



Nueces River Authority
Steering Committee and Stakeholder Update #5
(5th Quarter of FY 2018-2019)
September - November 2018

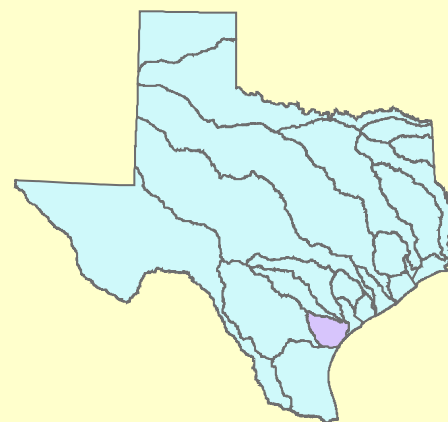
December 4th, 2018

Routine Clean Rivers Program Monitoring

Field staff from the Nueces River Authority conducted routine quarterly water quality sampling at all river/reservoir and coastal stations in the fifth quarter. 24-hour dissolved oxygen monitoring was conducted on the Atascosa Rivers at two locations (Pleasanton at station 12981 and at McCoy at station 20764). NRA field staff had scheduled 24-hour dissolved oxygen on the Nueces River at FM 624 and in Asherton but the approaching flood waters from the Upper Basin resulted in a change of plans.

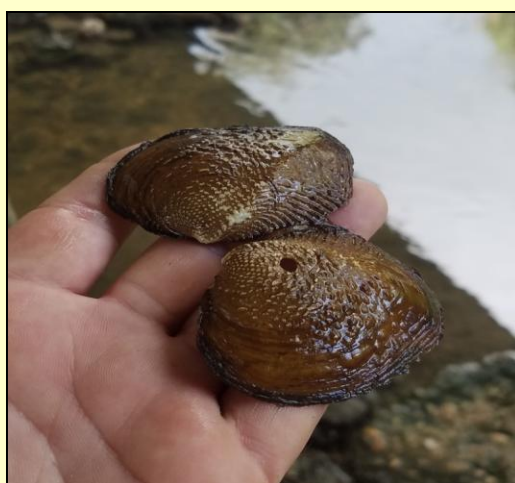
Basin 20 - San Antonio-Nueces Coastal Basin

The San Antonio-Nueces Coastal Basin covers approximately 3,100 square miles, draining to Copano and St. Charles bays. The basin is largely rural, with the dominant industries being crop farming and cattle rearing. Monitoring sites in Basin 20 are located on the tidal and above tidal portions of the Mission and Aransas rivers and Poesta Creek. Tidal portions of the Mission and Aransas rivers have been impaired for the contact recreation standard, bacteria, since the 2004 Assessment. The above tidal portion of Aransas River and Poesta Creek will likely be listed for the same parameter in the 2016 Assessment as it becomes finalized.



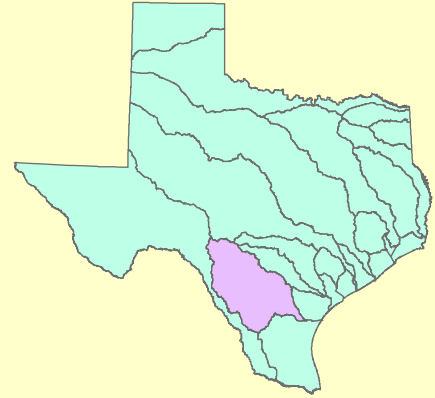
Mussels in Poesta Creek

Ever since NRA field staff assisted TCEQ with some mussel studies, we've been keeping an eye out for them during our routine water quality monitoring. We came across this specimen, a Southern Mapleleaf (*Quadrula apiculata*), out on Poesta Creek near Beeville on FM 202 in September. Poesta Creek flows into Aransas Creek in Bee County and eventually to Copano Bay.



Basin 21 - Nueces River Basin

The Nueces River Basin covers approximately 17,000 square miles in South-Central Texas. The Nueces River winds 315 miles from its source in the Edwards Plateau near Rock Springs (elevation 2,402) through the brush country of the South Texas Plains to its end in Nueces Bay, located near Corpus Christi. The Nueces River is joined by the Frio and Atascosa rivers near the town of Three Rivers.



Flooding in the Upper Basin

We Texans finally got the rain we've been wanting for years, too bad it came down all at once. Heavy rains in September and October put many of the Hill Country streams in flood stage on multiple occasions creating very dangerous situations. The peak flow on the Nueces River topped 100,000 ft³/s at the USGS streamgauge below Uvalde on October 9th and again October 16th.



Nueces River at the 19-mile Crossing in Uvalde County on 10/8/2018 (Q = approximately 15,000 ft³/s)

NRA field staff was out conducting routine monitoring in the Hill Country in early October when a flash flood in the headwaters sent river levels rising. The largest rain totals in the watershed were located around the headwaters of the Nueces River. The headwaters of the Llano River, which borders the Nueces River Watershed to the north, received even more rain resulting in peak flows of around 300,000 ft³/s at the USGS streamgauge in Llano during the October 16th event.

Timing the Flood Flows

For people that live on or near rivers, knowing when it's going to flood is of great importance. In the Texas Hill Country, it can mean the difference between life and death as the water can rise quickly and ferociously with little or no time to prepare. For those that live downstream in the middle and lower basins, a flood in the headwaters takes time to travel the length of the river giving people some time to prepare. Knowing how much time before the floodwaters arrive is essential for these folks to save livestock and equipment by moving them to higher ground. The NOAA Flood Forecast webpage is a great tool to provide this kind of information. NRA staff found their forecasts to be very accurate during the last few flood events.

https://water.weather.gov/ahps/region_forecast.php?wrr=12

Another great tool is the USGS list of stream flow gauges (link at the bottom of the paragraph). Based on hydrographs provided by the USGS, NRA staff was able to estimate the timing of flood pulses from the headwaters down to the receiving waterbodies. Many variables exist when trying to estimate the timing of the flows including how saturated the watershed is and how large of a flood event occurred. In general, normal spring flows from the headwaters do not travel the length of the watershed and are absorbed into the Edwards Aquifer.

http://waterdata.usgs.gov/tx/nwis/current?type=flow&group_key=basin_cd#tx14

Based on USGS hydrograph data, a flood in the headwaters of the Nueces River takes approximately 15-18 days until it begins to arrive into Lake Corpus Christi. This is the case when the watershed is completely saturated but not the case after a prolonged dry period. In general, if flood flows make it to the Asherton gage, they will make it to Lake Corpus Christi. The October 9th flood took approximately 18 days and the October 16th flood took approximately 15 days for peak flows to reach the lake. A flood in the headwaters of the Frio River takes approximately 7 days to reach Choke Canyon Reservoir. A flood in the headwaters of the Atascosa River takes approximately 2 days to reach Lake Corpus Christi.

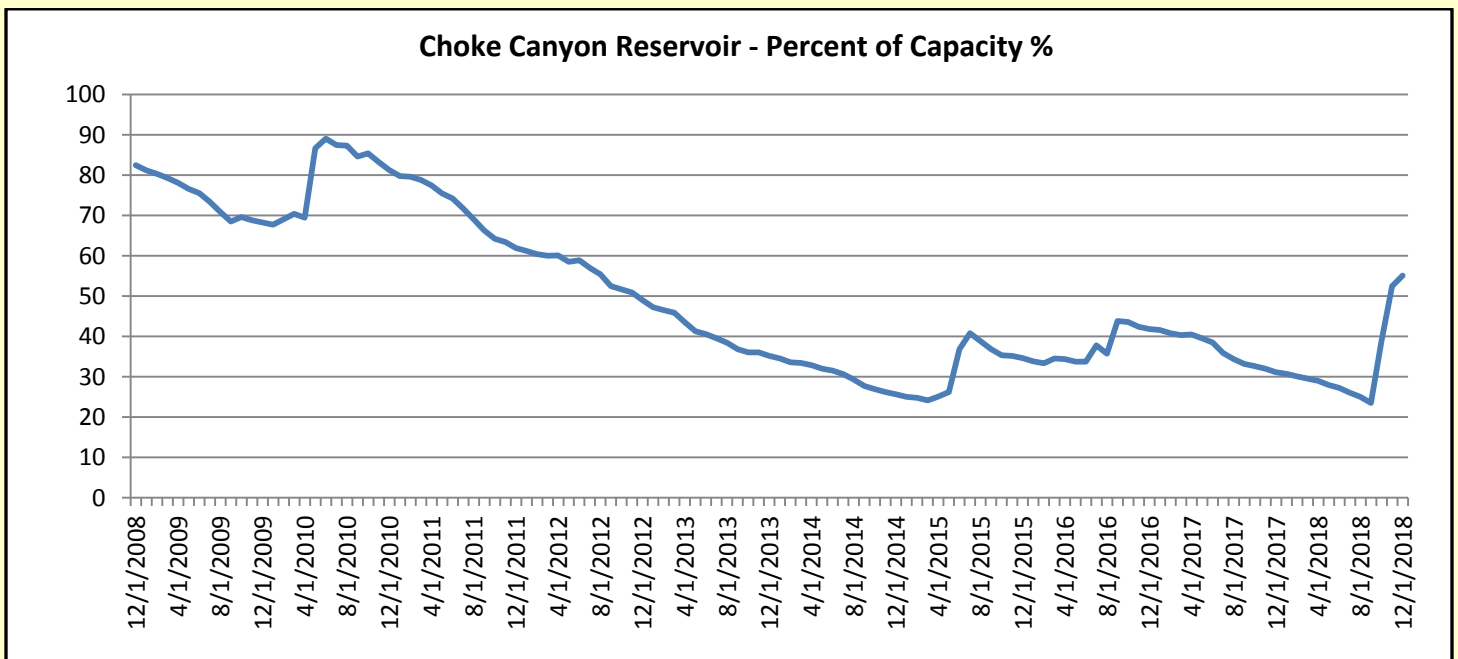
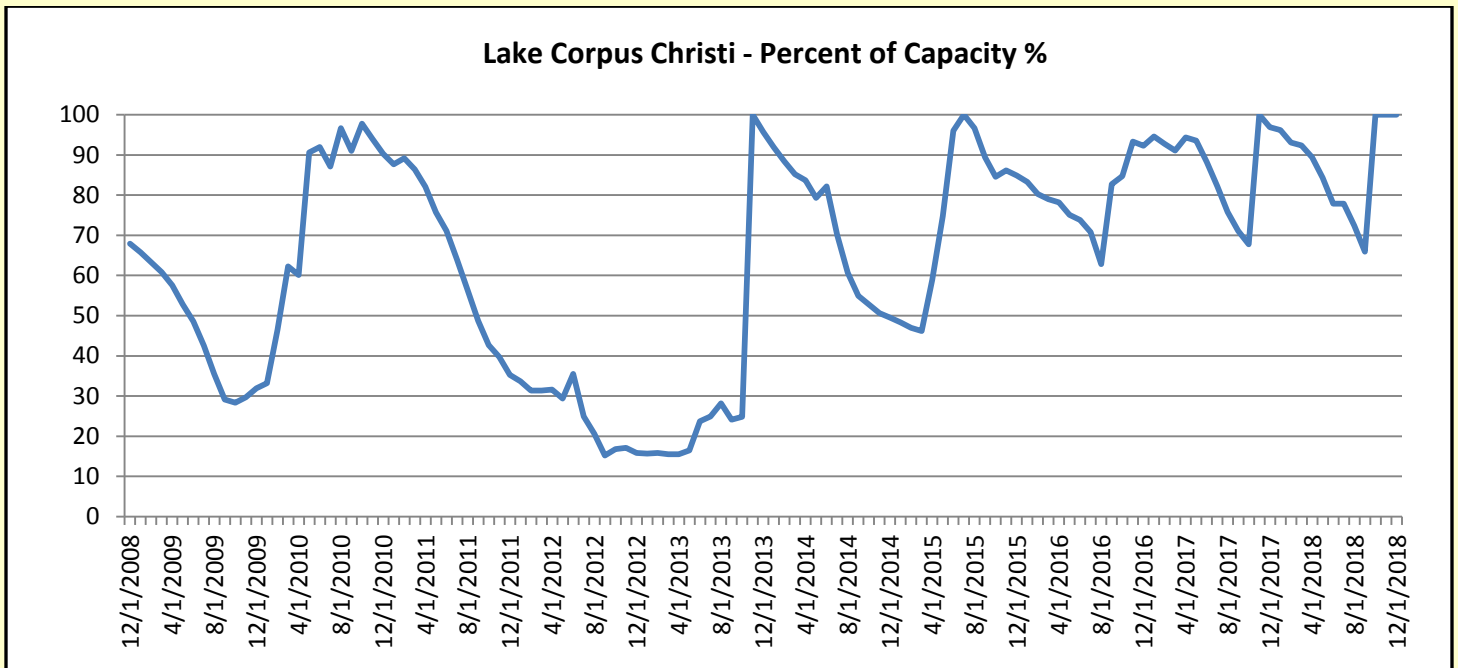
Oil and Gas Exploration in Choke Canyon Reservoir

Back in 2013, NRA field staff accompanied TPWD on a field trip out to Choke Canyon Reservoir to observe and document seismic survey activity related to the oil and gas industry. In November, Corpus Christi's KRISTV 6 Investigates aired a story about the Bureau of Reclamation's plan to auction off thousands of acres of land around Choke Canyon Reservoir to oil and gas developers.

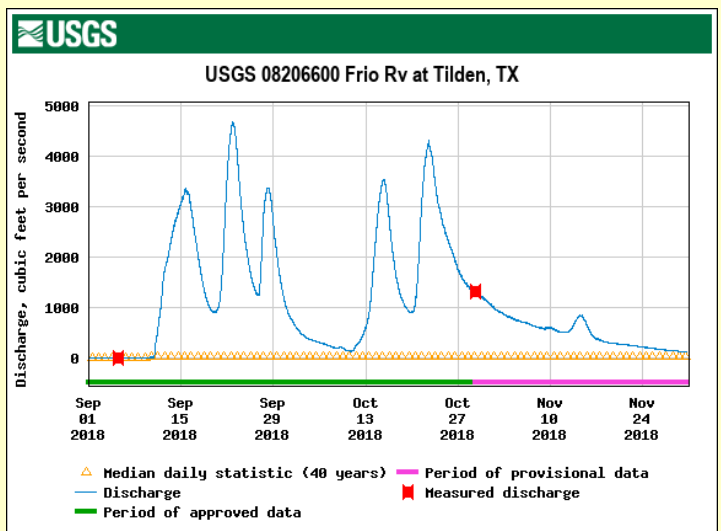
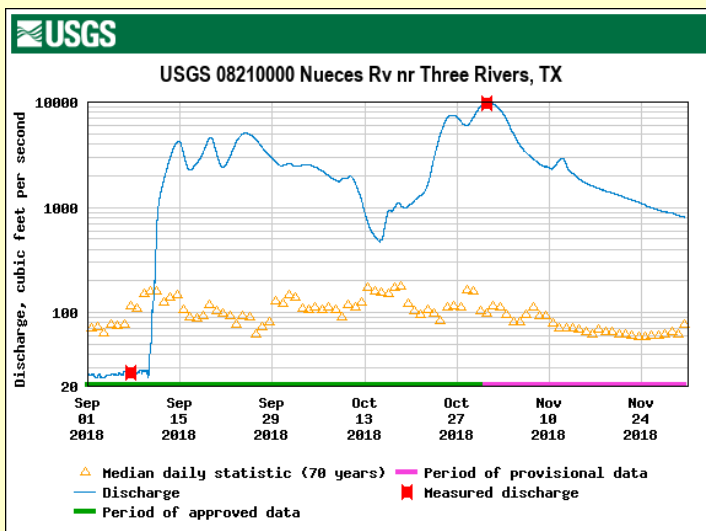
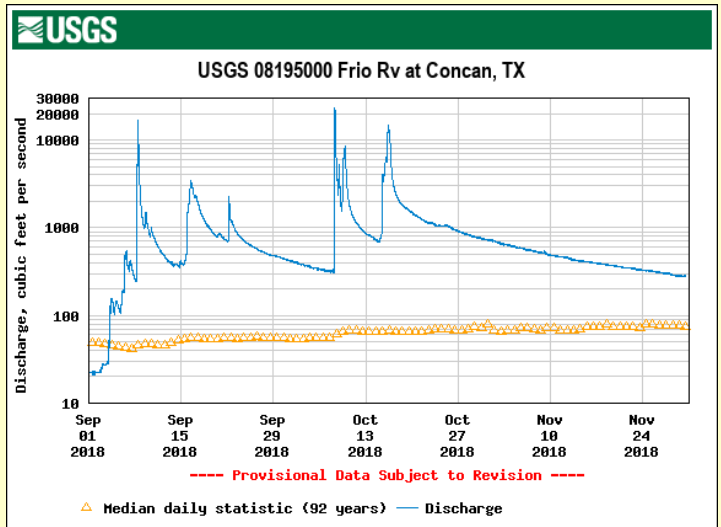
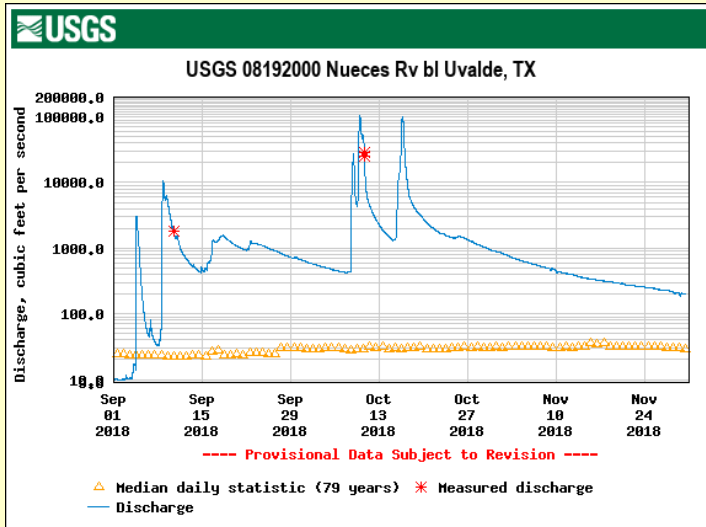


Lake Levels

The Reservoir System (Choke Canyon + Lake Corpus Christi) finally caught some water after a relatively dry Spring and Summer. A flash flood in the Upper Basin in August primed the river channels for what was to come in the succeeding months. A series of rain events in September and October sent river levels rising filling Lake Corpus Christi to capacity on September 28th. Inflows to the Reservoir System totaled 234,342 acre-feet in September, 278,154 acre-feet in October, and 181,043 acre-feet in November for a total of 693,539 acre-feet for the quarter. Lake Corpus Christi was at 100% of capacity and Choke Canyon Reservoir was at 55.1 % (combined 67.6%) at the end of the quarter. For the Daily Reservoir System and Pass-Thru Status Report, please visit the website <https://www.nueces-ra.org/CP/CITY/passthru/index.php>.



USGS Streamgauge Data



Nueces River Watershed Partnership – Implementation of the Lower Nueces River Watershed Protection Plan (WPP)

Funding for the NRA, as watershed coordinator to seek funding for and initiate implementation of the WPP, is provided by the TSSWCB through a §319(h) grant from EPA. Following is a brief update on the status of the implementation of some of the management measures identified in the WPP that are currently underway and other proposed work in the watershed.

OSSF Repair and Replacement

As of November 2018, 47 OSSFs within the watershed have been pumped out and inspected. Fourteen were found to be in good



working order. Of the remaining 33 systems, 21 need to be completely replaced and 12 need some repair work. Fourteen replacements and 11 repairs have been completed. The program, funded by the TCEQ through a §319(h) grant from EPA, will continue through February 2020 or until the budgeted funds are spent.

NRA has received notice from the TCEQ that will fund another §319(h) grant from EPA to continue with this work beginning September 2019. All of the funds allocated for inspections, repairs, and replacements in the current contract have been allocated, and there is a waiting list for additional work.

Environmental Education

There are numerous educational education opportunities available for landowners:

- ***Texas Watershed Steward*** – This program is implemented through a partnership between the Texas A&M AgriLife Extension Service (TAES) and the TSSWCB. The program provides science-based, watershed education to help citizens identify and take action to address local water quality impairments. Texas Watershed Stewards learn about the nature and function of watersheds, potential impairments, and strategies for watershed protection.
- ***Remarkable Riparian*** – This program was initiated by NRA to provide information to Nueces River Basin landowners on the importance of riparian areas to the health and function of rivers. The goal of the program is to provide this information to landowners and other decision makers through mailings, workshops, and on-the-ground visits. The Texas Water Resources Institute (TWRI) has adopted the program and conducts Texas Riparian & Stream Ecosystem workshops across the state.
- ***Texas Well Owner Network (TWON) and OSSF Maintenance*** – The TWON program is an educational training offered by TAES in cooperation with the TSSWCB and other partner agencies and organizations. The TWON program is for Texas residents who depend on household wells for their drinking water needs and want to become familiar with Texas' groundwater sources, water quality, water treatment, and well maintenance issues. OSSF maintenance is a one-hour component of the workshop, or can be offered separately as a two-hour workshop.
- ***Lone Star Healthy Streams*** – This program is implemented through a partnership between TAES and the TSSWCB. Its goal is the protection of Texas waterways from bacterial contamination originating from livestock operations and feral hogs that may pose a serious health risk to Texas citizens. To achieve this important goal, the program's objective is the education of Texas farmers, ranchers, and landowners about proper grazing, feral hog management, and riparian area protection to reduce the levels of bacterial contamination in streams and rivers.
- ***Feral Hog and Wildlife Management*** – TAES has created the <http://feralhogs.tamu.edu/> website to provide information to landowners and the general public on feral hog control, damage, diseases, and hunting tips. They also developed a Feral Hog Manual for the Lone Star Healthy Streams program which can be provided to stakeholders. TAES also provides a wealth of information on wildlife management at <http://wildlife.tamu.edu/wildlifemanagement/>. Stakeholders will be directed to the website for guidance on feral hog and wildlife management.

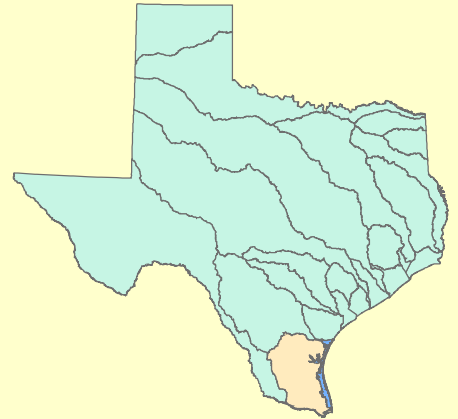
- **Soil and Water Testing Campaign – Texas AgriLife Extension** – Texas AgriLife Extension, through their County Extension Agents, offers soil and water testing to encourage proper nutrient management in both agricultural and urban areas.

NRA will work with these agencies to bring workshops to the area. If anyone has an interest in scheduling one, please us know.

The stakeholder meeting originally scheduled for November 7, was cancelled due to the ongoing flooding in the watershed. The next meeting will be schedule for early May 2019. For more information about the Partnership and the WPP, visit <http://www.nuecesriverpartnership.org> or contact Rocky Freund at (361) 653-2110 or rfreund@nueces-ra.org.

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 the Arroyo Colorado Tidal (Segment 2201) and above tidal (Segment 2202) in the Rio Grande Valley and Petronila Creek Tidal (Segment 2203) and above tidal (Segment 2204), which is a tributary to Alazan Bay located on the northern arm of Baffin Bay.



Texas Tortoise

NRA field staff encountered a Texas Tortoise (*Gopherus berlandieri*) on the quarterly trip down to the Lower Rio Grande Valley. Although the species has nothing to do with water quality, it was observed on a bridge over one of the sampling stations. It casually made a getaway and headed back to its terrestrial habitat in the brush. The Texas Tortoise is a protected (threatened) species found in Southern Texas southward into Mexico and is one of six species of tortoises that are native to North America. Should you encounter one of these species in the wild, please just leave it alone.



Rio Grande Valley Monitoring – Segment 2202

For FY2019, NRA is monitoring three sites down in the Rio Grande Valley (see page 14 for the map of stations). Station 13079 is located on the above tidal portion of the Arroyo Colorado (Segment 2202) at the US-77 Bridge in Harlingen. The other two stations, the Hidalgo and Raymondville Drains, are tributaries of the Laguna Madre (Segment 2491). All three sites were visited on October 31st during dry weather. (Disclaimer – Data has not been validated or input into the SWQMIS Database.)



Hidalgo Drain at FM1420 (Station 22003)



Raymondville Drain at CR 445 (Station 22004)

| Site | E. coli | Ammonia | TKN | Total Phos | Nitrate | Nitrite | Chlorophyll a |
|--------------|-----------|-----------|----------|------------|----------|-----------|---------------|
| 13079 | 290 MPN | <0.1 mg/L | 1.2 mg/L | 1.0 mg/L | 6.5 mg/L | <0.2 mg/L | 25.9 µg/L |
| 22003 | 80 MPN | <0.1 mg/L | 1.5 mg/L | 0.67 mg/L | 5.6 mg/L | <0.2 mg/L | 23.9 µg/L |
| 22004 | 1,700 MPN | 0.2 mg/L | 1.3 mg/L | 0.2 mg/L | 1.5 mg/L | <0.2 mg/L | 11.7 µg/L |

New USGS Streamgage on Petronila Creek – Segment 2204

The USGS installed a new streamgage on Petronila Creek, which is a tributary to Alazan Bay, and connected to Baffin Bay. The gage, which is located on FM 665, was installed back in June/July and is the only streamgage on the creek. The gage measures streamflow, gage height, and precipitation and has weathered 2 significant rain events since it went online. The streamflow data can be found at:

https://waterdata.usgs.gov/tx/nwis/uv/?site_no=08212820&PARAMeter_cd=00065,00060



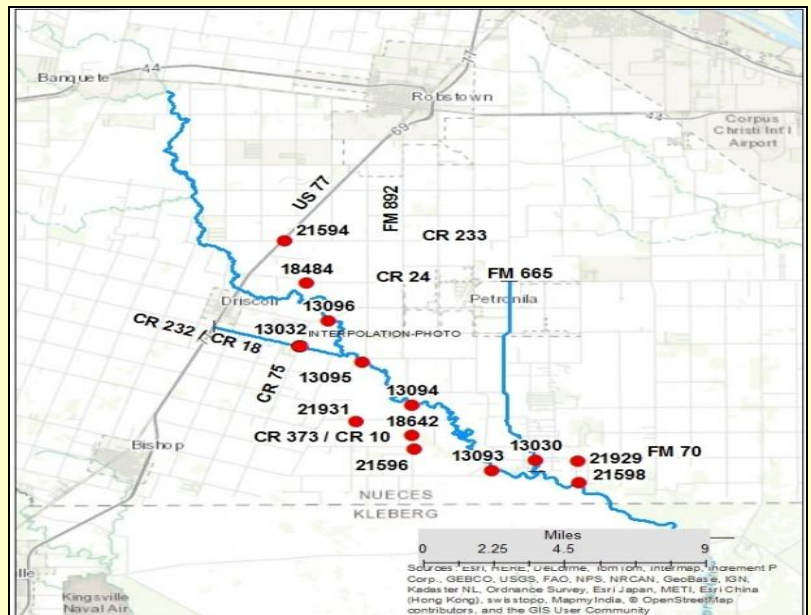
Petronila Creek Tributary Study – Segment 2204

Since FY 2013-2014, the TCEQ has contracted with NRA to conduct monthly water quality monitoring to identify chloride, sulfate, and TDS contributions from tributaries of Petronila Creek, including drainage ditches. For FY 2019, NRA is conducting monthly monitoring at 13 sites. Four sites are located on the main stem of Petronila Creek (13096, 13095, 13094, and 13093 – data is in bold on the graph). (Disclaimer – Data has not been validated or input into the SWQMIS Database.)

Monitoring in October was conducted following multiple rain events that flushed out much of the watershed. Station 18484 was inaccessible in October due to muddy road conditions leading to the site. As you can tell by the data, salt levels in the tributaries rebound fairly quickly after rain events.



| Site # | October (µmhos) | November (µmhos) |
|--------|--------------------|---------------------|
| 21594 | 1,820 | 1,250 |
| 18484 | No Data | 8,570 |
| 13032 | 2,950 | 32,100 |
| 13096 | 2,560 | 7,160 |
| 13095 | 4,800 | 10,100 |
| 21931 | 327 | 12,600 |
| 13094 | 4,650 | 10,600 |
| 18642 | 442 | 24,300 |
| 21596 | 4,390 | 19,500 |
| 13093 | 4,140 | 5,340 |
| 13030 | 3,120 | 18,800 |
| 21929 | 8,690 | 23,600 |
| 21598 | 10,100 | 21,800 |



Basin 24 –Bays and Estuaries

The Bays and Estuaries region of Texas covers approximately 2,002 square miles along the entire Texas Coast. There are 48 classified estuarine segments that are monitored by several River Authorities and TCEQ regional offices. Nueces River Authority monitors water quality in 5 of the coastal segments including: Copano/Port/Mission Bay (Segment 2472), Redfish Bay (Segment 2483), Oso Bay (Segment 2485), Laguna Madre (Segment 2491), and Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salada (Segment 2492).

Oso Bay & Oso Creek TMDL and IP – Segments 2485 and 2485A

Since 2002, Oso Creek, which flows 28 miles to the confluence of Oso Bay in Nueces County has been identified as being impaired for having bacteria concentrations that exceed state water quality standards. Since 2003, the TCEQ and the TSSWCB have conducted numerous studies of bacteria sources and quantities in the Oso Creek watershed. Based on the results of those studies, a Total Maximum Daily Load (TMDL) and an Implementation Plan (IP) for Oso Creek is being developed to address the



contact recreation impairment. Staff from the Center for Coastal Studies at Texas A&M University – Corpus Christi and the Coastal Bend Bays Foundation is disseminating information to the public.

Meetings generally take place once a quarter. The next meeting will be hosted by the Coastal Bend Bays Foundation on December 10th at the Del Mar Center for Economic Development from 5:30-7:00 PM. You can learn more about the Oso Bay TMDL and/or the Oso Creek Watershed Public Outreach at the TCEQ project page: <http://www.tceq.texas.gov/waterquality/tmdl/67-osobaybacteria.html>:

New Site for FY 2019 - Los Olmos Creek – Segment 2492

NRA added a new routine quarterly monitoring station on Los Olmos Creek near the bridge crossing at US-77 just south of Riviera. Station 13034 is tidally influenced with Laguna Salada (Salty Lagoon in Spanish) which is an arm of Baffin Bay. Monitoring occurred on October 31st. The water was still fresh after a series of rain events a couple of weeks prior to the sampling event. Oxygen levels were good (9.0 mg/L) but bacteria (enterococcus) levels were still slightly elevated at 120 CFU/100mL. (Disclaimer – Data has not been validated or input into the SWQMIS Database.)



New Segment/Assessment Unit - San Martin Lake System - Segment 2494C_01

TCEQ created a new stream segment (2494C) and assessment unit (_01) for the San Martin Lake System in October. The waterbody was previously part of Segment 2494B_01 located in the Lower Rio Grande Valley's Bays and Estuaries Basin (TCEQ Basin 24). NRA submitted a grant proposal with the Texas State Soil and Water Conservation Board (TSSWCB) in October to conduct monthly monitoring at one location to help fill a data gap necessary to fulfill the needs of the Lower Laguna Madre/Brownsville Ship Channel Watershed Protection Plan (WPP) that is underway.



New NRA Work Truck

NRA retired the fieldwork truck after 8 years of service and 162,000 trouble free miles on the odometer. The vehicle served us well in that timeframe, travelling the dusty ranch roads of the Nueces River Basin down to the levees of the Arroyo Colorado (We took the Chevy to the levee as the song goes). The 2010 truck is for sale "as is" and will be available for inspection beginning November 19, 2018 at 602 N. Staples St., Corpus Christi, TX 78401. Call 361-653-2110 to make an appointment. Sealed bids must be received in NRA's Uvalde office by 3pm on December 11, 2018, either by mail to "Nueces River Authority, PO Box 349, Uvalde, TX 78802-0349, Attn: Frankie Kruckemeyer" or delivered to the office at 200 E. Nopal Suite 206, Uvalde, TX 78801. We look forward to new adventures with the new 4 door version.



Outreach and Education

NRA's Education and Outreach Program saw 827 people in September, 831 people in October and 473 people in November for a total of 2131 for the quarter. Thank you Mary and Dee for your hard work showing off our river basin and groundwater models. For more information about outreach and education, contact slewey@nueces-ra.org.

Rest in Peace Mr. Koenig

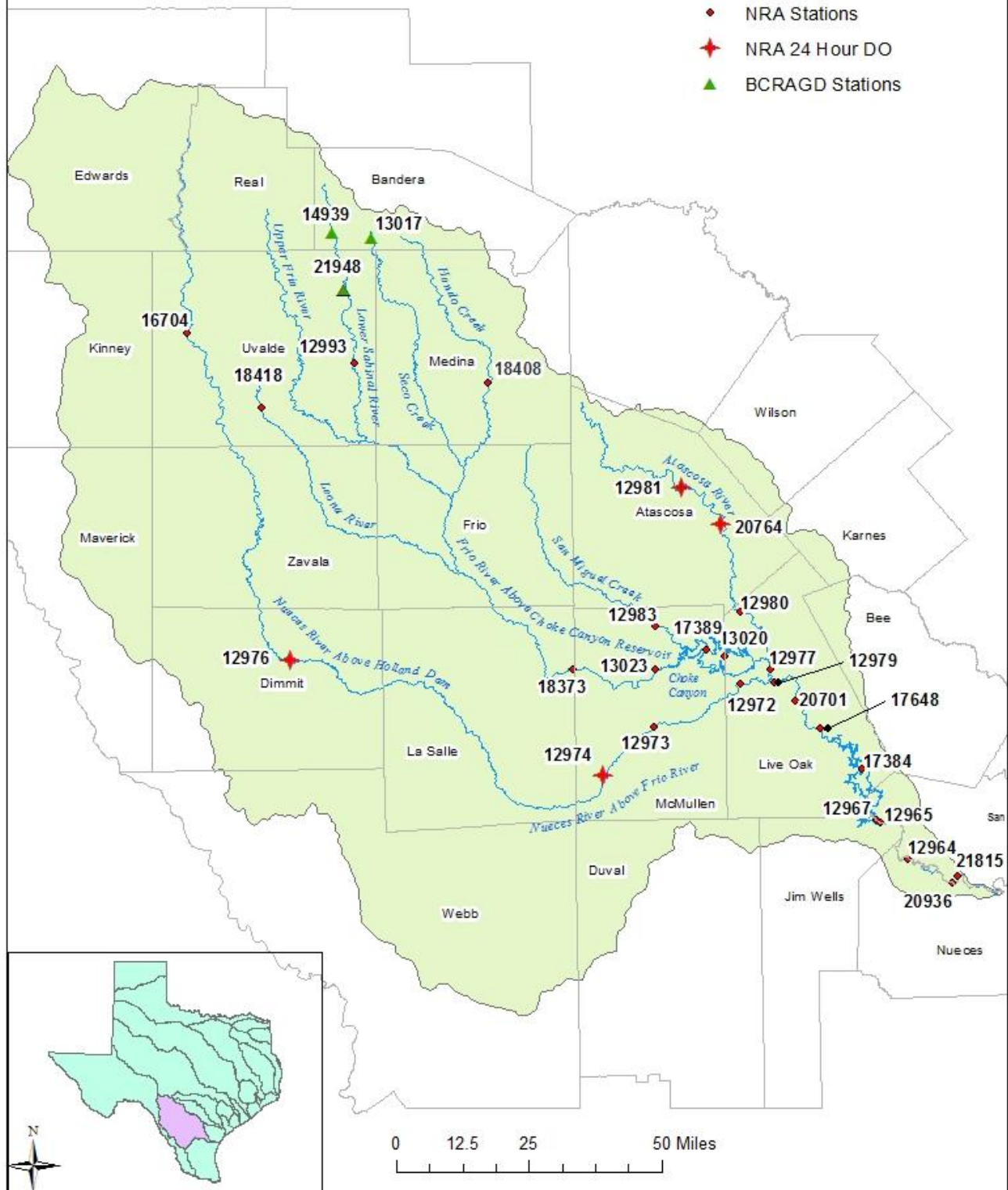
NRA lost a great man on November 29th, 2018 with the passing of Board Member Mr. Lindsey A. Koenig of Orange Grove. Mr. Koenig was a "hands on" kind of a guy, showing up to help NRA conduct public outreach at the annual Jim Wells County Ag Fair in Alice. We'll miss you Mr. Koenig!



Nueces River Basin

NRA Monitoring Stations

- ◆ NRA Stations
- ◆ NRA 24 Hour DO
- ▲ BCRAGD Stations



San Antonio-Nueces Coastal Basin

• NRA Routine Stations



Nueces-Rio Grande Coastal Basin

Monitoring Stations

• NRA Routine Stations

