Implementing Agriculture and Rural Management Measures in the Update to the Arroyo Colorado Watershed Protection Plan (ACWPP) to Address NPS Pollution and Impairments

Final Report

TSSWCB 19-05

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By

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Executive Summary

The goal of the "Implementing Agriculture and Rural Management Measures in the Update to the Arroyo Colorado Watershed Protection Plan (ACWPP) to Address NPS Pollution and Impairments," Texas State Soil and Water Conservation Board (TSSWCB) Project 19-05, was to continue to enhance education program delivery and provide more specific, technical, and financial information that will address both nutrient- and bacteria-induced impairments.

Texas Water Resources Institute (TWRI) and Texas A&M AgriLife Extension Service (AgriLife Extension) conducted educational programs in the three-county Arroyo Colorado watershed area focused on best management practices (BMPs), nutrient management, and financial and technical assistance sources. Continuation of these programs was possible with Clean Water Act Section 319(h) grant funding from TSSWCB and the U.S. Environmental Protection Agency (EPA).

This project began in 2019 and was a continued effort of previous agricultural education programs in the watershed. AgriLife Extension had previously provided agricultural education programming that highlighted water quality issues in the Arroyo Colorado and guidance on how the agricultural community could help in reducing NPS pollutants coming from agricultural fields. This guidance was provided primarily by providing producers with information on BMPs such as nutrient and irrigation management and financial and technical assistance available to implement these practices. By working closely with the TSSWCB, U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), and the local soil and water conservation districts (SWCDs), resources were utilized efficiently, and programs were current and relevant.

During this project, the ACWC gave 40 presentations regarding Arroyo Colorado water quality, impairments, ACWPP implementation, agricultural NPS pollution, education, and financial assistance incentives to various groups and project partners throughout the watershed. The ACWC continued to support ACWPP Update implementation and coordination of watershed steering committee and workgroups. The ACWC facilitated three Steering Committee meetings, three Ag Issues Workgroup meetings, three Habitat Workgroup meetings, and had individual meetings with five WWTF operators. The ACWC attended 83 meetings hosted by local groups and partners. The ACWC distributed 41 ACWP email updates to Arroyo producers/stakeholders and developed, published, and distributed three annual newsletters that are designed to keep landowners and entities informed 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 grant program to deliver agricultural education and financial assistance program information to the target audience of small acreage and disadvantaged farmers in the Rio Grande Valley. During the grant, the ACWC received positive feedback from the meeting attendees and project partners. Because agricultural production remains the dominant land use in the Arroyo

Colorado Watershed, agricultural education programs continue to be a vital part of accomplishing the goals outlined in the Arroyo Colorado Watershed Protection Plan.

List of Acronyms and Abbreviations

- AC Arroyo Colorado
- ACW Arroyo Colorado Watershed
- ACWP Arroyo Colorado Watershed Partnership
- ACWPP Arroyo Colorado Watershed Protection Plan
- BMPs best management practices
- CEA County Extension Agent
- CEU continuing education unit
- DO dissolved oxygen
- EPA U.S. Environmental Protection Agency
- AgriLife Extension Texas A&M AgriLife Extension Service
- NRCS U.S. Department of Agriculture, Natural Resources Conservation Service
- NPS nonpoint source
- 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 Arroyo Colorado (AC) is a distributary of the Rio Grande and, at one time was part of a diverse and unique semi-tropical, coastal environment. Today, the AC hardly resembles what it once was with 95% of its natural habitat cleared for agricultural and urban development. Stream bank destabilization due to habitat loss and major modifications to the channel for navigation and flood water conveyance has degraded the AC to the point where it can no longer efficiently assimilate pollutants. The combination of these factors has led to a severely impaired body of water.

The AC watershed is an area of approximately 706 square miles that encompasses portions of Hidalgo, Willacy, and Cameron counties. The AC begins in Hidalgo County in the City of Mission flowing 90 miles across the Rio Grande Valley into the Lower Laguna Madre. The AC is classified as having two segments due to different physical characteristics. Segment 2202 is the freshwater portion that is primarily used as a floodway and for wastewater conveyance for both urban and agricultural lands. Segment 2201 of the AC is tidally influenced and serves as an inland waterway for commercial barge traffic as well as a nursery and forage area for fish, shrimp, and crab.

The Arroyo Colorado watershed encompasses about 420,000 acres and is mostly used for agricultural production, including row crops, sugar cane, and citrus fruit. Rapid urbanization and population growth are quickly transforming the area into an urbanized metroplex. These land use and land cover changes have certainly contributed to water quality problems. Flow in the AC is sustained by urban wastewater, groundwater inflows, and irrigation return flow. During large rain events, stormwater from agricultural and urban areas dominates the hydrology of the system.

Both segments of the AC have been on the Texas Integrated Report of Surface Water Quality (303d list) since 1996. As of 2012, Segment 2201 is listed for bacteria, DDE (breakdown product of DDT), PCBs, and mercury in edible fish tissue, and depressed dissolved oxygen. Segment 2202 is listed for mercury and PCBs in edible fish tissue and excess bacteria. In 1998, various efforts to mitigate pollutant loads into the AC began. The Texas Commission on Environmental Quality (TCEQ) commissioned a Total Maximum Daily Load (TMDL) study for the AC in 1998. Results suggested the need for further monitoring and modeling of the AC watershed. In 2003, the Arroyo Colorado Watershed Partnership (ACWP) was formed to create a comprehensive plan to address the issues in the AC. Their recommendations formed the basis of the Arroyo Colorado Watershed Partnership (ACWP), which was published in 2007.

Agriculture is considered to be a significant NPS pollution contributor in the AC watershed. The ACWPP worked with watershed stakeholders to identify priority areas in the watershed where management practices can be implemented. Management practices designed to conserve and protect soil and water resources also yield positive water quality benefits. As a result, the ACWPP recommended encouraging agricultural producers to voluntarily adopt recommended best



Figure 1. Cutting haygrazer to be used for feed for cattle during drought

management practices (BMPs) through education and outreach programs, field days, newsletters, and other resources. This project worked to address this need by providing these resources to the agricultural community. The need to continue delivering this type of programming still exists and will continue into the future as farm ownership changes and new operators take over.

Objectives

This project began in October of 2019 with the objective of delivering 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 highlighted technical and financial assistance programs available through NRCS and TSSWCB available to qualifying producers by hosting education workshops, field days, and tours of on farm BMPs. The ACWC worked with the local County Extension Agents (CEAs), and other local conservation partners (NRCS, TSSWCB, SWCDs) to create relevant educational materials that included fact sheets and presentations for use in educational programs. The ACWC used the network of local partners to build upon existing programs and resources to host educational programs and events over the course of the project.

A secondary objective was to facilitate and track continued stakeholder involvement in the AC watershed to ensure successful WPP implementation of agricultural focused management measures.

Project Coordination

Throughout the project, TWRI and project partners regularly communicated to ensure that tasks and deliverables were completed on time and consistent with the work plan and to 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. Throughout the project, TWRI also worked with project partners to develop complementary programs including the Lower Rio Grande Valley Water Quality Improvement Initiative funded by NRCS through the Regional Conservation Partnership Program and Lower Rio Grande Valley Irrigation Education project funded by the Texas Water Development Board to deliver education resources to producers regarding water conservation potential from irrigation practices and technologies that are tailored to South Texas.

Education and Outreach

The ACWC attended 40 local events where educational presentations regarding the Arroyo Colorado, water quality and impairments, NPS pollution, and BMP and management measures outlined in the ACWPP to help improve water quality were provided. The ACWC also gave presentations to school groups and local grass-roots organizations such as the South Texas Master Naturalist, Master Gardeners, and Arroyo Colorado Audubon Society. The watershed model and rainfall simulator were used to demonstrate how rain/stormwater runoff and NPS pollution interact in the watershed and enter the Arroyo Colorado. Presentations covered water quality and highlighted the following points:

- Rainfall in the watershed affects water quality in the Arroyo Colorado
- Landuse and landcover affect sediment and pollutant transport
- Everyone contributes to water pollution; sometimes without knowing
- Everyone can help keep the Arroyo Colorado watershed clean
- Arroyo Colorado water quality is impaired due to elevated bacteria, low dissolved oxygen, elevated nutrient concentrations
- Water quality effects on river ecology and uses

The agriculture education workshop presentations focused on providing 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 BMP booklets created in a past project were distributed.

Local Education Meetings

The primary purpose of this project was to deliver educational programs to watershed producers to address agricultural NPS pollution in the Arroyo Colorado watershed and implement agricultural BMPs. To accomplish this, the ACWC worked with project partners to develop and deliver agricultural education workshops, field days, direct mailings, and working with socially disadvantaged and beginning small-acreage producers.

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



Figure 2. 2023 Cotton & Grain Growers Annual Meeting

A number of programs not directly hosted through this project were also supported during the planning and delivery phases. Recommendations on content related to natural resource conservation and management were made and relevant speakers were recommended. Support for these programs was provided by helping with event set up, registration, educational material display set up, and providing on-site question and answer.

Throughout the project, all workshops, presentations, and field days 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 and water resource conservation related information to all ages and demographics across the LRGV.

Conclusions

This project was successful based on the number of individuals reached, educational publications distributed, and the amount of information delivered. Continued educational program delivery focused on addressing agricultural NPS pollution in the Arroyo Colorado Watershed will remain a high priority for the ACWC. The majority of the land use in the AC watershed is comprised of some form of agriculture production and because implementation of agricultural BMPs and conservation plans are voluntary, it will be necessary to keep promoting these practices along with technical and financial assistance programs available to agricultural producers. Key barriers to adopting BMPs were identified as financial and educational needs. 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.

| | 1 1 | | 0 1 0 | | | |
|---|--------------|---------------------------|--|---------------------------|---------|----------------------|
| | Presentation | Presenter Name | Presentation Title | Event Title | # of | Location |
| 1 | | | | Delta Lake Water | recipie | |
| | 9/11/2019 | Jose Leal | Delta Lake Water reclamation project | reclamation project | 6 | Welslaco, 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 | Kindsville, TX |
| | 9/28/2019 | Jaime Flores | Gelogy of the RGV | TX Master Naturalist | 18 | Brownsville, TX |
| | 11/12/2010 | Dee Cerre | DWDAC Masting | Meeting DWDAC Masting | 25 | Washas TV |
| | 11/13/2019 | kon Garza | RWRAC Meeting | KWRAC Meeting | 25 | 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 |
| | -, -, | | | Cotton/Grain Pre-plant | | |
| | 1/14/2020 | Vidal Saenz | Cotton/Grain Pre-plant meeting | 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, IX |
| | 7/13/2020 | Manuel Cruz | LRGVDC-Regional WPP meeting-pre-meeting | Regional WPP meeting | 3 | Weslaco, IX |
| | 7/15/2020 | Inter Cruz | TX Well Owners Network Hurissee Hanna Despense | Regional WPP meeting | 45 | Westaco, TX |
| | 8/12/2020 | John Smith Manuel Cruz | DWDAC Meeting | DWDAC Meeting | 25 | Virtual-Weslaco T |
| | 9/1/2020 | Leah Martinsson | TY Groundwater Summit | TV Groundwater Summit | 250 | Virtual-San Antonia |
| | 9/9/2020 | Manuel Cruz | RWRAC Meeting | RWRAC Meeting | 250 | 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 Sacar | Cotton/Crain Bro plant monting | Cotton/Grain Pre-plant | 100 | Virtual Woolaco, T |
| | 1/14/2021 | vidal saenz | contony drain Pre-prant meeting | meeting | 100 | virtual-westaco, i. |
| | 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 | 45 | Virtual-Weslaco, T. |
| | 4/7/2021 | Tamaa Dadaiawaa | Design M Dispains mention | Forum Decise M | 45 | Minture I Manalana T |
| | 4/7/2021 | Nanuel Cruz | Region wi Planning meeting | Region M PWPAC Meeting | 45 | Virtual-Weslaco, T. |
| | 4/21/2021 | Manuel 6/02 | A MARK MEETING | Delta Lake Water | | viituai-wesiaco, I. |
| | 6/2/2021 | Robert Saenz | Delta Lake Water reclamation project | reclamation project | 4 | Weslaco, TX |
| | 6/24/2021 | John Claudio | IBWC Citizens Public Forum | Rio Grande Levee Rehab | 30 | Virtual-Weslaco, T. |
| | | | | TX Stream Team Arroyo | | |
| | 7/13/2021 | Aspen Navaro | TX Stream Team Coordination Meeting | sampling | 3 | Virtual-San Marcos |
| | 7/22/2021 | John Claudio | Llano Grande Lake | Llano Grande Lake | 33 | Project Location-Me |
| | 7/20/2024 | John Claudia | IDWO Citizana Dublia Farura | Hidalgo Co Regional | 22 | Watural Managada a |
| | //28/2021 | John Claudio | IBWC Citizens Public Forum | Mobility | 55 | 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 | TWON-South Texas | 8 | Virtual, New Jersey |
| | 0/00/0004 | Amin Wast | collaborationw/Northeastern U. | LIM Free such as Marchael | 14 | Wintural Constant |
| | 9/28/2021 | Amie West | Lower Laguna Madre Ecosystem Collaboration | LLIVI Ecosystem Workshop | 14 | virtual, Corpus |
| | 9/29/2021 | Melanie Guzman | collaborationw/Northeastern II | TWON-South Texas | 8 | Virtual, New Jersey |
| | 9/30/2021 | Rolando Zamora | Soil & Forage Management Virtual Workshop | Soil & Forage | 42 | Virtual Raymondui |
| | 9/30/2021 | Amie West | Lower Laguna Madre Ecosystem Collaboration | LLM Ecosystem Workshop | 16 | Virtual, Corpus |
| | | | | | | |

Appendix A: Meeting Participation & Educational Program List

| Presentation | | | | # of | |
|--------------|-------------------------|---|--|----------|--------------------|
| Date 🏋 | Presenter Name 🛛 🎽 | Presentation Title | Event Title 💌 | 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 Kuczmanski | 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 Acerage 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 Acerage 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 Acerage 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 Beautifcation 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 Guitirrez | 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 |
| | Jaime Flores & | Coastal Geology/Native Plants & UD Lanscaning | Falcon Lake Project | 67 | Los Fresnos, TX |
| 3/3-4/20 | Victor Guitirrez | constant deorogy, wattier interior a cip conscepting | Based Learning | | 20511251105,174 |
| 7/1/2020 | Jaime Flores | Arroyo Colorado Watershed Protection Plan-Case Study | TX 4-H Water | 30 | Virtual-Weslaco, T. |
| | laime Flores | Continued Progress on the Arroyo Colorado Watershed | LRGVDC Annual WPP | 60 | Virtual-Weslaco T |
| 7/15/2020 | Junie Hores | Protection Plan through an Engaged Partnership | Update meeting | 00 | vintual westaco, i |
| 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. |
| | laime Flores | ACWPP-Project Implementation Lindate | LRGVDC Annual WPP | 42 | Virtual-Weslaco T |
| 6/25/2021 | Junie Hores | Activity respect imprementation opdate | Update meeting | 72 | vintual westato, i |
| 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. |
| - | Jaime Flores | USDA-FSA Microloan Program | RGV Small Farmers Goat | 50 | Weslaco, TX |
| 5/26/2022 | Inima Flavor | Can Banita Watlanda Bainat | & Poultry workshop | 20 | Can Banita TV |
| //19/2022 | Jaime Flores | San Benito Wetlands Project | IX 4-H Water | 20 | San Benito, IX |
| 9/15/2022 | Jaime Flores | Soil Test Campaign/Arroyo Colorado Water Quality | Workshop | 48 | Weslaco, TX |
| 9/15/2022 | Benavides | Arroyo Colorado Partnership Steering Committee Meeting | 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 B: Arroyo Colorado Steering Committee & Workgroup Meeting Agendas

Arroyo Colorado Steering Committee Meeting

Estero Llano Grande World Birding Center 3301 S. FM 1015, Weslaco, Texas 78596

November 14, 2019 2:00 p.m. - 4:00 p.m.

MEETING AGENDA

| Welcome and IntroductionsDr. Jude Benavides, UTRGV |
|--|
| Ag Issues Workgroup Update Ronnie Ramirez, TSSWCB Water Quality Management Plans Update |
| Waste Water Infrastructure WorkgroupJaime Flores, TWRI Planning next meeting/1 on 1 visits to capture current/future WWTF expansions |
| On-Site Sewage Facility ProjectJaime Flores, TWRI |
| Habitat Workgroup |
| Llano Grande Lake Restoration Project Los Fresnos Coastal BMP Project |
| Education & Outreach Workgroup |
| Updating the Arroyo Colorado Website-Stakeholder input, ideas & suggestions Arroyo Watershed Model Usage 2020 New Arroyo Watershed Model Campaign |
| Texas A&M Kingsville ProjectDr. Juan Bezares, TAMUK |
| Upcoming Grant Opportunities |
| Bureau of Reclamation-WaterSMART Cooperative Watershed Management Program (CWMP) Phase I Grants-Llano Grande Lake Dredging Planning, Permitting & Design Project |
| Other BusinessDr. Jude Benavides, UTRGV |
| AdjournDr. Jude Benavides, UTRGV |

Arroyo Colorado Steering Committee Meeting

Virtual Teams Meeting

April 22, 2021 2:00 p.m. – 3:00 p.m.

MEETING AGENDA

| Welcome and Introductions | Dr. 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 Gu | tierrez |
| OSSF GIS Database Project | Dr. 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, Ar | nbiotec 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 IntroductionsDr. | Jude Benavides, UTRGV |
|--|-----------------------|
| Arroyo Colorado Sub-Watershed Database and DelineationPa | amela Mugisha, TAMUK |
| Ag Issues Workgroup Update Ro | onnie Ramirez, TSSWCB |
| Water Quality Management Plans Update-319 Funding Arroyo Colorado Soil Testing Project Update | Jaime Flores, TWRI |
| Wastewater Infrastructure Workgroup | 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, 1 st picked up May 21, 2022 | |
| Upcoming Grant Opportunities | |
| TCEQ, CWA 319, NPS Program RFP TSSWCB, CWA 319, NPS Program RFP | |
| Other BusinessDr. | Jude Benavides, UTRGV |
| AdjournDr. | Jude Benavides, UTRGV |

Appendix C: Arroyo Colorado Newsletters

The Arroyo Colorado Watershed Partnership **Newsletter**



Fall 2019

TWRI, AgriLife Extension and others host training, field days in 2019 for LRGV producers

By Victor Gutierrez

Rio Grande Valley Brush and Forage Management Field Day

About 60 attendees participated in the Rio Grande Valley (RGV) Brush and Forage Management Field Day Oct. 15 at the San Luis Ranch hosted by the Flores family in San Manuel. Texas Water Resources Institute (TWRI) and its partners, including U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS), USDA Farm Service Agency, Prairie View A&M University, Texas State Soil and Water Conservation Board (TSSWCB) and Texas A&M AgriLife Extension Service county agents, organized the educational program to inform producers on best management practices for brush management and forage inventory. Since pastures and rangelands have different issues than row crops in terms of irrigation, pests, fertility, etc., this field day focused on major points dealing with managing rangelands. Presentations and a ranch tour were given on brush and forage management. Presentations by Jose "Pepe" Martinez and Henry Gonzalez from USDA NRCS specifically focused on how to properly manage forages during the ranch tour.

A presentation on identifying native and introduced forage species and soil needs by Vivian Garcia (USDA NRCS) was of particular interest during to the morning tour. Megan Clayton, AgriLife Extension range specialist, presented on how to properly apply chemicals on brush in pastures, the correct stages plant species need to be for the optimal uptake of the chemicals added and the type of chemicals to use along with the rates recommended to control brush. USDA NRCS and TSSWCB representatives provided information about their cost-share incentive programs and how the programs can help producers implement conservation practices.

Small acreage and disadvantaged producer meetings

This past year, TWRI collaborated with Dr. Samuel Zapata, AgriLife Extension economist; Dr. Juan Anciso, AgriLife Extension vegetable specialist; Dr. Juan Enciso, Texas A&M AgriLife Research irrigation specialist; and county extension agents Vidal Saenz, Hidalgo County; Ashley Gregory, Hidalgo County; Jennifer Herrera, Cameron County; and Ronnie Zamora, Willacy County to produce educational programs targeting small acreage farmers, beginning farmers and historically disadvantaged producers in a series of workshops.

The project team hosted six workshops covering a number of topics ranging from livestock management, fruit production and preparation of products for sale at local and state farmer's markets along with a value-added workshop demonstrating other avenues for crop commodities. *(see Trainings, field days on page 6)*



Attendees at the Rio Grande Valley Brush and Forage Management Field Day at the San Luis Ranch.

The preparation of this newsletter was financed with grants from the U.S. Environmental Protection Agency through the Texas Commission on Environmental Quality.



22nd Annual Rio Grande Valley Beef Improvement Association's Bull Gain Test and Heifer Development Program

By Jaime Flores

The 2019 Bull Gain Test and Heifer Development Program was held on Oct. 9 at Rio Beef Feedyard in San Manuel. Bulls and heifers were delivered to the feedyard early that morning to begin the program. The cattle were tagged, weighed, vaccinated and dewormed. The program's purpose is to provide uniform, economical, nutritional and health management to allow optimal growth and fair comparisons of genetic differences between animals in similar age groups. The test enables Texas A&M AgriLife Extension Service county agents to provide a uniform method of collecting performance data and providing it to consignors and other interested parties. The data collected is also used by the county agents to conduct educational activities based on the results of the program.

These bulls are put on 110-day gain test and are measured for Average Daily Gain (30%), Rib-eye Area/cwt (20%), Weight per day of Age (20%), Percent IMF "Marbling"(20%) and Scrotal Circumference(10%). Bulls are ranked by breed and by age. Heifers are ranked by their reproductive tract scores, pelvic area and frame size to provide information to breeders of yearling purebred and commercial bulls and heifers for use in selection and marketing to beef cattle producers throughout Texas. Bulls that have an overall test ratio of 100 or better, have passed a fertility test and are negative for trichomoniasis are given a clean bill of health and are eligible to go to auction. This year there were four age groups, Senior Bulls – Spring 2018, Intermediate Bulls – Summer 2018, Junior Bulls – Fall 2018 and Calf Bulls – Spring 2019.

The Rio Grande Valley Beef Improvement Association was created in 1998 to assist cattlemen in improving the quality of their livestock. The bull gain test is an official gain test conducted by Texas A&M AgriLife Extension Service, under the direction of Dr. Joe Paschal, AgriLife Extension beef specialist and AgriLife Extension county agents in Cameron, Hidalgo, Willacy and Starr counties. Successful bull gain tests and heifer development programs have been conducted every year since 1998. A total of 1,608 bulls and 1,110 heifers have been entered in the program since its inception.



Beef Improvement Association's Bull Gain Test and Heifer Development Program conducted by Texas A&M AgriLife Extension Service to assist cattlemen in improving the quality of their livestock by collecting performance data.

Know it. Respect it. Enjoy it. 🛛 🔊



Team works on updating the inventory of septic systems in Cameron County

By Gabriele Bonaiti

Private residential on-site sewage facilities (OSSFs), commonly referred to as "septic systems" (or Onsite Wastewater Treatment System, OWTS), are estimated in Cameron County to have grown by more than 400 systems in 2018, reaching a total of almost 36,700 systems. OSSFs have various designs based on physical characteristics of the local soils and the level of seasonal groundwater and are generally categorized as "conventional" or "aerobic." Conventional systems typically consist of one or more septic tanks and a drainage or distribution field and are the most common type in Cameron County. Aerobic systems have an aerated holding tank and typically an above-ground sprinkler for distributing the treated effluent. When properly designed and operated, both types of OSSFs are expected to contribute virtually no fecal bacteria to adjacent water bodies.

During the development of the Arroyo Colorado Watershed Protection Plan, it was decided that a detailed inventory of OSSFs (number, location, type, age, etc.) could be beneficial, and funds were obtained from the Texas Commission on Environmental Quality to start developing an OSSF GIS database. In the first phase of the project, Texas A&M AgriLife Extension Service (AgriLife Extension), Texas Water Resources Institute (TWRI) and University of Texas Rio Grande Valley (UTRGV) created preliminary maps for the Arroyo Colorado watershed and the coastal zone. In



Cameron County OSSFs geolocated as of August 2019.

Phase II, AgriLife Extension, TWRI and UTRGV worked with the Cameron County Health Department to develop a complete inventory of OSSFs for the entire county. This phase will last three years.

The adopted method refers to previous experiences in Texas, i.e., the Coastal On-site Sewage Inventory database and the Lampasas River Watershed OSSF Inventory, by AgriLife Extension, and the Houston-Galveston Area Council OSSF Inventory. Identified steps include: a) maps of sewer service areas are obtained from cities and other sewer providers, and used to identify (and exclude) properties reached by collective lines; b) 911 physical addresses and aerial photography are used to identify buildings that likely have an OSSF and that fall outside sewer areas; c) parcels legal description and OSSF permits are used to estimate age and type of OSSFs and to validate OSSF location.

Currently, the main focus is locating OSSF permits in collaboration with Cameron County Health Department. The department agreed to update its database, start collecting XY coordinates of new permits and share data on a regular basis (use of XY coordinates was identified as the most effective method in locating new permits). AgriLife Extension, TWRI and UTRGV provide support to the health department, such as students, software and hardware, data analysis and online tools (e.g., interactive web maps). The county has an electronic database, which includes permits for installed OSSFs since 1988. The project team is working to determine the total count of permits and the number located on a map (some precisely on top of a building and some on an approximate location). Historic OSSFs permits are located using any available information, including appraisal legal description, while new ones are shared monthly by the health department and immediately located on a map based on XY coordinates and physical address. To date, a total of 12,109 OSSFs have been located on a map, as shown in Figure 1. Out of these, 47% have been located precisely on top of the building, while 53% are still on an approximate location (OSSFs with a permit obtained in the years 1988-2017).



Los Fresnos ISD hosts Falcon Pond Beautification Day

By Jaime Flores

Los Fresnos Independent School District hosted the Falcon Pond Beatification Day (FPBD) on Nov. 16 at the Los Fresnos High School campus. The FPBD is Phase II of the beautification project. Phase 1 was kicked off in March 2019.

The goal of the FPBD was to plant native flowers, shrubs and trees in Falcon Pond and pick up litter and trash in and around the pond.

The volunteers started arriving early Saturday morning. A total of 54 volunteers, including 40 students, two district employees, a school nurse, four campus administrators, five campus teachers/club sponsors and two parents/community members, showed up for the event. The students represented the Los Fresnos High School (Biology Club and AP Biology students), Los Fresnos United (Nature Club), Resaca Middle School (STEAM 6th and 7th grade students), Los Cuates Middle School (Gardening Club) and Liberty Memorial Middle School (Junior National Honor Society members).

Jaime Flores, Arroyo Colorado watershed coordinator, first explained to the students that they were going to plant trees and the reasons why. Rubber boots, shovels and trash pick up sticks were distributed and Flores demonstrated how to dig a hole, remove the tree from the pot and plant it correctly. Then the students broke into groups of 3-5 and started picking up trash and planting.

Falcon Pond is the bed of an abandoned resaca, an ancient distributary channel of the Rio Grande, modified to serve as



Los Fresnos High School students planting flowers, shrubs and trees at Falcon Pond Beautification Day.



Aerial photo marking where volunteers planted flowers, shrubs and trees during the Falcon Pond Beautification Day.

a stormwater retention pond. During rain events, all of the stormwater from the high school flows across and under the school's parking lot and eventually drains into Falcon Pond. The native flowers, shrubs and trees that were planted will serve several purposes: 1) they will filter out sediment, nutrients and pollutants from the stormwater coming from the high school and parking lot, 2) they will bloom and provide nectar that will attract pollinators, such as bees, butterflies and hummingbirds, and 3) they will attract more birds to the pond.

In two hours, the students planted 250 native flowers, shrubs and trees and collected trash to fill one and half 55-gallon trash bags. The flowers, shrubs and trees planted were: Scarlet Sage, Golden Wave Coreopsis, Mexican Capraria, Shrubby Aster, Heliotrope, Crucita, Golden Rod, Runyan Water Willow, Mexican Button Bush, Primrose Willow, Shrubby Aster, Montezuma Cypress, Anacua and Guamuchil.

Phase III of the project will consist of the students developing interpretive signage for the flowers, shrubs and trees that were planted in Falcon Pond, as well as signage discussing nonpoint source stormwater pollution and the role of Falcon Pond in removing pollutants from the stormwater.

The Arroyo Colorado Partnership, Texas Water Resources Institute and Los Fresnos ISD partnered together to implement this project. It is being financed through grants from the U.S. Environmental Protection Agency through the Texas Commission on Environmental Quality. Know it. Respect it. Enjoy it.



Irrigation Management Modernization Challenges and Opportunities demo, tour

By Victor Gutierrez

On July 16, Texas Water Resources Institute (TWRI), Texas Water Development Board and Rio Farms facilitated an Irrigation Modernization Challenges and Opportunities program that included a cotton irrigation demonstration trial that was conducted from April-August 2019 in Monte Alto. Rio Farms partnered with TWRI to conduct an irrigation demonstration project on a 16-acre tract of land using cotton as the target crop. The 16-acre block was split into three sections: a control block; a treatment block, which used an irrigation technology called Pipe Planner that uses larger hole sizes to push water faster down the furrows; and a skip row irrigation block. Soil moisture sensors were used to better understand water movement into the soil profile within each block. Three sensor arrays consisting of three sensors each (at 6, 12 and 24 inches deep) were placed in the center of each block at approximately a third of the way down the rows and a third of the way from the end of the row. Data was collected weekly and helped in determining when irrigation was needed. Automatic water metering technology was also used to report water use. A tour of the field highlighted challenges faced, lessons learned and future plans.

Irrigation district field tours

In preparation for the July 16 field day, on July 15, a group of farmers/producers and irrigation district members took a bus tour from Casa de Palmas in McAllen to two different pump houses. The first stop was in Hidalgo at the historic Hidalgo Pump House. The second stop was at the equally historic pump house located in Los Indios to demonstrate how water is pumped from the Rio Grande and then "pushed" into irrigation district reservoirs. Producers were refreshed on the practice of using poly-pipe to efficiently irrigate main row crops produced in the Rio Grande Valley (RGV), including cotton, corn and grain sorghum. Dr. Lucas Gregory, senior research scientist at TWRI, opened the program to irrigation specialists across the state. Irrigation district representatives spoke about improving irrigation district modernization and salinity management. There were more than 30 attendees from across the RGV at this event. 💦



Tom McLemore, general manager, Harlingen Irrigation District, discusses the components and utility of the automated canal gate demonstration channel at the Rio Grande Center for Ag Water Efficiency.



Water level sensor and automated gates in the demonstration channel at the Rio Grande Center for Ag Water Efficiency.



Arroyo Colorado

Training, field days (cont. from front page)

Each workshop also included a section that focused on business planning. Landowners were informed about where and how they could apply for cost-share assistance programs and where they could apply for USDA loans.

Every workshop was well attended, averaging 50 people per workshop. This year, based on feedback from participants who attended last year's workshops, producers who were not able to physically attend a workshop could live stream the workshops through Facebook Live and/ or see the workshops through the RGV small acreage website: <u>http://bit.ly/RGVSmallAcreage</u>.

Irrigation programs

TWRI and partners facilitated back-to-back identical irrigation programs focused on maximizing the efficiency of irrigation water use through technology and irrigation management. These programs were Sept. 25 at the AgriLife Extension annex service center in Cameron County and Sept. 26 at the Echo Hotel Conference Center in Edinburg.

There were presentations on the latest state-of-the-art irrigation technology including soil moisture sensors, drip irrigation and drip tape from local industry representatives Danny Sosebee, Netafim USA and Jeffery Kleypas, Toro Irrigation. Irrigation land-leveling and irrigation pipelines for faster water delivery, both irrigation best management practices, along with chemigation and fertigation process for application were presented by Dr. Juan Enciso, AgriLife Research irrigation specialist.

Salinity issues in irrigation water have become more of an issue over the last several years in the RGV, and producers had requested more information on salinity. In response to this request, Dr. Girisha Ganjegunte, Texas A&M AgriLife Research professor, El Paso, presented on salinity management in irrigation water and discussed the option to plant alternative crops. Dr. Dana Porter, AgriLife Extension agricultural engineering specialist, Lubbock, presented on irrigation scheduling tools and approaches to specific to soil and crop needs. Dr. Luis Ribera, AgriLife Extension agricultural economist, spoke on economics and value of irrigation water specific to the RGV, a topic of particular interest to the producers.

Dr. Leyon Greene of the Texas Water Development Board spoke on TexMesonet, a weather tool application to help inform producers on weather conditions and the use and installment of weather stations.

With a little over 70 attendees combined, there was good discussion between irrigation specialists and local producers about their irrigation practices and updates on which best management practices are in the new 2018 Farm Bill. Financial and technical assistance for these BMPs will be funded through USDA NRCS and TSSWCB.

Water conservation for youth

Throughout the year, TWRI participated in youth development programs explaining the importance of water conservation and nonpoint source pollution. Using a watershed model, TWRI educational presentations demonstrated how water is delivered, used and disposed of and, how eventually, it enters into the Arroyo Colorado to be distributed into the Lower Laguna Madre. Sometimes accompanying the watershed model was a live model stream trailer, which demonstrates how a stream flows and the impacts on the riverbank such as soil erosion and sediment and nutrient runoff. Presentations about water conservation have been made to more than 3,000 children this year in the tri-county area of Hidalgo, Cameron and Willacy counties.



The Arroyo Colorado Watershed Partnership

Texas Water Resources Institute

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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.

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Map of the Llano Grande Lake study area and habitat.



Map of the locations where cross-section surveys occurred.



Arroyo Colorado

GIS-Based Model Assesses OSSF Contamination Risks

By Jaime Flores, Alvaro Garcia and Lucas Gregory

On-site sewage facilities (OSSFs) are decentralized wastewater systems that provide effective human wastewater treatment when properly designed, installed, operated and maintained. However, failures of these systems are common when proper operation and maintenance are not performed, or if they were not appropriately designed or installed. The 2017 update to the Arroyo Colorado Watershed Protection Plan (WPP) estimates that over 17,000 OSSFs exist across the watershed, and over 2,500 of these are within approximately 100 yards of the Arroyo Colorado stream network. This close proximity to stream channels increases the risk of system failures, which adversely impact instream water quality through the discharge of bacteria, nutrients and other possible contaminants. In an effort to evaluate potential water quality contamination risks from OSSFs, Alvaro Garcia, a Master of Science student at the University of Texas Rio Grande Valley, developed a geographic information system (GIS) based model for Cameron County to assess risk potential using an approach similar to other OSSF risk evaluations. To develop this model, he collaborated with the Cameron County Public Health Department, Texas A&M AgriLife Extension and Texas Water Resources Institute to acquire available OSSF information about location, age and lot size. This information was combined in the GIS with environmental factors that can affect OSSF performance including soil type, land slope, floodplain locations, surface water proximity, drinking water supply proximity and groundwater recharge areas. *(continued on page 5)*



GIS Model generated map visualizing the contamination risk to surrounding water bodies.

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(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.



(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

Hidalgo County Extension office 410 N 13th Avenue 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 Expressway 83 # 103, San Benito, TX 78586

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

(956) 399-2522

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

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



The Arroyo Colorado Watershed Partnership

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> jjflores@ag.tamu.edu 6



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



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



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

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

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.



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.



(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:

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



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



Arroyo Colorado Watershed.







The Arroyo Colorado Watershed Partnership

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