The Arroyo Colorado Watershed Partnership
Newsletter

ARROYO COLORADO

Winter 2022

Soil Testing Campaign in the Arroyo Colorado Watershed

By Jaime Flores

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

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

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

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

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

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

Llano Grande Lake Restoration Preliminary Feasibility Project

By Anne Whitco

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

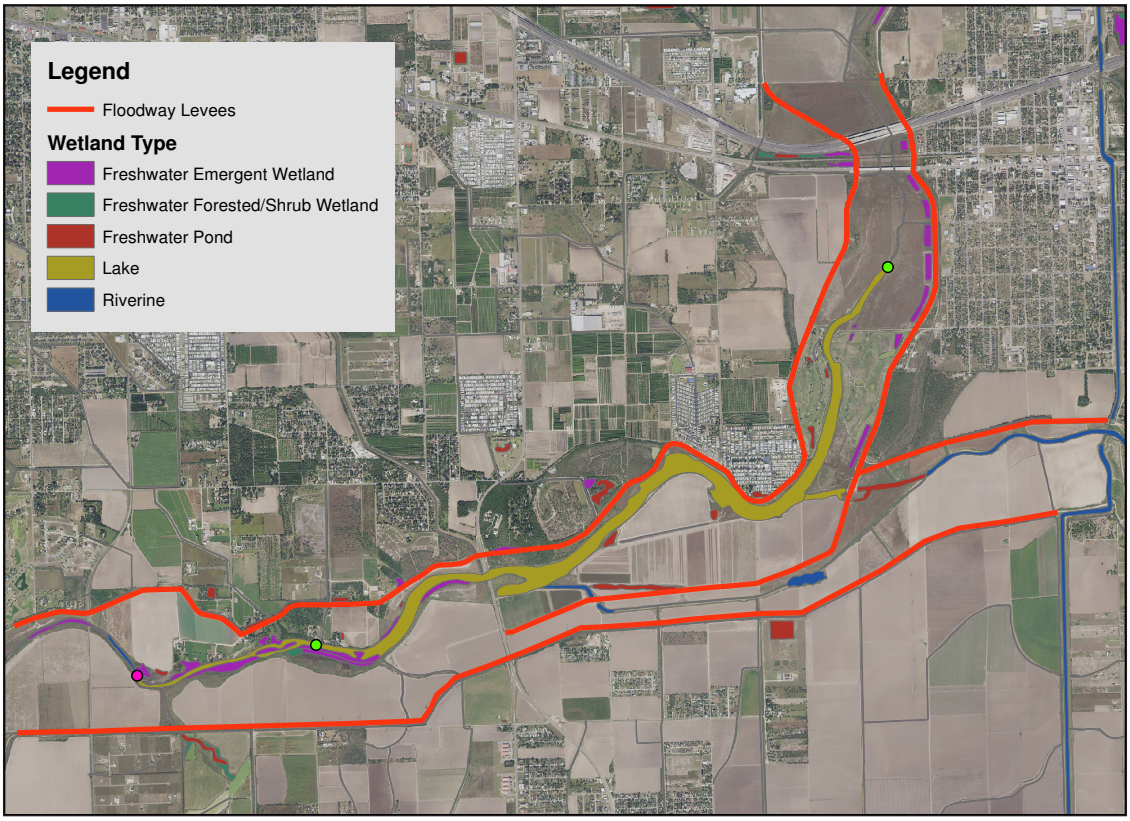
In September 2020, Ambiotec Civil Engineering Group, Inc. conducted a bathymetric survey of the lake in coordination with TWRI. Based on depth-to-sediment data collected at four lake cross sections, it was found that between five and 12 feet of sediment accumulation exists in the lake. Water depths recorded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

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

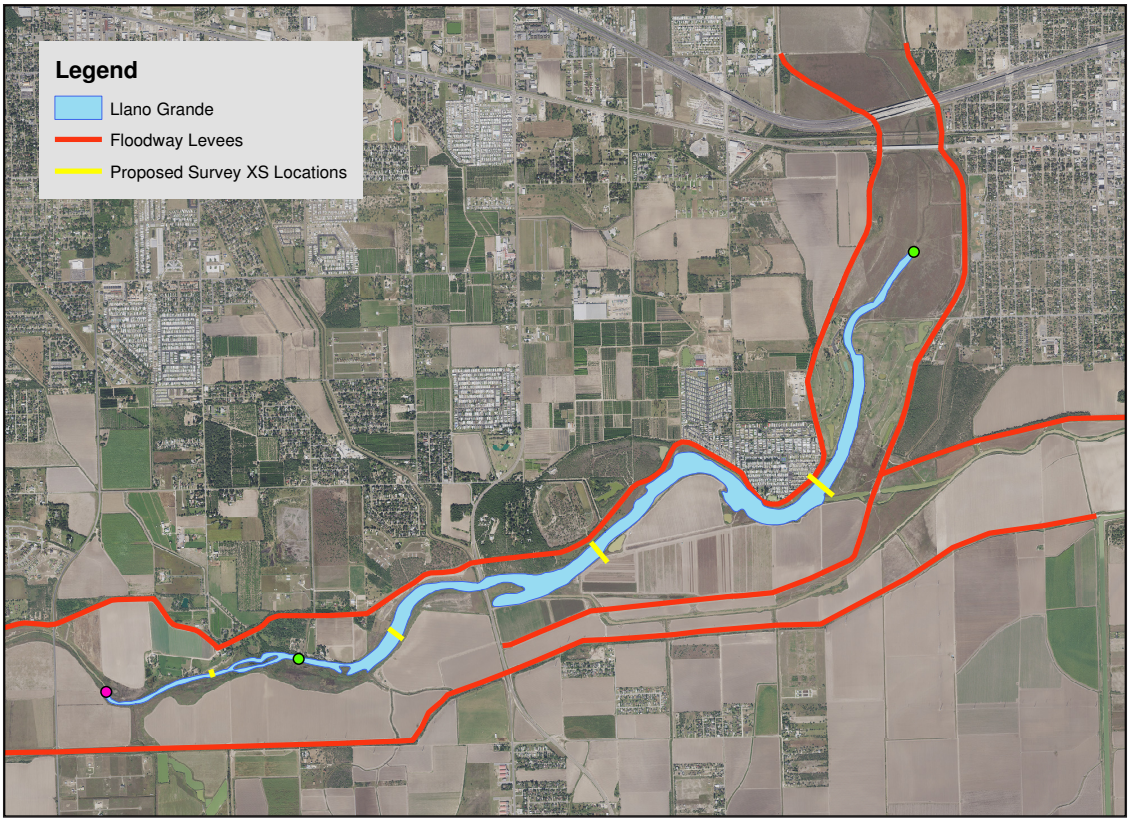
Llano Grande Lake is about 5.3 miles long and covers approximately 180 acres within the Arroyo Colorado channel. It sits at the head of the International Boundary and Water Commission North Floodway and is centrally located within the 90-mile length of the Arroyo Colorado that flows from southwest of Mission, Texas to the Laguna Madre near Arroyo City, Texas. Concerns over low dissolved oxygen and elevated bacteria levels in the Arroyo Colorado spurred development of the Arroyo Colorado WPP by numerous concerned watershed stakeholders, organized as the Arroyo Colorado Watershed Partnership. Through a facilitated process, the partnership developed a WPP that identified local water quality concerns and appropriate strategies to address these concerns over time. The Llano Grande Restoration Project is a key project identified in the plan, which is critical to improving water quality standards and flood mitigation in the watershed.

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

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



Map of the Llano Grande Lake study area and habitat.



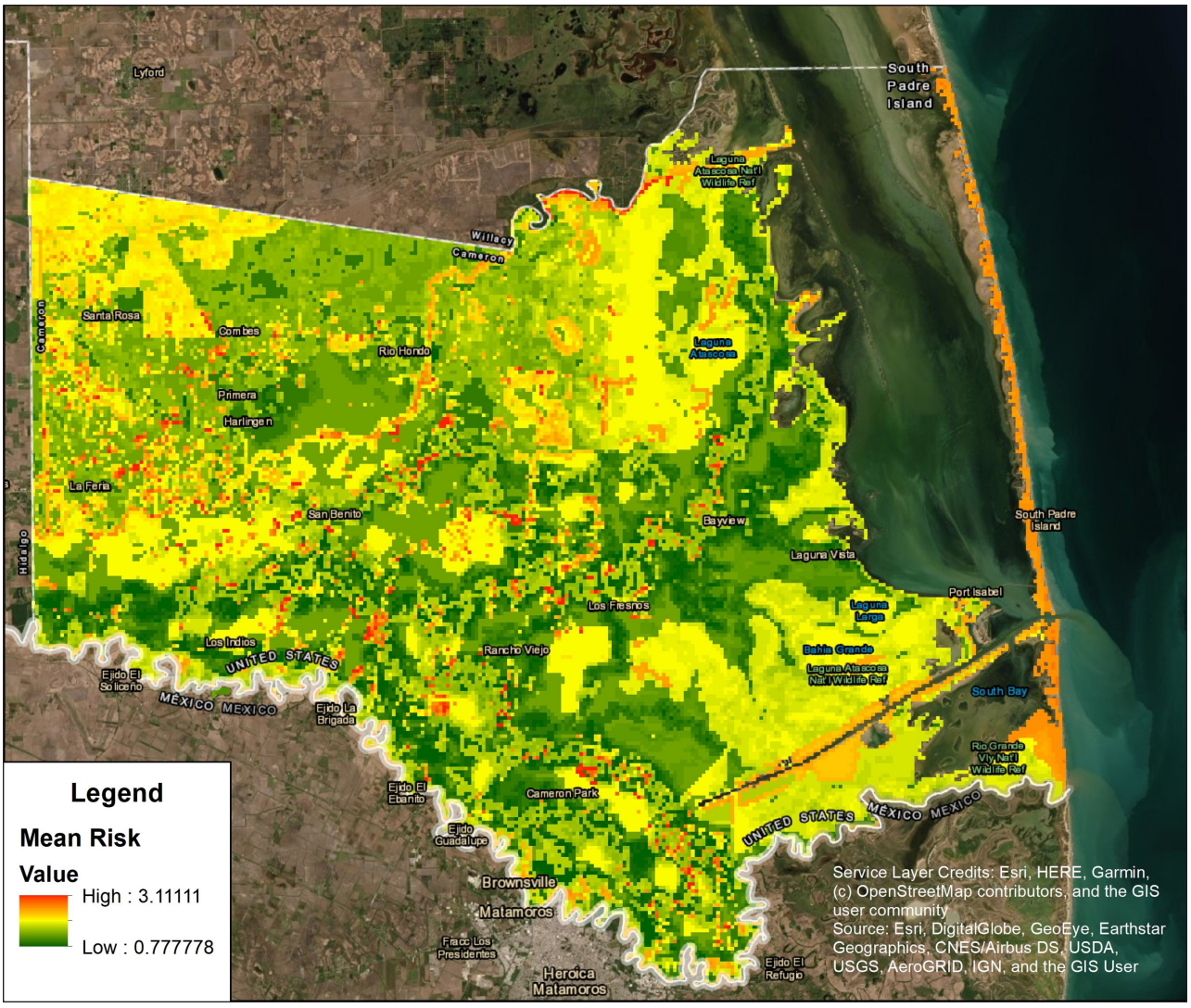
Map of the locations where cross-section surveys occurred.

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.

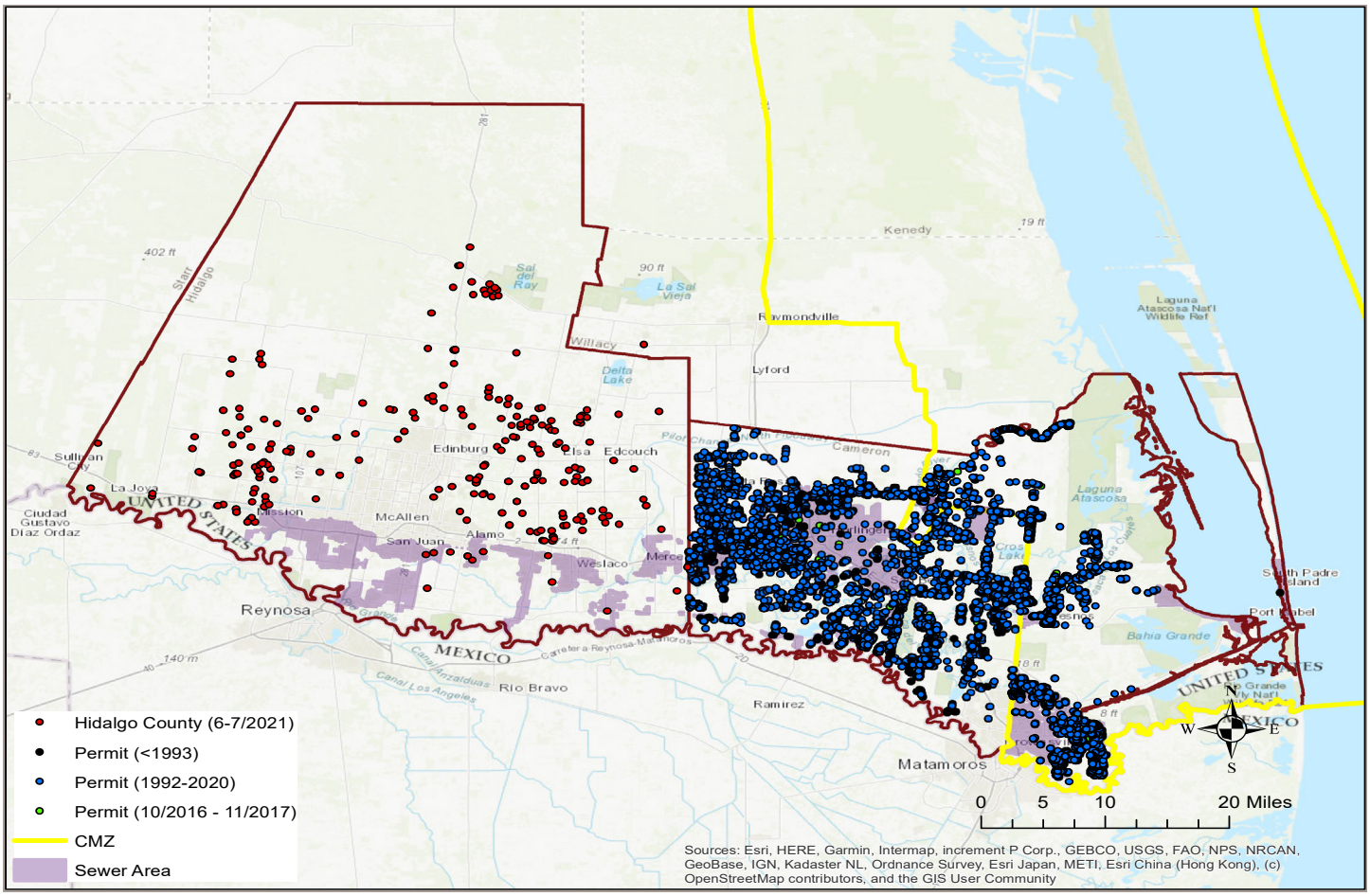
In an effort to evaluate potential water quality contamination risks from OSSFs, Alvaro Garcia, a Master of Science student at the University of Texas Rio Grande Valley, developed a geographic information system (GIS) based model for Cameron County to assess risk potential using an approach similar to 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.

(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
(956) 399-2522

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

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

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1824 W Jefferson Avenue STE A,
Harlingen, TX 78550
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