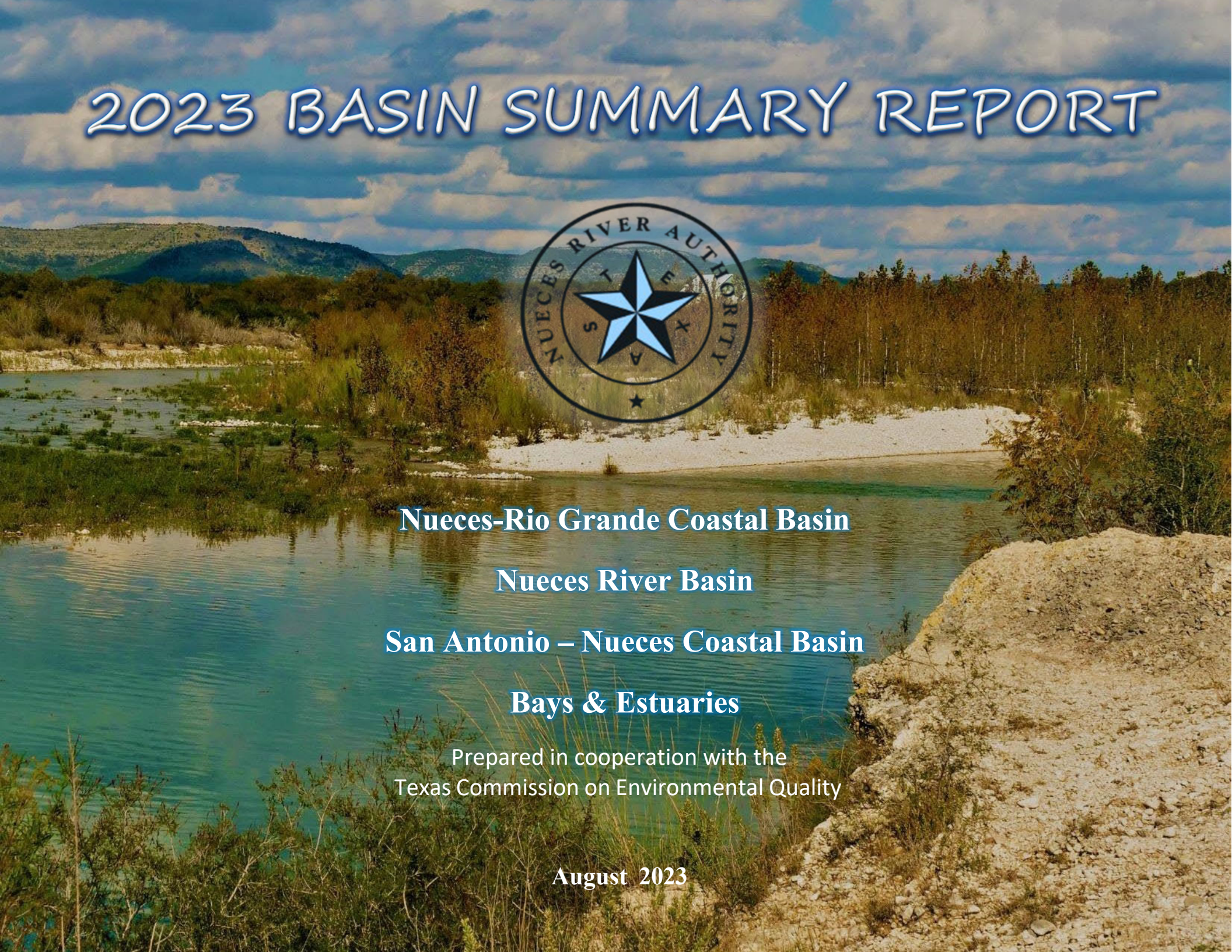
2023 BASIN SUMMARY REPORT



Nueces-Rio Grande Coastal Basin

Nueces River Basin

San Antonio – Nueces Coastal Basin

Bays & Estuaries

Prepared in cooperation with the
Texas Commission on Environmental Quality

August 2023

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Acknowledgements

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THANK YOU to all of the environmental professionals, stakeholders, citizen scientists (and so many more!) that helped in preparation for this report.

Together we can accomplish anything!

THANK YOU for supporting water for the future!

The preparation of this report was financed through grants from & in cooperation with the Texas Commission on Environmental Quality

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Executive Summary

In 1991, the Texas Legislature passed the Texas Clean Rivers Act (Senate Bill 818) requiring basin-wide water quality assessments to be conducted for each river basin in Texas. Under this act, the Clean Rivers Program (CRP) developed an effective partnership involving the Texas Commission on Environmental Quality (TCEQ), other state agencies, river authorities, local governments, industry, and citizens. CRP was originally funded by dedicated fees paid by municipal and industrial dischargers and water rights holders. TCEQ collects these fees among others, funding a multitude of water programs.

Using a watershed management approach, the Nueces River Authority (NRA) and TCEQ work together to identify and evaluate surface water quality issues and to establish priorities for corrective action. Under CRP, NRA is responsible for the San Antonio – Nueces Coastal Basin, the Nueces River Basin, the Nueces – Rio Grande Coastal Basin, and the adjacent bays and estuaries, an area roughly 30,500 square miles, ranging from the hill country in Edwards County to San Antonio Bay in Refugio County to the Brownsville Ship Channel in Cameron County.

Fifteen CRP partners collect data from over 1,800 water monitoring sites throughout the state. Data are used in the development of Texas Surface Water Quality Standards, for modeling water quality trends, providing baseline data for water quality projects, and to help establish wastewater permit limits. Steering Committees, made up of fee payers, elected officials, and the public, are created to help guide CRP efforts by providing input on local water quality concerns.

The long term goals of the CRP are to:

- Provide quality assured data to TCEQ for use in water quality decision-making
- Identify and evaluate water quality issues
- Promote cooperative watershed planning
- Inform and engage stakeholders
- Maintain efficient use of public funds
- Adapt to emerging water quality issues

To accomplish the goals set forth by the CRP, funding is allocated on a biennial cycle to CRP partners. During this reporting period, CRP partners including NRA, TCEQ Region 13 (San Antonio), Region 14 (Corpus Christi), Region 15 (Harlingen), and Region 16 (Laredo) provided water quality data for this report. Additional water quality data collected under approved Quality Assurance Project Plans and included in the Surface Water Quality Monitoring Information Systems (SWQMIS) database are used for water quality assessments.

The water quality data are compiled from the SWQMIS database. The Texas Integrated Report of Surface Water Quality is prepared and submitted to the U.S. Environmental Protection Agency (EPA) every two years in even numbered years, as required by law. This report satisfies the requirements of the federal Clean Water Act Sections 305(b) and 303(d). The 303(d) List of Impaired Waters bodies must be approved by EPA before it becomes final.

The 2022 Texas 303(d) List was adopted by the TCEQ on June 1, 2022. It was approved by the EPA on July 7, 2022.

Significant Findings

The water quality analysis for this report reviewed 16 parameters for assessment units (AU) on 48 segments in the San Antonio – Nueces Coastal Basin, the Nueces River Basin, the Nueces – Rio Grande Coastal Basin, and the adjacent bays and estuaries.

Basin 20

List of Impairments and Concerns in the San Antonio – Nueces Coastal Basin

Segment Name	AU	Description	Impairments	Concerns
2001 Mission River Tidal	01	From the confluence with Mission Bay in Refugio County to a point 7.4 km (4.6 mi) downstream of US 77 in Refugio County	Bacteria	Chlorophyll-*a*
2002 Mission River Above Tidal	01	From a point 7.4 km (4.6 mi) downstream of US 77 in Refugio County to the confluence of Blanco Creek and Medio Creek in Refugio County		DO, Chlorophyll-a
2003 Aransas River Tidal	01	From the confluence with Copano Bay in Aransas/Refugio County to a point 1.6 km (1.0 mi) upstream of US 77 in Refugio/San Patricio County	Bacteria	Chlorophyll-*a*
2004 Aransas River Above Tidal	01	From the downstream end of segment to the confluence with Papalote Creek		
	02	From the confluence with Papalote Creek to the upstream end of segment at the confluence with Aransas Creek and Poesta Creek	Bacteria	DO, Nitrate, Total Phosphorus
2004A Aransas Creek	01	From confluence with the Aransas River to the headwaters of the stream about 10 km upstream of US Highway 59	Bacteria	
2004B Poesta Creek	01	From the confluence with Aransas River to the confluence of Talpacate Creek	Bacteria	Nitrate, Total Phosphorus
	02	From the confluence with Talpacate Creek to the headwaters of the stream about 7.5 km upstream of FM 673	Bacteria	DO

Basin 21

List of Impairments and Concerns in the Nueces River Basin

Segment Name	AU	Description	Impairment	Concern
2101 Nueces River Tidal	01	From the confluence with Nueces Bay in Nueces County to Calallen Dam 1.7 km (1.1 mi) upstream of US 77/IH 37 in Nueces/San Patricio County		Chlorophyll-*a,* fish kill
2102 Nueces River Below Lake Corpus Christi	01	From the downstream end of segment upstream to FM 666		
	02	From FM 666 to the upstream end of segment at Lake Corpus Christi		Chlorophyll-*a*
2103 Lake Corpus Christi	01	From the Wesley E. Seale Dam in Jim Wells/San Patricio County to a point 4.5 mi upstream to County Road 10F on the east side of the lake and the third arm on the west side of the lake		DO
	02	Area ~ 4 miles SE of FM 3162 and FM 634 intersection near western shore		
	03	Western arm of lake near Lagarto Creek Inlet		
	04	Upper portion of lake on opposite shore from Hideaway Hill		
	05	Upper arm of lake in more riverine section surrounding FM 534		
	06	Uppermost riverine part of reservoir upstream of FM 534 to upper end of segment to just upstream of US Hwy 59		
2104 Nueces River Above Frio River	01	From the downstream end of the segment to the confluence with Dragon Creek		Nitrate
	02	From the confluence with Dragon Creek to the confluence with Guadalupe Creek		Chlorophyll-a
	03	From the confluence with Guadalupe Creek to the upstream end of the segment		DO
2105 Nueces River Above Holland Dam	01	From the downstream end of the segment at Holland Dam to the confluence of Sauz Mocho Creek		DO, Chlorophyll-*a*
	02	From the confluence with Sauz Mocho Creek to the confluence with Line Oak Slough	DO	DO, Chlorophyll-*a*
	03	From the confluence of Line Oak Slough to the upstream end of the segment at Ranch Rd. 1025		
2106 Nueces / Lower Frio River	01	The Nueces River from the downstream end to the confluence with the Frio River	TDS	Chlorophyll-*a*
	02	The Frio River from the confluence with the Nueces River to the Choke Canyon Reservoir Dam	Bacteria, TDS	Chlorophyll-*a*
2107 Atascosa River	01	From the confluence with the Frio River in Live Oak County to the confluence with Borrego Creek in Atascosa County	Bacteria, TDS	Chlorophyll-*a*
2108 San Miguel Creek	01	From Choke Canyon Reservoir to the confluence with Live Oak Creek	Bacteria	DO
	02	From the confluence of Live Oak Creek to the upstream end of the segment		
2109 Leona River	01	From the downstream end of segment to the confluence of Yoledigo Creek	Bacteria	Nitrate
	02	From the confluence with Yoledigo Creek to the confluence with Camp Lake Slough	Bacteria	Nitrate
	03	From the confluence with Camp Lake Slough to the upstream end	DO, Bacteria	DO, Nitrate
2109C Live Oak Creek	01	From its confluence with the Leona River in Zavala County to the headwaters approximately 15.2 km upstream of US Hwy 57 in Uvalde County		
2109D Gallina Slough	01	From the confluence with the Leona River is Zavala County to the headwaters ~ 9 km upstream of US Hwy 57 in Zavala County		Bacteria, Nitrate
2110 Lower Sabinal River	01	From the confluence with the Frio River in Uvalde County to a point 100 meters (110 yards) upstream of SH 127 in Uvalde County		DO, Nitrate, Chlorophyll-a, Bacteria
2111	01	From the downstream end to the confluence with the West Sabinal River		

Segment Name	AU	Description	Impairment	Concern
Upper Sabinal River	02	from the confluence with the West Sabinal River to the upstream end		
2112 Upper Nueces River	01	From the downstream end to the confluence with Sand Ridge Creek		DO
	02	From the confluence with Sand Ridge Creek to the confluence with unnamed tributary with NHD RC 12110103000444 at point N-99.91, W29.2 just downstream of US Highway 90.		
	03	From the confluence with unnamed tributary with NHD RC 12110103000444 at point N-99.91, W29.2 just downstream of US Highway 90 to the confluence with Miller Creek		
	04	From the confluence with Miller Creek to the upper end of the segment		
2113 Upper Frio River	01	From the downstream end of the segment to the confluence with Bear Creek	Impaired fish community	
	02	From the confluence with Bear Creek to the upstream end		Impaired fish community
2114 Hondo Creek	01	From the downstream end of the segment to the confluence with and unnamed tributary with NHD RC 12110107000245 at point N-99.12, W29.38 just upstream of FM 2676.		Nitrate
	02	From the confluence with and unnamed tributary with NHD RC 12110107000245 at point N-99.12, W29.38 just upstream of FM 2676 to the upstream end of the segment.		
2114A Commissioner's Creek	01	From the confluence with Hondo Creek upstream to the headwaters approximately 6.4 km (4.0 mi) NE of Tarpley in Bandera County		
2115 Seco Creek	01	From the confluence with Hondo Creek in Frio County upstream to an unnamed tributary 2.97 km (1.85 mi) downstream of FM 1796 in Medina County		
	02	From an unnamed tributary 2.97 km (1.85 mi) downstream of FM 1796 in Medina County upstream to the confluence of West Seco Creek in Bandera County		
2116 Choke Canyon Reservoir	01	Lowermost portion of reservoir near dam	Excessive algal growth	
	02	Small north arm of lake near dam and Willow Hollow Tank	Excessive algal growth	
	03	5120 acres in the middle of the reservoir	Excessive algal growth	
	04	Opossum Creek arm on north side of reservoir	Excessive algal growth	
	05	Southern arm near mid-Lake and RR7 west of Calliham	Excessive algal growth	
	06	Western end of the reservoir up to RR 99	Excessive algal growth	DO
	07	Uppermost portion of reservoir from FM 99 bridge, including the Frio River and San Miguel Creek arms	Excessive algal growth	
2117 Frio River Above Choke Canyon Reservoir	01	From the downstream end of segment to the confluence with Esperanza Creek	Bacteria	Chlorophyll-a, DO
	02	From the confluence with Esperanza Creek to the confluence with Ruiz Creek	Bacteria	Chlorophyll-a, DO
	03	From the confluence with Ruiz Creek to the confluence with Live Oak Creek		Chlorophyll-a, DO
	04	From the confluence with Live Oak Creek to the confluence with Elm Creek		Nitrate
	05	From the confluence with Elm Creek to the confluence with Spring Branch al		Nitrate
	06	From the confluence with Spring Branch to the upstream end of the segment		
2118 Atascosa River	01	From confluence with Borrego Creek to the confluence of Galvan Creek in Atascosa County	DO, Impaired macrobenthic, fish community, Bacteria	Impaired habitat, total phosphorus
2118A Bonita Creek	01	From the confluence with the Atascosa River in Pleasanton to the headwaters 1.4 km (0.87 mi) upstream of Ernest Rd in Jourdanton		
2118B West Prong	01	Intermittent stream with perennial pools from the confluence with the Atascosa River upstream to the confluence with an unnamed tributary at IH 35		

Segment Name	AU	Description	Impairment	Concern
Atascosa River				
2118C Upper Atascosa River	01	Intermittent stream with perennial pools from the confluence with Galvan Creek upstream to the confluencith Palo Alto Creek	Impaired fish community and macrobenthic community	Impaired Habitat, total phosphorus, Chlorophyll-a
	02	From the confluence with Palo Alto Creek upstream to the confluence of the West Prong Atascosa River and North Prong Atascosa River in Atascosa County		

Basin 22

List of Impairments and Concerns in the Nueces – Rio Grande Coastal Basin

Segment Name	AU	Description	Impairment	Concern
2201 Arroyo Colorado Tidal	01	From the downstream end of the segment to the confluence with San Vincente Drainage Ditch	Bacteria	Chlorophyll-*a*, Nitrate
	02	From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31	Bacteria	Chlorophyll-*a*, Nitrate
	03	From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary	Bacteria	Chlorophyll-*a*, Nitrate
	04	From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186	Bacteria, DO	Chlorophyll-*a*, Nitrate
	05	From just upstream of the City Rio of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment	DO, Bacteria, Mercury in edible tissue, and PCBs in edible tissue	DO, Chlorophyll-*a*, Nitrate, Total Phosphorus
2201B Unnamed Drainage Ditch Tributary (B) in Cameron County	01	From the confluence with the Arroyo Colorado in Cameron County in the Rio Hondo turning basin at -97.6, 26.196 decimal degrees to a point 17.6 km upstream at the FM 510 crossing	Bacteria	Chlorophyll-a
2202 Arroyo Colorado Above Tidal	01	From the downstream end of the segment to the confluence with Little Creek just upstream of State Loop 499	Bacteria, Mercury, in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
	02	From the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
	03	From confluence with La Feria Main Canal to the confluence with La Cruz Resaca just downstream of FM 907	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
	04	From the confluence with La Cruz Resaca to the upper end of segment at FM 2062	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
2202A Donna Reservoir	01	Off-channel irrigation reservoir pumped from Rio Grande near the City of Donna in Hidalgo County	PCBs in edible fish tissue	
2202B Unnamed Drainage Ditch Tributary (B) to S. Arroyo Colorado	01	Perennial drainage ditches that flow into the segment in Cameron and Hidalgo counties		Ammonia, Bacteria, Chlorophyll-*a*
2202C Unnamed Drainage Ditch Tributary (C) to S. Arroyo Colorado	01	From the confluence with S. Arroyo Colorado to a point 1.1 mi upstream near US Highway 281		Ammonia, Bacteria

Segment Name	AU	Description	Impairment	Concern
2203 Petronila Creek Tidal	01	From the confluence with Tunas Creek and Alazan Bay to a point 11 mi upstream	Bacteria	Chlorophyll-*a*
2204 Petronila Creek Above Tidal	01	From downstream end of segment to the confluence with 2204A, unnamed drainage ditch tributary to Petronila Creek at N-97.7, W27.65 approximately 32.5 km (20.2 mi) upstream	Bacteria, TDS, Chloride, Sulfate	Chlorophyll-*a*
	02	From the confluence with 2204A, unnamed drainage ditch tributary of Petronila Creek at N-97.7, W27.65 to the upstream end of segment at the confluence with Agua Dulce and Banquete Creeks approximately 31.6 km (19.6 mi) upstream		Chlorophyll-a, DO, Phosphorus

Basins 24 & 25

List of Impairments and Concerns in the Bays and Estuaries and Gulf of Mexico

Segment Name	AU	Description	Impairments	Concerns
2462 San Antonio Bay / Hynes Bay/ Guadalupe Bay	01	San Antonio Bay/Hynes Bay/Guadalupe Bay/Mission Lake at the mean high tide line	Bacteria (oyster waters)	Chlorophyll-*a*
2463 Mesquite Bay	01	Mesquite Bay/Carlos Bay/Ayres Bay		
2471 Aransas Bay	01	Aransas Bay		
2471A Little Bay	01	Located between Aransas Bay (Segment 2471) on the east side and Broadway Street in Rockport on the west side and Rockport Beach on the south side in Aransas County		Chlorophyll-*a*
2471RB Rockport Beach Park (Recreational Beaches)	01	Rockport (Recreational Beaches)		
2472 Copano Bay / Port Bay / Mission Bay	01	Mission Bay, Aransas River arm, and eastern shoreline	Bacteria (oyster waters)	
	02	Copano Bay		
	03	Port Bay		Chlorophyll-*a*
2473 St. Charles Bay	01	St. Charles Bay		
2481 Corpus Christi Bay	01	From the Corpus Christi Ship Channel east to Pelican Island, from Pelican Island south to Demit Island including the La Quint a Channel and the Corpus Christi Ship Channel adjacent to Redfish Bay		Copper
	02	From the Corpus Christi Ship Channel east to Pelican Island, from Pelican Island south to Demit Island including the area from the Corpus Christi Ship Channel to Demit Island (Oso Bay and City of Corpus Christi area)		
	03	From Pelican Island south to Demit Island, from Demit Island to Mustang Island and the area along Mustang Island State Park to the Corpus Christi Ship Channel		
	04	From the JFK Causeway to a line from Demit Island across to Mustang Island State Park		
2481CB Corpus Christi Bay (Rec. Beaches)	01	Corpus Christi Marina (Beach ID TX305317)		
	02	Corpus Christi Beach – Main (Beach ID TX546628)		
	03	Cole Park (Beach ID TX259473)	Bacteria	
	04	Ropes Park (Beach ID TX821303)	Bacteria	
	05	McGee Beach (Beach ID TX536781)		
	06	Poenisch Park (Beach ID TX682648)	Bacteria	

Segment Name	AU	Description	Impairments	Concerns
2481CB Corpus Christi Bay (Rec. Beaches)	07	Emerald Beach (TX199413)		Bacteria
	08	University Beach (Beach ID TX149569)		
	09	Packery Channel Park (Beach ID TX227625)		
2482 Nueces Bay	01	Nueces Bay	Copper, Zinc in edible oyster tissue	Chlorophyll-*a*
2483 Redfish Bay	01	Redfish Bay		
2483A Conn Brown Harbor	01	From the Aransas Channel confluence southeast of Aransas Pass in San Patricio County to a point 1.6 km (1 mi) northeast in Aransas County	Bacteria	Bacteria, Copper
2484 Corpus Christi Inner Harbor	01	Corpus Christi Inner Harbor - from US 181 to Viola Turning Basin	Copper	Ammonia, Nitrate
2485 Oso Bay	01	Upper bay from the abandoned Holly Road railroad tracks to Yorktown Blvd		Chlorophyll-*a*
	02	Middle bay from South Padre Island Drive (SPID) to the abandoned Holly Road railroad tracks	Bacteria, DO	Chlorophyll-*a*, Total Phosphorus
	03	Lower portion of the bay southeast of a line drawn from a point 550 meters west-northwest of the mouth of Oso Bay to the northern terminus of Shangrila Lane and to South Padre Island Drive (SPID)	Bacteria	Chlorophyll-*a*, Total Phosphorus
2485A Oso Creek	01	From the Oso Bay confluence in southern Corpus Christi to a point 4.8 km (3 mi) upstream of SH 44, west of Corpus Christi in Nueces County	Bacteria	Chlorophyll-*a*, Nitrate, Total Phosphorus
2485B Tributary of Oso Creek	01	From the Oso Creek confluence upstream to a point 5.2 km (3.2 mi) west of State Hwy 286		Total Phosphorus
2485D West Oso Creek	01	From the Oso Creek confluence upstream to a point 0.49 km (0.3 mi) west of FM 1694		Total Phosphorus
2491 Laguna Madre	01	Upper portion north of the Arroyo Colorado confluence	DO	Chlorophyll-*a*
	02	Area adjacent to the Arroyo Colorado confluence	Bacteria, DO	Chlorophyll-*a*, Nitrate
	03	Lower portion south of the Arroyo Colorado confluence		Bacteria
2491B North Floodway	01	From 0.04 mi north of Campacuas Lake and 0.32 mi west of FM 491 (Mercedes, TX) to the confluence with Lower Laguna Madre (tidal flats)		Chlorophyll-*a*, Nitrate, Bacteria
2491C Raymondville Drain	01	Raymondville Drain flowing into Lower Laguna Madre		Bacteria, Chlorophyll-a
2491C Hildalgo Drain	03	Hidalgo Main Floodwater Channel flowing into Lower Laguna Madre		Chlorophyll-a, Nitrate, Total Phosphorus

Segment Name	AU	Description	Impairments	Concerns
2492 Baffin Bay / Alazan Bay / Cayo Del Grullo / Laguna Salada	01	Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salada		Chlorophyll-*a*
2492A San Fernando Creek	01	From the Cayo Del Grullo confluence in Kleberg County upstream to the confluence with Chiltipin Creek and San Diego Creek in Jim Wells County	Bacteria	Chlorophyll-*a*, Nitrate, Total Phosphorus
2492B Los Olmos Creek	01	Tidal portion of Los Olmos Creek from the confluence with Laguna Salada upstream 10.9 km (6.8 mi) southwest of Riviera		Bacteria, Chlorophyll-a, DO
2493 South Bay	01	South Bay		
2494 Brownsville Ship Channel	01	From the Laguna Madre confluence upstream to the Port of Brownsville		DO
2494A Port Isabel Fishing Harbor	01	From the Laguna Madre confluence to 0.4 km (0.25 mi) south of SH 100 in Port Isabel	Bacteria	
2501 Gulf of Mexico	06	Port Aransas area	Mercury in edible tissue	
	10	Port Isabel area	Mercury in edible tissue	

List of Acronyms

AU	Assessment Unit
BCRAGD	Bandera County River Authority and Groundwater District
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operations
CBBEP	Coastal Bend Bays and Estuary Program
CCIH	Corpus Christi Inner Harbor
CCSC	Corpus Christi Ship Channel
cfu	colony forming units
CR	County Road
CRP	Clean Rivers Program
CWQM	Continuous Water Quality Monitoring
DO	Dissolved Oxygen
DSHS	Department of State Health Services
FM	Farm to Market
Hr	Hour
ICWW	Intracoastal Waterway
IH	Interstate Highway
I-Plan	Implementation Plan
km	kilometers
m	meters
mg/L	milligrams per liter
mL	milliliter
MSL	Mean Sea Level
NCR	Non-contact Recreation
NRA	Nueces River Authority
OW	Oyster Waters
PCB	Polychlorinated biphenyls
PCR	Primary Contact Recreation
RR	Ranch Road
RRC	Railroad Commission of Texas
RUAA	Recreational Use Attainability Analyses
SCR1	Secondary Contact Recreation 1
SCR2	Secondary Contact Recreation 2
SH	State Highway
su	Standard Units
SWQM	Surface Water Quality Monitoring
SWQMIS	Surface Water Quality Monitoring Information System
TAMU-CC	Texas A&M University – Corpus Christi
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TGLO	Texas General Land Office
TIAER	Texas Institute of Applied Environmental Research
TMDL	Total Maximum Daily Load
TPWD	Texas Parks and Wildlife Department
TSS	Total Suspended Solids
TSSWCB	Texas State Soil and Water Conservation Board
TWRI	Texas Water Resources Institute
µg/l	micrograms per liter
WPP	Watershed Protection Plan
WWTP	Wastewater Treatment Plant
24-hr	24-hour (DO)

Introduction

In 1991, the Texas Legislature passed the Texas Clean Rivers Act (Senate Bill 818) requiring basin-wide water quality assessments to be conducted for each river basin in Texas. Under this act, the Clean Rivers Program (CRP) developed an effective partnership involving the Texas Commission on Environmental Quality (TCEQ), other state agencies, river authorities, local governments, industry, and citizens. Using a watershed management approach, the Nueces River Authority (NRA) and TCEQ work together to identify and evaluate surface water quality issues (and to establish priorities for corrective action). Under CRP, NRA is responsible for the San Antonio – Nueces Coastal Basin, the Nueces River Basin, the Nueces – Rio Grande Coastal Basin, and the adjacent bays and estuaries, an area roughly 30,500 square miles, ranging from the hill country in Edwards County to San Antonio Bay in Refugio County to the Brownsville Ship Channel in Cameron County.

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To accomplish the goals set forth by the CRP, funding is allocated on a biennial cycle to CRP partners. During this reporting period, CRP partners including NRA, TCEQ Region 13 (San Antonio), Region 14 (Corpus Christi), Region 15 (Harlingen), and Region 16 (Laredo) provided water quality data for this report. NRA subcontracted five locations where water quality measurements are collected by Bandera County River Authority and Groundwater District (BCRAGD). NRA submits these to the SWQM system. Water quality data collected under approved Quality Assurance Project Plans and included in the Surface Water Quality Monitoring Information Systems (SWQMIS) database are used for water quality assessments.

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Draft 2016 Integrated Report is being finalized by TCEQ prior to submittal to EPA.

Steering Committee input provides valuable information and helps establish San Antonio-Nueces Coastal Basin, Nueces River Basin, Nueces-Rio Grande Coastal Basin, and adjoining bays and estuaries community priorities with respect to water quality. Three basin monitoring objectives were established to address the prioritized water quality concerns. The basin monitoring objectives are:

1. To provide data for water quality control programs
2. Generate historical water quality trends
3. Identify potential water quality problems

The monitoring objectives also consider the assessment of the Texas Surface Water Quality Standards (TSWQS) attainment.

Water quality is great in the headwaters of the Nueces River Basin, and alright in the San Antonio-Nueces Coastal Basin, lower Nueces River Basin, and Nueces-Rio Grande Coastal Basin. The Clean Rivers Program allows for the continuation of monitoring at most existing water quality stations in order to maintain a continuous record. The 2022 Texas Integrated Report lists the following segments as having one or more impairments: https://www.tceq.texas.gov/waterquality/assessment/22twqi/22txir

Stakeholder Participation and Public Outreach

Stakeholder Participation

CRP depends on public involvement and input from stakeholders to assist in understanding the needs of the basins and the areas of concern. The NRA steering committee serves as the focus for public input and assists with:

- Creation of specific achievable water quality objectives and basin priorities
- Review and develop work plans and allocation of resources
- Develop and review major reports
- Establish monitoring priorities and develop monitoring plans
- Improve awareness of water quality, water resources, and pollutant source issues
- Increase opportunities for citizens to identify pressing issues, concerns, and contributing ideas to the CRP process
- Expand the public's role in water quality management issues

The steering committee includes stakeholder volunteers from across NRA's area of responsibility, representing:

- Private citizens
- Fee-payers (identified in Texas Water Code 26.0135(h))
- Political subdivisions (including local, regional, and state officials)
- TSSWCB
- Other appropriate state agencies including: TPWD, Texas Water Development Board, TGLO, DSHS, Texas Department of Agriculture, RRC, and Texas Department of Transportation
- Other entities interested in water quality matters including: TCEQ regional staff, business and industry, agriculture, environmental and other public interest groups

NRA encourages stakeholder participation to provide suggestions for additional monitoring, special studies, outreach opportunities, and to be a voice for local concerns. For more information about stakeholder participation, the steering committee process, or how to become a steering committee member, visit our web page at https://nracleanriversprogram.org/ or contact NRA using the contact information at the end of this report.

Public Outreach and Education

NRA participates in numerous CRP supported activities to help educate students and adults on pollution sources, the importance of keeping our waters clean, and what they can to do help protect our rivers, lakes, and bays.

Watershed Model Demonstrations

NRA has three watershed models of the Nueces River Basin, and a third model which is owned by the City of the Corpus Christi. NRA also has a model of the Arroyo Colorado Watershed, which is on loan to the Arroyo Colorado Watershed Protection Partnership, and a second one was completed in summer 2010. A model of Oso Creek's watershed was made in 2021 and Baffin Bay was completed August 2023. These models are taken to classrooms and the

to demonstrate *point and nonpoint source pollution.* Primarily geared for 5th and 7th graders, participants of all ages enjoy participating in the demonstrations. Food coloring is dripped onto the model to simulate oil leaks, fertilized lawns, illegal dump sites, etc. Water is then squirted onto the model using spray bottles to simulate rain. Being an actual scale model of the basin, students locate where they live in the basin, and can see how pollution upstream can reach their backyard. This education program reaches over 13,000 students each year.

NRA used an **Aquifer model** in school presentations to demonstrate how water recharges a sand or karst aquifer, how wells tap an aquifer and how a plume of pollution can move through the ground and impact water quality coming from a water supply well. Students learn about groundwater aquifers, recharge, and personal responsibility.

We have two **Rainfall-Runoff-Recharge models** to illustrate the role of land cover on water quality and quantity These are delivered mostly at county agriculture fairs and stock shows and support the 4th grade study of erosion and weathering. Different types of vegetative cover are demonstrated along with bare ground and impervious cover. In the demonstration, eastern gamma, a native riparian grass, generates 100% clear ground water with no run-off.

Our **Red Rain Barn** is a miniature barn that is equipped with gutters and a rainwater collection system calibrated to show how much water can be collected by a simple system. It is an engaging tool delivered at county fairs and festivals.

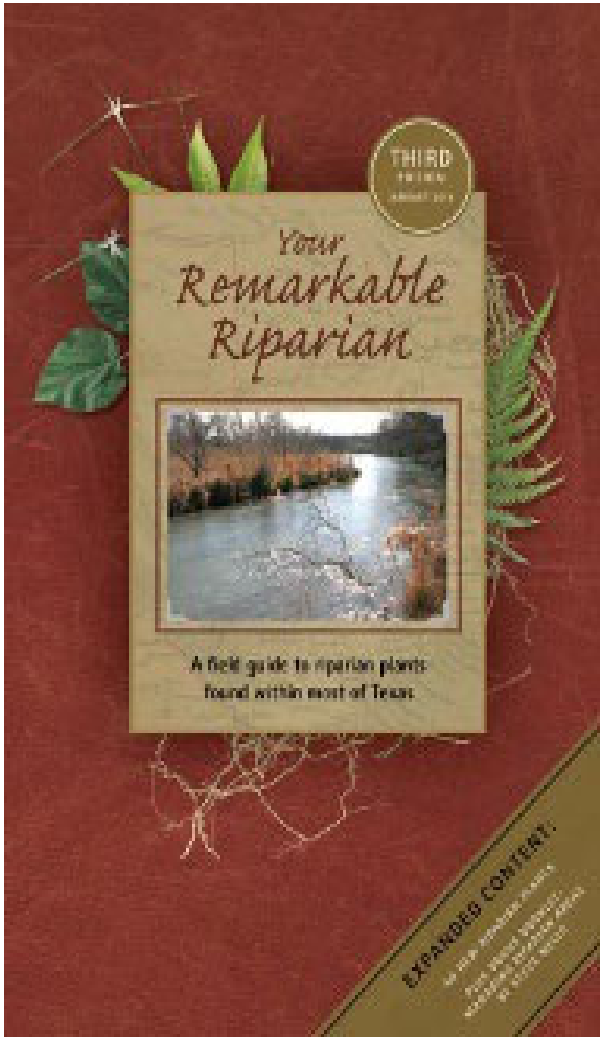
Up2U Campaign

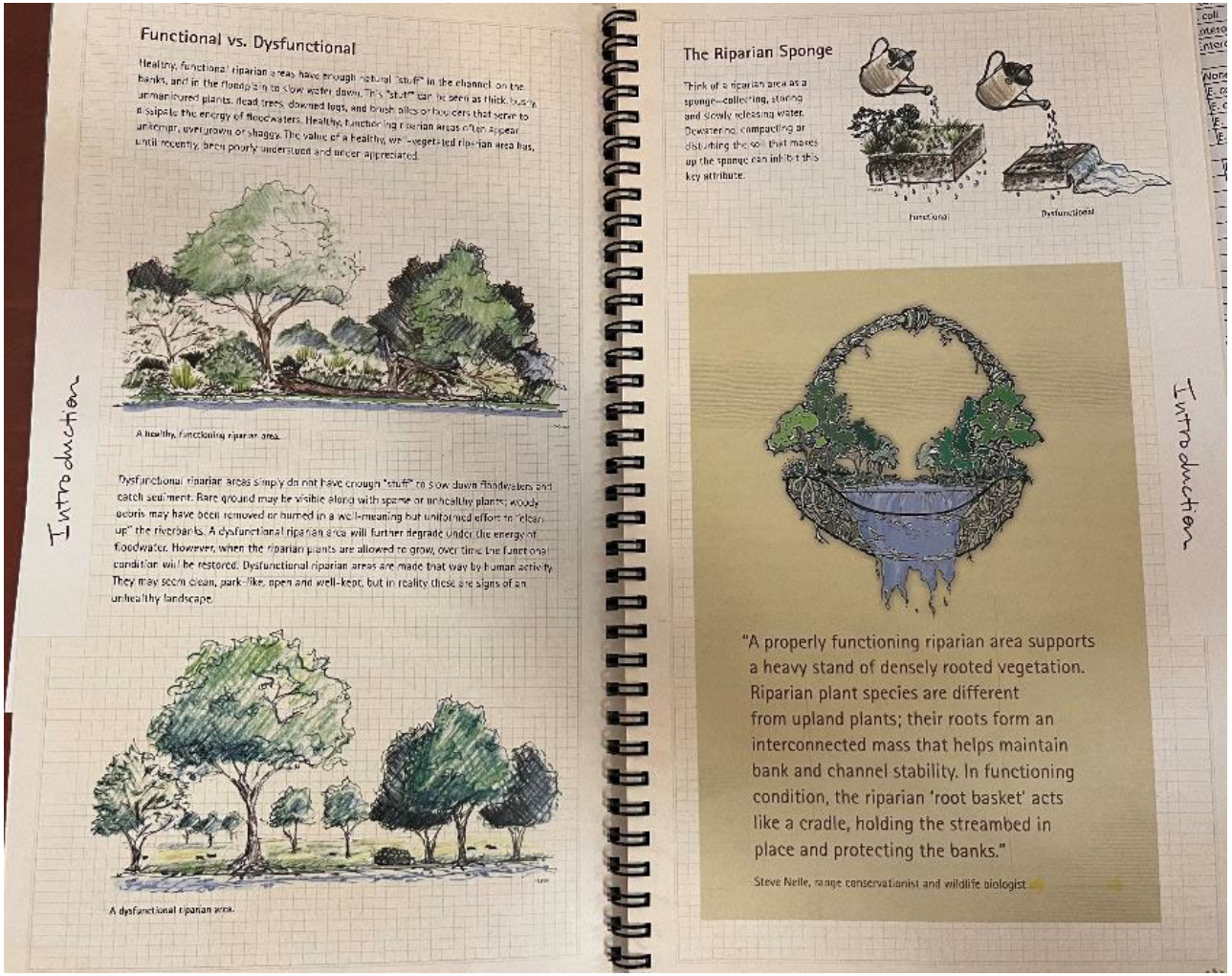
NRA, with guidance from local partners, designed and launched print and media components of the Up2U CRP in 2004 in the headwaters of the Nueces River Basin. It was expanded to include the coastal area in 2009. Partners now include the City of Corpus Christi, the City of Port Aransas, the City of Rockport, CBBEP, Friends of the Frio, Nueces County, Port Aransas Chamber of Commerce, and TCEQ. The cornerstone of the campaign is a logo emblazoned mesh litter bag which is both a litter prevention tool and an advertising tool. These bags are now being distributed to beach goers, boaters, students, and litter prevention advocates from the Nueces headwaters to the coast. NRA received the Governor's 2008 Environmental Excellence Award for Education for this project.

Clean Rivers & Beaches
Ríos y Playas Limpias
t2U SM

Riparian Network

NRA facilitates riparian landowner education focusing on how riparian areas work and what activities can hinder this function. Often misunderstood, the basic riparian dynamics are illustrated via multimedia lessons delivered on www.remarkableriparian.org. This program also resulted in the publication of the *Your Remarkable Riparian Field Guide,* a field guide to riparian plants within the Nueces River Basin, (now on its third edition) and a companion booklet *Managing Riparian Areas.* NRA works to integrate riparian understanding into all stakeholder processes associated with WPP's, RUAA's, and other special studies. Copies are available for purchase from the website.





Water Quality Monitoring

Surface water quality monitoring in South Texas is conducted by the Nueces River Authority (NRA) through the Texas Clean Rivers (CRP) Program and the Texas Commission on Environmental Quality (TCEQ) through the Surface Water Quality Monitoring (SWQM) Program. Most of the monitoring stations have been monitored for many years and provide valuable information with respect to trends and/or changing conditions. Routine water quality samples are analyzed for field, conventional, and bacteria parameters. These samples are usually collected four times per year (quarterly).
Parameters analyzed for conventional monitoring include:

- Alkalinity
- Ammonia
- Total dissolved solids (TDS)
- Total suspended solids (TSS)
- Total phosphorous
- Chloride
- Sulfate
- Nitrates
- Chlorophyll-*a*
- Pheophytin
- Total organic carbon

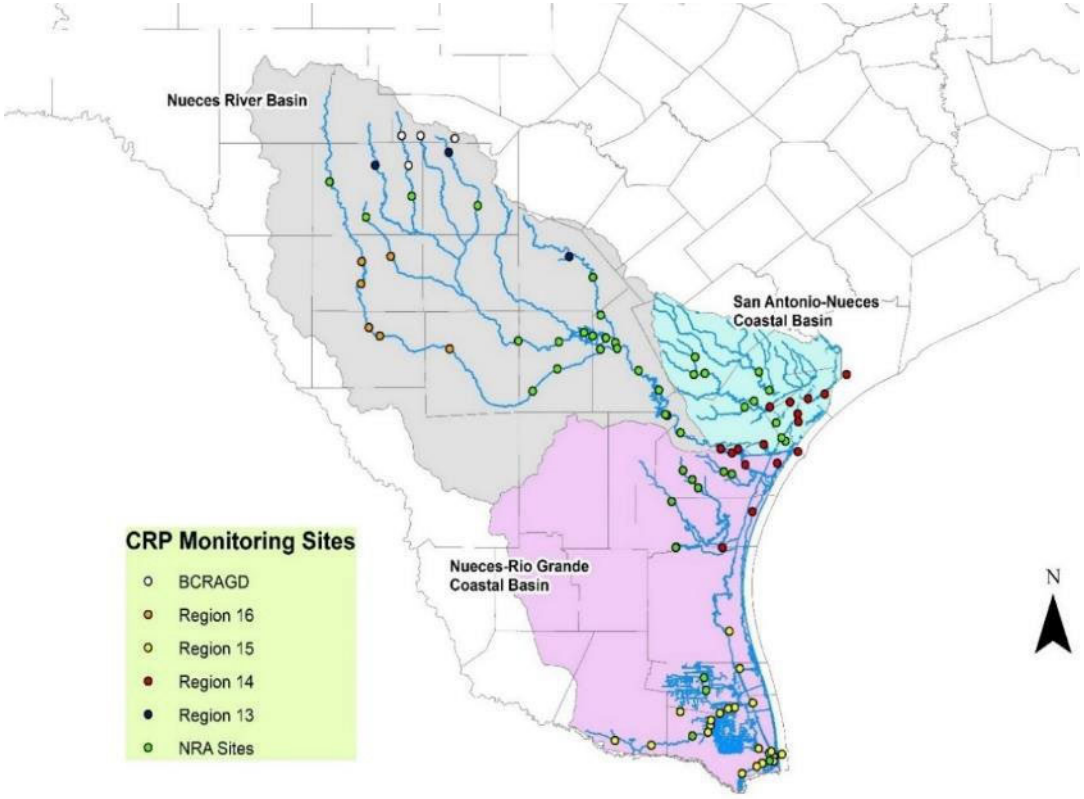
(TOC) Routine bacteria analysis

include:

- Enterococcus in saltwater and tidal segments
- *E. coli* for freshwater

Measured field parameters in the NRA CRP include:

- Dissolved oxygen (DO)
- Salinity (saltwater and tidal sites only)
- Flow (freshwater sites only)
- pH
- Water temperature
- Air temperature
- Conductivity
- Secchi depth
- Wind speed
- Wind direction.

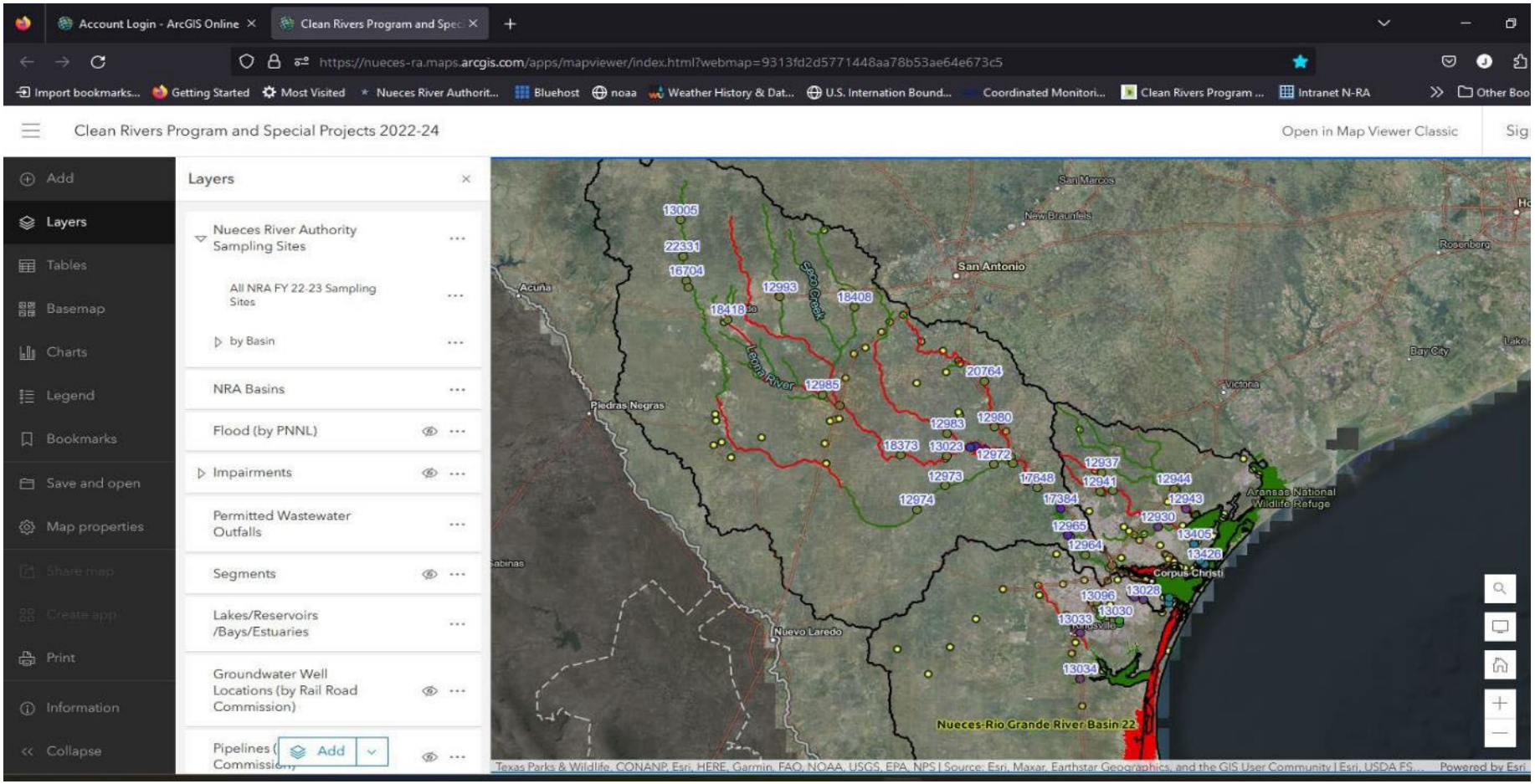


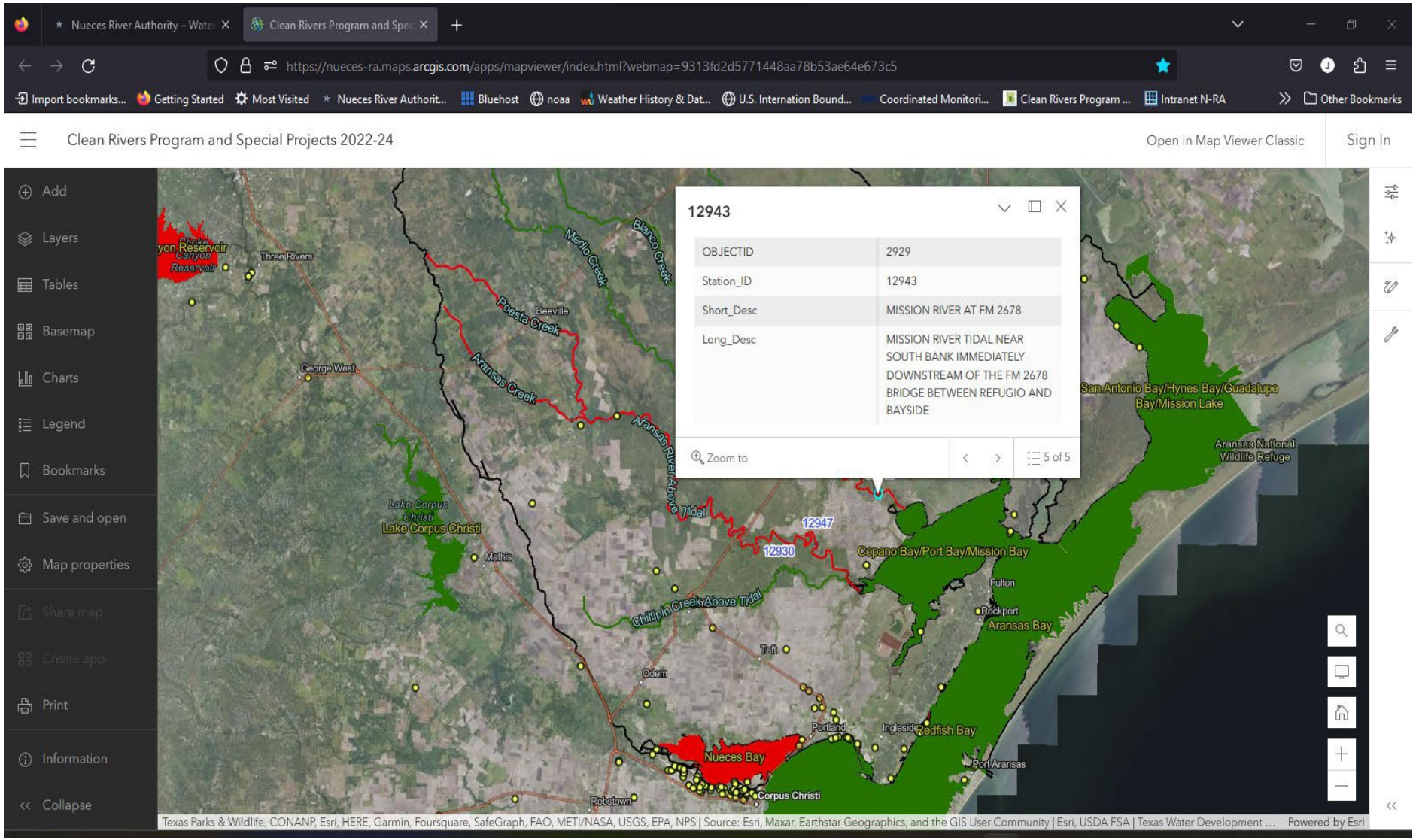
Observations of watercolor, water odor, surface conditions, turbidity, current weather, and recent rainfall amounts are notated as well. Low DO concerns are more thoroughly evaluated with 24-Hour (24-Hr) DO measurements. This monitoring is conducted when adequate flow conditions exist. Metals analysis samples are collected at select stations for various reasons including water supply protection,

monitoring historic impairments, and to provide baseline data on new water bodies before permitted facilities are constructed. FY 2024's sampling sites and type of monitoring are listed in summary tables at the beginning of each basin subsection. Detailed information is available on the Statewide Coordinated Monitoring Schedule, http://cms.lcra.org/ maintained by the Lower Colorado River Authority (LCRA).

Sampling Sites Map

An interactive map of NRA's current sampling locations, basins, WWTP effluent locations, flood maps, aquifers, and watersheds can be found at: https://nueces-ra.maps.arcgis.com/apps/mapviewer/index.html?webmap=9313fd2d5771448aa78b53ae64e673c5




Nueces River Authority – Wate
Clean Rivers Program and Spec
https://nueces-ra.maps.arcgis.com/apps/mapviewer/index.html?webmap=9313fd2d5771448aa78b53ae64e673c5
Import bookmarks...
Getting Started
Most Visited
Nueces River Authorit...
Bluehost
noaa
Weather History & Dat...
U.S. Internation Bound...
Coordinated Monitori...
Clean Rivers Program ...
Intranet N-RA
Other Bookmarks
Clean Rivers Program and Special Projects 2022-24
Open in Map Viewer Classic
Sign In
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Tables
Basemap
Charts
Legend
Bookmarks
Save and open
Map properties
Share map
Create app
Print
Information
Collapse
12943
OBJECTID 2929
Station_ID 12943
Short_Desc MISSION RIVER AT FM 2678
Long_Desc MISSION RIVER TIDAL NEAR SOUTH BANK IMMEDIATELY DOWNSTREAM OF THE FM 2678 BRIDGE BETWEEN REFUGIO AND BAYSIDE
Zoom to
5 of 5
Three Rivers
Beeville
George West
Mathis
Taft
Odem
Portland
Ingleside
Redfish Bay
Port Aransas
Corpus Christi
Nueces Bay
Robstown
Rockport
Fulton
Aransas Bay
Copano Bay/Port Bay/Mission Bay
San Antonio Bay/Hynes Bay/Guadalupe Bay/Mission Lake
Aransas National Wildlife Refuge
Lake Corpus Christi
Medio Creek
Blanco Creek
Poesta Creek
Aransas Creek
Aransas River Above Tidal
Chiltipin Creek Above Tidal
12947
12930
Texas Parks & Wildlife, CONANP, Esri, HERE, Garmin, Foursquare, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | Esri, USDA FSA | Texas Water Development ...
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FY 24 Monitoring Schedule

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
SEGMENT 2001 MISSION RIVER TIDAL													
Mission River Tidal Near South Bank Immediately Downstream of The FM 2678 Bridge Between Refugio And Bayside	12943	2001	14	NR	NR	RT			4	4		4	
SEGMENT 2002 MISSION RIVER ABOVE TIDAL													
Mission River Immediately Upstream Of US 77 Bridge At Refugio	12944	2002	14	NR	NR	RT			4	4	4	4	
SEGMENT 2003 ARANSAS RIVER TIDAL													
Aransas River Tidal At Boat Ramp At FM 629 Terminus South Of Bonnie View	12947	2003	14	NR	NR	RT			4	4		4	
Chiltipin Creek Mid Channel At Unnamed Bridge Possibly Aka Plymouth Rd 2.11 Km Downstream Of N End FM 631 Ne Of Sinton	12930	2003A	14	NR	NR	RT		2	4	4		4	New site for FY2021
SEGMENT 2004 ARANSAS RIVER ABOVE TIDAL													
Aransas River At County Road East Of Skidmore	12952	2004	14	NR	NR	RT			4	4	4	4	
Aransas Creek At US 181 North Of Skidmore In Bee County	12941	2004A	14	NR	NR	RT				4	4	4	New Station for FY2020
Poesta Creek, 77 M Downstream Of SH 202	12937	2004B	14	NR	NR	RT			4	4	4	4	
SEGMENT 2102 NUECES RIVER BELOW LAKE CORPUS CHRISTI													
Nueces River At Bluntzer Bridge On FM 666	12964	2102	14	NR	NR	RT			4	4	4	4	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
Nueces River At La Fruta Bridge On SH 359	12965	2102	14	NR	NR	RT			4	4	4	4	Chlorophyll-a, TDS and bacteria only
Nueces River Below Lake Corpus Christi At Hazel Bazemore Park Boat Ramp 4.5 Km Upstream Of I-37	20936	2102	14	NR	NR	RT			4	4	4	4	
Nueces River Immediately Upstream Of The Saltwater Barrier Dam At Labonte Park	21815	2102	14	NR	NR	RT			4	4	4	4	Chlorophyll-a, TDS and bacteria only
SEGMENT 2103 LAKE CORPUS CHRISTI													
Lake Corpus Christi Mid Lake Near The Dam 380 M Nnw Of Northern Tip Of Dam USGS Site Ac 280238097521301	12967	2103	14	NR	NR	RT			4	4		4	
Lake Corpus Christi Approx 0.2 Mi Off Western Shore Directly West Of Hideaway Hill	17384	2103	14	NR	NR	RT			4	4		4	
Nueces River At Live Oak Cr 151 Near River Creek Acres Upstream Of Lake Corpus Christi	17648	2103	14	NR	NR	RT			4	4	4	4	
SEGMENT 2104 NUECES RIVER ABOVE FRIO RIVER													
Nueces River At FM 1042 Bridge 1.2 Miles North Of Simmons	12972	2104	14	NR	NR	RT		2	4	4	4	4	
Nueces River At SH 16 South Of Tilden	12973	2104	16	NR	NR	RT			4	4	4	4	
Nueces River At FM 624	12974	2104	16	NR	NR	RT					4	4	24H DO monitoring removed for FY2020
SEGMENT 2105 NUECES RIVER ABOVE HOLLAND DAM													
Nueces River Bridge On FM 190 North Of Asherton	12976	2105	16	NR	NR	BS	4				4	4	
SEGMENT 2106 NUECES/LOWER FRIO RIVER													

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
Frio River At SH 72 In Three Rivers Tx	12977	2106	14	NR	NR	RT			4	4	4	4	
Nueces River Bridge On US 281 South Of Three Rivers	12979	2106	14	NR	NR	RT			4	4	4	4	
SEGMENT 2107 ATASCOSA RIVER													
Atascosa River At FM 99 Bridge West Of Whitsett	12980	2107	14	NR	NR	RT		2	4	4	4	4	Metals in Water added in FY2019
SEGMENT 2108 SAN MIGUEL CREEK													
San Miguel Creek At SH 16 North Of Tilden	12983	2108	16	NR	NR	RT		2	4	4	4	4	
SEGMENT 2109 LEONA RIVER													
Leona River At FM 1581 Southwest Of Pearsall	12985	2109	13	NR	NR	RT			4	4	4	4	New for FY 2023
Leona River 370 M Upstream Of FM 140	18418	2109	13	NR	NR	RT	4		4	4	4	4	
SEGMENT 2110 LOWER SABINAL RIVER													
Sabinal River Bridge At US 90 West Of Sabinal	12993	2110	13	NR	NR	RT			4	4	4	4	
SEGMENT 2111 UPPER SABINAL RIVER													
Sabinal River At FM 187 5.6 Mi South Of Vanderpool	14939	2111	13	NR	BA	RT			4	4	4	4	
Sabinal River At Ranch Road 187 Approx 10 Kilometers South Of Utopia And 400 Meters Upstream Of The Confluence With Onion Creek	21948	2111	13	NR	BA	RT			4	4	4	4	
Upper Sabinal River Immediately Upstream Of FM 187 Approximately 140 Meters Northeast Of The Entrance To Lost Maples State Natural Area	22306	2111	13	NR	BA	RT			4	4	4	4	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
SEGMENT 2112 UPPER NUECES RIVER													
Nueces River At SH 55 South Of Barksdale	13005	2112	13	NR	NR	RT			4	4	4	4	Resumed for FY 2023
Nueces River Immediately Downstream Of SH 55 Southbound Bridge Approximately 2.5 Km South Of Laguna	16704	2112	13	NR	NR	RT			4	4	4	4	
Nueces River Near Chalk Bluff Campground Appox 14.5 Miles North Of Uvalde Tx Off Of Highway 55	22330	2112	13	NR	NR	RT			4	4	4	4	new for FY 2023
Nueces River Near Cr 414 Bridge Crossing Approx 1 Mile South Of Montell Tx	22331	2112	13	NR	NR	RT			4	4	4	4	new for FY 2023
SEGMENT 2114 HONDO CREEK													
Hondo Creek Mid Channel Immediately Downstream Of SH 173 Southeast Of Hondo	18408	2114	13	NR	NR	RT			4	4	4	4	
Commissioners Creek 760 Meters Downstream Of The Impoundment At Camp Of The Ozarks Approximately 355 Meters South Of FM 470 Near The City Of Tarpley	22227	2114A	13	NR	BA	RT			4	4	4	4	
SEGMENT 2115 SECO CREEK													
Seco Creek At SH 470 Approximately 10 Mi West Of Tarpley	13017	2115	13	NR	BA	RT			4	4	4	4	
SEGMENT 2116 CHOKE CANYON RESERVOIR													
Choke Canyon Reservoir Near The Dam 422 M South And 129 M East Of Spillway Channel USGS Site Ac	13019	2116	14	NR	NR	RT	12		12	12		12	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
Choke Canyon Reservoir Mid Lake 15 M E Of Live Oak/Mcmullen County Line Near Old Hwy 99 1.25 Km North Of C C State Park Point	13020	2116	14	NR	NR	RT	12		12	12		12	
Choke Canyon Reservoir Approx 0.45 Km Southeast Of FM 99 Southern Most Bridge Crossing The Frio River Arm	17389	2116	16	NR	NR	RT	12	2	12	12		12	Metals in Water added for FY2019
Choke Canyon Reservoir Approx 553 Meters Upstream From The Frio River & San Miguel Creek Confluence	22328	2116	16	NR	NR	RT	4		12	12		12	New for FY 2023
SEGMENT 2117 FRIO RIVER ABOVE CHOKE CANYON RESERVOIR													
Frio River At SH 16 In Tilden	13023	2117	16	NR	NR	RT		2	4	4	4	4	
Frio River At Ih 35 Northbound Bridge North Of Dilley	13024	2117	13	NR	NR	RT			4	4	4	4	New for 2023
Frio River Immediately Upstream Of SH 97 North Of Fowlerton	18373	2117	16	NR	NR	RT			4	4	4	4	
SEGMENT 2202 ARROYO COLORADO ABOVE TIDAL													
Arroyo Colorado At US 77 In Sw Harlingen	13079	2202	15	NR	NR	RT			4	4	4	4	
SEGMENT 2204 PETRONILA CREEK ABOVE TIDAL													
Petronila Creek At FM 892 Se Of Driscoll	13094	2204	14	NR	NR	RT			4	4	4	4	
Petronila Creek At FM 665 East Of Driscoll	13096	2204	14	NR	NR	RT			4	4	4	4	
Petronila Creek 181 Meters West And 6 Meters South	20806	2204	14	NR	NR	RT			4	4		4	

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
From The Intersection Of Alice Road And Lost Creek Road													
SEGMENT 2472 COPANO BAY/PORT BAY/MISSION BAY													
Port Bay At Middle Of SH 188 West Of Rockport	13405	2472	14	NR	NR	RT		2	2	2		2	Metals in Water resumed in FY2023
SEGMENT 2483 REDFISH BAY													
Redfish Bay At SH 361 At 3Rd Bridge Between Aransas Pass And Port Aransas	13426	2483	14	NR	NR	RT			4	4		4	
Conn Brown Harbor Mid Harbor 50 M Northeast Of The Intersection Of Huff St And East Maddox Ave In Aransas Pass	18848	2483A	14	NR	NR	RT		2	2	2		2	Metals in Water resumed in FY2023
SEGMENT 2485 OSO BAY													
Oso Bay Immediately Offshore At Tip Of Peninsula At Padre Island Drive/Southbound SH 358	13440	2485	14	NR	NR	RT			4	4		4	
Oso Bay 40 M Upstream Of Ocean Drive And Approximately 50 M West Of Eastern Landfall Of Bridge	13442	2485	14	NR	NR	RT			4	4		4	New Site for FY2020
Oso Creek Immediately Downstream Of SH 286 South Of Corpus Christi	13028	2485A	14	NR	NR	RT			4	4		4	
Oso Creek Immediately Downstream Of FM 763 Southwest Of Corpus Christi	13029	2485A	14	NR	NR	RT			4	4	4	4	E. coli as bacteria indicator starting in FY2020
SEGMENT 2491 LAGUNA MADRE													
Hidalgo Main Floodwater Channel At FM 1420 1.65 Km South Of Intersection	22003	2491 C	15	NR	NR	RT			4	4	4	4	New Site for FY 2018

Site Description	Station ID	Waterbody ID	Region	SE	CE	MT	24 hr DO	Metal Water	Conv	Bacteria	Flow	Field	Comments
With FM 490 East Of Raymondville													
Raymondville Drain At Willacy County Road 445 800 Meters North Of Intersection With FM 3142 East Of Raymondville	22004	2491 C	15	NR	NR	RT			4	4	4	4	New Site for FY 2018
SEGMENT 2492 BAFFIN BAY/ALAZAN BAY/CAYO DEL GRULLO/LAGUNA SALADA													
San Fernando Creek At US 77 At Kingsville	13033	2492A	14	NR	NR	RT			4	4	4	4	E. coli is the indicator bacteria as of FY 2018
Los Olmos Creek Immediately Upstream Of US 77 South Of Riviera	13034	2492B	14	NR	NR	RT			4	4		4	Site added for FY2019
SEGMENT 2494 BROWNSVILLE SHIP CHANNEL													
San Martin Lake Mid Estuary 2.04 Km East And 0.80 Km North Of The Hwy 48 Bridge Northeast Of Brownsville	22170	2494 C	15	NR	NR	RT			4	4		4	New site for FY 2020

Water Quality Analysis

For this Basin Summary Report, each segment within the San Antonio – Nueces Coastal Basin, Nueces River Basin, Nueces – Rio Grande Coastal Basin, and the adjacent Bays and Estuaries is discussed in detail. For each segment, there is:

- a description of the segment and its watershed;
- a land use / land cover map of the watershed which includes the location of the sampling sites used for the data analysis in this report and / or is currently being monitored;
- references to any special studies that have been done within the watershed;
- descriptions of the stations used in the water quality analysis;
- summaries of the 2022 Integrated Report assessment;
- some results of the statistical water quality analysis (see below for the parameter list); and
- graphs of concerns, impairments, and trends along with possible explanations.

The Integrated Report assesses all Surface Water Quality Monitoring Information System (SWQMIS) database data for a 7-year period. Assessments are done every two years. In most cases, a minimum of 10 samples is required to conduct the assessment. In some cases, the 10 samples are obtained by using a slightly longer period of time.

The statistical water quality analysis for this report includes analysis of available data from January 2000 through November 2022 for a representative station of each Assessment Unit (AU) of the segment. The most downstream station of each AU, when appropriate, was used. If there were not enough data points for the statistical analysis, the associated discussion will state that NRA will continue to collect data to resolve unverifiable or insufficient data.

Trend analysis was conducted on available data from January 1, 2000 through November 2022. In most cases, the analysis was only conducted when there was **at least 9 years of data, without significant gaps, and at least 19 data records**. Significant trends (t-ratio => |2| and p-value <0.1) were evaluated.

- t-ratio is related to the change of the measured values over time.
- p-value is the probability that a calculated test statistic occurred by chance alone.

Therefore, the combination of a ***high t-ratio and a low p-value*** is *indicative* of a **significant trend.**

Trend analysis was also conducted for the fresh water segments for the parameters with sufficient data. All the data from the reservoirs have associated water level data.

The water body uses and corresponding parameters include:

- Aquatic Life Use
  - Dissolved Oxygen (DO)
- Recreation Use
  - Bacteria:
    - *E.coli* for fresh water segments
    - Enterococcus for tidal and marine segments
- General Use
  - water temperature
  - pH
  - ammonia
  - chlorophyll-*a*
  - nitrate
  - total phosphorus
  - Total Kjeldahl Nitrogen (TKN)
  - chloride – fresh water segments only
  - sulfate – fresh water segments only
  - total dissolved solids (TDS) – fresh water segments only

Terminology and Analysis Methodology

The graphs show how the data reflect the statistical and trend analysis by:

- The title includes the AU and the parameter.
- The blue line represents the numerical value of the parameter.
- The red line represents the trend direction over the past 10 years

Data for the analyses were extracted from the SQWMIS database using the TCEQ's SWQMIS Data Tool: https://www80.tceq.texas.gov/SwqmisWeb/public/crpweb.faces

The SQWMIS database consists of data that has been collected under approved Quality Assurance Project Plans and have been screened for accuracy.

Parameters are represented in SWQMIS by five-digit numeric codes. A parameter may be represented by multiple codes depending on the analysis method under which a water quality sample was analyzed. The parameter codes, in order of priority, used for this analysis are:

DO → 00300
E. coli → 31699, 31700, 31648
Enterococcus → 31701, 31649
Water temperature → 00010 pH
→ 00400
Ammonia → 00610, 00608
Chlorophyll-*a* → 70953, 32211
Nitrate → 00620, 00621, 00630, 00593, 00631
Total Phosphorus → 00665
Chloride → 00940, 00941
Sulfate → 00945
TDS → 70300, 70294, 47004, 70301, 00094, 00095
(00094 and 00095 are conductivity readings and multiplied by 0.65 to calculate TDS.)

The data for each parameter reviewed were imported into an Excel spreadsheet. The data were scanned and same-day measurements were removed. Data recorded as a "<" value indicated that the parameter was not present in concentrations greater than the detection limit for that analysis. This < value differs based on the lab doing the analysis and the detection limits at that time. It does not necessarily mean that it is not present at a lower concentration. But for review purposes, all of these values are considered "non- detects." For analysis and graphing, all of these values were reduced to the lowest non-detect value of the data set. Data reported below the lowest non-detect value were changed to the lowest non-detect value.

Trend analysis was performed in Microsoft Excel with data from 2000 to present. Simple linear regression follows the hand calculation equations from Zar Jerrold, H. (1996) Biostatistical Analysis 3rd edition. For this test, data needed at least 19 data records with no significant gapx. The calculations within the spreadsheet returned the t-ratio and p-value results for each parameter over time and with respect to flow or water level. The analysis indicated a trend if the t-ratio => |2| and the p-value < 0.1.

Water Quality Conditions

In this report, you will see many references to the 2022 IR. This refers to the 2022 Texas Integrated Report (IR).
The IR assesses suitable data in the State's water quality database (Surface Water Quality Monitoring Information System [SWQMIS]) for a 7-year period. A new 7-year data set is assessed every two years. The 2022 IR includes data from December 1, 2013, through November 30, 2020. For this report, the analysis and discussion of the concerns and impairments in each segment is based on the 2022 IR.

TCEQ assessed a variety of parameters including DO, pH, water temperature, total phosphorus, nitrates, ammonia, chlorophyll-a, and bacteria (*E. coli* for freshwater segments and Enterococcus on tidal and marine segments) values on each assessment unit (AU) of a classified segment where data were available. Metals data were assessed where applicable. A single segment can consist of one to several AUs. TDS, chloride, and sulfate are assessed for the entire segment on freshwater segments only. AU boundaries are occasionally modified to be more representative and to provide a more accurate analysis.

Impairments for the following parameters are defined as follows:

Parameter	Criteria	Calculation Used for Impairment
Total Dissolved Solids (TDS), chloride, and sulfate	Segment specific	Average of samples are above the criteria
Dissolved Oxygen (DO) for High Aquatic Life Use (in perennial streams and reservoirs)	3.0 mg/L[1] grab sample 5.0 mg/L 24-Hr average or Segment specific	10% of samples are below either criterion
DO for High Aquatic Life Use (in tidal streams and estuaries)	3.0 mg/L[1] grab minimum 4.0 mg/L 24-Hr average or Segment specific	
pH	6.5 su[2] and 9 su	10% of samples are above or below the criteria
E. coli (Primary Contact Recreation 1)	126 cfu[3]	Geometric mean is greater than the criteria
Enterococci (Primary Contact Recreation 1)	35 cfu	Geometric mean is greater than the criteria

Notes:

[1] = milligrams per liter
[2] = standard units
[3] = colony forming units

Concerns for the following parameters are defined as follows:

Parameter	Screening Levels*			Calculation Used for Concern
	Stream	Reservoir	Tidal Stream	
Ammonia-Nitrogen	0.33 mg/L	0.11 mg/L	0.46 mg/L	20% of samples are above the criteria
Nitrate	1.95 mg/L	0.37 mg/L	1.10 mg/L	
Total phosphorus	0.69 mg/L	0.20 mg/L	0.66 mg/L	
Chlorophyll-a	14.1 µg/l**	26.7 µg/l	21.0 µg/l	

*Screening levels to identify concerns have been developed by the State to enable an assessment of water quality for some parameters, primarily nutrients that only have a narrative criterion. The levels were developed by calculating the 85th percentile for all water quality data in the TCEQ's water quality database over a 10-year period.
**µg/l: micrograms per liter

The following table explains the potential impacts when the water quality standards are not met and the most common causes for concerns or impairments.

Parameter	Impact	Cause
DO	Organisms that live in water need oxygen to live. In waters with depressed (lower) DO levels, organisms may not have sufficient oxygen to survive.	Modifications to the riparian zone, human activity that causes water temperatures to increase, increase of organic matter, bacteria, and/or over abundant algae.
pH	Most aquatic life is adapted to live within a narrow pH range. Different organisms can live and adjust to differing pH ranges, pH below 4 (the acidity of orange juice) or above 12 (the pH of ammonia) is lethal to most fish species.	Industrial and wastewater discharge, runoff from quarry operations, and/or accidental spills.
Ammonia	Elevated (higher) levels of ammonia in the environment can adversely affect fish and invertebrate reproductive capacity and can reduce growth of the young.	Ammonia is excreted by animals and is produced during the decomposition of plants and animals. It is an ingredient in many fertilizers and is also present in sewage, storm water runoff, certain industrial wastewaters, and runoff from animal feedlots.
Nutrients Nitrates Total phosphorus	These nutrients increase plant and algae growth. When plants and algae die, the bacteria that decompose them use and deplete the oxygen available for fish and other living aquatic life. High levels of nitrate and nitrites can produce Nitrite Toxicity, or "brown blood disease," in fish. This disease reduces the ability of blood to transport oxygen throughout the body.	Nutrients are found in effluent (liquid waste/sewage discharged in a body of water) released from wastewater treatment plants (WWTPs), fertilizers, and agricultural runoff carrying animal waste from farms and ranches. Soil erosion and runoff from farms, lawns, and gardens can also add nutrients to the water.
Chlorophyll-*a*	Chlorophyll-*a* is the photosynthetic pigment found in all green plants, algae, and cyanobacteria. Elevated levels indicate abundant plant growth which could lead to reduced DO levels.	Modifications to the riparian zone, human activity that causes water increases in organic matter, nutrients, bacteria, and/or over abundant algae.
TSS	TSS measures particles that are suspended in water and will not pass through a filter which can affect light penetration. Deposition of these particles can bury and/or destroy benthic habitat for most species of aquatic insects, snails, and crustaceans.	TSS originates from multiple point and nonpoint sources but most commonly results from erosion of soil substrates. A good measure of the upstream land use conditions is how much TSS rises after a heavy rainfall.
TDS Chloride Sulfate	High levels of these parameters may affect the aesthetic quality of water, interfering with washing clothes and corroding plumbing fixtures. They can also affect the permeability of ions in aquatic organisms.	Mineral springs, carbonate deposits, salt deposits, and sea water intrusion are natural sources of these parameters. Other sources can be attributed to oil exploration, drinking water treatment chemicals, storm water and agricultural runoff, and wastewater discharges.
Conductivity	Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate, and sodium in the stream.	Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate and sodium in the stream.
Secchi Disc	Transparency is a measure of the depth to which light is transmitted through the water column and thus the depth at which aquatic plants can grow.	Low secchi disc depth is an estimate of turbidity.
Turbidity	Turbidity is a measure of the water clarity or light transmitting properties Turbidity is a measure of the water clarity or light transmitting properties	Increases in turbidity are caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, plankton, and other microscopic organisms.

Bacteria E. Coli or Enterococci	Although fecal coliform bacteria may not themselves be harmful to human beings, their presence is an indicator of recent fecal matter contamination and that other pathogens dangerous to human beings may be present and that other pathogens dangerous to human beings may be present.	Present naturally in the digestive system of all warm-blooded animals, these bacteria are in all surface waters. Poorly maintained or ineffective septic systems, overflow of domestic sewage or non-point sources and runoff from animal feedlots can elevate bacteria levels.
Temperature	Water temperature affects the oxygen content of the water, with warmer water unable to hold as much oxygen. When water temperature is too cold, cold-blooded organisms may either die or become weaker and more susceptible to other stresses, such as disease or parasites.	Colder water can be caused by reservoir releases. Warmer water can be caused by removing trees from the riparian zone, soil erosion, or use of water to cool manufacturing equipment.
Hardness	Hardness is a composite measure of certain ions in the water, primarily calcium and magnesium. The hardness of the water is critical due to its effect on the toxicity of certain metals	Higher hardness concentrations in the receiving stream can result in reduced toxicity of heavy metals.
Stream flow	Flow is an important parameter affecting water quality. Low flow conditions common in the warm summer months create critical conditions for aquatic organisms.	At low flows, the stream has a lower assimilative capacity for waste inputs from point and nonpoint sources.
Conductivity	Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate and sodium in the stream.	Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate and sodium in the stream.

Recreational Use Designations

Beginning in 2010, TCEQ initiated a Water Quality Standards revision by expanding categories for Recreational Uses. Below is a breakdown of definitions of each designation and corresponding bacterial concentrations.

Primary contact recreation 1 (PCR1): Water recreation activities, such as wading, swimming, water skiing, diving, tubing, surfing, whitewater kayaking, canoeing, and/or rafting, involving a significant risk of ingestion of water. For *E. coli*, the geometric mean criterion is 126 cfu per 100 milliliters of sampled water; for Enterococcus, the geometric mean criterion is 35 cfu per 100 milliliters of sampled water.

Primary contact recreation 2 (PCR2): Water recreation activities, such as wading, swimming, water skiing, diving, tubing, surfing, whitewater kayaking, canoeing, and/or rafting, that involve a significant risk of ingestion of water but occur less frequency than PCR1 due to the physical characteristics of the water body or limited public access. For E. coli, the geometric mean criterion is 206 cfu per 100 milliliters.

Secondary contact recreation 1 (SCR1): Water recreation activities that commonly occur but have limited body contact incidental to shoreline activity, such as fishing, commercial and recreational boating, and rafting. These activities are presumed to pose a less significant risk of water ingestion than PCR1 or PCR2. For *E. coli*, the geometric mean criterion is 630 cfu per 100 milliliters of sampled water. For Enterococcus, the geometric mean criterion is 175 colonies er 100 milliliters of sampled water.

Secondary contact recreation 2 (SCR2): Water recreation activities with limited body contact incidental to shoreline activity, such as fishing, commercial and recreational boating, and rafting, limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion that occur less frequently than SCR1 due to (1) physical characteristics of the water body and/or (2) limited public access. For *E. coli*, the geometric mean criterion is 1,030 cfu per 100 milliliters of sampled water.

Noncontact recreation (NCR): Activities, such as ship and barge traffic, birding, and using hike and bike trails near a water body, not involving a significant risk of water ingestion, and where primary and secondary contact recreation should not occur because of unsafe conditions. For *E. coli*, the geometric mean criterion is 2,060 cfu per 100 milliliters of sampled water. For Enterococcus, the geometric mean criterion is 350 cfu per 100 milliliters of sampled water.

Recreational Use Designations	E. coli (Freshwater) cfu/100 mL	Enterococcus (Salt Water) cfu/100 mL
Primary Contact Recreation 1	126	35
Primary Contact Recreation 2	206	*
Secondary Contact Recreation 1	630	175
Secondary Contact Recreation 2	1030	*
Noncontact Recreation	2060	350

*There is no PCR2 or SCR2 designation for Enterococcus.

Recreational Use Attainability Analysis (RUAA)

To determine the appropriate designation, a Recreational Use Attainability Analysis (RUAA) must be conducted. A RUAA is designed to: capture information of the types of recreational uses occurring in a water body; document physical stream characteristics that affect recreational uses; and document observed, historical, and anecdotal recreational uses. This information is obtained via questionnaires, field surveys, and research. Until a RUAA is conducted and a designation other than primary contact recreation is found to be more appropriate, a segment will continue to be assessed using the primary contact recreation criteria.

Aquatic Life Monitoring (ALM)

Aquatic Life Monitoring (ALM) is a type of monitoring that's used to derive baseline data on fish communities, benthic macroinvertebrate communities, and physical habitat to determine if designated or presumed aquatic life uses are being attained and/or are appropriate for the waterbody. ALM activities include fish and aquatic invertebrate collection, habitat assessment, 24-hour dissolved oxygen data collection, and optional water chemistry analysis. Typically, two biological events are required over one year. One event is to be conducted during the critical period (July 1 - September 30) and the other event during the non-critical portion of the index period (March 15 - June 30 or October 1 – October 15) with at least one month between monitoring events.

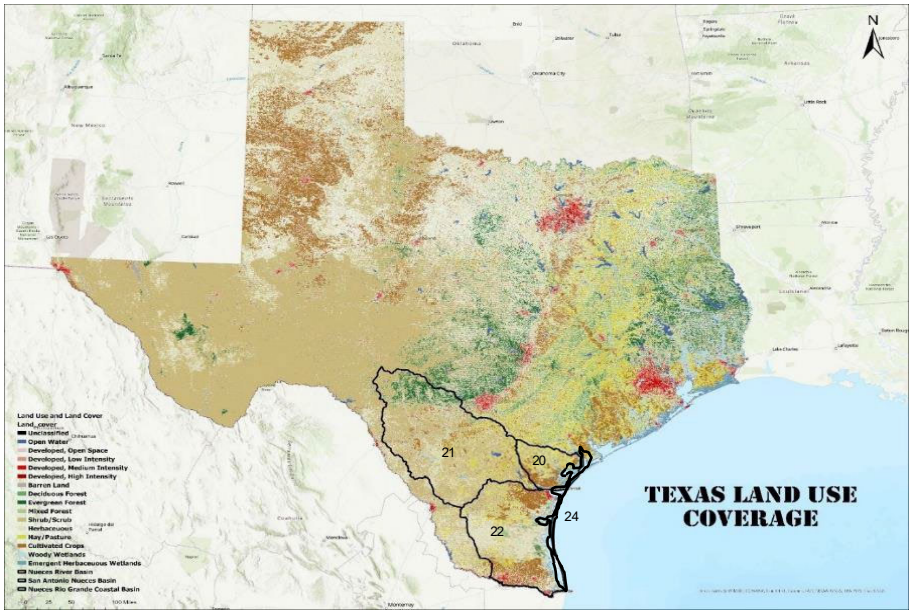
Least Disturbed Stream (LDS)

Least Disturbed Stream (LDS) monitoring is a type of ALM that is conducted in streams to define reference conditions for Texas streams and represent the "best available" streams in each of the ecoregions in Texas. LDS studies serve as the basis for developing benchmarks against which a biological monitoring program can assess the biological condition of test sites. LDS studies were conducted on Segment 2105 – Nueces River above Holland Dam in 2018.

Watershed Summaries

This section contains detailed information for each of the three basins in NRA's area of responsibility for CRP: the San Antonio – Nueces Coastal Basin, the Nueces River Basin, and the Nueces – Rio Grande Coastal Basin. Information included for each of the basins contains a map of the basin, a description of the basin, and a summary of concerns and impairments identified in the 2022 IR.

The map shows the segment boundaries; includes land use/land cover information of the contributing watershed (see key below); the location of sampling sites, wastewater treatment plants (WWTPs), and confined animal feeding operations (CAFO); the names of nearby cities and major roads; and an inset of the watershed's location within the basin. Below is a sample map.



BASIN 20: San Antonio – Nueces Coastal

Approximately 3,100 square miles, covering counties: Aransas, Bee, Goliad, Karnes, Live Oak, Refugio, and San Patricio. There are two minor rivers in the watershed, the *Mission River* and the *Aransas River*, but no watercourses that maintain significant stream flow.

Being a coastal area, the basin is naturally host to several state-operated recreational areas.

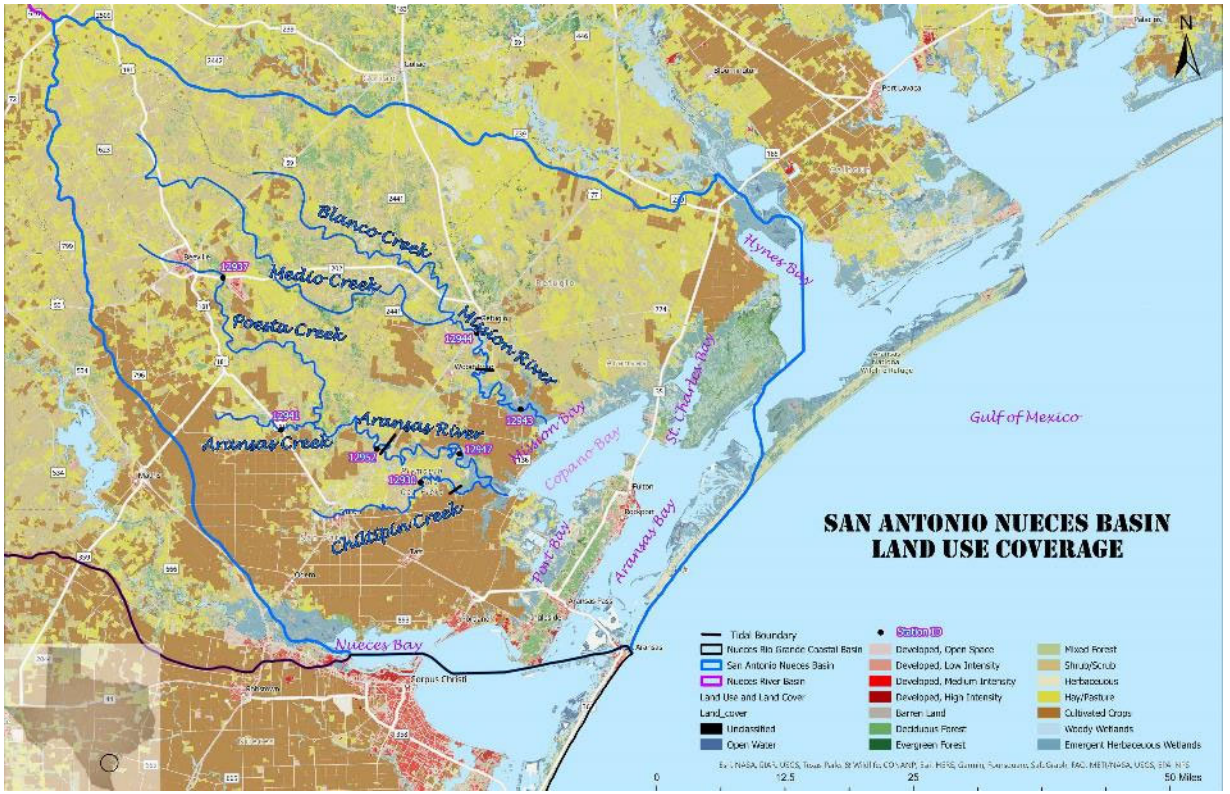
These include:

- Goose Island State Park near Rockport,
- Copano Bay State Fishing Pier along SH 35 north of Fulton,
- Fulton Mansion State Historic Park, &
- Aransas National Wildlife Refuge.

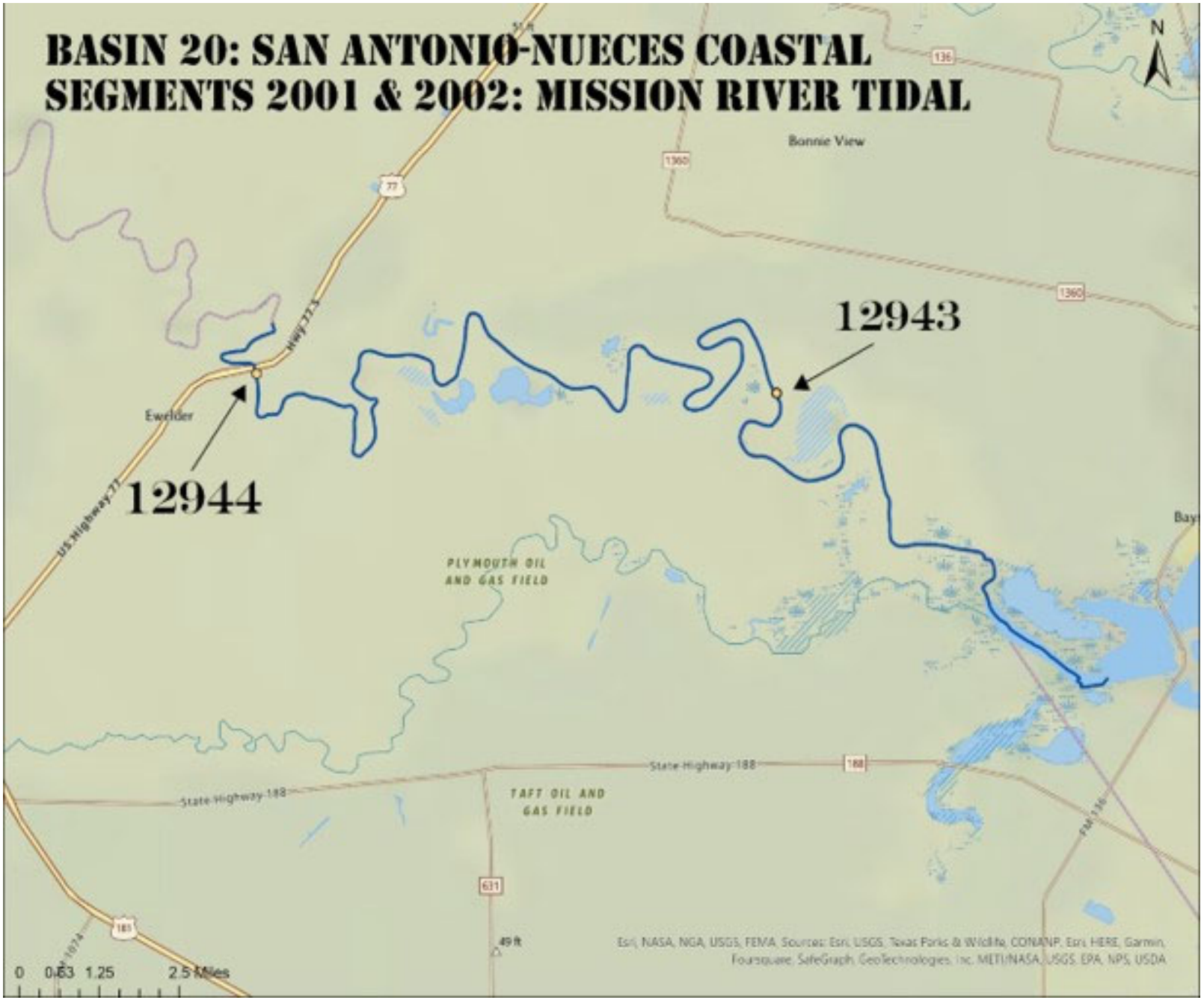
The basin is largely rural, with the dominant industries being *crop farming* and *cattle rearing*.

Blanco and Medio creeks flow into Mission River, Poesta, Aransas, and Chiltipin creeks, which flow into Aransas River.

Copano Creek discharges directly into Copano Bay. Tributaries into St. Charles Bay are also within this basin.



The tidal segments of both the *Aransas* and *Mission* rivers are impaired for *bacteria* for *primary contact recreation*. Copano Bay is located within Basin 24 – Bays and Estuaries.


BASIN 20: SAN ANTONIO-NUECES COASTAL
SEGMENTS 2001 & 2002: MISSION RIVER TIDAL
N
Bonnie View
12943
12944
Ewerlder
US Highway 77
PLYMOUTH OIL AND GAS FIELD
State Highway 188
TAFT OIL AND GAS FIELD
0 0.63 1.25 2.5 Miles
Esri, NASA, NGA, USGS, FEMA, Sources: Esri, USGS, Texas Parks & Wildlife, CONANP, Esri HERE, Garmin, Foursquare, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Segment 2001: Mission River Tidal

Pinkladies

From the confluence with Mission Bay to a point 7.4 km (4.6 mi) downstream of US 77 in Refugio County. The segment is a single Assessment Unit (AU). Its watershed is 199,798 acres and is predominately ranch and farmland with only one community known as the town of Woodsboro.

According to the 2022 IR, Segment 2001 is **impaired** for **bacteria** (Enterococcus) and has a screening level **concern** for **chlorophyll-*a***. Segment 2001 has been impaired for bacteria, which is the primary contact recreation indicator, since the 2004 IR and was included in the Copano Bay Total Maximum Daily Load (TMDL).

Special Studies:
In 2011, TMDLs were established. TMDLs were recommended by stakeholders. The Mission and Aransas Tidal bacteria TMDL was adopted, and the Implementation Plan (I-Plan) was approved in 2016. The segment was also included in the Mission and Aransas River Watershed Protection Plan (WPP) that was completed by Texas Water Resources Institute (TWRI) in 2019. The goal of the WPP is to restore water quality by establishing a 5-year implementation schedule and work to reduce runoff pollution concentrations from entering the river and coastal zone. The final report can be found at: https://twri.tamu.edu/media/4175/mission-and-aransas-rivers-watershed-protection-plan-final-draft.pdf

Station 12943 – Mission River Tidal at FM 2678

Segment 2001 – 12943

Water Quality Monitoring Results:
A statistically significant increasing trend was observed for Total Phosphorus.
Impairment: *Bacteria (Recreation Use) 4a*
Concern: *Chlorophyll-a*

Parameter	Number of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	85	46	310	155	-1.414	0.161	
Chloride (mg/L)	85	1.6	28400	5510	1.932	0.057	
Chlorophyll-a (µg/L)	78	112	45700	8260	1.920	0.059	
Dissolved Oxygen (mg/L)	101	1.9	15.9	7.3	0.331	0.741	
Log Enterococci (MPN/100 mL)	97	10	4600	296	0.675	0.501	
Nitrate Nitrogen, Total (mg/L)	87	0.01	0.81	0.1	-1.832	0.070	
pH (S.U.)	101	7.1	8.9	8.1	0.707	0.481	
Pheophytin-a (µg/L)	81	2	56.8	4.1	1.540	0.128	
Sulfate (mg/L)	85	5.000	3410	711.4	1.933	0.057	
Total Phosphorus (mg/L)	99	0.06	1.9	0.2	2.264	0.026	↑
Water Temperature (°C)	101	8	32.2	23.4	0.731	0.467	

Runoff from private landowners and increased wastewater effluent have contributed to the significant increase in total phosphorus.

Segment 2002: Mission River Above Tidal

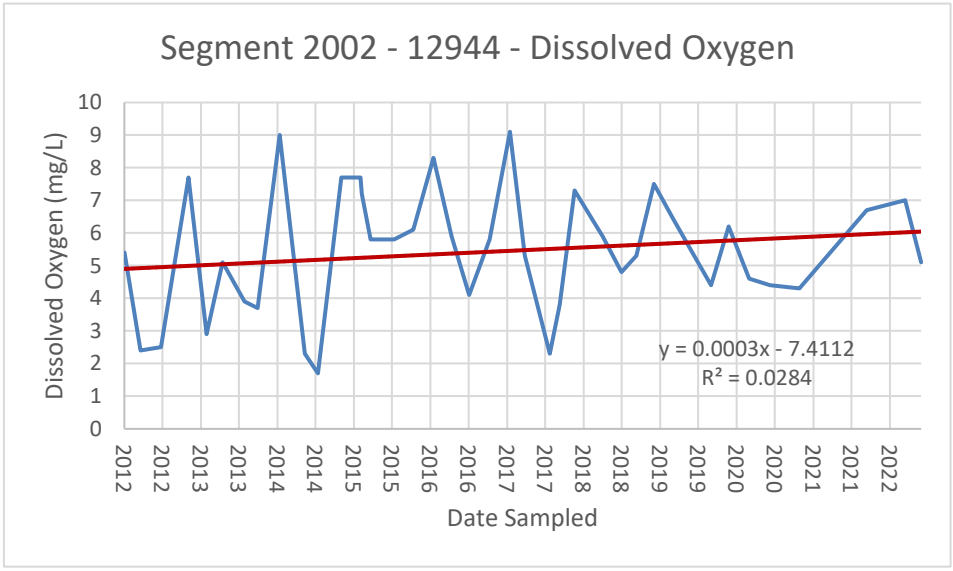
Mission River Above Tidal Segment 2002 flows 9 miles from the confluence of Blanco and Medio creeks to a point 4.6 miles downstream of US 77 in Refugio County. Its watershed is 452,172 acres. The area is predominately ranch and farmland. The Town of Refugio (pop. 2,806) is the only community within the watershed.

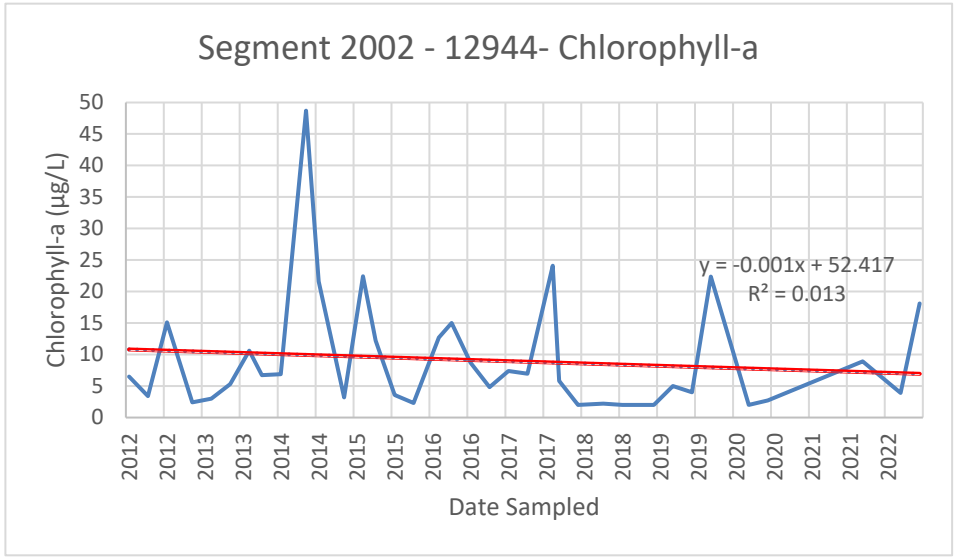
Water Quality - Segment 2002 has **concerns** for **depressed dissolved oxygen** (grab screening level) and **chlorophyll-a** in the 2022 IR. All other parameters met their criteria. Wastewater plants are starting to be looked at in the Mission Aransas watershed. NRA has helped other wastewater plants meet demand and will turn focus to the Aransas Watershed soon. Bacteria has significantly improved since 2012 and is even delisted from the IR.

Special Studies:
In 2011, after extensive data collection, analysis, and water quality efforts, TMDLs were recommended by stakeholders. The Mission and Aransas Tidal bacteria TMDL was adopted, and the I-Plan was approved in 2016. The segment was also included in the Mission and Aransas River WPP that was completed by TWRI in 2019. The goal of the WPP is to restore water quality to water quality standards by establishing a 5-year implementation schedule and work to reduce runoff pollution concentrations from entering the river and coastal zone. The final report can be found at:

https://twri.tamu.edu/media/4175/mission-and-aransas-rivers-watershed-protection-plan-final-draft.pdf.

Station 12944 – Mission River Above Tidal at US-77 in Refugio





Station 12944 Dissolved Oxygen in the last ten years has increased, with the minimum remaining above 4 mg/L since 2018. This could be attributed to increased riparian buffer zone or increased rainwater due to Hurricane Harvey.

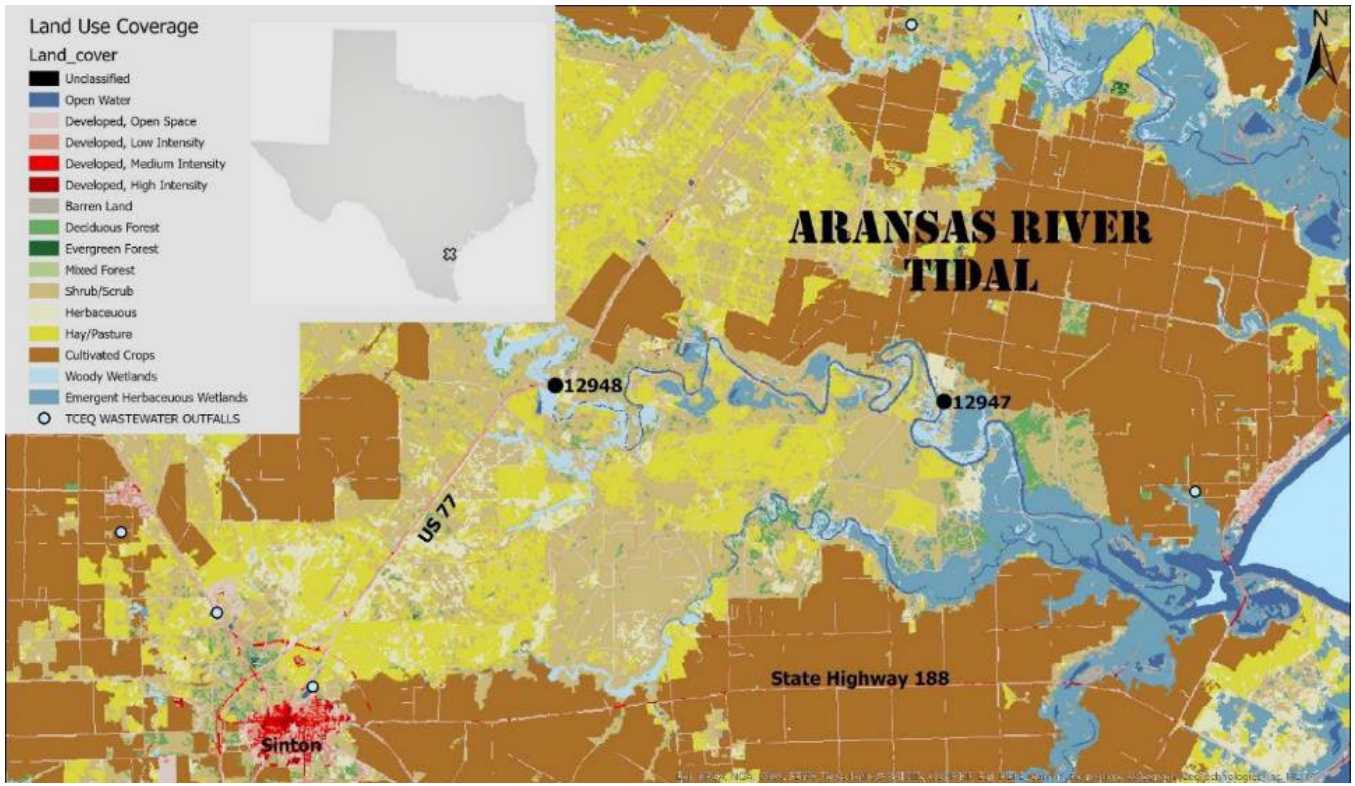
Segment 2002 – 12944:

Water Quality Monitoring Results:
Concern: *DO, Chlorophyll-a*

Parameter	Number of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	87	62	420	242.3	2.415	0.018	↑
Chloride (mg/L)	87	3.8	5340	602.1	0.391	0.697	
Chlorophyll-a (µg/L)	80	142	5780	1183	1.483	0.142	
Dissolved Oxygen (mg/L)	127	1.7	12.6	6.3	-2.721	0.007	↓
Dissolved Oxygen Demand	127	-2.20	6.75	2.5	3.059	0.003	↑
Log Enterococci (MPN/100 mL)	125	10	7200	311.2	-0.404	0.687	
pH (S.U.)	127	6.3	8.56	7.7	-2.136	0.035	↓
Secchi Disc, Transparency (m)	126	0.08	1.5	0.5	2.075	0.040	↑
Pheophytin-a (µg/L)	58	0.87	32.1	3.7	1.214	0.230	
Sulfate (mg/L)	87	4.93	152	34.6	0.716	0.476	
Total Phosphorus (mg/L)	87	0.02	2.6	0.11	1.527	0.130	
Water Temperature (°C)	127	10.4	30.1	22.2	1.149	0.253	

This table represents a simple trend analysis beginning in the 2000s.

When looking at data since 2000, a significant decrease in Dissolved Oxygen has occurred. There is not much flow at this location so in the fall and spring months, a buildup of leaf matter can occur as show in the picture two pages before. Increased groundwater infiltration causes a natural decrease in dissolved oxygen. Big storm like hurricanes or long rain events will increase the oxygen content in water. Runoff from rain and farming activities are likely why the pH is decreasing.



Segment 2003: Aransas River Tidal

Aransas River Tidal Segment 2003 forms part of the county line between Refugio and San Patricio Counties. It flows 6 miles from a point 1.0 mile upstream of US 77 into its confluence with Copano Bay. Its watershed is 208,031 acres and the City of Sinton (pop. 5,406) is the only major town in the watershed. Segment 2003 has two stations that get monitored. Station 12947 is located on FM 629 terminus south of Bonnie View at a boat ramp. Station 12948 is between Woodsboro and Sinton at the US-77 bridge. TMDL was completed and approved by EPA. Segment 2003 has two stations 12947 AU_01 and 12947 AU_02.

Water Quality - Segment 2003 has an impairment for bacteria (enterococcus) and a screening level concern for chlorophyll-a. The segment has been impaired for bacteria for primary contact recreation since the 2004 IR. All other parameters met their assessment criteria for the 2022 IR.

Aransas River Tidal at Station 12947

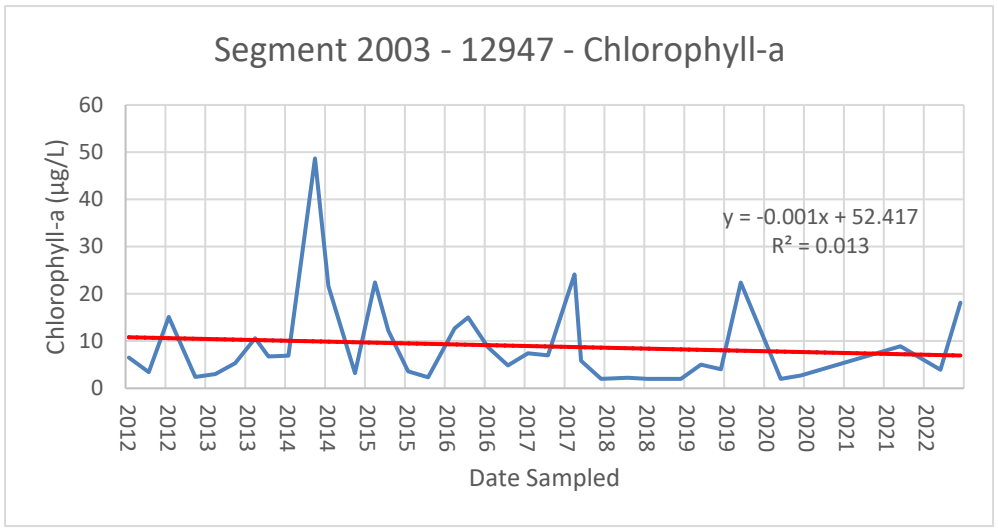
Special Studies:

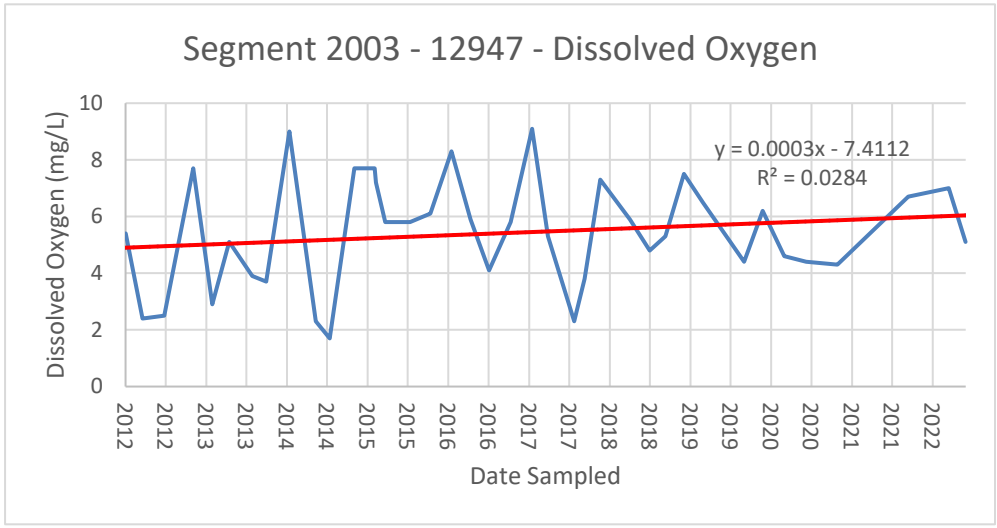
Aransas River Tidal was included in the Mission and Aransas River WPP that was completed by TWRI in 2019. The goal of the WPP is to restore water quality to meet the water quality standards. The goal will be completed by establishing a 5-year implementation schedule and work to reduce runoff pollution concentrations from entering the river and coastal zone. The final report can be found at: https://twri.tamu.edu/media/4175/mission-and-aransas-rivers- watershed-protection-plan-final-draft.pdf

Segment 2003 - 12947 AU_01:

Parameter	Number of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	87	62	420	242.3	2.415	0.018	↑
Ammonia, Total (mg/L)	87	0.02	0.27	0.05	5.417	0.000	
Chloride (mg/L)	87	3.8	5340	602.1	0.391	0.697	
Chlorophyll-a (µg/L)	80	142	5780	1183	1.483	0.142	
Dissolved Oxygen (mg/L)	127	1.7	12.6	6.3	-2.721	0.007	↓
Dissolved Oxygen Demand	127	-2.20	6.75	2.5	3.059	0.003	↑
Log Enterococci (MPN/100 mL)	125	10	7200	311.2	-0.404	0.687	
Nitrate Nitrogen, Total (mg/L)	87	0.02	1.99	0.1	0.000	1.000	
pH (S.U.)	127	6.3	8.56	7.7	-2.136	0.035	↓
Secchi Disc, Transparency (m)	126	0.08	1.5	0.5	2.075	0.040	↑
Pheophytin-a (µg/L)	58	0.87	32.1	3.7	1.214	0.230	
Sulfate (mg/L)	87	4.93	152	34.6	0.716	0.476	
Total Dissolved Solids (mg/L)	80	142	5780	1182.8	1.483	0.142	
Total Kjeldahl Nitrogen (mg/L)	28	0.201	1.92	0.9	-0.650	0.521	
Total Organic Carbon (mg/L)	87	1.99	12.5	5.8	-0.402	0.689	
Total Phosphorus (mg/L)	87	0.02	2.6	0.11	1.527	0.130	
Total Suspended Solids (mg/L)	123	3	1030	24.7	-0.607	0.545	
Water Temperature (°C)	127	10.4	30.1	22.2	1.149	0.253	

This water has higher temperatures due to the oil pipeline running underneath it. Higher temperatures will cause decreased dissolved oxygen. Runoff from landowners could be decreasing the pH and drought is likely causing the increase in alkalinity.





Segment 2003 - 12974 AU_02:

Parameter	No. of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	27	69	292	216.0	0.345	0.733	
Chloride (mg/L)	27	5.1	462	217.7	0.788	0.438	
Chlorophyll-a (µg/L)	21	1.5	422.3	28	1.454	0.161	
Dissolved Oxygen (mg/L)	81	3.5	11	7.1	0.439	0.662	
Dissolved Oxygen Demand	81	-2.3	4.8	1.5	-0.98	0.326	
Enterococci (MPN/100 mL)	76	1	16000	76	-2.11	0.038	↓
Nitrate Nitrogen, Total (mg/L)	29	0.01	2.6	1.0	0.382	0.705	
pH (S.U.)	83	7.1	8.5	7.9	0.762	0.448	
Secchi Disc, Transparency (m)	83	0.1	0.7	0.4	-3.08	0.003	↓
Pheophytin-a (µg/L)	23	0.5	20.2	3.1	1.011	0.323	
Sulfate (mg/L)	27	3.49	123	51.0	1.440	0.162	
Total Phosphorus (mg/L)	39	0.15	2.6	0.87	4.961	0.000	
Water Temperature (°C)	83	11.6	32.1	24.0	0.605	0.547	

Dollar weed near Aransas River

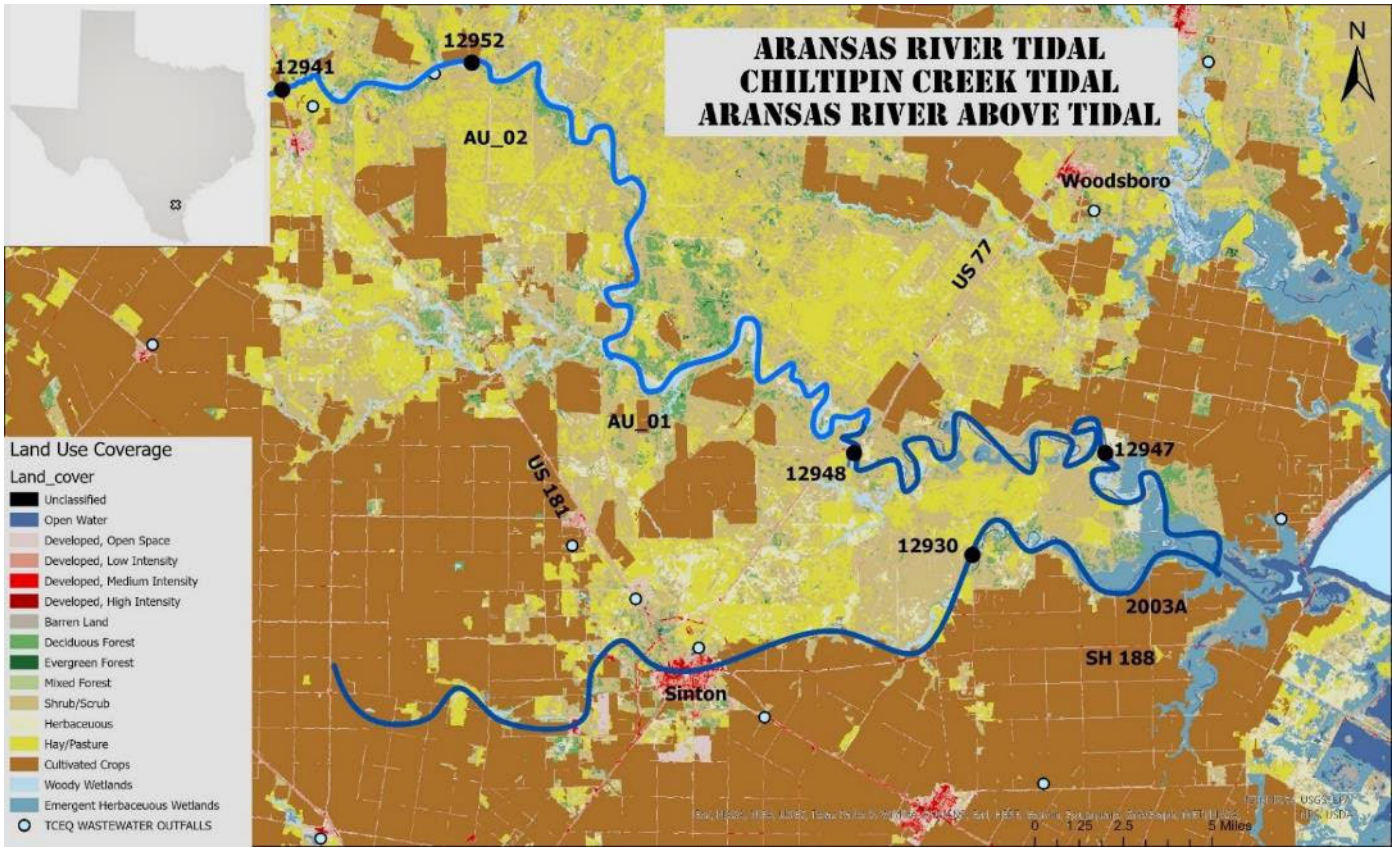
This portion of the segment features a beautiful Riparian zone that meanders naturally. The riparian buffer zone acts as a natural filter for the water, keeping the groundwater low in bacteria. Less wildlife in the area can also attribute to lower bacteria.

Station 12947 - Aransas River Tidal at Bonnie View Boat Ramp

Segment 2003A: Chiltipin Creek Tidal

Chiltipin Creek Tidal is in a newly renamed segment for 2020 that was previously included with the Aransas River Tidal (Segment 2003). Segment 2003A flows from a point 0.75 km (0.46 mi) downstream of the intersection of San Patricio CR 81 and CR 864 to the confluence with the Aransas River Tidal. The land use in the watershed is largely comprised of cultivated cropland south of the creek. On the north side, hay/pasture and shrub/scrub dominate the land use. The City of Sinton (population 5,410) is the only town in the watershed. Segment 2003A includes station **12930** which is located 2.11 km downstream from the north end of Plymouth Road, Northeast of Sinton.

Water Quality – Station 12930 is a new monitoring station for the Nueces River Authority (NRA) beginning in the Fall of 2020. Water quality was last monitored in 1979 by the TCEQ. Located on a bridge crossing private property, the station is downstream from *Steel Dynamics*, near Sinton. Stakeholder input indicated the need for a monitoring station on the creek to provide quarterly water quality data and semi-annual trace heavy metals data on the creek prior to the construction of the plant. There was not enough data available for the 2022 IR.



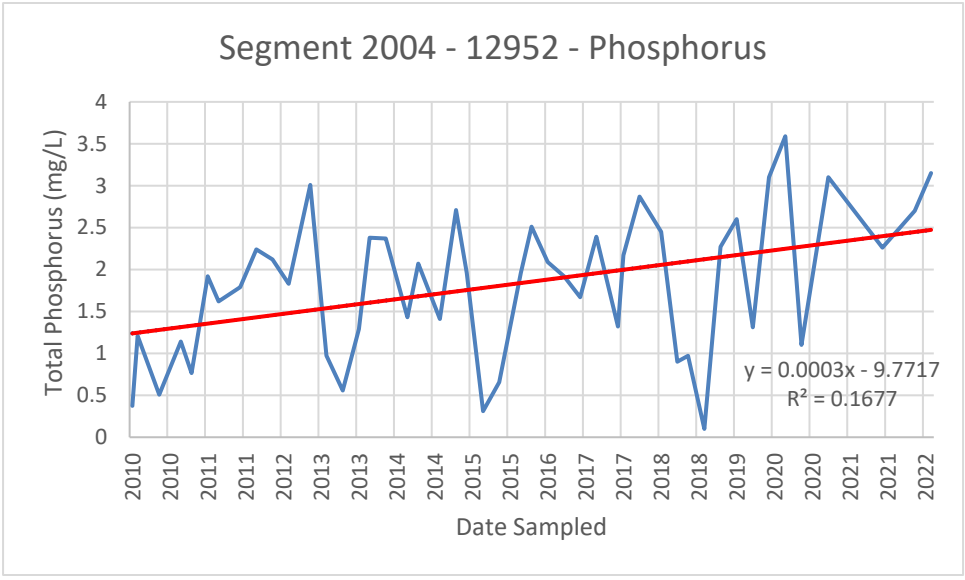
Segment 2004: Aransas River Above Tidal

Aransas River Above Tidal Segment 2004 flows 35 miles from the confluence of Poesta Creek and Aransas Creek to a point 1.0 mile upstream of US 77. Its watershed is 178,807 acres with Skidmore and Tynan being the only communities in the watershed. The area is a mix of cultivated crops, hay, pasture, and shrub/scrub. Segment 2004 is divided into two Assessment Units (AUs). Sampling has only been conducted on AU_02 at **Station 12952** which is located at the crossing at Corrigan Road east of Skidmore.

Water Quality – There are **no** water quality **concerns** or **impairments** in AU_01. AU_02 has an **impairment** for **bacteria** (*E. coli*) and concerns for **depressed dissolved oxygen** (grab sample), **nitrate**, and **total phosphorus.** A TMDL was completed and approved in 2016. AU_01 to the south of 12952 (AU_02) remains inaccessible with no public access. 12952 is a lot cleaner than ever before, trash is rarely thrown in this location. NRA will continue to monitor this location.

Station 12952- Aransas River East of Skidmore

Special Studies:
The segment was included in the addendum to the Two TMDLs on Mission and Aransas River in 2017. Possible sources include nutrient laden runoff from cropland and effluent from WWTPs. The segment was also included in the Mission and Aransas River WPP that was completed by TWRI in 2019. The goal of the WPP is to restore water quality to water quality standards by establishing a 5-year implementation schedule and work to reduce runoff pollution concentrations from entering the river and coastal zone. The final report can be found at: https://twri.tamu.edu/media/4175/mission-and-aransas-rivers- watershed-protection-plan-final-draft.pdf

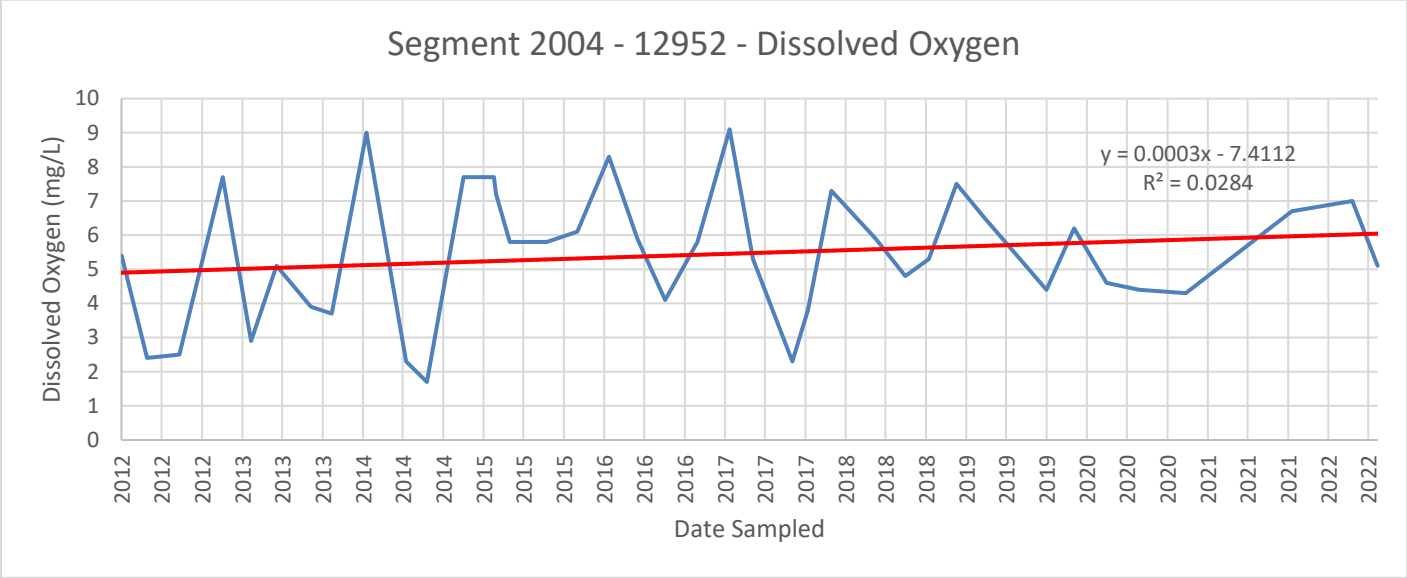


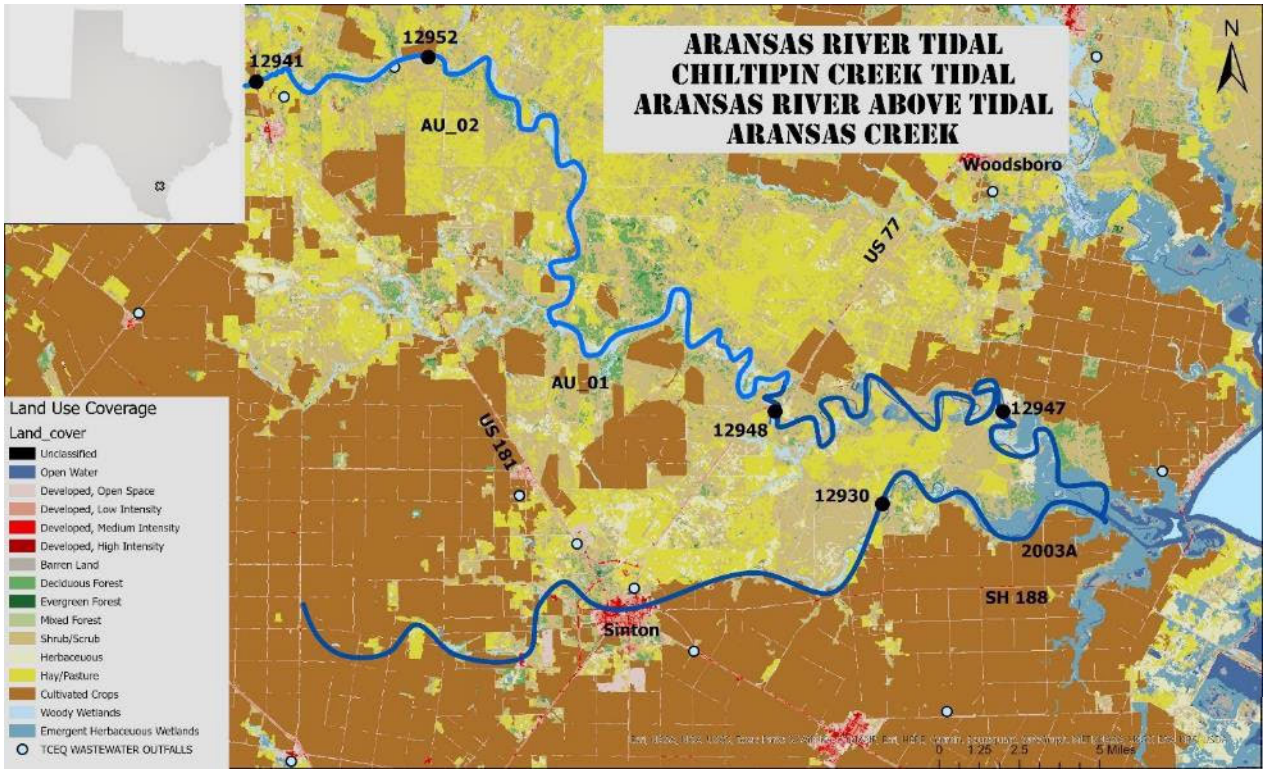
Station 12952 - Aransas River east of Skidmore

Segment 2004 – 12952:

Param	Number of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	47	73	330	170.4	1.517	0.136	
Ammonia, Total (mg/L)	47	0.02	0.327	0.07	1.552	0.128	
Chloride (mg/L)	46	39.6	395	218.2	0.013	0.989	
Chlorophyll-a (µg/L)	40	321	96533	3102	1.202	0.237	
Dissolved Oxygen (mg/L)	68	2.1	10.8	6.0	-1.784	0.079	
Dissolved Oxygen Demand	68	0.14	5.94	3.0	1.663	0.101	
Log Enterococci (MPN/100 mL)	21	70	2000	573.5	0.247	0.808	
pH (S.U.)	68	7	8.1	7.6	-0.917	0.362	
Secchi Disc, Transparency (m)	68	0.06	1.2	0.5	3.493	0.001	
Pheophytin-a (µg/L)	47	1.4	23.3	2.8	1.436	0.158	
Sulfate (mg/L)	47	9	139	80.5	0.944	0.350	
Total Phosphorus (mg/L)	47	0.1	3.59	1.81	2.972	0.005	↑
Water Temperature (°C)	68	9.2	29.6	21.6	0.593	0.555	

Like Segment 2002 at Station 12944, the water here has experienced a decrease in the number of foot traffic due to rock material being added near the sampling site. There is not much flow at this location so in the fall and spring months, a buildup of leaf matter can occur. This would account for the significant increase in phosphorus.





Segment 2004A: Aransas Creek

Aransas Creek Segment 2004A is located on US 181 north of Skidmore. Aransas Creek is 20 miles long, beginning west of Beeville (pop. 12,863) to its confluence with the Aransas River. Its watershed is 45,196 acres and the area is predominately ranchland. The station monitored is **12941.**

NRA will continue monitoring on a quarterly basis at Aransas Creek (Station 12941) located at the bridge crossing of US 181 north of Skidmore. The site is monitored for field and bacteria parameters only. High bacteria is possibly due to bat feces or leaking septic systems. According to the 2022 TCEQ Assessment, Segment 2002 has an **impairment** for **bacteria** (E. coli).

Water Quality:

The segment was listed as being impaired for bacteria in 2006 based on fecal coliform analysis. For several years, Station 12941, at US 181, was accidently monitored instead of 12952 on the Aransas River. NRA, under contract with the Texas State Soil and Water Conservation Board (TSSWCB), conducted a Recreational Use Attainability Analysis (RUAA) on Aransas Creek back in 2013. The final report for the RUAA was submitted to TSSWCB in May 2013. Based on the results, TCEQ recommended that the contact recreational use be revised to SCR1. This change was included in the 2018 Texas Surface Water Quality Standards (TSWQS).

Originally thought to be Aransas River, this sampling location includes a small bat population and a water moccasin. A storm sewer access point is located above the Creek and adjacent. Foam and nutrients tend to build up right up to the bridge due to the <0.1 CFS flow. Rain events can alter this flow significantly. Additionally bacteria data is needed. Monitoring will continue per the FY24.

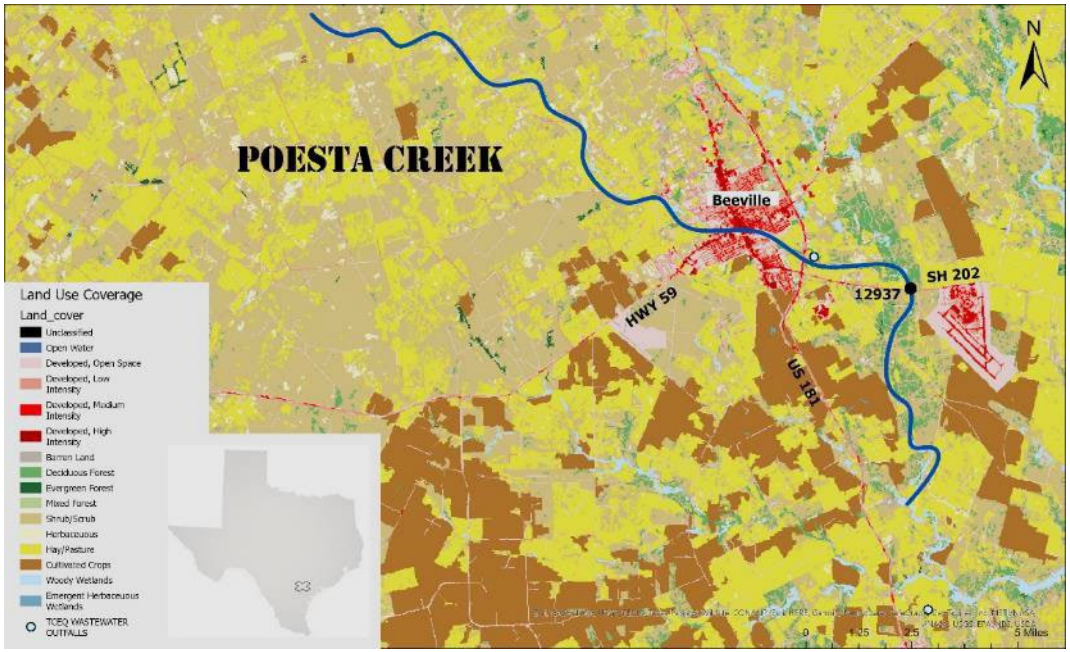
Texas bee blossom near Aransas Creek US 181

Texas Wild Blackberry near Aransas Creek.

Segment 2004B: Poesta Creek

Poesta Creek is approximately 24 miles long, beginning northwest of Beeville, 7.5 km upstream of FM 673, to its confluence with the Aransas River. The segment is made up of two AUs and the watershed for Segment 2004B is 78,921 acres. The land use is predominately ranchland with Beeville (pop. 12,912) being the only community in the watershed. Poesta Creek tends to have high nitrate due to wastewater treatment plant effluent.

The segment was added as an addendum to Mission Aransas TMDL that was approved. Station 12937 is downstream of Beeville's WWTP outfall. Nitrate (nutrients) and bacteria remains high. A lot of small town WWTPs need money for continuous maintenance and training.



Water Quality – AU_01 was assessed as having a water quality **impairment** for **bacteria** (*E.* coli) and concerns for **nitrate** and **total phosphorus**. AU_02 was assessed as having an **impairment** for **bacteria** (*E.* coli) and a concern for **depressed dissolved oxygen** (grab sample) in the 2022 IR. TMDL was completed and approved. Sampling was expanded to the full suite of parameters in Summer 2016. Bats live under the bridge and can be heard when sampling. A deep pool exists here as well. As the water sits, bacteria and nutrients will build, attributing to the depressed DO.

Special Studies:

The segment was also included in the Mission and Aransas River WPP that was completed by TWRI in 2019. The goal of the WPP is to restore water quality to water quality standards by establishing a 5-year implementation schedule and work to reduce runoff pollution concentrations from entering the river and coastal zone. The final report can be found at: https://twri.tamu.edu/media/4175/mission-and-aransas-rivers-watershed-protection- plan-final-draft.pdf

A previous sampling station existed at the US 181 bridge crossing but was moved to Station 12937 at SH 202 in FY 2016 due to construction on US 181. Station 12937 is more representative of the overall creek since it is located in a more rurally located area.

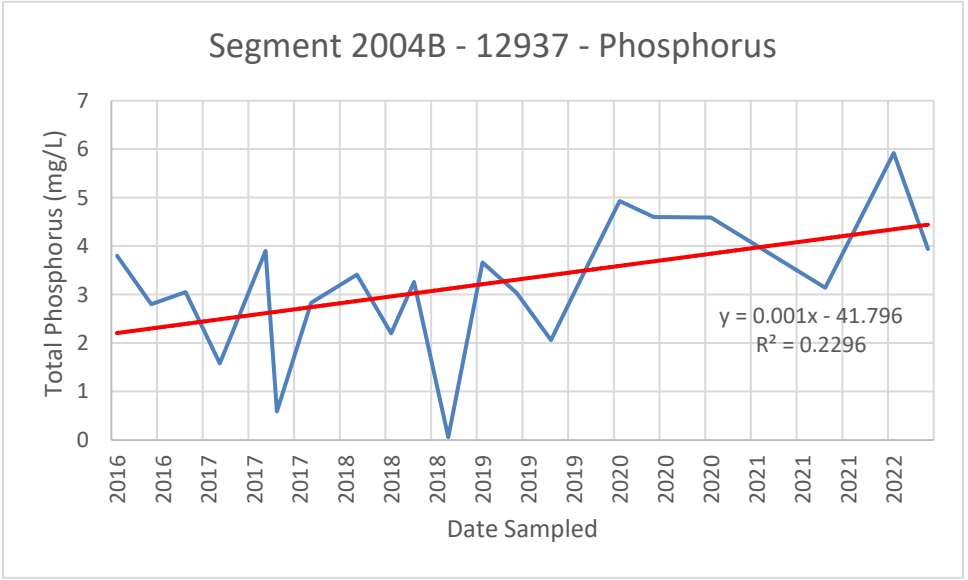
Expanded to the full suite of parameters in the summer 2016. Upstream of any bats, a deep pool exists here, likely attributing to the depressed DO. As the water sits, bacteria and nutrients build.

Segment 2004B – 12937:

Parameter	Number of Samples	Minimum	Maximum	Mean / Geomean	t-stat	p-value	Trend
Alkalinity, Total (mg/L)	21	57.8	328	146.5	3.104	0.006	↑
Ammonia, Total (mg/L)	21	0.02	2.5	0.30	2.279	0.034	↑
Chloride (mg/L)	21	36	312.45	189.7	2.294	0.033	↑
Chlorophyll-a (µg/L)	21	167	1132	730	2.872	0.009	↑
Dissolved Oxygen (mg/L)	24	2.3	9.3	5.5	-1.681	0.079	
Dissolved Oxygen Demand	24	1.05	6.63	3.2	1.425	0.167	
Log Enterococci (MPN/100 mL)	24	25	2400	556.4	0.078	0.939	
pH (S.U.)	24	6.8	8	7.5	-0.629	0.536	
Secchi Disc, Transparency (m)	24	0.2	1.2	0.6	1.238	0.228	
Pheophytin-a (µg/L)	21	2	9.7	2.5	0.245	0.809	
Sulfate (mg/L)	21	16.7	125	87.2	2.144	0.044	↑
Total Phosphorus (mg/L)	21	0.06	5.92	3.18	2.371	0.028	↑
Water Temperature (°C)	24	13.3	29.8	23.1	1.014	0.321	

Station 12937 Peosta Creek FM 202 near Beeville

Trash is this area has significantly decreased since Texas Department of Transportation added rock material. A sewer access hatch lies adjacent to the sampling location. The presence of fertilizers in storm water runoff causes these increases in Chlorophyll-a or the green hue to the water as shown in the picture to the left. Fertilizers are high in phosphorus. Increased bat activity here as well as other wildlife could lead to an increase in bacteria in the future. Ammonia is excreted by animals and produced during decomposition of plants and animals. It is also an ingredient in fertilizers and present in sewage and storm water runoff- all present at this location.



List of Impairments and Concerns in the San Antonio – Nueces Coastal Basin

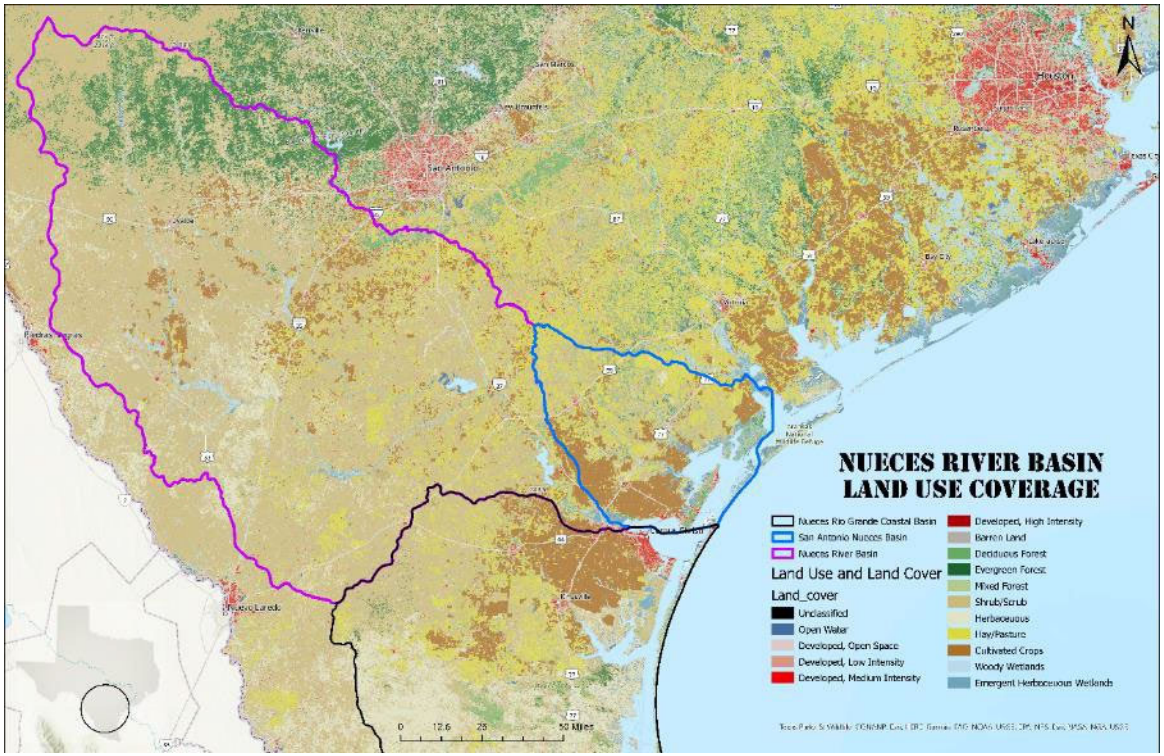
Segment Name	AU	Description	Impairments	Concerns
2001 Mission River Tidal	01	From the confluence with Mission Bay in Refugio County to a point 7.4 km (4.6 mi) downstream of US 77 in Refugio County	Bacteria	Chlorophyll-*a*
2002 Mission River Above Tidal	01	From a point 7.4 km (4.6 mi) downstream of US 77 in Refugio County to the confluence of Blanco Creek and Medio Creek in Refugio County		DO, Chlorophyll-a
2003 Aransas River Tidal	01	From the confluence with Copano Bay in Aransas/Refugio County to a point 1.6 km (1.0 mi) upstream of US 77 in Refugio/San Patricio County	Bacteria	Chlorophyll-*a*
2004 Aransas River Above Tidal	01	From the downstream end of segment to the confluence with Papalote Creek		
	02	From the confluence with Papalote Creek to the upstream end of segment at the confluence with Aransas Creek and Poesta Creek	Bacteria	DO, Nitrate, Total Phosphorus
2004A Aransas Creek	01	From confluence with the Aransas River to the headwaters of the stream about 10 km upstream of US Highway 59	Bacteria	
2004B Poesta Creek	01	From the confluence with Aransas River to the confluence of Talpacate Creek	Bacteria	Nitrate, Total Phosphorus
	02	From the confluence with Talpacate Creek to the headwaters of the stream about 7.5 km upstream of FM 673	Bacteria	DO

BASIN 21: Nueces River Basin

Nueces River Basin

The Nueces River Basin covers approximately 17,000 square miles, encompassing all or part of 23 counties in South-Central Texas. Other rivers within the basin include the Frio, Leona, Sabinal, and Atascosa. The basin is bordered by the Colorado, Guadalupe, and San Antonio River Basins to the north, the San Antonio – Nueces Coastal Basin to the southeast, the Nueces – Rio Grande Coastal Basin to the south, and the Rio Grande River basin to the south and southwest. Throughout the basin, the rivers are used for water supply and recreational purposes. The basin is home to numerous state-operated recreational areas including:

- Choke Canyon State Park on the south side of Choke Canyon Reservoir near Three Rivers
- Lake Corpus Christi State Park on the southeast bank of Lake Corpus Christi near Mathis,
- Garner State Park north of Concan,
- Tips State Recreational Area on the Frio River in Three Rivers,
- Lipantitlan State Historic Park near Sandia, and
- Lost Maples State Natural Area north of Vanderpool, and Hill Country State.



Bluebonnets in Basin 21

There are several TMDLs that have been conducted in the basin: Segment 2104, Nueces River above Frio River, for depressed DO; Segment 2107, Atascosa River, for bacteria and depressed DO; Segment 2110, Lower Sabinal River, for nitrates; and Segment 2113, Frio River above Choke Canyon Reservoir, for depressed dissolved oxygen.

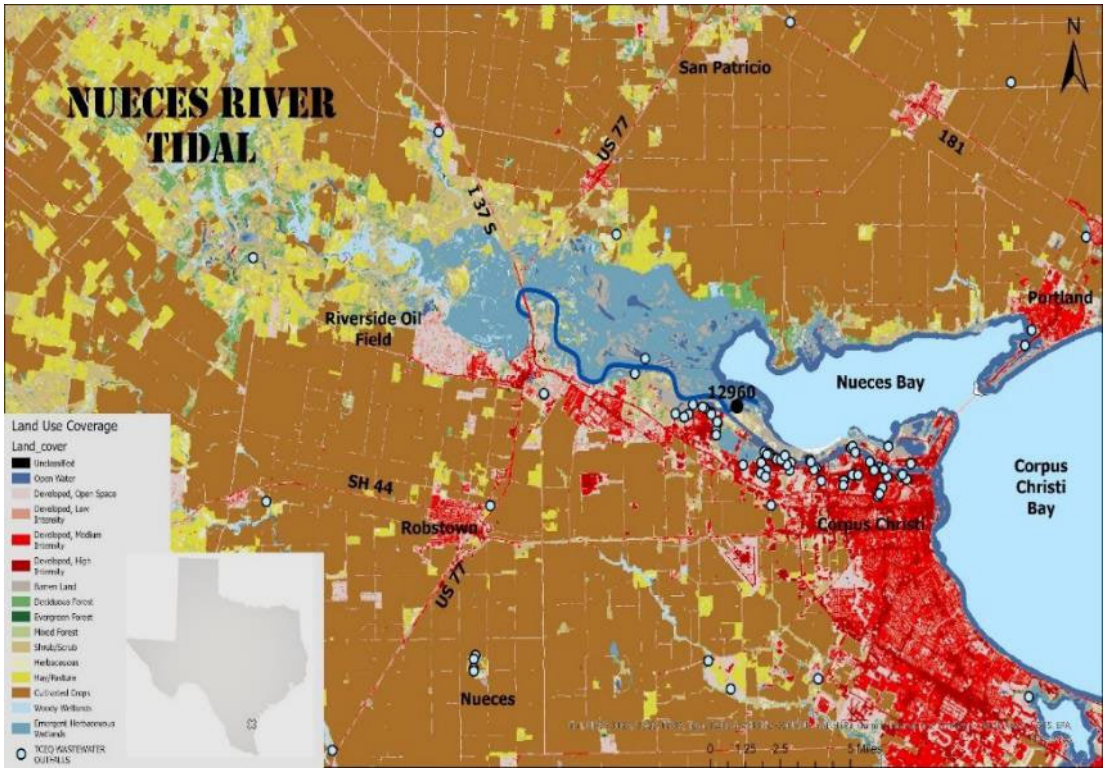
Segment 2101: Nueces River Tidal

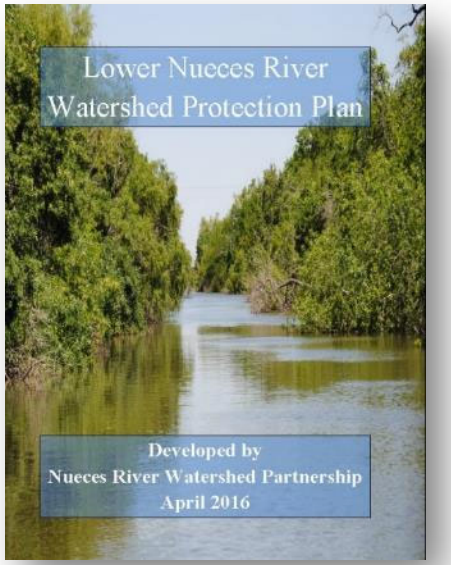
Segment 2101 forms part of the county line between Nueces and San Patricio Counties. It flows 12 miles from the Calallen “saltwater barrier” Dam 1.1 miles upstream of US 77/IH 37 to its confluence with Nueces Bay. Its watershed is 175,301 acres and the City of Corpus Christi (pop. 325,780) borders the south bank of the river. A large portion of the area north of the river is included in the Coastal Bend Bays and Estuaries Program (CBBEP) Nueces Delta Preserve. The rest are owned by private ranches. The sample site is station **12960** located North of Viola Turning Basin. A potential special study for this segment was suggested due to fish kills and WWTP effluent issues in the area. It proposed redirecting outfall from the river to the delta to rectify these issues.

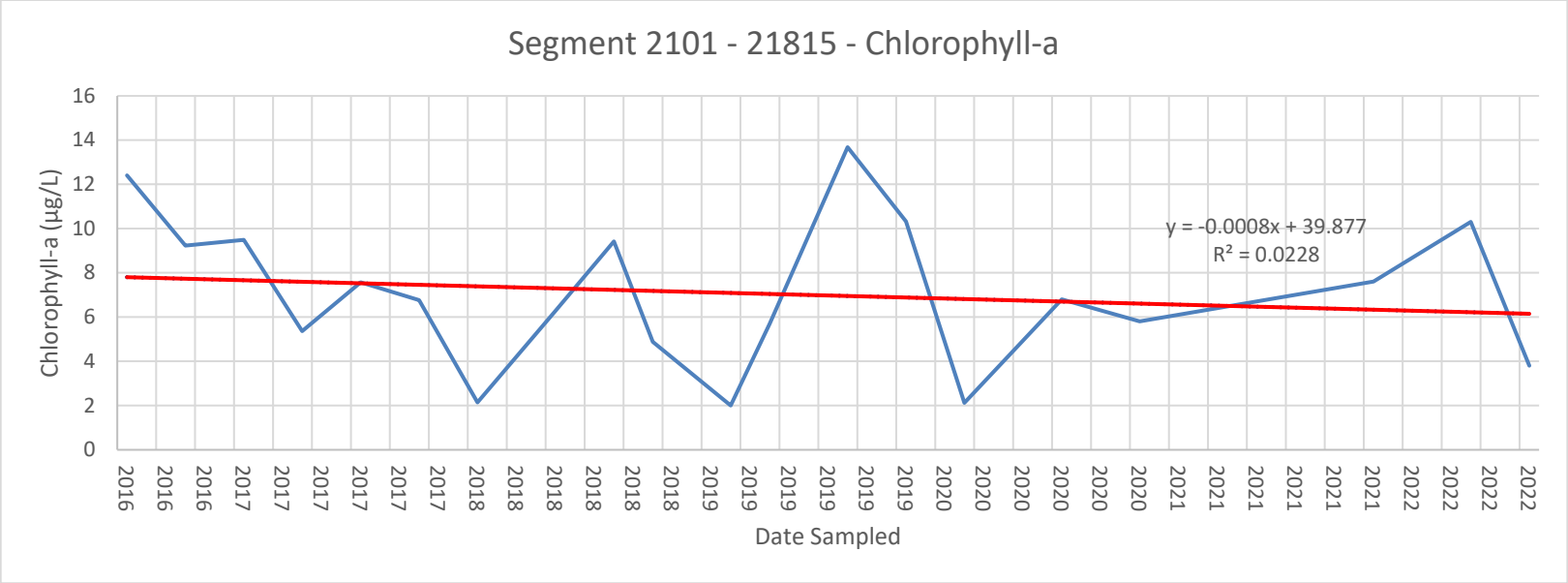
Water Quality –

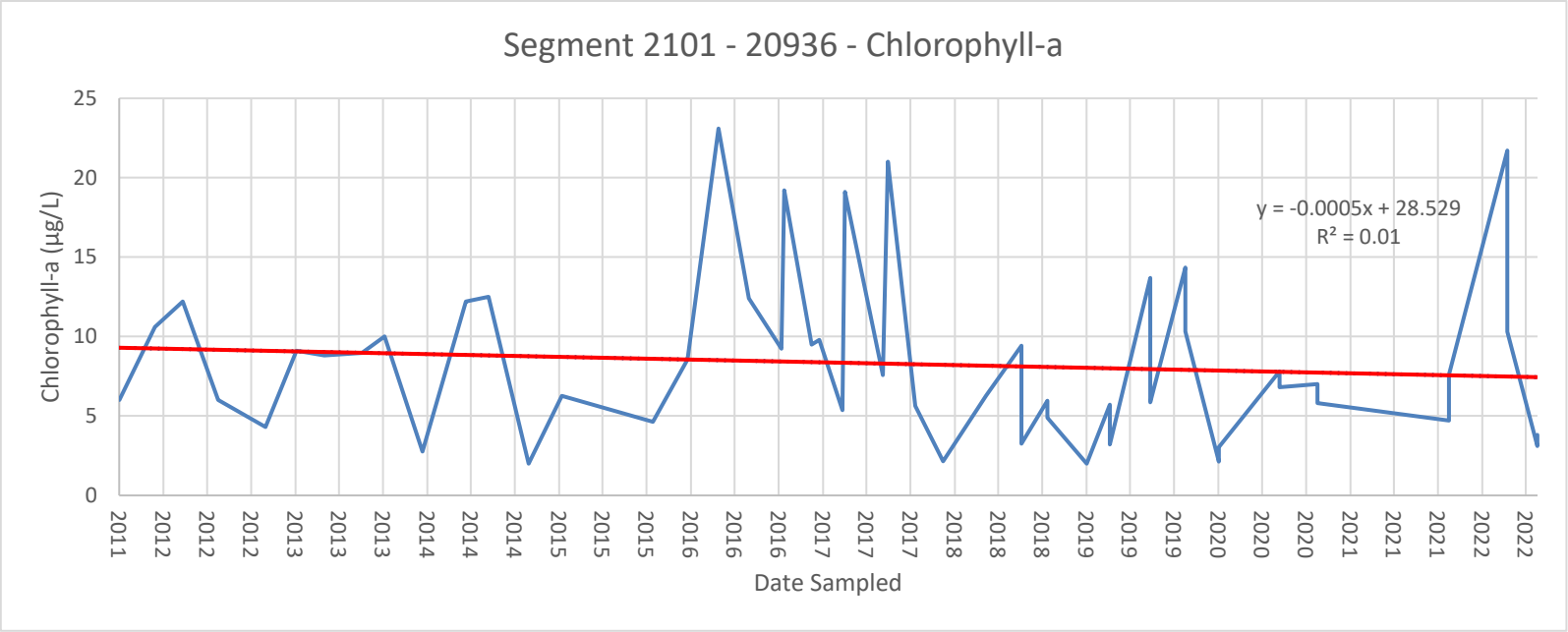
The segment was assessed as having **concerns** for elevated **chlorophyll-*a*** and **fish kills** in the 2022 IR. The chlorophyll-*a* concern is likely attributed to nutrient inputs from multiple permitted effluent discharges in the segment and minimal flushing from tide and or pass through events. Elevated levels of chlorophyll-*a* indicate abundant plant and algal growth which can lead to reduced dissolved oxygen levels. Fish kills in the segment have been attributed to low dissolved oxygen events and effluent treatment issues. Fish kills also occur as freshwater species are trapped in the tidal portion of the river following a reservoir pass through and/or spill. All the other assessed parameters met the assessment criteria in 2022. The Coastal Bend Bays and Estuaries Program (CBBEP) put together a stakeholder group to discuss Nueces River Tidal's issues. Landowners and scientific experts together agreed symptoms were due to drought, poor tidal flux, and increased trash buildup.

WWTPs are not setup to handle the beef-processing plant's effluent. TAMU-CC's Harte Research Institute's performing nutrient assay here. Recommend re-routing outfall from the river to the Nueces Delta (previously done in the 1990's to 2010). The excess nutrients and bacteria will be more manageable by the ecosystem and is expected to improve overall water quality.






Segment 2101 - 21815 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0008x + 39.877
R² = 0.0228
Date Sampled


Segment 2101 - 20936 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0005x + 28.529
R² = 0.01
Date Sampled

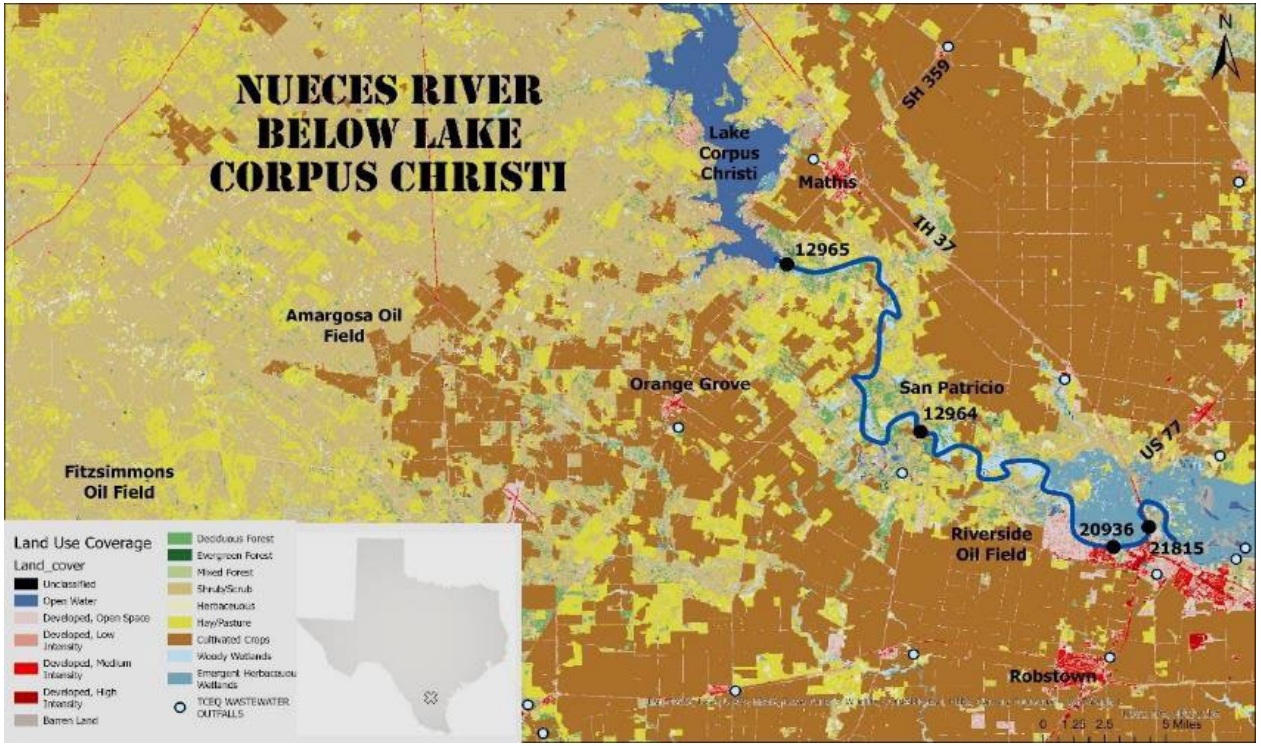
Segment 2102: Nueces River Below Lake Corus Christi

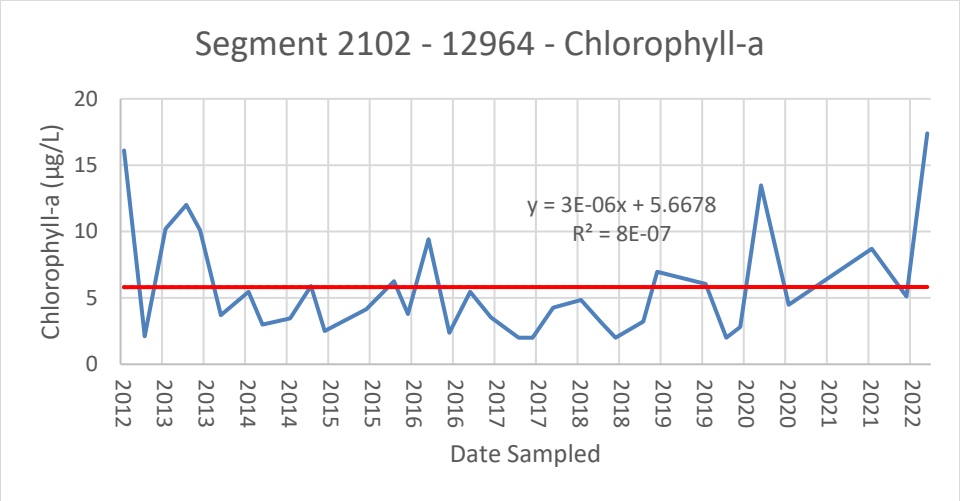
It flows 39 miles from Wesley Seale Dam at Lake Corpus Christi to Calallen Dam 1.7 km (1.1 miles) upstream of US 77/IH 37 and is divided into two AUs. Its watershed is 116,863 acres. The City of Corpus Christi (pop. 325,780) borders the south bank of the river in the lower 10 miles of the segment and conducts its own water quality monitoring as this is the primary drinking water source for the area. There are several freshwater intakes in the Calallen Pool just above the Calallen "saltwater barrier" Dam. The upper half of the segment is primarily private ranches and farms. There are numerous, active, and inactive, sand and gravel pits in the lower half. Segment 2102 consists of four sites: 21815, 20936, 12964, 12965.

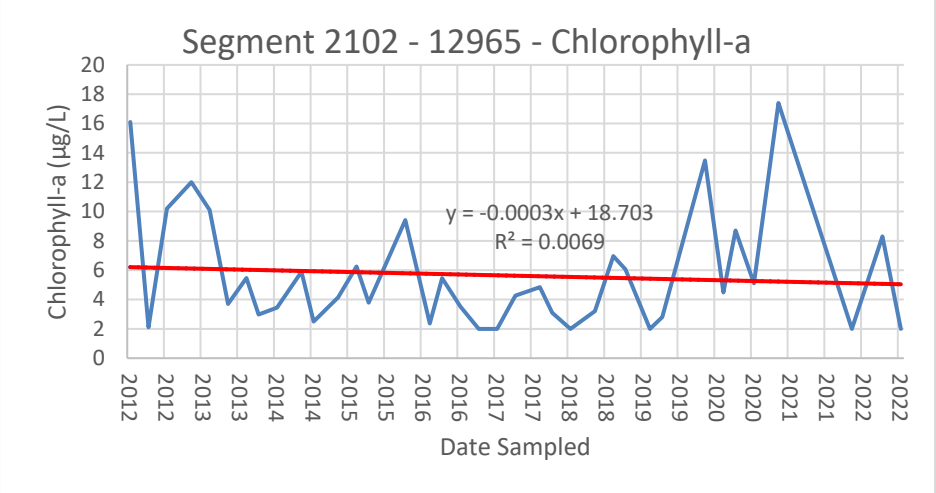
Stations 12964 and 12965 have elevated chlorophyll-a. Source unknown. Possibly septic systems.

Water Quality – AU_01 of the segment was first assessed as having an impairment for Total Dissolved Solids (TDS) in the 2014 IR. The impairment was largely due to elevated TDS concentrations in the groundwater that seeped into the river segment and elevated TDS levels in Lake Corpus during drought conditions. This is usually when mineral become concentrated due to evaporation. AU_02 of the segment was also assessed as having an impairment for TDS. Both impairments were removed in the 2022 IR based on more recent data. AU_02 had a water quality concern for chlorophyll-a. All the other assessed parameters met the assessment criteria.

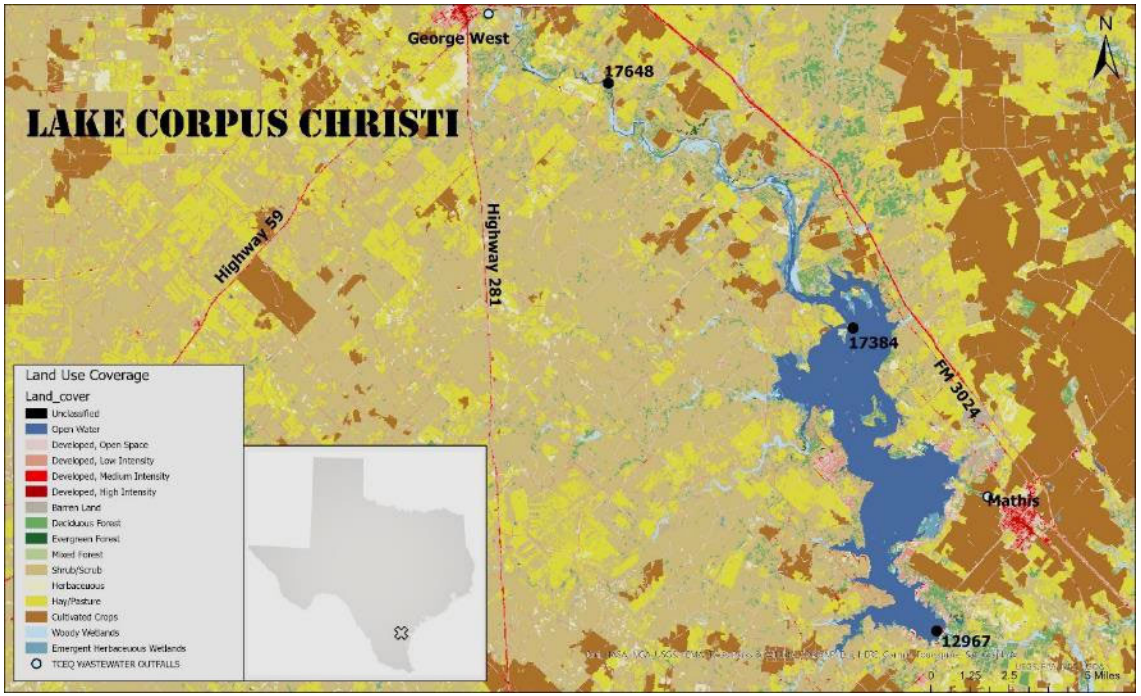
Special Studies – The Lower Nueces River Watershed Protection Plan (WPP) was completed in 2016 to protect the drinking water supplies for approximately 500,000 Coastal Bend residents following a spike in turbidity levels in 2009 that resulted in a drinking water violation. The City of Corpus hired the NRA to develop a source water protection plan to help prevent future turbidity issues and identify and prevent other possible threats to the water supply. For more information, please visit http://www.nuecesriverpartnership.org/







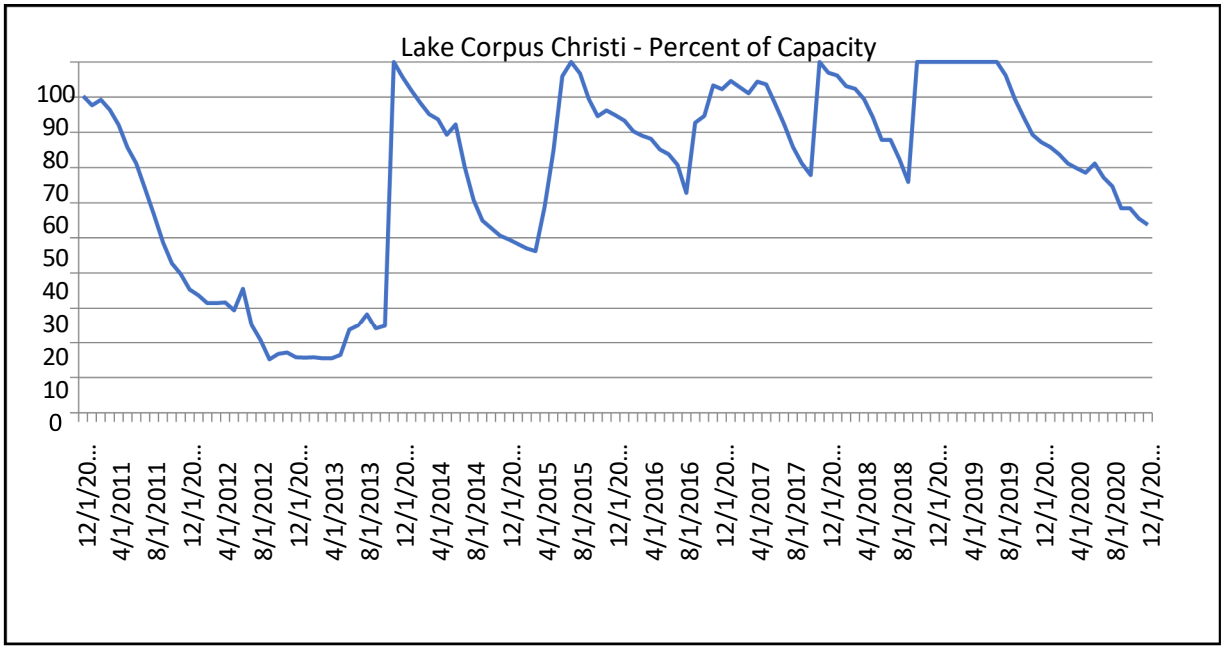
Station 21815 – Nueces River above Calallen "saltwater barrier"

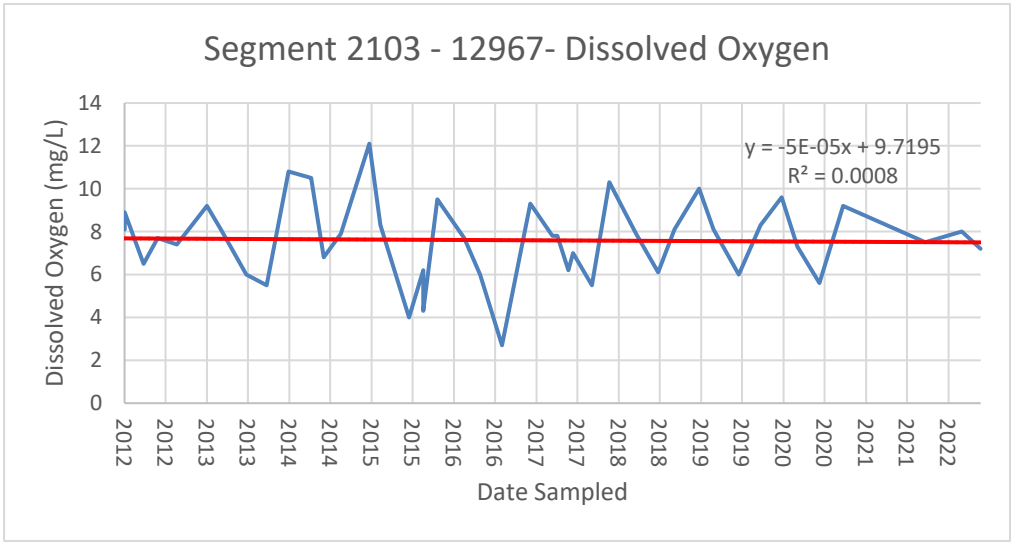


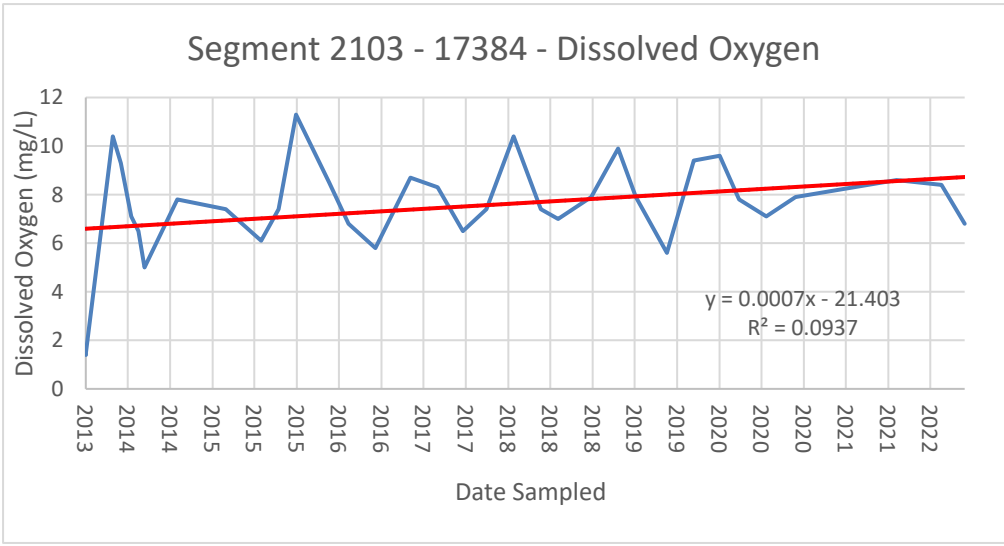
Segment 2103: Lake Corpus Christi

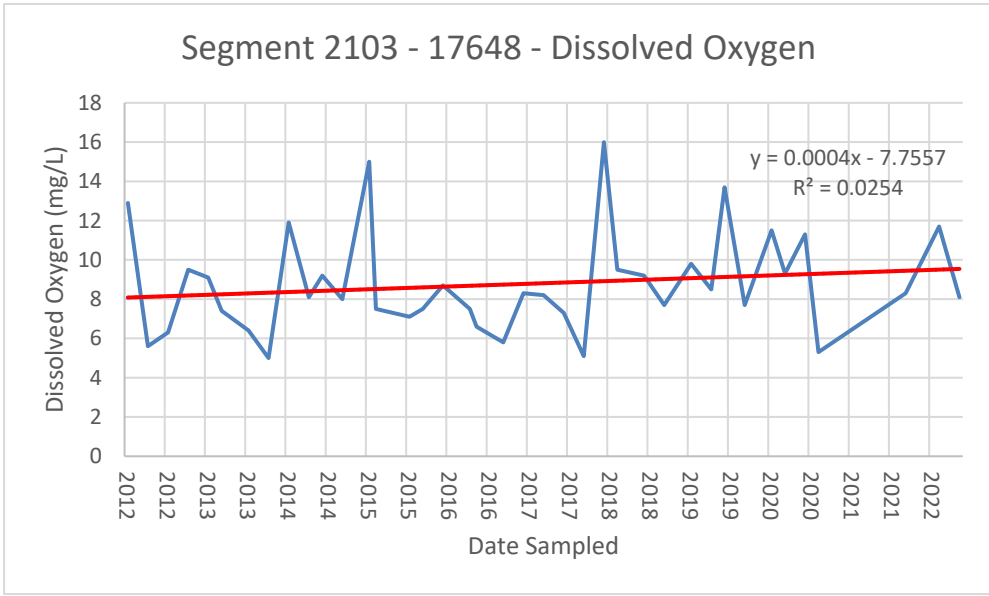
Lake Corpus Christi is formed by Wesley Seale Dam near Mathis and impounds the Nueces River. It is defined by the 94' above mean sea level (MSL) elevation. The lake covers portions of Live Oak, Jim Wells, and San Patricio Counties. Segment 2103 extends upstream to a point 100m (110 yards) upstream of US 59 in Live Oak County and is divided into six AUs. Its watershed is 505,550 acres. When the lake is near capacity, the river levels are influenced by the lake level as far north as Airport Road north of George West (pop. 2,566). Segment 2103 consist of three different stations: **12967** AU_01, **17384** AU_04,**17648** AU_06.

Water Quality – Water quality monitoring in Lake Corpus Christi indicates **no impairments** in the 2022 IR. The segment has had historical impairments for TDS, but the entire segment was delisted in the 2018 IR. TDS levels tend to increase as lake levels drop and can be attributed to evaporation of surface waters that concentrate the dissolved solids. There is one **concern** for **depressed DO** in AU_01. All the other assessed parameters met the assessment criteria in the 2022 IR. Additional information about the reservoir is available at: http://www.twdb.texas.gov/surfacewater/rivers/reservoirs/corpus_christi/index.asp. 17384 has shallower water and no Issues have been found. Mikeska bridge has been removed and they are building a completely new bridge. The bridge is nearing completion and sampling can continue un FY24. TDS is no longer an impairment at this location.



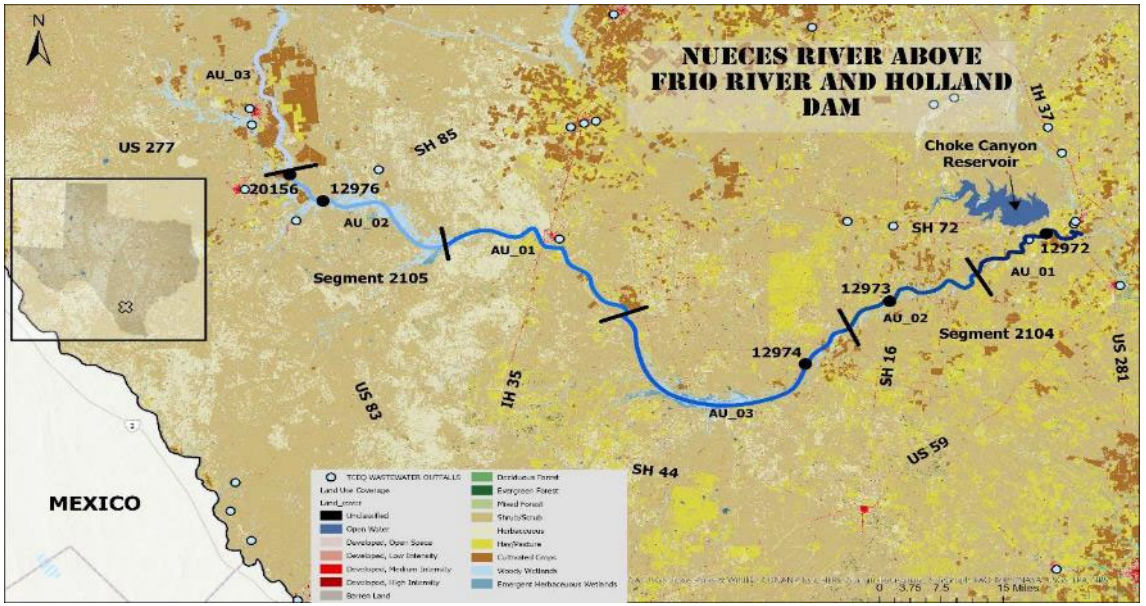

Segment 2103 - 12967- Dissolved Oxygen
Dissolved Oxygen (mg/L)
y = -5E-05x + 9.7195
R² = 0.0008
Date Sampled

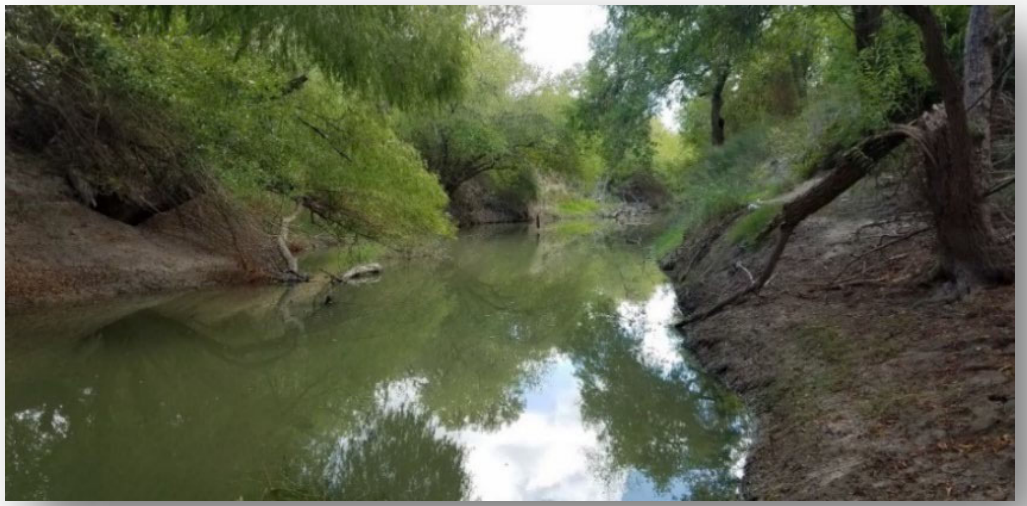

Segment 2103 - 17384 - Dissolved Oxygen
Dissolved Oxygen (mg/L)
y = 0.0007x - 21.403
R² = 0.0937
Date Sampled


Segment 2103 - 17648 - Dissolved Oxygen
Dissolved Oxygen (mg/L)
y = 0.0004x - 7.7557
R² = 0.0254
Date Sampled

Segment 2104: Nueces River Above Frio River

Segment 2104 flows from Holland Dam in La Salle County to its confluence with the Frio River in Live Oak County near the town of Three Rivers (pop. 1,821). The segment is approximately 91 miles long and its watershed is 1,876,877 acres. The middle Nueces River is underlain by Cretaceous chalk, clay, and limestone beds that contribute turbidity to surface water flows. The middle Nueces River winds its way through a portion of Texas known at the “Wildhorse Desert”. A relative lack of topography combined with finer sediments results in a gently flowing but turbid stream. The upper reaches of this segment are also known as the “braided reach” due to a network of flood relief channels that crisscross each other during high flow events. Pools left behind after floods provide refuge to wildlife and aquatic species. Segment 2104 consists of three stations: **12972** AU_01, **12973** AU_02, **12974** AU_03.



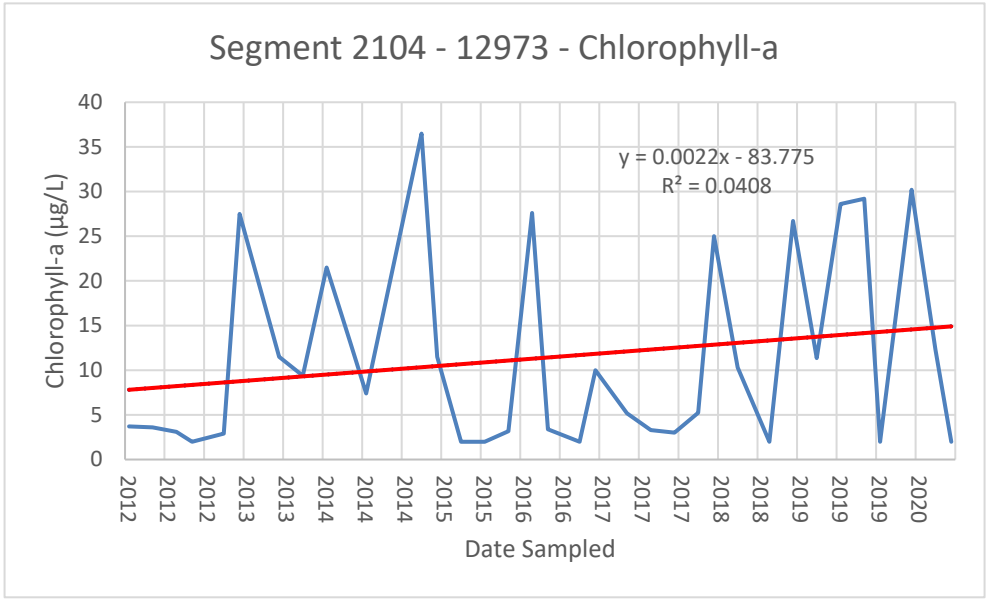


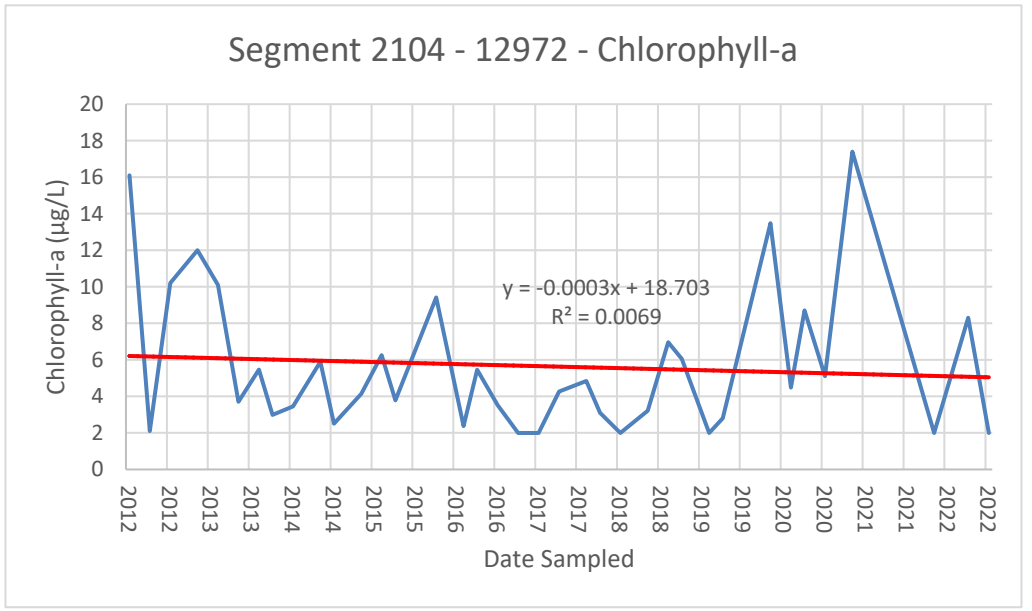
Water Quality – AU_01 of the segment was previously assessed as having an **impairment** for **bacteria** (*E. coli)*. However, this impairment was removed in the 2022 IR due to new data. Previous water quality **concerns** for **impaired macrobenthic community** (and impaired fish from AU_02) and **total phosphorus** in water were also removed in the 2022 IR. Upstream of the town of Three Rivers. Aquatic Life Monitoring (ALM) conducted in 2017 and 2019. Mussel survey conducted in August 2017. WWTP outfall at site. NRA continues to monitor some nitrate exceedances and bacteria levels were below the screening level. WWTP outfall from the federal prison appears excellent, likely due to adequate funding to run the WWTP on-site.

AU_02 is no longer considered an impaired microbenthic community and fish community. Part of ALM. Species found during the mussel survey included: yellow sandshell, golden orb, southern mapleleaf, threeridge, Texas lilliput, Tampico pearlymussels, giant floaters, and washboard. Algae buildup in area likely due to natural causes.

There is still a concern for nitrate and chlorophyll-a. AU_03 has a water quality **concern** for **depressed dissolved oxygen** (grab sample) in water. Algae, flowing water (rainfall), water quality is great in the area. Black willow trees have a lot of organic matter that drops in the spring. Long periods of time with no flow. This causes stagnant waters that are high in chlorophyll-a, and consequently low DO.

Special Studies - The concerns for impaired macrobenthic community and impaired fish community were addressed by conducting Aquatic Life Monitoring (ALM) studies in 2017 and 2019 at Stations 12972 and 12973. ALMs include fish and macroinvertebrate collection, habitat surveys, measuring streamflow, analyzing water chemistry, and 24- hour dissolved oxygen monitoring. The first ALM was held in April 2017 and the second was in September 2019. Results were used to reassess concerns in the 2022 I


Segment 2104 - 12973 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = 0.0022x - 83.775
R² = 0.0408
Date Sampled


Segment 2104 - 12972 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0003x + 18.703
R² = 0.0069
Date Sampled

Segment 2105: Nueces River Above Holland Dam

Segment Description – Segment 2105 flows 78 miles from FM 1025 in Zavala County to Holland Dam in La Salle County and is divided into three AUs. Its watershed is 2,200,065 acres and contains the Cities of Crystal City (pop. 7,310), Carrizo Springs (pop. 5,554), Asherton (pop. 877), Big Wells (pop. 930), and Cotulla (pop. 4,168). Each of these cities has WWTPs that discharge into the river. Streamflow in Segment 2105 varies greatly from year to year and is largely dependent on runoff from localized rain events and flood flows originating in the upper Nueces River. Much of the segment is underlain by the Carrizo-Wilcox Aquifer which provides flow in the upper part of the segment, but streamflow typically drops to zero at the lower end of the segment. During periods of moderate drought, streamflow drops to zero with intermittent pools providing refuge for aquatic species. During periods of extreme drought much of the riverbed goes dry. Segment 2105 consists of three stations: **12975** AU_01, **12976** AU_02, **20156** AU_03.

Special Studies:

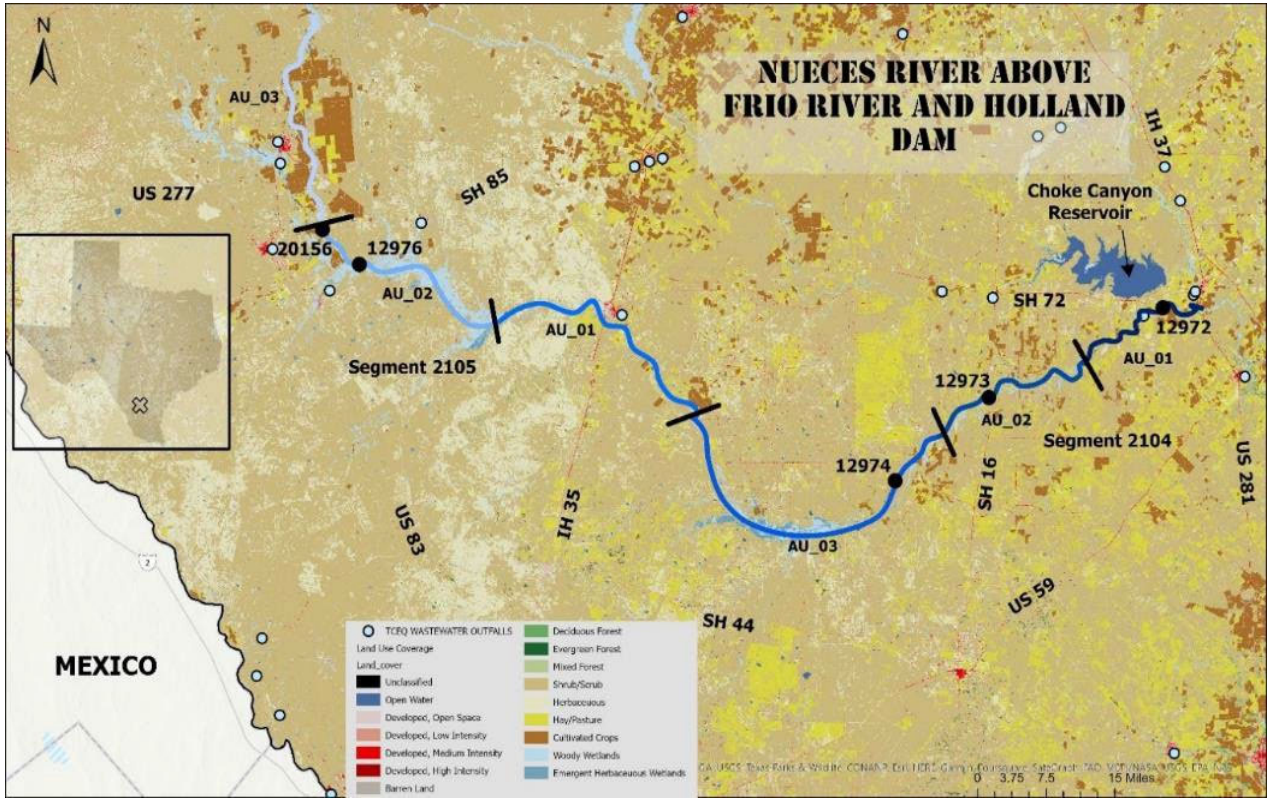
NRA Streamflow at the station 12976 dropped to zero for 2020. Three 24-hour dissolved oxygen collections conducted to date have all been above the dissolved oxygen criteria. NRA will continue to conduct 24-hour monitoring at the site until the impairment can be fully assessed. NRA has asked TCEQ Region 16 about possibly conducting 24-hour Dissolved Oxygen at Station 12976 instead of NRA.

Water Quality:

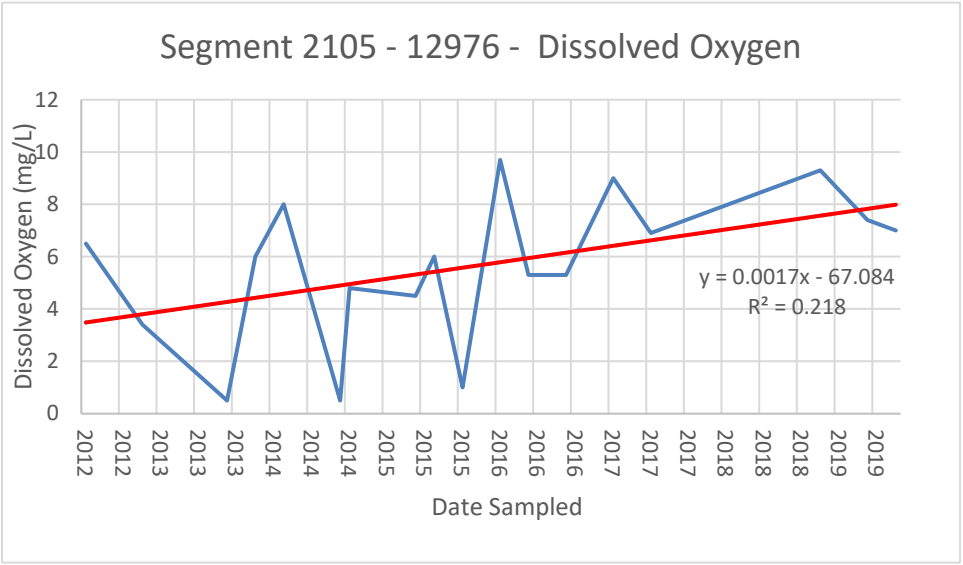
AU_01 have **concerns** for **depressed dissolved oxygen** and **chlorophyll-*a***. When flow is low, WWTP effluent is dominant supply of water.

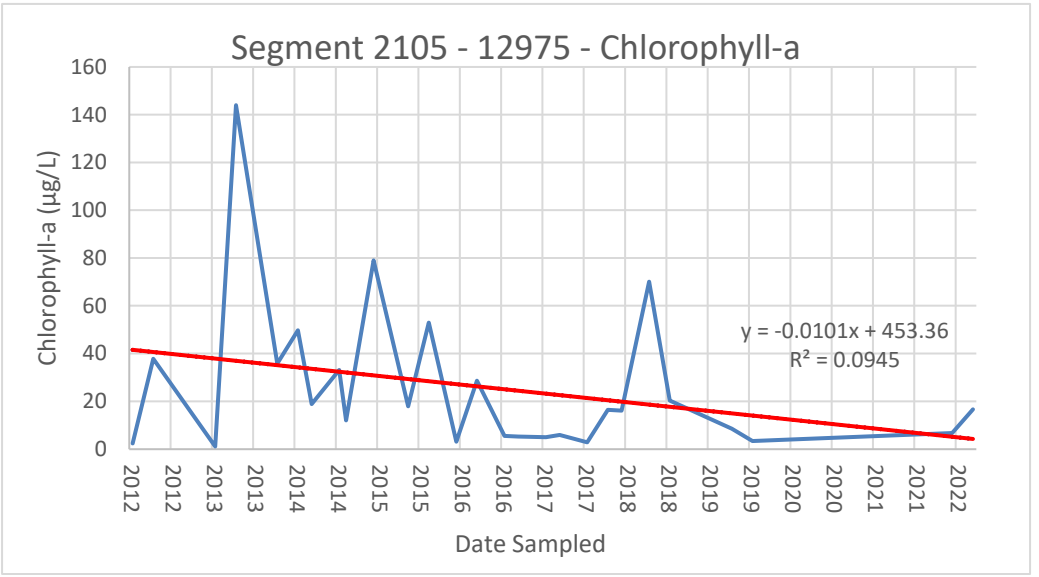
AU_02 is **impaired** for **depressed dissolved oxygen** (grab minimum). 24-hr DO at Nueces River North of Asherton; desolate and giant ranches; USGS stream gage site; had flowing water maybe a week in the last couple years; DO has busted both the DO min and DO average on different occasions. This can be attributed to high nutrient flows from the ranches when flash flood and WWTP effluent when no rainfall (low DO).

20156 is close to the AU_02 boundary.



Station 12976 – Nueces River at SH 85 in Asherton





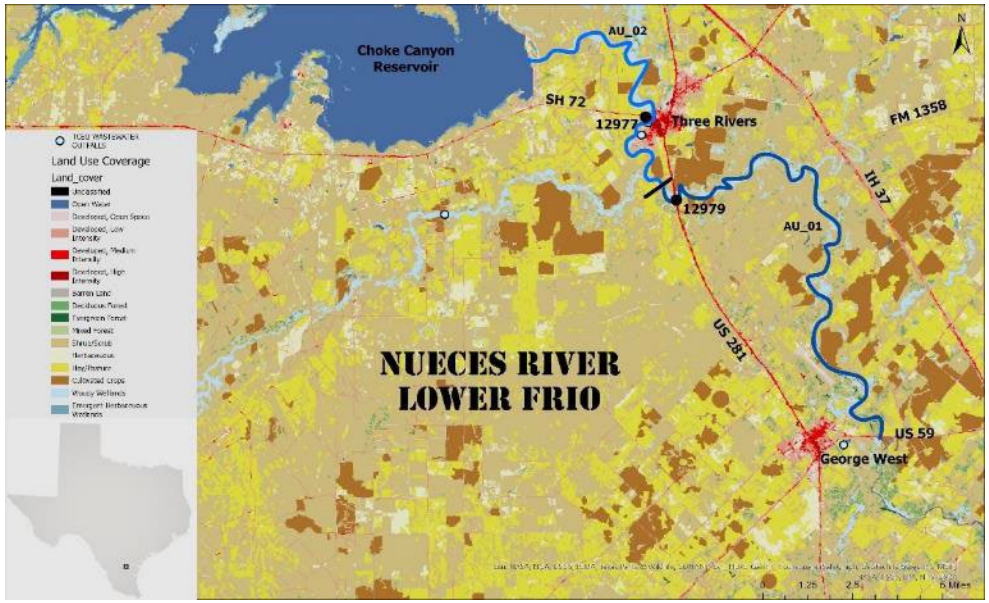
Segment 2106: Nueces River / Lower Frio River

Segment Description - Segment 2106 flows 27 miles from Choke Canyon Reservoir Dam to just upstream of US 59 and is divided into two AUs. Its watershed is 204,055 acres. The City of Three Rivers and the Valero Refinery WWTPs discharge to the Frio River below SH 72. Segment 2106 has two stations: **12979** AU_01 and **12977** AU_02. Illegal dumping has been recorded downstream of Choke Canyon wastewater outfall.

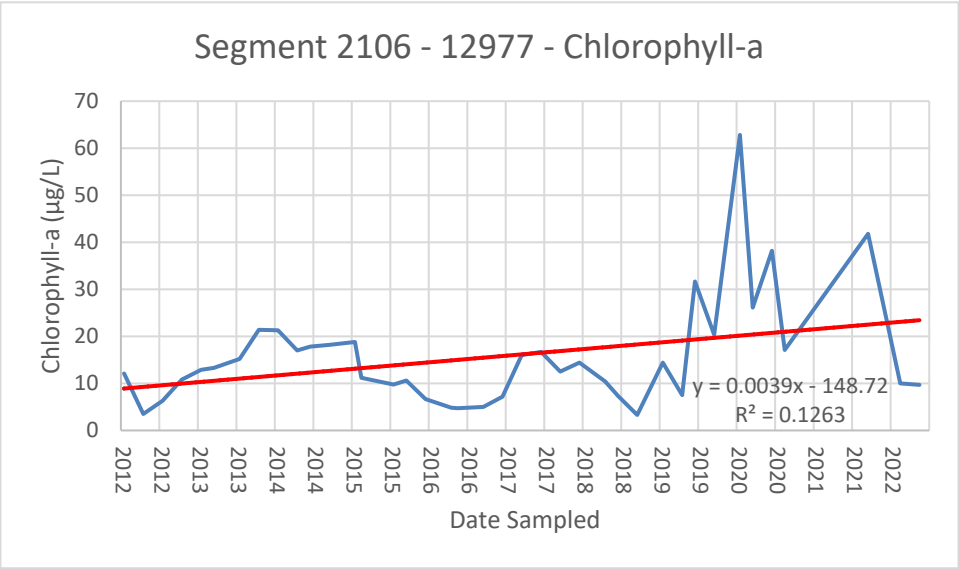
Water Quality – AU_01 and AU_02 have a water quality **impairment** for **TDS** and a **concern** for **chlorophyll-a**. AU_02 is also **impaired** for **bacteria** (*E. coli*)**.** NRA did a tour of 2 WWTPs nearby. Both WWTPs are trying to run at maximum capacity, though improved in recent years. Illegal dumping of waste (high bacteria) just downstream of Choke Canyon's outfall.

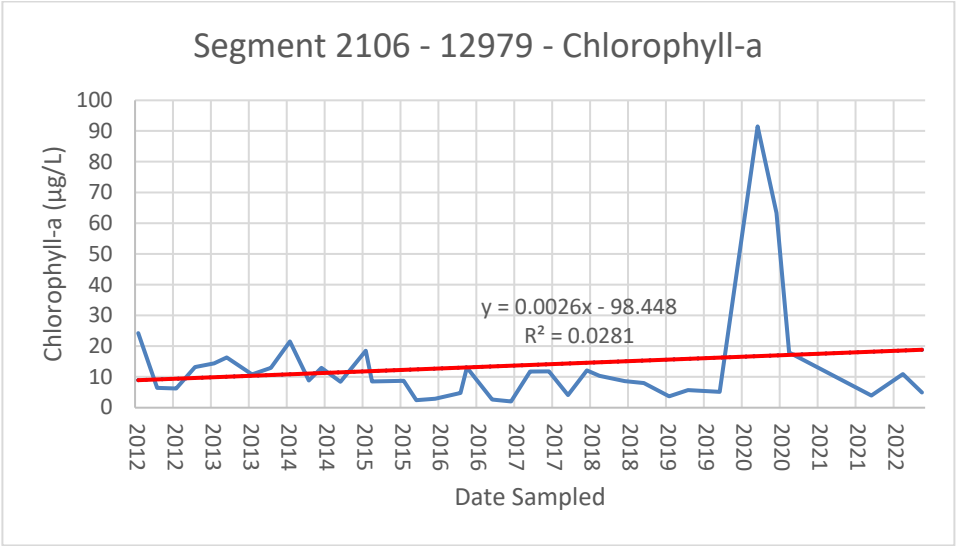
Special Studies –

The TDS standard is based on the average of all values and is currently 500 mg/L for both AUs. Alan Plummer and Associates Inc., working on behalf of the City of Corpus Christi, worked with TCEQ to develop revised and separate standards for the two distinct portions of this segment. The proposed changes will increase the TDS standard to 950 mg/L in the downstream portion (AU_01) and 735 mg/L in the upstream portion (AU_02). If and when approved, AU_01 will most likely meet the proposed standard and be removed from the 303(d) List. Standards revisions are also being proposed for chloride and sulfate in the segment. Again, the standard is based on the average of all values. For AU_01, chloride would increase from 250 mg/L to 350 mg/L and sulfate would decrease from 250 mg/L to 165 mg/L. For AU_02, chloride would increase from 250 mg/L to 285 mg/L and sulfate would decrease from 250 mg/L to 145 mg/L.



Station 12977 – Frio River at US 72





Station 12979- Nueces River at US 281.17

Segment 2107: Lower Atascosa River

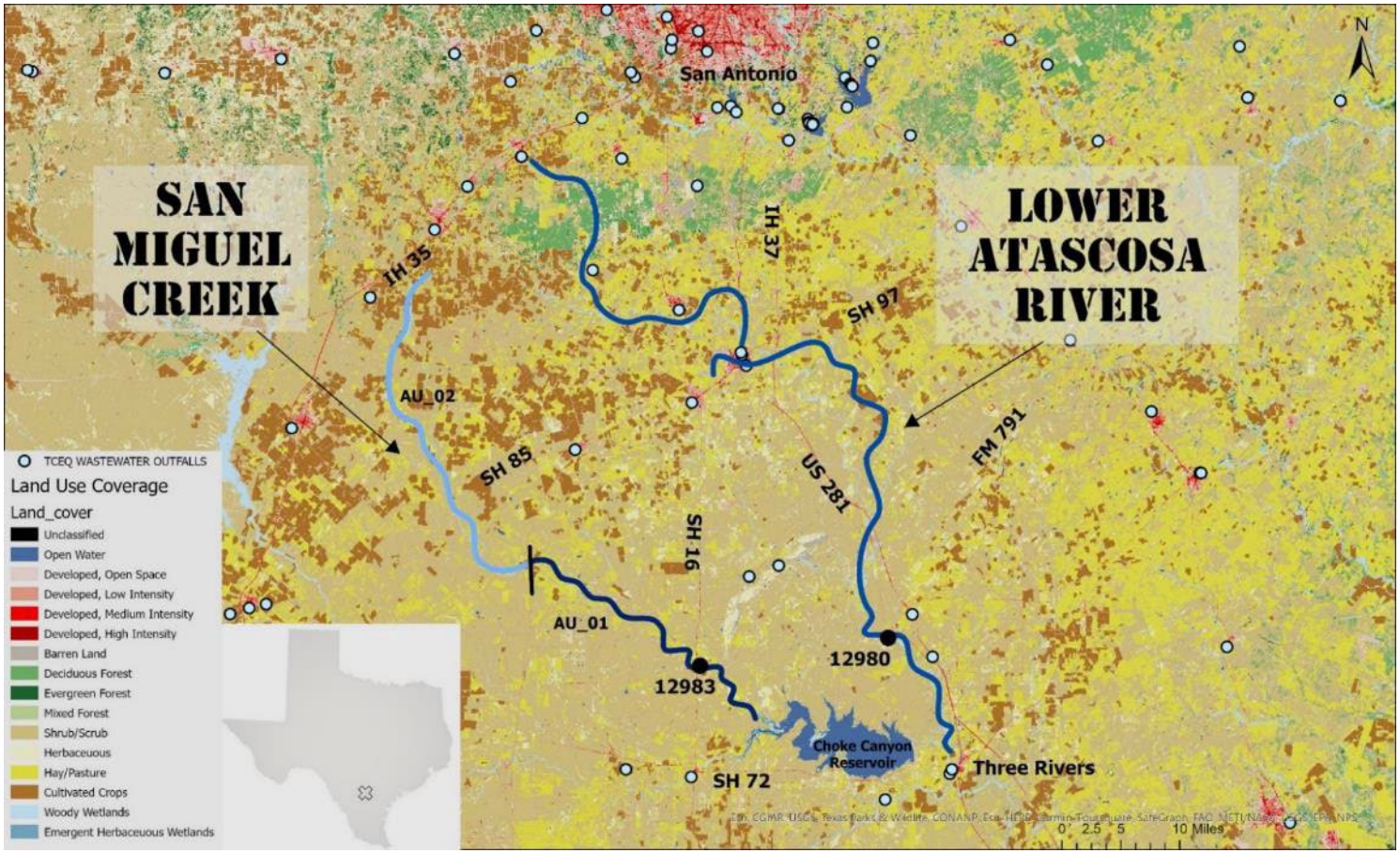
As a result of a Texas Surface Water Quality Standards (TSWQS) revision, segment descriptions for the Atascosa River have changed. Segment 2107 now includes only the Lower Atascosa River in a single AU which flows from the confluence with Borrego Creek to the confluence of the Frio River. The upper reaches of the river are now in the newly created segment known as the Upper Atascosa River Segment 2118. The total watershed is 886,750 acres Segment 2107 consists of one station numbered **12980** AU_01.

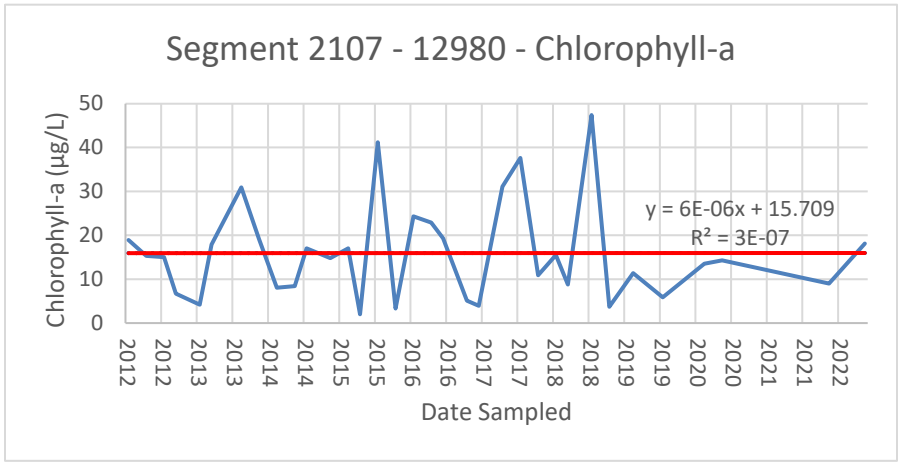
Water Quality – Segment 2107 has been **impaired** for **bacteria** (*E. coli*) since the 1996 IR and remains listed for that parameter in the 2022 IR. The AU_01 also has an **impairment** for **TDS** and a water quality **concern** for **chlorophyll-*a*.** Metals analysis was added in FY 2019. Review of standards(Recreational Attainability Analyses [RUAA]/Use Attainability Analyses [UAA]) was completed. New impairment this year is TDS, criteria is 1,500 mg/L. Additional data is needed because of low flows in 2022 and 2023. Lignite mining near water supply so we test form metals twice a year. Arsenic was the only detect during Atascosa metals study completed two years ago. This was only during extremely low flow.

Special Studies:
Sampling for a TMDL to address the bacteria impairment was conducted between 2002 and 2004. The sampling confirmed the impairment, and a RUAA was conducted by the Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University in 2009 and 2010.

https://www.tceq.texas.gov/waterquality/standards/ruaas/atascosa2107

Additional proposed standards revisions for Segment 2107 include chloride from 600 mg/L to 400 mg/L, sulfate from 500 mg/L to 300 mg/L, and TDS from 1,500 mg/L to 1,650 mg/L.





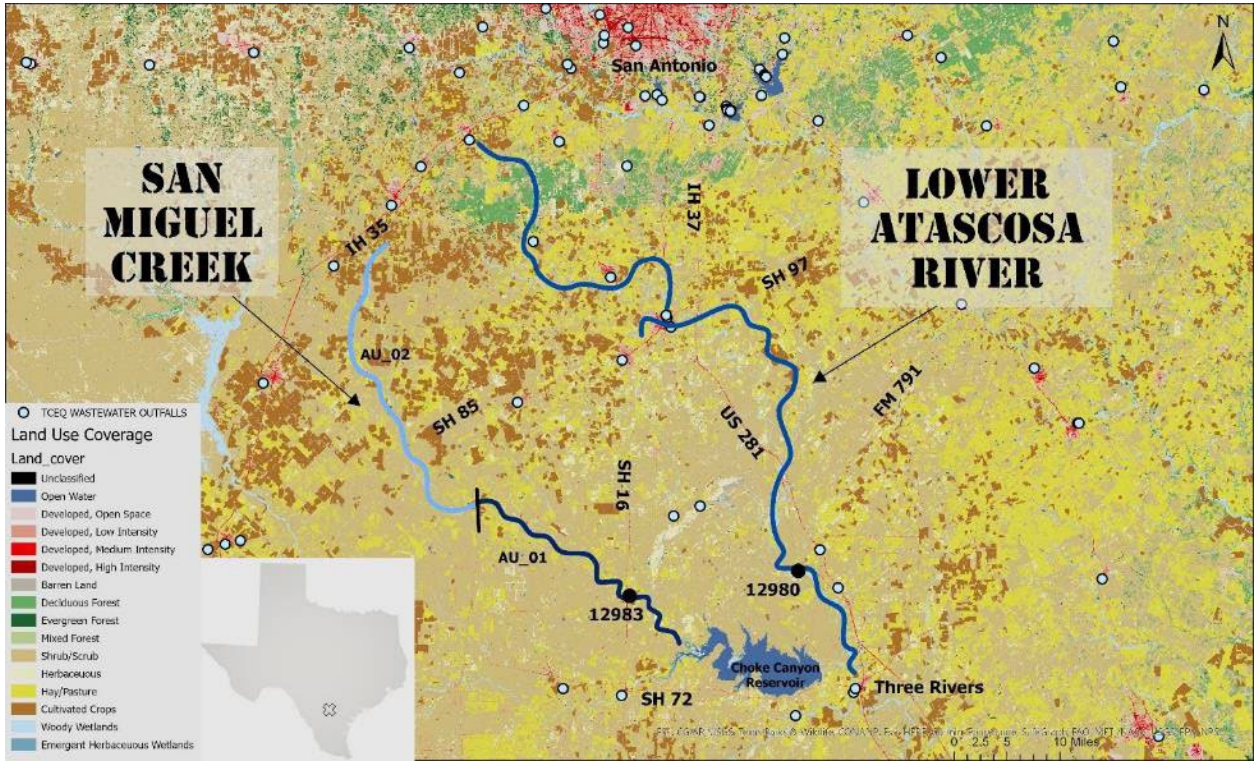
Station 12980 – Atascosa River at FM 99

Segment 2108: San Miguel Creek

Segment Description – Segment 2108 flows 69 miles from the confluence of San Francisco Perez Creek and Chacon Creek in Frio County to Choke Canyon Reservoir and is divided into two AUs. Its watershed is 535,610 acres. There are no sampling sites located in AU_02. The Cities of Charlotte, Devine, Natalia, and the Moore Water Supply Corporation ultimately discharge to San Miguel Creek. Segment 2108 has one station numbered **12983** AU_01**.**

Water Quality – AU_01 has been listed as being **impaired** for **bacteria** (*E. coli*) for primary contact recreation since the 2006 IR. The impairment carries over to the 2022 IR. AU_01 also has a **concern** for **depressed DO**. In AU_02 there are **no concerns** or **impairments**. Upstream of Choke Canyon Reservoir. USGS gage exists here. Drought since 2007 for all tributaries to Choke Canyon (Hondo and Seco Creek). RUAA study completed in 2015 when flooded (possible buildup of fecal matter). Whole area went from oil boom to bust, repeatedly without a good flood to wash it through Choke Canyon.

Special Studies – To address the bacteria impairment and determine if the correct standard is being applied to the water body, the TSSWCB contracted with NRA to conduct a Recreational Use Attainability Analysis (RUAA) to determine if recreation is occurring on the stream. The site surveys took place in late spring/early summer of 2015.

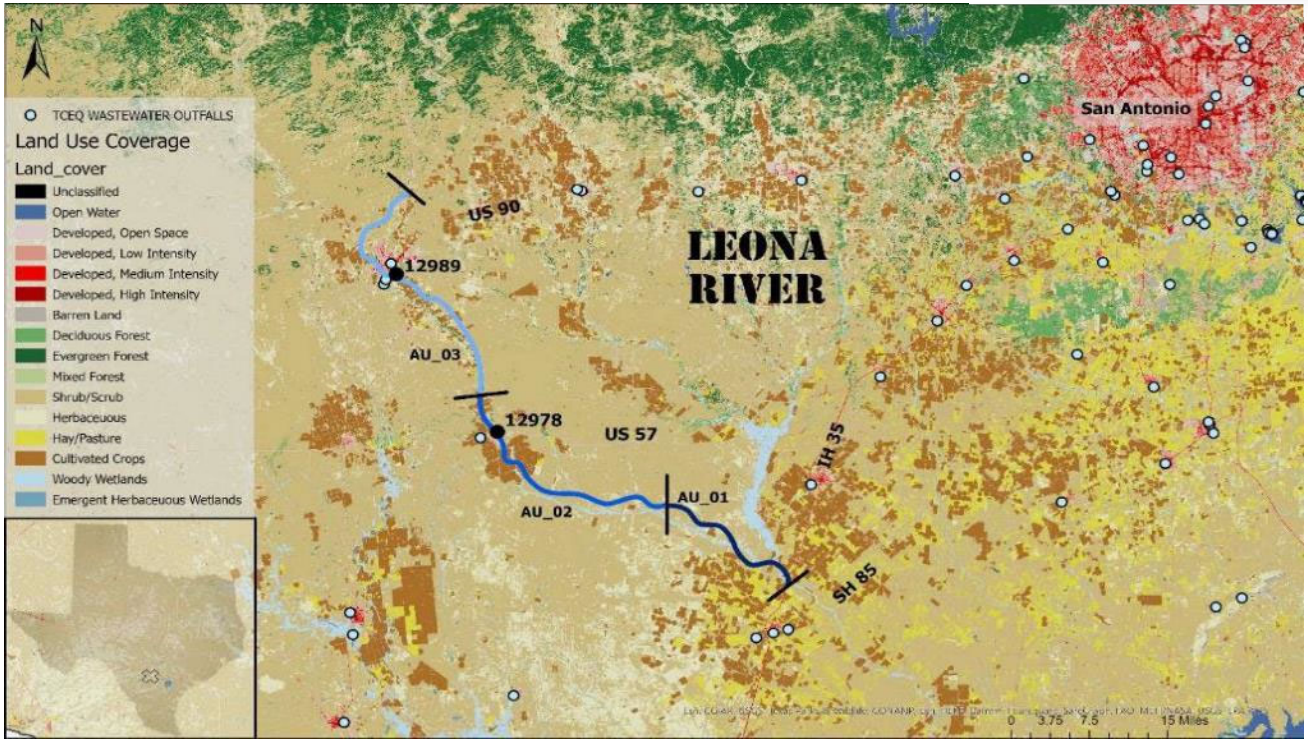


For more information visit the project website.

https://www.tceq.texas.gov/waterquality/standards/ruaas/nueces-river-recreational-use-attainability-analysis

Segment 2109: Leona River

Segment 2109 flows from central Uvalde County southeast through Zavala County to its confluence with the Frio River near I-35 north of Dilley. The segment is approximately 85 miles long and its watershed is 429,555 acres. Municipalities located within the watershed include the City of Uvalde (population 16,300) and the town of Batesville (population 1,100). Tributaries in the upper reaches of the river near Uvalde include Cooks, Boon, and Taylor sloughs. Gallina Slough, Live Oak, Little Yoledigo and Todos Santo creeks contribute water below Batesville. Segment 2109 consists of three stations: **12985** AU_01, **12987** AU_02, **18418** AU_03.

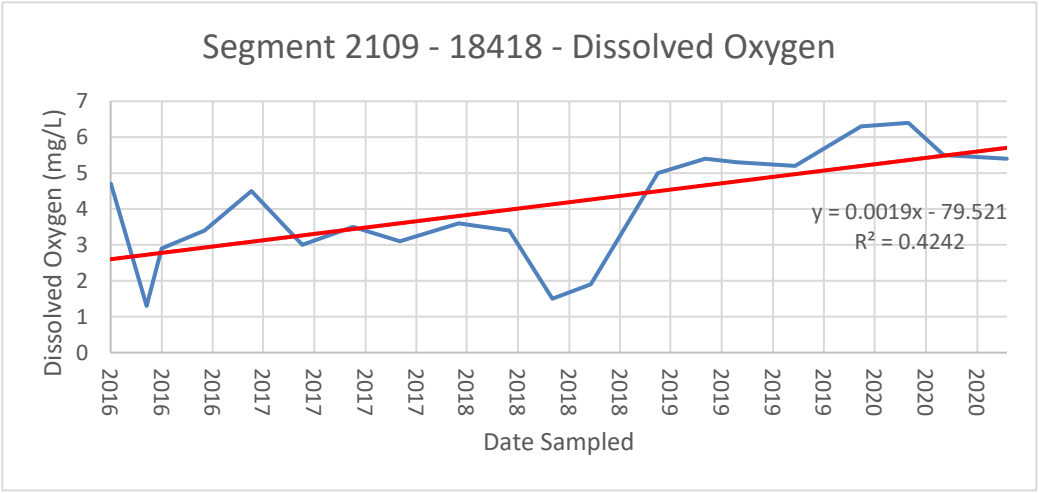


Water Quality - The entire segment was listed as being impaired for **bacteria** (*E.* coli) for primary contact recreation in the 2006 IR. The impairment carries over to the 2022 IR. The entire segment also has a water quality **concern** for **nitrate**. AU_03, located in the upper end of the segment has a water quality **impairment** for **depressed dissolved oxygen** (grab minimum) and a screening level **concern** for **depressed dissolved oxygen**. NRA will be sampling at Station 12985 on a quarterly basis. Water comes out of the ground contributing to the low oxygen level in this area. Groundwater might be contributing to high Nitrate. A lot of farming is going on in this area. Leona RUAA completed, possible WQS revisions needed. No spring flow when Edwards Aquifer levels are low.

Special Studies-

To address the bacteria impairment, a RUAA was conducted by the Texas Institute for Applied Environmental Research (TIAER) from January 2011 through December 2012. The interviews indicated that contact recreation (wading by children) does occur. No recreational activities were observed during the field surveys or site. See https://www.tsswcb.texas.gov/assessment-water-quality-and-watershed-planning-leona-river for more information.

Station 18418 – Leona River at FM 140

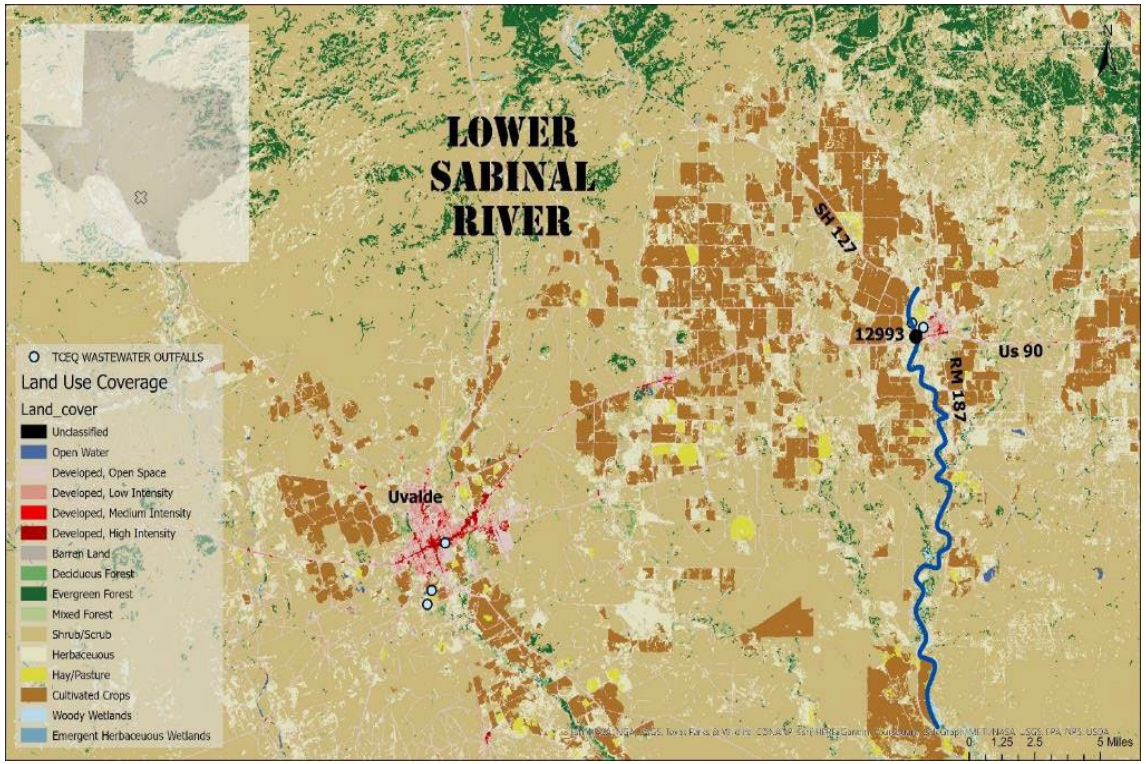


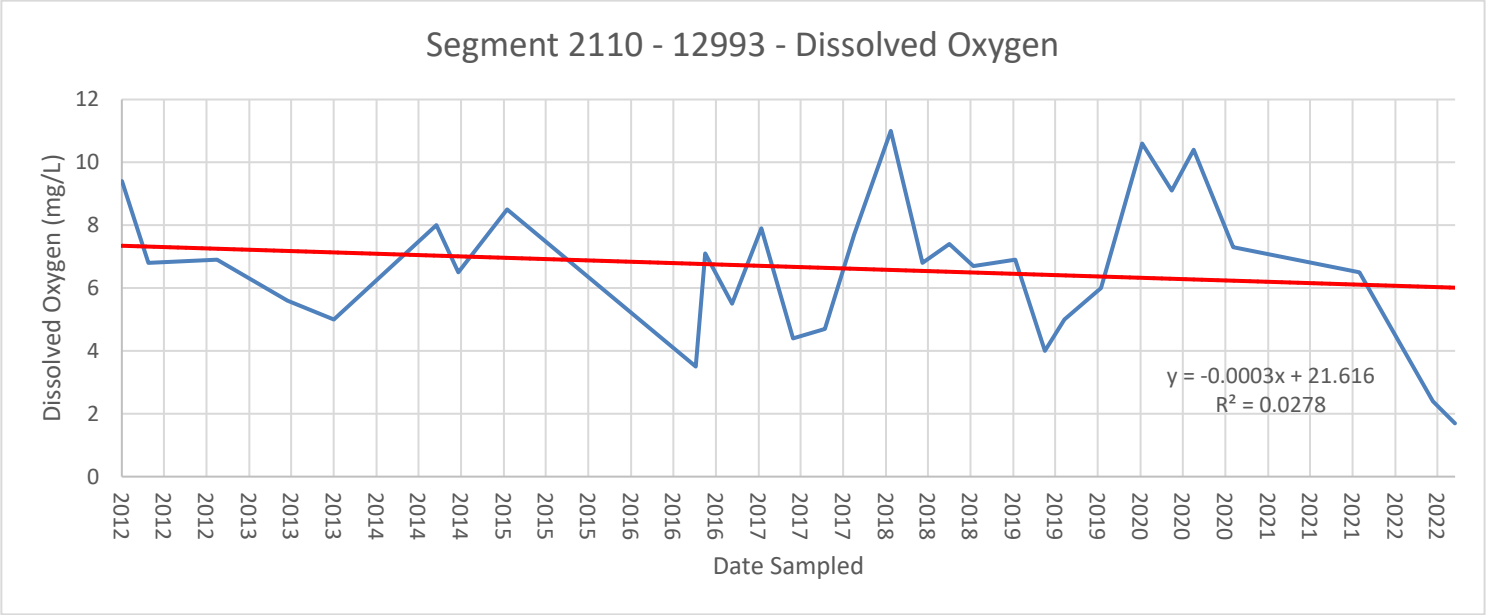
Segment 2110: Lower Sabinal River

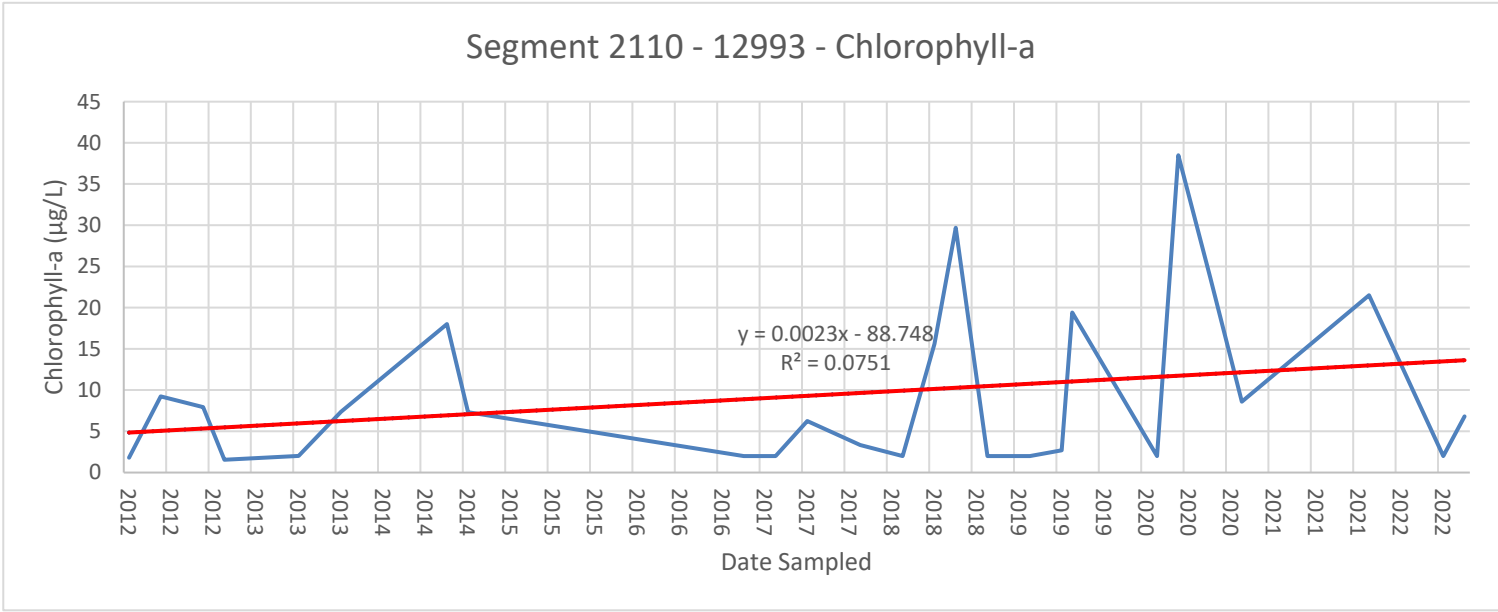
Segment Description - Segment 2110 is from the confluence with the Frio River in Uvalde County to a point 100 meters (110 yards) upstream of SH 127 in Uvalde County. Its watershed is 136,676 acres and the City of Sabinal (population 1,696) is the only community in the watershed. The segment has one station numbered **12993** on AU_01.

Water Quality - The segment was first listed as being impaired for nitrates in the 2002 IR. The status of the waterbody changed from "not supporting" to "of concern" in the 2014 IR. The **concern** for **nitrate** continues in the 2022 IR. The Sabinal WWTP was a possible source as it was subject to inundation during floods. Frequently, site visits included visible evidence of nutrient enrichment, notated as an abundance of floating and submerged algae. The site has *screening level* **concerns** for **depressed dissolved oxygen** and **chlorophyll-a**, as well as a ***use* concern** for **bacteria** (*E. coli*) in the 2022 IR. Stream gage generally shows zero flow at this location. Last of the bald cypress. Lots of floating algae visible and high nitrate values were found. WWTP has been relocated out of the Flood Plain.

Special Studies – To address the nitrate impairment, a TMDL was conducted, and an I-Plan was approved in 2005. The plan called for the construction of a new plant which has been completed and came online on July 27, 2011. The final report for the TMDL can be found at: https://www.tceq.texas.gov/downloads/water-quality/tmdl/lower-sabinal-river-drinking-water-45/45-sabinal-tmdl-adopted.pdf




Segment 2110 - 12993 - Dissolved Oxygen
Dissolved Oxygen (mg/L)
Date Sampled
y = -0.0003x + 21.616
R² = 0.0278

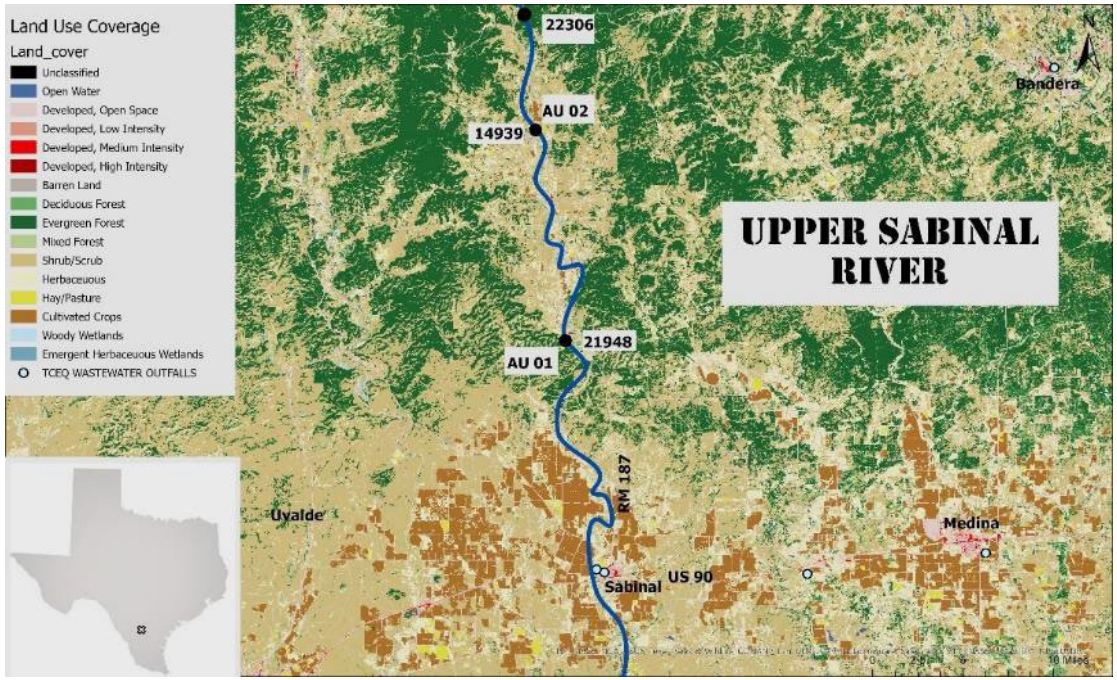

Segment 2110 - 12993 - Chlorophyll-a
Chlorophyll-a (µg/L)
Date Sampled
y = 0.0023x - 88.748
R² = 0.0751

Segment 2111: Upper Sabinal

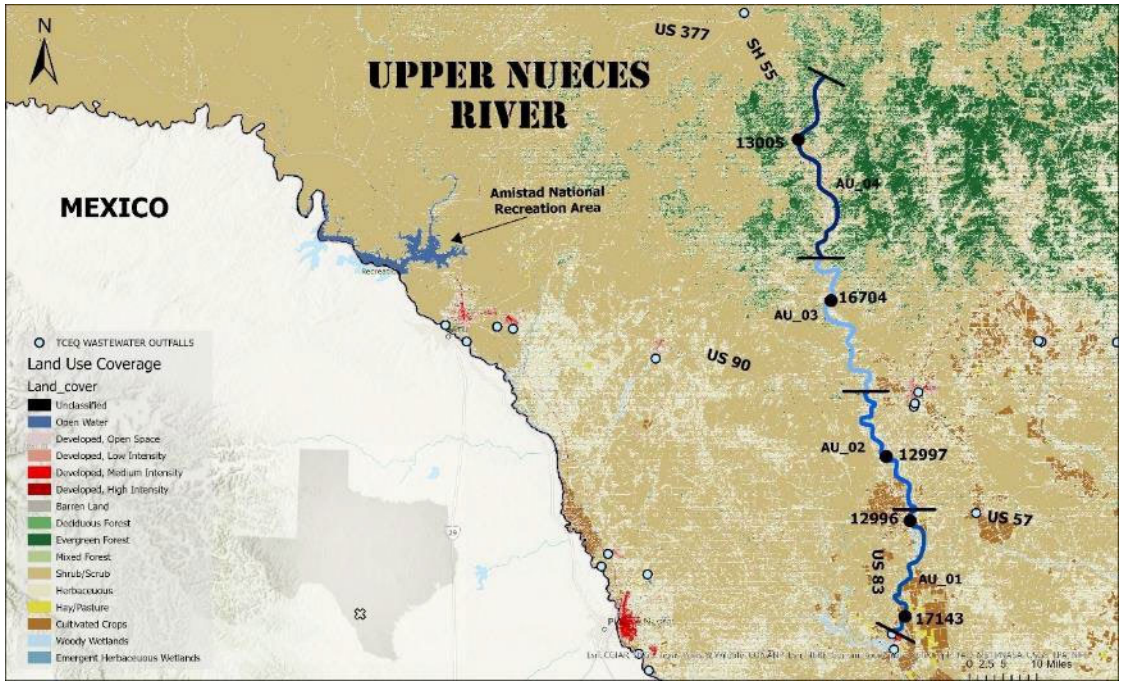
Segment 2111 flows 48 miles from the most upstream crossing FM 187 in Bandera County to a point 100 m upstream of SH 127 in Uvalde County and is divided into two AUs. Its watershed is 149,444 acres with the Cities of Utopia (pop. 167) and Vanderpool (pop. 86) being the only communities within the

watershed. Lost Maples State Park is in the headwaters of the stream. Segment 2111 consists of two stations: **14939** AU_01, **21948** AU_02. Feral hogs have been an issue for the area surrounding Segment 2111.

Water Quality – There are **no** water quality **concerns** or **impairments** identified in AU_01 or AU_02 in the 2022 IR. Station 22306 is located just downstream of Lost Maples – bacteria is a little higher than it should be. Lost Maples might have issues of wildlife, specifically feral hog.



Station 21948 – Sabinal River at FM 187



Segment 2112: Upper Nueces River

Segment 2112 flows 123 miles from the confluence of the East Prong Nueces River and Hackberry Creek in Edwards County to a point 100m (110 yards) upstream of FM 1025 in Zavala County. The segment is divided into four AUs and its watershed is 1,336,006 acres. There are several small communities located in the watershed including Camp Wood (pop. 934), Uvalde (pop. 16,154), and Crystal City (pop. 7,310). Segment 2112 consists of three stations: **12143** AU_01, **12996** AU_01, **16704** AU_03. Segment 2112 has two new quarterly stations (22330 and 22331) and former station 13005 were added.

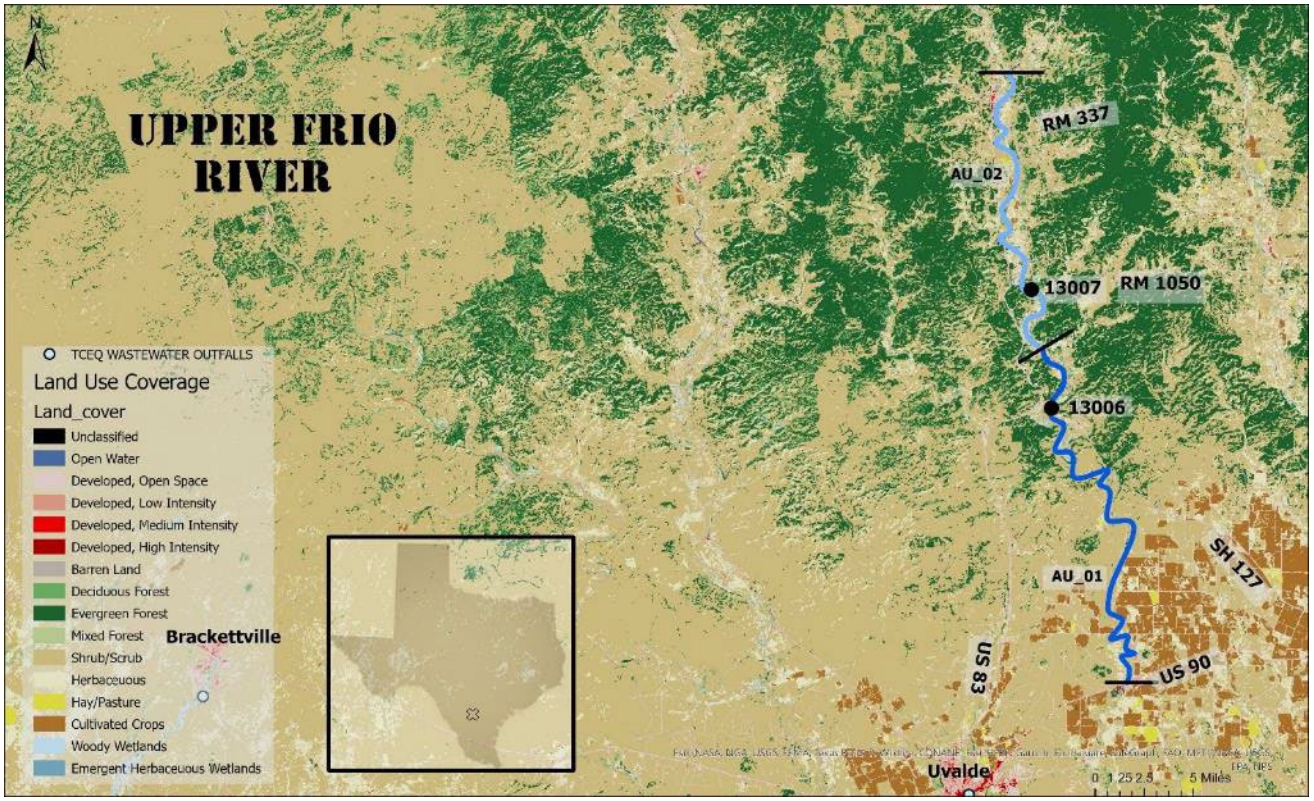
Water Quality - AU_01, located at the bottom end of the segment, has a water quality **concern** for **depressed dissolved oxygen** (grab sample) in the 2022 IR. Water quality in the headwaters and upper end of the segment is exceptional with crystal-clear springs providing a steady flow of water in all but the driest of years. **No concerns** or **impairments** exist in AUs 02 through 04. Shallows live under SH 55, also know as the 19- Mile Crossing. Perfect water quality here and very little bacteria.

Special Studies – In 2010 and 2011, TCEQ, TPWD, and NRA conducted a type of Aquatic Life Monitoring (ALM) in this segment known as the Least Disturbed Stream (LDS) monitoring. LDS monitoring occurs in streams where there is little to no anthropogenic influences on water quality. These streams are used as reference streams to help assess rivers across the state. LDS occurred in AU_03, AU_04, Montell Creek, and Bullhead Creek.

Station 16704 – Upper Nueces River at SH 55

Segment 2113: Upper Frio River

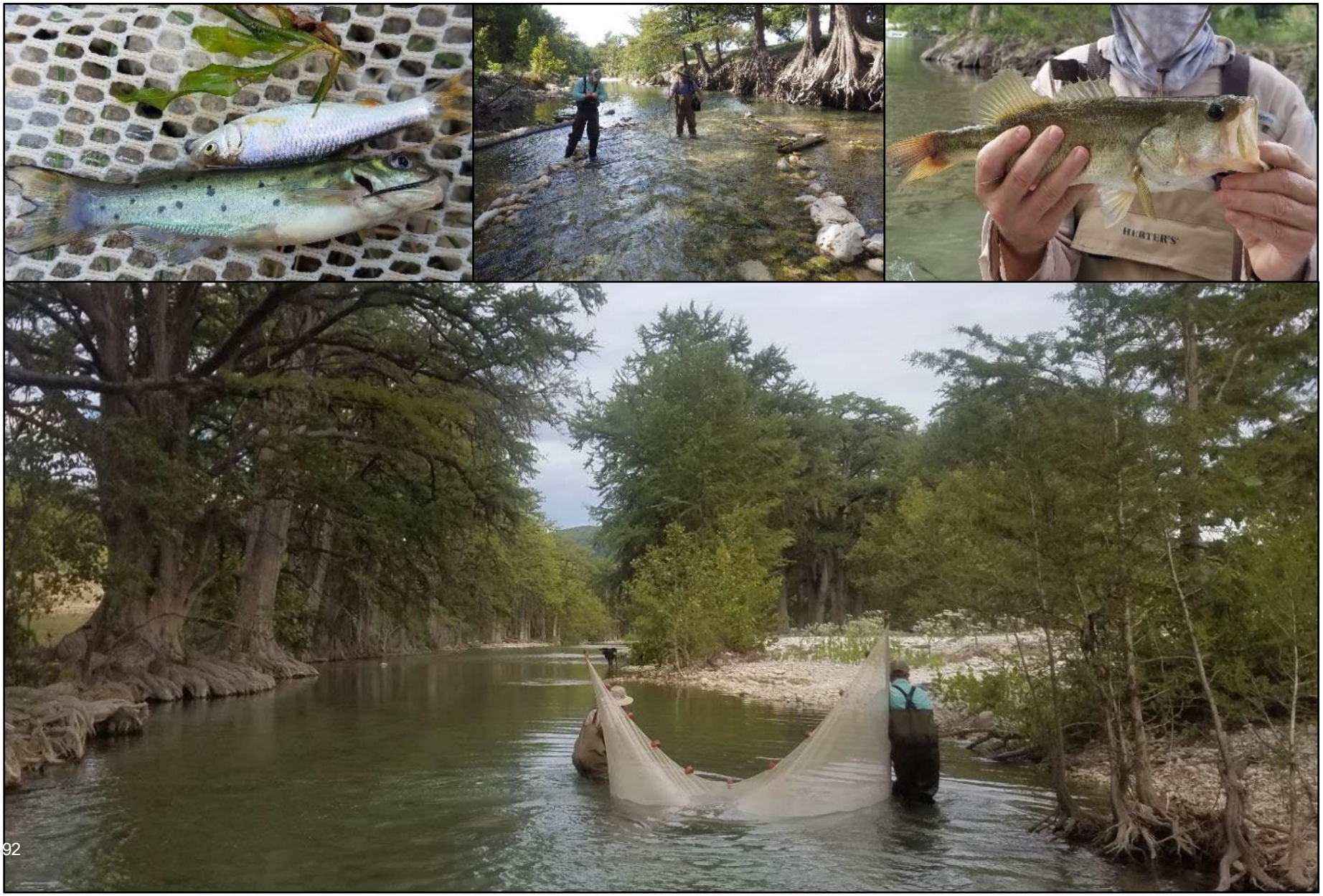
Segment 2113 flows 47 miles from the confluence with the West Frio River and the East Frio River in Real County to a point 100m upstream of US 90 in Uvalde County. The segment is divided into two AUs and the watershed is 280,596 acres. Towns in the watershed include Leakey (pop. 430) and Concan (pop. 271) which have significant seasonal variations in population due to recreation on the river. Recreational activities are very popular within the segment. Garner State Park receives between 300,000 and 400,000 visitors on an annual basis. Concan is another popular destination for summertime recreation activities. Streamflow in the Upper Frio River is sourced from numerous spring-fed tributaries located north of Leakey in Real County. Segment 2113 consists of one station numbered **13006** on AU_01.



Water Quality – AU_01 has **impairments** for **fish community.** AU_02 has a water quality **concern** for impaired **fish community**. The Upper Nueces River is showing improved water quality in recent years. Both the macrobenthic communities and habitat impairment were removed in the 2022 IR. Not much water flow in the area. ALM conducted in 2017 and 2019.

Special Studies:

To address the biological impairments and habitat concerns, a collaborative effort between TCEQ, TPWD, and NRA occurred to conduct two Aquatic Life Monitoring (ALM) events at four stations in the segment. ALMs include fish and macroinvertebrate collection, habitat surveys, flow, water chemistry, and 24-hour dissolved oxygen monitoring. The first one was held in April 2017 and the second one was in September 2019.



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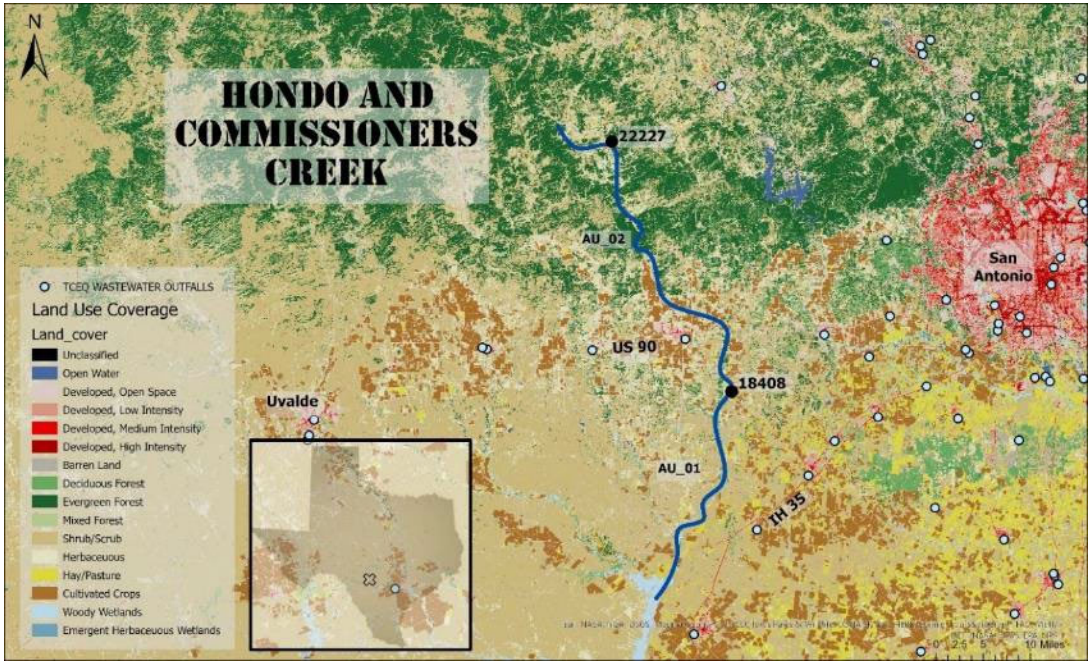
Segment 2114: Hondo Creek

Segment 2114 flows 78 miles from FM 470 in Bandera County to the confluence with the Frio River in Frio County. It is divided into two AUs and the watershed is 435,985 acres. The City of Hondo (pop. 9,251) WWTP discharges into this segment. The creek is spring fed in its upper reaches as it makes its way through the steep slopes of the Texas Hill Country to the gently rolling hills and fertile croplands in Frio County. A large pool exists at the crossing of SH-173 southeast of Hondo and water appearance at Station 18408 often takes on an aquamarine color during quarterly site visits. Segment 2114 consists of one station numbered **18408** AU_01.

Water Quality - There is a water quality **concern** for **nitrate** in AU_01. Watercolor has changed dramatically. Possibly a dam that broke down, creating islands at sampling location. Stream gage shows 0.0 for flow all the time in this area. Upstream Hondo Creek has clear water, although very low flow.



Segment 2114A: Commissioner's Creek

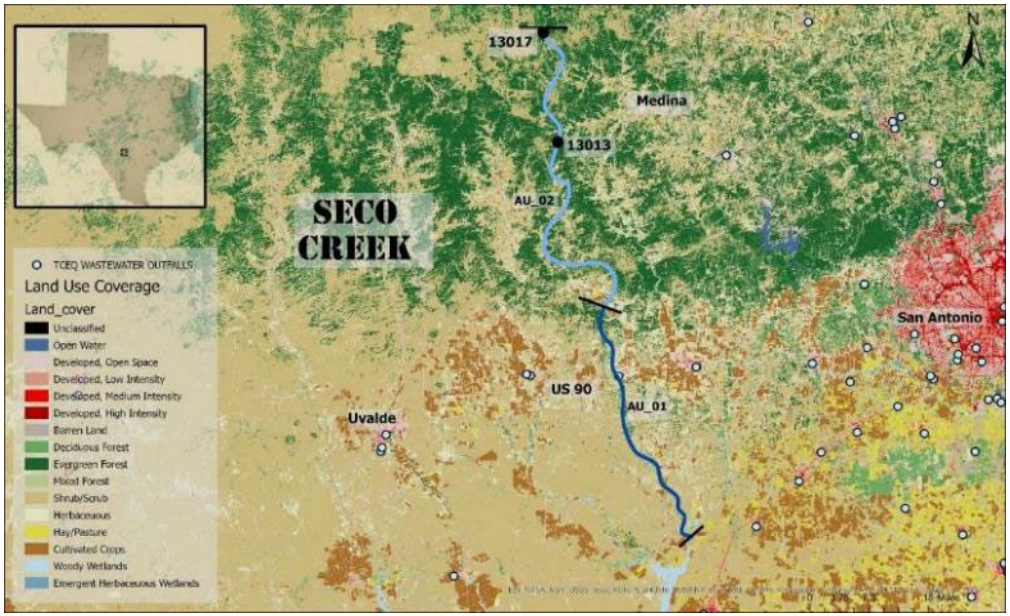
Segment 2114A is a tributary to Upper Hondo Creek. The segment flows from the headwaters approximately 6.4 km (4.0 mi.) northeast of Tarpley in Bandera County to the confluence with Upper Hondo Creek. The waterbody was previously included with Upper Hondo Creek (Segment 2114) but is now a newly created segment with a new monitoring station. Segment 2114A consists of one station numbered **22227**.

Water Quality – Commissioners Creek is a new site and does not have enough data for assessment. The site was chosen due to stakeholder input following water quality disturbances associated with construction of an impoundment on the creek. The low flowing creek also receives effluent from Camp of the Ozarks (RR 417 LLC – 49,000 gal/day). Bandera County River Authority and Groundwater District monitors at this location. Downstream of this location there is no flow.

Segment 2115: Seco Creek

Segment 2115 is 70 miles long and flows from the confluence of West Seco Creek in Bandera County to the confluence with Hondo Creek in Frio County. The segment is divided into two AUs and the watershed is 266,833 acres. There are no sampling sites in AU_01. BCRAGD began sampling in AU_02 in FY 2016. They are contributing their resources for this sampling and providing the data to NRA for submittal to SWQMIS. Segment 2115 consists of one station numbered **13017**.

Water Quality – There are **no** water quality **concerns** or **impairments** listed in the 2022 IR. Seco means "dry" in Spanish. No flow on Seco Creek. The upper part of Seco Creek has clear water. The lower is nearly dry in its entirety. Cattle and wildlife runoff are likely causes of high nutrient values.

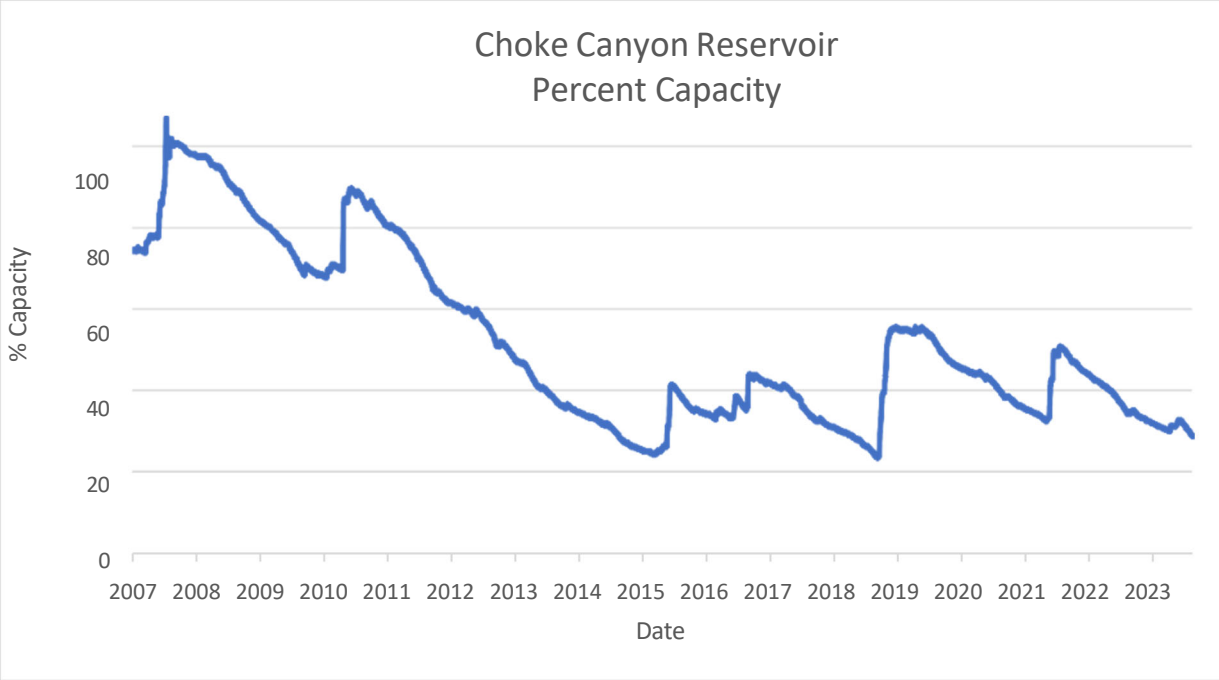


Segment 2116: Choke Canyon Reservoir

Segment 2116 is from Choke Canyon Dam to a point 4.2 km (2.6 mi) downstream of SH-16 on the Frio River Arm and to a point 100 meters (110 yards) upstream of the confluence of Mustang Branch on the San Miguel Creek Arm and up to the normal pool elevation of 220.5 feet (impounds Frio River). The reservoir covers portions of McMullen and Live Oak Counties. The reservoir is divided into seven AUs and the watershed is 11,304 acres. Segment 2116 consists of four stations: **13019**, **13020**, **17389,** and **22328**. The three stations total (13019, 13020, and 17389) will be monitored on a monthly basis, including 24-hr DO. 22328 will be monitored quarterly (with 24-hr DO). This segment's high nutrients are due to the nature of the flooded vegetation (i.e. an overabundance of black willow).

Water Quality – AU_01 through AU_07 all have **impairments** for **excessive algal growth**. AU_06 has a water quality **concern** for **depressed DO** (screening level and grab minimum). All other assessed parameters met the standards in the 2022 IR. The last time the reservoir was full in September 2007. The water level graph displays the lake percent of capacity from January 1, 2007, through January 1, 2023. Additional information about the reservoir is available at: http://www.twdb.texas.gov/surfacewater/rivers/reservoirs/choke_canyon/index.asp.

Frio and San Miguel Creek lead into Choke Canyon Reservoir. 24-hr DO is monitored at all 4 stations (22328 quarterly and remaining stations monthly). Reservoir levels too low to allow South Shore Unit Boat Ramp usage, so 13019 inaccessible for 2 months. 13019 station was created in FY19. Does not meet Chlorophyll-a criterion, but additional study is needed to verify. NRA is conducting monthly 24-hr DO at 2 stations. Open water locations have great water quality (i.e. good saturation throughout the whole water column). During warm weather and after flow events DO is very low. We've seen 0.00 mg/L a few times. The cause for low DO is likely due to a combination of low circulation due to low flow/backwater and biodegrading black willow leaves (the dominant riparian species). Black willow rots easily and there is an abundance of wood on the banks. Tree stumps exist everywhere in the water body, usually oak, and boaters must go slow to navigate. Monitoring at station 22328 began October 2022. High flow event, or good rainfall, permits the Frio and San Miguel to dump freshwater into Choke Reservoir. Alligators were known for eating fish off the overnight lines during high flow events at our 22328 and 17389 sites. Counted at least 6 alligators from sizes of 5' to 11'.

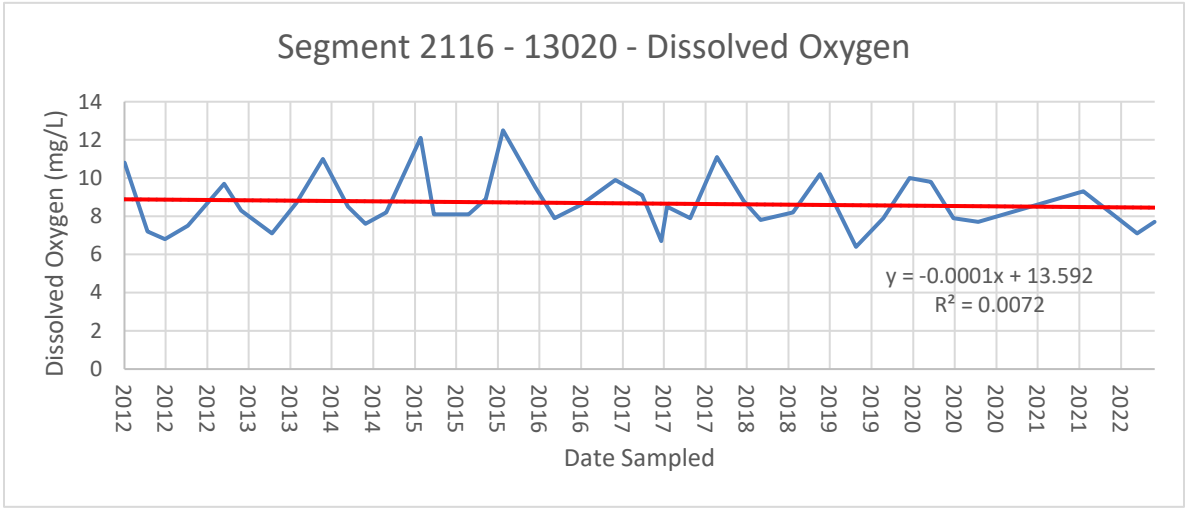


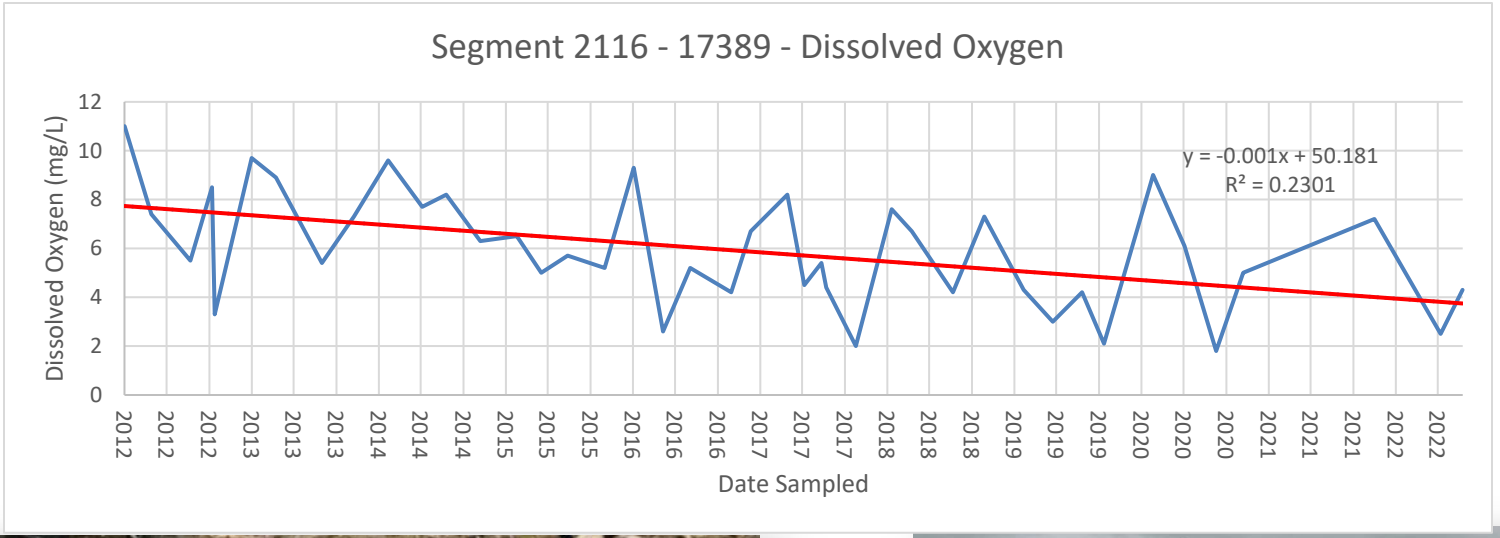
American Alligator found in Choke Canyon Reservoir.

Segment 2116- Station 13019

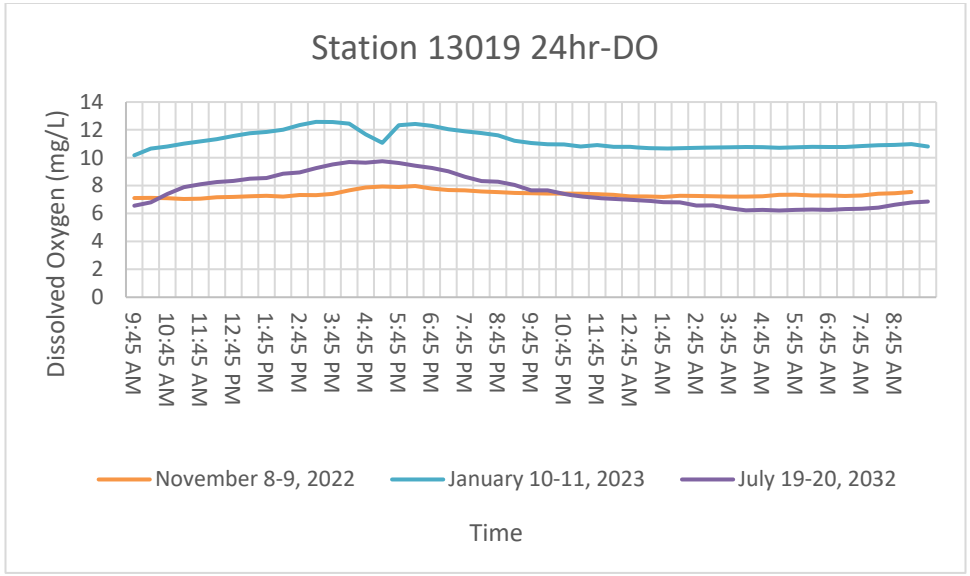
Segment 2116- Flock of Rio Grande Turkeys at Station 13019

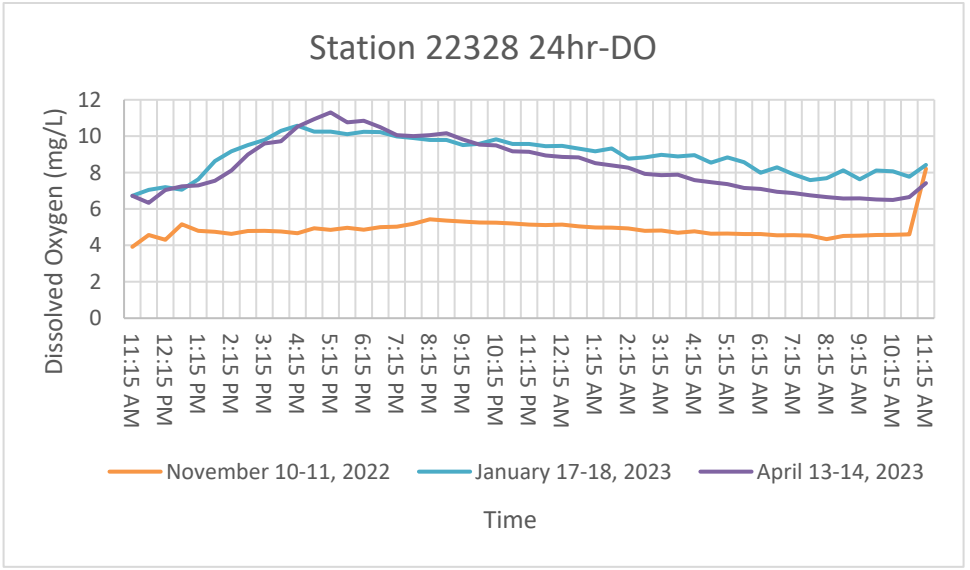
Segment 2116- Double-crested Cormorant flying over Station 13020

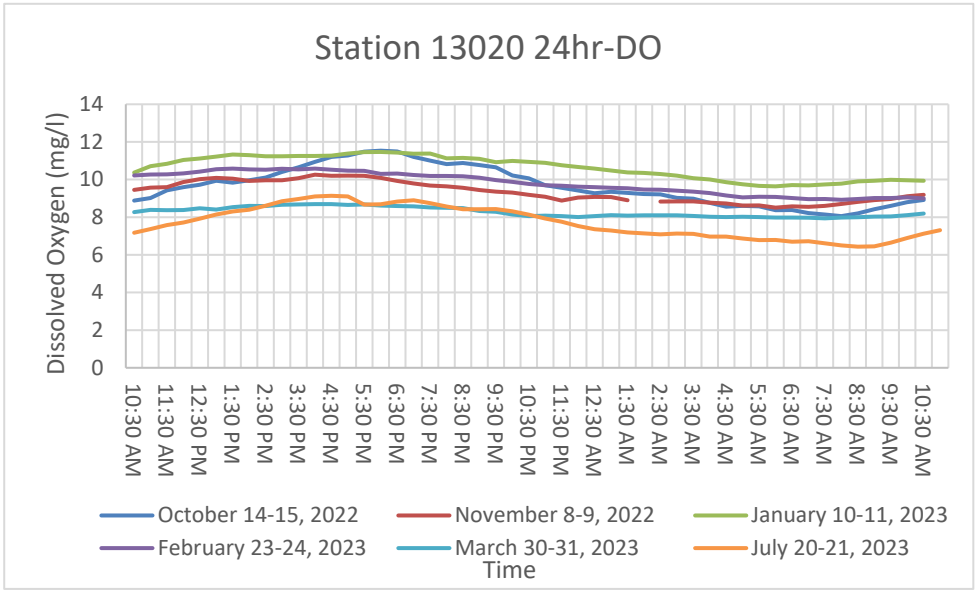


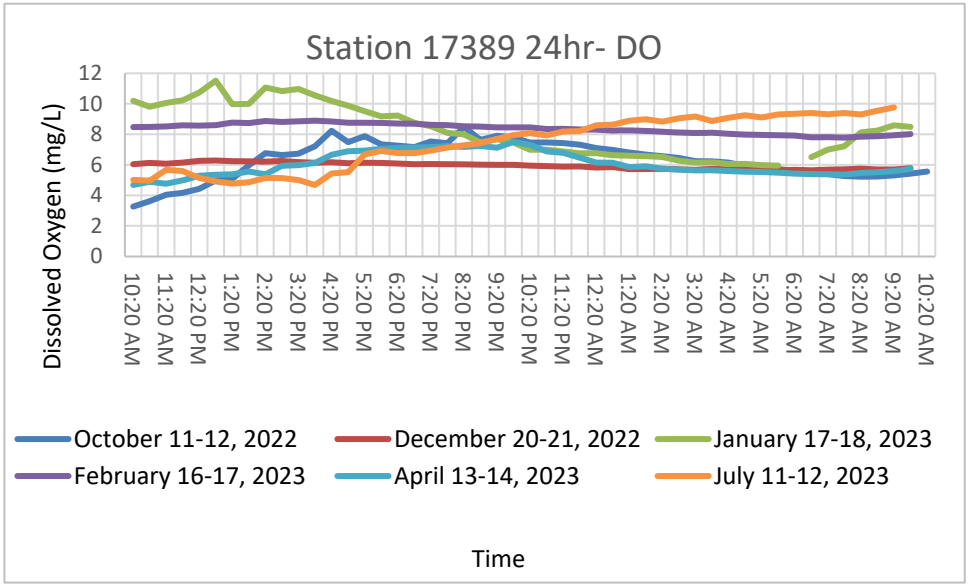


American Allegator near station 17389


Station 13019 24hr-DO
Dissolved Oxygen (mg/L)
14
12
10
8
6
4
2
0
9:45 AM
10:45 AM
11:45 AM
12:45 PM
1:45 PM
2:45 PM
3:45 PM
4:45 PM
5:45 PM
6:45 PM
7:45 PM
8:45 PM
9:45 PM
10:45 PM
11:45 PM
12:45 AM
1:45 AM
2:45 AM
3:45 AM
4:45 AM
5:45 AM
6:45 AM
7:45 AM
8:45 AM
November 8-9, 2022
January 10-11, 2023
July 19-20, 2032
Time


Station 22328 24hr-DO
Dissolved Oxygen (mg/L)
12
10
8
6
4
2
0
11:15 AM
12:15 PM
1:15 PM
2:15 PM
3:15 PM
4:15 PM
5:15 PM
6:15 PM
7:15 PM
8:15 PM
9:15 PM
10:15 PM
11:15 PM
12:15 AM
1:15 AM
2:15 AM
3:15 AM
4:15 AM
5:15 AM
6:15 AM
7:15 AM
8:15 AM
9:15 AM
10:15 AM
11:15 AM
November 10-11, 2022
January 17-18, 2023
April 13-14, 2023
Time


Station 13020 24hr-DO
Dissolved Oxygen (mg/L)
14
12
10
8
6
4
2
0
10:30 AM
11:30 AM
12:30 PM
1:30 PM
2:30 PM
3:30 PM
4:30 PM
5:30 PM
6:30 PM
7:30 PM
8:30 PM
9:30 PM
10:30 PM
11:30 PM
12:30 AM
1:30 AM
2:30 AM
3:30 AM
4:30 AM
5:30 AM
6:30 AM
7:30 AM
8:30 AM
9:30 AM
10:30 AM
October 14-15, 2022
November 8-9, 2022
January 10-11, 2023
February 23-24, 2023
March 30-31, 2023
July 20-21, 2023
Time

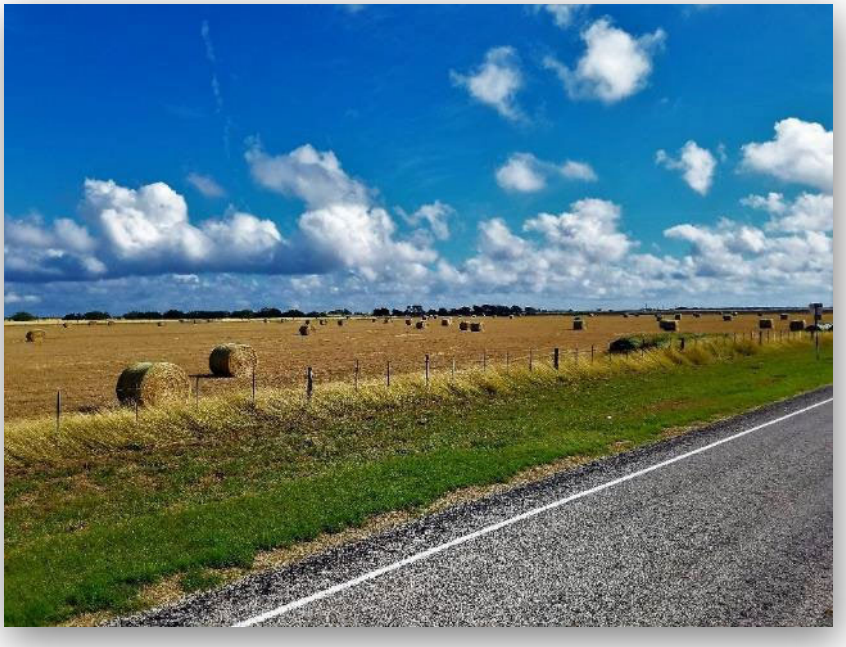

Station 17389 24hr- DO
Dissolved Oxygen (mg/L)
12
10
8
6
4
2
0
10:20 AM
11:20 AM
12:20 PM
1:20 PM
2:20 PM
3:20 PM
4:20 PM
5:20 PM
6:20 PM
7:20 PM
8:20 PM
9:20 PM
10:20 PM
11:20 PM
12:20 AM
1:20 AM
2:20 AM
3:20 AM
4:20 AM
5:20 AM
6:20 AM
7:20 AM
8:20 AM
9:20 AM
10:20 AM
October 11-12, 2022
December 20-21, 2022
January 17-18, 2023
February 16-17, 2023
April 13-14, 2023
July 11-12, 2023
Time

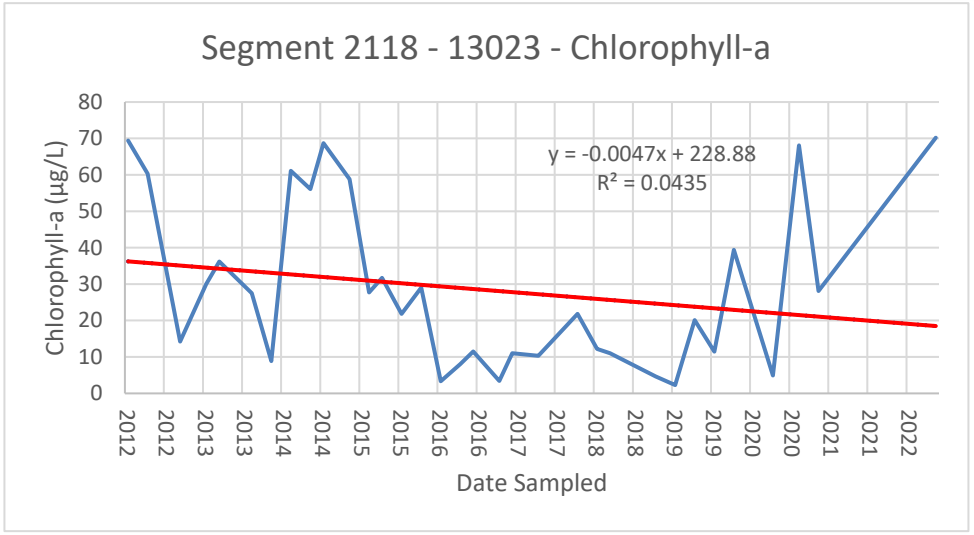
Segment 2117: Frio River Above Choke Canyon Reservoir

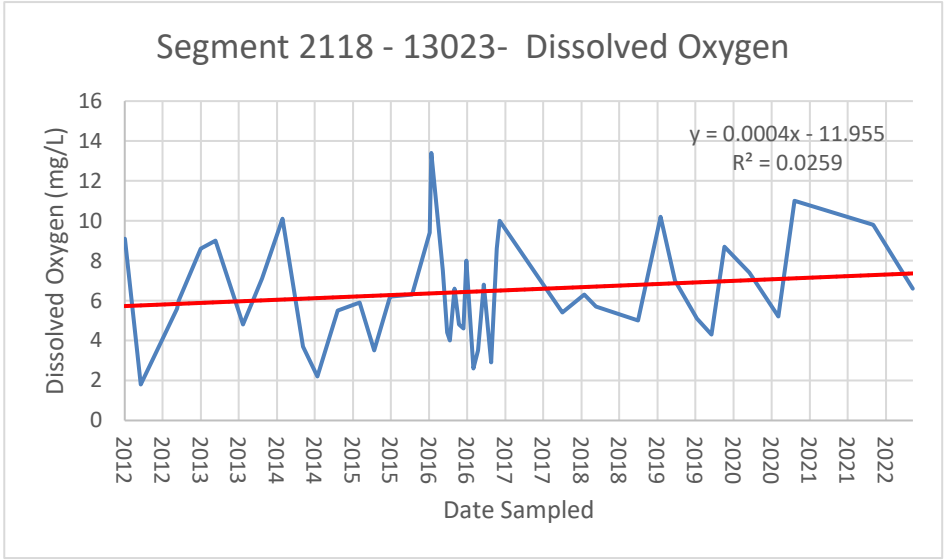
Segment 2117 flows 158 miles from 100 m upstream of US 90 in Uvalde County to the confluence with Choke Canyon Reservoir in McMullen County. The segment is divided into six AUs. The City of Tilden (pop. 290) is the only city within the segment and the watershed is 1,161,405 acres. The segment has been in a persistent drought since 2007 when the receiving waterbody, Choke Canyon, was last full. Segment 2117 consists of three stations: **13023** AU_01, **18373** AU_02, and **13024** AU_03.

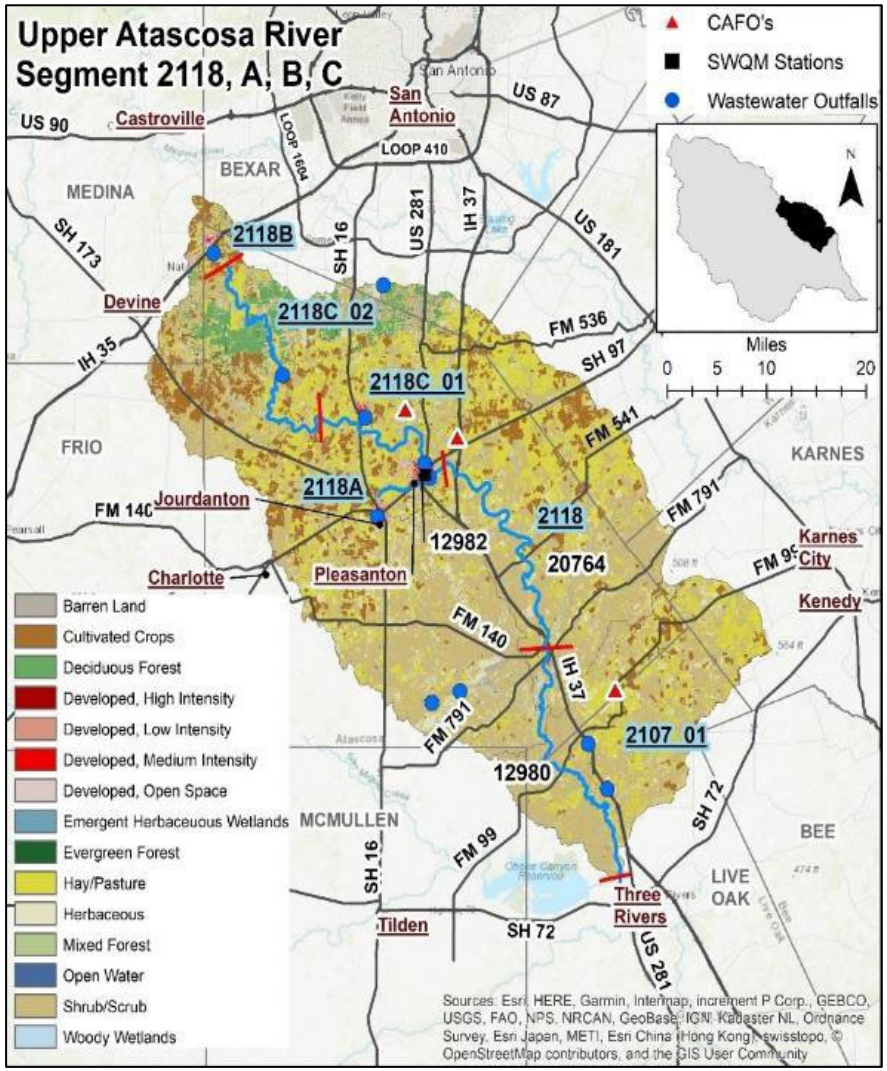
Water Quality – AUs 01 through 06 had previously been listed as being impaired for TDS. These impairments were removed in the 2022 IR due to new data. AUs 01 and 02 have been i**mpaired** for **bacteria** since the 2012 IR. AUs 01 and 02 have water quality **concerns** for **chlorophyll-a** and **depressed DO**. AUs were delisted for chloride in the 2018 IR. Frio River in Tilden was filled with duckweed causing the water to be a brilliant green color. NRA saw very high bacteria coming from the WWTP and is now helping manage this WWTP. Water quality remains the same. AU_01 has been dry. Conductivity has been above 10,000 µmhos/cm in low flow this is a very high conductivity.

Station 13023 – Frio River at SH 173 in Tilden




Segment 2118 - 13023 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0047x + 228.88
R² = 0.0435
Date Sampled


Segment 2118 - 13023- Dissolved Oxygen
Dissolved Oxygen (mg/L)
y = 0.0004x - 11.955
R² = 0.0259
Date Sampled



Segment 2118: Atascosa River

As a result of a 2014 Texas Surface Water Quality Standards (TSWQS) revision, segment descriptions for the Atascosa River have changed. The middle reach of the river is now in the newly created segment known as the Upper Atascosa River, Segment 2118. The new segment consists of one AU which runs from the confluence with Borrego Creek to the confluence with Galvan Creek in Atascosa County. Tributaries and the upper end of the river have been broken up into appendices, Bonita Creek (Segment 2118A), West Prong Atascosa River (Segment 2118B), and Atascosa River (Segment 2118C). Segment 2118 consists of the station **20764**.

Water Quality – Segment 2118_01 (formerly 2107_02) has i**mpairments** for **depressed DO**, 24-hour average and grab (since the 1996 IR), **macrobenthic** and **fish community**, and **bacteria** (*E. coli*). The AU also has water quality **concerns** for **impaired habitat** and **total phosphorus**.

Special Studies –

Sampling for a TMDL to address the bacteria impairment was conducted between 2002 and 2004. The sampling confirmed the impairment, and a RUAA was conducted by Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University in 2006 and 2007. The proposed standards for Segment 2118 for chloride, sulfate, and TDS are 350 mg/L, 700 mg/L, and 1,550 mg/L, respectively.

Segment 2118A: Bonita Creek

Segment 2118A replaces Atascosa River Segment 2107A. This waterbody is within the Upper Atascosa River watershed and is from its confluence with the Atascosa River in Pleasanton to the headwaters approximately 1.4 km (0.87 mi.) upstream of Ernest Road in Jourdanton. There are no active water quality monitoring stations in the segment.

Segment 2118B: West Prong Atascosa River

The West Prong Atascosa River is an intermittent stream with perennial pools located from the confluence with the Atascosa River upstream to the confluence with an unnamed tributary at IH 35. There are no active water quality monitoring stations in the segment.

Segment 2118C: Upper Atascosa River

Segment 2118C is made up of two AUs. 2118C_01 replaces Segment 2107_03 for assessment purposes. Segment 2118C_01 is the confluence with Galvan Creek in Atascosa County, immediately upstream to the confluence with Palo Alto Creek (Segment 2118C_02). Segment 2118C_02 is from the confluence with Palo Alto Creek to the upper end of the segment. AU_01 has impairments for fish and macrobenthic communities. AU_01 also has water quality concerns for habitat, total phosphorus, and chlorophyll-a. 2118C_02 needs more data until an impairment or concern can be evaluated.

Station 20764 – Atascosa River at FM 541 near McCoy

List of Impairments and Concerns in the Nueces River Basin

Segment Name	AU	Description	Impairment	Concern
2101 Nueces River Tidal	01	From the confluence with Nueces Bay in Nueces County to Calallen Dam 1.7 km (1.1 mi) upstream of US 77/IH 37 in Nueces/San Patricio County		Chlorophyll-*a*, fish kill
2102 Nueces River Below Lake Corpus Christi	01	From the downstream end of segment upstream to FM 666		
	02	From FM 666 to the upstream end of segment at Lake Corpus Christi		Chlorophyll-*a*
2103 Lake Corpus Christi	01	From the Wesley E. Seale Dam in Jim Wells/San Patricio County to a point 4.5 mi upstream to County Road 10F on the east side of the lake and the third arm on the west side of the lake		DO
	02	Area ~ 4 miles SE of FM 3162 and FM 634 intersection near western shore		
	03	Western arm of lake near Lagarto Creek Inlet		
	04	Upper portion of lake on opposite shore from Hideaway Hill		
	05	Upper arm of lake in more riverine section surrounding FM 534		

Segment Name	AU	Description	Impairment	Concern
	06	Uppermost riverine part of reservoir upstream of FM 534 to upper end of segment to just upstream of US Hwy 59		
2104 Nueces River Above Frio River	01	From the downstream end of the segment to the confluence with Dragon Creek		Nitrate
	02	From the confluence with Dragon Creek to the confluence with Guadalupe Creek		Chlorophyll-a
	03	From the confluence with Guadalupe Creek to the upstream end of the segment		DO
2105 Nueces River Above Holland Dam	01	From the downstream end of the segment at Holland Dam to the confluence of Sauz Mocho Creek		DO, Chlorophyll-*a*
	02	From the confluence with Sauz Mocho Creek to the confluence with Line Oak Slough	DO	DO, Chlorophyll-*a*
	03	From the confluence of Line Oak Slough to the upstream end of the segment at Ranch Rd. 1025		
2106 Nueces / Lower Frio River	01	The Nueces River from the downstream end to the confluence with the Frio River	TDS	Chlorophyll-*a*
	02	The Frio River from the confluence with the Nueces River to the Choke Canyon Reservoir Dam	Bacteria, TDS	Chlorophyll-*a*
2107 Atascosa River	01	From the confluence with the Frio River in Live Oak County to the confluence with Borrego Creek in Atascosa County	Bacteria, TDS	Chlorophyll-*a*
2108 San Miguel Creek	01	From Choke Canyon Reservoir to the confluence with Live Oak Creek	Bacteria	DO
	02	From the confluence of Live Oak Creek to the upstream end of the segment		
2109 Leona River	01	From the downstream end of segment to the confluence of Yoledigo Creek	Bacteria	Nitrate
	02	From the confluence with Yoledigo Creek to the confluence with Camp Lake Slough	Bacteria	Nitrate
	03	From the confluence with Camp Lake Slough to the upstream end	DO, Bacteria	DO, Nitrate
2109C Live Oak Creek	01	From its confluence with the Leona River in Zavala County to the headwaters approximately 15.2 km upstream of US Hwy 57 in Uvalde County		
2109D Gallina Slough	01	From the confluence with the Leona River is Zavala County to the headwaters ~ 9 km upstream of US Hwy 57 in Zavala County		Bacteria, Nitrate
2110 Lower Sabinal River	01	From the confluence with the Frio River in Uvalde County to a point 100 meters (110 yards) upstream of SH 127 in Uvalde County		DO, Nitrate, Chlorophyll-a, Bacteria
2111 Upper Sabinal River	01	From the downstream end to the confluence with the West Sabinal River		
	02	from the confluence with the West Sabinal River to the upstream end		
2112 Upper Nueces River	01	From the downstream end to the confluence with Sand Ridge Creek		DO
	02	From the confluence with Sand Ridge Creek to the confluence with unnamed tributary with NHD RC 12110103000444 at point N-99.91, W29.2 just downstream of US Highway 90.		
	03	From the confluence with unnamed tributary with NHD RC 12110103000444 at point N-99.91, W29.2 just downstream of US Highway 90 to the confluence with Miller Creek		
	04	From the confluence with Miller Creek to the upper end of the segment		
2113	01	From the downstream end of the segment to the confluence with Bear Creek	Impaired fish community	

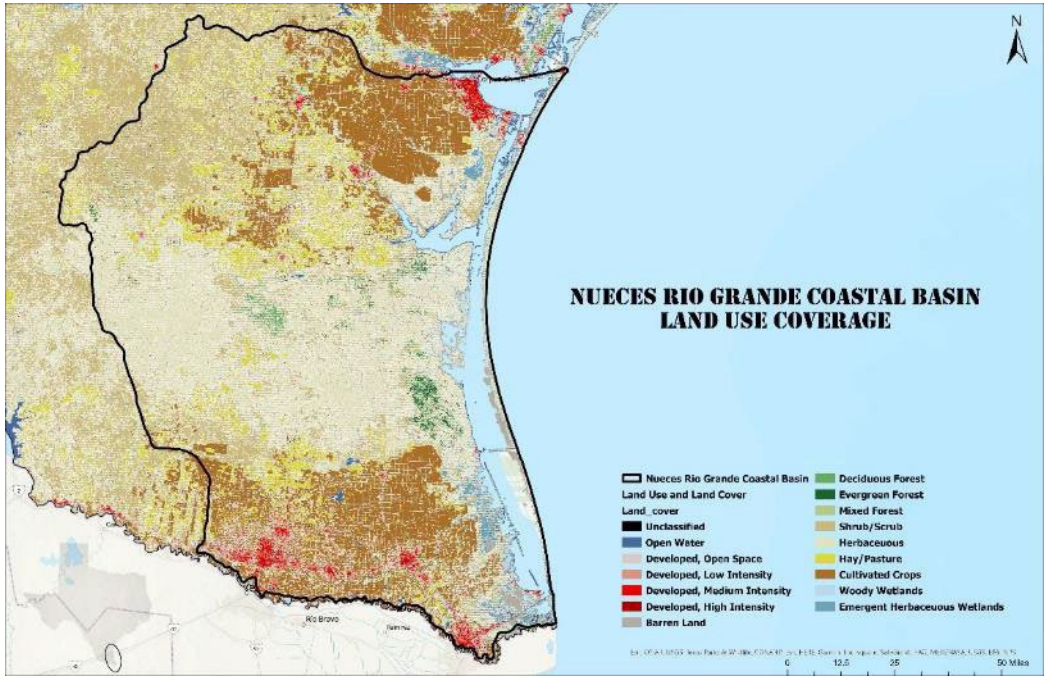
Segment Name	AU	Description	Impairment	Concern
Upper Frio River	02	From the confluence with Bear Creek to the upstream end		Impaired fish community
2114 Hondo Creek	01	From the downstream end of the segment to the confluence with and unnamed tributary with NHD RC 12110107000245 at point N-99.12, W29.38 just upstream of FM 2676.		Nitrate
	02	From the confluence with and unnamed tributary with NHD RC 12110107000245 at point N-99.12, W29.38 just upstream of FM 2676 to the upstream end of the segment.		
2114A Commissioner's Creek	01	From the confluence with Hondo Creek upstream to the headwaters approximately 6.4 km (4.0 mi) NE of Tarpley in Bandera County		
2115 Seco Creek	01	From the confluence with Hondo Creek in Frio County upstream to an unnamed tributary 2.97 km (1.85 mi) downstream of FM 1796 in Medina County		
	02	From an unnamed tributary 2.97 km (1.85 mi) downstream of FM 1796 in Medina County upstream to the confluence of West Seco Creek in Bandera County		
2116 Choke Canyon Reservoir	01	Lowermost portion of reservoir near dam	Excessive algal growth	
	02	Small north arm of lake near dam and Willow Hollow Tank	Excessive algal growth	
	03	5120 acres in the middle of the reservoir	Excessive algal growth	
	04	Opossum Creek arm on north side of reservoir	Excessive algal growth	
	05	Southern arm near mid-Lake and RR7 west of Calliham	Excessive algal growth	
	06	Western end of the reservoir up to RR 99	Excessive algal growth	DO
	07	Uppermost portion of reservoir from FM 99 bridge, including the Frio River and San Miguel Creek arms	Excessive algal growth	
2117 Frio River Above Choke Canyon Reservoir	01	From the downstream end of segment to the confluence with Esperanza Creek	Bacteria	Chlorophyll-*a,* DO
	02	From the confluence with Esperanza Creek to the confluence with Ruiz Creek	Bacteria	Chlorophyll-*a,* DO
	03	From the confluence with Ruiz Creek to the confluence with Live Oak Creek		Chlorophyll-*a*, DO
	04	From the confluence with Live Oak Creek to the confluence with Elm Creek		Nitrate
	05	From the confluence with Elm Creek to the confluence with Spring Branch al		Nitrate
	06	From the confluence with Spring Branch to the upstream end of the segment		
2118 Atascosa River	01	From confluence with Borrego Creek to the confluence of Galvan Creek in Atascosa County	DO, Impaired macrobenthic, fish community, Bacteria	Impaired habitat, total phosphorus

Segment Name	AU	Description	Impairment	Concern
2118A Bonita Creek	01	From the confluence with the Atascosa River in Pleasanton to the headwaters 1.4 km (0.87 mi) upstream of Ernest Rd in Jourdanton		
2118B West Prong Atascosa River	01	Intermittent stream with perennial pools from the confluence with the Atascosa River upstream to the confluence with an unnamed tributary at IH 35		
2118C Upper Atascosa River	01	Intermittent stream with perennial pools from the confluence with Galvan Creek upstream to the confluence with Palo Alto Creek	Impaired fish community and macrobenthic community	Impaired Habitat, total phosphorus, Chlorophyll-*a*
	02	From the confluence with Palo Alto Creek upstream to the confluence of the West Prong Atascosa River and North Prong Atascosa River in Atascosa County		

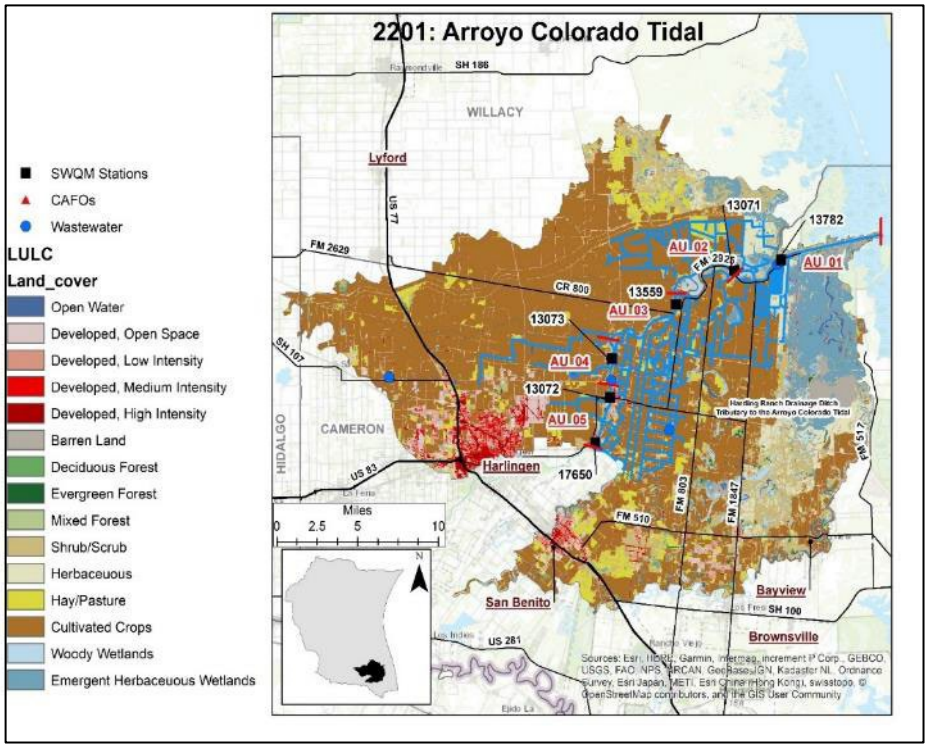
Delt arrowhead near Choke Canyon Reservoir.

BASIN 22: Nueces - Rio Grande Coastal Basin

The Nueces – Rio Grande Coastal Basin covers approximately 10,400 square miles, encompassing all or part of 12 counties in South Texas. The basin is bordered by the Nueces River Basin and the San Antonio – Nueces Coastal Basin to the north, bays, estuaries, and the Gulf of Mexico to the east, and the Rio Grande River Basin to the south and southwest. Waterbodies include the Arroyo Colorado which drains into the Laguna Madre and Petronila Creek into Baffin Bay. The inland area of the basin is dominated by large ranches, including the King Ranch. State-operated recreational areas are primarily along the coast and include Mustang Island State Park, Port Isabel Light House, State Historic Park in Port Isabel, and the Padre Island National Seashore.



Segment 2204 – Petronila Creek Above Tidal



Segment 2201: Arroyo Colorado Tidal

Segment Description – Segment 2201 flows 26 miles from 110 yards downstream of Cemetery Road south of the Port of Harlingen to its confluence with the Laguna Madre. The segment forms part of the county line between Cameron and Willacy Counties. The segment is divided into five AUs and the area is predominately farmland. The Arroyo Colorado Tidal segment serves as the waterway from the Laguna Madre to the Port of Harlingen. Its watershed is 294,591 acres. The City of Rio Hondo is just downstream of the Port. Arroyo City is located along the southern shore, with many homes lining the river. Segment 2201 has four stations that consists of **13782** AU_01, **13071** AU_02, **13073** AU_04, **13072** AU_05.

Water Quality – All AUs have listed water quality i**mpairments** for **bacteria** (Enterococcus) and **concerns** for **chlorophyll-*a*** and **nitrate** in the 2022 IR. The impairment for bacteria for primary contact recreation is based on inadequate data. Due to the eight-hour holding time and because there are no local labs accredited for enterococci analysis, routine bacteria sample collection has been suspended. Wastewater dominated effluent with nitrate exceedances (every time) as well as chlorophyll-a and bacteria (more often than not).

AUs 04 and 05 are also **impaired** for **depressed dissolved oxygen** (24-hour minimum) and AU_05 has a **concern** for **total phosphorus**. AU_04 and AU_05 have been impaired for depressed DO since the 1996 IR, generally attributed to the physical properties of the segment, including the Port of Harlingen and manipulation by dredging and other mechanical changes to the river. At times, barge traffic to the Port causes the anoxic water near the bottom of the channel to rise to the surface which results in fish kills. This report also lists AU_05 as having a **concern** for **depressed dissolved oxygen** (24-hour average). Additional 24-hour DO monitoring will be needed to fully evaluate the concern.

Fish consumption warnings continue for AU_05 for **PCBs** and **mercury in edible fish tissue**. More information on fishing advisories and bans are available at http://dshs.texas.gov/seafood/advisories-bans.aspx.

Special Studies – Numerous water quality studies have been conducted on the segment by multiple entities over the past two decades. The Watershed Protection Plan (WPP) Phase 1 was completed in 2007 by Texas Water Resources Institute (TWRI). Phase 1 of the WPP describes the state of the watershed and presents a strategic plan to improve environmental conditions, and to address impairments and concerns listed in the 2004 IR. That document can be found at:https://arroyocolorado.org/media/gthk4kpd/watershed-protection-plan-phase-i-final-jan-11-2007.pdf

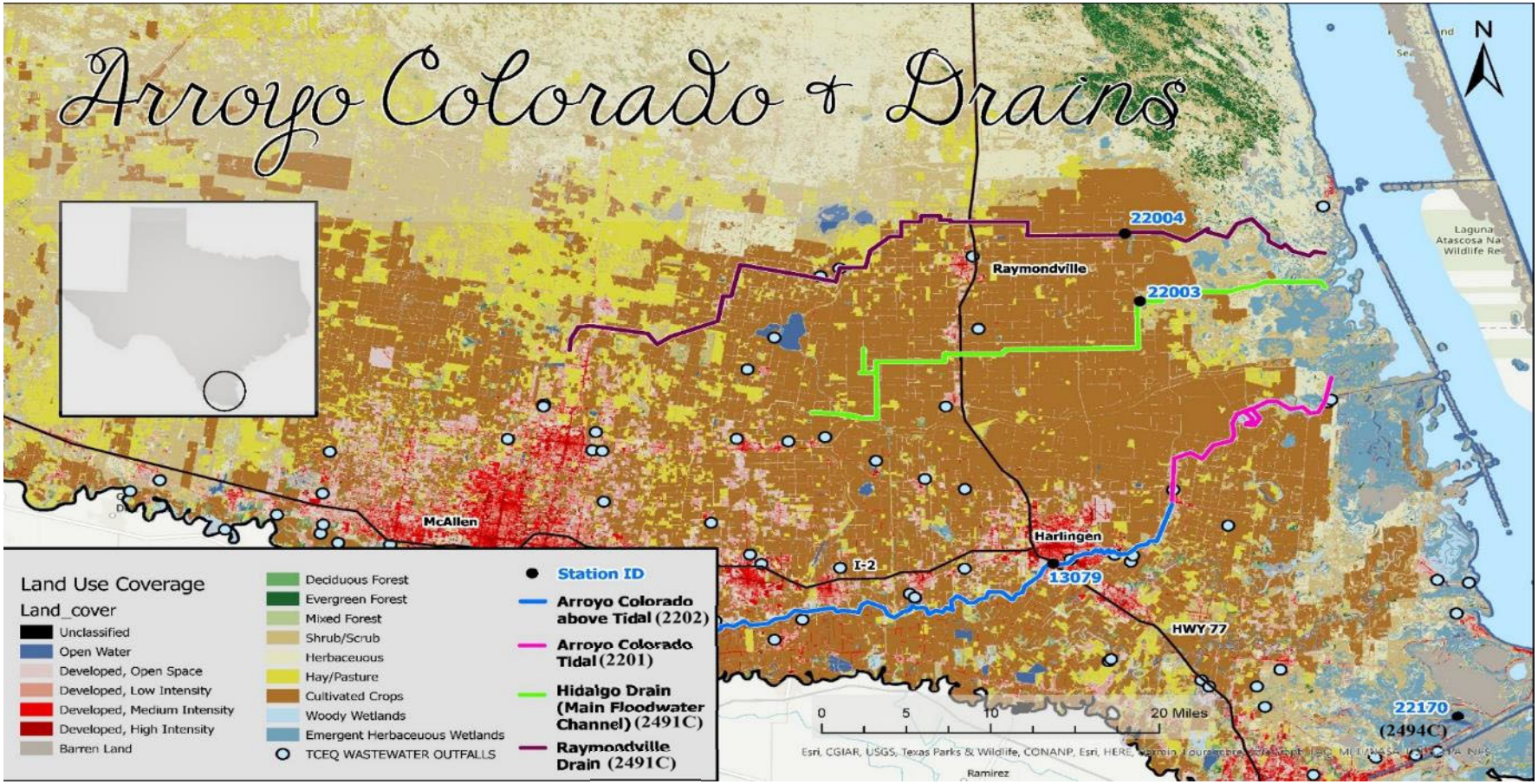
The Arroyo Colorado Watershed Partnership, which is a coalition of public and private organizations was created to provide collaboration with stakeholders goals and priorities. More information about the WPP can be found at: https://arroyocolorado.org/about/wpp/.

An update to the WPP was completed by the Arroyo Colorado Watershed Partnership and approved by EPA in 2017. The technical report for the project can be found at: https://arroyocolorado.org/media/wwmmsqzx/arroyo-colorado-wpp-final-optimized.pdf.

Segment 2201A: Harding Ranch Drainage Ditch Tributary

Segment Description - The unclassified water body flows from 20.8 km upstream of the FM 508 crossing to the confluence with the Arroyo Colorado Tidal.

There are no active monitoring sites on the segment. Data was collected during 2001 and 2002 as part of the Arroyo Colorado TMDL study. No additional sampling has taken place.

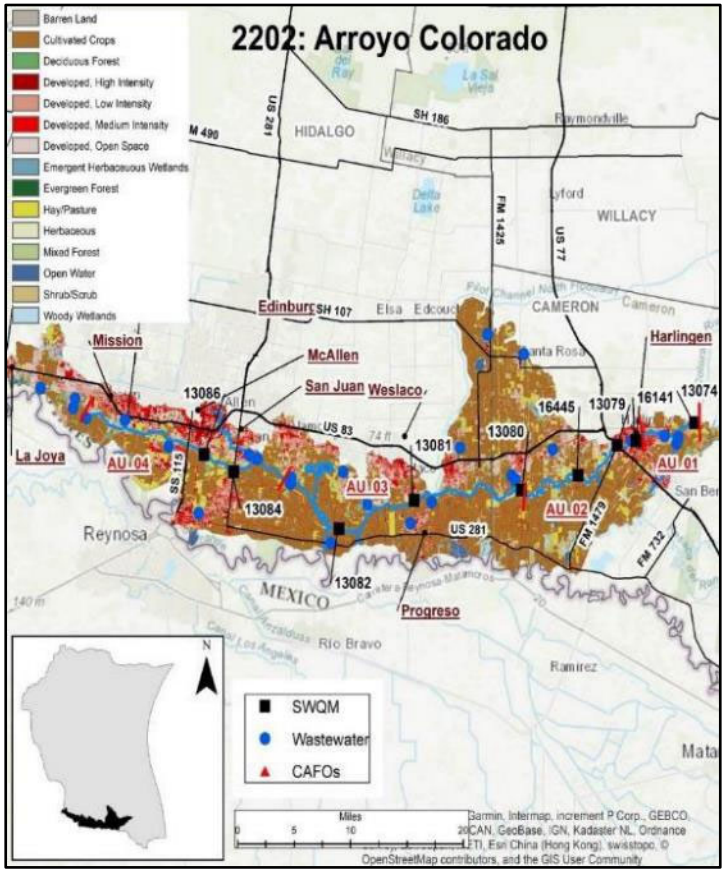


Segment 2201B: Unnamed Drainage Ditch Tributary in Cameron County Drainage District #3

Segment Description - The unclassified water body flows from 17.6 km upstream of the FM 510 crossing to the confluence with the Arroyo Colorado Tidal in the Rio Hondo turning basin.

There are no active monitoring sites on the segment. Data was collected during 2001 and 2002 as part of the Arroyo Colorado TMDL study. No additional sampling has taken place, but a bacteria impairment and a concern for chlorophyll-*a* are carried forward in the 2022 IR and addressed by the WPP.

Station 13073 – Arroyo Colorado Tidal at Camp Perry north of Rio Hondo



Segment 2202: Arroyo Colorado Above Tidal

Segment 2202 flows 63 miles from FM 2062 in Hidalgo County to 110 yards downstream of Cemetery Road south of the Port of Harlingen. The segment is divided into four AUs and the watershed is 252,633 acres. There are numerous cities along US 83 just north of the Arroyo Colorado, with farming activities in between. The Arroyo Colorado is the primary conveyance of wastewater and agricultural runoff for this area. Segment 2202 consists of four stations: **13074** AU_01, **13079** AU_02, **13081** AU_03, **13084** AU_04.

Water Quality - All four AUs have **impairments** for **bacteria** (*E. coli*) and have been impaired since the 1996 Assessment. They remain listed in the 2022 IR. All four AUs also have water quality **concerns** for **chlorophyll-*a***, **nitrate**, and **total phosphorus**. Newly installed wind turbines catching fire and causing farms to burn.

Fish consumption warnings continue for all AUs for **PCBs** and **mercury in edible fish tissue**. More information on fishing advisories and bans are available at http://dshs.texas.gov/seafood/advisories-bans.aspx.

Special Studies:

The Watershed Protection Plan (WPP) Phase 1 was completed in 2007 by Texas Water Resources Institute (TWRI). Phase 1 of the WPP describes the state of the watershed and presents a strategic plan to improve environmental conditions, and to address impairments and concerns listed in the 2004 IR. The document can be found:https://arroyocolorado.org/media/gthk4kpd/watershed-protection-plan-phase-i-final-jan-11-2007.pdf An update to the WPP was completed by the Arroyo Colorado Watershed Partnership and approved by EPA in 2017.The technical report from the project https://arroyocolorado.org/media/wwmmsqzx/arroyo-colorado-wpp-final-optimized.pdf

To address the bacteria (E. coli) impairment and to help TCEQ determine the appropriate bacteria standard for the stream, NRA conducted a Recreational Use Attainability Analysis (RUAA) in 2011. The project consisted of conducting site surveys on 20 publicly accessible stream crossings. It was decided to retain primary contact recreation use on the segment. The final report for the project can be found at: https://www.tceq.texas.gov/waterquality/standards/ruaas/arroyocolorado2202

No Fishing sign at Donna Reservoir

Station 13074 – Arroyo Colorado at Cemetery Road

Segment 2202A: Donna Reservoir

The unclassified water body is an off-channel irrigation reservoir pumped from the Rio Grande River near the City of Donna. There are no active monitoring sites on the segment.

Special Studies - The unclassified water body has been impaired for polychlorinated biphenyls (PCBs) in edible fish tissue since the 1996 Assessment. A TMDL was conducted, and an Implementation Plan was approved in 2001. This pollutant is considered a background source that reflects the site-specific application histories and loss rates. Any continuing source of pollutant loadings occur from nonpoint source runoff, leaching, or erosion of sinks that may exist within the watershed. Residual PCB contamination from a site near the Donna Canal is likely to remain a continuing source until site investigation and remediation is completed. No authorized point source discharges of this pollutant are allowed by law. The Implementation Plan is available at https://www.tceq.texas.gov/downloads/water-quality/tmdl/arroyo-colorado-fish-consumption-07/07-arroyo-imp-plan.pdf

Segment 2202B: Unnamed Drainage Ditch Tributary to Arroyo Colorado

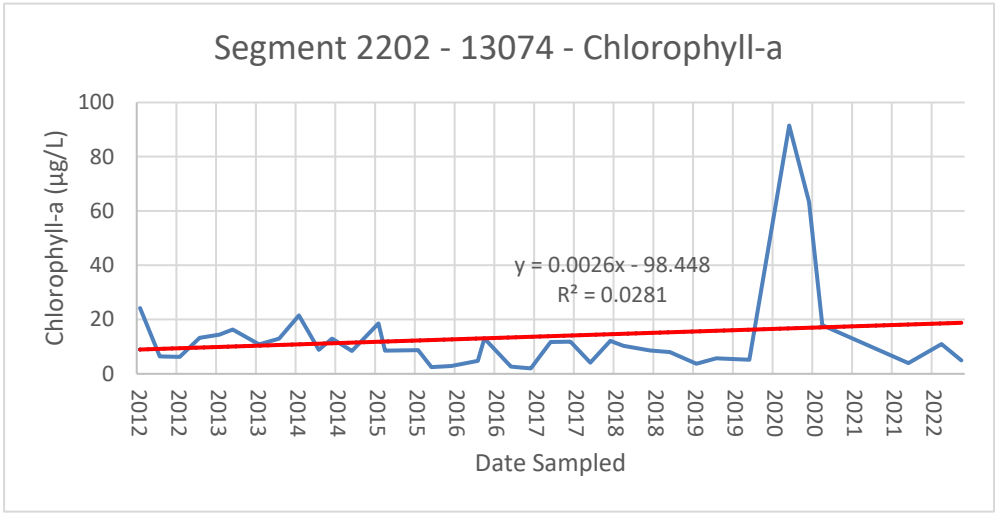
The unclassified water body is a perennial drainage ditch that flows into the Arroyo Colorado in Harlingen.

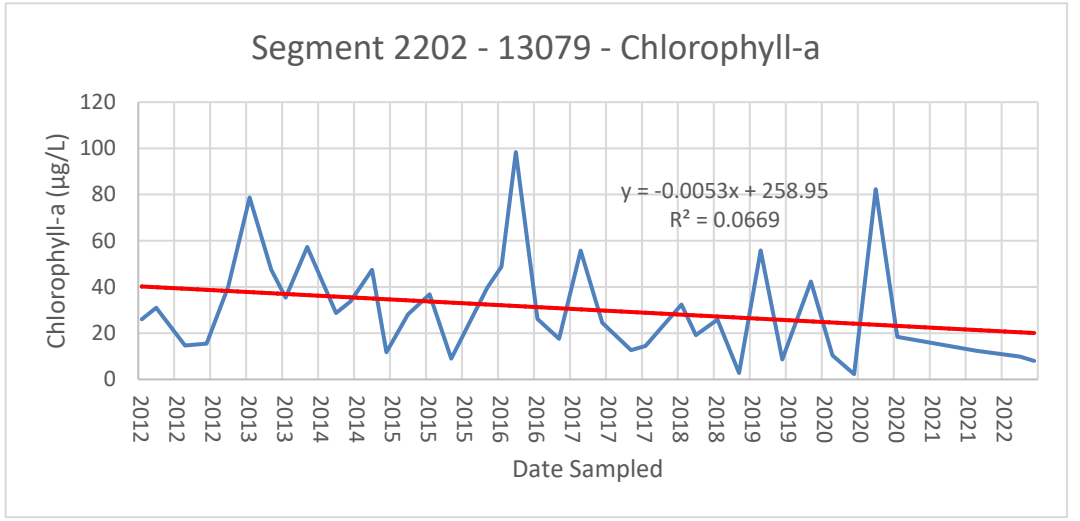
There are no active monitoring sites on the segment. Data were collected as part of the Arroyo Colorado TMDL study. No additional sampling has taken place, but concerns for bacteria, ammonia, and chlorophyll-*a* identified during the study are being carried forward in the 2022 IR and addressed by the WPP.

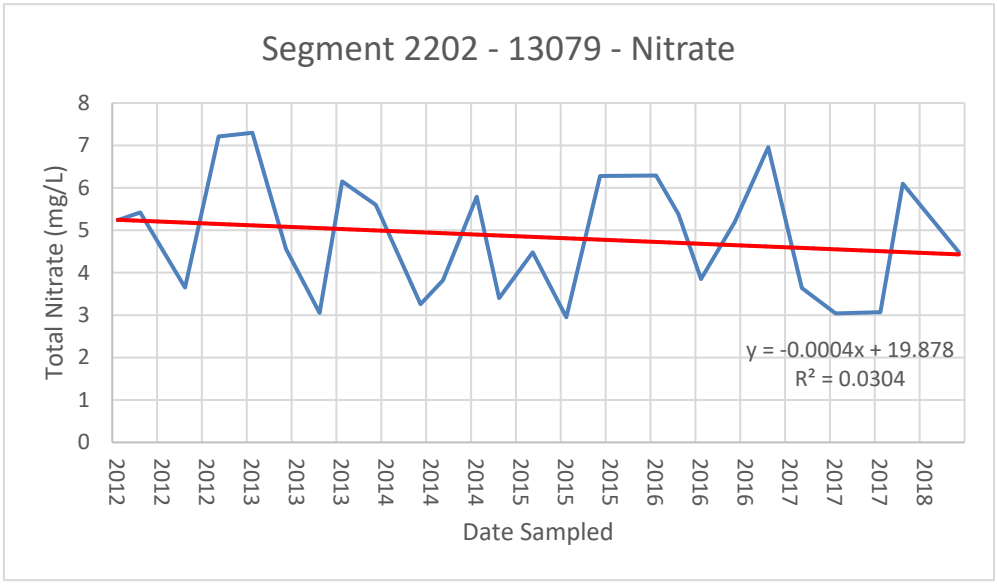
Segment 2202C: Unnamed Drainage Ditch Tributary to Arroyo Colorado

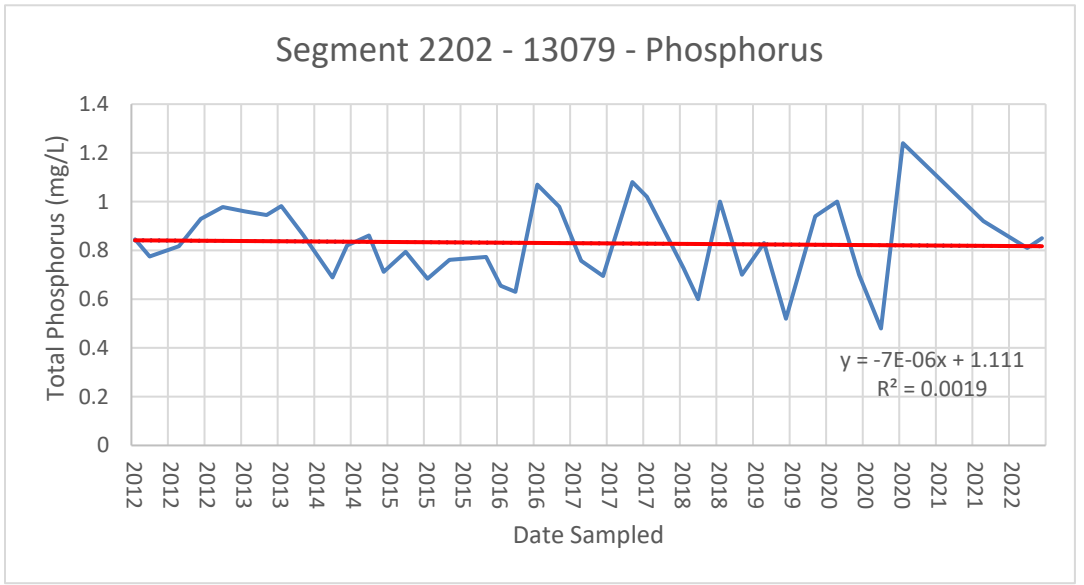
The unclassified water body is from a point 1.1 miles upstream of US 281 to the confluence with the Arroyo Colorado southeast of Donna.

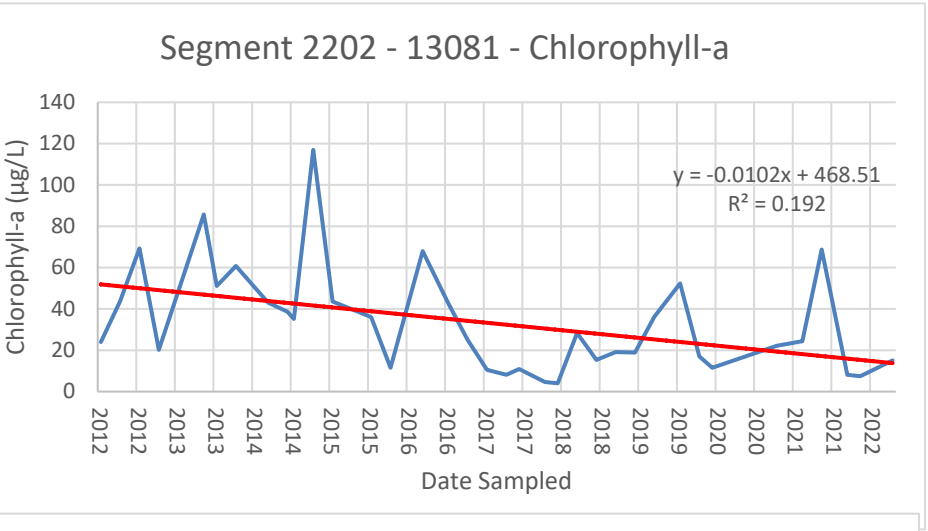
There are no active monitoring sites on the segment. Data were collected as part of the Arroyo Colorado TMDL study. No additional sampling has taken place but concerns for bacteria and ammonia identified during the study are being carried forward in the 2022 IR and addressed by the WPP.

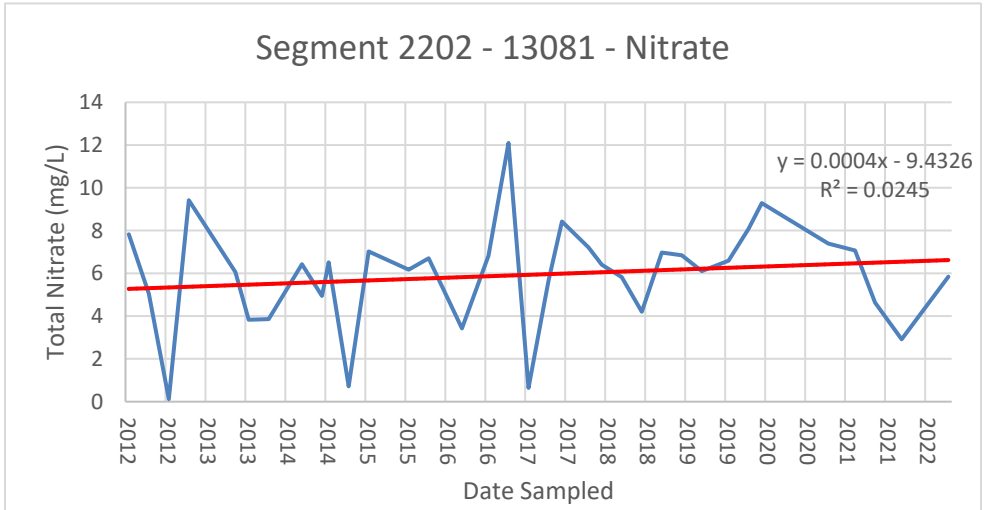

Segment 2202 - 13074 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = 0.0026x - 98.448
R² = 0.0281
Date Sampled

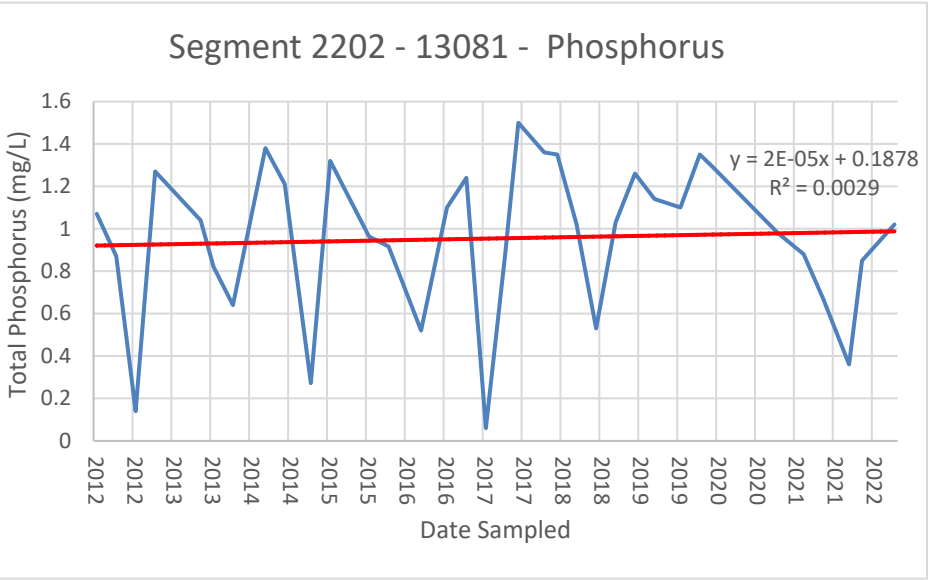

Segment 2202 - 13079 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0053x + 258.95
R² = 0.0669
Date Sampled

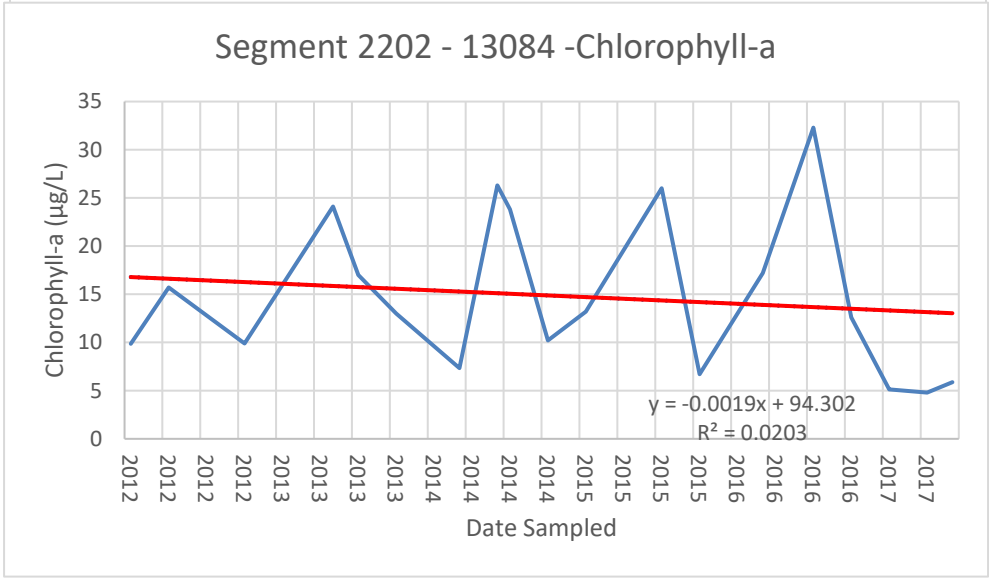

Segment 2202 - 13079 - Nitrate
Total Nitrate (mg/L)
y = -0.0004x + 19.878
R² = 0.0304
Date Sampled

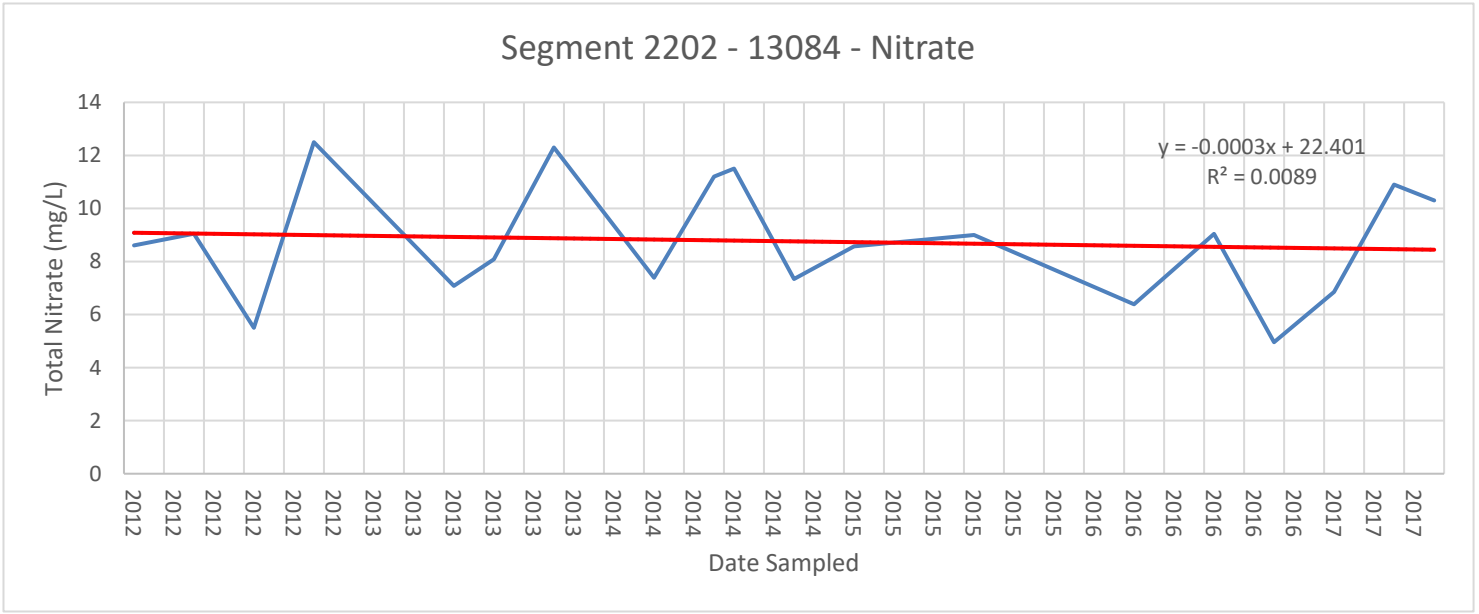

Segment 2202 - 13079 - Phosphorus
Total Phosphorus (mg/L)
y = -7E-06x + 1.111
R² = 0.0019
Date Sampled

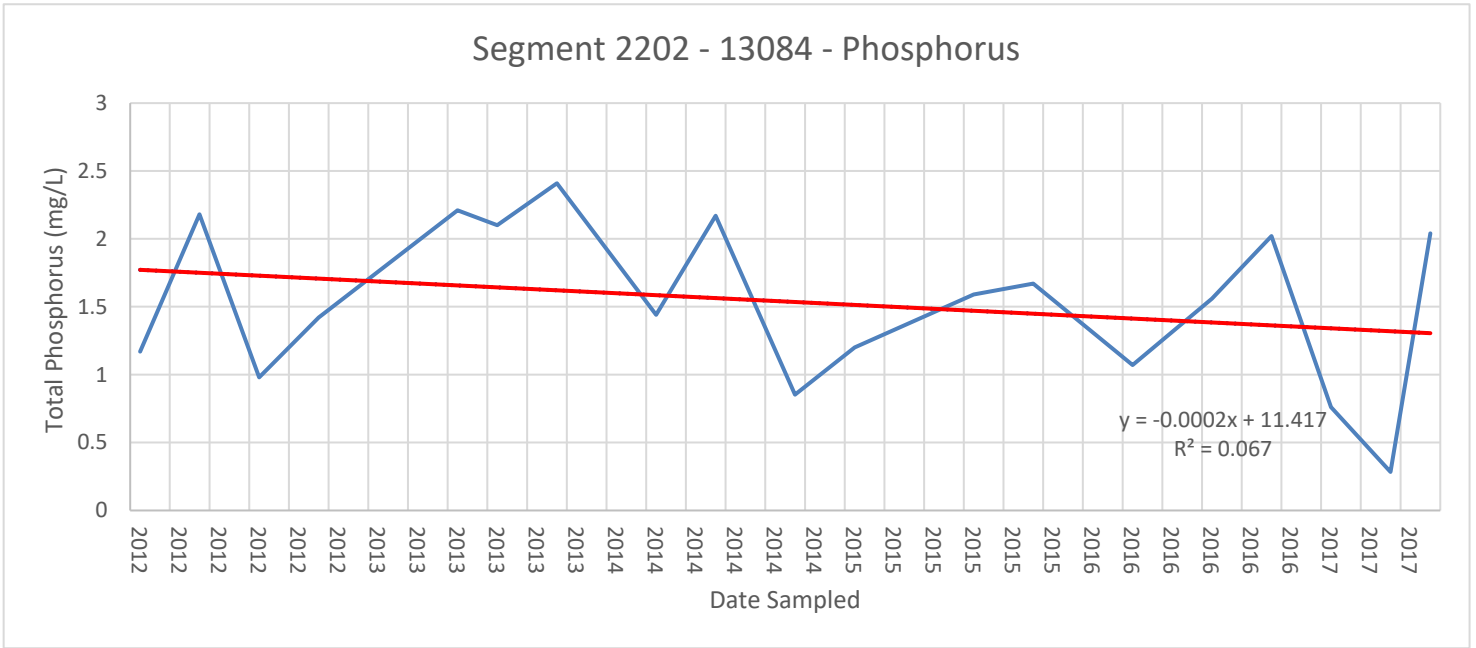

Segment 2202 - 13081 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0102x + 468.51
R² = 0.192
Date Sampled

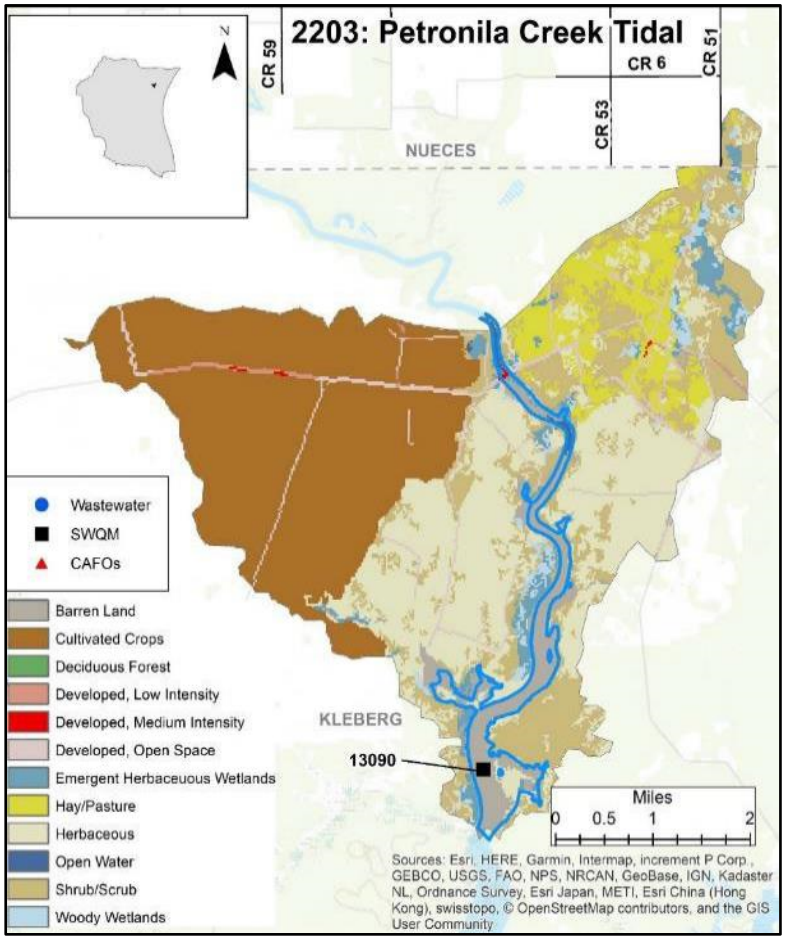

Segment 2202 - 13081 - Nitrate
Total Nitrate (mg/L)
y = 0.0004x - 9.4326
R² = 0.0245
Date Sampled


Segment 2202 - 13081 - Phosphorus
Total Phosphorus (mg/L)
y = 2E-05x + 0.1878
R² = 0.0029
Date Sampled


Segment 2202 - 13084 -Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0019x + 94.302
R² = 0.0203
Date Sampled


Segment 2202 - 13084 - Nitrate
Total Nitrate (mg/L)
14
12
10
8
6
4
2
0
y = -0.0003x + 22.401
R² = 0.0089
2012 2012 2012 2012 2012 2012 2013 2013 2013 2013 2013 2013 2014 2014 2014 2014 2014 2014 2015 2015 2015 2015 2015 2015 2016 2016 2016 2016 2016 2016 2017 2017 2017
Date Sampled


Segment 2202 - 13084 - Phosphorus
Total Phosphorus (mg/L)
3
2.5
2
1.5
1
0.5
0
y = -0.0002x + 11.417
R² = 0.067
2012 2012 2012 2012 2012 2012 2013 2013 2013 2013 2013 2013 2014 2014 2014 2014 2014 2014 2015 2015 2015 2015 2015 2015 2016 2016 2016 2016 2016 2016 2017 2017 2017
Date Sampled



Segment 2203: Petronila Creek Tidal

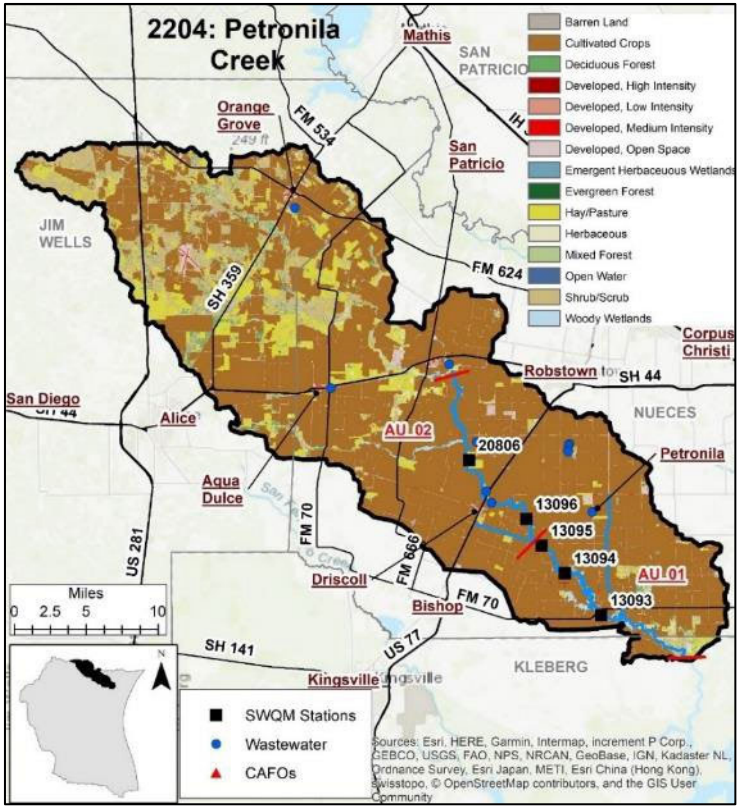
Segment Description – Segment 2203 flows 14 miles from a point 0.6 miles upstream of a private road crossing near Laureles Ranch in Kleberg County to the confluence with Chiltipin Creek/Alazan Bay in Kleberg County. Its watershed is 10,918 acres. Segment 2203 has one station numbered **13090**.

Water Quality - The segment has been listed as being **impaired** for **bacteria** (Enterococcus) for primary contact recreation since the 2010 IR. The impairment carries forward in the 2022 IR. The segment also has a water quality **concern** for **chlorophyll-*a***. The segment was delisted for elevated pH in the 2018 IR.

Segment 2203 - Petronila Creek Tidal

Special Studies:

A Watershed Protection Plan (WPP) is being developed for the Baffin Bay watershed due to water quality concerns and impairments in the bay and tributaries including Petronila and San Fernando creeks. Texas Water Resource Institute (TWRI), in partnership with Texas State Soil and Water Conservation Board (TSSWCB), NRA, Texas A&M University, Coastal Bend Bays and Estuaries Program (CBBEP), and Texas Sea Grant are working on the WPP. For more information, visit their website: https://twri.tamu.edu/baffinwpp



Segment 2204: Petronila Creek Above Tidal

Segment 2204 flows 44 miles from the confluence of Agua Dulce and Banquete Creeks in Nueces County to a point 0.6 miles upstream of a private road crossing near Laureles Ranch in Kleberg County. The segment is part of the Baffin Bay watershed which is 1,867,755 acres. It is divided into two AUs and the segment is primarily farmland interspersed with numerous small communities and cities. It flows through the City of Driscoll (pop. 631), at US 77. There are nine WWTPs that discharge to this segment and a storm water discharge permit for a hazardous waste landfill. Segment 2204 has three stations: **13094** AU_01, **13096** AU_02, **20806** AU_02. These stations are often used as illegal dumping sites. Possible recommendations for special studies including the specific lethal dose of D.O. to cause fish kills.

Water Quality - The segment has been **impaired** for **TDS**, **chloride**, and **sulfates** since the 1999 IR. Excessive concentrations of these three parameters occur east of U.S. Hwy 77, in an area where man-made nonpoint sources such as produced water, brine pits, and brine injection wells are most numerous. Segment 2204 is also i**mpaired** for **bacteria** (*E. coli*). The segment also has **concerns** for **chlorophyll-*a*** in both Aus. TMDL I-Plan completed for Chlorides, Sulfate, and TDS (aka "Salts) in March 2014. Bacteria became a new impairment in 2016 IR. A review of standards is needed.

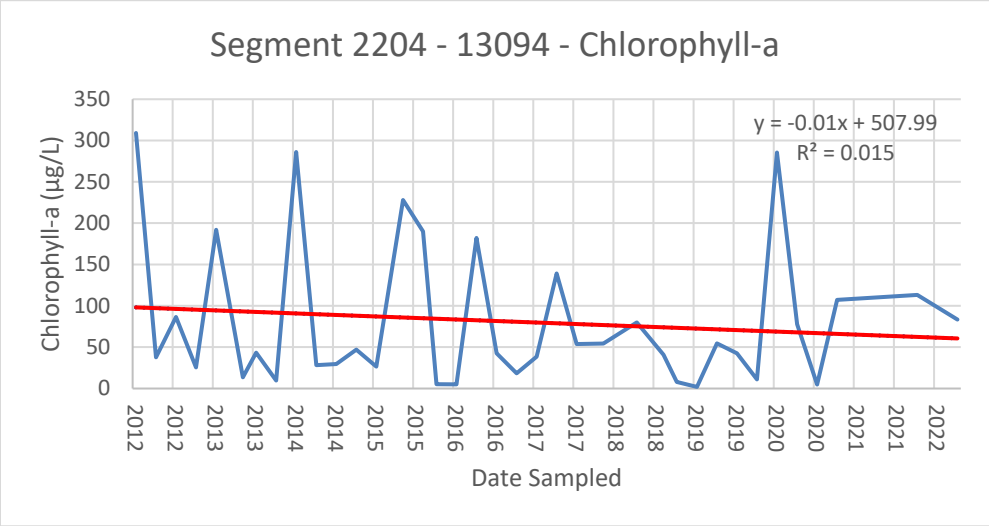
Special Studies:

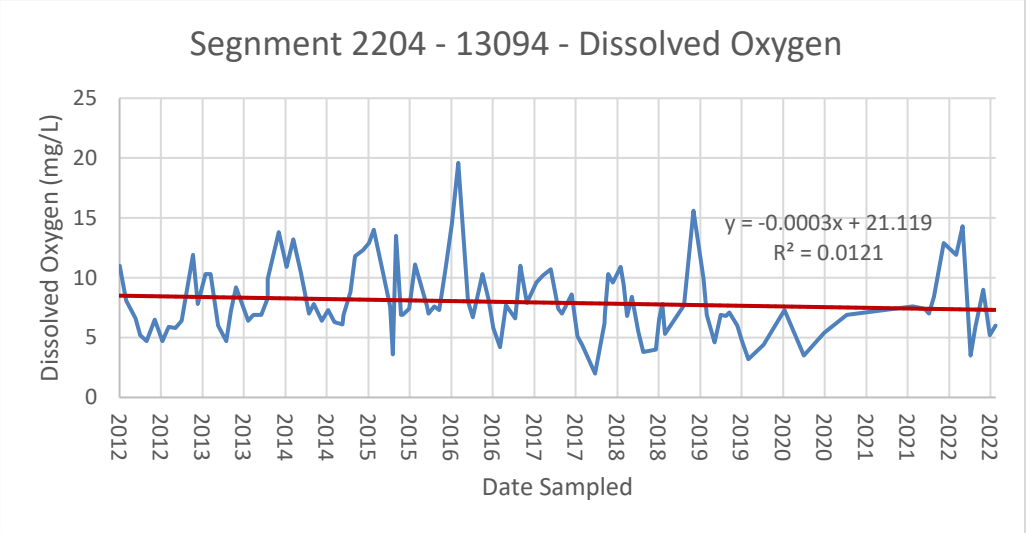
Three TMDLs were conducted for total dissolved solids (TDS), sulfate, and chloride in 2007. Results of the study concluded that the impairments were the result of historic oil and gas operations. The Railroad Commission of Texas (RRC) has been working with identified operators to properly plug abandon wells and to remove contaminated soils. Where operators cannot be identified, the RRC has been doing work as funding is available. The full TMDL report can be found here: https://www.tceq.texas.gov/downloads/water-quality/tmdl/petronila-creek-general-32/32-petronila-tmdl-approved.pdf.

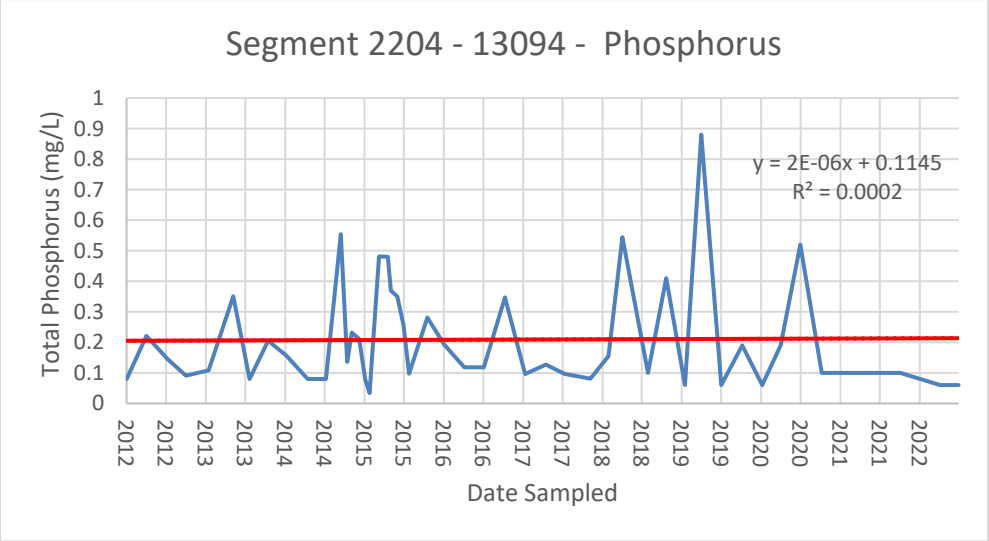
NRA completed a review of the I-Plan in FY 2014. Continued routine monitoring and monthly monitoring in the creek and tributaries were recommended and implemented. The I-Plan also recommended a continuous water quality monitoring (CWQM) station and a program to properly plug and abandon wells that are no longer active. The CWQM instrumentation was installed by TCEQ at Station 13093 at FM 70 in December 2006. NRA performed the routine maintenance. The CWQM station was discontinued in February 2016 after it was determined that sufficient data had been gathered to help understand the relationship between water level and pollutant concentrations.

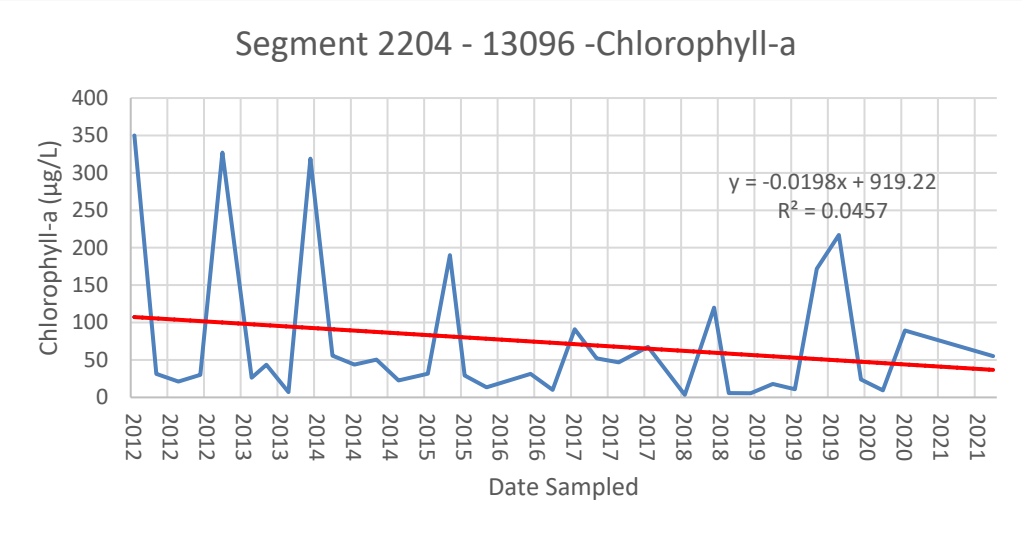
NRA also conducts monthly monitoring for TDS, sulfate, and chloride under TCEQs TMDL Program at 13 stations (9 tributary and 4 main stem stations). The CBBEP also funds nutrient monitoring at these same site locations. The final report for the CBBEP funded project can be found at: https://www.cbbep.org/manager/wp-content/uploads/2003-Final-Report-FINAL.pdf

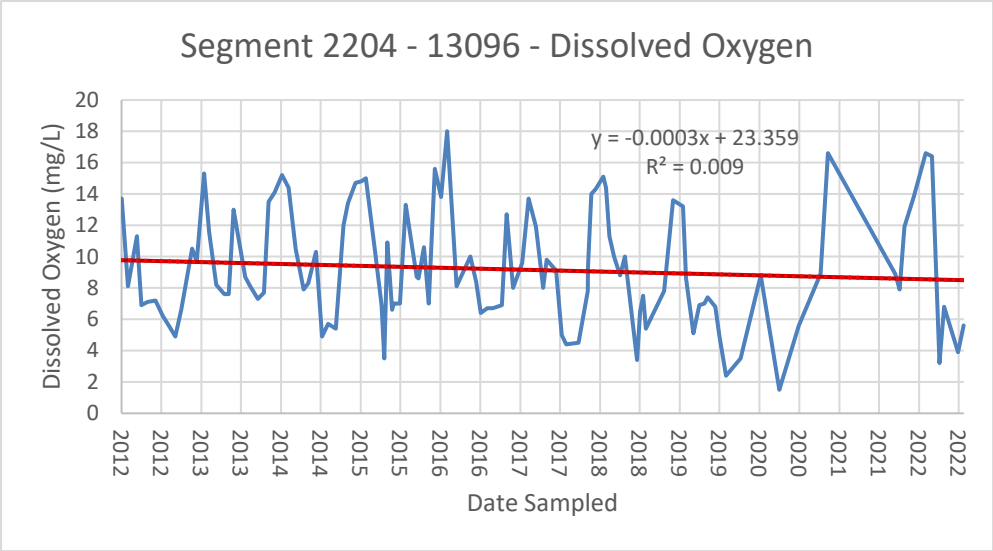
A Watershed Protection Plan (WPP) is being developed for the Baffin Bay Watershed due to water quality concerns and impairments in the bay and tributaries including Petronila and San Fernando creeks. Partners of the project include TWRI, TSSWCB, NRA, Texas A&M University, and Texas Sea Grant. For more information, visit: https://twri.tamu.edu/baffinwpp

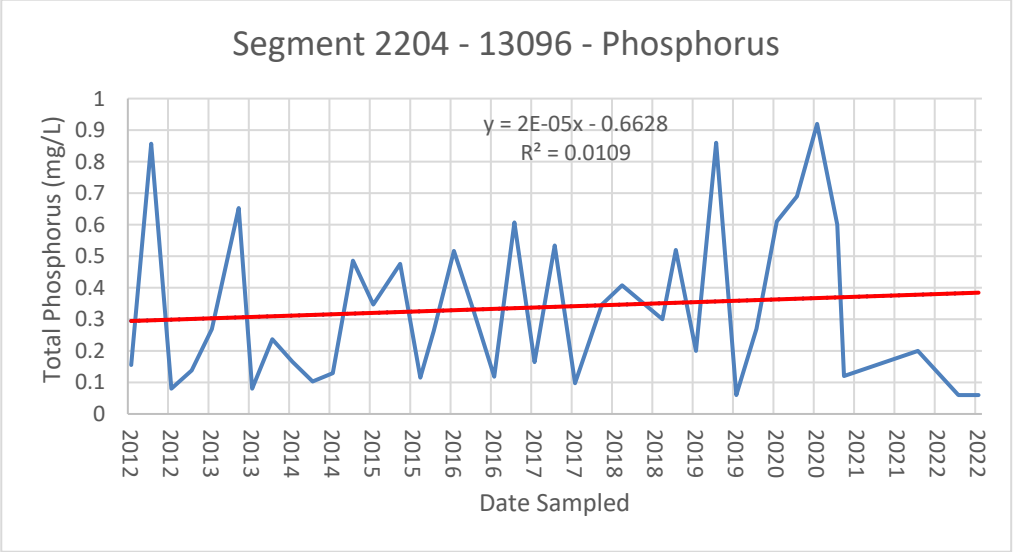

Segment 2204 - 13094 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.01x + 507.99
R² = 0.015
Date Sampled

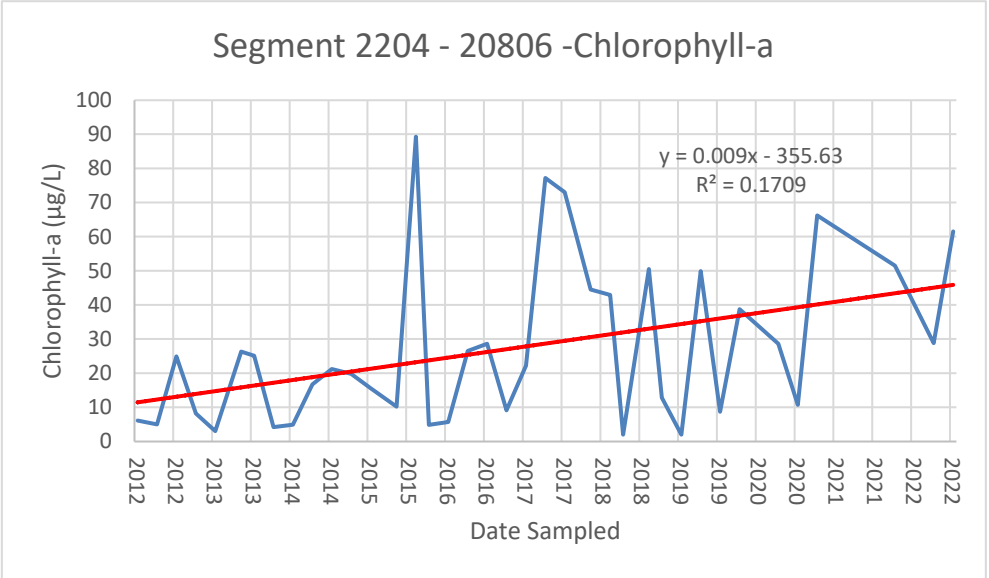

Segnment 2204 - 13094 - Dissolved Oxygen
Dissolved Oxygen (mg/L)
y = -0.0003x + 21.119
R² = 0.0121
Date Sampled

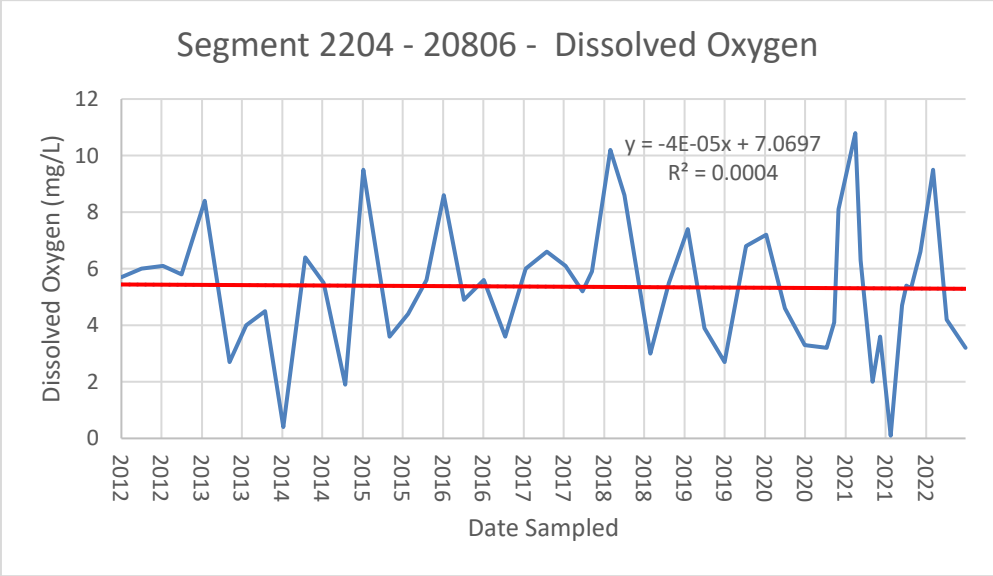

Segment 2204 - 13094 - Phosphorus
Total Phosphorus (mg/L)
y = 2E-06x + 0.1145
R² = 0.0002
Date Sampled

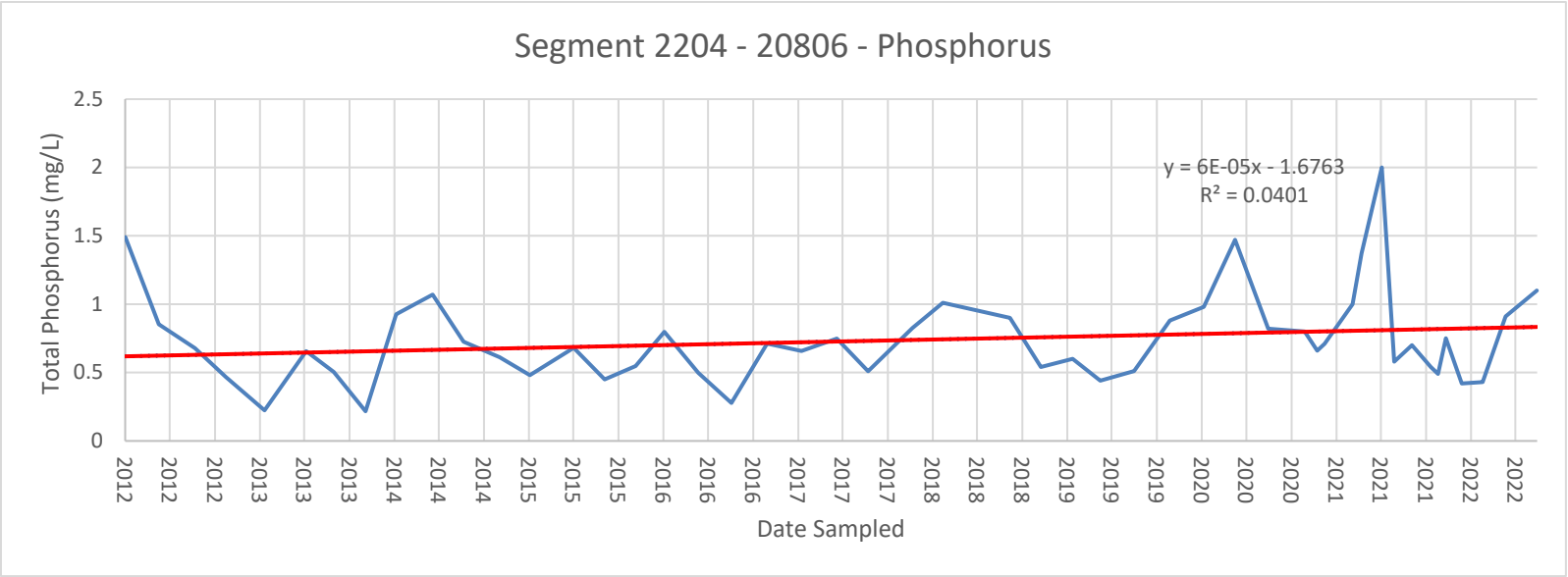

Segment 2204 - 13096 -Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0198x + 919.22
R² = 0.0457
Date Sampled


Segment 2204 - 13096 - Dissolved Oxygen
y = -0.0003x + 23.359
R² = 0.009
Dissolved Oxygen (mg/L)
Date Sampled


Segment 2204 - 13096 - Phosphorus
y = 2E-05x - 0.6628
R² = 0.0109
Total Phosphorus (mg/L)
Date Sampled


Segment 2204 - 20806 -Chlorophyll-a
y = 0.009x - 355.63
R² = 0.1709
Chlorophyll-a (µg/L)
Date Sampled


Segment 2204 - 20806 - Dissolved Oxygen
y = -4E-05x + 7.0697
R² = 0.0004
Dissolved Oxygen (mg/L)
Date Sampled



List of Impairments and Concerns in the Nueces – Rio Grande Coastal Basin

Segment Name	AU	Description	Impairment	Concern
2201 Arroyo Colorado Tidal	01	From the downstream end of the segment to the confluence with San Vincente Drainage Ditch	Bacteria	Chlorophyll-*a*, Nitrate
	02	From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31	Bacteria	Chlorophyll-*a*, Nitrate
	03	From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary	Bacteria	Chlorophyll-*a*, Nitrate
	04	From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186	Bacteria, DO	Chlorophyll-*a*, Nitrate
	05	From just upstream of the City Rio of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment	DO, Bacteria, Mercury in edible tissue, and PCBs in edible tissue	DO, Chlorophyll-*a*, Nitrate, Total Phosphorus
2201B Unnamed Drainage Ditch Tributary (B) in Cameron County	01	From the confluence with the Arroyo Colorado in Cameron County in the Rio Hondo turning basin at -97.6, 26.196 decimal degrees to a point 17.6 km upstream at the FM 510 crossing	Bacteria	Chlorophyll-a
	01	From the downstream end of the segment to the confluence with Little Creek just upstream of State Loop 499	Bacteria, Mercury, in edible tissue, PCBs in edible tissue	Chlorophyll-*a*, Nitrate, Total Phosphorus

2202 Arroyo Colorado Above Tidal	02	From the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
	03	From confluence with La Feria Main Canal to the confluence with La Cruz Resaca just downstream of FM 907	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
	04	From the confluence with La Cruz Resaca to the upper end of segment at FM 2062	Bacteria, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-*a,* Nitrate, Total Phosphorus
2202A Donna Reservoir	01	Off-channel irrigation reservoir pumped from Rio Grande near the City of Donna in Hidalgo County	PCBs in edible fish tissue	
2202B Unnamed Drainage Ditch Tributary (B) to S. Arroyo Colorado	01	Perennial drainage ditches that flow into the segment in Cameron and Hidalgo counties		Ammonia, Bacteria, Chlorophyll-*a*
2202C Unnamed Drainage Ditch Tributary (C) to S. Arroyo Colorado	01	From the confluence with S. Arroyo Colorado to a point 1.1 mi upstream near US Highway 281		Ammonia, Bacteria
2203 Petronila Creek Tidal	01	From the confluence with Tunas Creek and Alazan Bay to a point 11 mi upstream	Bacteria	Chlorophyll-*a*
2204 Petronila Creek Above Tidal	01	From downstream end of segment to the confluence with 2204A, unnamed drainage ditch tributary to Petronila Creek at N-97.7, W27.65 approximately 32.5 km (20.2 mi) upstream	Bacteria, TDS, Chloride, Sulfate	Chlorophyll-*a*
	02	From the confluence with 2204A, unnamed drainage ditch tributary of Petronila Creek at N-97.7, W27.65 to the upstream end of segment at the confluence with Agua Dulce and Banquete Creeks approximately 31.6 km (19.6 mi) upstream		Chlorophyll-a, DO, Phosphorus

Segment 21931 – Animal tracks at Petronila Creek at FM 335

Retama at Petronila Tributary FM 70 (Cefe #1)
Station 21598

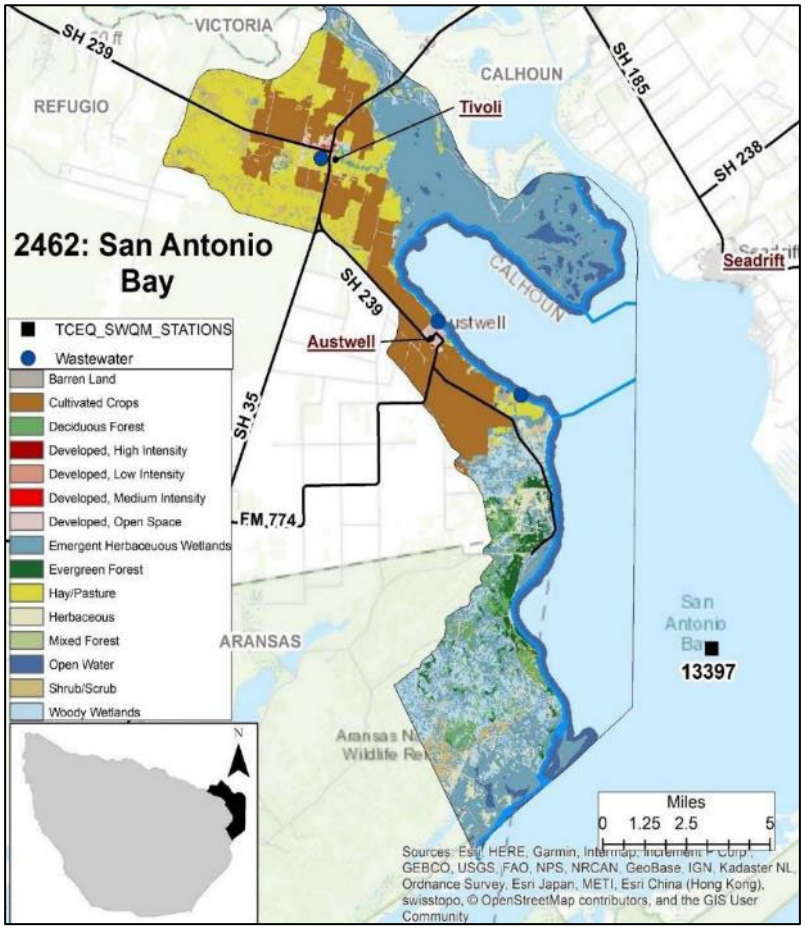
Gulf of Mexico

BASINS 24 and 25: Bays and Estuaries and Gulf of Mexico

Several TMDLs and special studies have been conducted in the basin. Segment 2472, Copano Bay, for bacteria in oyster waters; Segment 2482, Nueces Bay, for zinc in oyster tissue; Segment 2485, Oso Bay for bacteria and depressed DO; Segment 2485A, Oso Creek for bacteria; and Segment 2491, Laguna Madre for depressed DO.

Beach Watch is a Texas General Land Office (TxGLO) sponsored program that collects bacteria samples at Texas Beaches. There are five bays with Beach Watch Stations: Segment 2471, Aransas Bay – Rockport Beach; Segment 2481, Corpus Christi Bay; Segment 2483, Redfish Bay; Segment 2491, Laguna Madre; and Segment 2491, Baffin Bay - Cayo del Grullo Bay. Specific sites are discussed in their respective segments. The data are used to alert the public for times when it may be unsafe to be and can be found on the Beach Advisory and Closing On-line
Notification (BEACON) website: http://iaspub.epa.gov/waters10/beacon_national_page.main

Corpus Christi Marina



Segment 2462: San Antonio Bay / Hynes Bay

Segment Description - This segment is primarily in Refugio and Calhoun Counties and includes Guadalupe Bay. The official boundary for the San Antonio – Nueces Coastal Basin includes all of Hynes Bay and only a portion of San Antonio Bay. Its watershed is 69,939 acres. The area around the bay is dominated by farm and ranch lands. The small town of Austwell (pop. 133) is on the bay and is the only community in the area. Segment 2462 has one station numbered **13397.**

Water Quality - There is a water quality **concern** for **chlorophyll-*a*** in the 2022 IR. The Department of State Health Services (DSHS) shellfish restrictions in AU_01 for bacteria in oyster waters (OW) continued in Guadalupe Bay (2462OW_01) in the 2022 IR.

Special Studies:

To address the impaired oyster-waters use, TCEQ initiated a project to evaluate the oyster-water impaired waterbodies and to develop strategies to improve water quality. Texas' bays were divided in three geographical regions and projects were initiated reflecting the different needs in each region. The projects included data collection and stakeholder input. The project was completed in 2006 by TCEQs TMDL Program. For more information, visit the project webpage at:
http://www.tceq.texas.gov/waterquality/tmdl/35-gulfcoastoysters.html

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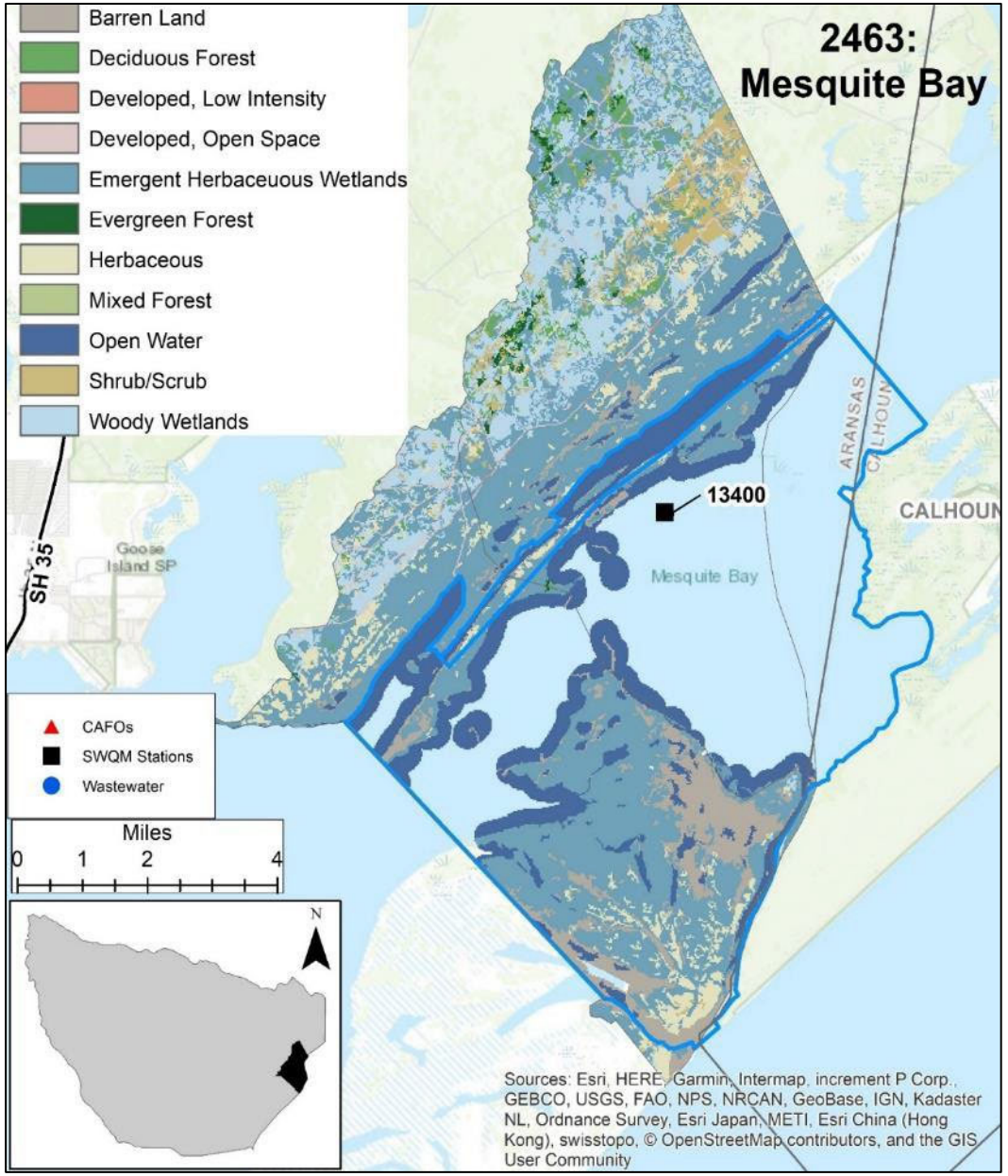
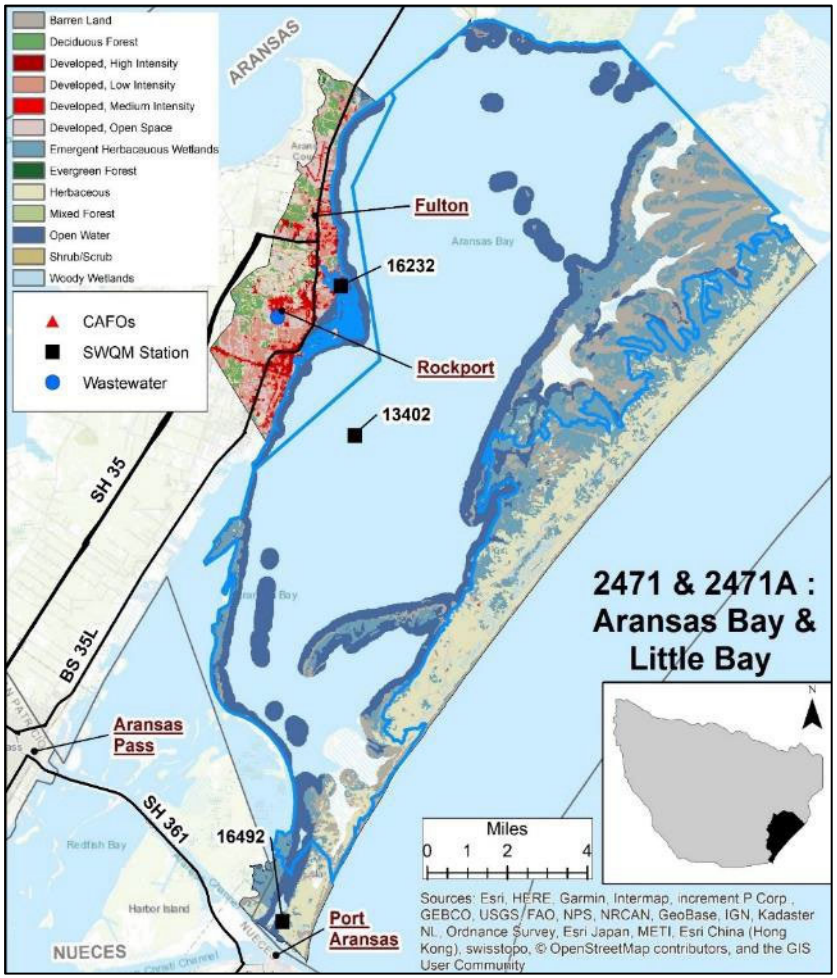
Segment 2463: Mesquite Bay

Mesquite Bay is the northernmost bay in the monitoring jurisdiction located in Aransas County. Its watershed is 37,323 acres. The bay is surrounded by natural areas. The Aransas Wildlife Refuge is to the northwest and uninhabited San Jose and Matagorda Islands are to the southeast. Segment 2463 has one station numbered **13400**.

Water Quality - There are **no water quality concerns** or **impairments** in Segment 2463.

Segment 2463 – Mesquite Bay





Segment 2471: Aransas Bay

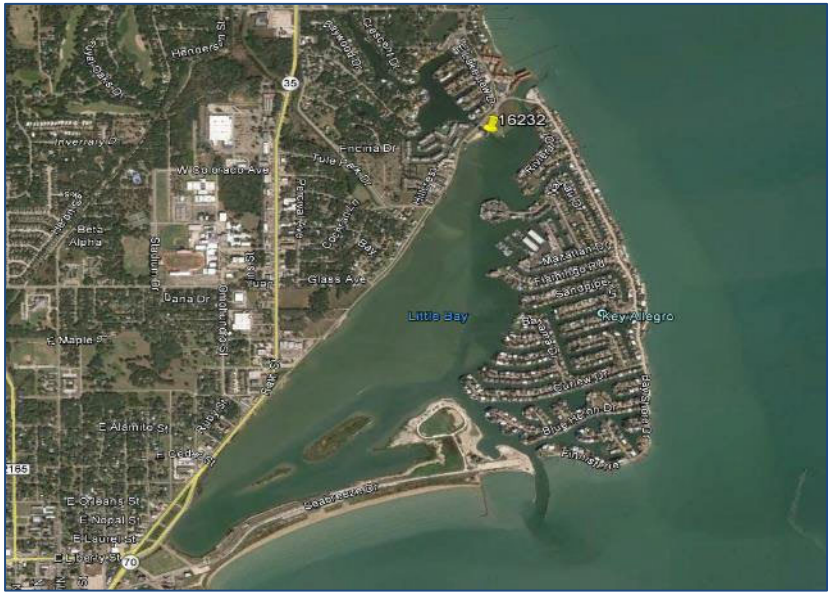
Segment Description – Segment 2471 is primarily in Aransas County and is composed of one AU. Its watershed is 85,724 acres. The City of Rockport is along the western shore of the bay and the uninhabited Matagorda Island is on the east. The Aransas Wildlife Refuge is to the north.

Water Quality - There are **no water quality concerns** or **impairments** in Segment 2471.

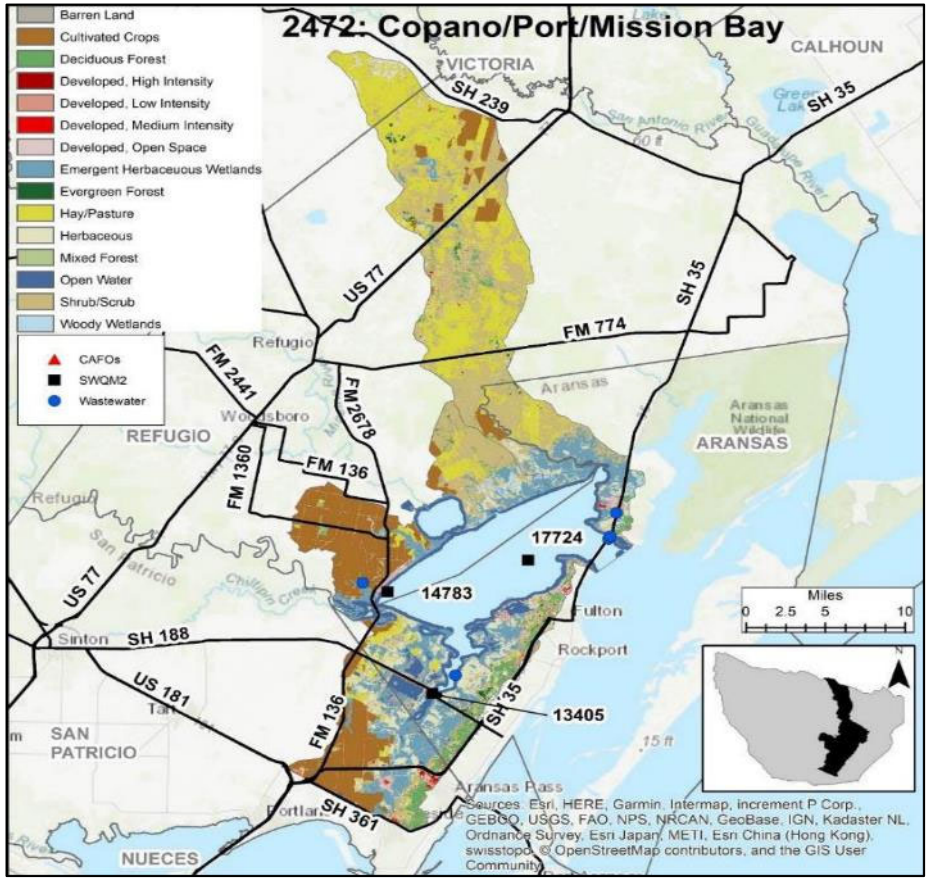
Segment 2471A: Little Bay

Segment Description - This segment is located between Aransas Bay, Broadway Street in Rockport, and Rockport Beach. Segment 2471A has one station numbered **16232.**

Water Quality - There is a **concern** for **chlorophyll-*a*** in the 2022 IR, which is likely attributed to limited circulation within the bay.



Station 1632 Little Bay in Rockport

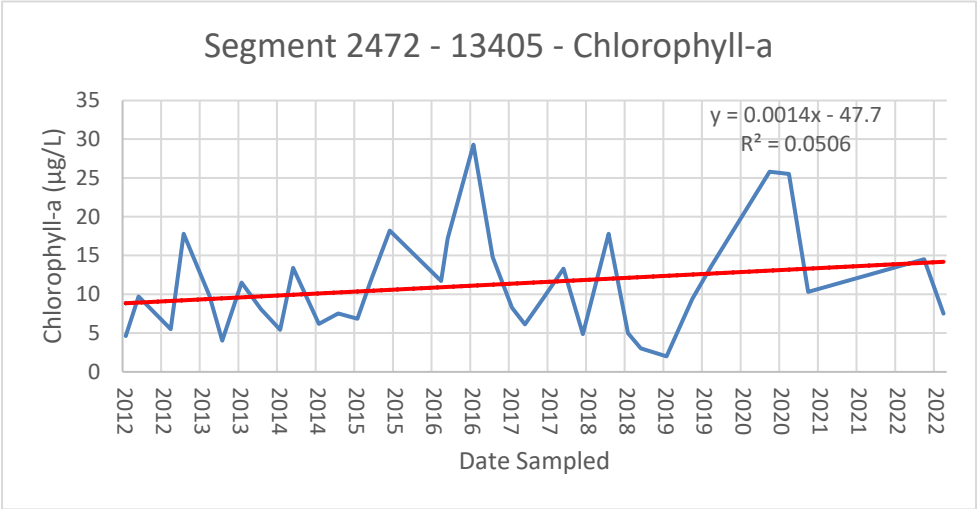


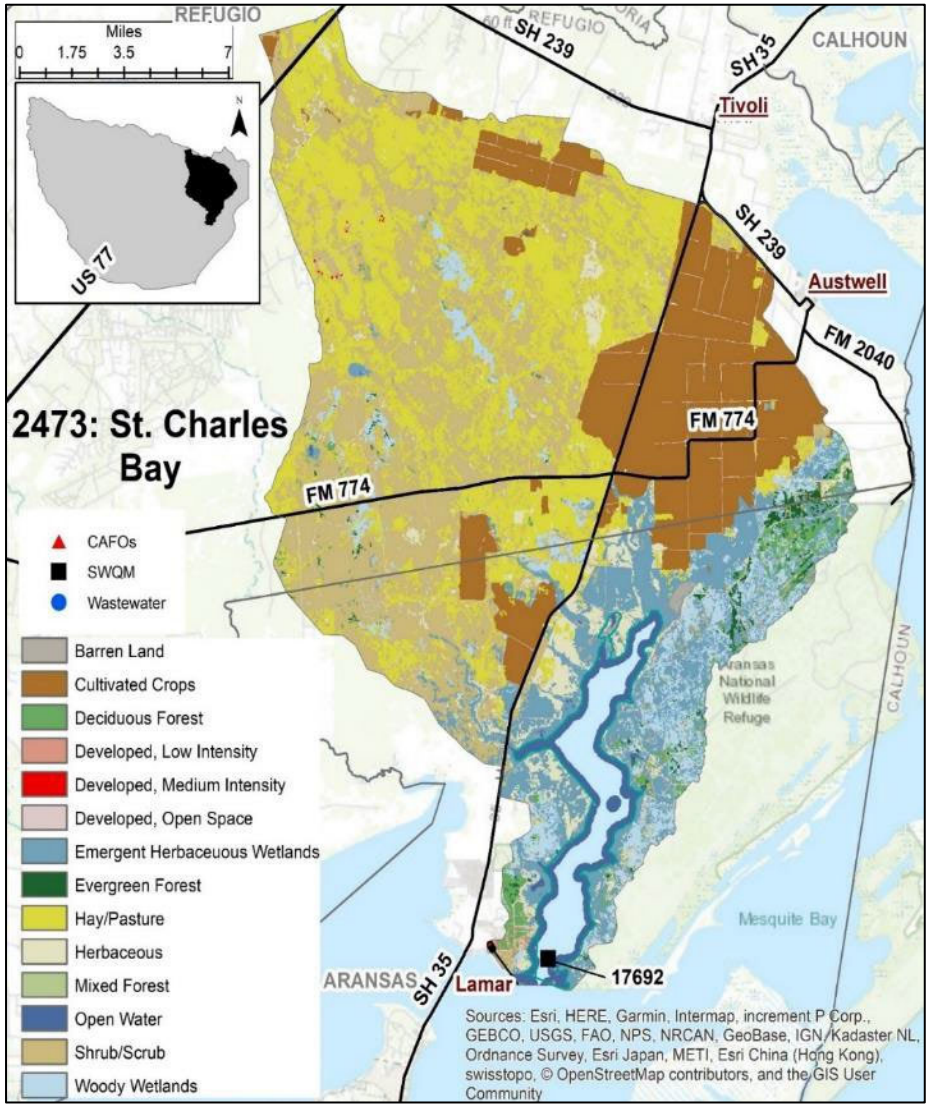
Segment 2472: Copano Bay / Port Bay / Mission Bay

Segment Description - These bays are in Refugio and Aransas counties. Its watershed is 249,235 acres. Segment 2472 is composed of three bays and three AUs. The south and east sides of the bay have multiple developments and small communities. The north and west sides are mostly farm and ranch lands. Segment 2472 has three stations: **14783** AU_01, **17724** AU_02, **13405** AU_03.

Water Quality – There are **no** water quality **concerns** or **impairments** in AU_01 or AU_02. AU_03 has a listed water quality **concern** for **chlorophyll-*a***. All other assessed water quality parameters met the criteria in the 2022 IR for AU_03. Metals in water monitoring was added to the monitoring schedule in 2019.

The DSHS shellfish restrictions in AU_01 for bacteria in oyster waters in 2472OW_01 continued in the 2022 IR.



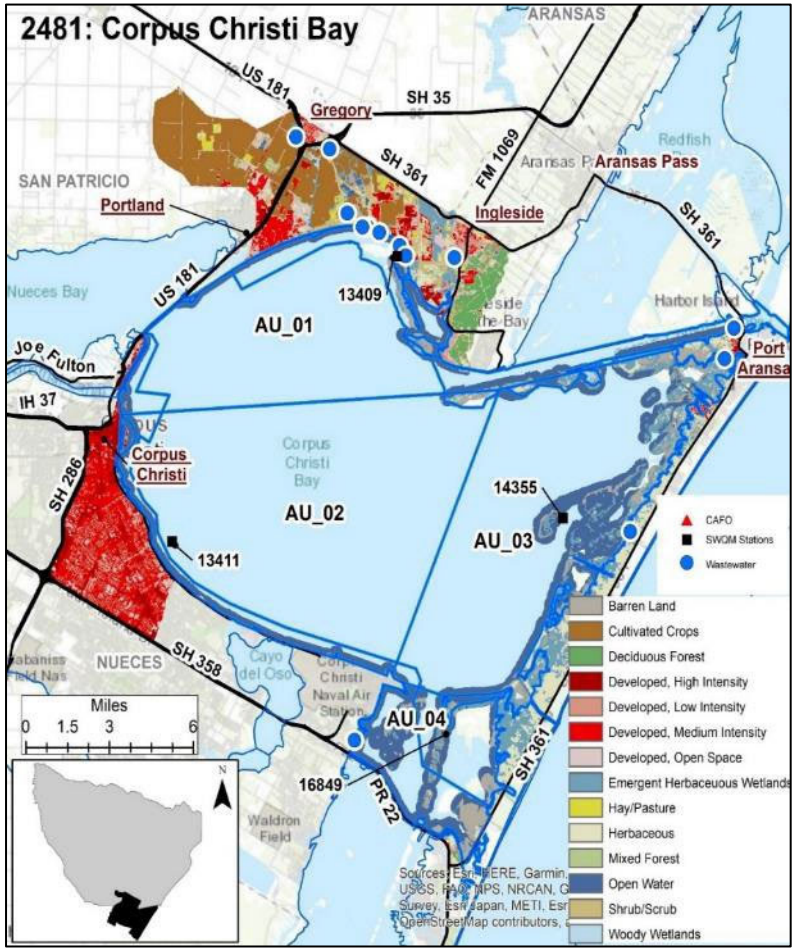


Segment 2473: St. Charles Bay

Segment Description – Segment 2473 is in Aransas County and consists of one AU. Its watershed is 162,401 acres. The bay is nearly surrounded by the Aransas Wildlife Refuge. The small community of Lamar, home to the "Big Oak", is located on the southwest side adjacent to Aransas Bay. Segment 2473 has one station numbered **17692.**

Water Quality - There are **no water quality concerns** or **impairments** in Segment 2473.

Segment 2473 – St. Charles Bay



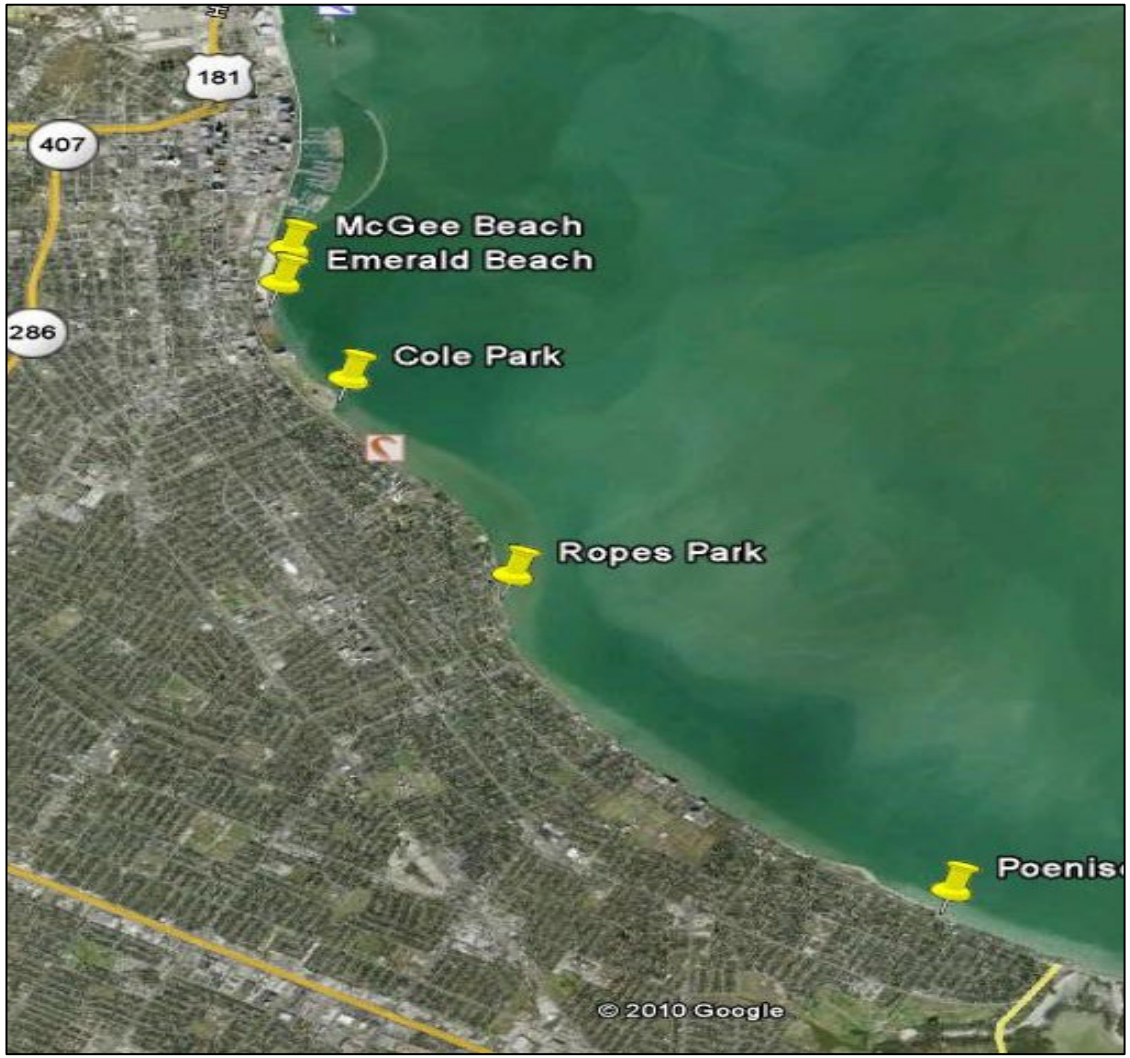
Segment 2481: Corpus Christi Bay

Segment Description – Corpus Christi Bay is in Nueces County and is split between the San Antonio – Nueces and the Nueces – Rio Grande Coastal Basins. The bay is divided into four AUs and the watershed is 144,878 acres. The bay is nearly surrounded by cities and industries. The City of Corpus Christi borders the south side of the bay and encompasses a large portion of Mustang Island. Along the northern shore are the cities of Portland, Ingleside, and Ingleside-By-The-Bay. There are several industries located along La Quinta Channel, along with the recently closed Naval Station Ingleside. Segment 2481 has three stations: **13409** AU_01, **13411** AU_02, **14355** AU_03.

Water Quality – There is a concern for copper in water in AU_01. There are **no water quality impairments** in Segment 2481, but near-shore **impairments** exist for **bacteria** (Enterococcus) for Cole Park (Segment 2481CB_03), Ropes Park (Segment 2481CB_04), and Poenisch Park (Segment 2481CB_06). There is a **concern** for **bacteria** in Emerald Beach (2481CB_07).

Special Studies:

Beach Watch data have identified Cole Park, Ropes Park, and Poenisch Park as having impairments for bacteria. These data are collected during and after high stormwater runoff events at the beaches where it discharges into the bay and people are likely to get into the water. Therefore, the impairment is only considered to be at the beaches, and not the entire bay.

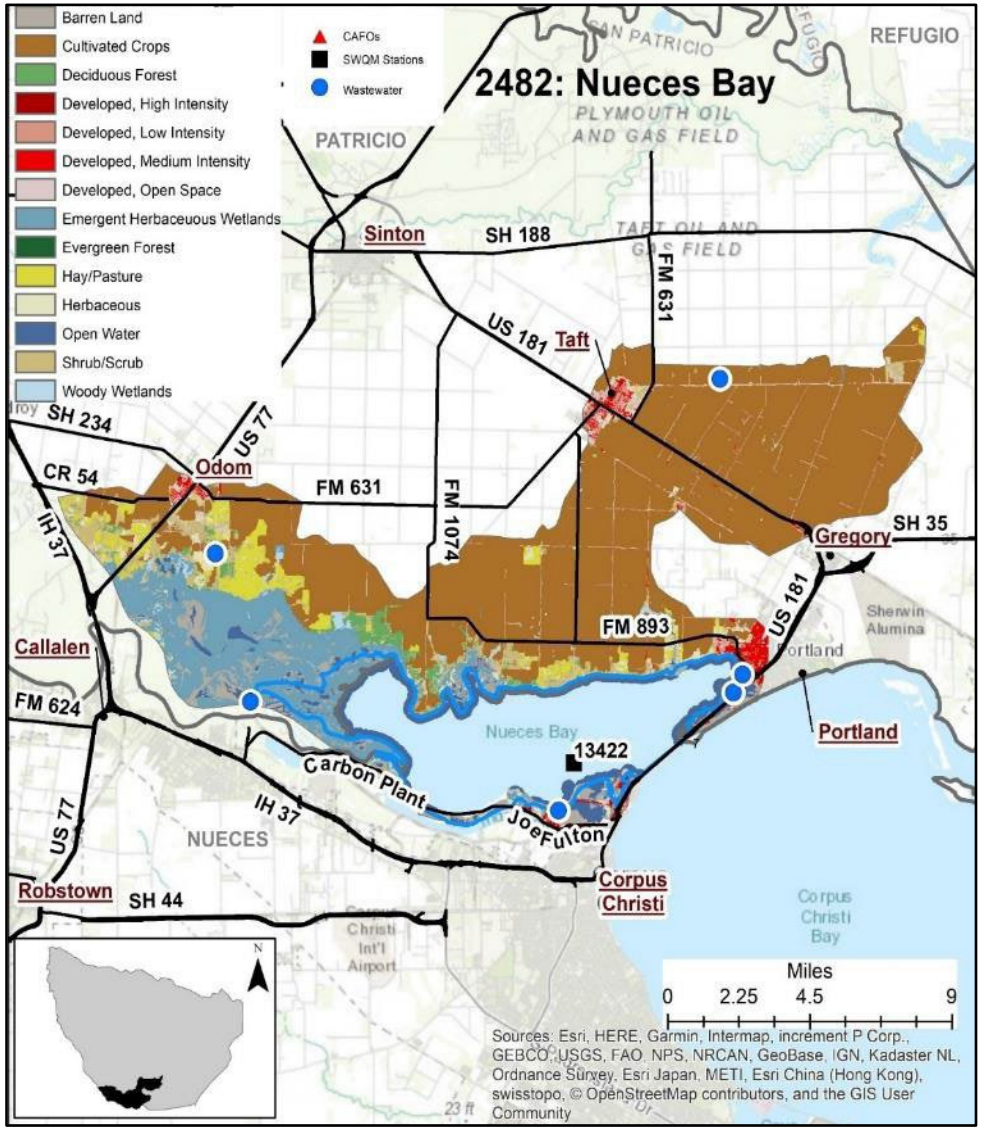

181
407
286
McGee Beach
Emerald Beach
Cole Park
Ropes Park
Poenis
© 2010 Google

Segment 2482: Nueces Bay

Segment Description – Nueces Bay is a shallow, secondary bay in Nueces County. Nueces Bay provides the boundary between the San Antonio – Nueces and Nueces – Rio Grande Coastal Basins and consists of a single AU. Its watershed is 92,834 acres. The bay is bordered on the south by the City of Corpus Christi where there are many industries associated with the ship channel. A large portion of the Nueces Delta has been bought and designated as a preserve. The area north of the bay is primarily farm and ranch lands. Segment 2482 has one station numbered **13422.**

Water Quality – The segment has an **impairment** for **copper** (acute and chronic toxicity) and a water quality **concern** for **chlorophyll-a** based on data in the 2022 IR. The DSHS **shellfish restrictions** for **zinc in edible tissue** continued in the 2022 IR.

Special Studies:
To address the zinc in edible tissue impairment, a TMDL and I-Plan were developed. The TMDL was approved by EPA in 2006 and the I-Plan was approved in 2007. The I-Plan recommended a continuation of metals sampling to track zinc concentrations. The full report can be found at: https://www.tceq.texas.gov/waterquality/tmdl/21-nuecesbay.html



Segment 2483: Redfish Bay

Segment Description - Redfish Bay is in Nueces County and its watershed is 45,936 acres. There is very little undeveloped land on the western shore of the bay. The main cities are Ingleside (pop. 10,165) and Aransas Pass (pop. 8,088), with numerous small communities all the way to Rockport (10,841). Port Aransas (pop. 4,123) encompasses most of the eastern shoreline. Segment 2483 has one station numbered **13426**.

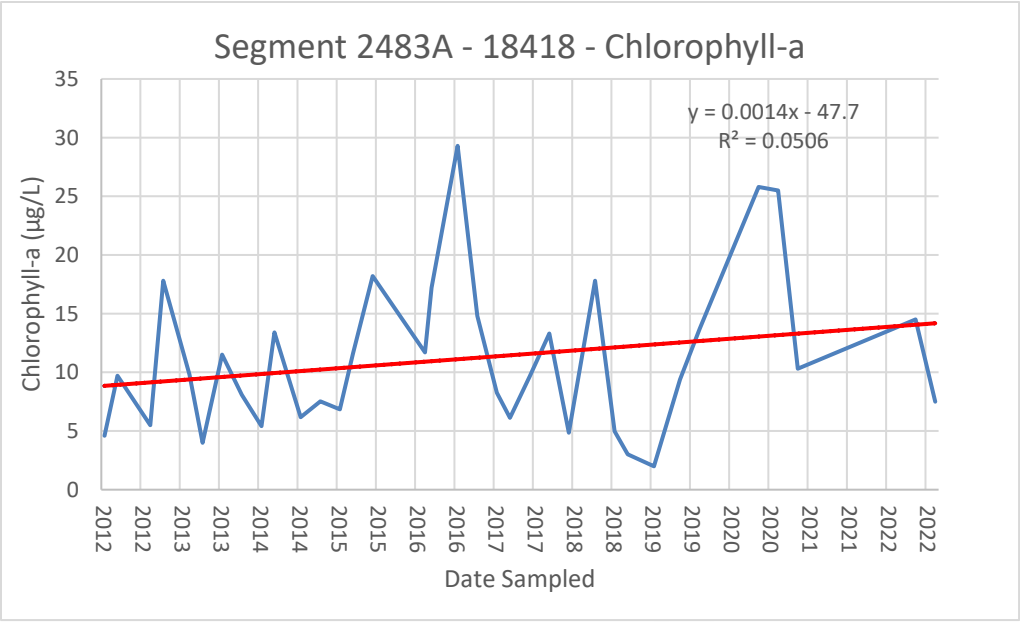
Water Quality - There are **no water quality concerns** or **impairments** in Segment 2483.

Segment 2483A: Conn Brown Harbor

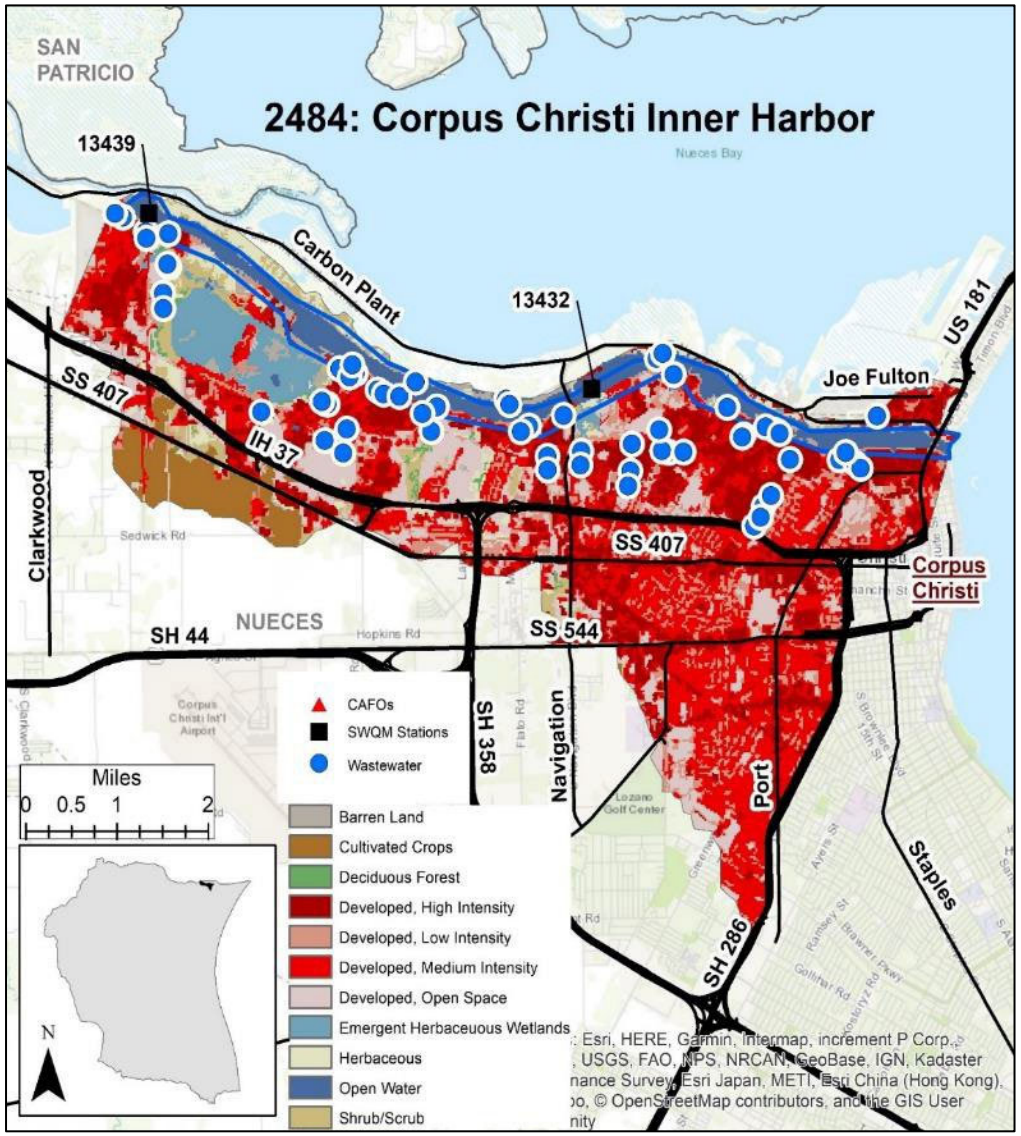
Segment Description - The harbor is within the City of Aransas Pass. The northeast end is in Aransas County and the southwest end is in San Patricio County. Conn Brown Harbor was a commercial harbor used primarily by shrimpers, for many years, ending in the mid-2000s. The harbor is now used mainly by recreational fishermen and boaters. Segment 2483A consists of one station numbered **18848.**

Water Quality - There is a **concern** for **copper** (acute and chronic toxicity) in the 2022 IR. The concern is likely associated with anti-fouling paint application in the harbor. Additionally, there is an impairment for bacteria single sample and geomean (Enterococcus).

Station 13426 – Redfish Bay at SH 361



Station 18848 – Conn Brown Harbor



Segment 2484: Corpus Christi Inner Harbor

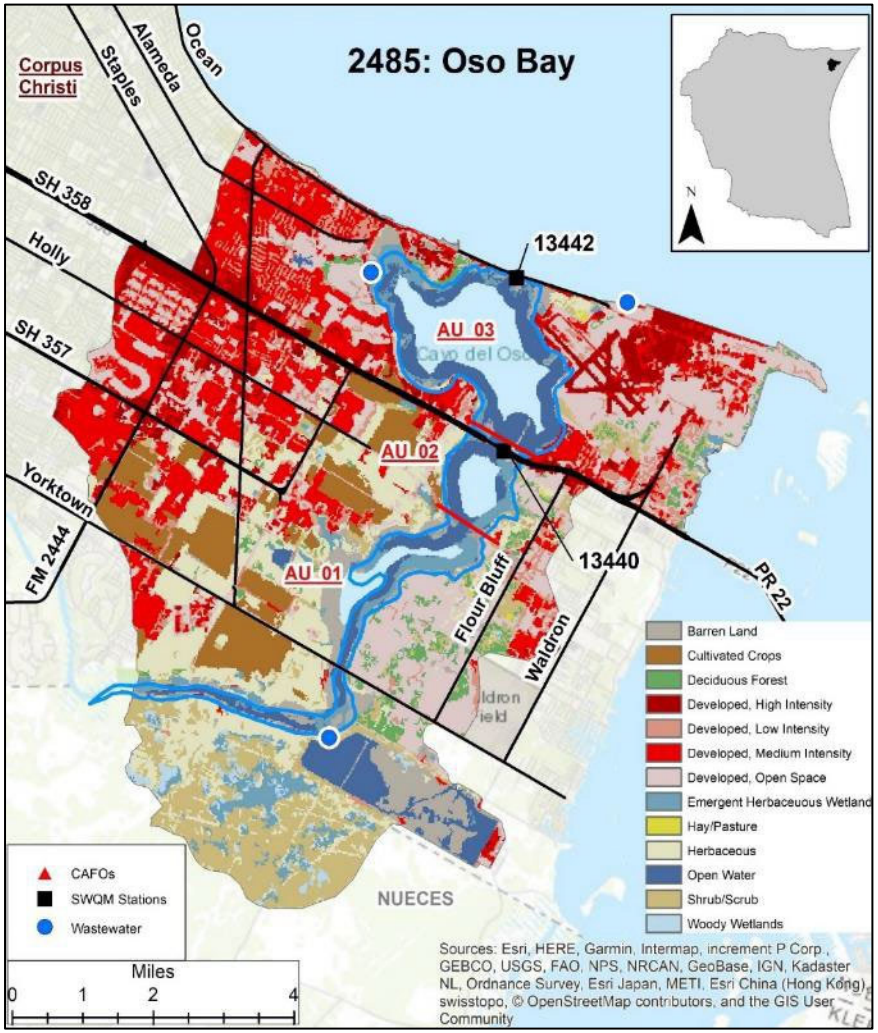
Segment Description - The Corpus Christi Inner Harbor (CCIH) is in the City of Corpus Christi (pop. 326,554) in Nueces County. Its watershed is 13,360 acres and is comprised of one segment. CCIH is home to the Port of Corpus Christi, the second deepest port in the State of Texas. Many refineries and other industries are located all along the harbor. There are also numerous permitted wastewater outfalls, many of which are for storm water. Only the outfalls for treated effluent are shown on the map (pg. 100). Segment 2484 consist of two stations: **13432** and **13439.**

Water Quality – Segment 2484 has a water quality i**mpairment** for **copper** (chronic toxicity) based on data from the 2022 IR. The segment also has **concerns** for **nitrates** and **ammonia** which may be related to the numerous WWTP and storm water discharge permits.

Segment 2484 – Inner Harbor

Segment 2485: Oso Bay

Segment Description - Oso Bay is in the City of Corpus Christi (pop. 326,554) in Nueces County. The bay is divided into three AUs and its watershed is 29,661 acres. The northwest portion of the bay between Ward Island and Ennis Joslin Road in AU_03 is known as the Blind Oso. Oso Bay receives much of the storm water runoff from the City of Corpus Christi as well as the cooling water from the Barney Davis Power Plant. The housing developments around the bay range from large, multi-acre tracts to neighborhoods with many houses per acre, to apartment complexes. Segment 2485 consists of two stations: **13440** AU_02, **13442** AU_03.



Water Quality – According to the 2022 IR, AU_01 has a water quality **concern** for **chlorophyll-a**. AU_02 has water quality i**mpairments** for **depressed dissolved oxygen** (24-hour minimum), bacteria (Enterococcus) and **concerns** for **chlorophyll-a** and **total phosphorus**. AU_03 has a water quality i**mpairment** for **bacteria (**Enterococcus) and has water quality **concerns** for **chlorophyll-a** and **total phosphorus**. AU_03 has had an impairment for bacteria for primary contact recreation and oyster waters since 2004.

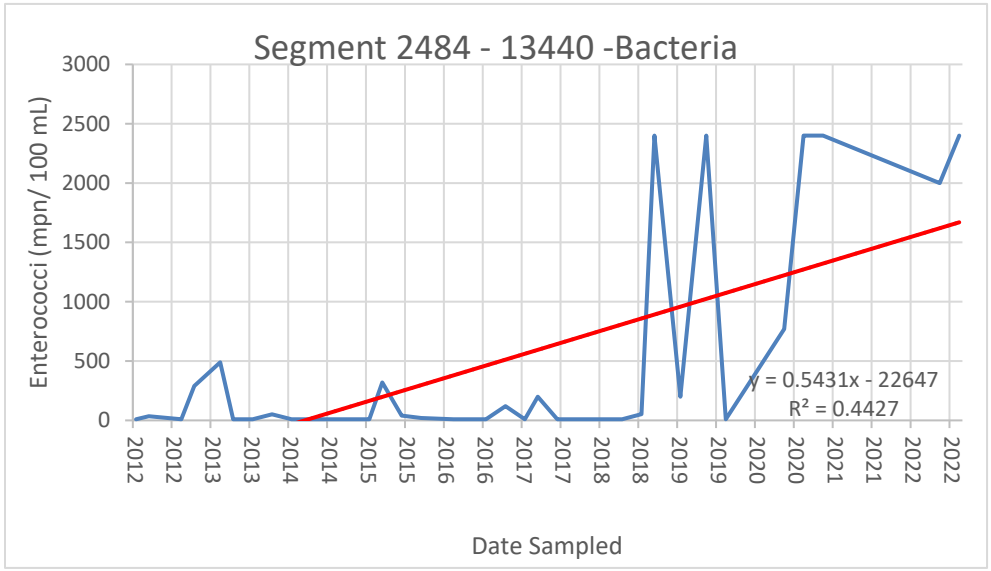
Special Studies:

In response to the bacteria impairment, a TMDL for bacteria (Enterococcus) was conducted by the Center for Coastal Studies at Texas A&M University – Corpus Christi (TAMU-CC) in 2007. The TMDL concluded that the Blind Oso differs significantly in physical characteristics and uses from the main portion of Oso Bay. It is extremely shallow and has a soft, muddy bottom and wetland areas. Local area stakeholders indicate that the Blind Oso is not used for contact recreation but is used extensively by waterfowl since it provides high quality habitat for waterfowl and shorebirds. TAMU-CC collected additional bacteria samples for a special study in 2013. Most of those samples exceeded the standard. The technical report can be found at: https://www.tceq.texas.gov/downloads/water-quality/tmdl/oso-bay-creek-recreational-67/67-oso-bay-bacteria-tmdl-adopted.pdf.

In 2010, TCEQ's TMDL Program assessed dissolved oxygen concentrations and prepared a Use Attainability Analysis (UAA) for the bay. Based on data collected for the UAA, a revision to the 24-Hr DO criteria was proposed-

- average 5.0 → 4.5 mg/L
- minimum 4.0 → 3.5 mg/L

The project website is:
https://www.tceq.texas.gov/waterquality/tmdl/24-osobayoxygen.html



Station 13440 – Oso Bay at SPID Bay Bridge

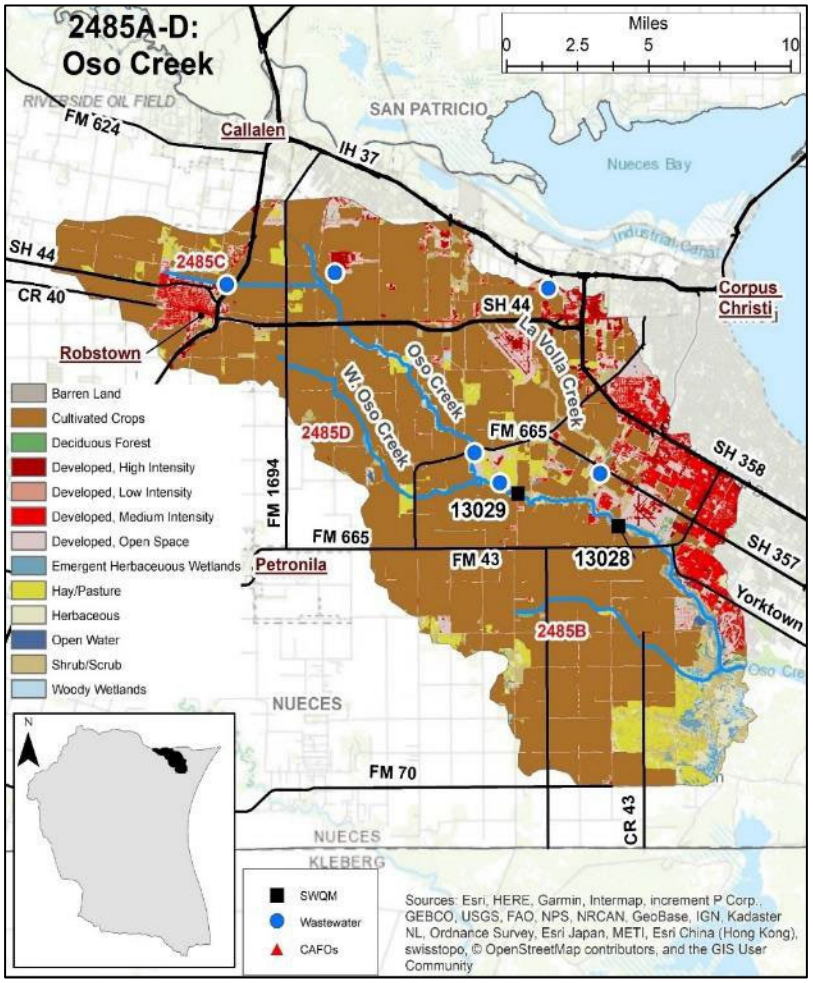
Segment 2485A: Oso Creek

Segment Description - Oso Creek flows 29.5 miles from a point 3 miles upstream of SH 44 west of Corpus Christi (pop. 326,554) to the confluence with Oso Bay in Nueces County. Its watershed is 118,380 acres. The southeastern end of the creek flows through highly developed areas of Corpus Christi. The northwestern end is primarily rural, but development is rapidly encroaching. Segment 2485A consists of two stations: **13028** and **13029.**

Water Quality - The creek has had an **impairment** for **bacteria** (enterococcus) for primary contact recreation since 2002. The creek also has concerns for **nitrate**, **chlorophyll-*a*,** and **total phosphorus** in the 2022 IR.

Special Studies:
In 2013, TCEQ began developing a TMDL for Oso Creek. The TMDL was conducted and completed by the Texas Institute for Applied Environmental Research (TIAER) in 2019. TIAER developed a load duration curve (LDC) to quantify pollutant loads and specific TMDL allocations for point and nonpoint sources of bacteria. For more information on the project, visit: https://www.tceq.texas.gov/waterquality/tmdl/67-osocreekbacteria

In 2016, NRA completed a report called the Riparian Evaluation of Oso Creek and Tributaries in support of the TMDL's Implementation Plan recommendations. For the study, NRA made maps identifying hindrances and constraints of riparian areas and identified evaluation project areas to establish on-going evaluations. The report can be found at: https://www.tceq.texas.gov/downloads/water-quality/tmdl/oso-bay-creek-recreational-67/67-oso-riparian-evaluation-report-2016.pdf



Station 13028- Oso Creek at SH286

Segment 2485B: Unnamed Tributary of Oso Creek

Segment Description - The unclassified water body is from a point 3.2 miles west of SH 286 to the confluence with Oso Creek. This tributary is a primarily rural area, but development is rapidly encroaching.

Water Quality - There are no active monitoring sites on the segment. Data for the assessment were collected during the TMDL studies. There is a water quality **concern** for **total phosphorus** in the 2022 IR. The segment was included in NRA's Oso Riparian Evaluation. https://www.cbbep.org/manager/wp-content/uploads/1907-Final-Report-9.11.19-Reduce.pdf

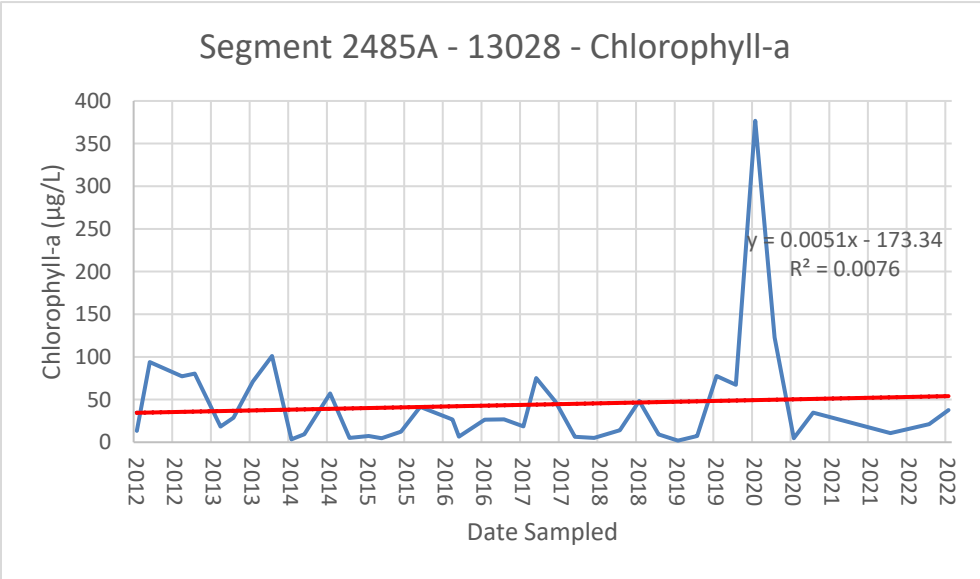
Segment 2485D: West Oso Creek

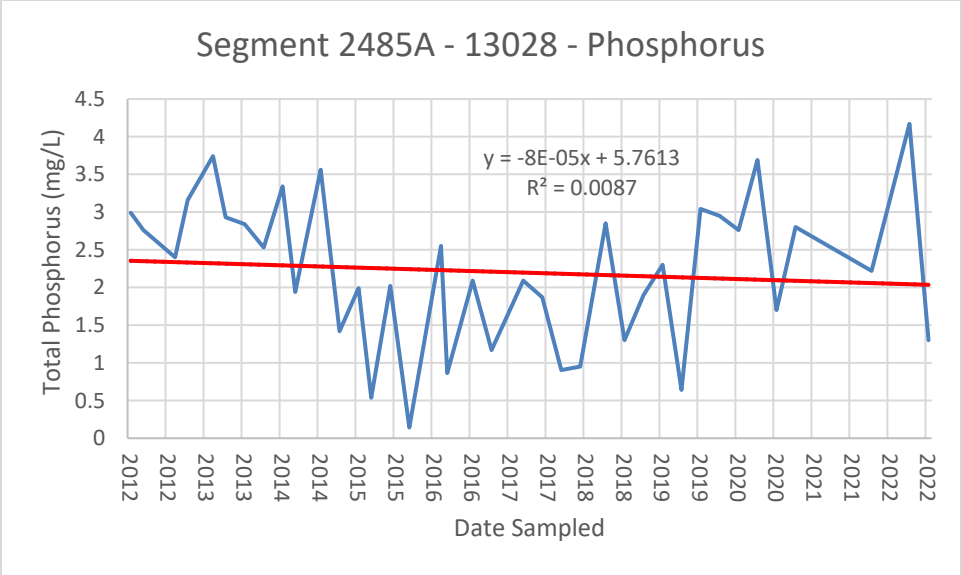
Segment Description - The unclassified water body is from a point 0.3 miles west of FM 1694 to the confluence with Oso Creek. This tributary is a primarily rural area, but development is rapidly encroaching.

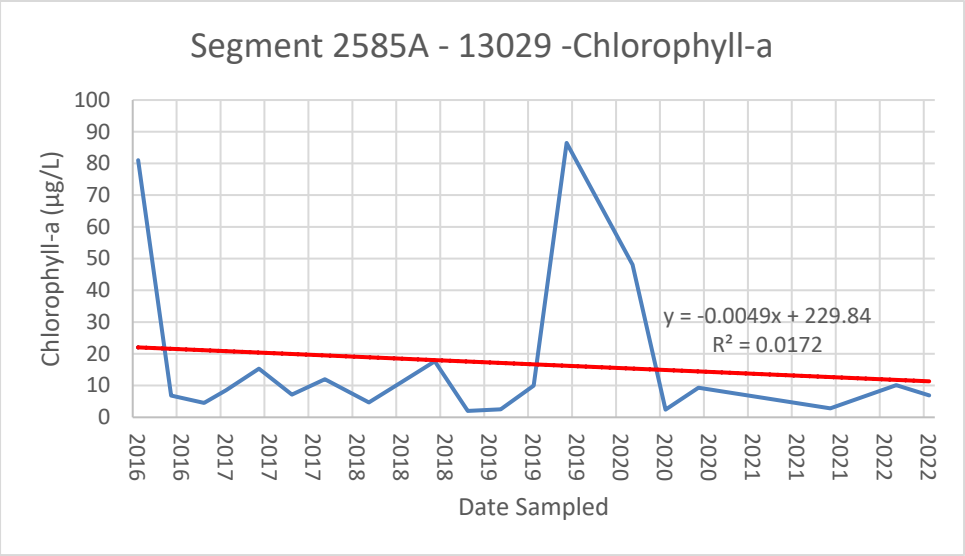
Water Quality - There are no active monitoring sites on the segment. Data for the assessment were collected during the TMDL studies. There is a water quality **concern** for **total phosphorus** in the 2022 IR. The segment was included in NRA's Oso Creek Riparian Evaluation: https://www.cbbep.org/manager/wp-content/uploads/1907-Final-Report-9.11.19-Reduce.pdf

Segment 2485B – Unnamed Tributary of Oso Creek during Riparian Evaluation

Segment 2485D – West Oso Creek during Riparian Evaluation


Segment 2485A - 13028 - Chlorophyll-a
Chlorophyll-a (µg/L)
y = 0.0051x - 173.34
R² = 0.0076
Date Sampled


Segment 2485A - 13028 - Phosphorus
Total Phosphorus (mg/L)
y = -8E-05x + 5.7613
R² = 0.0087
Date Sampled


Segment 2585A - 13029 -Chlorophyll-a
Chlorophyll-a (µg/L)
y = -0.0049x + 229.84
R² = 0.0172
Date Sampled

Segment 2491- Laguna Madre

Segment Description - The Laguna Madre runs along the Texas coast from Corpus Christi Bay in Nueces County to the Brownsville Ship Channel in Cameron County. It is divided into three AUs and its watershed is 4,222,224 acres. The only development is in the very northern and very southern ends: Corpus Christi and Port Isabel, respectively. Padre Island National Seashore encompasses most of the barrier island to the east. The land to the west is predominantly large ranches such as the King Ranch. There are numerous WWTPs permitted to discharge to the Laguna Madre via the North Floodway, some of which are as far west as McAllen. Segment 2491 consists of six stations: **13445** AU_01, **13449** AU_01, **13448** AU_01, **13477** AU_02, **14870** AU_03, **13446** AU_03.

Water Quality – AU_01 has a water quality **impairment** for **depressed dissolved oxygen** (24-hour minimum) and a **concern** for **chlorophyll-a** in the 2022 IR.

AU_02 has water quality i**mpairments** for **depressed dissolved oxygen** (24-hour minimum) and **bacteria** (Enterococcus) and **concerns** for **nitrate**, and **chlorophyll-a**. 2491OW_02 has had an impairment for bacteria in oyster waters since 2006. Due to the eight-hour holding time and because there are no local labs accredited for enterococci analysis, bacteria sample collection has been suspended.

AU_03 has a water quality **concern** for **bacteria** (Enterococcus).

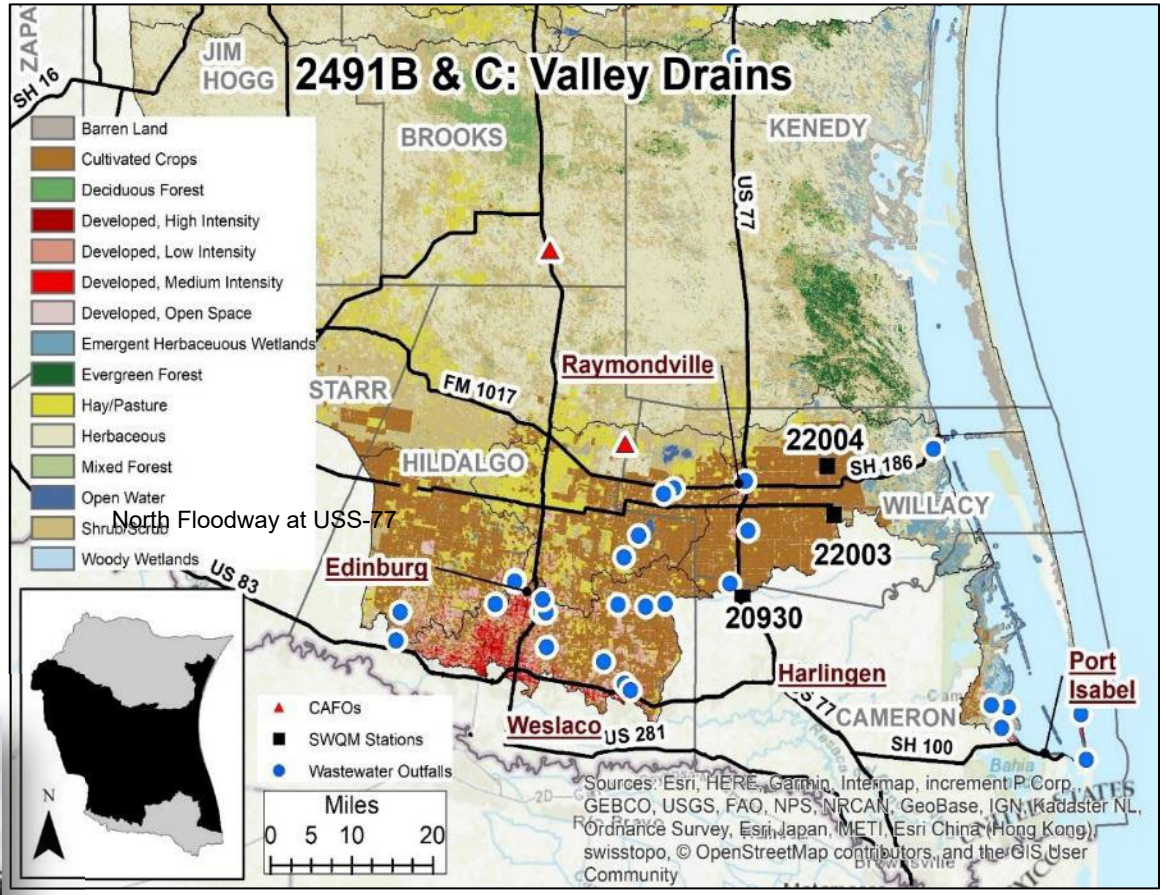
Special Studies:

To address the dissolved oxygen impairments, water quality standards revisions to the criteria are being proposed: The TCEQ recommends changing the 24-hour average criteria from 5.0 mg/L to 4.5 mg/L, but local stakeholders have requested that they consider 4.0 mg/L. The recommended change for the 24-Hr minimum criteria is from 4.0 mg/L to 2.0 mg/L. If the proposed revisions are approved, the bay would meet the DO standards in all AUs.

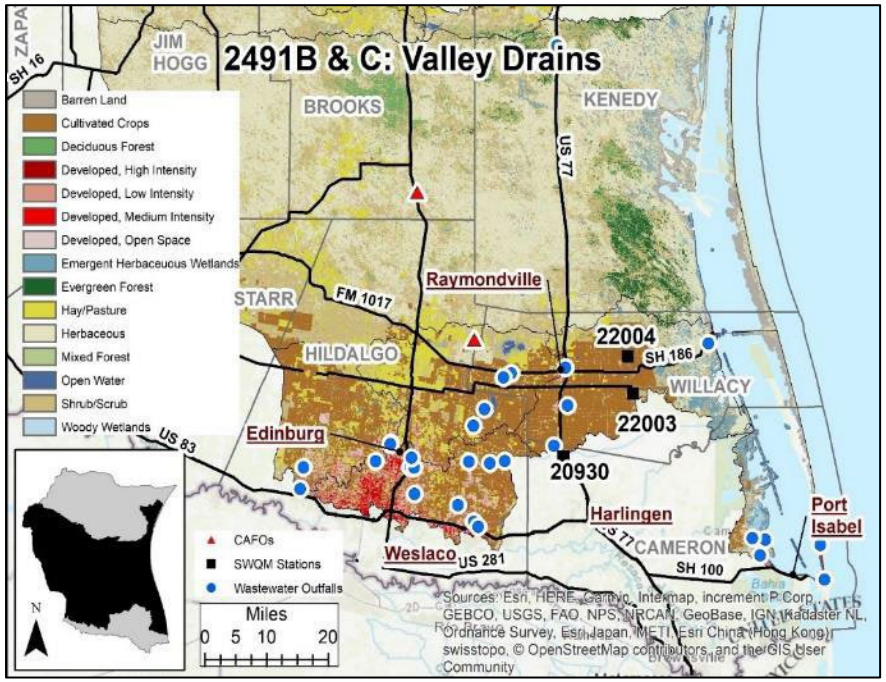
Segment 2491B: North Floodway

Segment Description – Located in the Lower Rio Grande Valley (LRGV), the North Floodway is used to drain WWTP effluent, return flows from irrigation, and diverted flood water flows from the Arroyo Colorado. It runs from point 0.04 miles north of Campacuas Lake and 0.32 miles west of FM 491 in Mercedes to the confluence with Lower Laguna Madre tidal flats. Segment 2491B consists of one station numbered **20930.**

Water Quality – Data collection on this water body began in November 2011. Although there are no impairments identified in the 2022 IR, the segment does have water quality **concerns** for **bacteria** (*E. coli*), **nitrate.**



North Floodway at USS-77



Segment 2491C: Raymondville Drain

Segment Description – Raymondville Drain flowing into Laguna Madre. Segment 2491C consists of one station numbered **22004** AU_01.

Water Quality – AU_01 has concerns for chlorophyll-a and bacteria.

Station 22003 – Raymondville Drain at CR 445

Segment – 2491C_03: Hidalgo Main Drain

Hidalgo Main Floodwater Channel flowing into Laguna Madre. Segment 291C_03 consists of one station numbered **22003** AU_01.

Water Quality – There are concerns for total phosphorus, nitrate, and chlorphyll-a.

Segment 2492: Baffin Bay / Alazan Bay / Cayo del Grullo / Laguna Salado

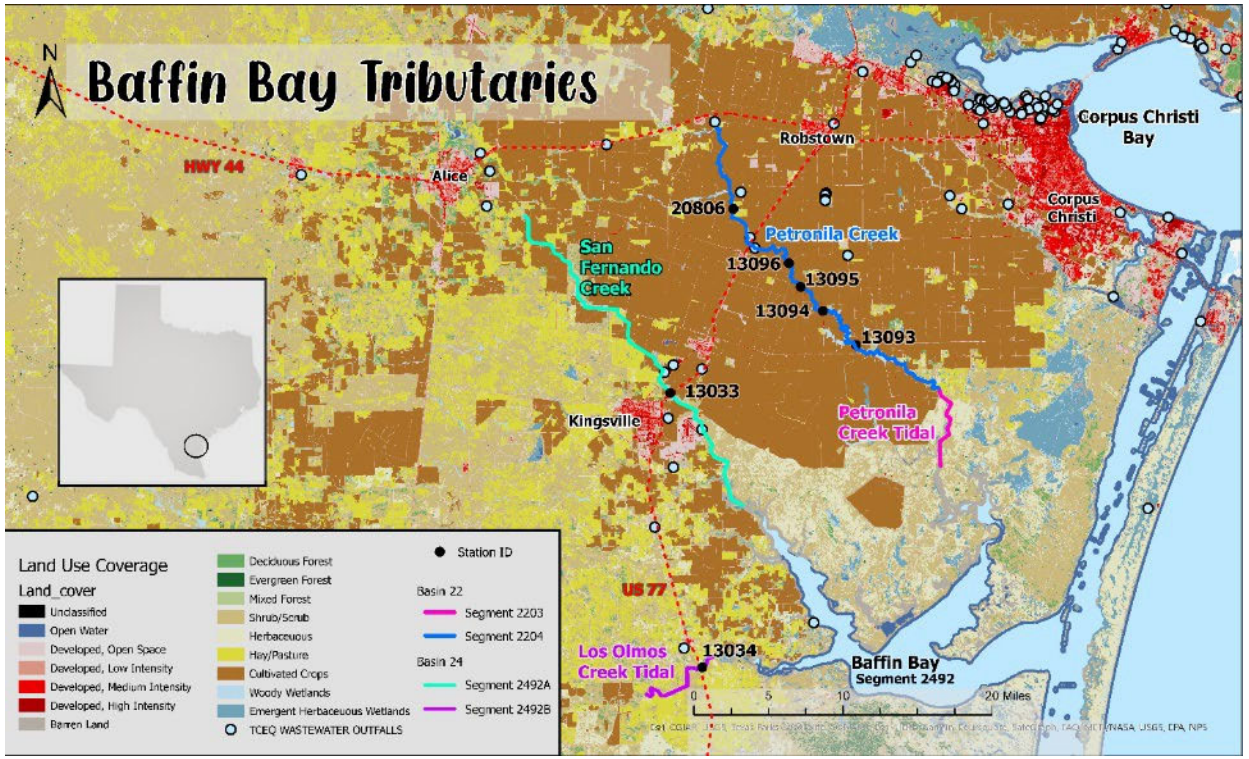
Segment Description - Baffin Bay is a hypersaline secondary bay located in Kleberg and Kenedy counties. Alazan Bay is a tertiary bay located in the northeastern arm of Baffin Bay in Kleberg County, Cayo del Grullo is the northwestern arm in Kleberg County, and Laguna Salado is the western arm in Kleberg and Kenedy Counties. Its watershed is 1,376,310 acres. The City of Kingsville (pop. 25,487) is the only large city in the watershed. Most of the bay is surrounded by large ranches such as the King Ranch. There are only a few public access points. Segment 2492 consists of two stations: **13450** AU_01 and **13452** AU_01.

Water Quality – Baffin Bay has a water quality **concern** for **chlorophyll-*a*** listed in the 2022 IR.

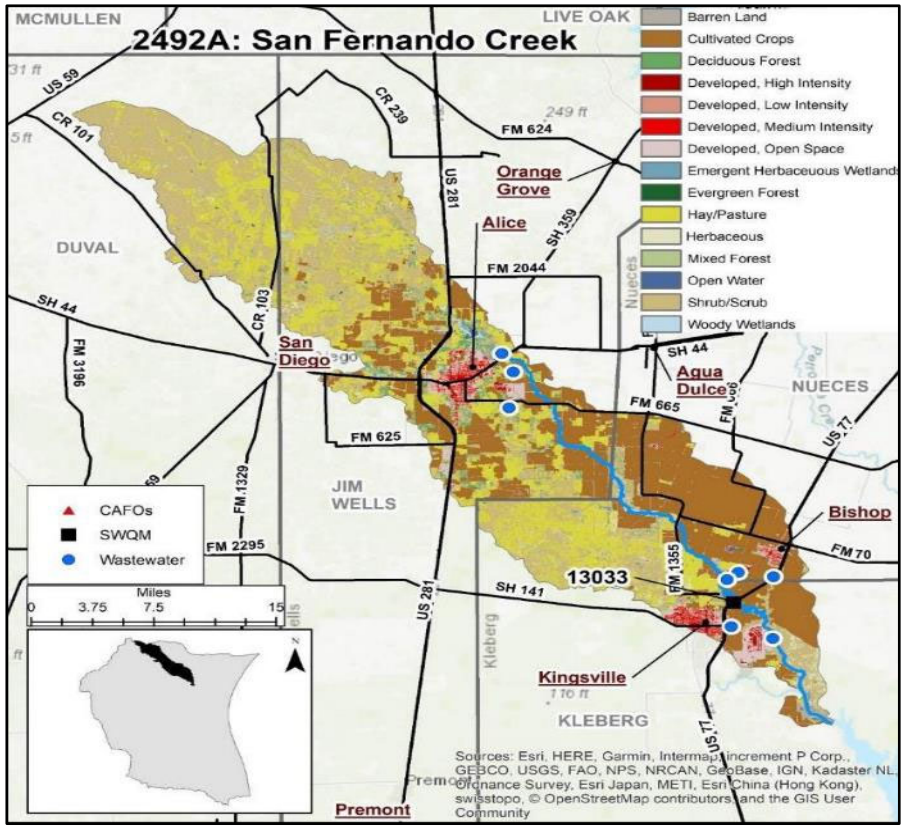
Special Studies:

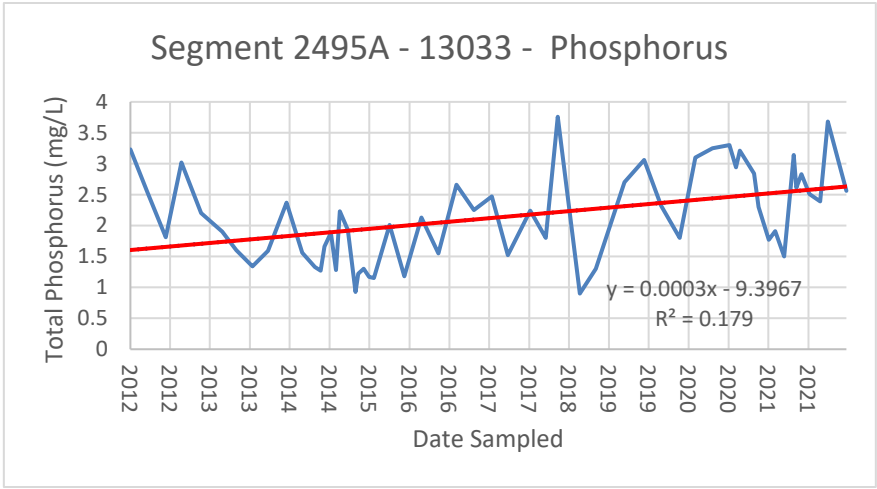
In the last decade, there have been a lot of studies targeting Baffin Bay and its watershed. Although the bay only has a water quality concern for chlorophyll-*a*, episodes of fish-kills and food web disruptions have caught the attention of a concerned public and researchers alike. The Baffin Bay Stakeholder Group, formed in 2012, is composed of scientists from Harte Research Institute (HRI) at TAMU-CC, CBBEP, USDA-NRCS, TSSWCB, TWRI, TCEQ, Texas Sea Grant, TxGLO, NRA, and a host of concerned citizens, including commercial and recreational fishermen, ranchers, and business owners. In 2013, HRI initiated a volunteer water quality monitoring program. Presently, HRI is conducting an assessment of nutrient loadings to Baffin Bay, a coastal Resiliency Master Plan, and Serpulid reef studies.

Additionally, TWRI received funding for the development of a WPP for Baffin Bay and its tributaries Petronila and San Fernando creeks. The project kicked off in 2020. For more information, please visit their project page: https://twri.tamu.edu/our-work/restoring-protecting/petronila-san-fernando-creeks-watershed-planning/



Segment 2492 – Alazan Bay





Segment 2492A: San Fernando Creek

Segment Description - San Fernando Creek flows 45.6 miles from a point just east of the Nueces and Jim Wells county lines to the confluence of the Cayo del Grullo arm of Baffin Bay in Kleberg County. Its watershed is 288,572 acres. While primarily rural, the creek flows through the City of Alice (pop. 18,887) and the City of Kingsville (pop. 25,487). There are a number WWTPs that discharge into the creek providing consistent flow. The watershed also has several small communities on septic systems. Segment 2492A consists of one station numbered **13033**.

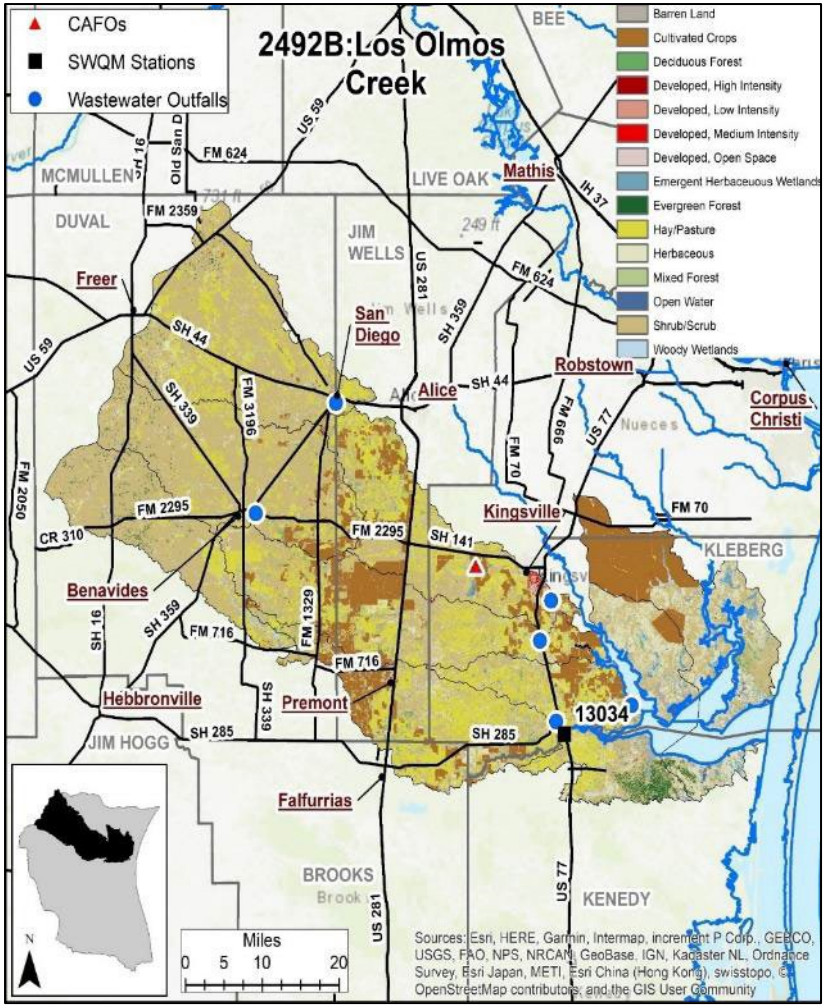
Water Quality – San Fernando Creek is currently listed as **impaired** for **bacteria** (*E. coli*) in the 2022 IR. The creek was previously listed for enterococci bacteria (marine water), but the sampling location was determined to be upstream of the tidal boundary. The creek also has water quality **concerns** for **chlorophyll-*a***, **nitrate**, and **total phosphorus**.

Special Studies:

TWRI received funding for the development of a WPP for Baffin Bay and its tributaries Petronila and San Fernando creeks. The project kicked off in 2020 and includes monthly water quality monitoring for bacteria (*E. coli*) and nutrient parameters at San Fernando Creek (Station 13033) and Petronila Creek. For more information or to get involved in the process please visit their project page: https://twri.tamu.edu/our-work/restoring-protecting/petronila-san-fernando-creeks-watershed-planning/

In 2020, NRA conducted a year-long water quality monitoring project funded by TxGLO's Coastal Management Program (CMP). The study included high flow event monitoring on San Fernando, Los Olmos, and Petronila creeks. Los Olmos Creek showed increased concentrations of nutrients specifically for nitrogen and chlorophyll-a along with elevated bacteria levels. Petronila and San Ferando showed extremely wide ranges of concentrations throughout the year.

Station 13033 – San Fernando Creek at US 77



Segment 2492B: Los Olmos Creek Tidal

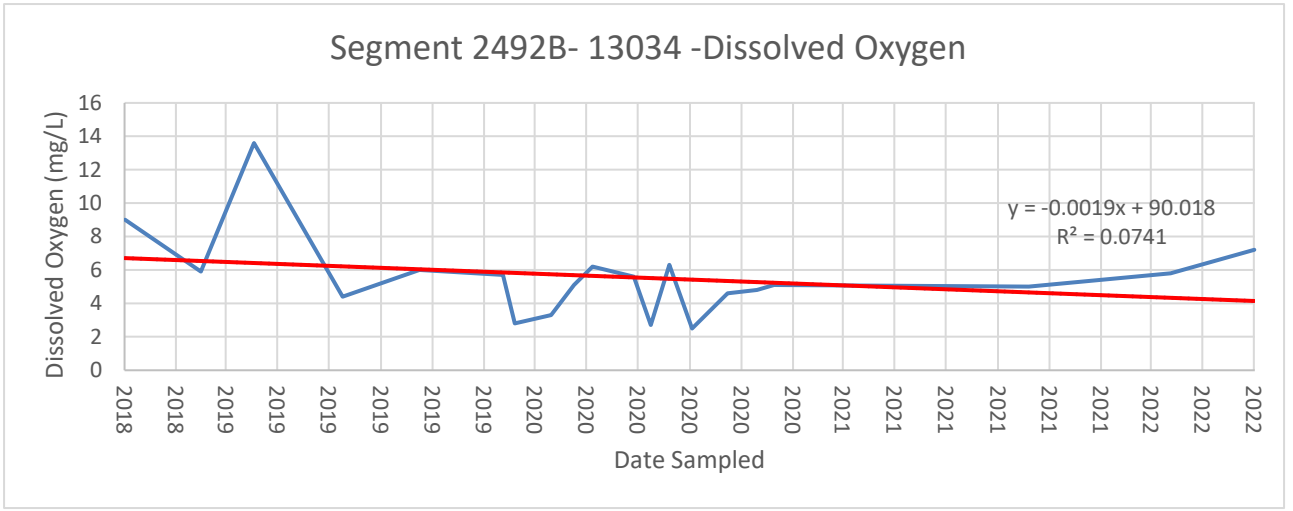
Segment Description – Tidal portion of Los Olmos Creek is from the confluence with Laguna Salada upstream 10.9 km (6.8 mi) southwest of Riviera. Segment 2492B consists of one station numbered **13034** AU_01.

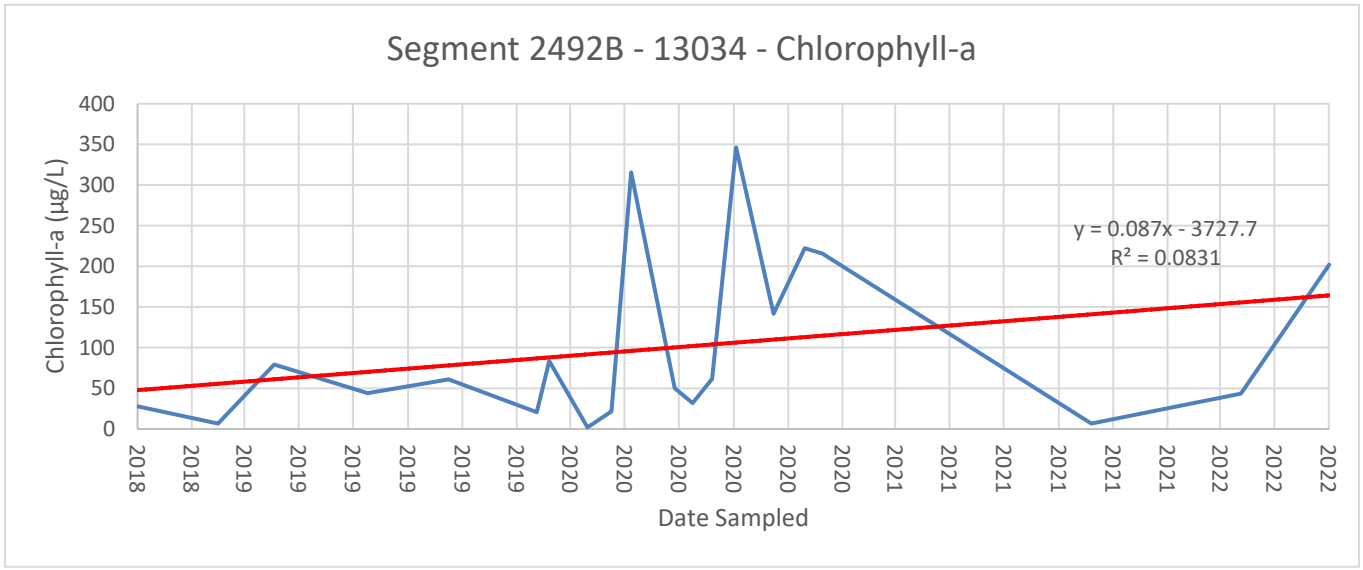
Water Quality – This segment has concerns for bacteria (Enterococcus), depressed dissolved oxygen (grab minimum and grab screening level), and chlorophyll-a.

Special Studies:

In 2020, NRA conducted a year-long water quality monitoring project on Los Olmos Creek that was funded by the Texas General Land Office's (TxGLO) Coastal Management Plan (CMP). The purpose of the study was to provide monthly water quality data that TCEQ can use to evaluate the water body and to help researchers determine the contribution of bacteria and nutrient parameters to the creek during rain events. Results of the study indicated concentrations of bacteria (Enterococcus), nitrate, and chlorophyll-a were above their criteria.


Los Olmos
Creek


Segment 2492B- 13034 -Dissolved Oxygen
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
0
y = -0.0019x + 90.018
R² = 0.0741
2018 2018 2019 2019 2019 2019 2019 2019 2020 2020 2020 2020 2020 2020 2021 2021 2021 2021 2021 2021 2022 2022 2022
Date Sampled

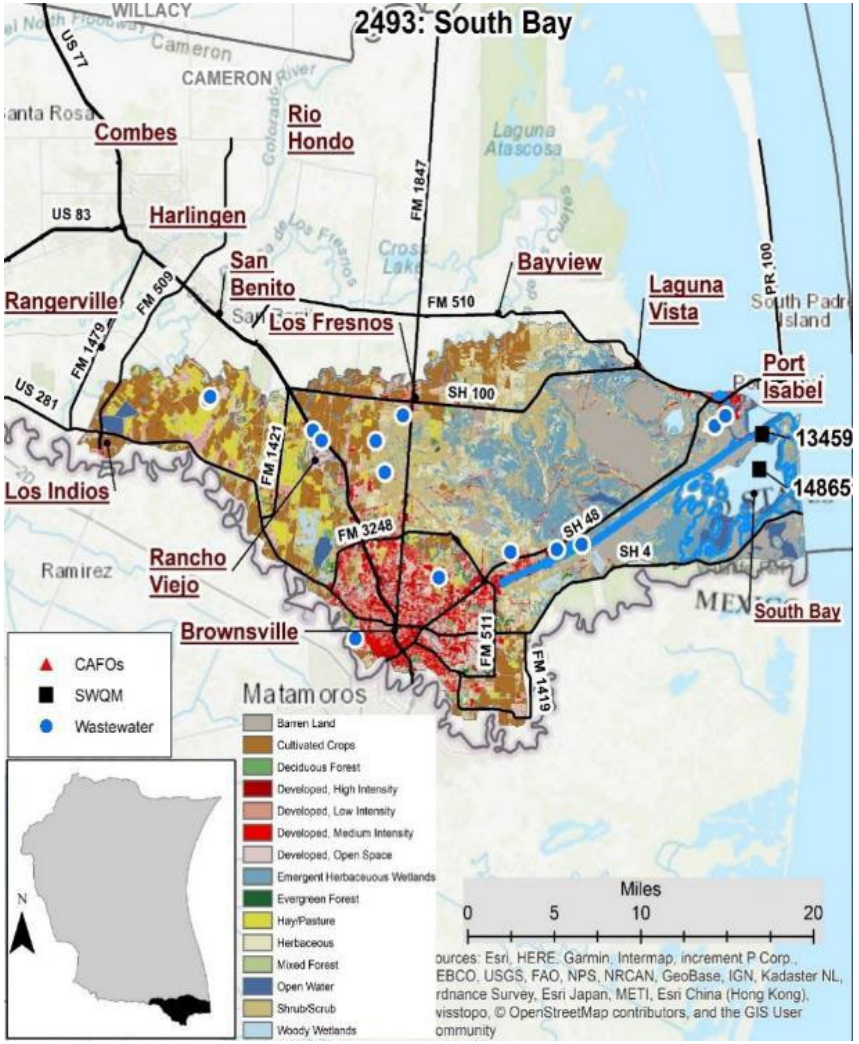

Segment 2492B - 13034 - Chlorophyll-a
Chlorophyll-a (µg/L)
400
350
300
250
200
150
100
50
0
y = 0.087x - 3727.7
R² = 0.0831
2018 2018 2019 2019 2019 2019 2019 2019 2020 2020 2020 2020 2020 2020 2021 2021 2021 2021 2021 2021 2022 2022 2022
Date Sampled

Segment 2493: South Bay

Segment Description South Bay is located south of the Brownsville Ship Channel in Cameron County. Its watershed, combined with that of the Segment 2493, South Bay, and Segment 2494, the Brownsville Ship Channel is 225,554 acres. South Bay is the southernmost bay in Texas and is part of the South Bay Coastal Preserve. It supports the largest concentration of oysters in the Lower Laguna Madre and is relatively inaccessible. Segment 2493 consists of two stations: **13459** AU_01 and **14865** AU_01.

Water Quality - All assessed parameters met the standards in the 2022 IR.

Special Studies:
South Bay was included in the Lower Laguna Madre/Brownsville Ship Channel Watershed Characterization that was conducted by a collaboration of the University of Texas – Rio Grande Valley Brownsville, TWRI, TCEQ, and TIAER in 2018. The report discusses water quality in San Martin Lake, the Brownsville Ship Channel, and the Lower Laguna Madre. The full report can be found at the following website: https://arroyocolorado.org/media/zqjpi1e0/llm_wc_102618_forstakeholderreview.pdf



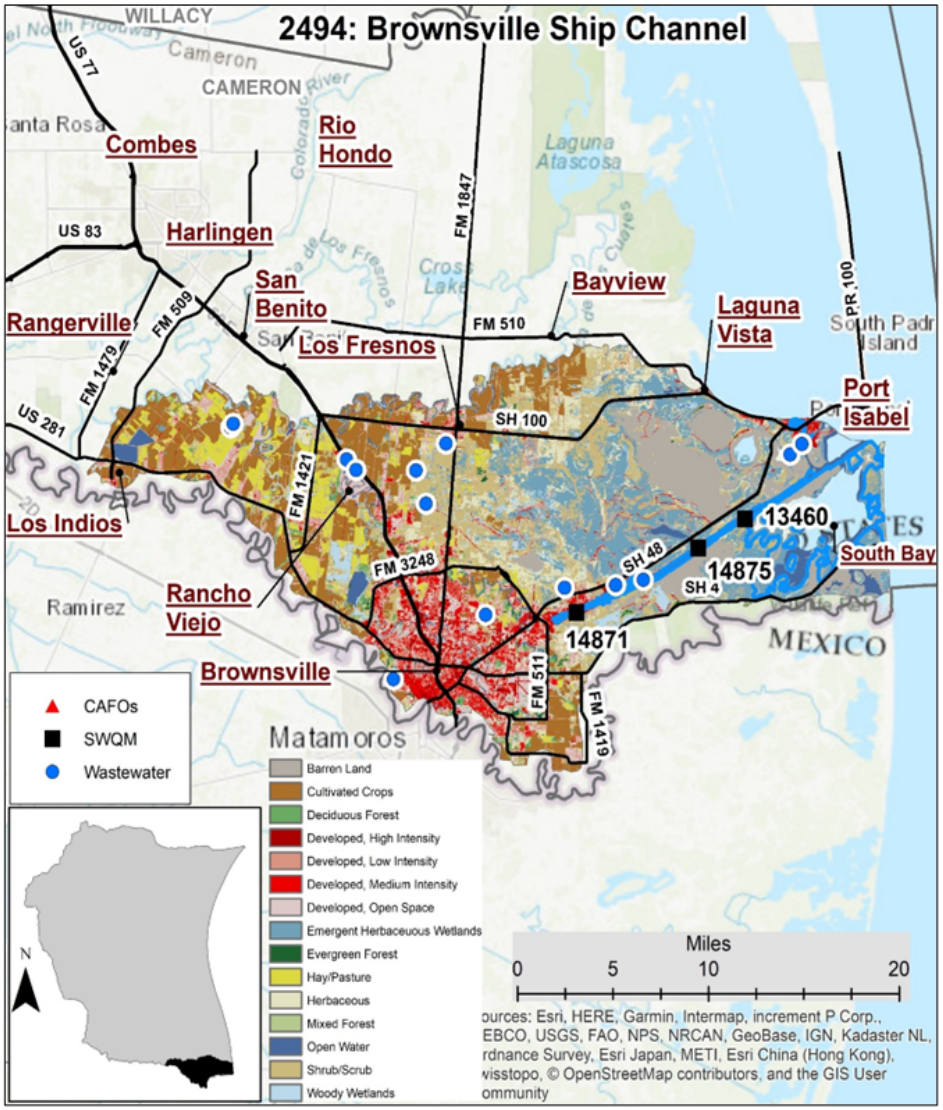
Segment 2494: Brownsville Ship Channel

Segment Description – The Brownsville Ship Channel extends from the Port of Brownsville to the Laguna Madre. Its watershed, combined with that of the Segment 2493, South Bay, and Segment 2494A, the Port Isabel Fishing Harbor is 225,554 acres. The ship channel is part of the Port of Brownsville, a major center of industrial development with over 230 companies doing business there. Segment 2492 consits of three stations: **13460** AU_01, **14875** AU_01, and **14871** AU_01.

Water Quality - The segment is listed as having a water quality **concern** for **depressed dissolved oxygen** (grab screening level) in the 2022 IR.

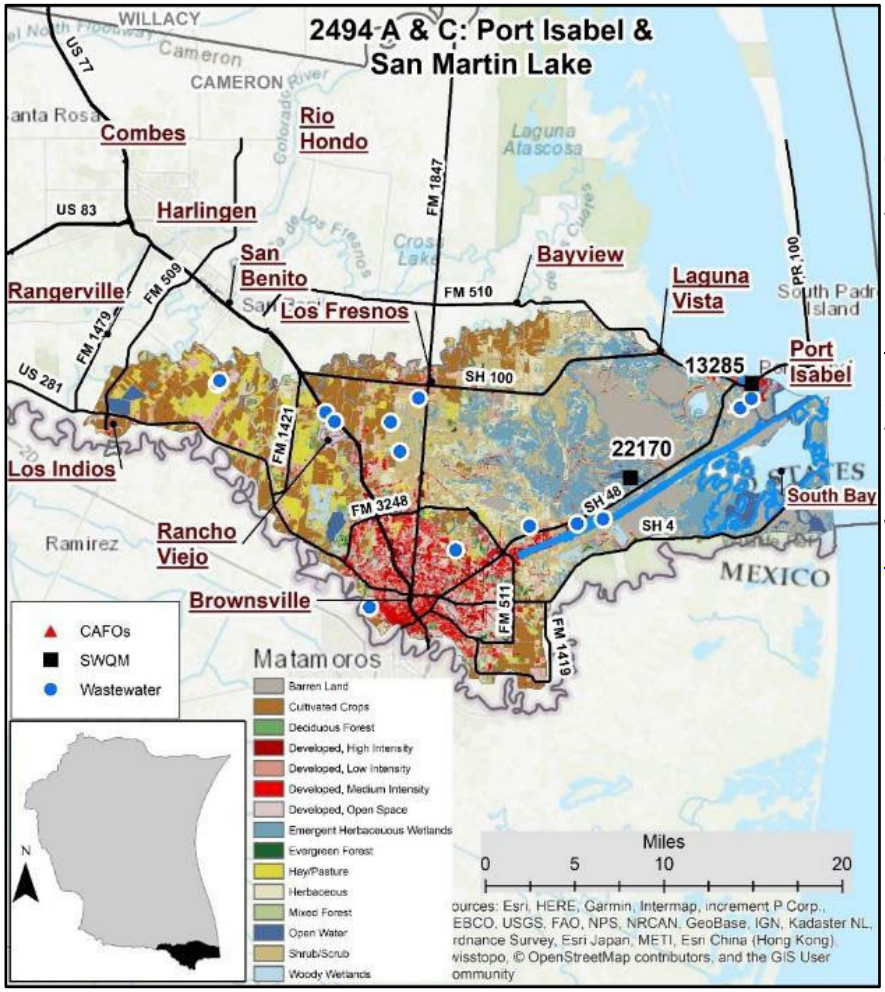
Special Studies – The Brownsville Ship Channel (BSC) was included in the Lower Laguna Madre/Brownsville Ship Channel Watershed Characterization that was conducted by a collaboration of the University of Texas – Rio Grande Valley Brownsville, TWRI, TCEQ, and TIAER in 2018. The report discusses water quality in San Martin Lake, Brownsville Ship Channel, and the Lower Laguna Madre. The full report can be found at the following website: https://arroyocolorado.org/media/zqjpi1e0/llm_wc_102618_forstakeholderreview.pdf

Brownville Ship Channel



Segment 2494A: Port Isabel Fishing Harbor

Segment Description – The Port Isabel Fishing Harbor is located within the City of Port Isabel in Cameron County. It is connected to the Laguna Madre to the north and to the Brownsville Ship Channel to the south. Its watershed, combined with that of the Segment 2493, South Bay, and Segment 2494, the Brownsville Ship Channel is 225,554 acres. The properties along the canals are a combination of businesses and residential properties. Segment 2494A consist of one station numbered **13285** A



Water *Quality* – The water body is listed as being **impaired** for **bacteria** (Enterococcus) for primary contact recreation since the 2010 IR. The impairment carries forward in the 2022 IR. The source of the bacteria is thought to be from nonpoint source runoff since there are no permitted discharges into the harbor. Due to the eight-hour holding time and because there are no local labs accredited for Enterococcus analysis, bacteria sample collection has been suspended.

Special Studies:

Port Isabel Fishing Harbor was included in the Lower Laguna Madre/Brownsville Ship Channel Watershed Characterization that was conducted by a collaboration of the University of Texas – Rio Grande Valley Brownsville, TWRI, TCEQ, and TIAER in 2018. The report discusses water quality in San Martin Lake, Brownsville Ship Channel, and the Lower Laguna Madre. The full report can be found at the following website:
https://arroyocolorado.org/media/zqjpi1e0/llm_wc_102618_forstakeholderreview.pdf

Segment 2494C: San Martin Lake Tidal

Segment Description – San Martin Lake is from the confluence with the Brownsville Ship Channel upstream to the confluence with drainage ditches flowing into San Martin Lakes. Segment 2494C consists of one station numbered **22170** AU_01.

Water Quality – San Martin Lake is a new sampling location for FY 2020 and does not yet have enough data for an assessment.

Special Studies:

San Martin Lake was included in the Lower Laguna Madre/Brownsville Ship Channel Watershed Characterization that was conducted by a collaboration of the University of Texas – Rio Grande Valley Brownsville, TWRI, TCEQ, and TIAER in 2018. The report discusses water quality in San Martin Lake, Brownsville Ship Channel and the Lower Laguna Madre. The full report can be found at the following website: https://arroyocolorado.org/media/zqjpi1e0/llm_wc_102618_forstakeholderreview.pdf

Station 22170 – San Martin Lake Tidal

Segment 2501: Gulf of Mexico

Segment Description - Segment 2501 is the Gulf of Mexico along the entire Texas Coast and is broken up into 10 AUs. The portion of segment 2501 in NRA's region consists of two stations: **13468** AU_06 and **13470** AU_10.

Water Quality – Segment 2501 has been listed by the DSHS as being **impaired** for **mercury in edible tissue** (King Mackerel > 43") since 1998. The impairment continues in the 2022 IR. There are no other impairments or concerns on AU_06 or AU_10.

Segment 2501 – Gulf of Mexico

List of Impairments and Concerns in the Bays and Estuaries and Gulf of Mexico

Segment Name	AU	Description	Impairments	Concerns
2462 San Antonio Bay / Hynes Bay/ Guadalupe Bay	01	San Antonio Bay/Hynes Bay/Guadalupe Bay/Mission Lake at the mean high tide line	Bacteria (oyster waters)	Chlorophyll-*a*
2463 Mesquite Bay	01	Mesquite Bay/Carlos Bay/Ayres Bay		
2471 Aransas Bay	01	Aransas Bay		
2471A Little Bay	01	Located between Aransas Bay (Segment 2471) on the east side and Broadway Street in Rockport on the west side and Rockport Beach on the south side in Aransas County		Chlorophyll-*a*
2471RB Rockport Beach Park (Recreational Beaches)	01	Rockport (Recreational Beaches)		
2472 Copano Bay / Port Bay / Mission Bay	01	Mission Bay, Aransas River arm, and eastern shoreline	Bacteria (oyster waters)	
	02	Copano Bay		
	03	Port Bay		Chlorophyll-*a*
2473 St. Charles Bay	01	St. Charles Bay		
2481 Corpus Christi Bay	01	From the Corpus Christi Ship Channel east to Pelican Island, from Pelican Island south to Demit Island including the La Quint a Channel and the Corpus Christi Ship Channel adjacent to Redfish Bay		Copper
	02	From the Corpus Christi Ship Channel east to Pelican Island, from Pelican Island south to Demit Island including the area from the Corpus Christi Ship Channel to Demit Island (Oso Bay and City of Corpus Christi area)		
	03	From Pelican Island south to Demit Island, from Demit Island to Mustang Island and the area along Mustang Island State Park to the Corpus Christi Ship Channel		
	04	From the JFK Causeway to a line from Demit Island across to Mustang Island State Park		
2481CB Corpus Christi Bay (Rec. Beaches)	01	Corpus Christi Marina (Beach ID TX305317)		
	02	Corpus Christi Beach – Main (Beach ID TX546628)		
	03	Cole Park (Beach ID TX259473)	Bacteria	
	04	Ropes Park (Beach ID TX821303)	Bacteria	
	05	McGee Beach (Beach ID TX536781)		
	06	Poenisch Park (Beach ID TX682648)	Bacteria	

Segment Name	AU	Description	Impairments	Concerns
2481CB Corpus Christi Bay (Rec. Beaches)	07	Emerald Beach (TX199413)		Bacteria
	08	University Beach (Beach ID TX149569)		
	09	Packery Channel Park (Beach ID TX227625)		
2482 Nueces Bay	01	Nueces Bay	Copper, Zinc in edible oyster tissue	Chlorophyll-*a*
2483 Redfish Bay	01	Redfish Bay		
2483A Conn Brown Harbor	01	From the Aransas Channel confluence southeast of Aransas Pass in San Patricio County to a point 1.6 km (1 mi) northeast in Aransas County	Bacteria	Bacteria, Copper
2484 Corpus Christi Inner Harbor	01	Corpus Christi Inner Harbor - from US 181 to Viola Turning Basin	Copper	Ammonia, Nitrate
2485 Oso Bay	01	Upper bay from the abandoned Holly Road railroad tracks to Yorktown Blvd		Chlorophyll-*a*
	02	Middle bay from South Padre Island Drive (SPID) to the abandoned Holly Road railroad tracks	Bacteria, DO	Chlorophyll-*a*, Total Phosphorus
	03	Lower portion of the bay southeast of a line drawn from a point 550 meters west-northwest of the mouth of Oso Bay to the northern terminus of Shangrila Lane and to South Padre Island Drive (SPID)	Bacteria	Chlorophyll-*a*, Total Phosphorus
2485A Oso Creek	01	From the Oso Bay confluence in southern Corpus Christi to a point 4.8 km (3 mi) upstream of SH 44, west of Corpus Christi in Nueces County	Bacteria	Chlorophyll-*a*, Nitrate, Total Phosphorus
2485B Tributary of Oso Creek	01	From the Oso Creek confluence upstream to a point 5.2 km (3.2 mi) west of State Hwy 286		Total Phosphorus
2485D West Oso Creek	01	From the Oso Creek confluence upstream to a point 0.49 km (0.3 mi) west of FM 1694		Total Phosphorus
2491 Laguna Madre	01	Upper portion north of the Arroyo Colorado confluence	DO	Chlorophyll-*a*
	02	Area adjacent to the Arroyo Colorado confluence	Bacteria, DO	Chlorophyll-*a*, Nitrate
	03	Lower portion south of the Arroyo Colorado confluence		Bacteria
2491B North Floodway	01	From 0.04 mi north of Campacuas Lake and 0.32 mi west of FM 491 (Mercedes, TX) to the confluence with Lower Laguna Madre (tidal flats)		Chlorophyll-*a*, Nitrate, Bacteria
2491C Raymondville Drain	01	Raymondville Drain flowing into Lower Laguna Madre		Bacteria, Chlorophyll-a
2491C Hildalgo Drain	03	Hidalgo Main Floodwater Channel flowing into Lower Laguna Madre		Chlorophyll-a, Nitrate, Total Phosphorus

Segment Name	AU	Description	Impairments	Concerns
2492 Baffin Bay / Alazan Bay / Cayo Del Grullo / Laguna Salada	01	Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salada		Chlorophyll-*a*
2492A San Fernando Creek	01	From the Cayo Del Grullo confluence in Kleberg County upstream to the confluence with Chiltipin Creek and San Diego Creek in Jim Wells County	Bacteria	Chlorophyll-*a*, Nitrate, Total Phosphorus
2492B Los Olmos Creek	01	Tidal portion of Los Olmos Creek from the confluence with Laguna Salada upstream 10.9 km (6.8 mi) southwest of Riviera		Bacteria, Chlorophyll-a, DO
2493 South Bay	01	South Bay		
2494 Brownsville Ship Channel	01	From the Laguna Madre confluence upstream to the Port of Brownsville		DO
2494A Port Isabel Fishing Harbor	01	From the Laguna Madre confluence to 0.4 km (0.25 mi) south of SH 100 in Port Isabel	Bacteria	
2501 Gulf of Mexico	06	Port Aransas area	Mercury in edible tissue	
	10	Port Isabel area	Mercury in edible tissue	

Summary

CRP utilizes a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action, and work to implement those actions. Below is a brief narrative of the water quality conditions assessed in the report for each of the four basins within Nueces River Authority's region.

Water Quality in the San Antonio – Nueces Coastal Basin

The primary issue in the basin is bacteria with respect to contact recreation. There are also some concerns for low DO and nutrients. These issues are being addressed by the Copano Bay TMDL and Implementation Plan which was developed to address the bacteria impairment in Copano Bay, the tidal portions of the Mission River and both segments of the Aransas River. BMPs to address the issue include improvements and upgrades to WWTPs and the development and implementation of conservation plans in priority areas of the watershed. From 2011 through 2017, 126 WQMPs have been written for 69,142 acres in the Mission River watershed.

NRA will continue to conduct routine CRP monitoring in the basin, and any special studies that may be developed, to assist in the evaluation of the effectiveness of the BMPs that are implemented. NRA will continue to attend the stakeholder meetings and to provide input into the implementation of the Plan.

Water Quality in Nueces River Basin

The upper reaches of this basin, in general, have fewer water quality issues than the middle and lower reaches. Three of the upper reach segments, Upper Sabinal River, Commissioner's Creek, Seco Creek, and other very small upper basin tributaries meet all water quality standards. Low DO, bacteria, and nutrients are the primary concerns and impairments in the lower reaches. The continuing drought conditions throughout the basin, and state, are contributing factor to these issues. There are fewer rainfall events for continuous, diluting flow. When it does rain, the events are often large events, resulting in more non-point source loadings. The Lower Nueces WPP addresses the protection of the major water supply in the Coastal Bend area. A stakeholder group has been put together by the Coastal Bend Bays and Estuaries program. The invasive giant cane (*Arundo donax*) in the headwaters of the Nueces River, Frio River, and Sabinal River out-compete native vegetation and consumes copious amount of water.

NRA will continue to serve as the Lower Nueces River watershed coordinator, seeking funding opportunities to implement the management measures identified in the WPP. NRA will pursue opportunities to conduct additional RUAAs on water bodies that are not currently meeting the primary contact recreation standard, which may not be the appropriate standard based on local knowledge. NRA will continue to spearhead the effort of *Arundo* removal and seek funding to maintain the program.

Water Quality in the Nueces – Rio Grande Coastal Basin

The issues within this basin differ greatly between the northern and southern areas. The primary issues in the northern area are being addressed by the Petronila Creek TMDL for chloride, sulfate, and TDS and the nutrient study. NRA has been monitoring on the tributaries to the creek to try and pinpoint the source areas. The chloride, sulfate, and TDS concentrations are inversely correlated with the three-week antecedent rainfall amounts. The concentrations rise quickly from groundwater seepage during low flow periods. The creek is listed as being impaired for bacteria and has a concern for chlorophyll-a as of the 2022 Integrated Report. The non-tidal segment also has impairments for TDS, Chloride, and Sulfate in AU_01, and additional concerns of DO and Phosphorus in AU_02. NRA will continue to conduct routine CRP monitoring in Petronila watershed, including the tributary monitoring, to monitor chloride,

sulfate, and TDS and nutrient concentrations. NRA recommends doing additional metals sampling along various locations on Petronila Creek to assist with the Bring Baffin Back campaign by Texas A&M University – Corpus Christi's Harte Research Institute.
The southern area is dominated by the Arroyo Colorado. Water quality issues in the Arroyo Colorado include the following: elevated nutrients (nitrogen and phosphorus) and bacteria loads, instances of low DO, high levels of chlorophyll-*a,* and legacy pollutants resulting in fish consumption advisories (poly-chlorinated biphenyls in the above tidal portion). These water quality issues are being addressed by the Arroyo Colorado WPP. NRA will continue to conduct routine CRP monitoring on the Arroyo Colorado and its tributaries, and any special studies that may be developed, to assist in the evaluation of the effectiveness of the BMPs that are implemented. While the impairments and concerns continue on both the tidal and above tidal segments, there does seem to be some improvement in the above tidal segment.

Water Quality in the Bays and Estuaries and Gulf of Mexico

Bacteria in oyster waters, chlorophyll-*a,* and bacteria at recreational beaches are the primary issues within the coastal bays. Other issues include low DO, nutrients, and copper. The Oso Bay and Oso Creek TMDL is addressing the bacteria issues in those segments. The Oso Bay and Laguna Madre TMDL is addressing the DO issues in those segments. Six of the 13 bays- Mesquite Bay, Aransas Bay, Copano Bay, St. Charles Bay, Redfish Bay, and South Bay, meet all water quality standards.

The low DO, based on current standards, in Oso Bay and the Laguna Madre, are naturally occurring and do not appear to negatively affect aquatic life. Many studies have been conducted and proposed changes to the standards are being evaluated. A TMDL was adopted for Oso Creek in July 2019 and Oso Bay in 2007. Management measures include creating habitat away from the creek for birds and wildlife, addressing failing OSSFs, and how the maintenance of the drainage ditches from the City of Corpus Christi to the creek can be improved to reduce loadings from rainfall runoff events. NRA will continue to conduct routine CRP monitoring in the basin, and any special studies that may be developed, to assist in the evaluation of the effectiveness of the BMPs that are implemented. NRA will continue to attend the stakeholder meetings and to provide input into the implementation of the Plan.

The impairments for the harbors are bacteria in Conn Brown Harbor and Port Isabel Fishing Harbor and copper in the Corpus Christi Inner Harbor. Concerns are Bacteria and Copper in the Conn Brown Harbor, Ammonia and Nitrate in the Corpus Christi Inner Harbor, and DO in the Brownsville Ship Channel.

Although not an assessed concern, local fishermen and women are concerned about nitrate and the health of Baffin Bay fisheries. Local scientists have conducted studies that concluded that the nitrogen levels are from organic nitrogen. A campaign has been put together by the Texas A&M University – Corpus Christi's Harte Research Institute called Bring Baffin Back. A WPP was approved by the EPA in March 2023.

Recommendations

TCEQ depends on the CRP partner agencies to provide the majority of the data used for in the bi-annual water quality assessments. Therefore, dedicated funds for CRP should be reinstated in order to enhance the current level of monitoring and to provide additional monitoring to support the TCEQ, WPPs, RUAAs, TMDLs, and Implementation Plans.

Collaborating and coordinating with all entities conducting water quality monitoring should be continued through the annual coordinated monitoring meetings. This reduces duplication of effort and increases the amount of information that can be collected and shared.

CRP should remain flexible to support proactive projects to protect water quality before a segment is listed on the 303 (d) List.

Annual CRP Partner meetings should be held to strengthen the program by promoting cooperative projects between the partner agencies and to provide opportunities to share knowledge and ideas.

To enhance the data available to TCEQ for assessments, CRP partners should continue to provide as much support to all water quality monitoring and protection efforts as possible as resources allow. Specifically related to NRA's CRP area of responsibility, NRA plans to:

- Continue to conduct routine CRP monitoring.
- Continue to implement the management measures identified in the Lower Nueces WPP.
- Continue the OSSF repair and replacement program.
- Pursue opportunities to facilitate other studies in Petronila Creek and San Fernando Creek.
- Add some metals sampling to Petronila Creek and Los Olmos Creek to facilitate Bring Baffin Back campaign and other scientific studies
- Facilitate widespread education and outreach activities.
- Expand our outreach program online
- Continue to battle the *Arundo donax* invasion in the upper Nueces Basin, some Lower Nueces, and a few of Petronila Creek's tributaries.
- Continue to serve as stakeholders on all water quality related projects within our areas of jurisdiction and responsibility.

Contact Information

For More information on CRP, other activities of NRA, or to obtain additional copies of this report, contact:

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Jessica Wright, Manager of Water Quality Programs jwright@nueces-ra.org
Courtney Taylor, Water Quality Data Specialist ctaylor@nueces-ra.org

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NRA would like to recognize and thank our CRP partners for their support and contributions to the program!!

We are honored to work with so many ***legendary people***!

Bandera Country River Authority & Groundwater District
Center for Coastal Studies
Coastal Bays Foundation
Coastal Bend Bays & Estuaries Program
Harte Research Institute
Texas A&M University – Corpus Christi
Texas Commission of Environmental Quality
Texas Parks & Wildlife
San Antonio River Authority
Surfrider Foundation

And so many more!!

Appendix A

Wastewater Discharge Permit Information

2001 Mission River Tidal
WQ0010156-001 – Town of Woodsboro: 250,000 gpd via Willow Creek

2002 Mission River Above Tidal
WQ0010255-001 – Town of Refugio: 576,000 gpd with provision for beneficial land application and storm water WQ0010748-001 – Pettus Municipal Utility District (MUD): 105,000 gpd via Medio Creek

2003 Aransas River Tidal 2003A Chiltipin Creek
WQ0010055-001 – City of Sinton: 800,000 gpd via Chiltipin Creek
WQ0013412-001 – TxDOT: 3,800 gpd via Chiltipin Creek
WQ0013641-001 – City of Sinton Rob and Bessie Welder Park: 15,000 gpd via Chiltipin Creek WQ0014119-001 – St. Paul Water Supply Corporation (WSC): 50,000 gpd via Chiltipin Creek WQ0005283-000 – Steel Dynamics Southwest: 1,560,000 gpd via Chiltipin Creek

2004 Aransas River Above Tidal
WQ0010124-004 – City of Beeville, Chase Field: 2,500,000 gpd WQ0014112-001 – Skidmore WSC: 131,000 gpd via unnamed tributary WQ0014123-001 – Tynan WSC: 45,000 gpd via Papalote Creek

2004B Poesta Creek
WQ0010124-002 – City of Beeville: 3,000,000 gpd with provision for irrigation

2101 Nueces River Tidal
WQ0000531-000 – Flint Hill Resources Limited Partnership (LP): storm water WQ0001255-000 – Lon C Hill: 1,098,000 gpd
WQ0004934-000 – City of Corpus Christi: WTP sludge
WQ0010401-006 – City of Corpus Christi (Allison Plant): 5,000,000 gpd WQ0013644-001 – San Patricio County MUD No. 1: 75,000 gpd via Hondo Creek

2103 Lake Corpus Christi
WQ0004859-000 – Bar Ranch: WWTF sludge and domestic septic WQ0010015-001 – City of Mathis: 947,000 gpd via unnamed tributary WQ0010455-002 – City of George West: 539,000 gpd via Nueces River
WQ0011165-001 – Texas Parks and Wildlife Department – Lake Corpus Christi State Park: 67,000 gpd via evaporation and surface irrigation

2104 Nueces River Above Frio River
WQ0004184-000 – Webb County – Colorado Acres Water Plant: 28,800 gpd via evaporation
WQ0005091-000 – MultiChem Group Three Rives Facility – 11,500 gpd reverse osmosis reject water via 001
WQ0010088-001 – Freer Water Control and Improvement District (WCID): 280,000 gpd via surface irrigation on nonpublic access agriculture land WQ0013461-001 – US Department of Justice (DOJ): 300,000 gpd
WQ0013943-001 – Encina WSC: 95,000 gpd via irrigation

2105 Nueces River Above Holland Dam
WQ0000546-000 – Del Monte Foods (Crystal City Plant) 1,800,000 gpd via irrigation WQ0010098-001 – City of Crystal City: 1,200,000 gpd via Line Oak Slough
WQ0010145-001 – City of Carrizo Springs: 950,000 gpd via Soldier Slough WQ0010153-001 – City of Cotulla: 990,000 gpd via Mustang Creek

WQ0013746-001 – City of Asherton: 200,000 gpd via Soldier Slough WQ0013782-001 – City of Big Wells: 150,000 gpd via Arroyo Negro
WQ0013943-001 – Encinal Water Supply Corporation: 95,000 gpd via surface irrigation WQ0014006-001 – Zavala County (Crystal City Land Fill): 50,000 gpd via Soldier Slough WQ0015047-001 – MacBain Properties Inc.: 14,000 gpd via irrigation
WQ0015049-001 – Quail Run Services LLC: 300,000 gpd

2106 Nueces River / Lower Frio River
WQ0001353-000 – Diamond Shamrock Refining Company: 1,500,000 gpd via unnamed ditch WQ0010301-003 – City of Three Rivers: 400,000 gpd (pending

2107 Atascosa River
WQ0002043-000 – San Miguel Electric Cooperative: 62,000 gpd (nine outfalls) via evaporation (one outfall in San Miguel Creek Segment 2108) WQ0002601-000 - San Miguel Electric Cooperative: coal pile runoff and storm water
WQ0010096-001 – City of Lytle: 450,000 gpd via West Prong Atascosa River
WQ0010418-001 – City of Jourdanton: 980,000 gpd via Metate Creek WQ0010598-001 – City of Pleasanton: 1,420,000 gpd
WQ0013630-001 – City of Poteet: 640,000 gpd via Rutledge Hollow
WQ0014767-001 – TxDOT (Northbound rest stop): 10,000 gpd via unnamed tributary WQ0014768-001 – TxDOT (Southbound rest stop): 10,000 gpd via Salt Branch Creek WQ0015400-001 – Benton City: 15,000,000 gpd via unnamed tributary

2108 San Miguel Creek
WQ0002043-000 – San Miguel Electric Cooperative: 62,000 gpd (nine outfalls) via evaporation (eight outfalls in Atascosa River Segment 2107) WQ0010142-001 – City of Charlotte: 220,000 gpd via Lagunillas Creek
WQ0010160-001 – City of Devine: 650,000 gpd via San Francisco Perez Creek WQ0011806-001 – City of Natalia: 260,000 gpd via Chacon Creek WQ0014239-001 – Moore WSC: 65,000 gpd via Black Creek

2109 Leona River
WQ0010306-001 – City of Uvalde: 970,000 gpd
WQ0014394-001 – Batesville WSC: 184,000 gpd via Gallina Slough

2110 Lower Sabinal River
WQ0014689-001 – City of Sabinal: 340,000 gpd

2111 Upper Sabinal River
WQ0011951-001 – Lost Maples State Park: 8,000 gpd via irrigation WQ0015892-001 – Young Life: 60,000 gpd

2112 Upper Nueces River
WQ0012334-001 – City of Camp Wood: 101,000 gpd via irrigation WQ0014367-002 – Zavala County WCID: 330,000 gpd via irrigation

2113 Upper Frio River
WQ0011683-001 – Alto Frio Baptist Encampment: 20,000 gpd via irrigation WQ0015083-001 – NRA: 360,000 gpd via irrigation

2114 Hondo Creek
WQ0010189-001 – City of Hondo: 1,800,000 gpd via Elm Slough

2115 Seco Creek
WQ0011144-001 – Medina County WCID 002: 80,000 gpd

2116 Choke Canyon Reservoir
WQ0013100-001 – Texas Parks and Wildlife Department – Choke Canyon State Park, Calliham Unit: 13,000 gpd via evaporation
WQ0013461-001 – US DOJ – Federal Corrections Institution at Three Rivers: 300,000 gpd via irrigation plus effluent line to the Nueces River Segment 2104

2117 Frio River Above Choke Canyon Reservoir WQ0010360-001 – City of Pearsall: 1,950,000 gpd via Buck Creek WQ0010404-002 – City of Dilley: 300,000 gpd via Cibolo Creek WQ0010404-003 – City of Dilley: 800,000 gpd
WQ0010404-005 – City of Dilley: 30,000 gpd
WQ0011962-001 – Garner State Park: 60,000 gpd via irrigation
WQ0014945-001 – McMullen County WCID No. 1 and McMullen County: 96,000 gpd via unnamed tributary WQ0015016-001 – Qual Run Services: 300,000 gpd
WQ0015043-001 – Seventy Seven Land Company LCC: 24,000 gpd WQ0015084-001 – La Salle Oil Field Services: 120,000 gpd via irrigation

2201 Arroyo Colorado Tidal
WQ0003596-000 – Taiwan Shrimp Village Association and Arroyo Aquaculture Association: 100,000,000 gpd WQ0004792-000 – Military Highway WSC: 1,440,000 gpd via Resaca Del Rancho Viejo
WQ0005137-000 – La Paloma Energy Center LLC: 1,634,000 gpd
WQ0005226-000 – Denali Water Solutions, LLC: land application of WWTP and WTP sludge on 909 acres WQ0010475-002 – City of Rio Hondo: 400,000 gpd
WQ0013462-008 – Military Highway WSC Lago: 510,000 gpd via Resaca Del Rancho Viejo WQ0014558-001 – East Rio Hondo WSC: 180,000 gpd
WQ0015265-001 – City of San Benito

2201A Harding Ranch Drainage Ditch Tributary
WQ0005179-000 – Denali Water Solutions LLC: sludge on 1,048 acres

2201B Unnamed Drainage Ditch Tributary in Cameron Co. Drainage District #3
WQ0005025-000 – Military Highway WSC: 1,440.000 gpd of reverse osmosis reject water

2202 Arroyo Colorado Above Tidal
WQ0004051-000 – Frontera Generation Ltd.: 1,400,000 gpd via Main Floodway WQ0004257-000 – Watermill Express: 1,000 gpd via subsurface drainfield
WQ0004754-000 – Military Highway WSC Progresso WTP: 520,000 gpd to Llano Grande Lake WQ0004782-000 – North Alamo WSC: 2,000,000 gpd to the North Floodway
WQ0004789-000 – North Alamo WSC: 2,000,000 gpd to the North Floodway WQ0004861-000 – Denali Water: WWTF and WTP sludge
WQ0004924-000 – Denali Water: WWTF and WTP sludge WQ0005186-000 – Denali Water: WWTF and WTP sludge
WQ0010347-001 – City of Mercedes: 5,000,000 gpd via Arroyo Anacuitas WQ0010484-001 – City of Mission: 9,000,000 gpd
WQ0010490-003 – City of Harlingen Water Works Facility #2: 10,000,000 gpd WQ0010504-001 – City of Donna: 2,300,000 gpd to the Llano Grande Lake
WQ0010596-001 – City of Pharr: 5,000,000 gpd via Main Floodway
WQ0010619-005 – City of Weslaco South Plant: 2,500,000 gpd via South Donna Drain WQ0010633-003 – City of McAllen Facility No. 2: 10,000,000 gpd via unnamed ditch
WQ0010697-001 – City of La Feria: 500,000 gpd via ditch WQ0010697-002 – City of La Feria: 1,250,000 gpd via ditch WQ0010972-002 – Palm Valley Estates: 280,000 gpd via irrigation
WQ0011080-001 – City of Hidalgo: 2,700,000 gpd via Hidalgo County drainage ditch
WQ0011512-001 – City of San Juan: 4,000,000 gpd via Outfall 001 and 200,000 gpd via Outfall 002 to Main Floodway WQ0011628-001 – Winter Garden Park Corporation: 11,000 gpd into Reba Bass Lake
WQ0013462-001 – Military Highway WSC Progresso: 750,000 gpd WQ0013462-002 – Military Highway WSC La Paloma: 210,000 gpd via irrigation
WQ0013462-003 – Military Highway WSC Santa Maria: 230,000 gpd via irrigation WQ0013462-004 – Military Highway WSC San Pedro: 160,000 gpd via irrigation WQ0013462-005 – Military Highway WSC Los Indios: 135,000 gpd via irrigation WQ0013462-006 – Military Highway WSC South Alamo: 510,000 gpd

WQ0013523-007 – La Joya ISD: 12,570 gpd via subsurface low pressure dosed drainfields WQ0013523-009 – La Joya ISD: 12,500 gpd via subsurface low pressure dosed drain fields WQ0013523-010 – La Joya ISD: 20,000 gpd via subsurface low pressure dosed drain fields WQ0013523-012 – La Joya ISD: 9,000 gpd via subsurface low pressure dosing drain fields WQ0013523-013 – La Joya ISD: 35,000 gpd via subsurface low pressure dosed drain fields WQ0013523-016 – La Joya ISD: 12,000 gpd via subsurface low pressure dosing drain fields WQ0013633-001 – City of Alamo: 2,000,000 gpd via Hidalgo County drainage ditch
WQ0013680-002 – Donna ISD Munoz Elementary: 2,500 gpd via subsurface drain fields WQ0013680-003 – Donna ISD Garza Elementary: 12,500 gpd via subsurface drain fields
WQ0014178-001 – US Fish and Wildlife Service Santa Ana National Wildlife Refuge: 1,500 gpd via evaporation WQ0014415-001 – Agua Special Utility District: 1,400,000 gpd
WQ0014415-003 – Agua Special Utility District: 7,550,000 gpd (pending) WQ0015265-001 – City of San Benito: 3,750,000 gpd via Arroyo Colorado

2202A Donna Reservoir
WQ0015513-001 – North Alamo WSC: 700,000 gpd (pending)

2204 Petronila Creek Above Tidal
WQ0002888-000 – US Ecology Texas: storm water via Nueces County drainage ditch WQ0010140-001 – City of Agua Dulce: 160,000 gpd via Agua Dulce Creek
WQ0010592-001 – City of Orange Grove: 200,000 gpd via Agua Dulce Creek WQ0011541-001 – City of Driscoll: 100,000 gpd
WQ0011583-002 – Nueces County WCID #5: 8,000,000 gpd via Banquete Creek WQ0011754-001 – Bishop Consolidated ISD: 8,000 gpd via drainage ditch
WQ0014802-001 – Geo Group: 150,000 gpd via drainage ditch
WQ0014981-002 – KB Foundation of Texas: 9,000 gpd

2462 San Antonio Bay / Hynes Bay
WQ0003995-000 – Austwell Aqua Farm, Inc.: 3,700.000 gpd
WQ0004917-000 – Aransas National Wildlife Refuge: 937 gpd via subsurface application WQ0010256-001 – Refugio WCID No. 1: 75,000 gpd
WQ0011117-001 – City of Austwell: 60,000 gpd

2471 Aransas Bay
WQ0011624-001 – Aransas County MUD #1: 263,000 gpd via irrigation

2471A Little Bay
WQ0010054-001 – City of Rockport: 2,500,000 gpd to Little Bay to Aransas Bay and via irrigation

2472 Copano Bay / Port Bay / Mission Bay
WQ0004290-000 – Holiday Beach WSC: 120,000 gpd via mud flats WQ0004788-000 – Sherwin Alumina Inc. sludge
WQ0004956-000 – Aransas Bay Utilities Co.: 61,000 gpd WQ0010705-001 – City of Taft: 900,000 gpd via mud flats WQ0013892-001 – Town of Bayside: 64,200 gpd WQ0014925-001 – City of Rockport, Port Bay.: 550,000 gpd
WQ0011624-001 – Aransas County MUD #1: 263,000 gpd via irrigation (Interim II and Final Phases)

2473 St. Charles Bay
WQ0011624-001 – Aransas County MUD #1: 263,000 gpd via irrigation (Interim I Phase)

2481 Corpus Christi Bay
WQ0001651-000 – E. I. Du Pont De Nemours & Co.: 4,610,000 gpd via submerged pipe in La Quinta Channel and storm water WQ0002317-000 – US Department of the Navy Corpus Christi Naval Air Station (NAS): 1,500,000 gpd
WQ0003083-000 – Occidental Chemical Corporation: 2,790,000 gpd via submerged pipeline in La Quinta Channel WQ0003966-000 – Reynolds Metal Company: 1,000 metric tons per year on closed bauxite tailing beds WQ0004606-000 – Reynolds Metals Co.: storm water and leachate

WQ0004646-000 – Sherwin Alumina LP: storm water WQ0005097-000 – voestalpine: 6,020,000 gpd WQ0005218-000 – Nashtec: storm water (new permit)
WQ0005219-000 – Gregory Power Partners LLC: 918,000 gpd WQ0010092-001 – City of Gregory: 320,000 gpd via Green Lake WQ0010422-001 – City of Ingleside: 1,200,000 gpd via Kinney Bayou
WQ0010846-001 – Nueces Co. WCID No. 4 Mustang Island North Plant: 1,880,000 gpd via mud flats WQ0010846-002 – Nueces Co. WCID No. 4 Mustang Island South Plant: 1,200,000 gpd to Shamrock Cove

2482 Nueces Bay
WQ0001244-000 – Nueces Bay WLE LP: 500,000,000 gpd once through cooling water and previously monitored effluent WQ0010237-002 – City of Odem: 475,000 gpd via Rincon Bayou
WQ0010478-001 – City of Portland WWTP: 2,500,000 gpd via drainage ditch WQ0011096-001 – Sublight Enterprises, Inc. (Portland Inn): 9,000 gpd.

2483 Redfish Bay
WQ0002077-000 – Evonik Degussa Corporation: storm water WQ0003012-000 – Gulf Marine Fabricators: 4,000 gpd WQ0005162-000 – Mile 533 Marine Ways: 5,000 gpd
WQ0010521-002 – City of Aransas Pass: 1,600,000 gpd.
WQ0012064-001 –Gulf Marine Fabricators: 12,000 gpd via drainage ditch WQ0012731-001 – Martin Operating Partnership, LP: 3,800 gpd

2484 Corpus Christi Inner Harbor
WQ0000349-000 – Elementis Chromium LP: 20,000,000 gpd WQ0000457-000 – Flint Hills Resources LP: 2,160,000 gpd
WQ0000465-000 – Valero Refining-Texas LP: 3,000,000 gpd and storm water WQ0000467-000 – Citgo Refining and Chemicals: 5,300,000 gpd and storm water
WQ0000531-000 – Flint Hills Resources LP: 145,000 gpd via irrigation and storm water WQ0001909-000 – Valero Refining Company-Texas: storm water
WQ0002070-000 – Magellen Terminals Holdings: 1,060,000 gpd via drainage ditch WQ0002075-000 – Equistar Chemicals LP: 2,000,000 gpd (1 oufall; 2 outfalls in 2485A) WQ0002540-000 – Valero Refining and Marketing: storm water
WQ0002614-000 – Citgo Refining and Chemicals: storm water
WQ0002720-000 – BTB Refining LCC: 120,000 gpd via underground pipe and storm water WQ0003137-000 – Markwest Company: 288,000 gpd plus 100,000 gpd via irrigation WQ0003562-000 – Citgo Refining and Chemicals: storm water
WQ0004158-000 – Corpus Christi Cogeneration: 11,000,000 gpd. WQ0004889-000 – John Bludworth Shipyard, LLC: ballast water WQ0004977-000 – Citgo Refining and Chemical Co, LPP: ballast water WQ0005024-000 – EF90 Mini Refinery: 197,600 gpd
WQ0005019-000 – M&G Resins: - 38,500,000 reject and filtration water WQ0005217-000 – Koch Sulfur Products Company LLC: 600,000 gpd WQ0010401-005 – City of Corpus Christi Broadway Plant: 10,000,000 gpd

2485 Oso Bay
WQ0001490-000 – AEP Texas Central Barney M. Davis Plant: 540,000,000 gpd WQ0010401-004 – City of Corpus Christi Oso Facility: 16,200,000 gpd

2485A Oso Creek
WQ0002075-000 – Equistar Chemicals LP – Corpus Christi Plant: storm water (2 outfalls; I outfall in 2484) WQ0010261-001 – City of Robstown: 3,000,000 gpd via unnamed ditch
WQ0010401-003 – City of Corpus Christi – Greenwood Plant: 16,000,000 gpd via La Volla Creek WQ0011134-002 – Corpus Christi Peoples Baptist Church: 20,000 gpd directly to Oso Creek.
WQ0014228-001 – MPB Properties, Cuddihy Airfield: 60,000 gpd

2491 Laguna Madre
WQ0001752-000 – Rio Grande Valley Sugar Growers: 289,000 gpd via North Floodway Pilot Channel WQ0002525-000 – Azteca Milling: 300,000 gpd via irrigation

WQ0002803-000 – Value Frozen Foods: 6.9 feet/acre/year via irrigation WQ0003946-000 – Fresh Aquatics, LLC: 8,000,000 gpd via tidal ditch
WQ0004040-000 – Calpine Construction Finance: 1,110,000 gpd via North Floodway Pilot Channel WQ0004126-000 – Texas Pack, Inc: 150,000 gpd via outfall 001
WQ0004138-000 – Calpine Hidalgo Energy Center: 920,000 gpd via North Floodway Pilot Channel
WQ0004480-000 – North Alamo WSC: 1,000,000 gpd via East Main Drain
WQ0004758-000 – P.E.N. Joint Tenants and North Cameron Regional WSC: 2,000,000 gpd: via North Floodway WQ0004782-000 – North Alamo WSC: 2,000,000 gpd via Donna Drain
WQ0004789-000 – North Alamo WSC: 2,000,000 gpd via Donna WQ0004915-000 – North Alamo WSC: 1,000,000 gpd
WQ0005159-000 – Denali Water Solutions LLC: sludge
WQ0010330-001 – City of Santa Rosa: 390,000 gpd via North Floodway WQ0010365-001 – City of Raymondville: 1,500,000 gpd via Delta Irrigation Ditch
WQ0010401-008 – City of Corpus Christi Laguna Madre: 3,000,000 gpd via pipeline WQ0010401-009 – City of Corpus Christi Whitecap: 2,500,000 gpd
WQ0010503-002 – City of Edinburg: 5,900,000 gpd via North Floodway WQ0010619-001 – City of Weslaco: 250,000 gpd via North Floodway WQ0010619-003 – City of Weslaco: 3,000,000 gpd via North Floodway WQ0010633-004 – City of McAllen: 15,000,000 gpd via North Floodway
WQ0010682-003 – Willacy Co. Navigation District: 221,000 gpd via Four Mile Slough WQ0010757-001 – Laguna Madre Water District Isla Blanca Plant: 2,600,000 gpd via irrigation
WQ0010799-001 – Jim Hogg County WCID No. 2 (Hebbronville Plant): 796,000 gpd: via drainage ditch WQ0010973-002 – County of Hidalgo Delta Lake Park: 5,000 gpd via Willacy WCID Ditch No. 1 (pending) WQ0011210-001 – City of Lyford: 270,000 gpd via North Floodway
WQ0011510-002 – City of Elsa: 800,000 gpd via North Floodway

2491 Laguna Madre (cont.)
WQ0012321-001 – U.S. Department of Homeland Security Immigration and Customs Enforcement: 160,000 gpd via Cameron County WCID No. 11 Drainage Ditch WQ0013344-002 – US Department of the Interior: 25,000 gpd via wetland
WQ0013523-014 – La Joya ISD: 13,500 gpd
WQ0013742-001 – Sebastian MUD: 225,000 gpd via North Floodway WQ0013747-001 – North Alamo WSC: 100,000 gpd via drainage ditches WQ0013747-002 – North Alamo WSC: 210,000 gpd via surface irrigation WQ0013747-003 – North Alamo WSC: 122,000 gpd via surface irrigation WQ0013747-004 – North Alamo WSC: 300,000 gpd via drainage
WQ0013772-001 – Laguna Madre Water District Andy Bowie Park Plant: 1,500,000 gpd via wetland WQ0013924-001 – Bruni Rural WSC: 62,500 gpd
WQ0014069-001 – Laguna Madre Water District Laguna WWTP: 650,000 gpd via City of Port Isabel Reservoir WQ0014076-001 – City of San Perlita: 100,000 gpd via evaporation and percolation
WQ0014698-001 – TxDOT: 13,000 gpd via drainage ditches WQ0014781-002 – City of La Villa: 780,000 gpd via North Floodway
WQ0014919-001 – City of Edcouch: 310,000 gpd via North Floodway Pilot Channel WQ0014950-001 – Hidalgo County MUD #1: 950,000 gpd
WQ0015163-002 – North Alamo: 500,000 gpd
WQ0015513-001 – North Alamo: 700,000 gpd via North Floodway

2492 Baffin Bay / Alazan Bay / Cayo del Grullo / Laguna Salado
WQ0010067-002 – Duval County Conservation and Reclamation District: 40,000 gpd via Los Olmos Creek WQ0010084-001 – Utility Board of Falfurrias: 460,000 gpd via surface irrigation
WQ0010253-001 – City of Premont: 350,000 gpd via surface irrigation WQ0011515-001 – Riviera ISD: 16,000 gpd via surface irrigation
WQ0013361-002 – Kenedy County Sarita Sewer Service and WSC: 44,000 gpd via evaporation WQ0013374-001 – Kleberg County Kaufer Hubert Memorial Park: 33,000 gpd via Cayo Del Grullo. WQ0013374-002 – Riviera WCID: 60,000 gpd via Los Olmos Creek
WQ0013374-003 – County of Kleberg Ricardo WWTP: 48,500 gpd via Jaboncillos Creek WQ0014808-001 – King Ranch Inc.: 25,500 gpd via evaporation

2492A San Fernando Creek
WQ0000579-000 – Ticona Polymers, Inc. (Celanese).: storm water WQ0004819-000 – SNBL USA Ltd.: 35,000 gpd via evaporation

WQ0010067-001 – Duval County Conservation and Reclamation District: 250,000 gpd via Santa Gertrudis Creek WQ0010270-001 – San Diego MUD: 750,000 gpd via San Diego Creek
WQ0010427-001 – City of Bishop: 320,000 gpd via Carreta Creek WQ0010536-002 – City of Alice: 2,600,000 gpd via Lattas Creek WQ0010536-004 – City of Alice: 2,020,000 gpd and irrigation
WQ0010696-001 – City of Kingsville – Plant 1: 3,000,000 gpd via Tranquitas Creek WQ0010696-004 – City of Kingsville: 1,000,000 gpd via Santa Gertrudis Creek and irrigation WQ0012035-001 – US Department of the Navy (Kingsville NAS: 400,000 gpd

2494 Brownsville Ship Channel
WQ0002597-000 – Brownsville Navigation District: 100,000 gpd via evaporation WQ0002817-000 – Brownsville Navigation District Fishing Harbor: 250,000 gpd
WQ0003936-000 – Valley MUD No. 2: 540,000 gpd via San Martin Lake WQ0004126-000 – Texas Pack, Inc: 150,000 gpd via irrigation
WQ0004541-000 – Southmost Regional Water Authority and Brownsville Public Utilities Board: 4,000,000 gpd via San Martin Lake WQ0005005-000 – Tenaska Brownsville Partners: storm water
WQ0005209-000 – Maverick Fuel Oil Terminal: storm water (pending)
WQ0010332-001 – Brownsville Navigation District Northside Plant: 98,000 gpd via drainage ditch to BSC
WQ0010350-001 – Laguna Madre Water District Port Isabel Plant: 1,100,000 gpd via Vadia Ancha and monofill sludge on permittee property WQ0010397-005 – Brownsville Public Utilities N. Robindale Plant: 14,500,000 gpd via San Martin Lake
WQ0010590-002 – City of Los Fresnos: 1,000,000 gpd via San Martin Lake WQ0015162-001 – East Rio Hondo Water Supply: 100,000 gpd WQ0011348-001 – Valley MUD No. 2: 400,000 gpd via San Martin Lake
WQ0013817-001 – Olmito WSC (Olmito Plant): 750,000 gpd via San Martin LakeChec WQ0014355-001 – Brownsville Navigation District: 100,000 gpd via San Martin Lake