in the Arroyo Colorado Watershed

Results

The predominant irrigation system in the Lower Rio Grande Valley is surface irrigation. Primary BMPs adopted by irrigating farmers in the Arroyo Colorado watershed are conservation crop rotation, irrigation land leveling, the use of poly-pipe and nutrient management. During this project, only one site had filter strips at the lower end of the rows which received irrigation runoff. The main results of this study are listed below.

1. Results indicated that the irrigation water contained high concentrations of nitrates, nitrites, orthophosphates, total phosphorus and total Kjeldahl nitrogen prior to application, but concentrations varied between irrigation events.
2. Nitrate, nitrite and total Kjeldahl nitrogen load increases from fields were small. Runoff volume significantly influenced nutrient loadings. Therefore, nutrient losses can be reduced through runoff management.
3. Orthophosphate and total phosphorus loads were extremely low for all sites during both years, but they were influenced by runoff volume. High total dissolved solids likely resulted from higher furrow flowrates that produce increased erosion and sediment transport. These higher flow rates also result in higher nutrient loadings of orthophosphates and total phosphorus. The use of poly-pipe can reduce erosion, facilitate irrigation management and may have an influence on orthophosphates and total phosphorus.
4. Groundwater nutrient concentrations fluctuated from year to year and from irrigation to irrigation, but remained low. Sites with nutrient management implemented as a BMP exhibited the lowest groundwater nutrient concentrations.

Recommendations

Producers can implement multiple BMPs to protect Arroyo Colorado water quality. Combining multiple practices will improve nutrient reduction in runoff water. Simply using just two practices such as land leveling and the use of poly-pipe will help facilitate irrigation management and have an impact on improving yields and profits. The two BMPs that reduced nutrient runoff the most were nutrient and irrigation management. Nutrient management typically consists of applying fertilizer at a specific rate according to a soil analysis test. Irrigation management includes controlling the total amount of water applied to the land focusing on using non-erosive flow-rates, thereby reducing runoff.



Runoff resulting from an irrigation event being measured.

This project was funded by a Clean Water Act §319(b) grant through the United States Environmental Protection Agency administered by the Texas State Soil and Water Conservation Board.

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