The Arroyo Colorado Watershed Partnership
Newsletter

ARROYO COLORADO

Fall 2018

TWRI, AgriLife Extension and others host training, field days in 2018 for LRGV producers

Master Rancher Program

On Jan. 22, the Texas Water Resources Institute (TWRI) presented to 15 attendees of the Master Rancher Program at the Texas A&M AgriLife Extension Service Center in Cameron County. Speakers for the program were experts in irrigation, financial and technical assistance from across the Lower Rio Grande Valley. There were presentations on irrigation management practices and water delivery for pastures and rangeland. TWRI presented a program on ag issues affecting the Arroyo Colorado watershed, including demonstrating land use, land loss to urban development, nonpoint source pollution and cost-share incentive programs that can help improve conservation practices in the county.

Rio Grande Valley Forage Field Day

About 40 attendees participated in the Rio Grande Valley (RGV) Forage Field Day on Oct. 10 at Encino Ranch, hosted by Mitzi and Mark Swanberg in Raymondville. TWRI and its partners, including Willacy County Soil and Water Conservation District, U.S. Department of Agriculture Natural Resources Service (USDA NRCS), USDA Agricultural Research Service, Prairie View A&M University, Texas State Soil and Water Conservation Board (TSSWCB) and AgriLife Extension county agents, organized the educational program to inform producers on best management practices for healthy pastures and rangelands. Since pastures and rangelands have different issues than row crops in terms of irrigation, pests and fertility, this field day focused on major points dealing with these issues. Presentations were given on weed management and fertility, specifically on how to properly manage forages by soil testing, how to know the amount of fertilizer needed, how to control weeds and how to keep and maintain healthy pastures. Producers learned how to correctly apply chemicals on brush in their pastures and the type and amount of chemicals recommended. USDA NRCS, TSSWCB, Texas Department of Agriculture and the Farm Service Agency gave presentations about their cost-share incentive programs and how they could help producers implement conservation practices. Producers had been concerned with hay and equipment theft on their pastures and ranches. To provide some information on these topics, Joe Aguilar, special agent from the Texas and Southwestern Cattle Raisers Association, spoke about hay fraud and what to look for when selling large amounts of hay at a time.

Small acreage and disadvantaged producer meetings

This past year, TWRI collaborated with AgriLife Extension economist Dr. Samuel Zapata and AgriLife Extension county agents to produce educational programs targeting small acreage farmers, beginning farmers and historically disadvantaged producers in a series of workshops. *(see **Trainings, field days** on back page)*

TWRI and partners held a workshop on maximizing water use for vegetables.

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U.S. Environmental Protection Agency through the Texas Commission on Environmental Quality.

Coastal BMP project is implementing LID improvements in Los Fresnos

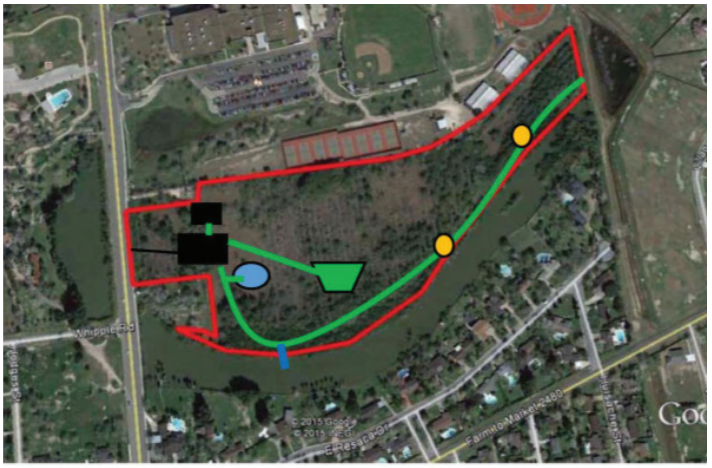
Two coastal sites within the Arroyo Colorado watershed have been chosen to implement selected low impact development (LID) improvements: the City of Los Fresnos Nature Park and the Los Fresnos Independent School District High School student parking lot and stormwater detention pond.

This project is part of the management measures recommended in the Arroyo Colorado Watershed Protection Plan (WPP) and addresses management measures within the tidal segment of the Arroyo Colorado watershed.

These sites are adjacent and unique in that both sites are part of an resaca, the Resaca Escondida. The northern portion of the resaca makes up the southern part of the high school campus and also receives stormwater runoff from the school and parking lot. The nature park's location is on the natural levee of the resaca, with the bed of the resaca surrounding it to the north, west and south.

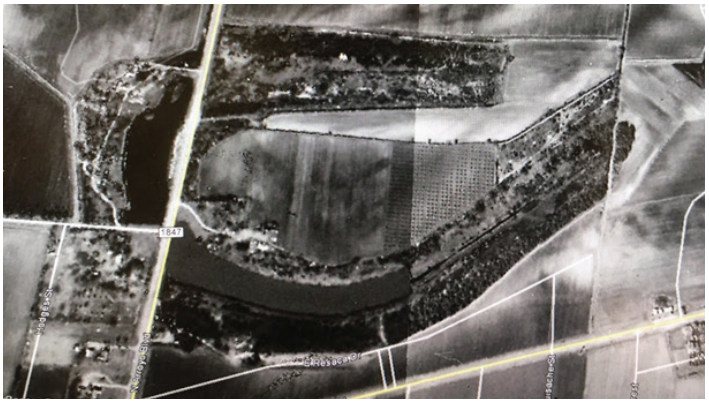
Los Fresnos is developing the 20-acre nature park immediately south of the high school, with funding in part from the Texas Parks and Wildlife Department, on land purchased with Coastal Impact Assistance Program funds. Clean Water Act 319 funds were used to install LID elements, including a bio-retention basin in the parking lot, bioswales, pervious walking trails and a rainwater collection system on the roof of the restroom building, as well as educational components. High school classes will use the park as an outdoor classroom for a variety of natural sciences and natural resource-based classwork.

The City of Los Fresnos installed LID elements at the nature park, including a bio-rention basin in the parking lot. Other LID elements include bioswales, pervious walking trails and a rainwater collection system.



Development of the City of Los Fresnos Nature Park located on the natural levee of the Resaca Escondida.

Los Fresnos High School science students will perform citizen water quality monitoring on the stormwater from the school and at the end of the BMP treatment train to compare results.



Aerial photograph of Resaca Escondida in Los Fresnos, circa 1960.

The Los Fresnos High School has a large, sloped parking lot that drains into the bed of the resaca. This portion of the resaca also serves as a detention basin to capture stormwater runoff from the school and parking lot. For this project, the school district will install a series of stormwater best management practices (BMPs) designed to divert, slow down and treat the stormwater as part of a treatment train. The BMPs will channel the stormwater to vegetated wetlands to minimize sediment and other pollutants in the stormwater flow.

TWRI, in conjunction with the Texas Stream Team, hosted a Stream Team Training workshop to train Los Fresnos High School teachers and students to use water sampling kits. After all trainings are completed, Los Fresnos science students will perform citizen water quality monitoring on the stormwater from the school and at the end of the BMP treatment train to compare results. Sampling will be conducted during rain events during school hours. The high school will incorporate this experiential learning into its Science, Technology, Engineering, and Math (STEM) curricula.

The Arroyo Colorado Watershed Coordinator, Jaime Flores, conducted education and outreach efforts for the project, facilitated and supported partner communication and cooperation and raised public awareness and understanding of the resaca, stormwater runoff and the Arroyo Colorado WPP. He also coordinated student monitoring training and communicated with public officials so that they could gain a better understanding of the importance of the projects and long-term project sustainability.

San Benito Wetlands helps reduce nitrogen loadings in arroyo

The Arroyo Colorado has high nutrient levels due to nonpoint source runoff from urban and agricultural land and from 24 permitted, wastewater treatment facilities that discharge approximately 60 million gallons per day in the Arroyo Colorado. The Arroyo Colorado Watershed Protection Plan (WPP) identifies wetlands and wastewater reuse as management measures to reduce nutrient loadings.

In 2012, the Texas Water Resource Institute (TWRI) partnered with the cities of Harlingen and San Benito to pipe treated effluent from the city of San Benito Wastewater Treatment Facility (WWTF) into abandoned ponds that were part of the old lagoon, pre-mechanical WWTF. This

San Benito Wetlands.

created a coastal wetland habitat and further decreased the nitrogen content of the water prior to releasing into the Arroyo Colorado.

In 2017, the city of San Benito began Phase 3 of the project. The city used Coastal Management Zone Act funds to add infrastructure to its WWTF to pump effluent to three additional ponds and to connect the ponds for water circulation. The water in these ponds will not be discharged to the Arroyo Colorado but will evaporate back into the atmosphere, effectively reducing all sediment, nutrients and bacteria that might have been carried off in the effluent.

The city removed invasive plant species and replaced them with native wetland vegetation and trees. The city also provided public access to the site and refurbished two existing sampling piers to include a wildlife viewing platform to facilitate environmental education and ecotourism. Educational and interpretive signage was installed to provide information about the project, native wildlife and coastal resources and stewardship.

TWRI and the city of San Benito conducted education and outreach to residents and public officials, ensuring

Refurbished piers in the San Benito Wetlands.

the project's long-term success. TWRI conducted three workshops to educate the public and community leaders on the importance of wetlands and provide information about the project.

This project is one of many point and nonpoint source best management practices (BMPs) that have been implemented through the WPP. The BMPs have led to reduced nitrogen loadings in the Arroyo Colorado. Monitoring of the Arroyo Colorado has shown a significant decline in ammonia levels and no significant increase in nitrite and nitrate levels. Ammonia in wastewater is being converted to nitrite and nitrate more effectively, and nonpoint loadings of nitrite and nitrates are likely decreasing because there is no associated increase of nitrites and nitrates. This shows that total nitrogen loadings are decreasing.

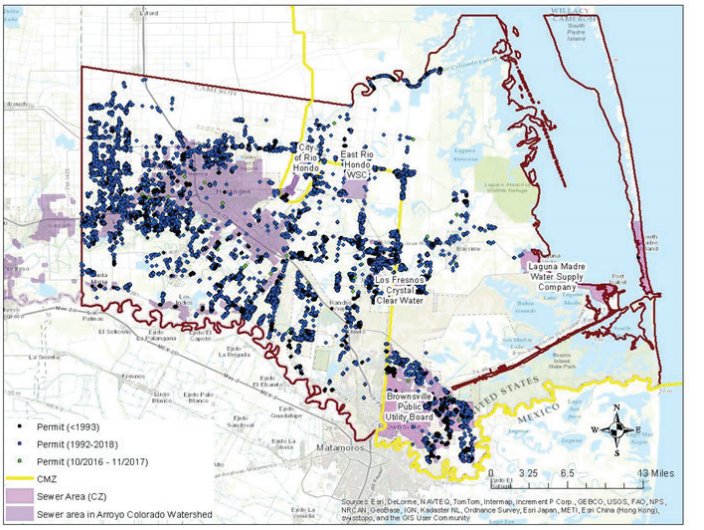


Figure 1. Cameron County OSSF permits geolocated through August 2018.

Team works on inventory of Cameron County Septic Systems

Private residential on-site sewage facilities (OSSFs), commonly referred to as septic systems, have varying designs based on physical conditions of the local soils. Typical designs consist of one or more septic tanks and a drainage or distribution field (anaerobic system) or aerobic systems that have an aerated holding tank and often an aboveground sprinkler system for distributing the liquid. In the Arroyo Colorado watershed, 95 percent of the OSSFs installed are septic tanks with a drainfield. In the simplest terms, household waste flows into the septic tank or aerated tank, where solids settle out. The liquid portion of the waste flows to the distribution system, which may consist of buried perforated pipes or an aboveground sprinkler system.

Several pathways of the liquid waste in OSSFs afford opportunities for bacteria to enter groundwater and surface waters if the systems are not properly operating. Properly designed and operated, however, OSSFs would be expected to contribute virtually no fecal bacteria to surface waters. For example, it has been reported that less than 0.01 percent of fecal coliforms originating in household wastes move further than 6.5 feet down gradient of the drainfield of a septic system (Weikel et al., 1996).

During the development of the Arroyo Colorado Watershed Protection Plan and the Texas Coastal Zone OSSF Inventory, Texas A&M AgriLife Extension Service and Texas Water Resources Institute (TWRI) conducted a preliminary effort to estimate OSSFs. TWRI and AgriLife Extension acquired sewer service maps from cities and other sewer providers and digitized polygons of the sewer service areas. Cameron County 911 addresses were obtained, and addresses outside the service areas were assumed to use an OSSF. Preliminary estimate maps were created for both the Arroyo Colorado watershed and the coastal zone. TWRI, AgriLife Extension and the University of Texas Rio Grande Valley (UTRGV) then partnered with the Cameron County Health Department to develop a more detailed inventory and database of OSSFs.

For the second phase of the OSSF Inventory, the project team of TWRI, AgriLife Extension and UTRGV are working with Cameron County to develop an inventory of all OSSFs within the county. The project team entered into a collaborative agreement with Cameron County to review the county's OSSF permit data in order to identify and estimate the total number of OSSFs in the watershed. The team obtained permit spreadsheets and records and was able to automatically match some permits to the Cameron County Appraisal District Parcel geographic information system (GIS) layer. The project team was also able to match permits that contained addresses to the Cameron County 911 GIS layer. So far, approximately 10,000 OSSF permit files have been automatically matched to the Parcel and 911 GIS layers. Figure 1 is a map showing parcel centroids and 911 addresses of the matched permits. There are many additional permits that will need to be manually matched to the GIS parcel layer. This next phase of the project is about to begin and will accomplish this goal over the next three years.

Nueces River Authority Steering Committee and Stakeholder Update #4

(4th Quarter of FY 2018-2019) June-August 2018

September 11th, 2018
Routine Clean Rivers Program Monitoring

Field staff from the Nueces River Authority (NRA) conducted routine quarterly water quality sampling at all river/reservoir stations and coastal stations in the second quarter. A couple of stations were dry including San Miguel Creek and the Frio River in Tilden. No dissolved oxygen monitoring occurred this quarter due to a lack of streamflow in the middle Nueces and Atascosa rivers.

Monitoring Changes for FY 2019

Following the Coordinated Monitoring Meeting last March, NRA field staff revised the list of sampling stations. In an attempt to streamline the monitoring to avoid duplication of efforts, a number of sites in the same Assessment Unit (AU) were dropped. On the chopping block for 2019 were two quarterly sites in the above tidal portion of the Arroyo Colorado down in the Rio Grande Valley: Stations 16445 and 13080. NRA also dropped quarterly Station 20701 (Nueces River at the Airport Road boat ramp) and Station 13093 on Petronila Creek. Station 13093 will be monitored through the ongoing Petronila Tributary Study. Two new quarterly sites will be added to the sampling site list for 2019: Los Olmos Creek (Station 13034), located on U.S. Highway 77 near Riviera and Choke Canyon Reservoir (Station 13019) near the dam. NRA will add metals in water at four routine quarterly monitoring sites: Choke Canyon Reservoir (Station 17389), Atascosa River at Farm-to-Market 99 (Station 12980), Conn Brown Harbor (Station 18848) and Port Bay at Farm-to-Market 188 (Station 13405).

Nueces-Rio Grande Coastal Basin monitoring stations.

Flood and Drought Report

It seems that South Texas is always in a drought or in a flood, or both at the same time. In mid-June, tropical moisture inundated the coast with a four-day-long gully washer but left the mid- and upper-Nueces River Basin high and dry. After the rain totals were tallied, it became clear that the only water flowing into Lake Corpus Christi came from the sky as opposed to the rivers. Lake Corpus Christi did rise about 10 feet between June 15 and June 22, and all water was from direct rainfall on or near the lake.

Basin 22 – Nueces-Rio Grande Coastal Basin

The Nueces-Rio Grande Coastal Basin covers approximately 10,400 square miles in South Texas and includes streams such as Petronila Creek (Segments 2203 and 2204), which is a tributary to Baffin Bay and the Arroyo Colorado (Segments 2201 and 2202) in the Rio Grande Valley. (*cont. on back page)*

Streamflow rates for five sites visited July 18 following a minor flood event on the Arroyo Colorado.

Site	*E. coli*	Ammonia	TKN	Total Phos	Nitrate	Nitrite	Chlorophyll a
13079	97 MPN	<0.1 mg/L	3.0 mg/L	0.6 mg/L	3.8 mg/L	<0.2 mg/L	19.2 µg/L
16445	230 MPN	<0.1 mg/L	3.0 mg/L	0.6 mg/L	4.0 mg/L	<0.2 mg/L	27.2 µg/L
13080	80 MPN	<0.1 mg/L	3.2 mg/L	0.6 mg/L	3.8 mg/L	<0.2 mg/L	25.2 µg/L
22003	20 MPN	0.2 mg/L	2.1 mg/L	0.2 mg/L	1.2 mg/L	<0.2 mg/L	98.5 µg/L
22004	250 MPN	<0.1 mg/L	3.1 mg/L	0.2 mg/L	0.8 mg/L	<0.2 mg/L	39.8 µg/L

(Disclaimer – Data has not been validated or input and uploaded into the SWQMIS Database.)

Training, field days *(cont. from front page)*

TWRI hosted six workshops covering areas from livestock management, fruit production and pest management, to how to achieve optimal yields and be ready for local and state markets. Each workshop had a focus on business planning, so landowners were informed about where and how they could apply for cost share assistance and where they could apply for USDA loans. Events were well attended, averaging 50 attendees.

Advances in irrigation for vegetable production

On May 12, TWRI and partners facilitated an irrigation program focused on maximizing water use for vegetable production. There were presentations on the latest state-of-the-art irrigation technology including soil moisture sensors, drip irrigation, drip tape, irrigation land leveling and irrigation pipelines for faster water delivery. There was good discussion between local and neighboring producers about their irrigation practices. For implementation of most best management practices, financial and technical assistance is 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, disposed of and, eventually, how 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, sediment and nutrient runoff. Presentations about water conservation have been made to more than 3,000 kids this year in the tri-county area of Hidalgo, Cameron and Willacy counties.

Improving Cotton and Row Crop Yields with Efficient Irrigation

On Oct. 16, TWRI and partners facilitated a program on cotton and other row crop irrigation at the Texas A&M University–Kingsville Citrus Center in Weslaco. Producers were refreshed on the practice of using surge valves and poly-pipe to efficiently irrigate main row crops produced in the RGV, including cotton, corn and grain sorghum. Dr. Lucas Gregory, senior research scientist at TWRI, opened the program. Dr. Jason Krutz, Mississippi Water Resources Research Institute director, discussed similar practices in the Mississippi Delta for row crops and incorporating surge valves for their efficiency. Mac Young, AgriLife Extension program specialist, spoke about improving crop yields and economics through irrigation management. There were over 30 attendees from across the RGV at this event.

Nueces River Authority (*cont. from page 5*)

Valley Monitoring

For FY 2018, NRA monitored five sites in the Rio Grande Basin. Three sites (16445, 13079 and 13080) are located on the above tidal portion of the Arroyo Colorado (Segment 2202) and two are tributaries of the Laguna Madre (Segment 2491). As mentioned earlier, NRA will be dropping sites 16445 and 13079 for FY 2019 due to the redundancy in the same AU. All five sites were visited on July 18 following a minor flood event on the Arroyo Colorado. Streamflow rates were back in the normal range by the site visit. (Disclaimer – Data has not been validated or input and uploaded into the SWQMIS Database.)

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Texas Water Resources Institute
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