



Nueces River Authority

2015 Basin Highlights Report

San Antonio-Nueces Coastal Basin

Nueces River Basin

Nueces-Rio Grande Coastal Basin

June 2015

**Prepared in cooperation with the Texas Commission on Environmental Quality
Clean Rivers Program**

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List of Acronyms

AU	Assessment Unit
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operations
CBBEP	Coastal Bend Bays and Estuary Program
cfu	Colony Forming Units
CM	Channel Marker
CR	County Road
CRP	Clean Rivers Program
DDE	Dichlorodiphenylethylene
DO	Dissolved Oxygen
DSHS	Department of State Health Services
FM	Farm to Market
hr	Hour
ICWW	Intracoastal Waterway
km	Kilometers
m	Meters
mg/l	Milligrams Per Liter
MSL	Mean Sea Level
NCR	Non Contact Recreation
NPS	Nonpoint Source
NRA	Nueces River Authority
PCB	Polychlorinated biphenyl
PCR	Primary Contact Recreation
RRC	Railroad Commission of Texas
RUAA	Recreational Use Attainability Analysis
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
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
µg/l	Micrograms Per Liter
WPP	Watershed Protection Plan
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION and 2014 HIGHLIGHTS

1.1 Introduction

In 1991, the Texas Legislature passed the Texas Clean Rivers Act requiring basin-wide water quality assessments to be conducted for each river basin in Texas. Under this act, the Clean Rivers Program (CRP) has 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 31,500 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. (Figure 1.1)

San Antonio – Nueces Coastal Basin

The San Antonio – Nueces Coastal Basin is approximately 3,100 square miles, covering all or part of 7 counties. The basin is bordered by the San Antonio River Basin to the north, the Lavaca-Guadalupe Coastal Basin to the northeast, bays, estuaries, and the Gulf of Mexico to the east, the Nueces-Rio Grande Coastal Basin to the south, and the Nueces River Basin to the northwest. 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 State Highway 35 north of Fulton, Fulton Mansion State Historic Park in Fulton, and the Aransas National Wildlife Refuge in Aransas County.

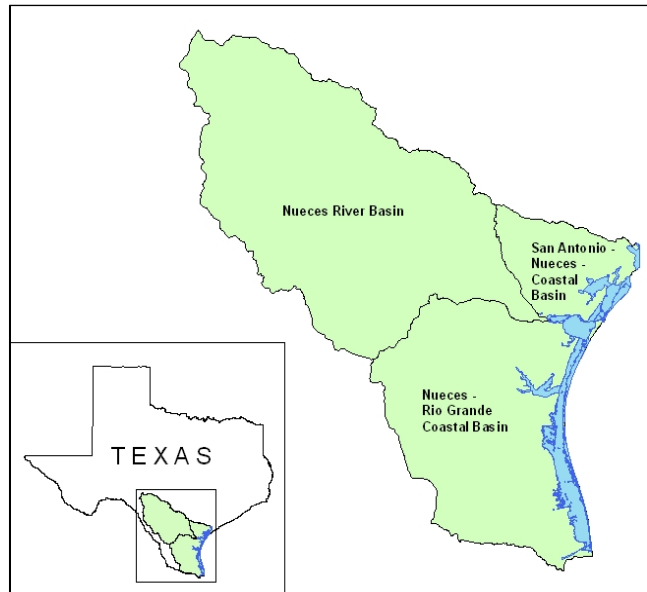


Figure 1.1. NRA's Basins of Responsibility

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 Rivers. 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 State Historic Park near Sandia, Lost Maples State Natural Area north of Vanderpool, and Hill Country State Natural Area north of Hondo.

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. 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.

1.2 2014 Highlights

For 2014, the most significant factor affecting water quality throughout the Nueces River Basin, San Antonio-Nueces Coastal Basin was the drought which began in 2008. For 2014, annual precipitation deficits in the upper and middle Nueces River Basin were in the 5 -10 inch range. The lower Nueces River Basin and the Nueces Rio Grande Coastal Basin, however, were one of the few areas in the state that experienced above average precipitation. Precipitation along the coast does little to aide reservoir levels though. At the end of 2014, Choke Canyon Reservoir was at 25.0% of capacity and Lake Corpus was at 48.4% of capacity. The combined capacity of the two reservoirs was at 31.3% (down from 50% at the end of 2013).

2.0 WATER QUALITY MONITORING

In general, the CRP and Surface Water Quality Monitoring (SWQM) programs conduct quarterly monitoring at routine monitoring sites. Most of these sites 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 conventional and bacteria parameters. These samples are usually collected four times per year, once per quarter. Field parameters are also recorded as part of the sampling events.

Parameters analyzed for conventional monitoring include alkalinity, ammonia, total dissolved solids (TDS), total suspended solids (TSS), total phosphorous, chlorides, sulfate, hardness (fresh water sites), nitrates, chlorophyll-a, pheophytin, and total organic carbon.

Routine bacteria analysis includes enterococcus in saltwater bodies and tidal segments and *E. coli* for fresh water sites. Additional bacterial analysis is being conducted for some of the special studies. These studies are discussed in Section 3.2, Watershed Summaries.

Measured field parameters in the NRA CRP include dissolved oxygen (DO), salinity (saltwater and tidal sites), flow (fresh water sites), pH, water temperature, air temperature, conductivity, secchi depth, and wind speed and direction. Observations such as water color, water odor, surface conditions, turbidity, current weather, and recent rainfall amounts are noted.

Additional monitoring is conducted at some sites. 24-hour (hr) DO measurements are generally conducted to more fully evaluate a low DO concern.

Sites and the type of monitoring being conducted during FY 2014 are listed in summary tables at the beginning of each basin subsection within Section 3.2. Detailed information is available on the Statewide Coordinated Monitoring Schedule, <http://cms.lcra.org/>, maintained by the Lower Colorado River Authority. Figure 2-1 shows a map of routine quarterly monitored sampling locations and program partners involved in water quality monitoring in the Nueces River Basin, San Antonio-Nueces Coastal Basin, and Nueces-Rio Grande Coastal Basin.



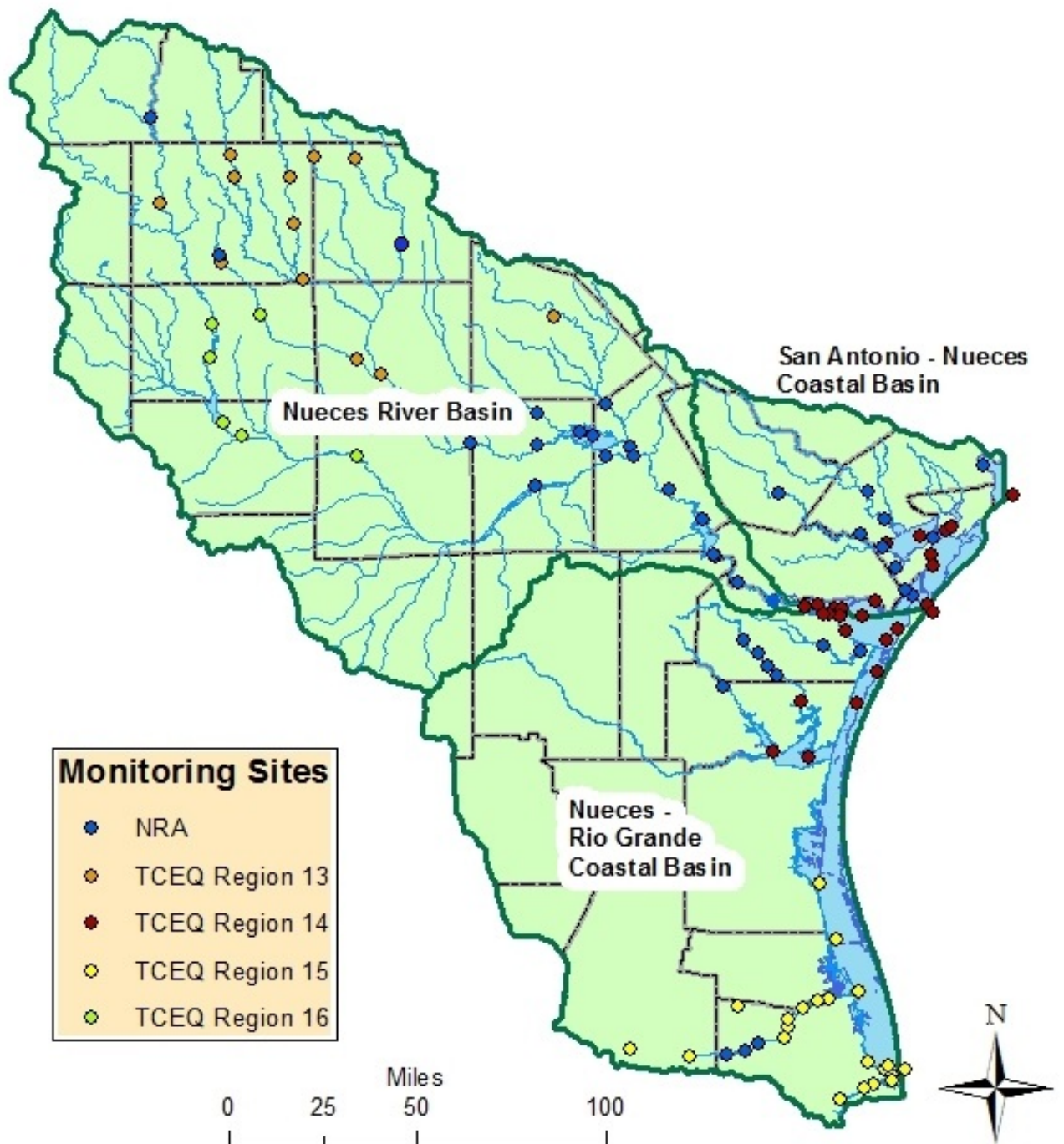


Figure 2-1. Routine Quarterly Water Quality Monitoring Sites in the Nueces River Basin, San Antonio-Nueces Coastal Basin, and Nueces-Rio Grande Coastal Basin

3.0 WATER QUALITY CONDITIONS

3.1 Water Quality Terminology

The Draft 2014 Integrated Report assesses suitable data in the State's water quality database (Surface Water Quality Monitoring Information System (SWQMIS)) for a 7-year period, and a new 7-year data set is assessed every two years. This has changed from the previous 5-year data sets. 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 Draft 2014 Integrated Report included data from December 1, 2005 through November 30, 2012 and is the data set used in this report. Prior to 2010, water quality assessments conducted by the TCEQ were called the Water Quality Inventory.

For the Draft 2014 Integrated Report, TCEQ assessed a variety of parameters including DO, pH, water temperature, total phosphorus, nitrate, ammonia, chlorophyll-a, and bacteria (*E.coli* for fresh water segments and *Enterococcus* on tidal and marine segments) values on each assessment unit (AU) of a classified segment where ample data was 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 and only on fresh water segments. AU boundaries are occasionally modified to be more representative and provide for a more accurate analysis. The analysis for this report focused on the concerns and impairments identified in the Draft 2014 Integrated Report.

Impairments for the following parameters are defined as follows:

Parameter	Criteria	Calculation Used for Impairment*
TDS, chloride, and sulfate	Segment specific	Average of samples are above the criteria
DO (for High Aquatic Life Use)	3.0 mg/l** grab sample 5.0 mg/l 24-Hr average or Segment specific	10% of samples are below either criteria
pH	6.5 su*** and 9 su	10% of samples are above or below the criteria
<i>E. coli</i>	126 cfu****	Geometric mean is greater than the criteria
	394 cfu	25% of samples are above the criteria
Enterococci	35 cfu	Geometric mean is greater than the criteria
	89 cfu	25% of samples are above the criteria

*The percent of samples exceeding the criteria or screening level varies somewhat with small sample sizes (between 10 and 20). When sample sizes are greater than 20 samples, the percentage shown in the calculation column is much more accurate.

**mg/l: milligrams per liter

***su: standard units

****cfu: 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 the parameters, primarily nutrients, that only have a narrative criteria. 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 chart explains the potential impacts when the water quality standards are not met along with an explanation of the most common causes for the standards not to be met.

Parameter of Concern or Impairment	Impact	Cause
DO	Organisms that live in water need oxygen to live. In waters with depressed DO levels, organism may not have sufficient oxygen to survive.	Modifications to the riparian zone, human activity that causes water temperatures to increase, and increases organic matter, bacteria, and 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, but all fish die if pH is below 4 (the acidity of orange juice) or above 12 (the pH of ammonia).	Industrial and wastewater discharge, runoff from quarry operations, and accidental spills.
Ammonia	Elevated levels of ammonia in the environment can adversely affect fish and invertebrate reproductive capacity and reduced 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 Nitrate Total phosphorus	These nutrients increase plant and algae growth. When plants and algae die, the bacteria that decompose them use oxygen so that is no longer available for fish and other living aquatic life. The more dead plants in the water, the more bacteria are produced to decompose the dead leaves. 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 released from wastewater treatment plants (WWTP)s, fertilizers, and agricultural runoff carrying animal waste from farms and ranches. Soil erosion and runoff from farms, lawns, and gardens can 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 over abundant algae.
TSS	TSS measures the amount of particles that are suspended in water and which will not pass through a filter. It can also 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 non-point sources but most commonly results from erosion of soils 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.

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 (PCR): Water recreation activities, such as wading by children, swimming, water skiing, diving, tubing, surfing, and whitewater kayaking, canoeing, and 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.

- Secondary contact recreation 1 (SCR1): Water recreation activities, such as fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion and that commonly occur. 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 per 100 milliliters of sampled water.

- Secondary contact recreation 2 (SCR2): Water recreation activities, such as fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion but that occur less frequently than for secondary contact recreation 1 due to (1) physical characteristics of the water body and/or (2) limited public access. For *E. coli*, the geometric mean criterion is 1030 cfu per 100 milliliters of sampled water.

- Noncontact recreation (NRC): 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 colony forming units per 100 milliliters of sampled water; for Enterococcus, the geometric mean criterion is 350 cfu per 100 milliliters of sampled water.

Recreational Use Designations	<i>E. coli</i> (Freshwater) cfu/100 mL	Enterococcus (Salt Water) cfu/100 mL
Primary Contact Recreation (PCR)	126	35
Secondary Contact 1 (SCR1)	630	175
Secondary Contact 2 (SCR2)	1030	*
Noncontact Recreation (NCR)	2060	350

*There is no SCR2 designation for Enterococcus.

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



3.2 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 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, a summary of concerns and impairments identified in the Draft 2014 Integrated Report, a table of the FY 2014 sampling locations, and write-ups for each segment within the basin.

The write-ups for each segment include a map, a description of the watershed, a concerns and impairment discussion, and graphs of the data relating to each concern and impairment.

The map shows the segment boundaries; includes landuse / land cover information of the contributing watershed (see key below); the location of sampling sites, 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. Figure 3-1 is a sample map.

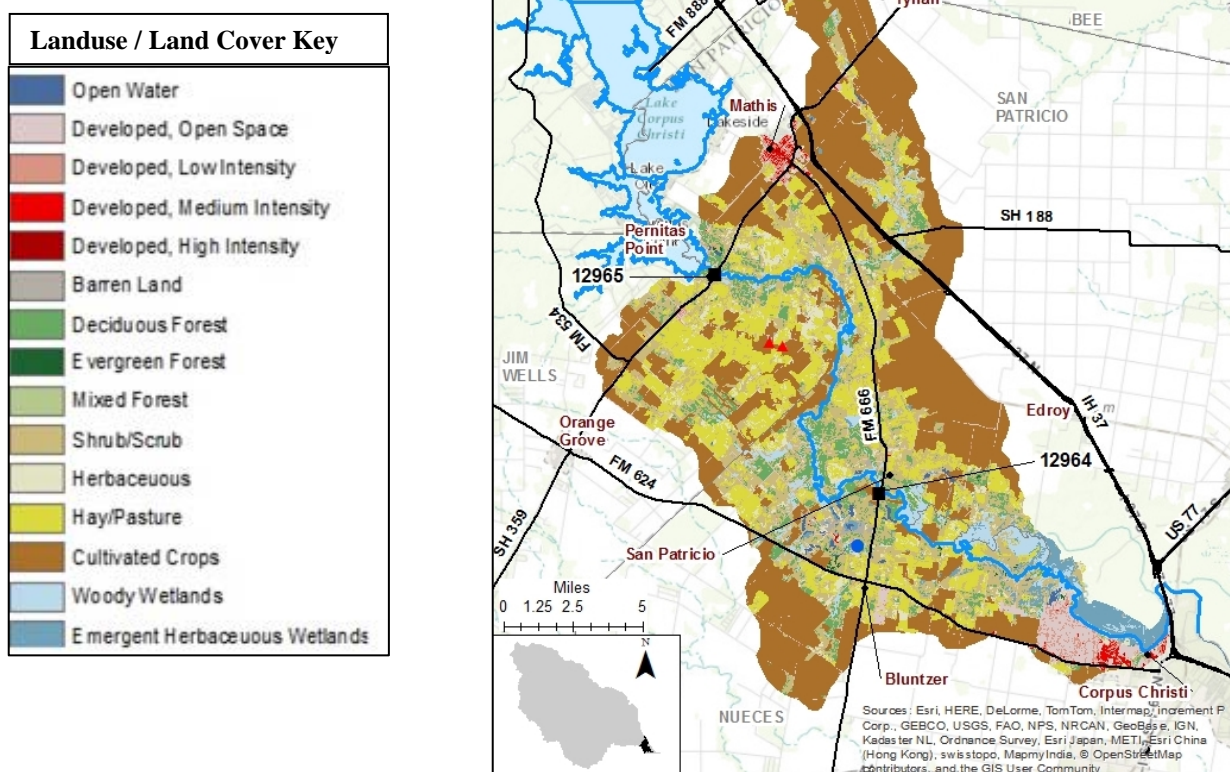


Figure 3-1. Sample Map

3.2.1 SAN ANTONIO – NUECES COASTAL BASIN (Figure 3-2)

The San Antonio – Nueces Coastal Basin is approximately 3,100 square miles, covering all or part of 7 counties. The basin is largely rural, with the dominant industries being crop farming and cattle rearing. Rivers and creeks in the basin include: Blanco and Medio Creeks which flow into Mission River, Poesta and Aransas Creeks which flow into Aransas River. Chiltipin and Copano Creeks discharge directly into Copano Bay. The basin also includes the tributaries of St. Charles Bay.

The tidal segments of both the Aransas and Mission Rivers are impaired for bacteria for primary contact recreation. Copano Bay is impaired for fecal coliform in oyster waters.

Table 3.1 lists all the CRP and SWQM sites monitored during FY 2014 in this basin.

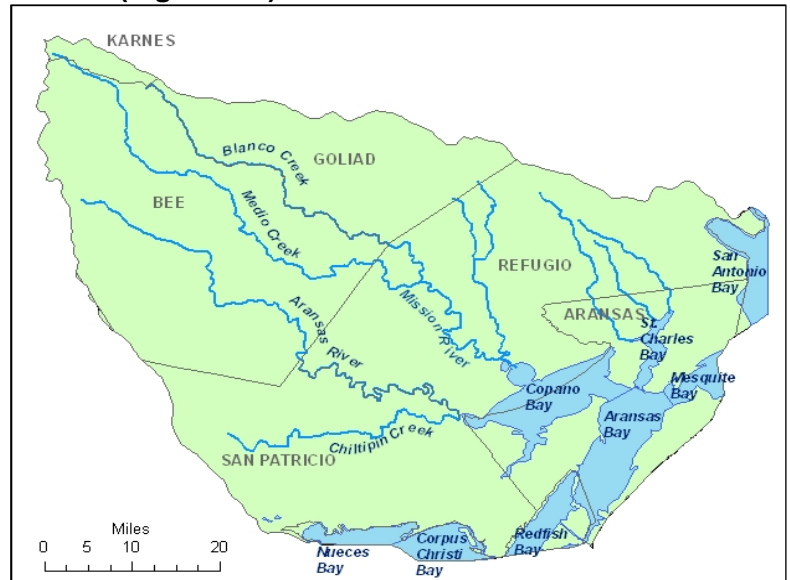
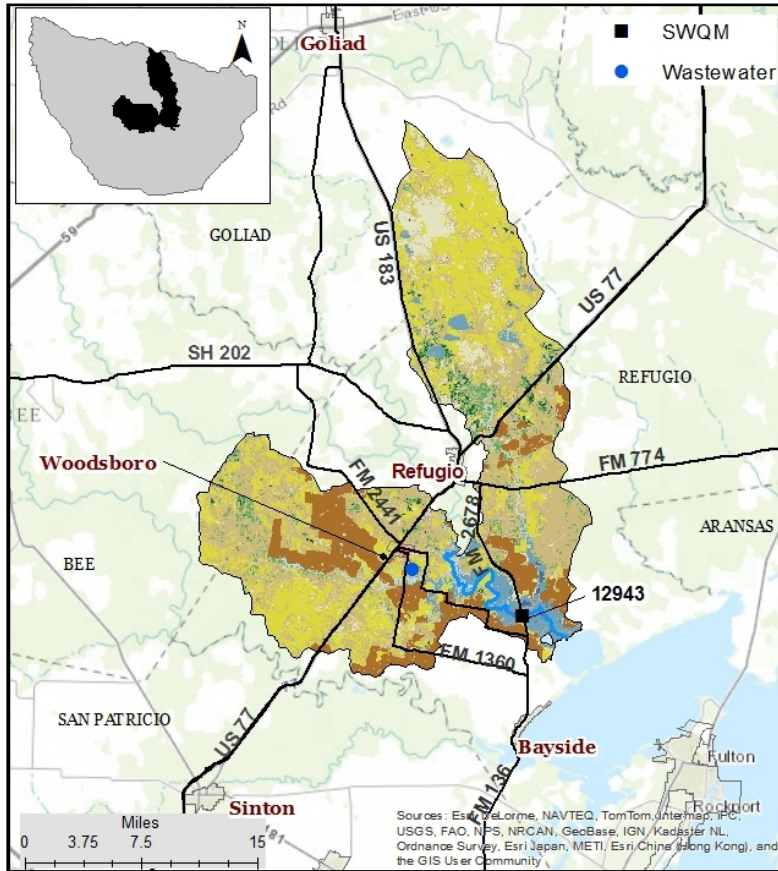


Figure 3-2. San Antonio Nueces Coastal Basin

Table 3-1: CRP and SWQM Sites in the San Antonio – Nueces Coastal Basin

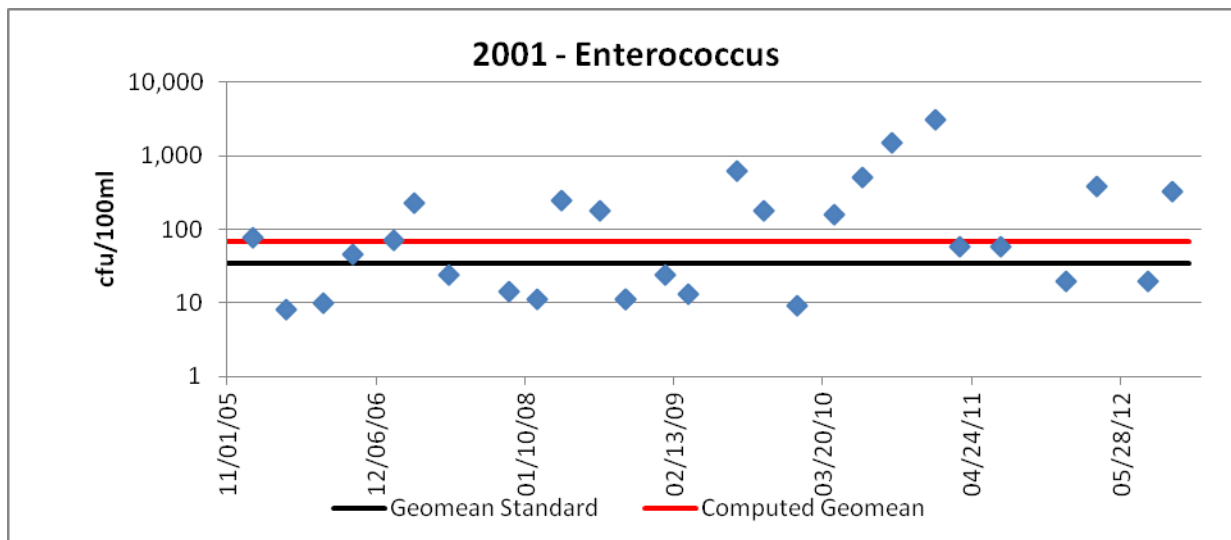
Segment Name	Station Id	Description	Monitoring Entity	Conventional, Bacteria, Field	Other
2001 Mission River Tidal	12943	Near south bank immediately downstream of FM 2678 between Refugio and Bayside	NRA	Quarterly	
2002 Mission River Above Tidal	12944	At US 77 upstream from bridge at Refugio	NRA	Quarterly	
2003 Aransas River Tidal	12947	At boat ramp at FM 629 terminus south of Bonnie View	NRA	Quarterly	
2004 Aransas River Above Tidal	12952	At county road east of Skidmore	NRA	Quarterly	
2004A Aransas Creek	12941	At US 181 North of Skidmore	NRA		4 24-Hr DO
2004B Poesta Creek	12932	At US 181 in Beeville	NRA	Quarterly Bacteria , Field	

2001: Mission River Tidal

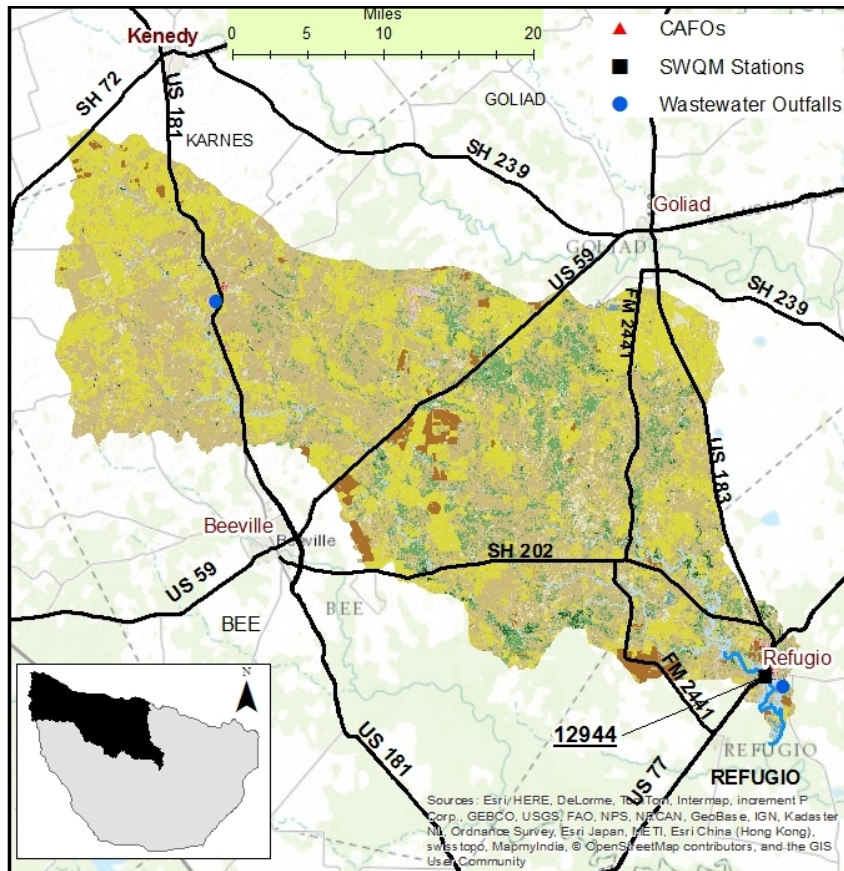


The tidal segment flows 19 miles from a point 4.6 miles downstream of US 77 in Refugio County to its confluence with Mission Bay in Refugio County. Its watershed is 199,798 acres. The area is predominately ranch and farm land. The town of Woodsboro is the only community in the watershed.

The segment has been impaired for bacteria for primary contact recreation since the 2004 Assessment and was included in the Copano Bay Total Maximum Daily Load (TMDL). The Enterococcus samples collected during the 2014 assessment period keeps this parameter on the Draft 2014 303(d) List. A subsequent Copano Bay TMDL project was initiated in FY 2013 to address the impairment. Best Management Practices (BMP) to address the issue include improvements and upgrades to WWTPs and the development and implementation of conservation plans in priority areas of the watershed. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.



2002: Mission River Above Tidal

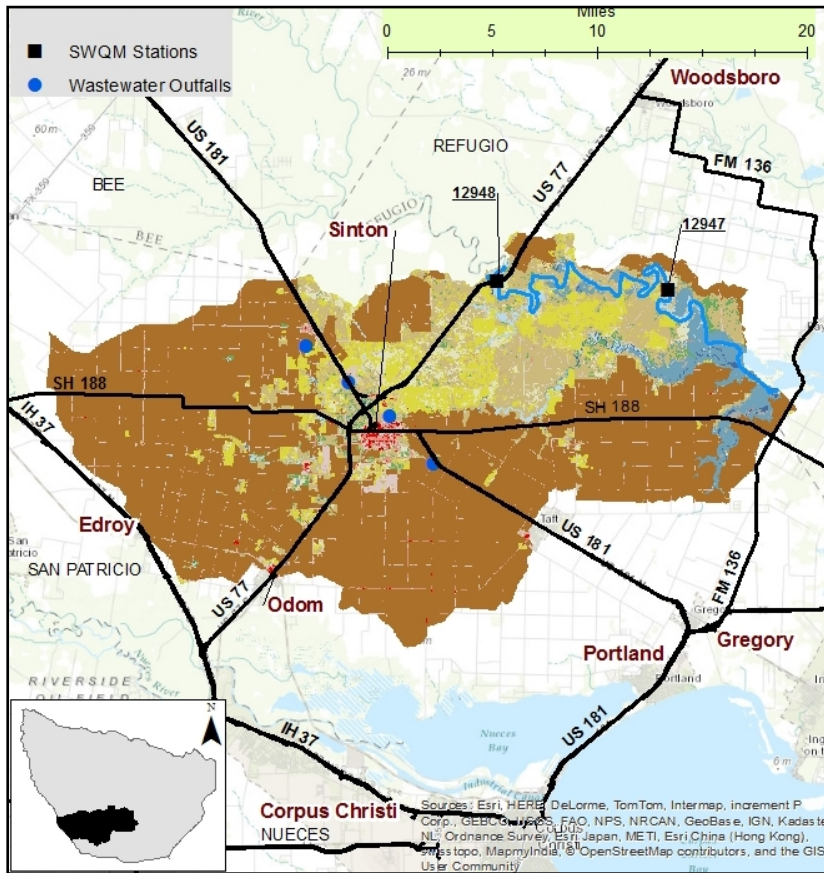


The above tidal segment flows 9 miles from the confluence of Blanco Creek and Medio Creek to a point 4.6 miles downstream of US 77 in Refugio County. Its watershed is 452,172 acres. The area is predominately ranch and farm land. The Town of Refugio is the only community in the watershed.

All the assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.

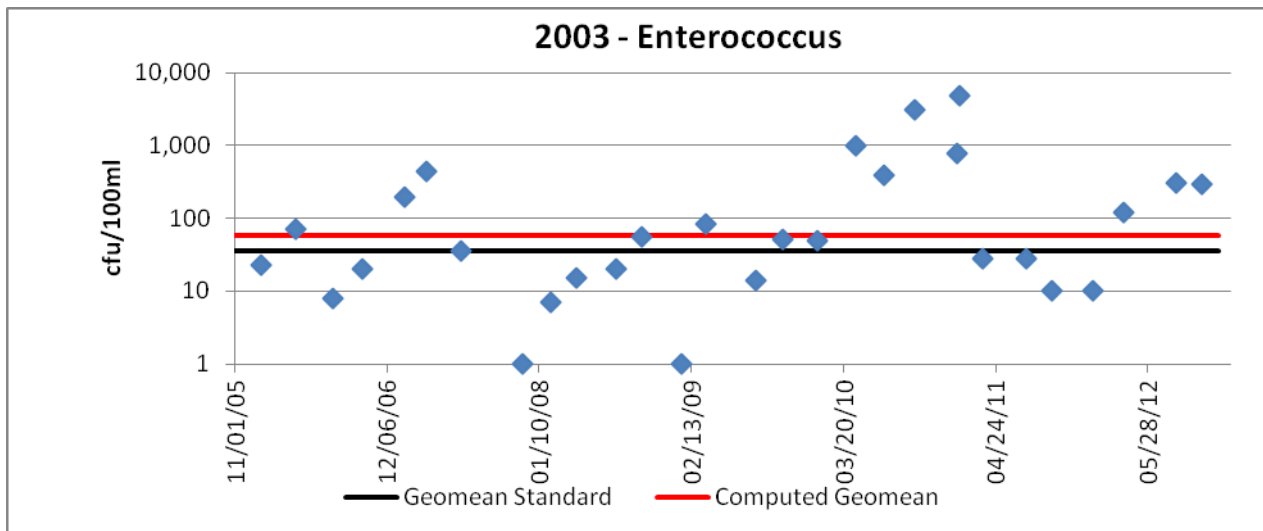


2003: Aransas River Tidal

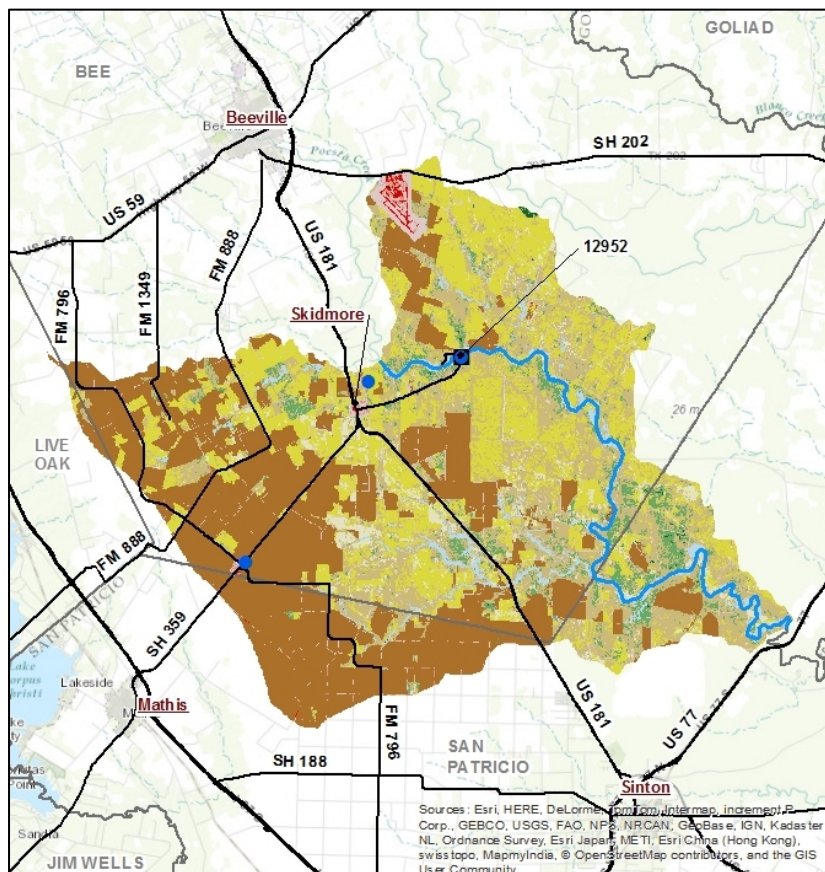


The tidal segment forms part of the county line between Refugio and San Patricio Counties. It flows 6 miles from a point 1.0 mile upstream of US 77 in to its confluence with Copano Bay. Its watershed is 208,031 acres.

The segment has been impaired for bacteria for primary contact recreation since the 2004 Assessment and was included in the Copano Bay TMDL. The Enterococcus samples collected during the 2014 assessment period keeps this parameter on the Draft 2014 303(d) List. A subsequent Copano Bay TMDL project was initiated FY2013 to address the impairment. 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. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.



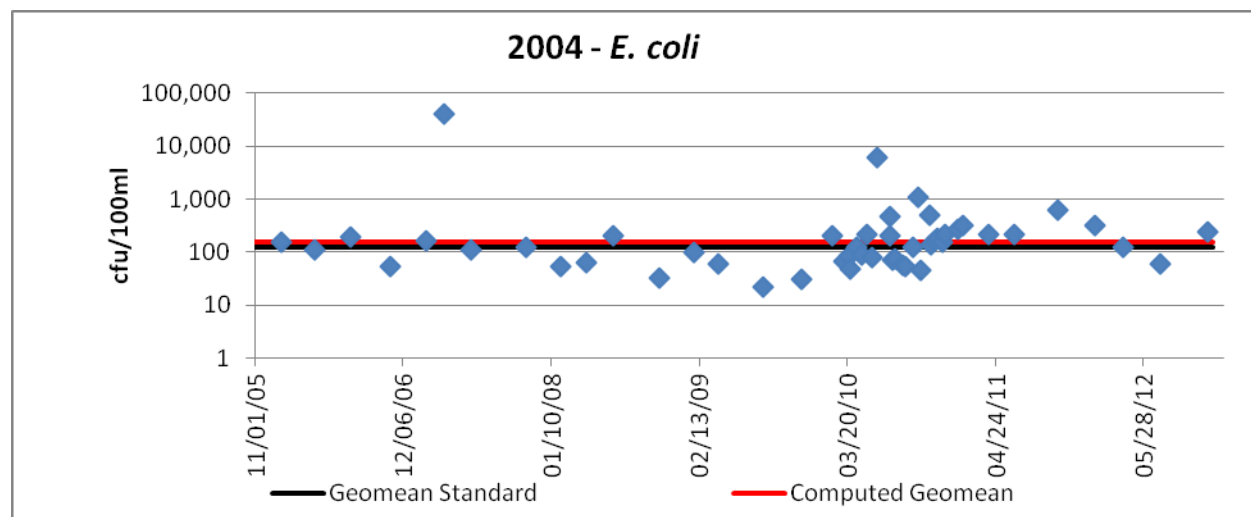
2004: Aransas River Above Tidal



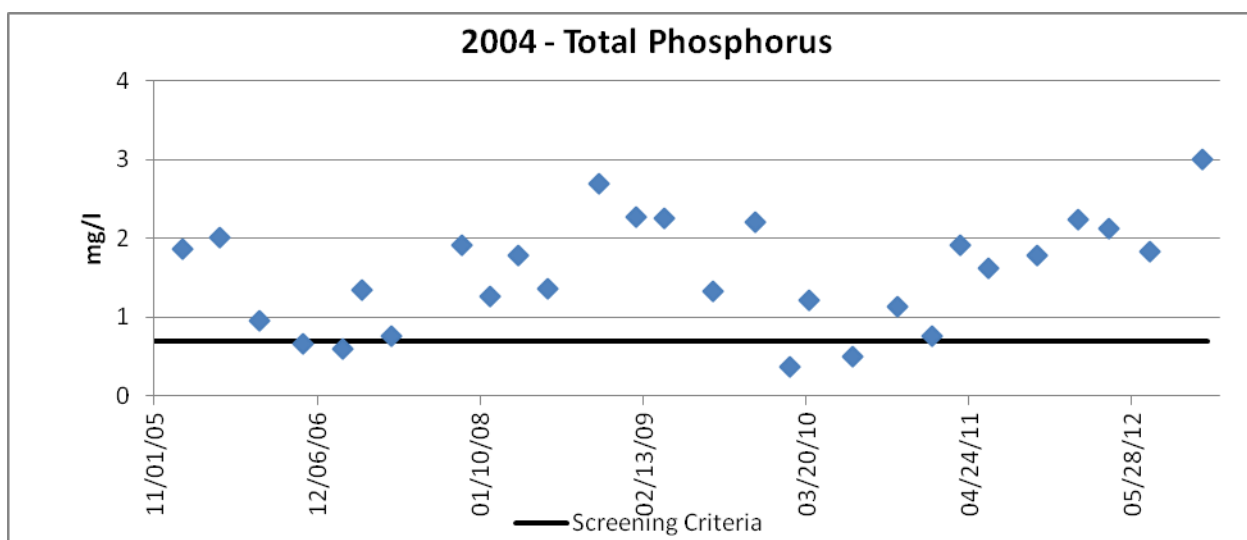
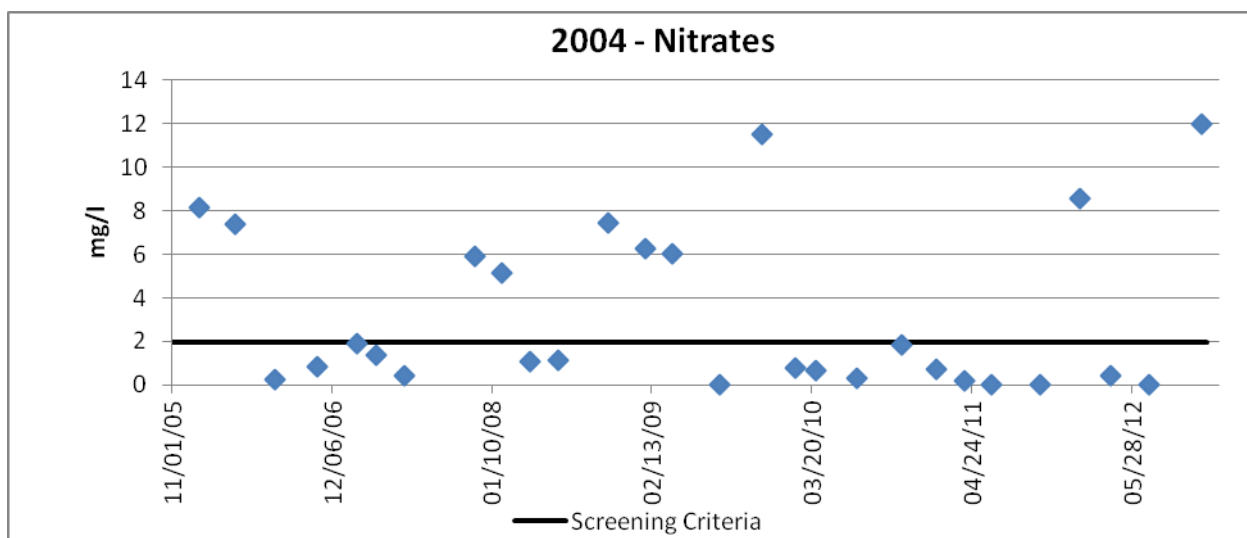
The above tidal segment flows 35 miles from the confluence of Poesta Creek and Aransas Creek to a point 1.0 mile upstream of US 77. Its watershed is 178,807 acres. The segment is divided into two assessment units; the lower 17 miles (AU_01) and the upper 18 miles (AU_02). Sampling has only been conducted on AU_02. The area is predominately ranchland. Skidmore and Tynan are the only communities in the watershed.

The segment was included in the Copano Bay TMDL. *E. coli* was identified as an impairment during the 2014 Assessment and placed on the Draft 2014 303(d) List.

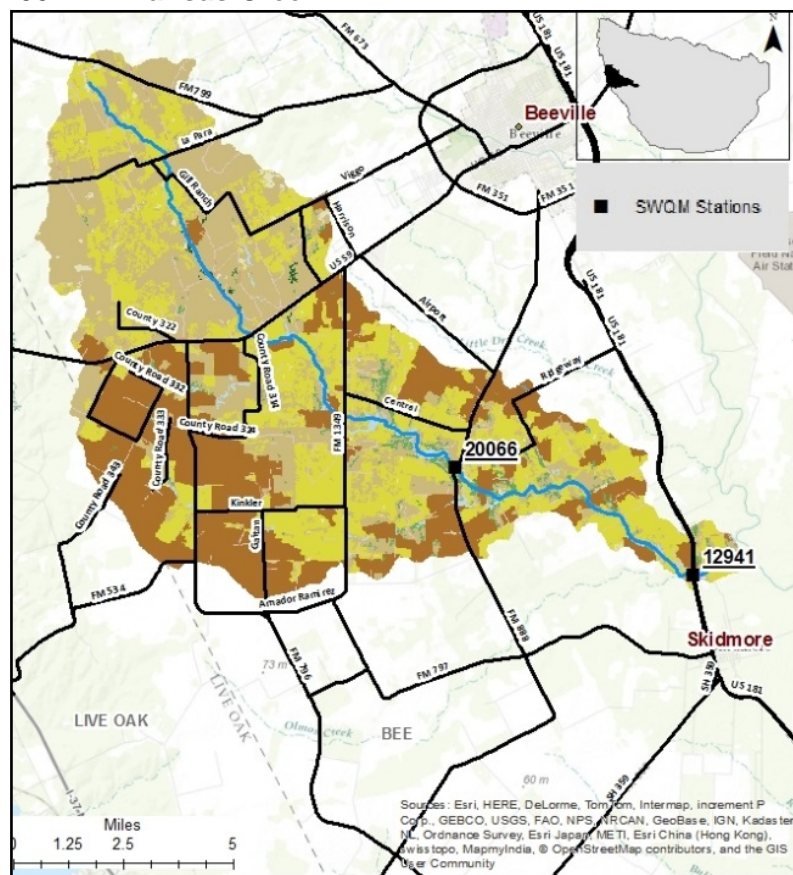
A previously identified concern for depressed DO at the 5 mg/l screening level has been removed as of the Draft 2014 Integrated Report.



However, concerns identified in the 2006 Water Quality Inventory remain for nitrates and total phosphorus. Possible sources include nutrient laden runoff from cropland and effluent from WWTPs. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.

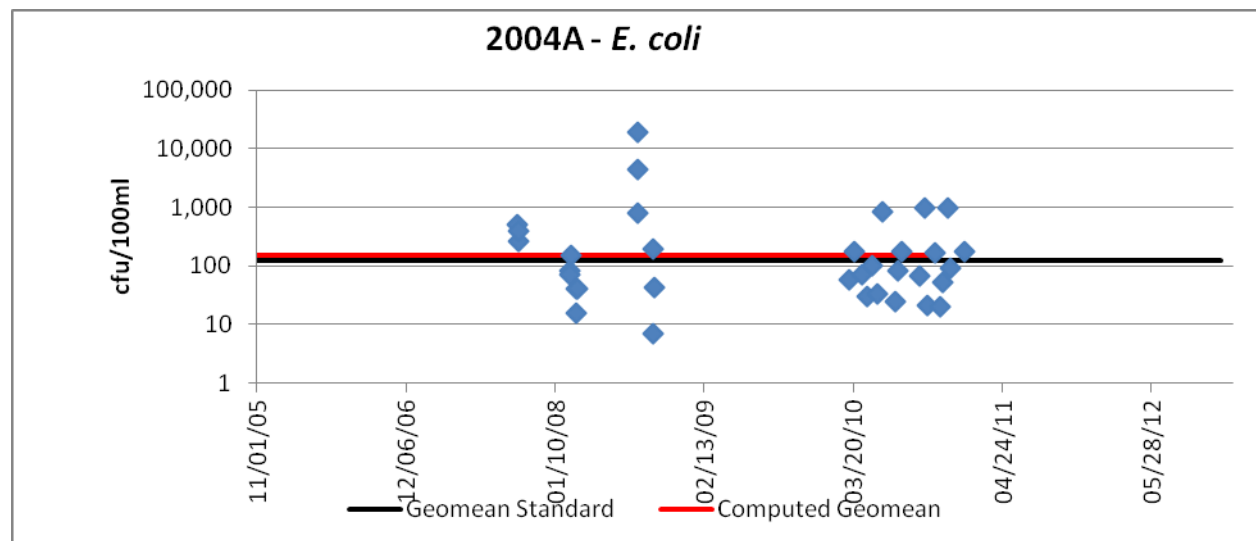


2004A: Aransas Creek



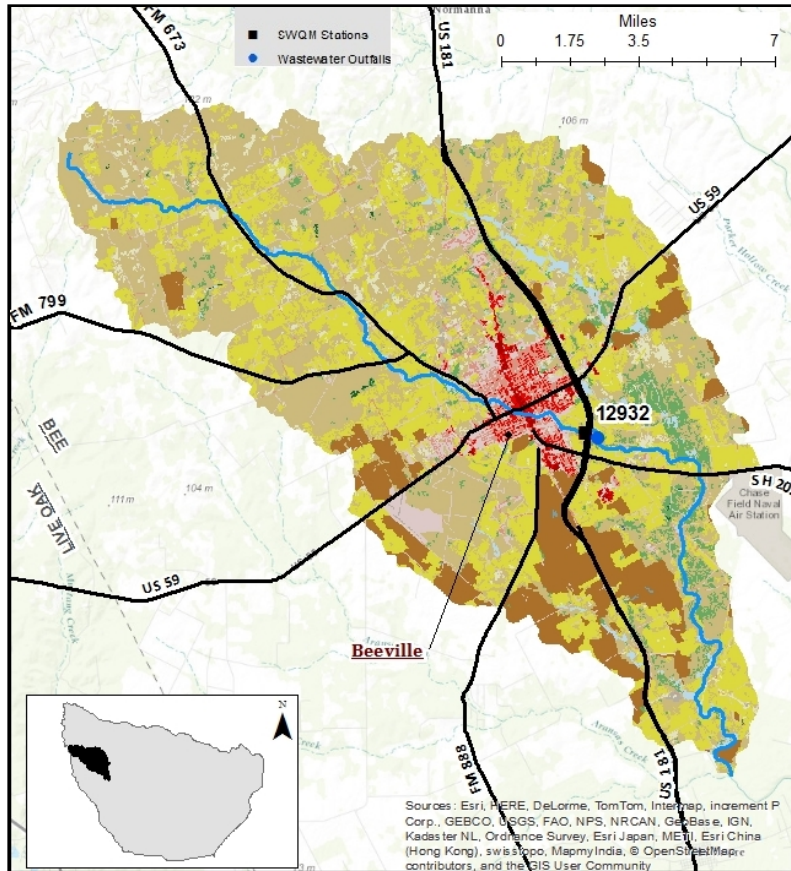
The segment is 20 miles long, beginning west of Beeville to its confluence with the Aransas River. Its watershed is 45,196 acres. The area is predominately ranchland. There are no major communities in the watershed.

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 accidentally monitored instead of at 12952 on the Aransas River. The impairment remains listed in the Draft 2014 Integrated Report. Data collected at Station 20066 during the Copano TMDL confirms the impairment. NRA, under contract with the Texas State Soil and Water Conservation Board (TSSWCB), conducted an RUAA on Aransas Creek. The final report for the RUAA was submitted to TSSWCB in May 2013. Whether or not to change the recreational use category is still being evaluated by TCEQ.



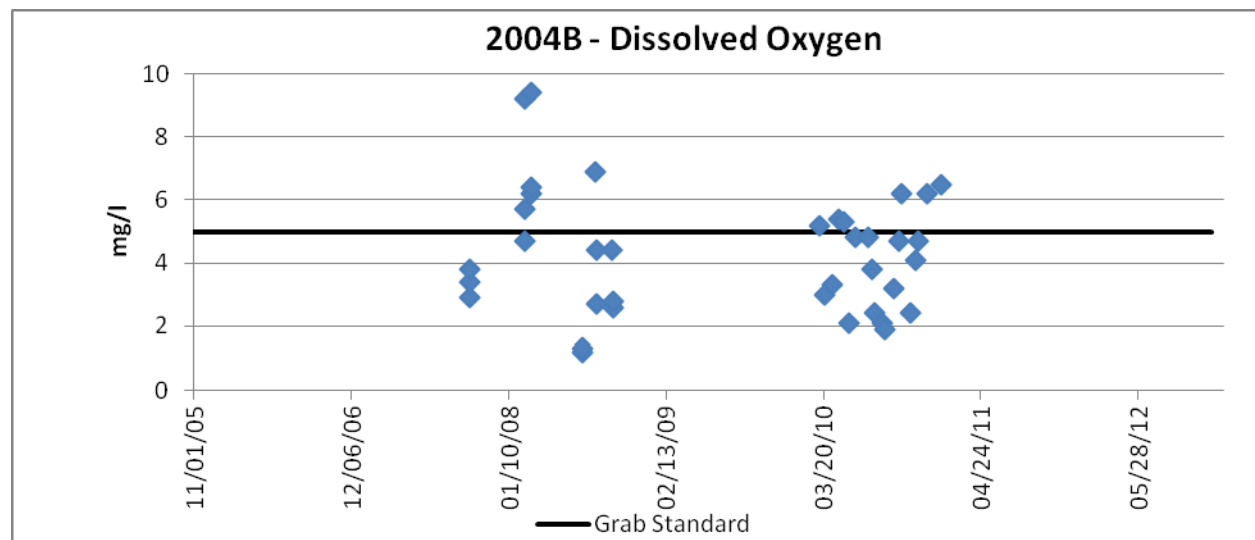
The depressed DO concerns for grab sample minimum and screening level are also being carried forward in the Draft 2014 Integrated Report. Due to the ongoing drought, NRA has not been able to collect a sufficient number of 24-Hr DO measurements to fully evaluate the concern. The five 24-Hr DO measurements that were able to be collected in 2009 and 2010 all met the standards.

2004B: Poesta Creek



The segment is approximately 24 miles long, beginning northwest of Beeville, 7.5 km upstream of FM 673, to its confluence with the Aransas River. Its watershed is 78,921 acres. The area is predominately ranchland. Beeville is the only community in the watershed.

Only DO and *E. coli* were assessed for this segment. The data set is not temporally representative, but indicates potential concerns for the DO grab screening level and bacteria levels. Additional sampling began in FY 2014 in order to collect enough data to fully assess the parameters.



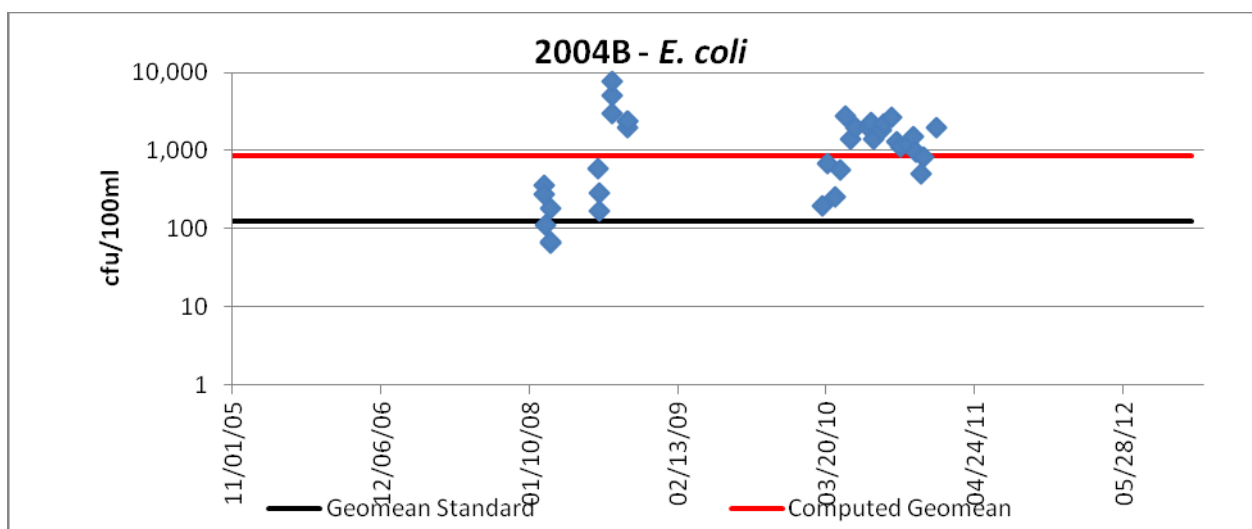


Table 3-2: List of Impairments and Concerns in the San Antonio – Nueces Coastal Basin

Segment Name	AU	Description	Impairments	Concerns
2001 Mission River Tidal	01	Entire water body	Bacteria	none
2002 Mission River Above Tidal	01	Entire water body	none	none
2003 Aransas River Tidal	01	Entire water body	Bacteria	none
2004 Aransas River Above Tidal	01	From the downstream end of segment to the confluence with Papalote Creek	None	none
	02	From the confluence with Papalote Creek to the upstream end of segment at the confluence with Aransas Creek and Poesta Creek	Bacteria	Nitrate, Total Phosphorus
2004A Aransas Creek	01	Entire 20 miles of segment	Bacteria	DO
2004B Poesta Creek	02	From the confluence with Aransas Creek to the headwaters of the stream ~ 7.5km upstream of FM 673	Bacteria	DO

3.2.2 NUECES BASIN (Figure 3-3)

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 Rivers.

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 DO.

Table 3.3 lists all the CRP and SWQM sites monitored during FY 2014 in this basin.

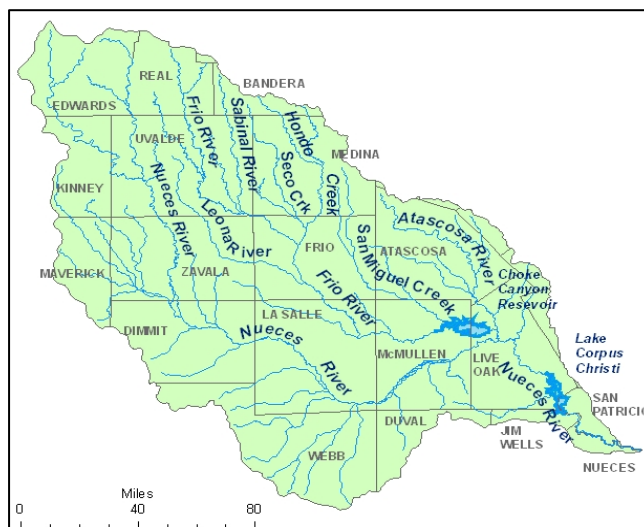


Figure 3.3. Nueces River Basin

Table 3-3: CRP and SWQM Sites in the Nueces River Basin

Segment Name	Station Id	Description	Monitoring Entity	Conventional, Bacteria, Field	Other
2101 Nueces River Tidal	12960 (AU_01)	North of Viola Turning Basin	TCEQ Region 14	Quarterly	
2102 Nueces River Below Lake Corpus Christi	20936 (AU_01)	At Hazel Bazemore Park Boat Ramp	NRA	Quarterly	
	12964 (AU_01)	Bluntzer Bridge at FM 666	NRA	Quarterly	
	12965 (AU_02)	At La Fruta Bridge on SH 359	NRA	Quarterly	
2103 Lake Corpus Christi	12967 (AU_01)	380 m NNW of northern tip of dam	NRA	Quarterly	
	17384 (AU_04)	0.2 miles off western shore directly west of Hideaway Hill	NRA	Quarterly	
	17648 (AU_06)	At Live Oak CR 151 near River Creek Acres	NRA	Quarterly	
2104 Nueces River Above Frio River	12972 (AU_01)	At FM 1042 bridge 1.2 miles north of Simmons	NRA	Quarterly	(4) 24-Hr DO
	12973 (AU_02)	At SH 16 south of Tilden	NRA	Quarterly	(4) 24-Hr DO
2105 Nueces River Above Holland Dam	12975 (AU_01)	At Bus. IH 35 south of Cotulla	TCEQ Region 16	Quarterly	
	12976 (AU_02)	At FM 190-north of Asherton	TCEQ Region 16	Quarterly	
	20156 (AU_02)	Immediately upstream of SH 85 approximately 12 miles east of Carrizo Springs	TCEQ Region 16	Quarterly	
2106 Nueces / Lower Frio River	12977 (AU_02)	At US 72 in Three Rivers	NRA	Quarterly	
	12979 (AU_01)	At US 281 south of Three Rivers	NRA	Quarterly	
	20701 (AU_01)	Northeast of the intersection of Airport Rd and CR 379 / Paisano Dr.	NRA	Quarterly	
2107 Atascosa River	12980 (AU_01)	At FM 99 west of Whitsett	NRA	Quarterly	
	12982 (AU_03)	At US 281 at Pleasanton	TCEQ Region 13	Quarterly	(4) 24-Hr DO
2108 San Miguel Creek	12983 (AU_01)	At SH 16 north of Tilden	NRA	Quarterly	(8) <i>E.coli</i>

Table 3-3: CRP and SWQM Sites in the Nueces Basin (cont.)

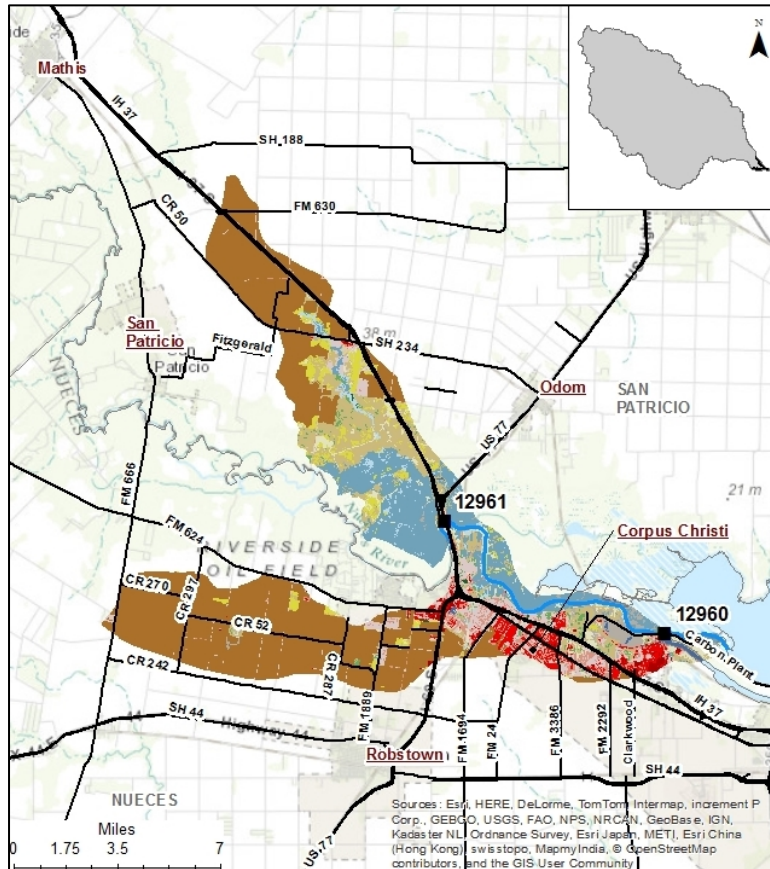
Segment Name	Station Id	Description	Monitoring Entity	Conventional, Bacteria, Field	Other
2109 Leona River	12985 (AU_01)	At FM 1581 southwest of Pearsall	TIAER	20 Bacteria, Flow, Field	Total NO2-N+NO3-N
	12985 (AU_01)	At FM 1581 southwest of Pearsall	TCEQ Region 13	Quarterly	
	21044 (AU_01)	Private Road 5.6 KM Upstream on Confluence of Frio River	TIAER	Bi-monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21060 (AU_01)	Creek at CR 4757 5.25 KM upstream of confluence of Leona River	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21061 (AU_01)	Todos Santos Creek at FM 1581 7.43 KM upstream of confluence of Leona River	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	12986 (AU_02)	At 160 M downstream of Loma Vista road bridge	TIAER	Bi-Monthly	Total NO2-N+NO3-N
	12987 (AU_02)	At US 57 near Batesville	TIAER	20 Bacteria, Flow, Field	Total NO2-N+NO3-N
	12987 (AU_02)	At US 57 near Batesville	TCEQ Region 16	Quarterly	
	21062 (AU_02)	Live Oak Creek at US Highway 57 East of Batesville	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21063 (AU_02)	Gallina Slough at La Poma road 6.35 KM upstream of the confluence of the Leona River	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21064 (AU_02)	At Ranch Road 1866	TIAER	Bi-monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	12989 (AU_03)	At Hoags Dam, upstream side	TIAER	20 Bacteria, Flow, Field	Total NO2-N+NO3-N
	12989 (AU_03)	At Hoags Dam, upstream side	TCEQ Region 13	Quarterly	
	12990 (AU_03)	At FM 140	TIAER	Bi-monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	18418 (AU_03)	370 M upstream of FM 140	NRA	Quarterly	
	21067 (AU_03)	Cooks Slough at FM 2369	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21068 (AU_03)	Taylor Slough at CR 373	TIAER	Monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	21070 (AU_03)	At CR 429A	TIAER	Bi-monthly Bacteria, Flow, Field	Total NO2-N+NO3-N
	12956 (AU_03)	Cooks Slough at FM 117	TIAER	Monthly Bacteria, Field, Flow	Total NO2-N+NO3-N
2110 Lower Sabinal River	12993 (AU_01)	At US 90 west of Sabinal	TCEQ Region 13	Quarterly	
2111 Upper Sabinal River	12994 (AU_01)	12.5 miles north of Sabinal and 2.3 miles downstream from the mouth of Onion Creek	TCEQ Region 13	Quarterly	
2112 Upper Nueces River	12996 (AU_01)	20 M upstream of US 57 south of Uvalde	TCEQ Region 16	Quarterly	
	17143 (AU_01)	At Lake Averhoff / Upper Nueces Lake 1.62 KM upstream of Texas Parks and Wildlife Department (TPWD) boat ramp	TCEQ Region 16	Quarterly	
	16704 (AU_03)	Immediately downstream of SH 55 southbound bridge approx 2.5 km south of Laguna	TCEQ Region 13	Quarterly	
	13005 (AU_04)	At SH 55 south of Barksdale	NRA	Quarterly	

Table 3-3: CRP and SWQM Sites in the Nueces Basin (cont.)

Segment Name	Station Id	Description	Monitoring Entity	Conventional, Bacteria, Field	Other
2113 Upper Frio River	13006 (AU_01)	At SH 127 east of Concan	TCEQ Region 13	Quarterly	
	13007 (AU_02)	At Mager's Crossing/Old Leahey road 670 M downstream from Garner State Park Dam	TCEQ Region 13	Quarterly	
2114 Hondo Creek	13010 (AU_02)	150 M downstream of RR 462 bridge near Tarpley	TCEQ Region 13	Quarterly	
2115 Seco Creek	13013 (AU_02)	At Medina CR 111 on Miller Ranch near Utopia at 4 th crossing downstream of SH 470	TCEQ Region 13	Quarterly	(2) 24-Hr DO
2116 Choke Canyon Reservoir	13020 (AU_03)	Mid lake 15 M east of Live Oak/McMullen County line near old HWY 99 1.25 km north of Choke Canyon State Park Point	NRA	Quarterly	
	17389 (AU_06)	0.45 km southeast of FM 99 southern most bridge crossing the Frio River Arm	NRA	Quarterly	
2117 Frio River Above Choke Canyon Reservoir	13023 (AU_01)	At SH 16 in Tilden	NRA	Quarterly	
	18373 (AU_02)	Immediately upstream of SH 97 north of Fowlerton	NRA	Quarterly	
	13024 (AU_03)	At IH 35 northbound bridge north of Dilley	TCEQ Region 13	Quarterly	(4) 24-Hr DO
	15449 (AU_05)	At FM 187 8 miles south of Sabinal	TCEQ Region 13	Quarterly	

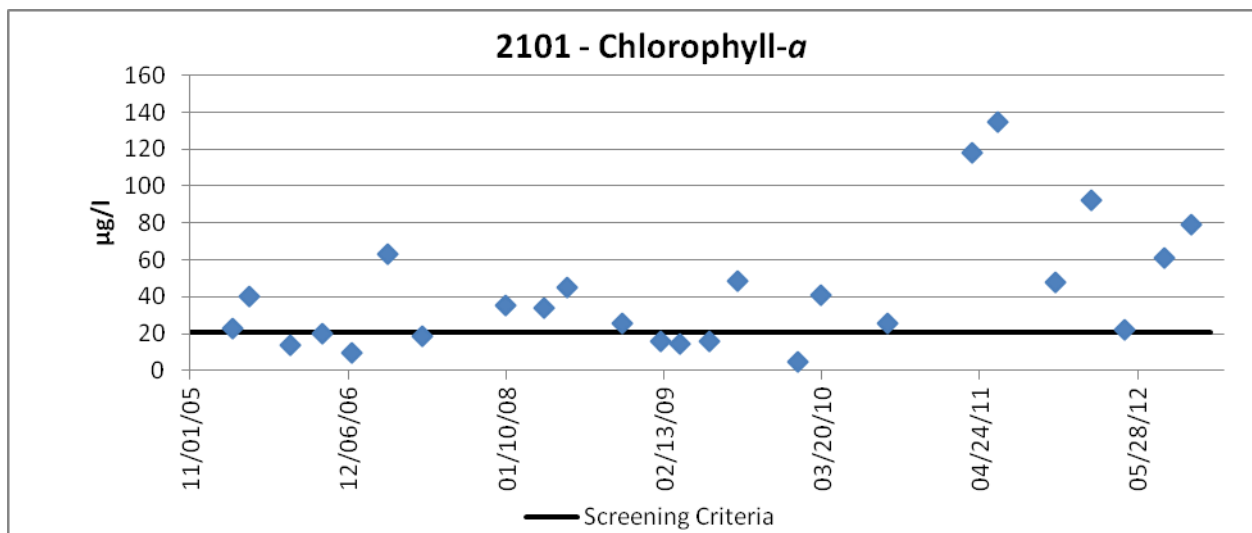


2101: Nueces River Tidal



The tidal segment forms part of the county line between Nueces and San Patricio Counties. It flows 12 miles from Calallen Dam 1.7 km (1.1 miles) upstream of US 77 / IH 37 to its confluence with Nueces Bay. Its watershed is 175,301 acres. The City of Corpus Christi 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's (CBBEP) Nueces Delta Preserve. The rest is owned by private ranches.

The segment is assessed as having a concern for chlorophyll-a. One possible explanation is that the tidal portion is not flushed on a regular basis. In general, the amount of water released from Lake Corpus Christi for freshwater inflows into the Nueces Estuary is based on the amount of water that has flowed into the reservoir system. Except during times of major flooding, the water more or less sloshes back and forth with tides. The Rincon Bayou Pipeline diverts some of the freshwater inflows to the upper delta instead of being passed down the river. This may also contribute to less frequent flushing of the river. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.

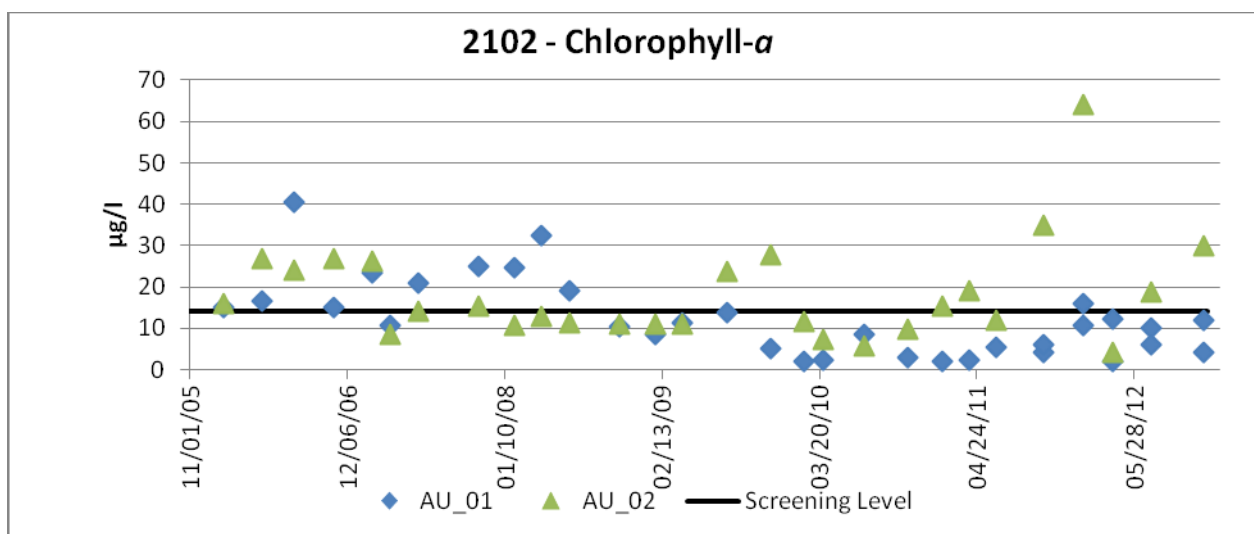


Map of the San Antonio area showing wastewater outfalls, SWQM stations, and CAFOs. The map includes major highways (I-37, SH 359, SH 188, FM 666, FM 624, FM 534, SH 339, US 77), cities (San Antonio, Mathis, Orange Grove, San Patricio, Edroy, Bluntzer, Corpus Christi), and water bodies (Lake Corpus Christi, Lake Oso, Live Oak). A legend indicates Wastewater Outfalls (blue dots), SWQM Stations (black squares), and CAFOs (red triangles). A scale bar shows 0 to 5 miles, and an inset map shows the location within Texas.

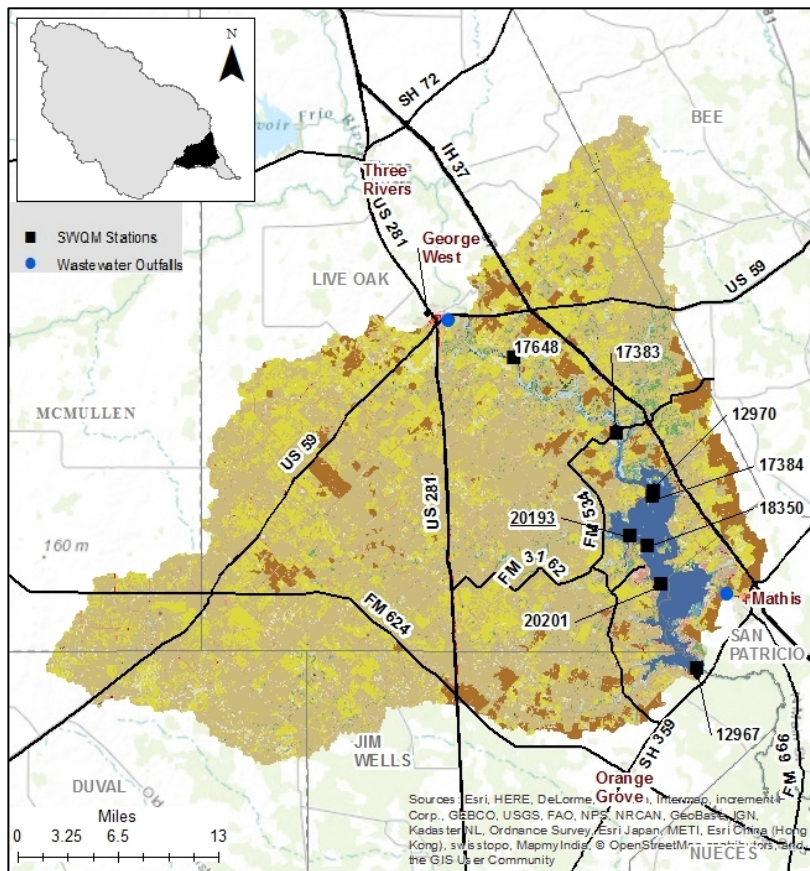
The City of Corpus Christi borders the south bank of the river in the lower 10 miles of the segment. The City conducts its own water quality monitoring as this is the primary drinking water source for the area. There are several freshwater intakes in the Calallen Pool just above the Saltwater Barrier 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.

The Watershed Protection Plan (WPP) being developed for this section of the river is expected to be completed in Summer 2015. Visit <http://www.nuecesriverpartnership.org/> for more information.





2103: Lake Corpus Christi



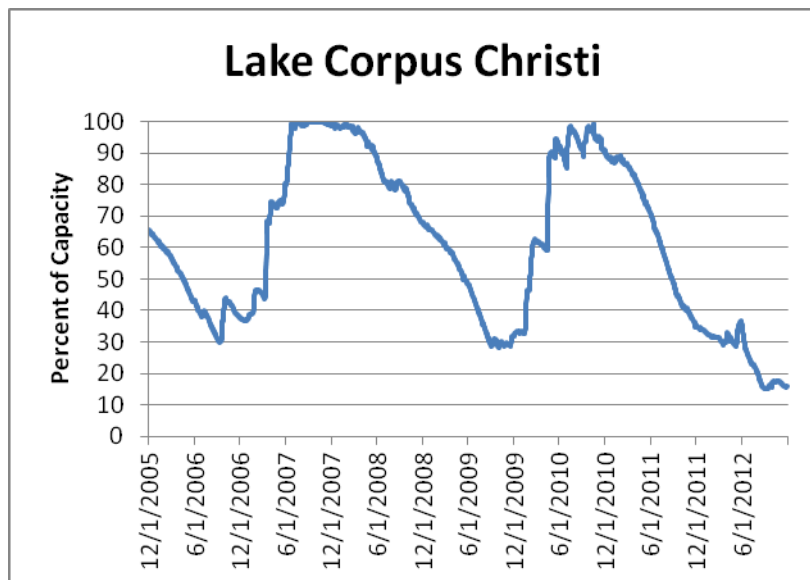
Lake Corpus Christi is formed by Wesley Seale Dam near Mathis and impounds the Nueces River. It is defined by the 94' above mean sea level (MSL) elevation. The lake covers portions of Live Oak, Jim Wells, and San Patricio Counties. The segment extends upstream to a point 100 m (110 yards) upstream of US 59 in Live Oak County. 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.

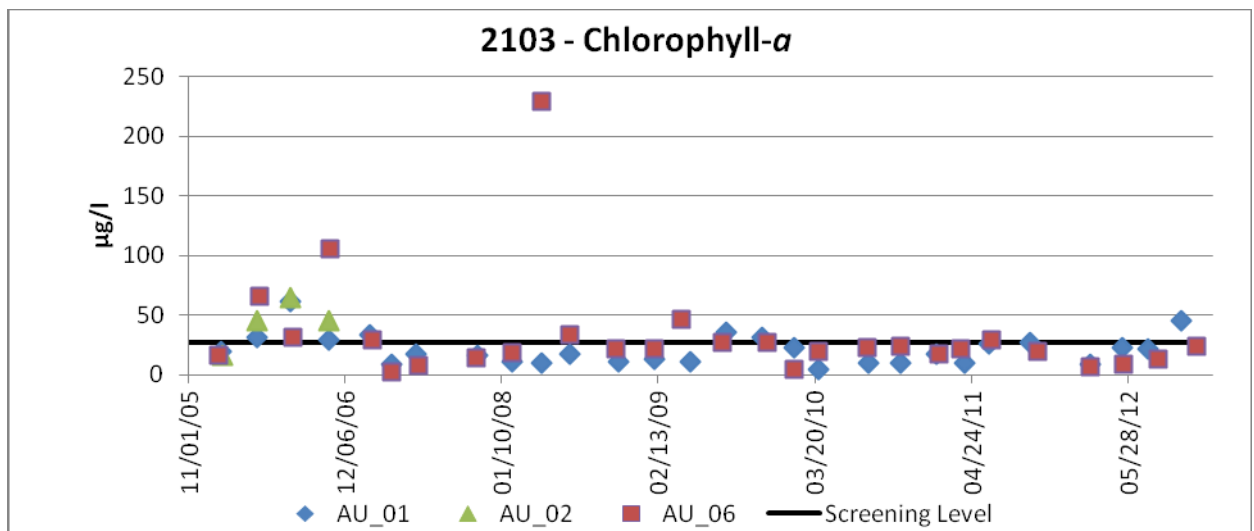
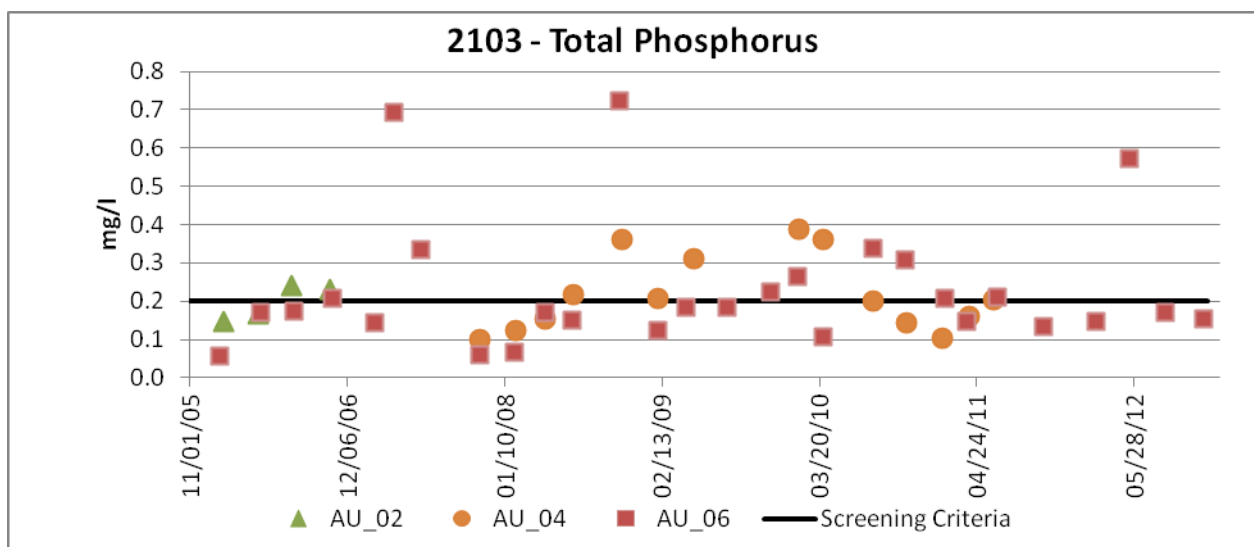
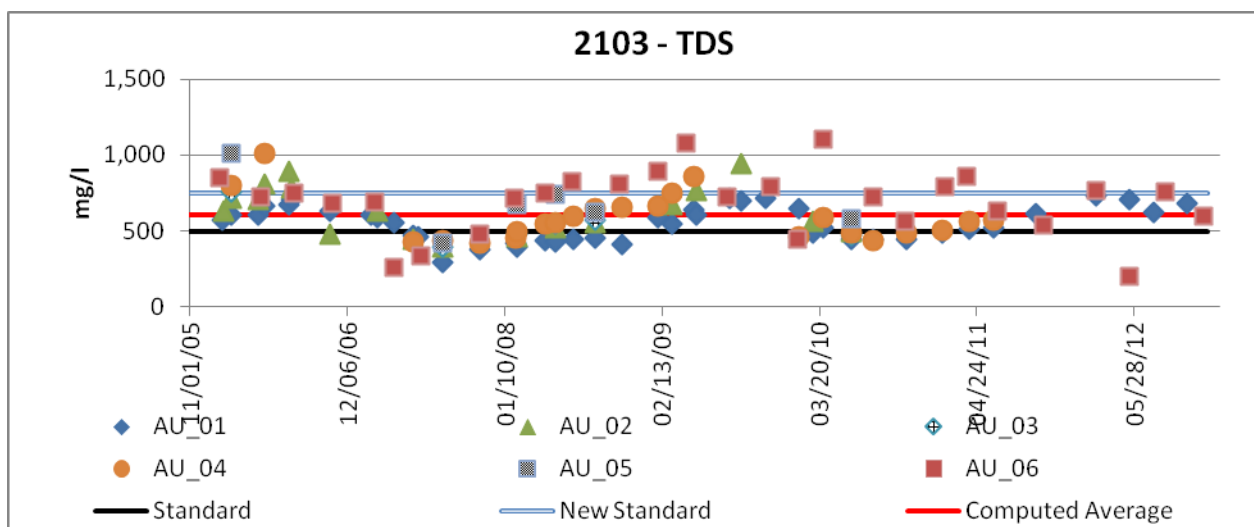
The segment is divided into six AUs; mid-lake near the dam (AU_01), the area approximately 4 miles SE of FM 3162 and FM 534 intersection near the western shore (AU_02), the western arm of the lake near the Lagarto Creek Inlet (AU_03), the upper portion of the lake on the opposite shore from Hideaway Hills (AU_04), the upper arm of the lake at FM 534 crossing (AU_05), and the remainder of the segment (AU_06).

The City of George West is located near the upstream end of the segment. There are many smaller communities and individual homes surrounding the lake and along the river.

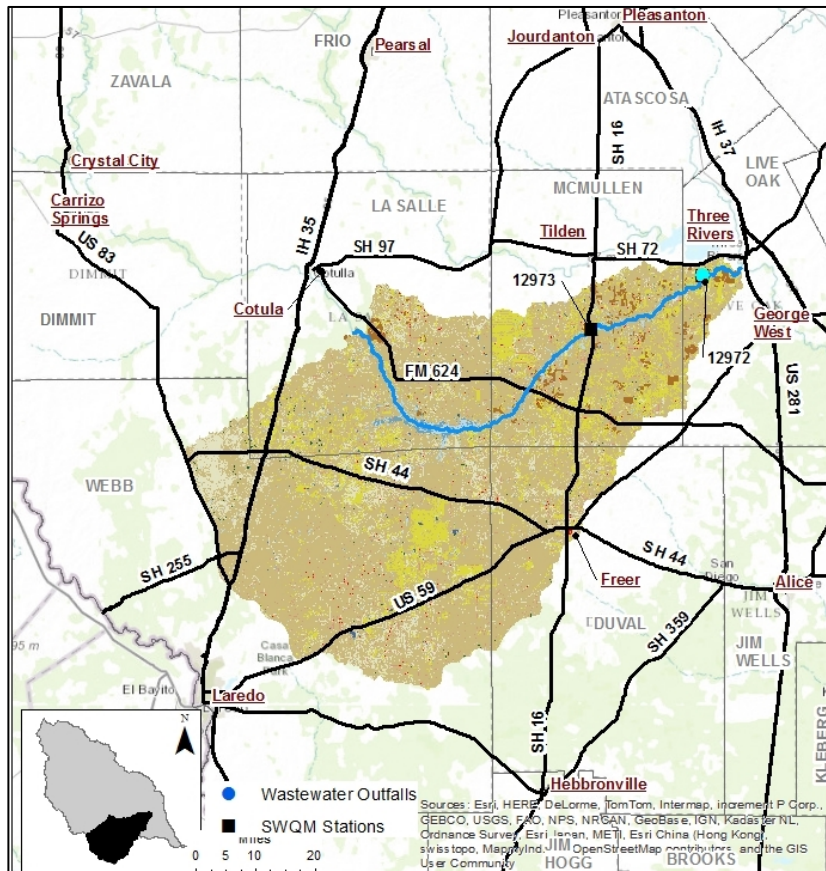
The segment is listed as being impaired for TDS as a result of the 2010 Texas Integrated Report. A proposed standards revision from 500 mg/l to 750 mg/l is under consideration. If and when approved, the lake would meet the new standard and be removed from the 303 (d) List. TDS levels tend to increase as lake levels drop and can be attributed to evaporation of surface waters that concentrate the dissolved solids. The water level graph displays the lake percent of capacity from December 1, 2005 through November 30, 2012.

The segment is also listed as having concerns for total phosphorus (AU_02, AU_04 and AU_06), and chlorophyll-a (AU_01, AU_02, and AU_06). All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.





2104: Nueces River Above Frio River

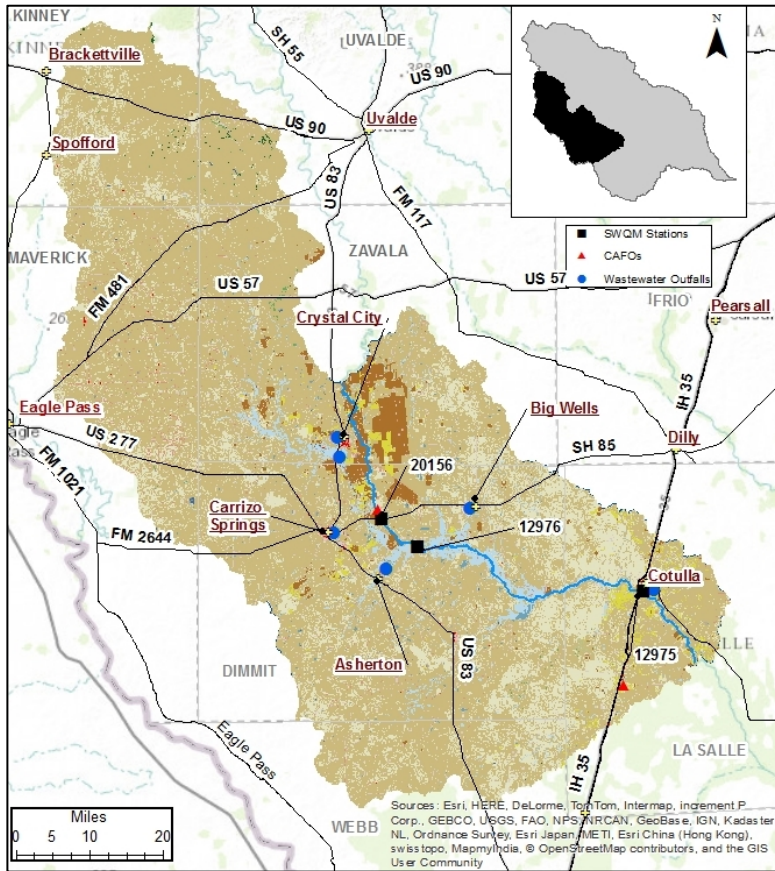


The segment flows 91 miles from Holland Dam in La Salle County to its confluence with the Frio River in Live Oak County. It is divided into three AUs; from the downstream end of the segment to the confluence with Dragon Creek (AU_01), from the confluence with Dragon Creek to the confluence with Guadalupe Creek (AU_02), and from the confluence with Guadalupe Creek to Holland Dam (AU_03). Its watershed is 1,876,877 acres. The area is dominated by large ranches.

The depressed DO concern for the minimum screening level is listed in the Draft 2014 Integrated Report for AU_03. Due to the ongoing drought, NRA has not been able to collect a sufficient number of 24-Hr DO measurements to fully evaluate the concern. All the other assessed water quality parameters met their assessment criteria in the Draft 2014 Integrated Report. Biological impairments and concerns identified in the 2010 Texas Integrated Report are being carried forward in the Draft 2014 Integrated Report.



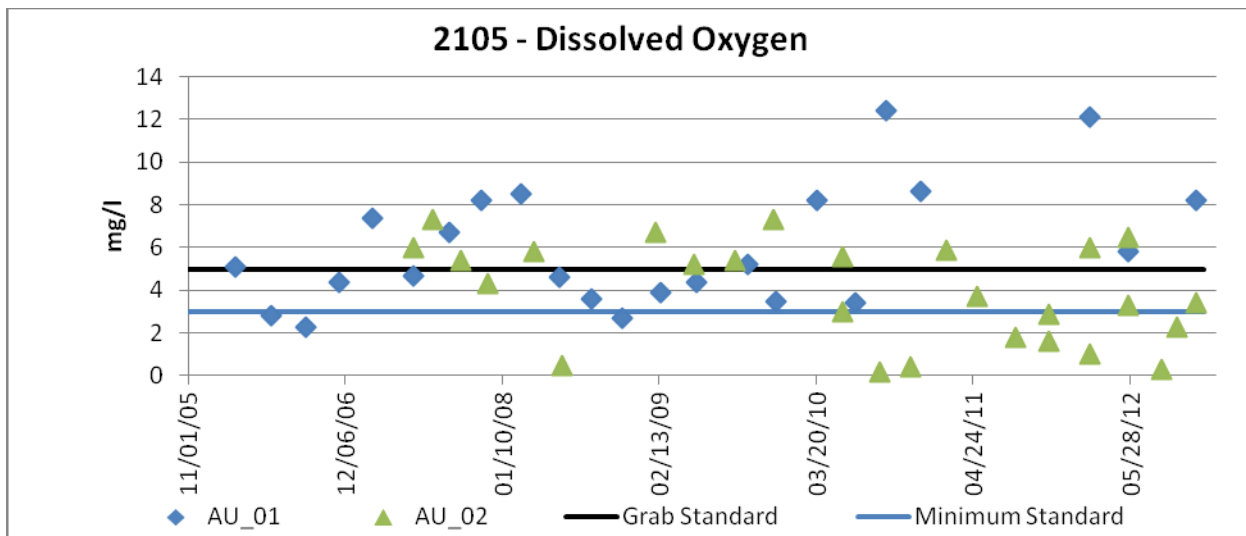
2105: Nueces River Above Holland Dam

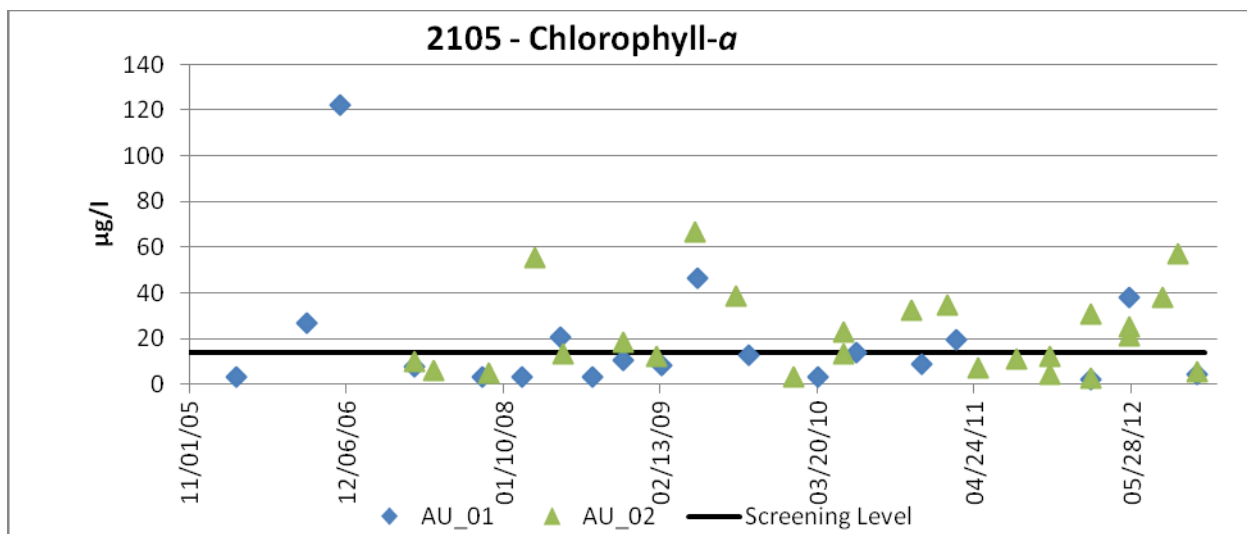


The segment flows 78 miles from FM 1025 in Zavala County to Holland Dam in La Salle County. It is divided into three AUs; from the downstream end of the segment to the confluence with Sauz Mocho Creek (AU_01), from the confluence with Sauz Mocho Creek to the confluence with Line Oak Slough (AU_02), and from the confluence of Live Oak Slough to the upstream end. (AU_03). Its watershed is 2,200,065 acres.

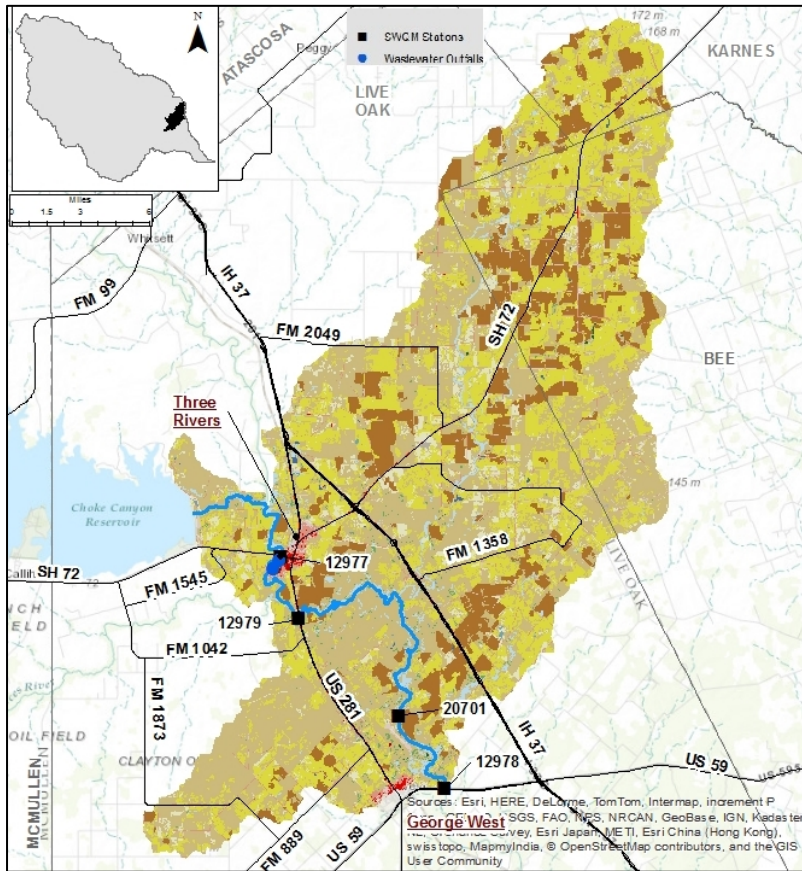
The Cities of Crystal City, Carrizo Springs, Asherton, Big Wells, and Cotulla are all in this watershed. Each of these cities has WWTPs that discharge into the river.

AU_01 has concerns for depressed DO for the grab screening level and for chlorophyll-a. AU_02 is impaired for depressed DO at the grab minimum and a concern for chlorophyll-a. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.





2106: Nueces River / Lower Frio River



The segment flows 27 miles from Choke Canyon Reservoir Dam to just upstream of US 59. It is divided into two AUs; the Nueces River from the downstream end to the confluence with the Frio River (AU_01), and the Frio River from the confluence with the Nueces River to the Choke Canyon Reservoir Dam (AU_02). Its watershed is 204,055 acres.

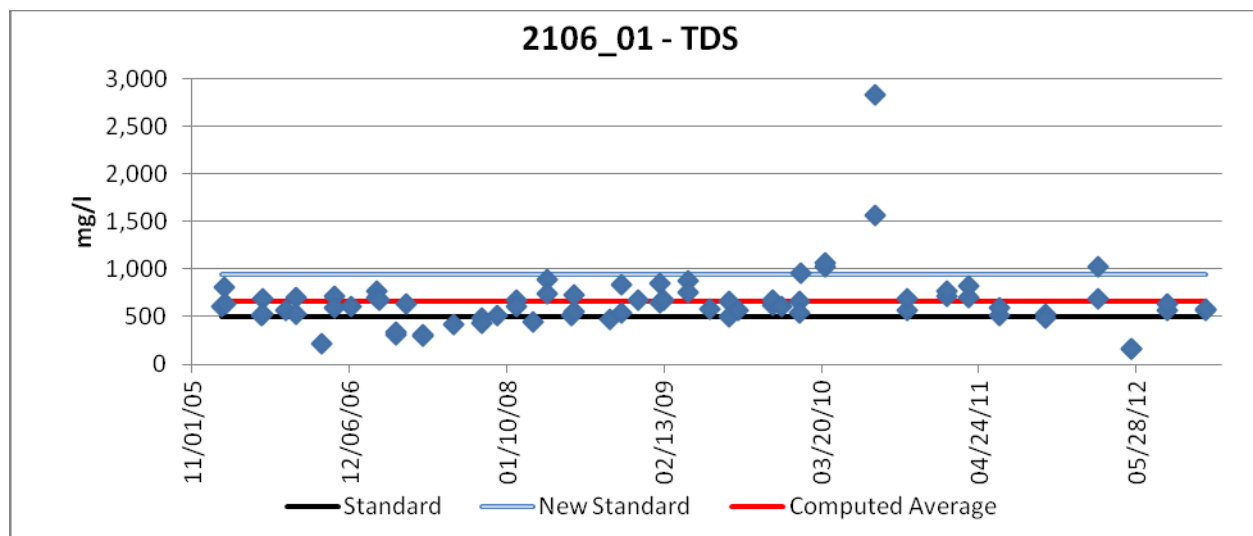
The City of Three Rivers and the Valero Refinery WWTPs discharge to the Frio River below SH 72.

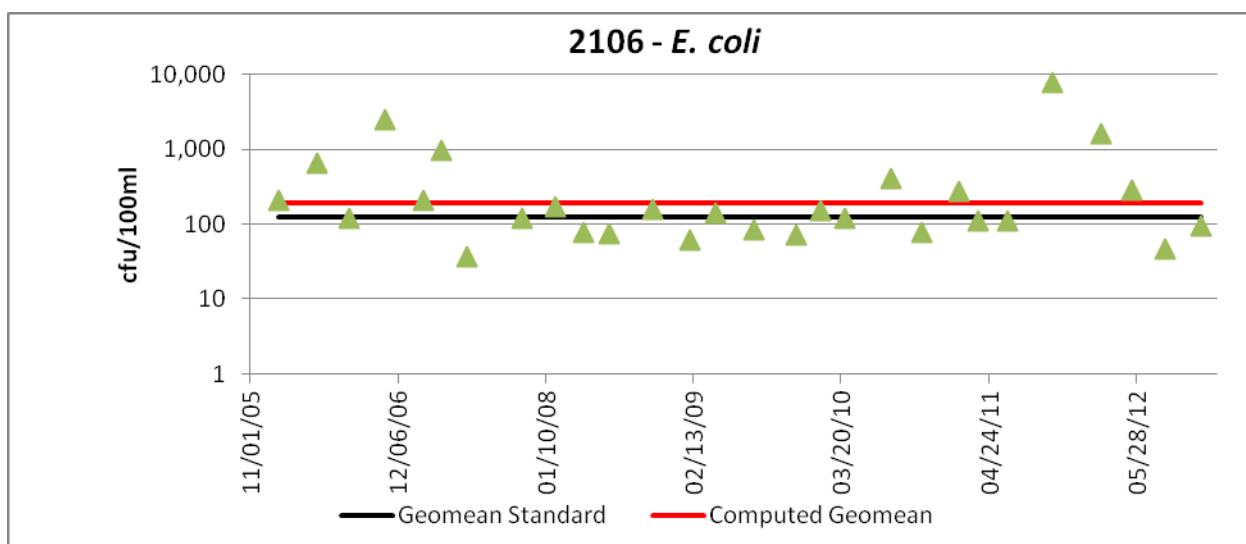
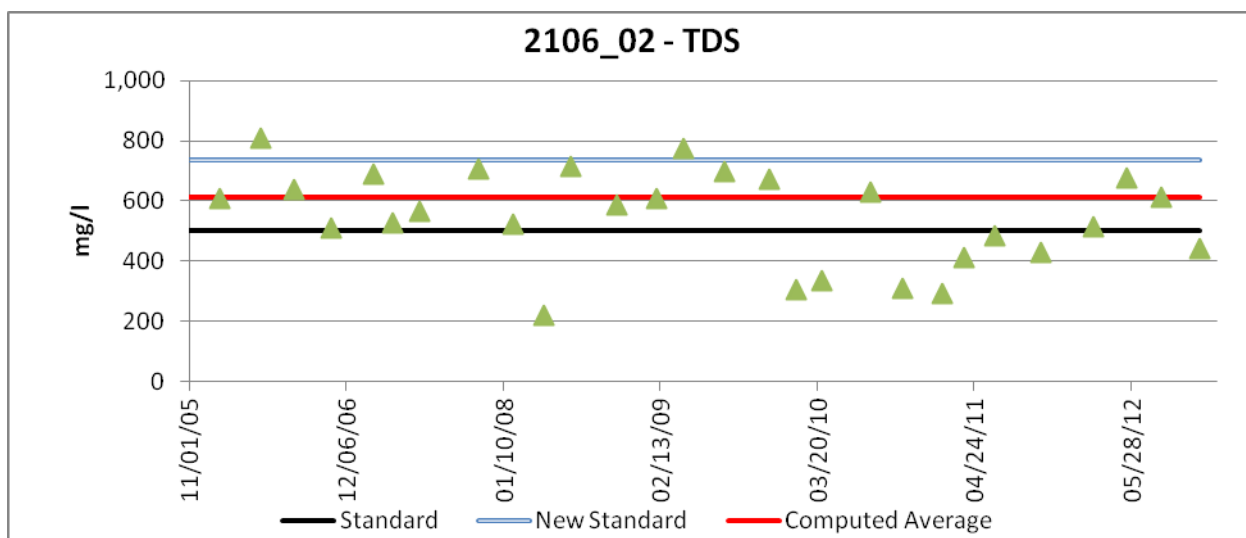
Both AUs have been listed as being impaired for TDS since the 2006 Assessment. The standard is based on the average of all values and is currently 500 mg/l for both AUs. Alan Plummer and Associates, Inc., working on behalf of the City of Corpus Christi, worked with TCEQ to develop revised and separate 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 and 735 mg/l in the upstream portion. If and when approved, both AUs will meet the new 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 145 mg/l.

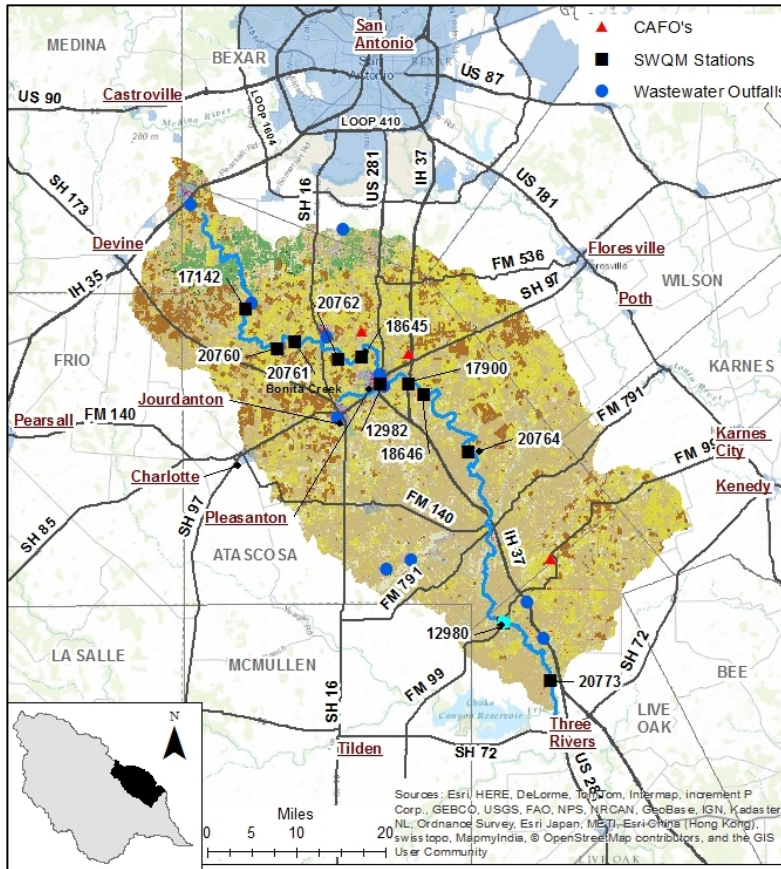
For AU_02, chloride would increase from 250 mg/l to 285 mg/l and sulfate would decrease from 250 mg/l to 145 mg/l.

Both AUs are also listed as having a concern for chlorophyll-a. A bacteria impairment for AU_02 was identified in the 2014 Assessment. All the other assessed parameters met their assessment criteria in the Draft 2014 Integrated Report.





2107: Atascosa River



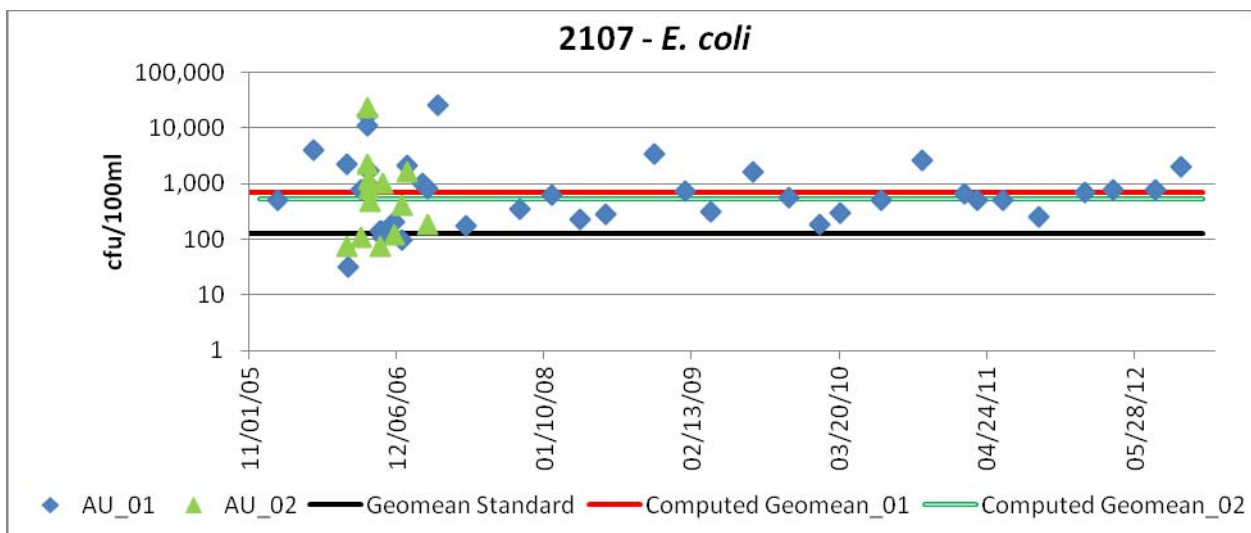
The segment flows 103 miles from the confluence of the West Prong Atascosa River and the North Prong Atascosa River in Atascosa County to the confluence with the Frio River in Live Oak County. It is divided into four AUs; from the downstream end to the confluence with Borrego Creek (AU_01), from the confluence with Borrego Creek to the confluence with Galvan Creek (AU_02), from the confluence with Galvan Creek to the confluence with Palo Alto Creek (AU_03), and from the confluence with Palo Alto Creek to the upper end of the segment. Its watershed is 886,750 acres.

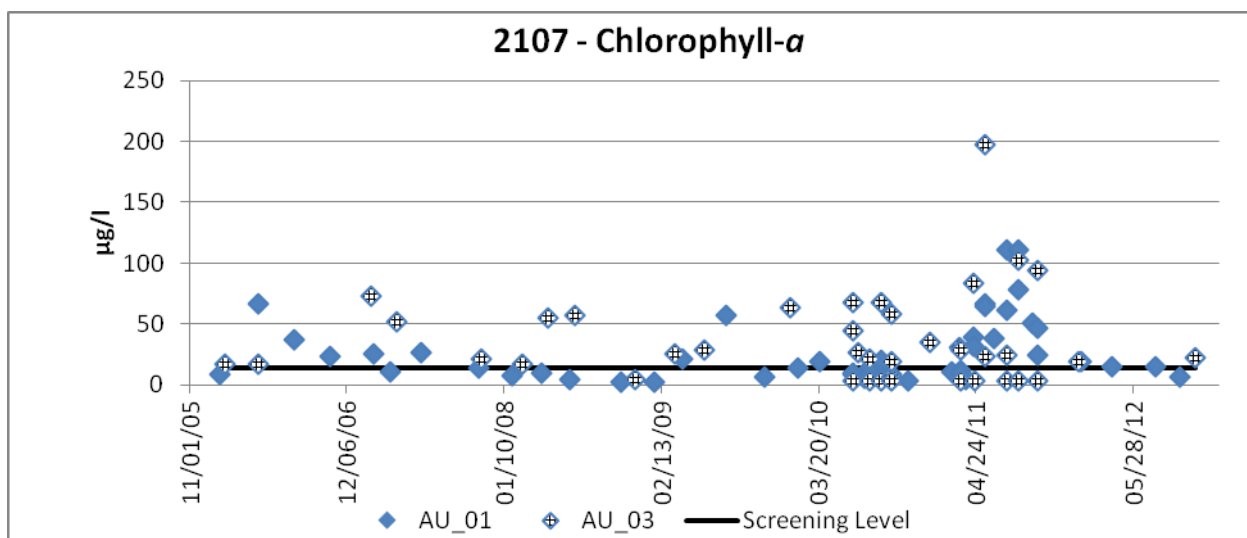
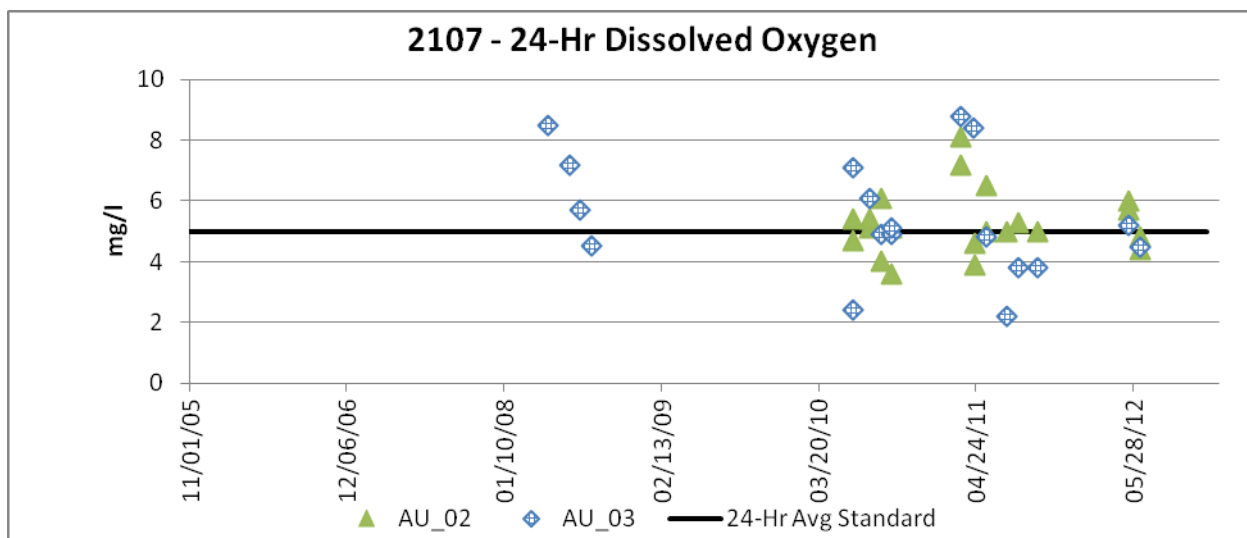
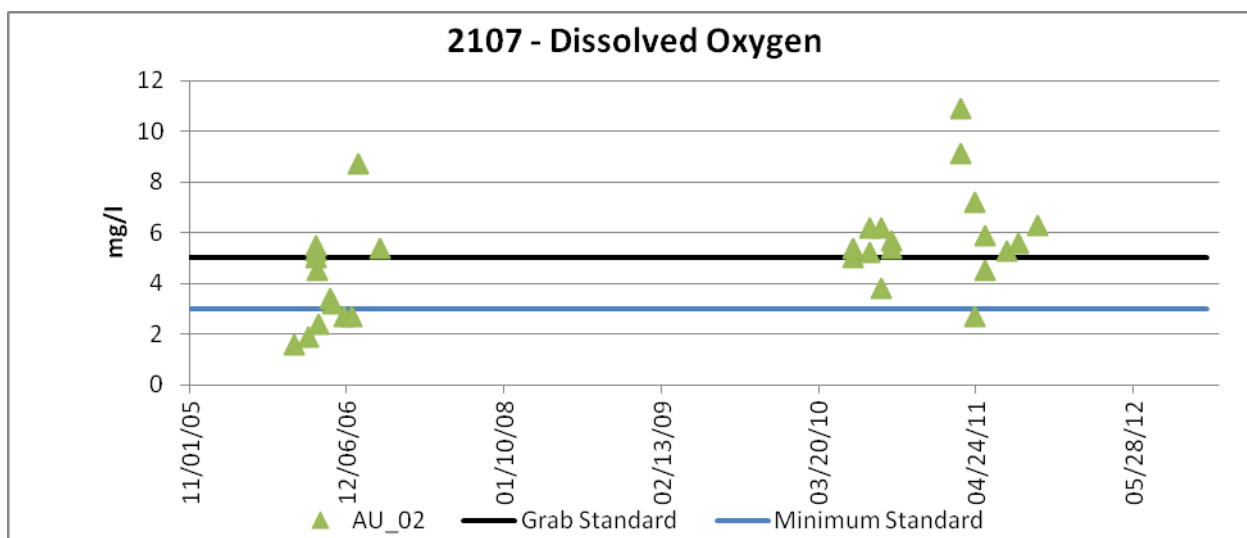
AU_01 and AU_02 have been listed as being impaired for bacteria for primary contact recreation since the 1996 Assessment. Sampling for a TMDL to address the bacteria impairment was conducted between 2002 and 2004. The sampling confirmed the impairment and an RUAA was conducted by Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University.

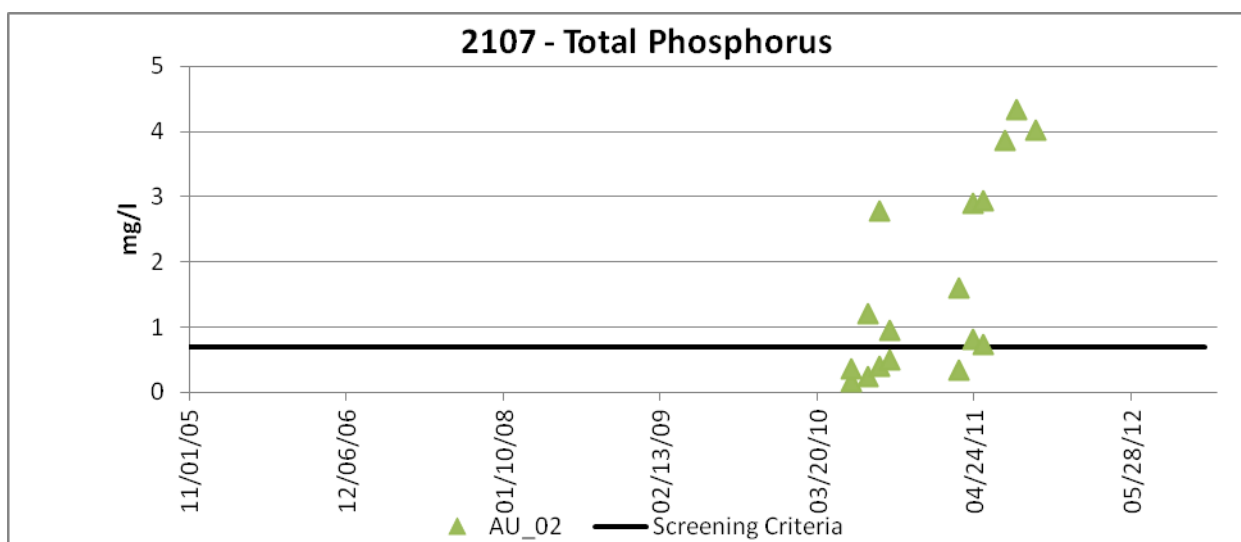
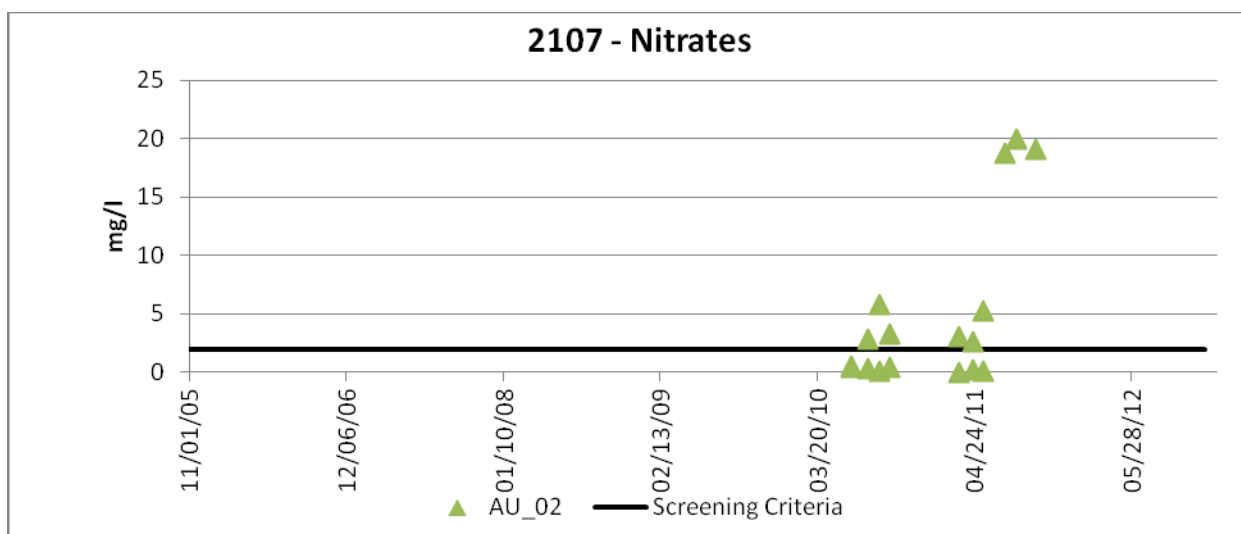
AU_02 and AU_03 have had concerns and impairments for low DO since the 1996 Assessment. Additional 24-Hr DO sampling assess DO was also conducted during the TMDL resulting in the current listings of a concern for low DO at the grab screening level and an impairment for low DO at the grab minimum in AU_02 and for impairments for 24-Hr DO average in AU_02 and AU_03.

Chlorophyll-a remains a concern in AU_01 and AU_03. Nitrate and total phosphorus are concerns in AU_02.

Biological impairments and concerns identified in the 2006 Water Quality Inventory and 2010 Texas Integrated Report are being carried forward in the Draft 2014 Integrated Report.







The TMDL and other extensive sampling that has taken place on this segment has resulted in some proposed standards revisions as well as changes to the segment descriptions. If and when approved:

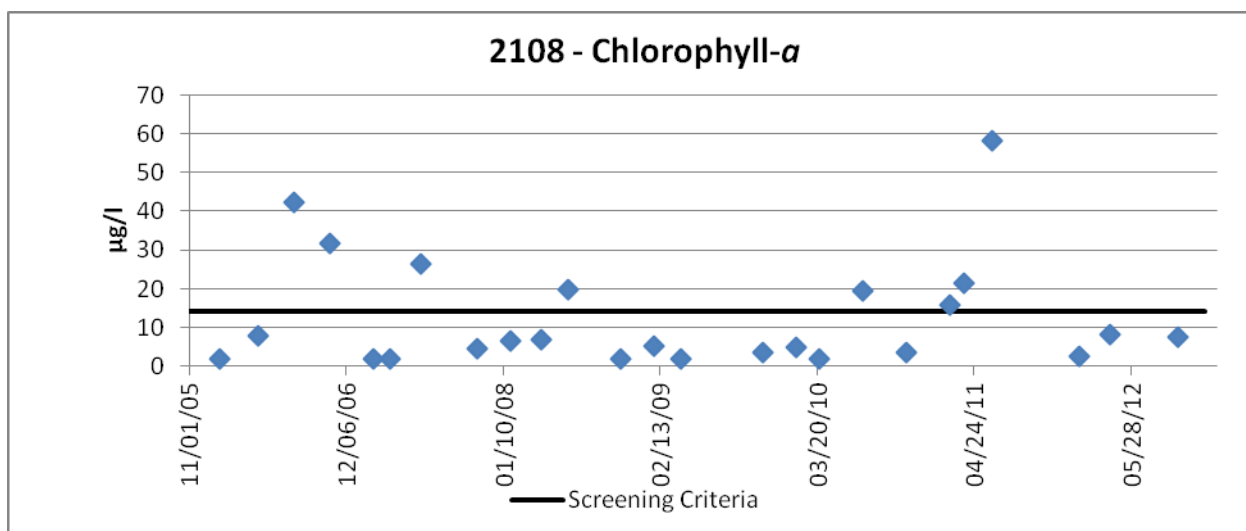
- Segment 2107 is proposed to be what is currently AU_01, from the confluence with the Frio River in Live Oak County to the confluence with Borrego Creek in Atascosa County,
- a new Segment 2118 will be what is currently AU_02, from the confluence with Borrego Creek in Atascosa County to the confluence with Galvan Creek in Atascosa County, and the 24-Hr DO average standard will be 4.0 mg/l instead of 5.0 mg/l,
- what is currently AU_03, from the confluence with Galvan Creek in Atascosa County to the confluence with Palo Alto Creek in Atascosa County, will be moved to Appendix D of the Texas Water Quality Standards; the 24-Hr DO average standard will be 3.0 mg/l instead of 5.0 mg/l and the minimum DO grab standard will be 2.0 mg/l instead of 3.0 mg/l, and
- what is currently AU_04, from the confluence with Palo Alto Creek in Atascosa County to the headwaters in Atascosa County, will be considered the undescribed portion; the 24-Hr DO average standard will be 2.0 mg/l instead of 5.0 mg/l and the minimum DO grab standard will be 1.5 mg/l instead of 3.0 mg/l.

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. The proposed standards for Segment 2118 for chloride, sulfate, and TDS are 350 mg/l, 700 mg/l, and 1,550 mg/l, respectively.

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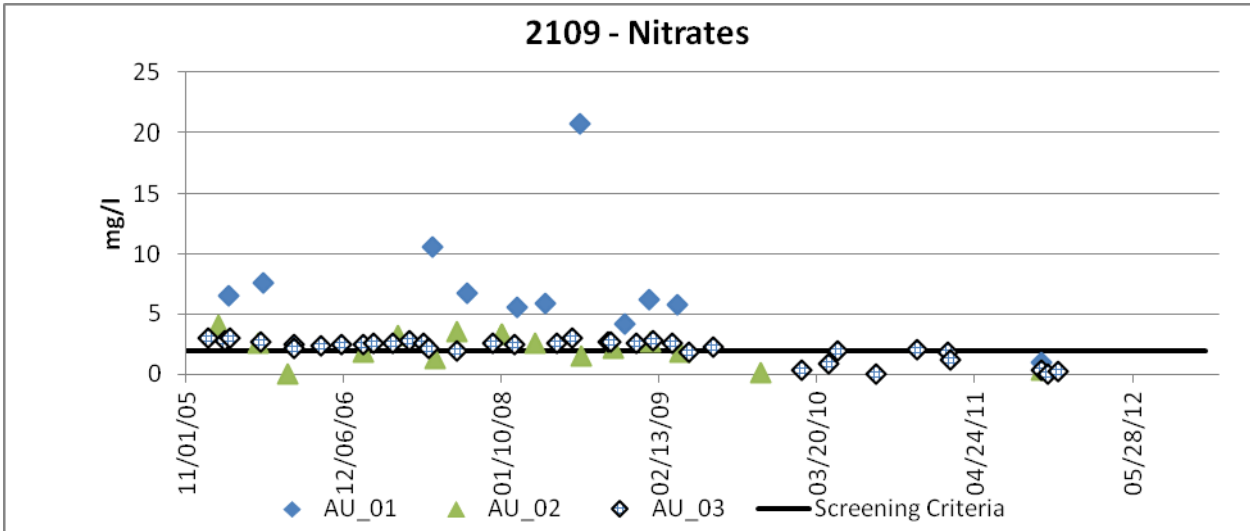
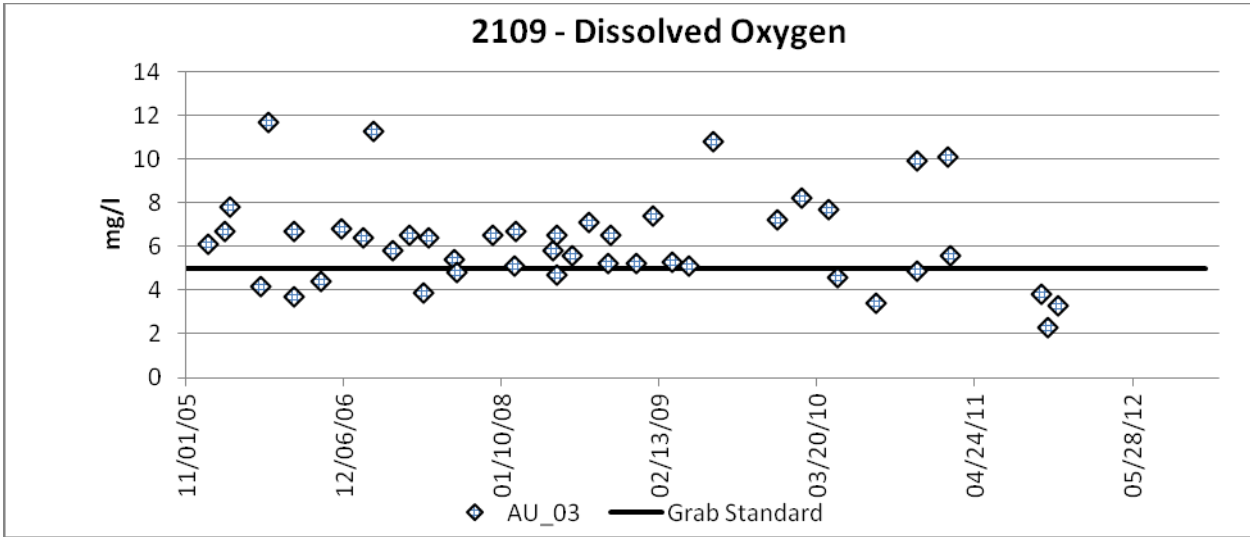
AU_01 also has a concern for chlorophyll-a.





This map illustrates the Rio Grande watershed in the Rio Grande Valley, Texas. The Rio Grande is shown as a prominent blue feature flowing through the landscape. Land use is categorized by color: brown for urban areas, green for agriculture, and light green for natural areas. Major infrastructure includes highways (US 90, US 83, US 57, US 51, FM 140, FM 117, FM 1025, FM 1867, FM 40, IH 35, CR 201, FM 481, SH 55, SH 127, RM 2800) and cities/towns such as Sabinal, Uvalde, La Pryor, Pearsall, Dilley, and Hondo. Environmental features include SWQM Stations (black squares), Waste Water Outfalls (blue circles), and CAFOs (red triangles). Elevation points are marked with values like 988 m, 294 m, 233 m, 999.1 m, and 21063. The map also shows the Rio Hondo, Rio Frio, and Rio Grande rivers. A legend in the top right corner defines the symbols for SWQM Stations, Waste Water Outfalls, and CAFOs. An inset map in the bottom left shows the location of the study area within the state of Texas. The map is sourced from Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.

The entire segment was listed as being impaired for bacteria for primary contact recreation as a result of the 2006 Water Quality Inventory. An RUAA was conducted by TIAER from January 2011 through December 2012. Visit <http://www.leonariver.org/> for more information.

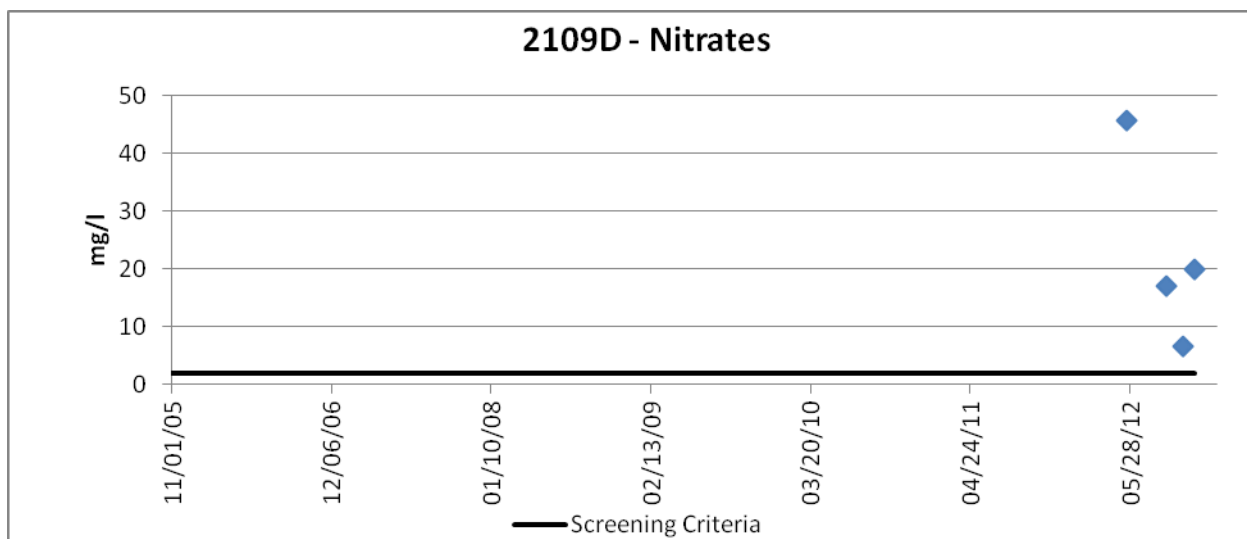
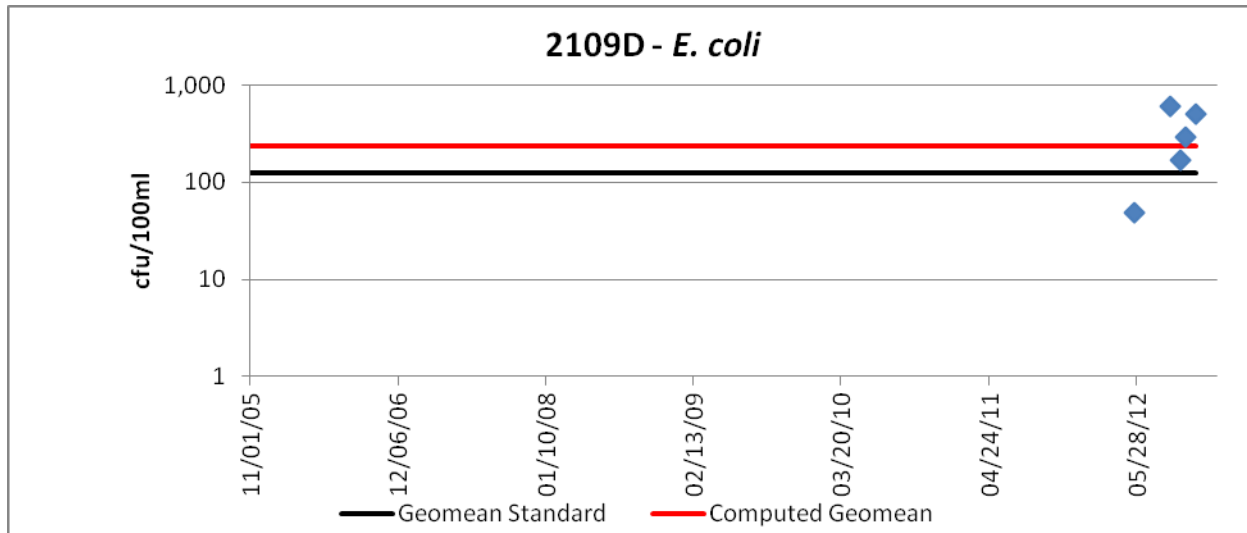


2109C: Live Oak Creek

This unclassified waterbody is within the Leona River watershed and is from its confluence with the Leona River in Zavala County to the headwaters approximately 15.2 km upstream of US Hwy 57 in Zavala County. Only limited DO data collected during the Leona RUAA was assessed, and no concerns or impairments were listed in the Draft 2014 Integrated Report.

2109D: Gallina Slough

This unclassified waterbody is within the Leona River watershed and is from its confluence with the Leona River in Zavala County to the headwaters approximately 9 km upstream of US Hwy 57 in Zavala County. Based on limited data collected during the Leona RUAA, it is assessed as having concerns for bacteria and nitrates.



• Wastewater Outfalls
 ■ SWQM Stations
 ▲ CAFOs

MEDINA
 UVALDE
 Sabinal
 FM 1796
 CR 334
 CR 312
 US 90
 CR 301
 CR 167
 12993

Miles
 0 1.25 2.5 5

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapboxIndia, © OpenStreetMap contributors, and the GIS User Community

The segment was first listed as being impaired for nitrates in the 2002 Assessment. The suspected source was the Sabinal WWTP which was subject to inundation during floods. A TMDL was conducted and an Implementation Plan has been approved. The plan called for the construction of a new plant which has been completed and came online on July 27, 2011.

2110 - Nitrates

mg/l

Screening Criteria

Date	Nitrate Level (mg/l)
11/01/05	10
11/01/05	6
11/01/05	6
12/06/06	6
12/06/06	7
12/06/06	5
12/06/06	3
01/10/08	2
01/10/08	11
01/10/08	15
01/10/08	17
02/13/09	17
02/13/09	15
02/13/09	11
02/13/09	9
03/20/10	9
03/20/10	4
03/20/10	4
03/20/10	8
04/24/11	0
04/24/11	8
05/28/12	11
05/28/12	6
05/28/12	4

2111: Upper Sabinal River



The segment flows 48 miles from the most upstream crossing FM 187 in Bandera County to a point 100m upstream of SH 127 in Uvalde County. It is divided into two AUs; from the downstream end to the confluence with the West Sabinal River (AU_01), and from the confluence with the West Sabinal River to the upstream end (AU_02). Its watershed is 149,444 acres. The Cities of Utopia and Vanderpool are the only communities in the watershed. Lost Maples State Park is near the headwaters.

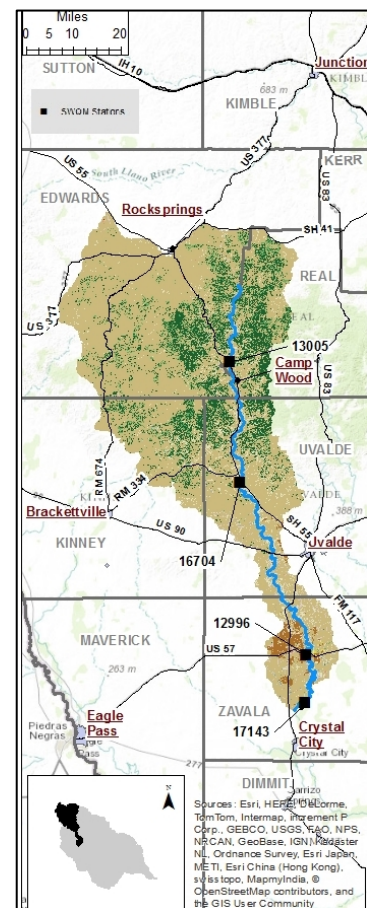
All assessed parameters met the standards in the Draft 2014 Assessment.



2112: Upper Nueces River

The segment 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. It is divided into four AUs; from the downstream end to the confluence with Sand Ridge Creek (AU_01), from the confluence with Sand Ridge Creek to just downstream of US 90 (AU_02), from just downstream of US 90 the confluence with Miller Creek (AU_03), and from the confluence with Miller Creek to the upstream end. Its watershed is 1,336,006 acres. There are several smaller communities in the watershed.

All assessed parameters met the standards in the Draft 2014 Assessment.



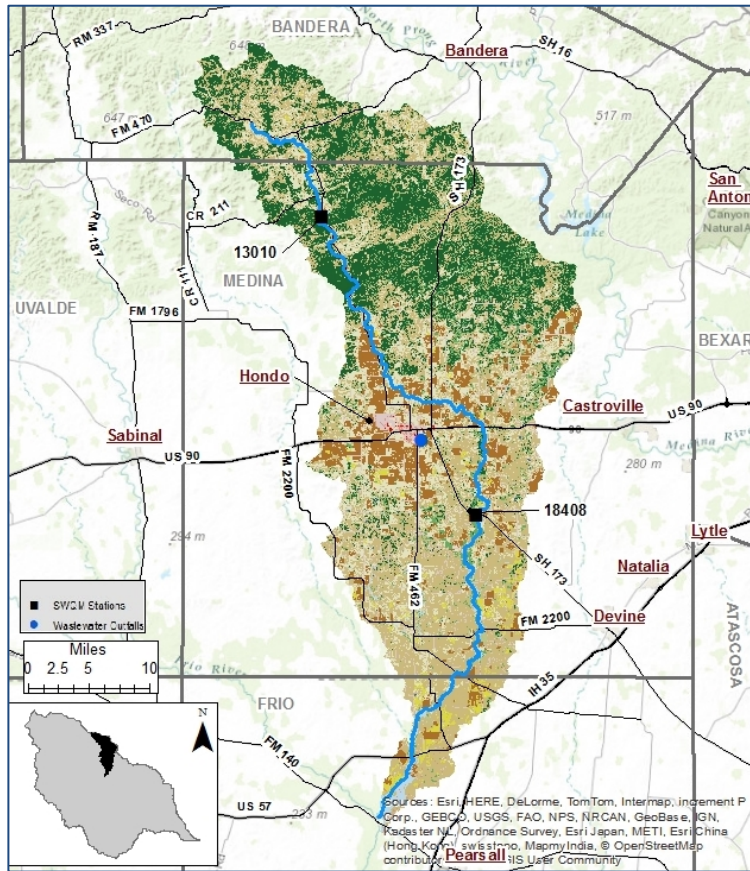
Map of the San Geronimo National Monument area in southern Arizona. The map shows the San Pedro River flowing through the region, with various towns and landmarks labeled. Key locations include Lees Ferry, Uvalde, and the San Pedro River National Monument. The map also displays major roads (RM 128, RM 337, RM 157, RM 195, RM 268, CR 101, SH 127, SH 138, US 90) and a scale bar (0 to 10 miles). An inset map shows the location of the study area within the state of Arizona. The map is color-coded to show different land management zones: green for National Forest, yellow for BLM land, and brown for private land.

Sources: Esri, DigitalGlobe, GeoEye, AeroGRID, IGN, USGS, FAO, NPS, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox India, OpenStreetMap contributors, and the GIS User Community

All assessed water quality parameters met the standards. Biological impairments and concerns identified in the 2006 Water Quality Inventory are being carried forward in the Draft 2014 Integrated Report.

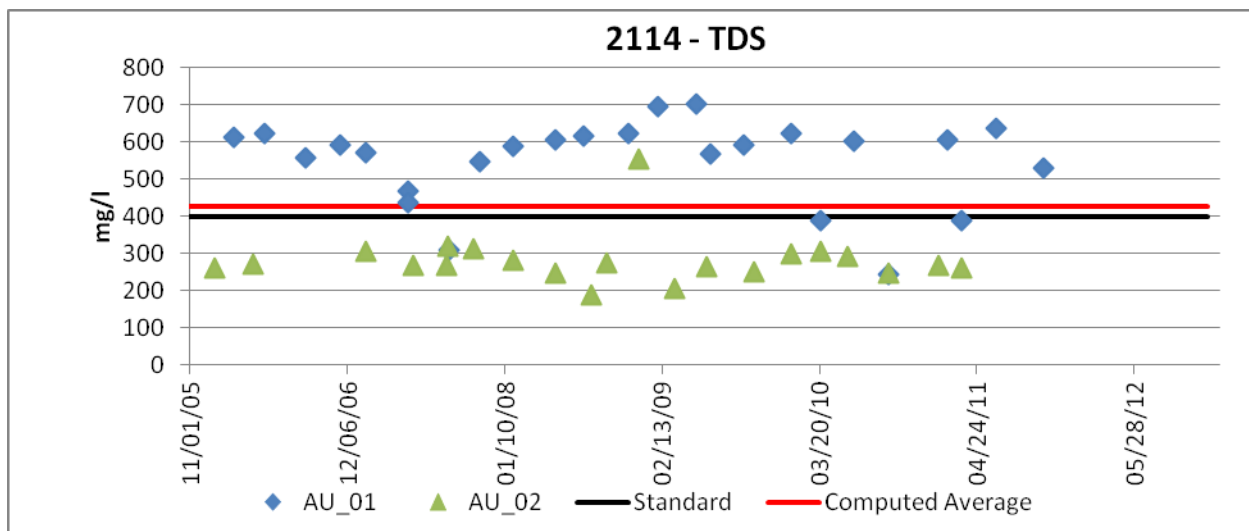


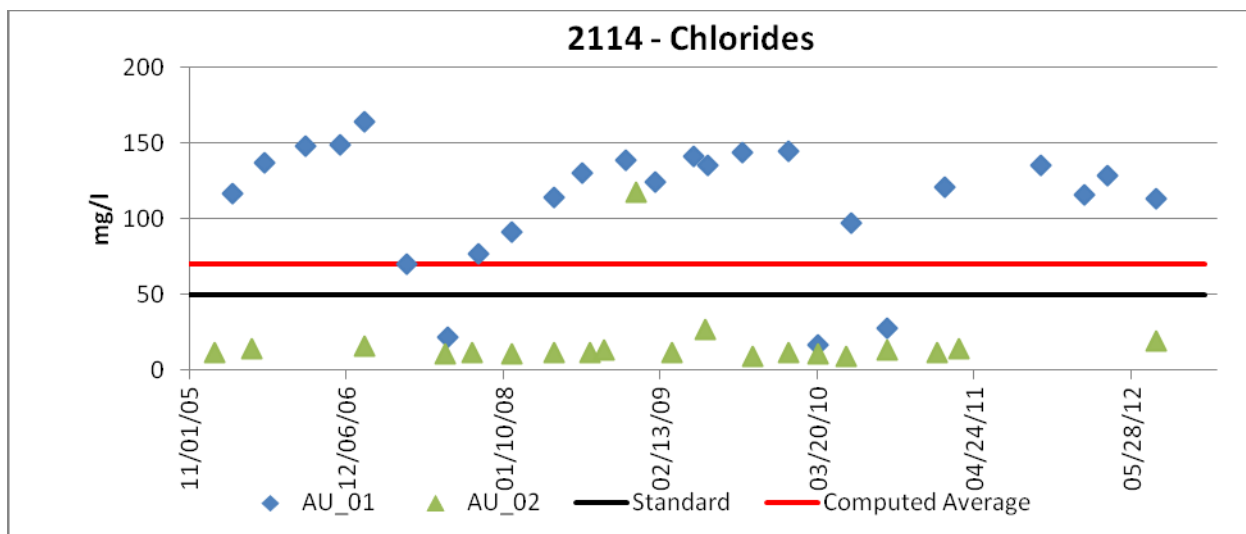
2114: Hondo Creek



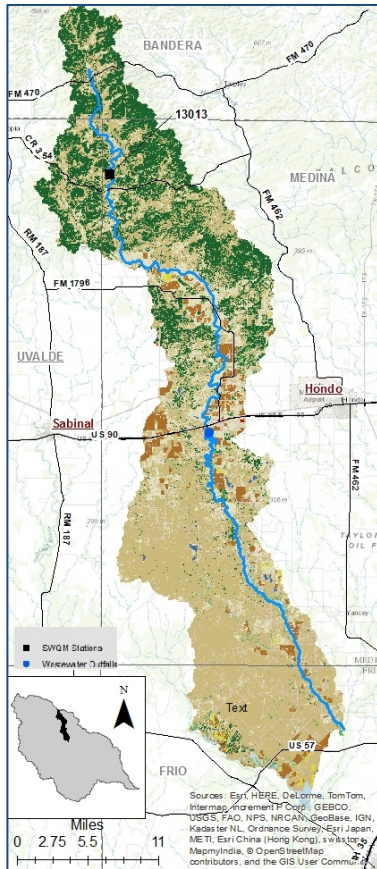
The segment flows 78 miles from FM 470 in Bandera County to the confluence with the Frio River in Frio County. It is divided into two AUs; from the downstream end to just upstream of FM 2676 (AU_01), and from just upstream of FM 2676 to the upstream end (AU-02). Its watershed is 435,985 acres. The City of Hondo WWTP discharges to this segment.

There are concerns for TDS and chloride for the entire segment and for nitrate in AU_01. It is obvious from the graphs that the TDS and chloride levels in AU_01 are the cause of the concern. The sampling site in AU_02 was dropped by TCEQ beginning FY 2013. NRA picked the site back up beginning in FY 2015 to provide additional information for the assessments.





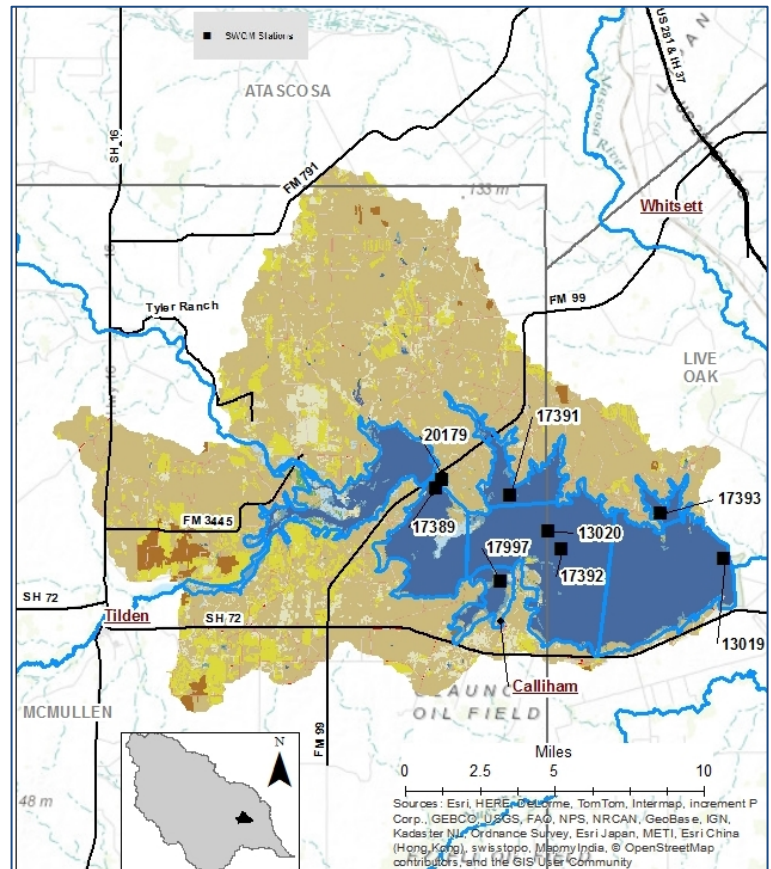
2115: Seco Creek



The segment flows 70 miles from the confluence with West Seco Creek in Bandera County to the confluence with Hondo Creek in Frio County. It is divided into two AUs; from the downstream end to the confluence with an unnamed tributary near FM 1796 (AU_01), and from the confluence with an unnamed tributary near FM 1796 to the upstream end (AU_02). Its watershed is 266,833 acres. There are no sampling sites in AU_01.

All assessed parameters met the standards in the Draft 2014 Integrated Report.

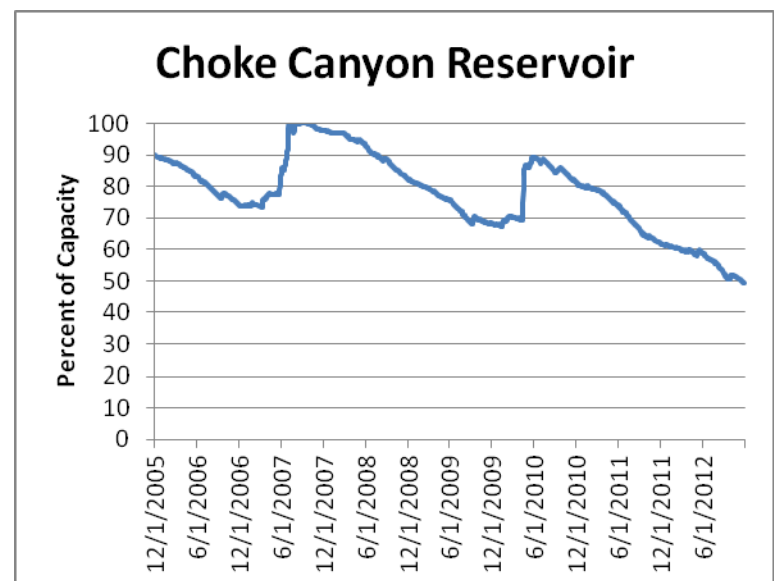
2116: Choke Canyon Reservoir



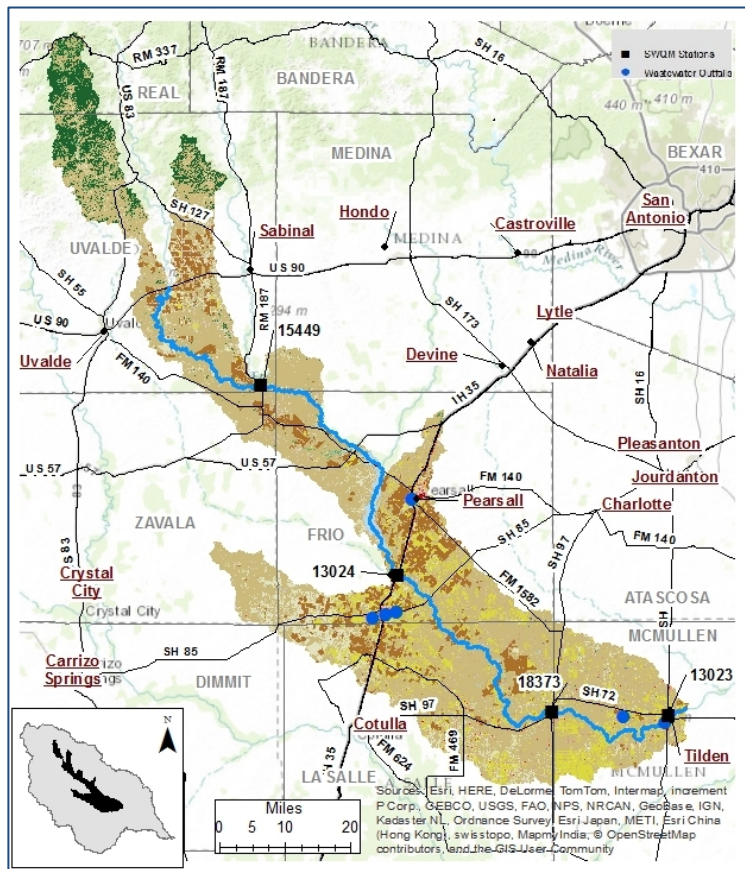
Choke Canyon Reservoir impounds the Frio River and is defined by the 220.5' MSL elevation. The reservoir covers portions of McMullen and Live Oak Counties. When near capacity, the water levels at the Frio River at Tilden are affected.

The reservoir is divided into seven AUs; the 5120 acres near the dam (AU_01), the small north arm near the dam and Willow Hollow Tank (AU_02), the 5120 acres in the middle of the reservoir (AU_03), the large north arm near mid-reservoir and Jacob Oil Field (AU_04), the southern arm near mid-reservoir and Rec. Road 7 west of Calliham (AU_05), the western end of the reservoir up to RR 99 (AU_06), and from RR 99 to the upper end (AU_07). Its watershed is 11,304 acres.

All assessed parameters met the standards in the Draft 2014 Integrated Report. The last time the reservoir was full was in September 2007. The graph shows the percent of capacity during the assessment period. With no significant inflow, the water level continues to drop and is below 25% at the time of this writing.



2117: Frio River Above Choke Canyon Reservoir

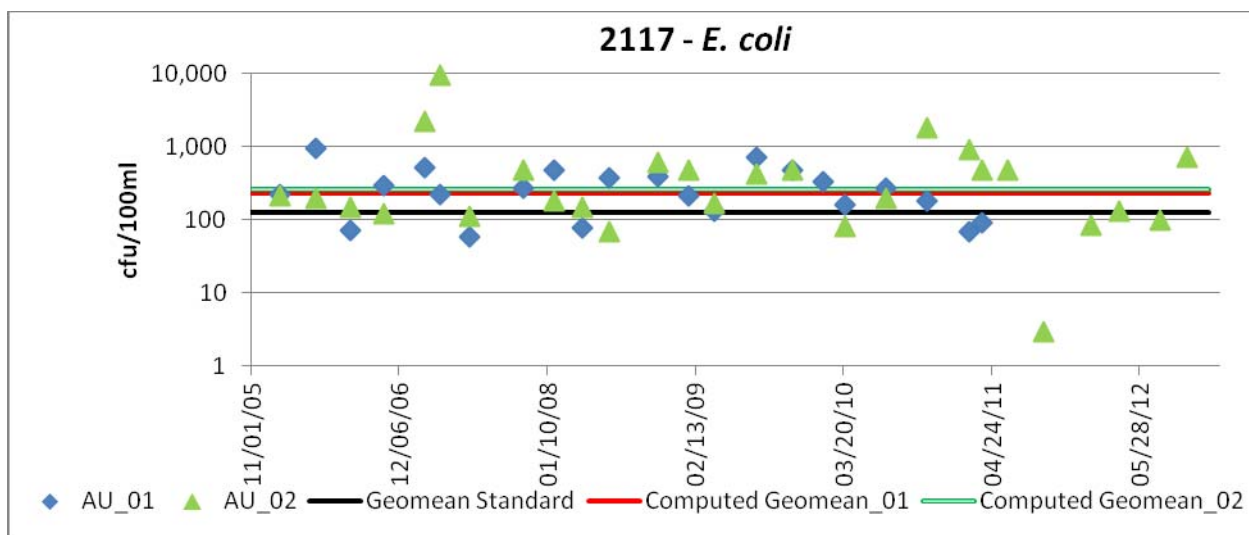


The segment flows 158 miles from 100m upstream of US 90 in Uvalde County to the confluence with Choke Canyon Reservoir in McMullen County. The segment is divided into six AUS; from Choke Canyon Reservoir to the confluence with Esperanza Creek (AU_01), from the confluence with Esperanza Creek to the confluence with Ruiz Creek (AU_02), from the confluence with Ruiz Creek to the confluence with Live Oak Creek (AU_03), from the confluence with Live Oak Creek to the confluence with Elm Creek (AU_04), from the confluence with Elm Creek to the confluence with Spring Branch (AU_05), and from the confluence with Spring Branch to the upper end of the segment. Its watershed is 1,161,405 acres.

AU_01 and AU_02 are listed as being impaired for bacteria for primary contact recreation as a result of the 2012 Integrated Report and 2008 Water Quality Inventory, respectively. Both AUs also have a concern for chlorophyll-a.

AU_01 through AU-03 have a concern for low DO at the grab screening level.

AU_03 through AU-05 have a concern for nitrates. Although there are no sampling sites in AU_04, a concern for nitrates is being carried forward in the Draft 2014 Integrated Report most likely because the AUs on either side have high levels.



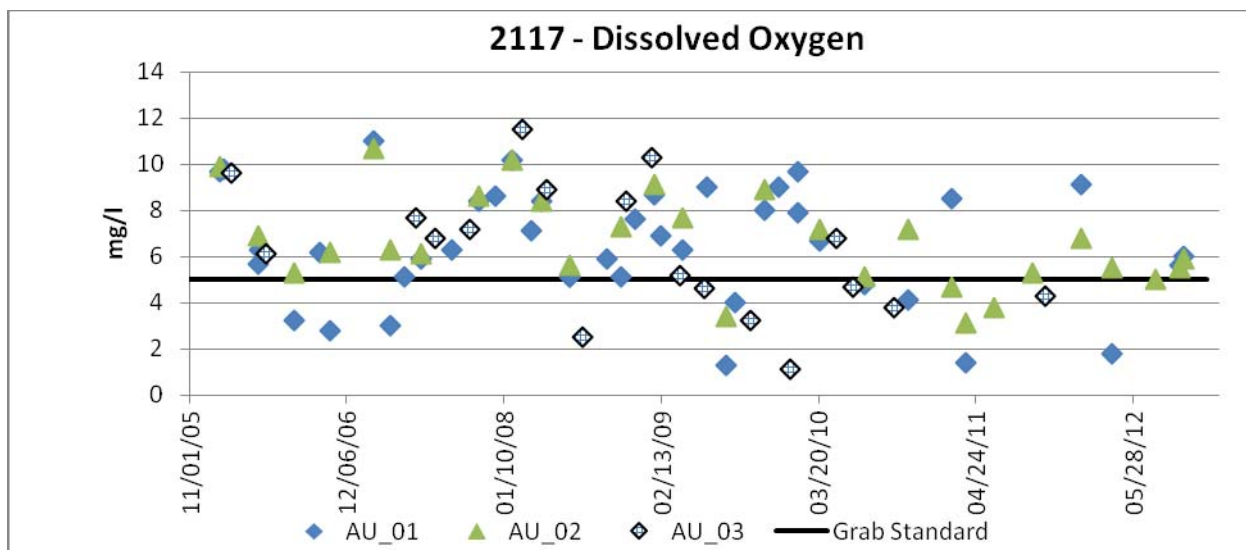
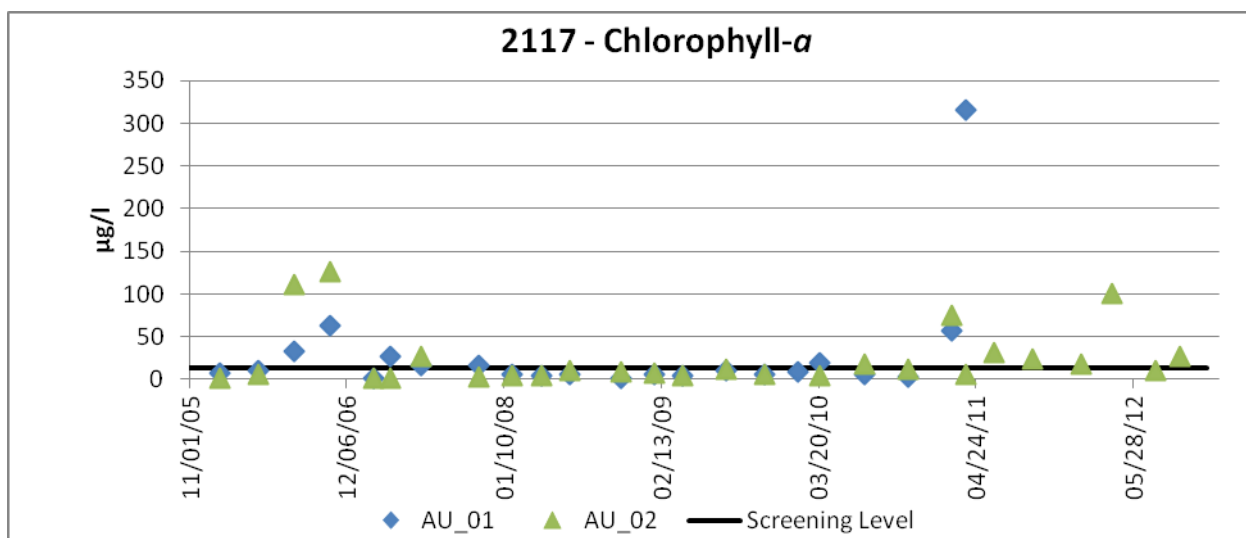


Table 3-4: List of Impairments and Concerns in the Nueces River Basin

Segment Name	AU	Description	Impairment	Concern
2101 Nueces River Tidal	01	Entire water body	none	Chlorophyll-a
2102 Nueces River Below Lake Corpus Christi	01	From the downstream end of segment to the confluence with Javelin Creek	TDS	Chlorophyll-a
	02	From the confluence with Javelin Creek to the upstream end of segment at Lake Corpus Christi	TDS	Chlorophyll-a
2103 Lake Corpus Christi	01	Mid lake near dam	TDS	Chlorophyll-a,
	02	Area ~ 4 miles SE of FM 3162 and FM 634 intersection near western shore	TDS	Chlorophyll-a, Total Phosphorus
	03	Western arm of lake near Lagarto Creek Inlet	TDS	none
	04	Upper portion of lake on opposite shore from Hideaway Hill	TDS	Total Phosphorus
	05	Upper arm of lake in more riverine section surrounding FM 534	TDS	none
	06	Uppermost riverine part of reservoir upstream of FM 534 to upper end of segment to just upstream of US Hwy 59	TDS	Chlorophyll-a, Total Phosphorus
2104 Nueces River Above Frio River	01	From the downstream end of the segment to the confluence with Dragon Creek	none	Impaired macrobenthic community
	02	From the confluence with Dragon Creek to the confluence with Guadalupe Creek	none	Impaired fish community, impaired macrobenthic community
	03	From confluence of Guadalupe Creek to Holland Dam	none	DO
2105 Nueces River Above Holland Dam	01	From the downstream end of the segment to the confluence with Sauz Mocho Creek	none	Chlorophyll-a, DO
	02	From the confluence with Sauz Mocho Creek to the confluence with Live Oak Slough	DO	DO, Chlorophyll-a
	03	From the confluence of Live Oak Slough to the upstream end	None	none
2106 Nueces / Lower Frio River	01	The Nueces River from the downstream end to the confluence with the Frio River	TDS	none
	02	The Frio River from the confluence with the Nueces River to the Choke Canyon Reservoir Dam	Bacteria, TDS	none
2107 Atascosa River	01	From the downstream end to the confluence with Borrego Creek	Bacteria	Chlorophyll-a
	03	From confluence with Borrego Creek to the confluence of Galvan Creek	Bacteria, DO, Impaired fish community, Impaired macrobenthic community	DO, Impaired habitat, Nitrate, Total Phosphorus
	03	From the confluence with Galvan Creek to the confluence with Palo Alto Creek	DO, Impaired fish community, Impaired macrobenthic community	Impaired habitat, Chlorophyll-a
	04	From the confluence with Palo Alto Creek to the upper end of the segment	None	None
2108 San Miguel Creek	01	From Choke Canyon Reservoir to the confluence with Live Oak Creek	Bacteria	Chlorophyll-a
	02	From the confluence of Live Oak Creek to the upstream end of the segment	none	none

Table 3-4: List of Impairments and Concerns in the Nueces River Basin (cont.)

Segment Name	AU	Description	Impairment	Concern
2109 Leona River	01	From the confluence with the Frio River to the confluence with 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	Bacteria	DO, Nitrate
2109C Live Oak Creek	01	From its confluence with the Leona River in Zavala County to the headwaters approximately 15.2km upstream of US Hwy 57 in Zavala County	none	none
2109D Gallina Slough	01	From the confluence with the Leona River in Zavala County to the headwaters ~ 9km upstream of US Hwy 57 in Zavala County	none	Bacteria, Nitrate
2110 Lower Sabinal River	01	Entire water body	nonr	Nitrate
2111 Upper Sabinal River	01	From the downstream end to the confluence with the West Sabinal River	none	none
	02	from the confluence with the West Sabinal River to the upstream end	none	none
2112 Upper Nueces River	01	From the downstream end to the confluence with Sand Ridge Creek	none	none
	02	From the confluence with Sand Ridge Creek to the confluence with unnamed tributary just downstream of US Hwy 90	none	none
	03	From the confluence with unnamed tributary just downstream of US Hwy 90 to the confluence with Miller Creek	none	none
	04	From the confluence with Miller Creek to the upper end of the segment	none	None
2113 Upper Frio River	01	From the downstream end to the confluence with Bear Creek	Impaired fish community, Impaired macrobenthic community	Impaired Habitat
	02	From the confluence with Bear Creek to the upstream end	none	Impaired habitat, Impaired fish community
2114 Hondo Creek	01	From downstream end to just upstream of FM 2676	Chloride, TDS	Nitrate
	02	From just upstream of FM 2676 to the upstream end	Chloride, TDS	None
2115 Seco Creek	01	From the downstream end of the segment to the confluence with and unnamed tributary at -99.28N, 29.42W	none	none
	02	From the confluence with an unnamed tributary near FM 1796 to the upstream end	none	None
2116 Choke Canyon Reservoir	01	5120 acres near dam	none	none
	02	Small north arm of lake near dam and Willow Hollow Tank	none	none
	03	5120 acres in the middle of the reservoir	none	none
	04	Large north arm near mid lake and Jacob Oil Field	none	none
	05	Southern arm near mid-Lake and RR7 west of Caliham	none	none
	06	western end of the reservoir up to RR 99	none	none
	07	Remainder of lake from RR 99 bridge to upper end of segment	none	None

Table 3-4: List of Impairments and Concerns in the Nueces River Basin (cont.)

Segment Name	AU	Description	Impairment	Concern
2117 Frio River Above Choke Canyon Reservoir	01	From Choke Canyon Reservoir 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	none	Nitrate, DO
	04	From the confluence with Live Oak Creek to the confluence with Elm Creek	None	Nitrate
	05	From the confluence with Elm Creek to the confluence with Spring Branch al	none	Nitrate
	06	From the confluence with Spring Branch to the upstream end of the segment	none	none



3.2.3 NUECES – RIO GRANDE COASTAL BASIN (Figure 3-4)

The Nueces – Rio Grande Coastal Basin covers approximately 10,400 square miles, encompassing all or part of 12 counties in South Texas.

Table 3.5 lists all the CRP and SWQM sites monitored during FY 2014 in this basin.

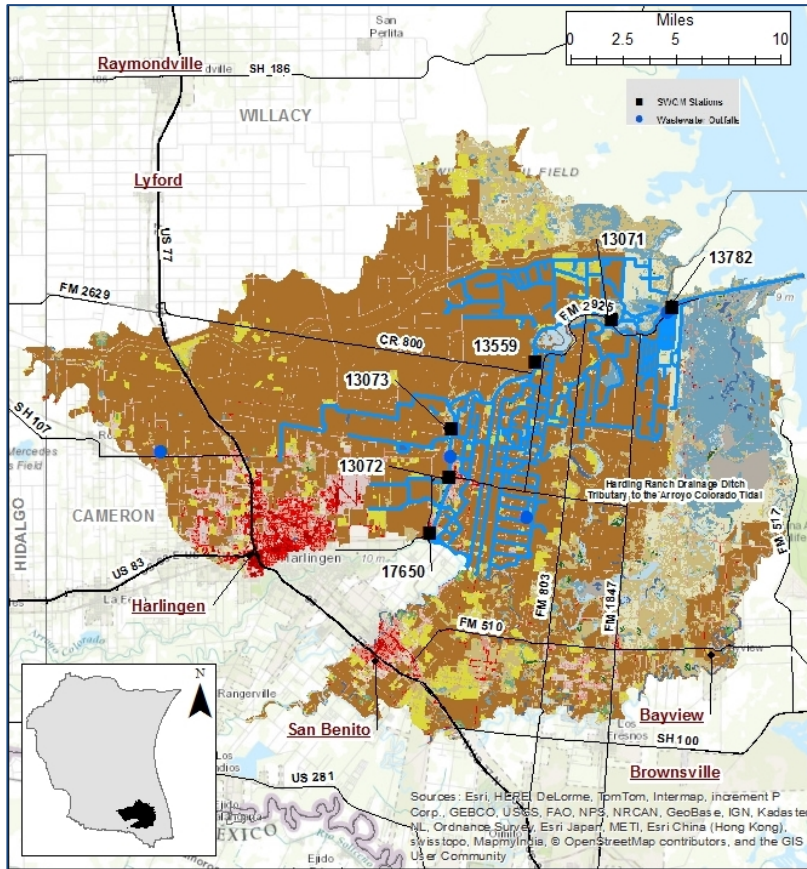


Table 3-5: CRP and SWQM Sites in the Nueces – Rio Grande Coastal Basin

Segment Name	Station Id #	Description	Monitoring Entity	Conventional, Field	Other
2201 Arroyo Colorado Tidal	13782 (AU_01)	Near Marker 16 at Arroyo City 492 m downstream of confluence with Arroyo Colorado and Arroyo Colorado cutoff	TCEQ Region 15	Quarterly	
	13071 (AU_02)	At Mile 10 Marker 22 81 m upstream from San Vicente drain ditch	TCEQ Region 15	Quarterly	
	13559 (AU_03)	At Marker 27 Mile 15 0.8 km north of the point where channel becomes boundary between Willacy and Cameron counties	TCEQ Region 15	Quarterly	
	13073 (AU_04)	At Camp Perry north of Rio Hondo 177 m downstream from confluence with unnamed ditch west side of Arroyo Colorado	TCEQ Region 15	Quarterly	
	13072 (AU_05)	At FM 106 bridge at Rio Hondo	TCEQ Region 15	Quarterly	
2202 Arroyo Colorado Above Tidal	13074 (AU_01)	At low water bridge at Port Harlingen at Cemetery Rd bridge	TCEQ Region 15	Quarterly	bacteria
	13079 (AU_02)	At US 77 in SW Harlingen	NRA	Quarterly	bacteria
	13080 (AU_02)	At FM 506 south of La Feria	NRA	Quarterly	bacteria, flow
	16445 (AU_02)	At low water crossing at Dilworth Rd east of La Feria	NRA	Quarterly	bacteria, flow
	13081 (AU_03)	At FM 1015 south of Weslaco	TCEQ Region 15	Quarterly	bacteria
	13084 (AU_03)	At US 281 south of Pharr	TCEQ Region 15	Quarterly	bacteria, flow
2203 Petronila Creek Tidal	13090	1.2km upstream of the confluence with Tunas Creek	TCEQ Region 14	Quarterly	bacteria
2204 Petronila Creek Above Tidal	13093 (AU_01)	At FM 70 Bridge East of Bishop (CAMS 731)	NRA	Monthly	
	13094 (AU_01)	At FM 892 SE of Driscoll	NRA	Monthly	bacteria, flow
	13096 (AU_02)	At FM 665 east of Driscoll	NRA	Monthly	bacteria, flow
	20806 (AU_02)	At 181 m West and 6 m South from the intersection of Alice Road and Lost Creek road	NRA	Quarterly	bacteria

Figure 3-4: Nueces – Rio Grande Coastal

2201: Arroyo Colorado Tidal



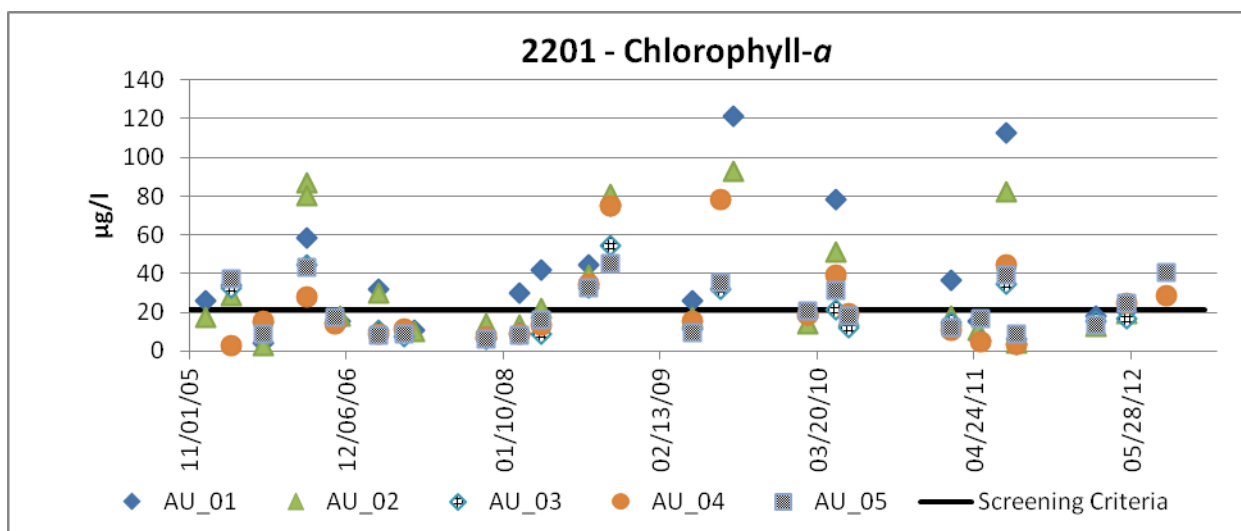
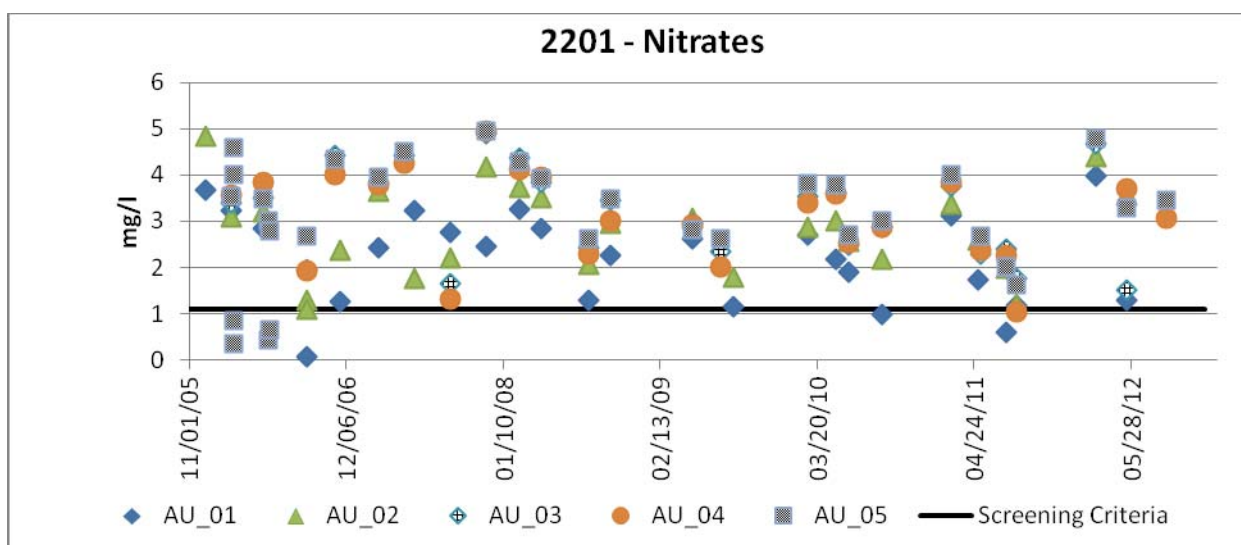
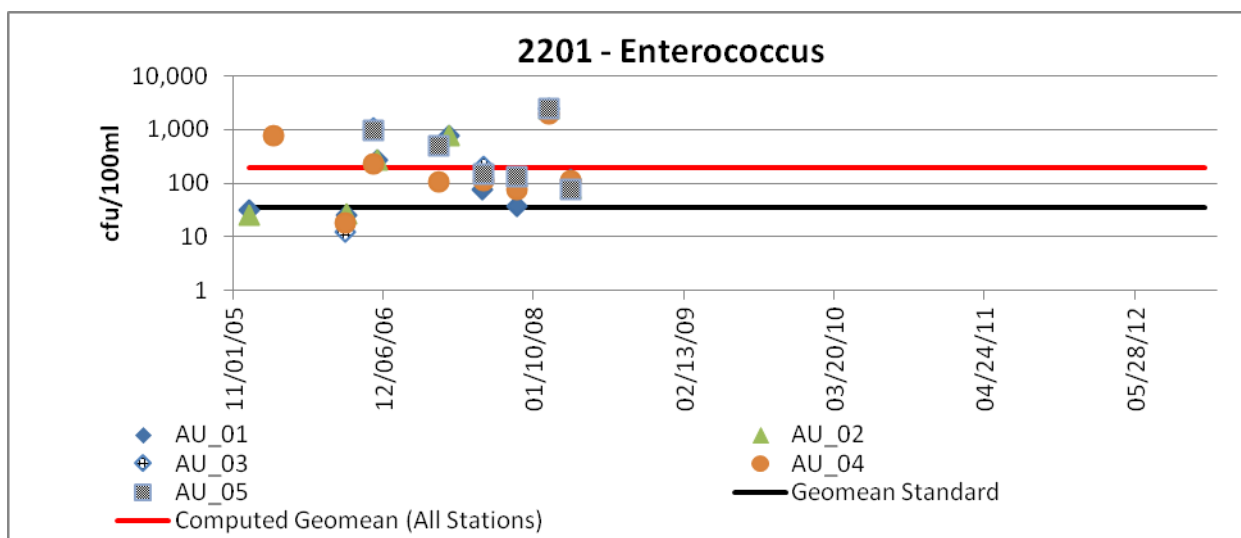
The segment flows 26 miles from 110 yards downstream of Cemetery Road south of the Port of Harlingen to its confluence with the Laguna Madre. The segment forms part of the county line between Cameron and Willacy Counties. The segment is divided into five AUs; from the confluence with the Laguna Madre to the confluence with San Vicente Drainage Ditch (AU_01), from the confluence with San Vicente Drainage Ditch to the confluence with an unnamed drainage ditch at 26.31, -97.53 (AU_02), from an unnamed drainage ditch at 26.31, -97.53 to the confluence with the Harding Ranch Ditch tributary (AU_03), from the confluence with the Harding Ranch Ditch tributary to just upstream of the City of Hondo wastewater discharge point (AU_04), and from just upstream of the City of Rio Hondo wastewater discharge point to the upstream end of the segment (AU_05). 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.

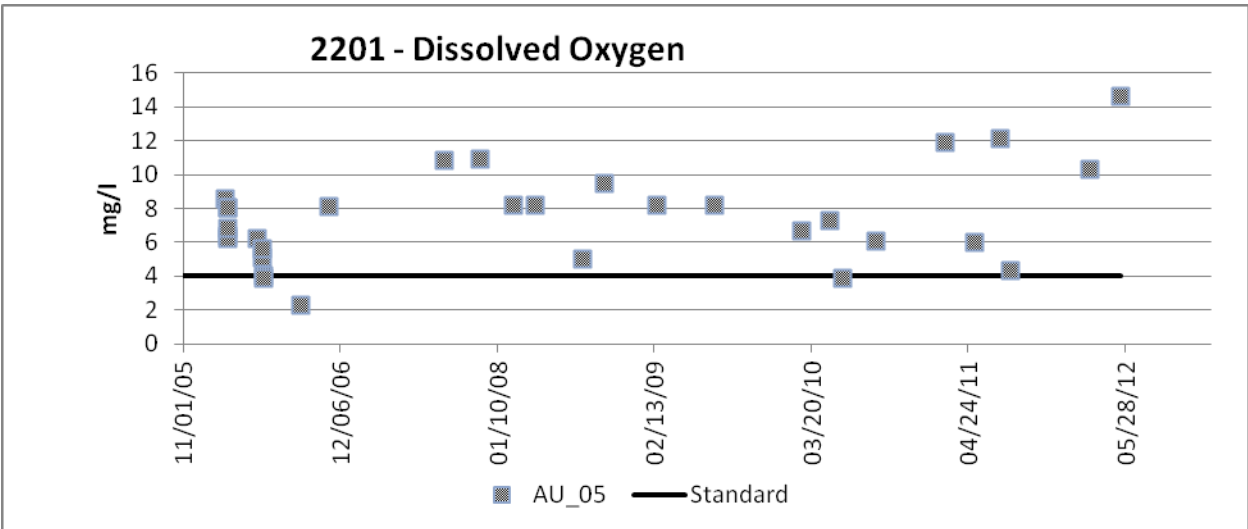
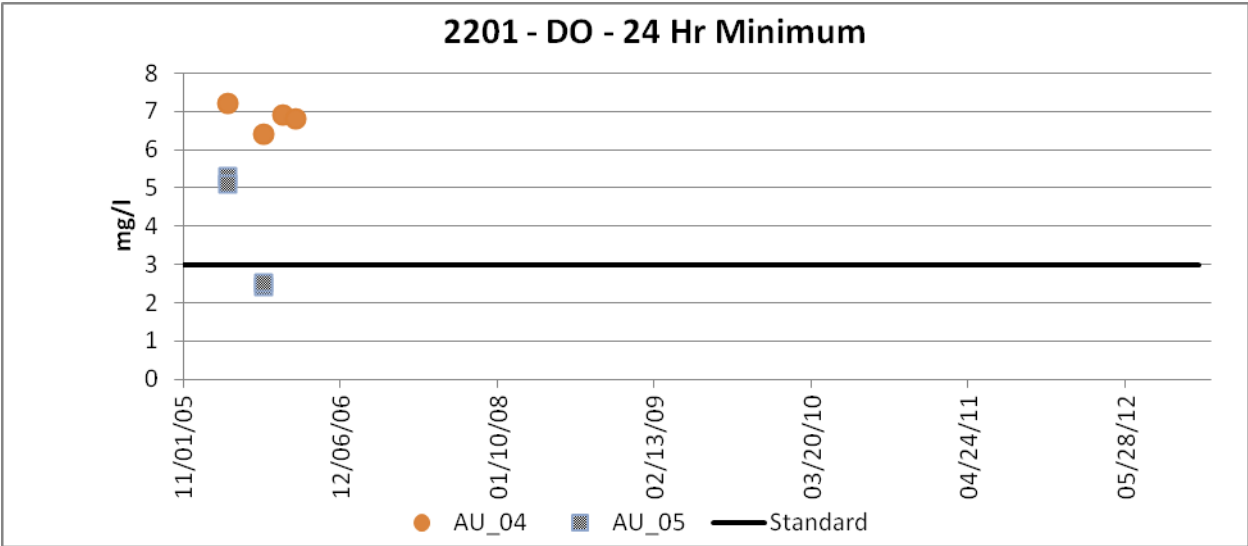
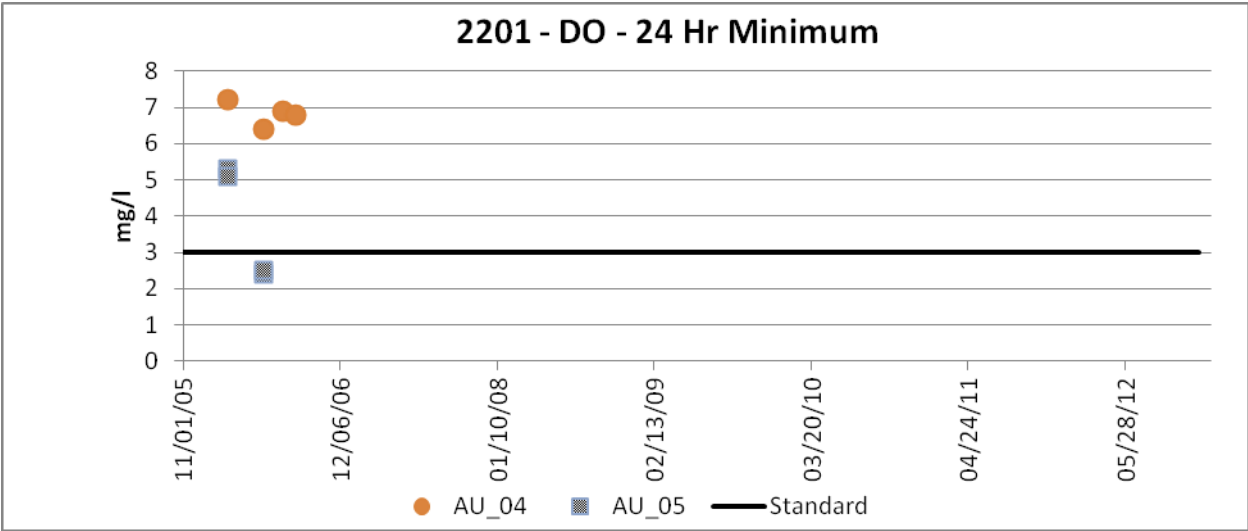
The impairment for bacteria for primary contact recreation in all AUs is based on limited data. Due to the eight hour holding time and because there are no local labs accredited for Enterococci analysis, bacteria sample

collection has been suspended. All AUs also have concerns for nitrates and chlorophyll-a. AU-04 and AU_05 have been impaired for depressed DO since the 1996 Assessment, 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. The impairment for AU_04 and AU_05 24-hr DO minimum and the 24-hr DO average for AU_05 are being carried forward in the Draft 2014 Integrated Report. This report also lists AU_05 as having a concern for low DO at the grab screening level, but the graphed data show otherwise. 24-Hour DO monitoring will be needed to remove the concern.

All concerns and impairments are being address by the Arroyo Colorado WPP. Visit <http://arroyocolorado.org/> for more information.

Fish consumption warnings continue for AU_05.





2201A: Harding Ranch Drainage Ditch Tributary

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

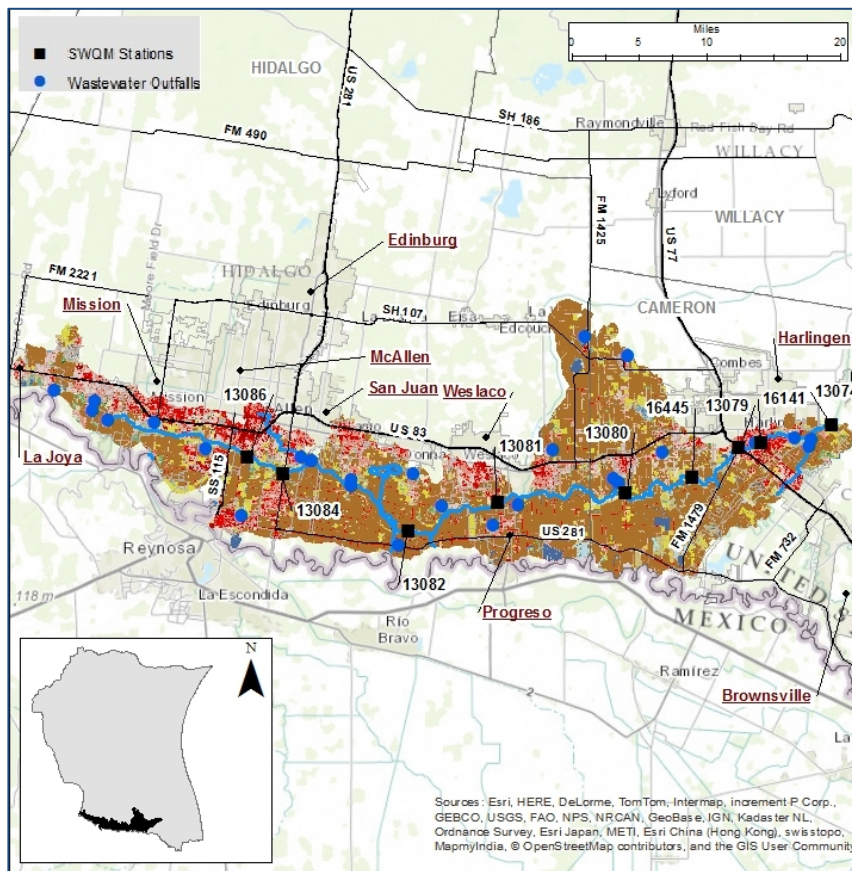
There are no active monitoring sites on the segment. Data were collected during 2001 and 2002 as part of the Arroyo Colorado TMDL study. No additional sampling has taken place, but the concern for ammonia identified during the study is being carried forward in the Draft 2014 Integrated Report and addressed by the WPP.

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

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 were collected during 2001 and 2002 as part of the Arroyo Colorado TMDL study. No additional sampling has taken place, but a bacteria impairment and concerns for nitrates and chlorophyll-*a* are listed in the Draft 2014 Integrated Report and addressed by the WPP.

2202: Arroyo Colorado Above Tidal

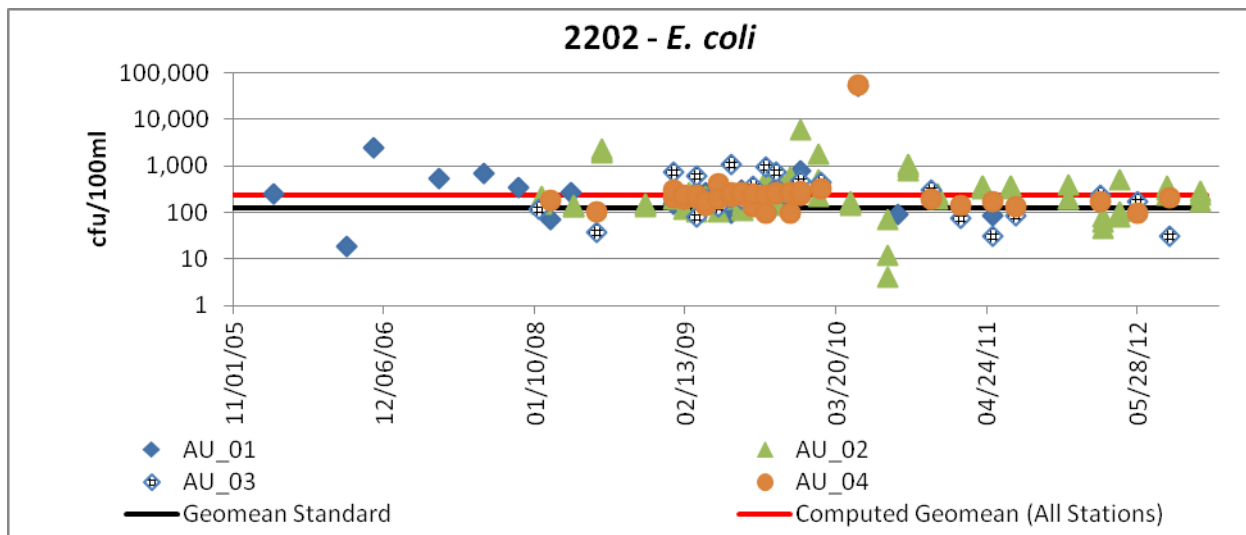


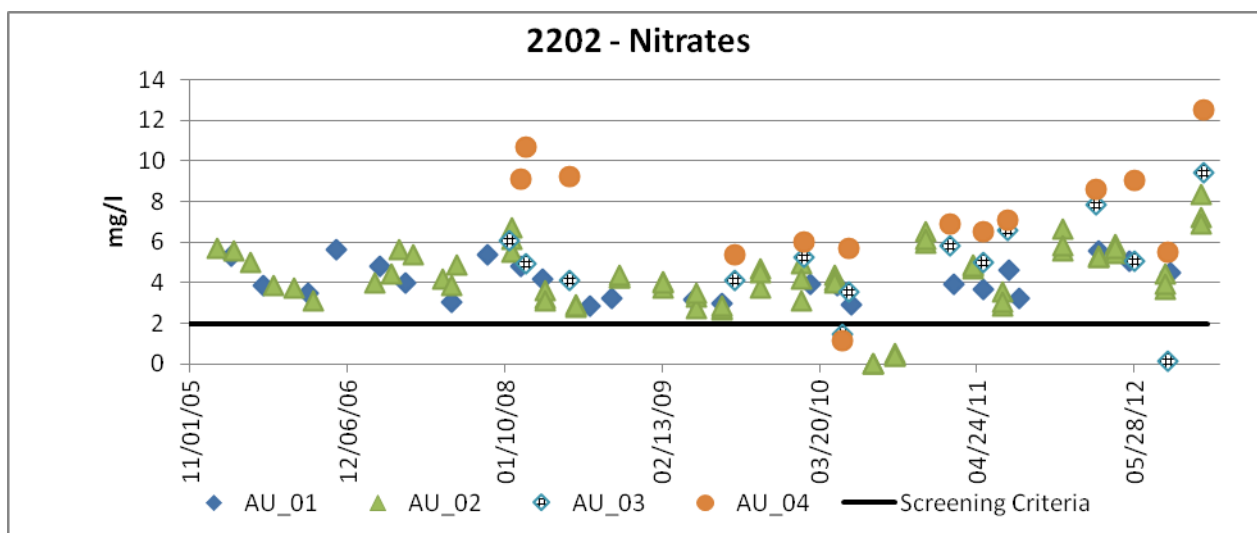
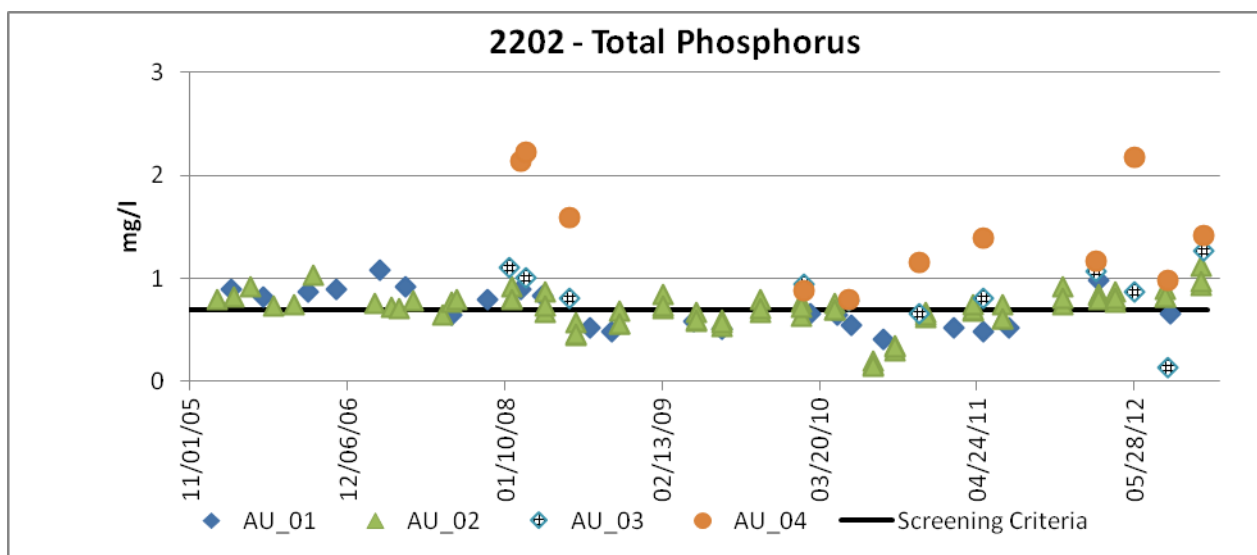
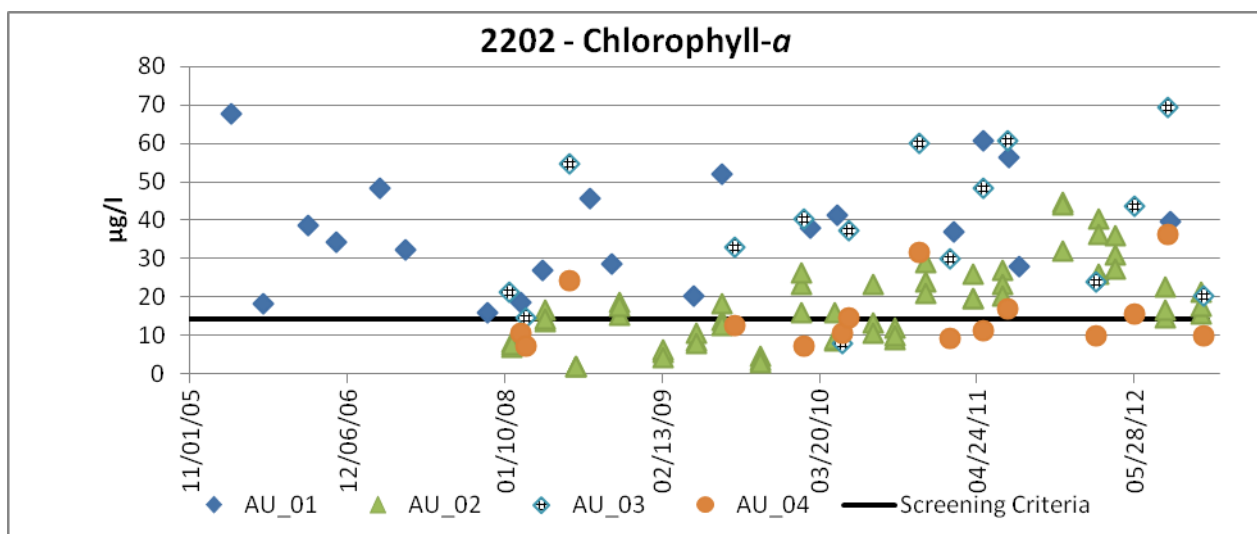
The segment flows 63 miles FM 2062 in Hidalgo County to 110 yards downstream of Cemetery Road south of the Port of Harlingen. The segment is divided into four AUs; from the downstream end of the segment to the confluence with Little Creek just upstream of State Loop 499 (AU_01), from the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway (AU_02), from confluence with La Feria Main Canal to the confluence with La Cruz Resaca just downstream of FM 907 (AU_03), and from the confluence with La Cruz Resaca to the upstream end of the segment (AU_04). Its watershed is 252,633 acres.

This area is one of the fastest growing areas in the State of Texas. 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.

All AUs have been impaired for bacteria for primary contact recreation since the 1996 Assessment. All AUs also have concerns for chlorophyll-a, total phosphorus, and nitrates. All concerns and impairments are being address by the Arroyo Colorado WPP. Visit <http://arroyocolorado.org/> for more information.

Fish consumption warnings continue for all AUs.





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.

The unclassified water body has been impaired for Polychlorinated biphenyl (PCB) 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 http://www.tceq.state.tx.us/assets/public/implementation/water/tmdl/07arroyoleg/07-implan_arroyo.pdf.

2202B: Unnamed Drainage Ditch Tributary to Arroyo Colorado

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

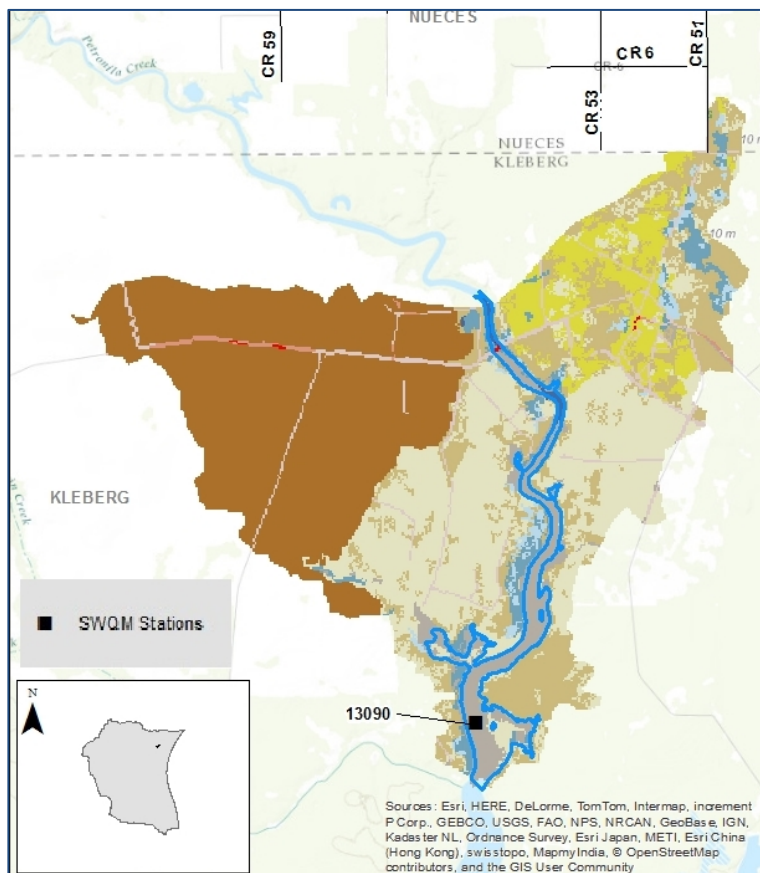
There are no active monitoring sites on the segment. Data were collected as part of the Arroyo Colorado TMDL study. No additional sampling has taken place, but concerns for bacteria, ammonia, and chlorophyll-a identified during the study are being carried forward in the Draft 2014 Integrated Report and addressed by the WPP.

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 Draft 2014 Integrated Report and addressed by the WPP.

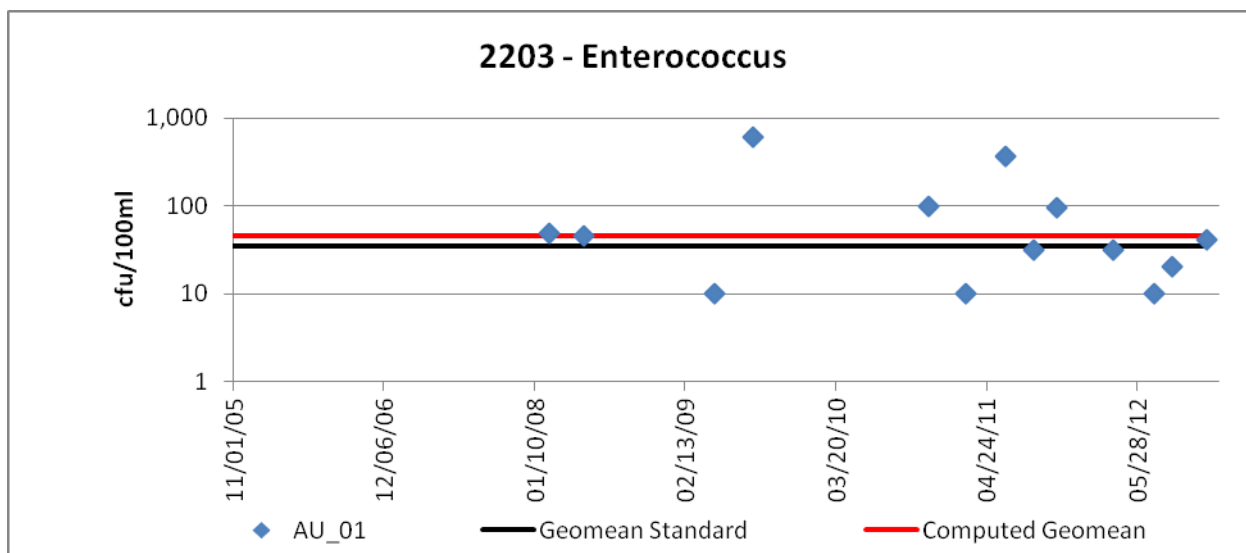
2203: Petronila Creek Tidal

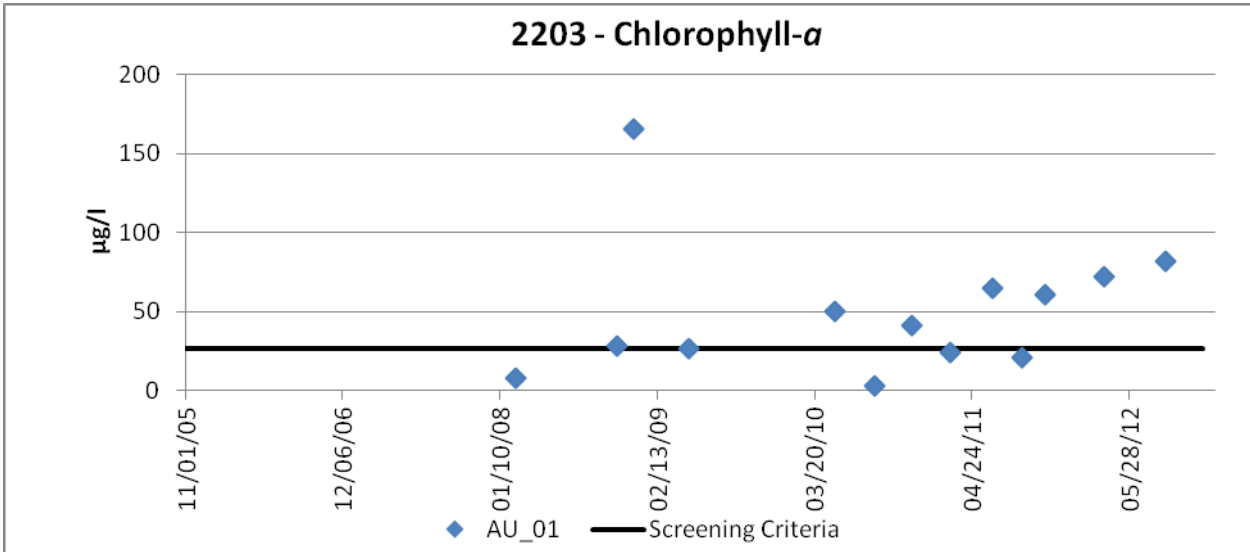
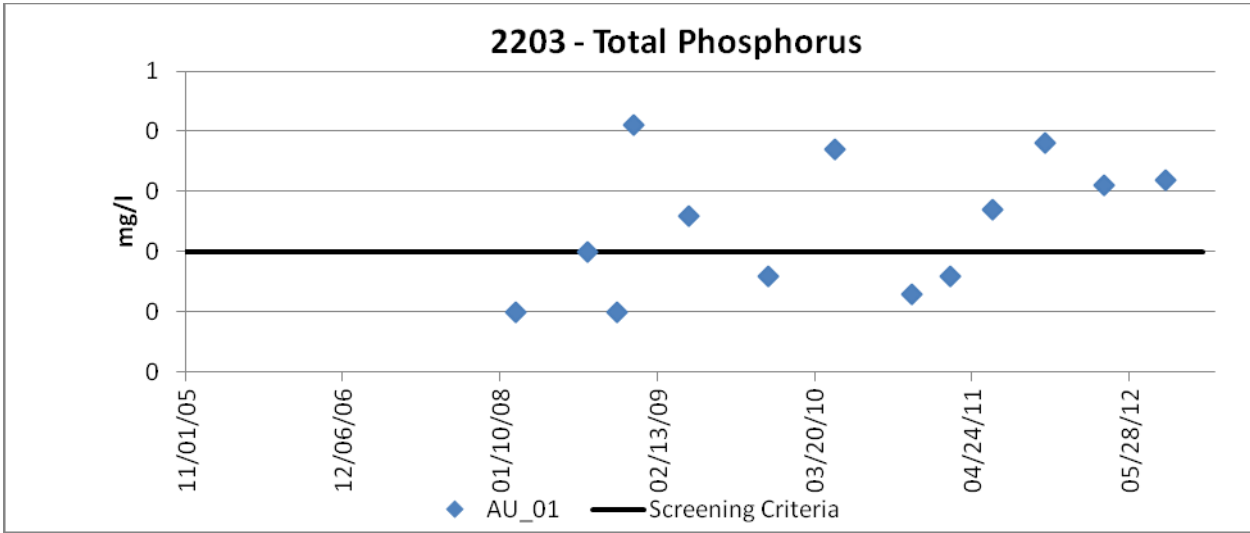


The segment flows 14 miles from a point 0.6 miles upstream of a private road crossing near Laureles Ranch in Kleberg County to the confluence with Chiltipin Creek / Alazan Bay in Kleberg County. Its watershed is 10,918 acres.

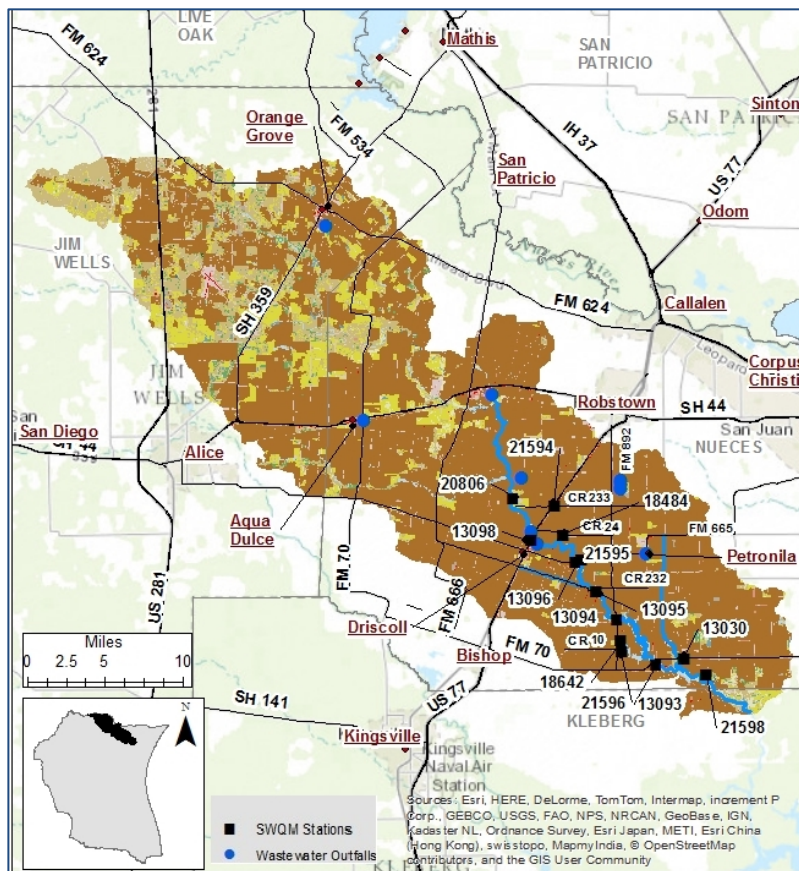
Station 13090 is the only active SWQM site at which TCEQ conducts routine quarterly sampling. Due to its location being on King Ranch property, accessibility is sometimes an issue.

The segment has been listed as having an impairment for bacteria for primary contact recreation since the 2010 Texas Integrated Report. The segment also has concerns pH, total phosphorus, and chlorophyll-a.





2204: Petronila Creek Above Tidal



The segment flows 35 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 divided into two AUs; from the downstream end to the confluence with 2204A (AU_01) and from the confluence with 2204A to the upstream end of the segment (AU_02). Its watershed is 1,867,755 acres.

The segment is primarily farmland interspersed with a number of small communities and cities. It flows through the City of Driscoll, at US 77, and several colonias.

There are a number of WWTPs that discharge to this segment and a storm water discharge permit for a hazardous waste landfill.

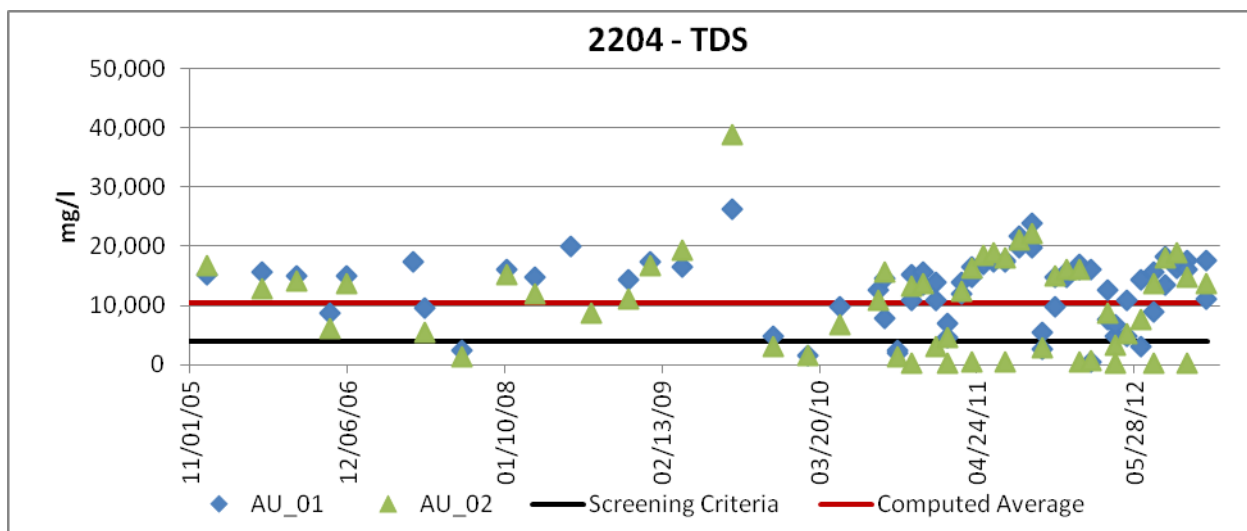
The segment has been impaired for TDS, chloride, and sulfates since 1999. A TMDL was conducted and concluded that the impairments were the result of historic oil and gas operations. The Implementation Plan recommended a continuous water quality monitoring (CWQM) station and a program to properly plug and abandon wells that are no longer active. The CWQM instrumentation was installed by TCEQ at the location of Station 13093 at FM 70. NRA performs the routine maintenance. The CWQM data is assessable at

[http://www.tceq.state.tx.us/cgi-](http://www.tceq.state.tx.us/cgi-bin/compliance/monops/water_daily_summary.pl?cams=731)

[bin/compliance/monops/water_daily_summary.pl?cams=731](http://www.tceq.state.tx.us/cgi-bin/compliance/monops/water_daily_summary.pl?cams=731). The Railroad Commission of Texas (RRC) has been working with identified operators to properly plug and abandon wells and to remove contaminated soils. Where operators cannot be identified, the RRC has been doing work as funding is available.

NRA completed a review of the Implementation Plan in FY 2014. Continued routine monitoring and monthly monitoring in the creek and tributaries were recommended and implemented.

The segment also has concerns for chlorophyll-a in AU_01 and AU_02.



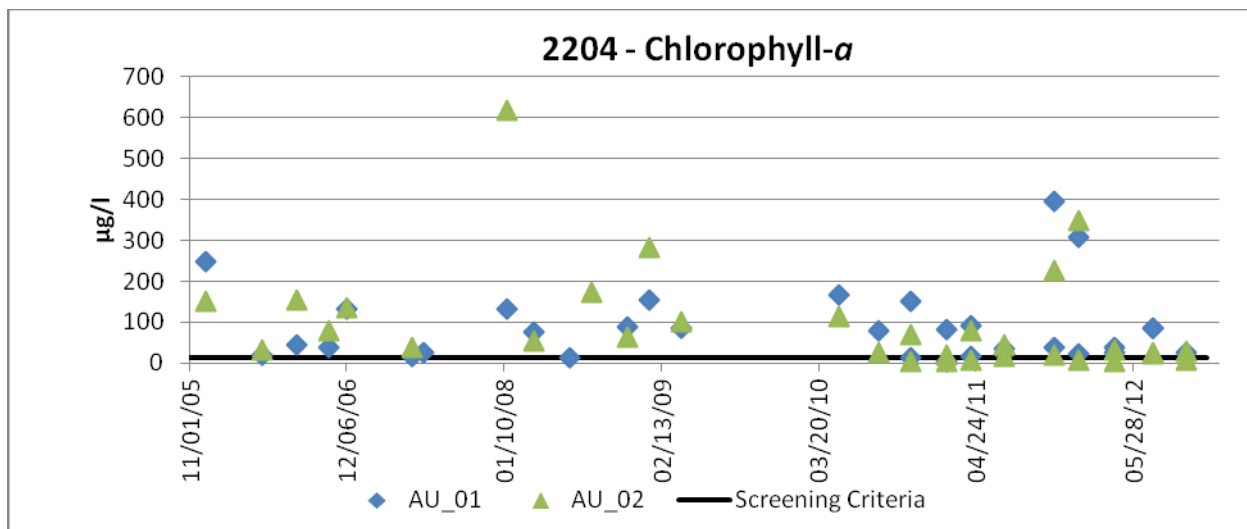
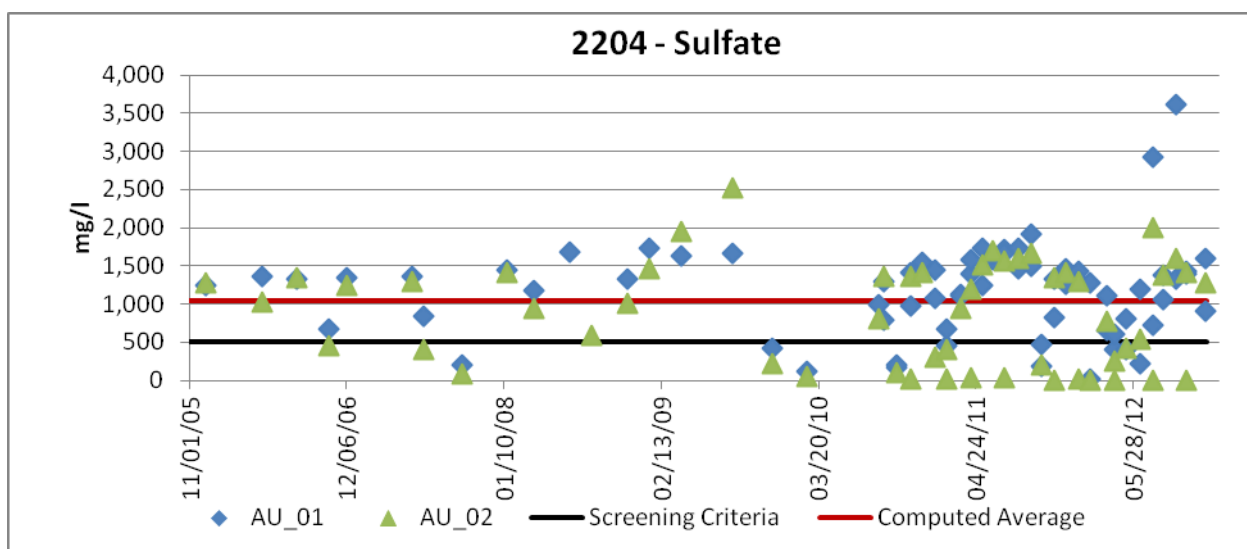
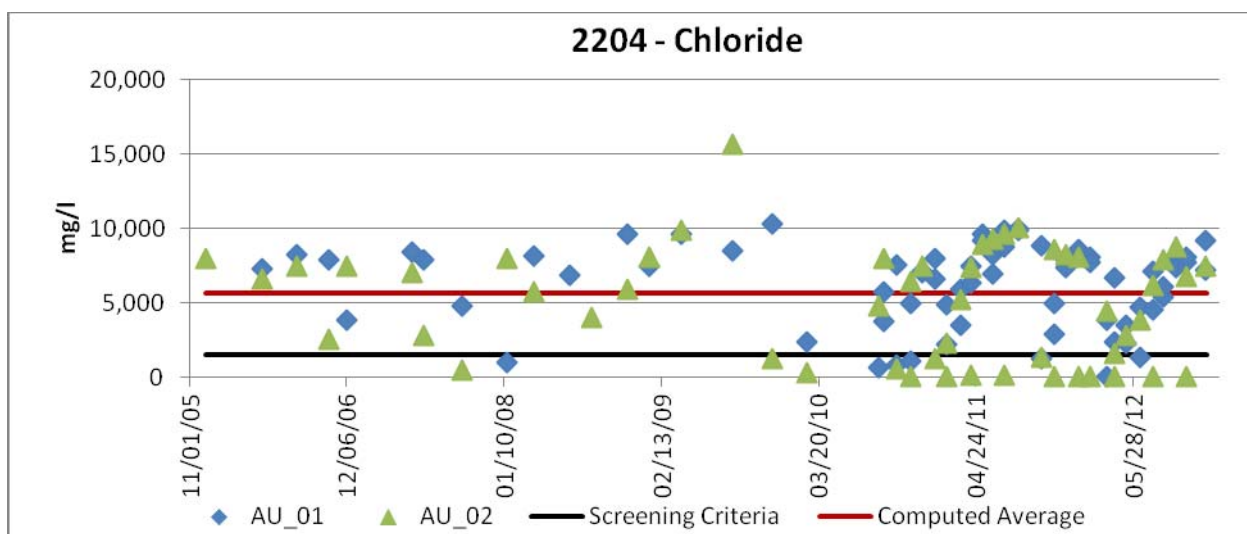


Table 3-6: List of Impairments and Concerns in the Nueces – Rio Grande Coastal Basin

Segment Name	AU	Description	Impairment	Concern
2201 Arroyo Colorado Tidal	01	From the confluence with the Laguna Madre to the confluence with San Vicente Drainage Ditch	Bacteria	Chlorophyll-a, Nitrate
	02	From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch at 26.31, -97.53	Bacteria	Chlorophyll-a, Nitrate
	03	From an unnamed drainage ditch at 26.31, -97.53 to the confluence with the Harding Ranch Ditch tributary	Bacteria	Chlorophyll-a, Nitrate
	04	From the confluence with the Harding Ranch Ditch tributary to just upstream of the City of Hondo wastewater discharge point	Bacteria, DO	Chlorophyll-a, Nitrate
	05	From just upstream of the City of Rio Hondo wastewater discharge point to the upstream end of the segment	DO, Bacteria, DDE in edible tissue,, Mercury in edible tissue, and PCBs in edible tissue	Chlorophyll-a, DO, Nitrate
2201A Harding Ranch Drainage Ditch Tributary (A) to the Arroyo Colorado Tidal	01	Entire water body	none	Ammonia
2201B Unnamed Drainage Ditch Tributary (B) in Cameron County Drainage District #3	01	Entire water body	Bacteria	Chlorophyll-a, Nitrate
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, DDE in edible tissue, 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, DDE in edible tissue, 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, DDE in edible tissue, 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, DDE in edible tissue, Mercury in edible tissue, PCBs in edible tissue	Chlorophyll-a, Nitrate, Total Phosphorus
2202A Donna Reservoir	01	Entire Reservoir	PCBs in edible fish tissue	none

Table 3-6: List of Impairments and Concerns in the Nueces – Rio Grande Coastal Basin (cont.)

Segment Name	AU	Description	Impairments	Concerns
2202B Unnamed Drainage Ditch Tributary (B) to S. Arroyo Colorado	01	Entire segment	none	Ammonia, Bacteria, Chlorophyll-a
2202C Unnamed Drainage Ditch Tributary (C) to S. Arroyo Colorado	01	Entire segment	none	Ammonia, Bacteria
2203 Petronila Creek Tidal	01	Entire segment	Bacteria	Chlorophyll-a, pH, Total Phosphorus
2204 Petronila Creek Above Tidal	01	From the downstream end to the confluence with 2204A	TDS, Chloride, Sulfate	Chlorophyll-a
	02	From the confluence with 2204A to the upstream end of the segment	TDS, Chloride, Sulfate	Chlorophyll-a



3.2.4 Bay and Estuaries and Gulf of Mexico (Figure 3-5)

Several TMDLs and special studies have been conducted in the basin. Segment 2472, Copano Bay, for bacteria in oyster waters (See Section 3.2.2); Segment 2482, Nueces Bay, for zinc in oyster tissue; Segment 2485, Oso Bay for bacteria and depressed DO; Segment 2485A for bacteria; and Segment 2491, Laguna Madre for depressed DO.

Beach Watch is a Texas General Land Office (TGLO) 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 in water and can be found on the Beach Advisory and Closing On-line Notification (BEACON) Website (http://iaspub.epa.gov/waters10/beacon_national_page.main).

Table 3.7 lists all the CRP and SWQM sites monitored during FY 2014 in the bays, estuaries, and Gulf of Mexico.

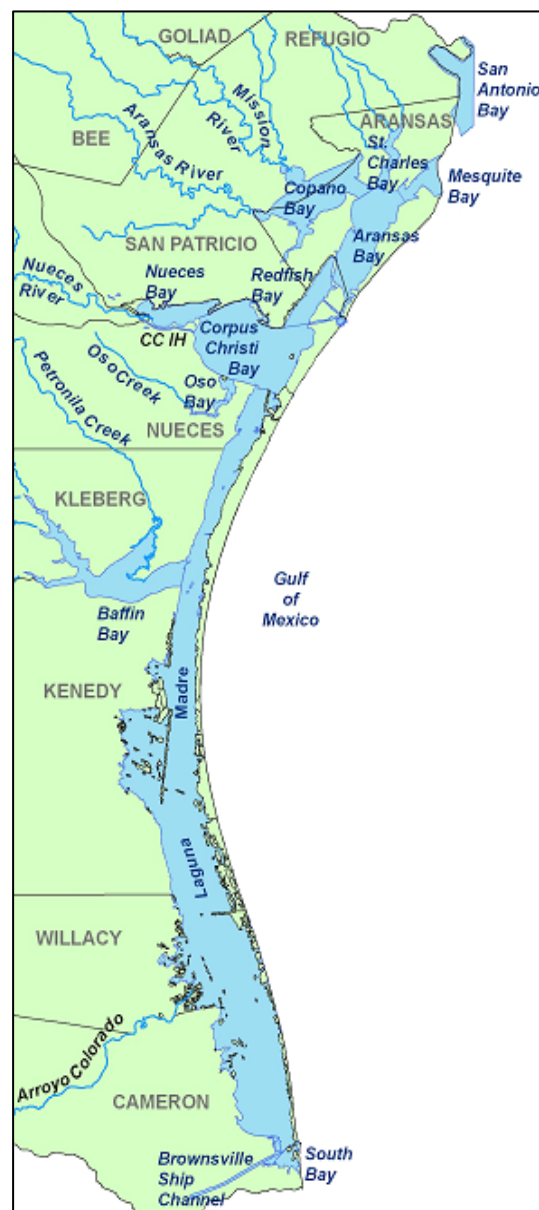


Figure 3-5: Bays and Estuaries and Gulf of Mexico

Table 3-7: CRP and SWQM Sites in the Bays and Estuaries and Gulf of Mexico

Segment Name	Station Id	Description	Monitoring Entity	Conventional Bacteria, Field	Other
2462 San Antonio Bay / Hynes Bay/ Guadalupe Bay	13397	At Intercoastal Waterway (ICWW) Buoy C-17	TCEQ Region 14	Quarterly	Metals in Sediment
	14956	At Austwell at TPWD public boat ramp	NRA	Quarterly	
2463 Mesquite Bay	13400	South of ICWW Marker 13	TCEQ Region 14	Quarterly	
2471 Aransas Bay	13402	At intersection of Intracoastal Canal and Lydia Ann Channel south of Rockport	TCEQ Region 14	Quarterly	
	16492	Lydia Ann/Palacios Channel 2.04 km north and 660 m west of northern tip of Oliver Point and west of Aransas Light House	TCEQ Region 14	Quarterly	
2471A Little Bay	16232	At Broadway and the inlet Canal to Canoe Lake in Rockport	TCEQ Region 14	Quarterly	
2472 Copano Bay / Port Bay / Mission Bay	12945	At FM 136 bridge 355 m from intersection with Egery Island Rd south of Bayside	NRA	Quarterly	
	13404	At west side of fishing pier near south end of SH 35 Causeway	NRA	Quarterly	
	13405	Port Bay at middle of SH 118 west of Rockport	NRA	Quarterly	
	14783	125 m south and 655 m east of Copano Bay Dr. at Spoonbill east of Bayside	TCEQ Region 14	Quarterly	
	17724	At Approx 3.5 mile west of Copano Bay Fishing pier at South end of Copano Bay Causeway SH 35	TCEQ Region 14	Quarterly	
2473 St. Charles Bay	13406	NE of Goose Island State Park 95 m south of Lamar Beach Rd at 4 th St	TCEQ Region 14	Quarterly	
	18222	From Charles Marina steer 058 degrees for 2.538 km	TCEQ Region 14	Quarterly	
2481 Corpus Christi Bay	13407 (AU_01)	At Corpus Christi Channel Marker (CM) 62	TCEQ Region 14	Quarterly	
	13409 (AU_01)	La Quinta CM 16	TCEQ Region 14	Quarterly	2 Metals in Sediment 2 Organics In Sediment
	13410 (AU_01)	Near Corpus Christi Ship CM 86 0.8 km east of US 181	TCEQ Region 14	Quarterly	
	13411 (AU_02)	1 km NE of Intersection of Doddridge St. and Ocean Dr.	TCEQ Region 14	Quarterly	
	14355 (AU_03)	0.4 km east of Shamrock Island and 1.5 km NE of Shamrock Point	TCEQ Region 14	Quarterly	
	17791 (AU_01)	3.1 mi SW of Shamrock Point on Shamrock Island	TCEQ Region 14	Quarterly	
2482 Nueces Bay	13421	US 181 bridge at causeway north side, 0.5 km NE of Rincon Point	TCEQ Region 14	Quarterly	
	13422	0.5 mi from south shore at east overhead powerline	TCEQ Region 14	Quarterly	2 Metals in Water 2 Metals in Sediment
	13425	0.8 km SE of Whites Point	TCEQ Region 14	Quarterly	
2483 Redfish Bay	13426	At SH 361 at 3 rd bridge between Aransas Pass and Port Aransas	NRA	Quarterly	
2483A Conn Brown Harbor	18848	Mid harbor 50 m NE of the intersection of Huff St and E Maddox Ave in Aransas Pass	NRA	Quarterly	

Table 3-7: CRP and SQWM Sites in the Bays and Estuaries and Gulf of Mexico (cont.)

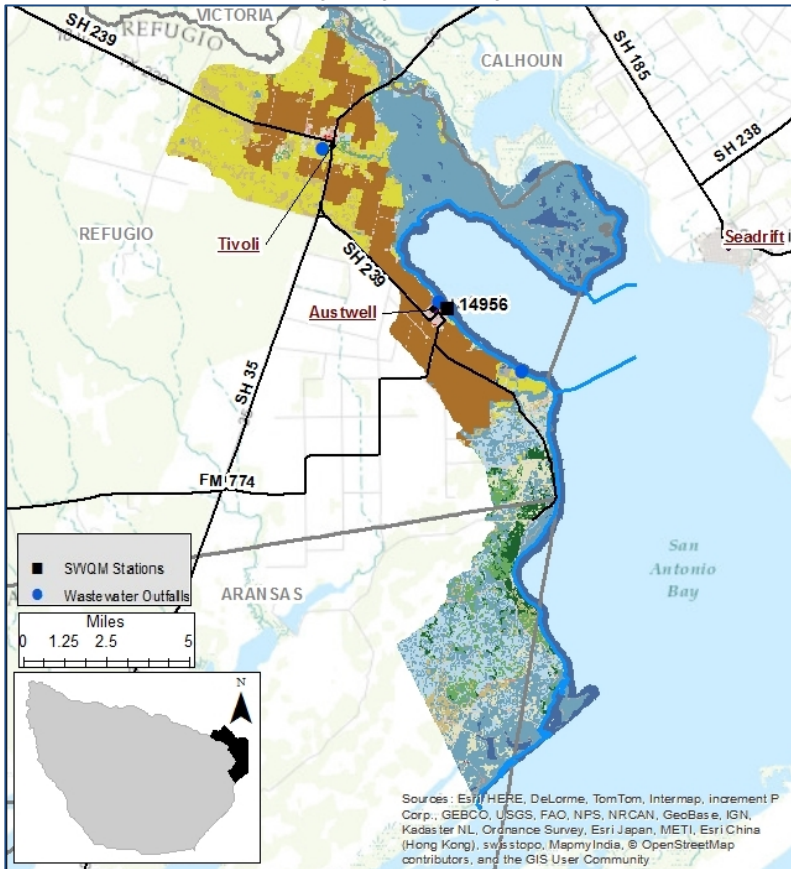
Segment Name	Station Id #	Description	Monitoring Entity	Conventional & Field	Other
2484 Corpus Christi Inner Harbor	13430	In Avery turning basin	TCEQ Region 14	Quarterly	2 Metals in water 2 Metals & 2 Organics in sediment
	13432	0.4 km east of Navigation Blvd draw bridge	TCEQ Region 14	Quarterly	
	13439	Viola turning basin	TCEQ Region 14	Quarterly	2 Metals in water
2485 Oso Bay	13440	Immediately offshore at tip of peninsula at Padre Island Drive/southbound SH 358	NRA	Quarterly	
2485A Oso Creek	13028	Immediately downstream of SH 286 south of Corpus Christi	NRA	Quarterly	
2491 Laguna Madre	13443 (AU_01)	South of the intersection of ICWW and Padre Island Causeway	TCEQ Region 14	Quarterly	
	13444 (AU_01)	1.87 km NW of Point Penascal at intersection of ICWW at Baffin Bay marker	TCEQ Region 14	Quarterly	
	13445 (AU_01)	at ICWW approx. 1.6 km SW from the southernmost point of south Bird Island	TCEQ Region 14	Quarterly	
	13446 (AU_03)	ICWW at Marker 129 east of Port Isabel	TCEQ Region 15	Quarterly	
	13447 (AU_02)	Intersection of ICWW and Arroyo Colorado	TCEQ Region 15	Quarterly	(10) Organics in Sediment
	13448 (AU_01)	Intersection of ICWW and Port Mansfield Channel	TCEQ Region 15	Quarterly	
	13449 (AU_01)	CM C-225A north of Port Mansfield	TCEQ Region 15	Quarterly	
	14844 (AU_03)	At ICWW Channel Marker 49	TCEQ Region 15	Quarterly	
	14870 (AU_03)	200 yds off Laguna Vista shoreline	TCEQ Region 15	Quarterly	
2491A North Floodway	20930	North Floodway at US77 South of Intersection of US77 and FM 2629 in Sebastian	TCEQ Region 15	Quarterly	
2492 Baffin Bay / Alazan Bay / Cayo Del Grullo / Laguna Salada	13450	At CM 14	TCEQ Region 14	Quarterly	
	13452	At CM 36	TCEQ Region 14	Quarterly	
2492A San Fernando Creek	13033	At US 77 at Kingsville	NRA	Quarterly	
2493 South Bay	13459	Near ship CM 17	TCEQ Region 15	Quarterly	
	14865	Middle of bay	TCEQ Region 15	Quarterly	
2494 Brownsville Ship Channel	13460	Near ship CM35 / black buoy	TCEQ Region 15	Quarterly	
	14871	Mid-channel 595 m east of SH 48 at Foust Rd.	TCEQ Region 15	Quarterly	
	14875	Mid-channel at entrance to San Martin Lake	TCEQ Region 15	Quarterly	

Table 3-7: CRP and SQWM Sites in the Bays and Estuaries and Gulf of Mexico (cont.)

Segment Name	Station Id #	Description	Monitoring Entity	Conventional& Field	Other
2494A Port Isabel Fishing Harbor	13285	Port Isabel Fishing Harbor	TCEQ Region 15	Quarterly	
2501 Gulf of Mexico	13468 (AU_06)	At Aransas Pass 165 m south and 413 m east of tip of South Jetty near Marker R-7	TCEQ Region 14	Quarterly	
	13470 (AU_08)	At Port Isabel, 1.18 km east and 35 m south of Brazos Santiago Pass North Jetty	TCEQ Region 15	Quarterly	

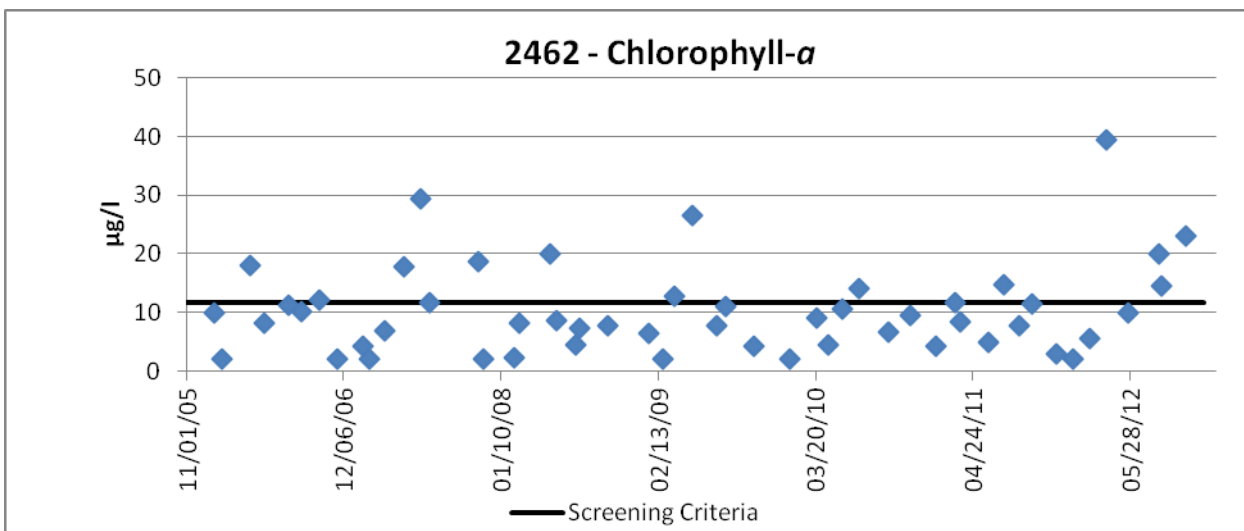


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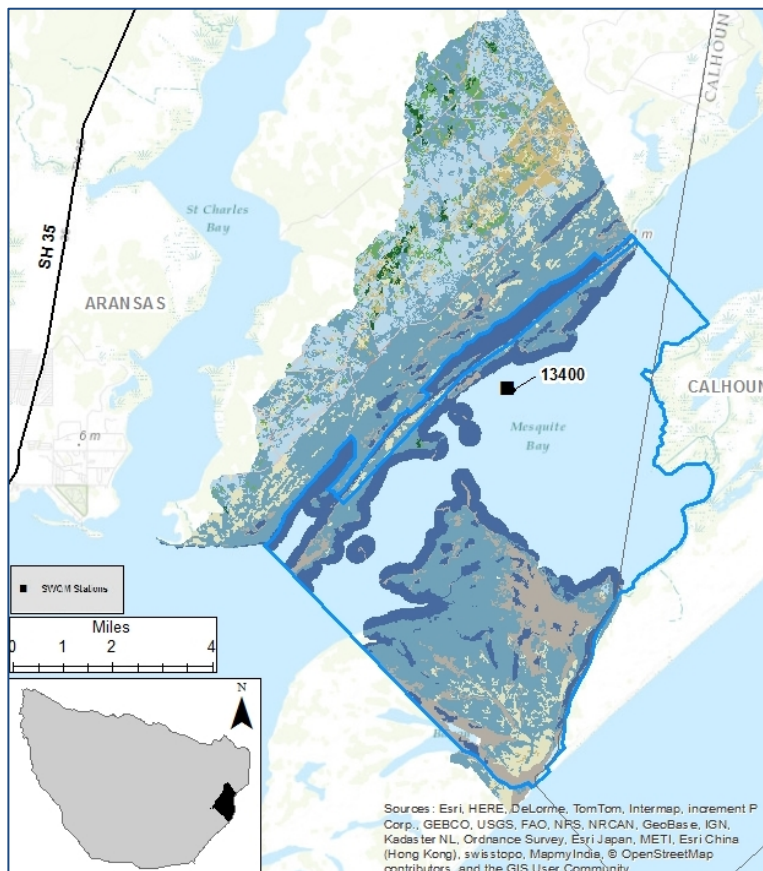


This segment is primarily in Refugio and Calhoun Counties and includes Guadalupe Bay. The official boundary for the San Antonio – Nueces Coastal Basin includes all of Hynes Bay and only a portion of San Antonio Bay. Its watershed is 69,939 acres. The area around the bay is dominated by farm and ranch lands. The small town of Austwell is on the bay is the only community in the area.

There is a concern for chlorophyll-a. The Department of State Health Service's (DSHS) shellfish restrictions for bacteria in oyster waters are being carried forward in the Draft 2014 Integrated Report.



2463: Mesquite Bay



This segment is 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.

All assessed water quality parameters met the standards in the Draft 2014 Integrated Report. The DSHS shellfish restrictions for bacteria in oyster waters are being carried forward in the Draft 2014 Integrated Report.

2471: Aransas Bay

This segment is primarily in Aransas County. 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.

All assessed water quality parameters met the standards in the Draft 2014 Integrated Report. The DSHS shellfish restrictions for bacteria in oyster waters are being carried forward in the Draft 2014 Integrated Report.

The concern for bacteria for primary contact recreation based on Beach Watch data at Rockport Beach Park has been removed.

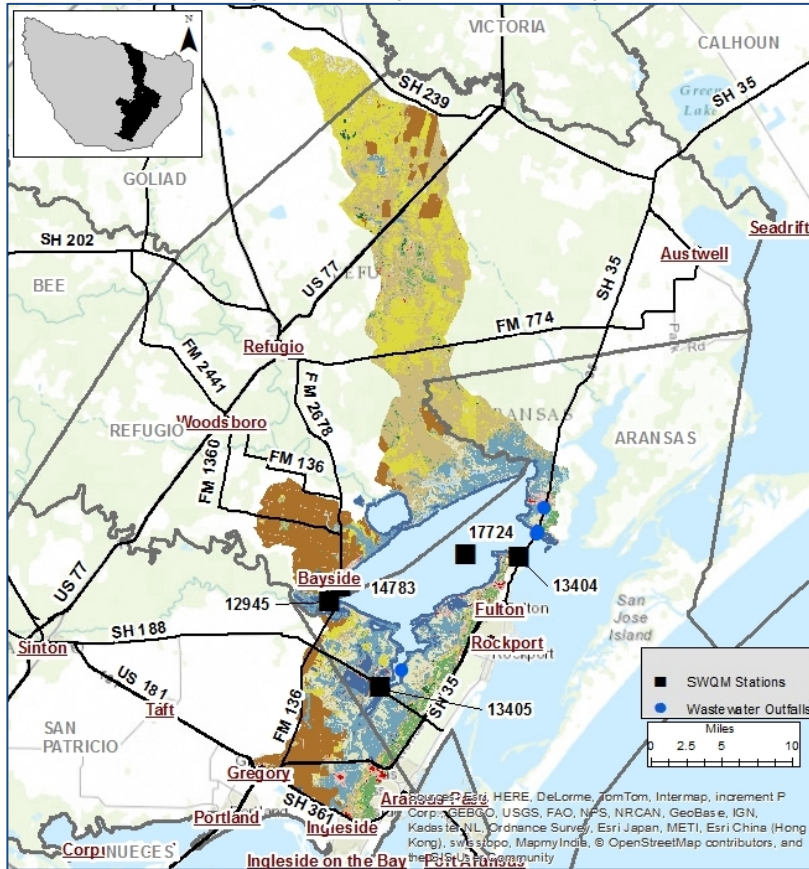


This is a satellite view of a coastal area in San Diego, California. A yellow pin is placed on the shoreline, with the number '16232' next to it. The map shows a mix of residential neighborhoods, some with large houses and others with smaller, more densely packed buildings. There are several streets labeled, including Encina Dr, Tule Park Dr, Glass Ave, and Seabreeze Dr. A large body of water, labeled 'Little Bay', is visible in the center. To the right, there's a peninsula with more houses and a small area labeled 'Key Allegro'. The map is overlaid with a grid of streets and some commercial areas. The bottom right corner has the 'Google earth' logo and the year '© 2015 Google'.

There is a concern for chlorophyll-a. The elevated concentrations may be due to limited circulation within the bay.

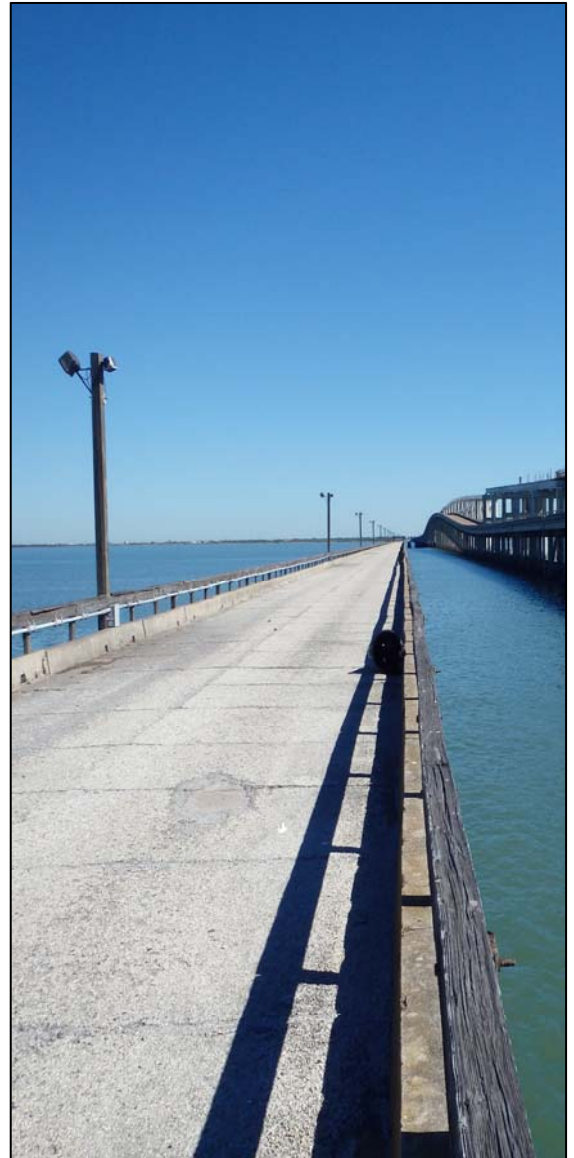


2472: Copano Bay / Port Bay / Mission Bay

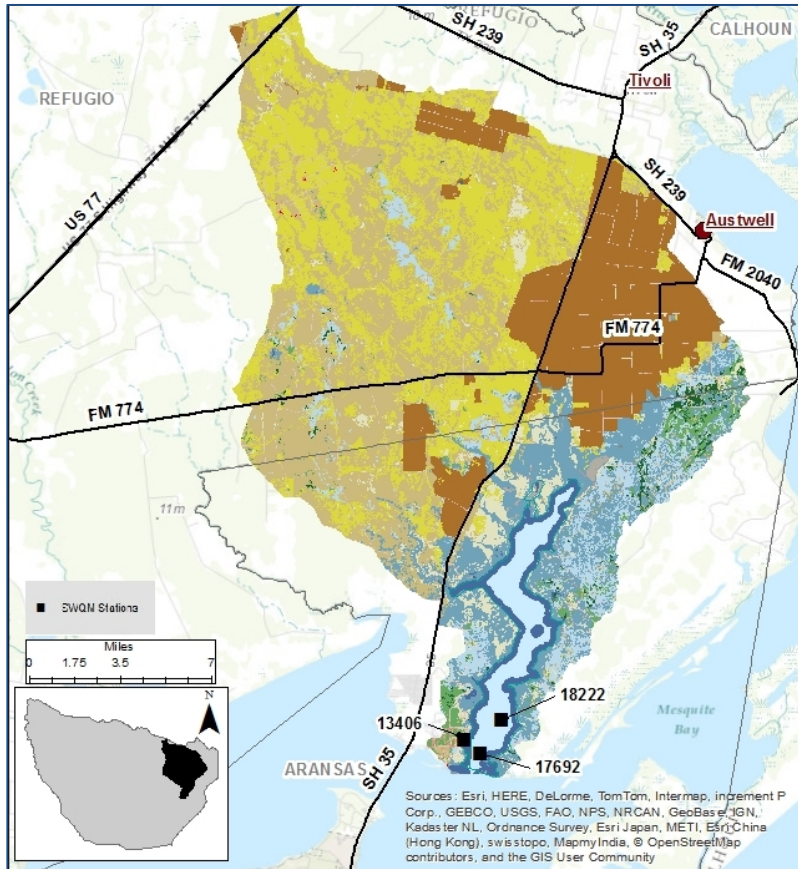


These bays are located in Refugio and Aransas Counties. Its watershed is 249,235 acres. The south and east sides of the bay have a number of developments and small communities. The north and west sides are mostly farm and ranch lands.

All assessed water quality parameters met the standards in the Draft 2014 Integrated Report. The DSHS shellfish restrictions for bacteria in oyster waters are being carried forward in the Draft 2014 Integrated Report.

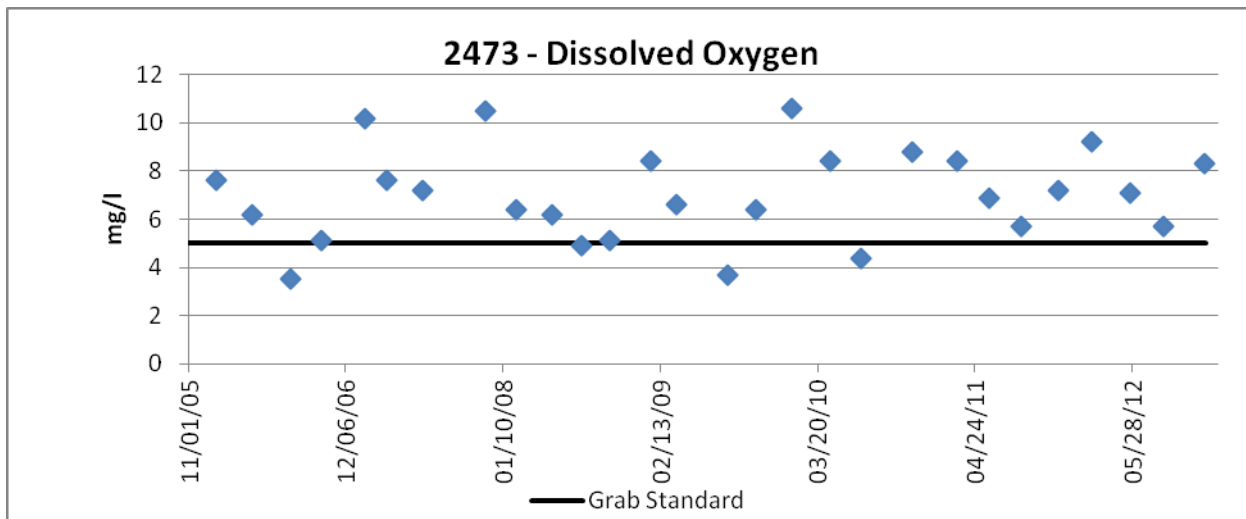


2473: St. Charles Bay

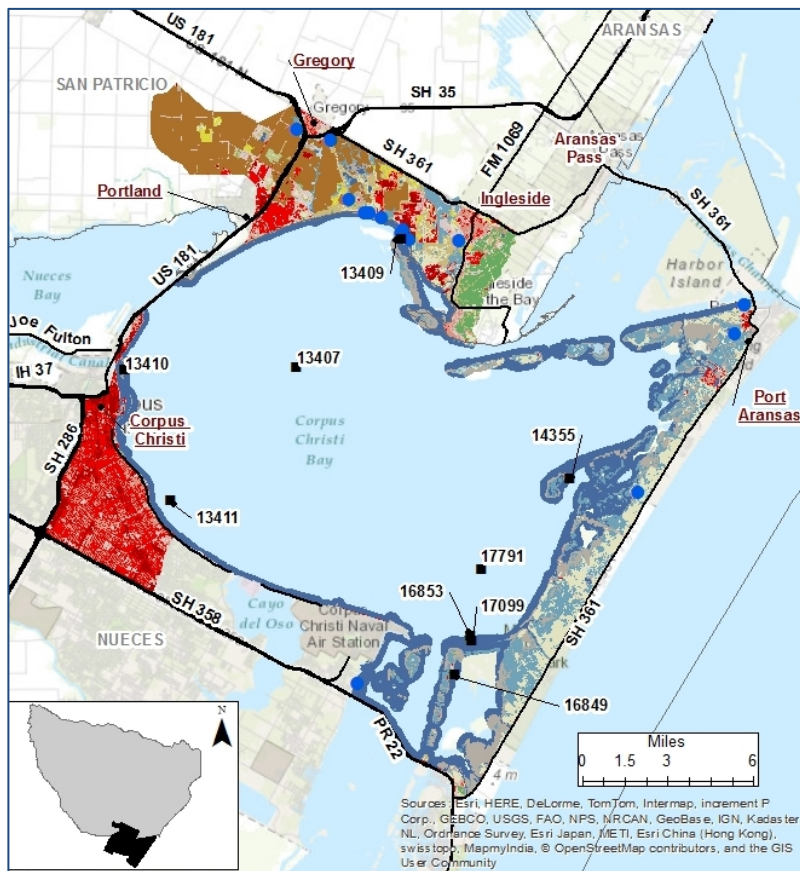


This segment is located in Aransas County. Its watershed is 162,401 acres. The bay is nearly surrounded by the Aransas Wildlife Refuge. The small community of Lamar is located on the southwest side adjacent to Aransas Bay.

There is a concern for low DO at the grab screening level.



2481: Corpus Christi Bay



The bay is located in Nueces County. It is split between the San Antonio – Nueces and Nueces – Rio Grande Coastal Basins. The bay is divided into four AUs: from the Corpus Christi Ship Channel (CCSC) east to Pelican Island, south to Demit Island including the La Quinta Channel and the CCSC adjacent to Redfish Bay (AU_01); from the CCSC east to Pelican Island, south to Demit Island including the area from the CCSC to Demit Island (Oso Bay and City of Corpus Christi area) (AU_02); from Pelican Island south to Demit Island, to Mustang Island and the area along Mustang Island State Park to the CCSC (AU_03); and from the JFK Causeway to a line from Demit Island across to Mustang Island State Park (AU_04). Its 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.

All assessed water quality parameters met the standards in the Draft 2014 Integrated Report.

Beach Watch data have identified Cole Park, Ropes Park, and Poenish Park as having impairments for bacteria for primary contact recreation. These data are collected during and after high stormwater runoff events at the beaches where it discharges into the bay people are likely to get into the water. Therefore, the impairment is only considered to be at the beaches Figure 3-6, and not the entire bay.

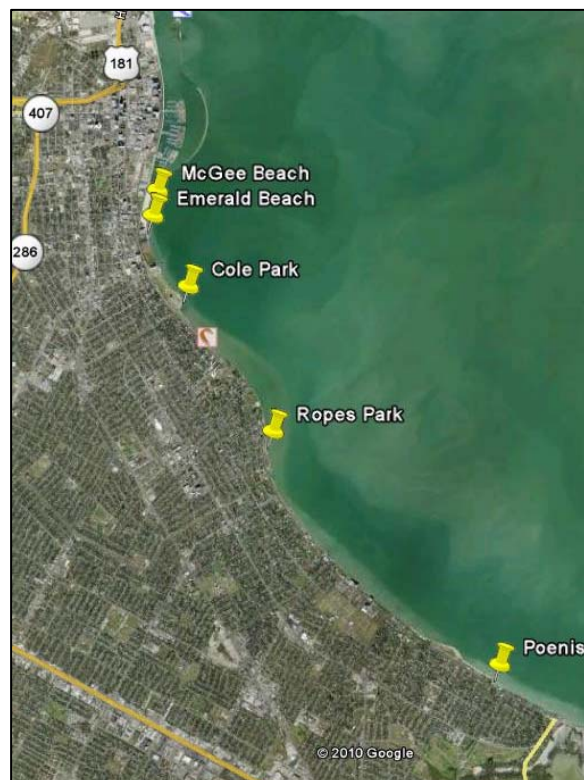
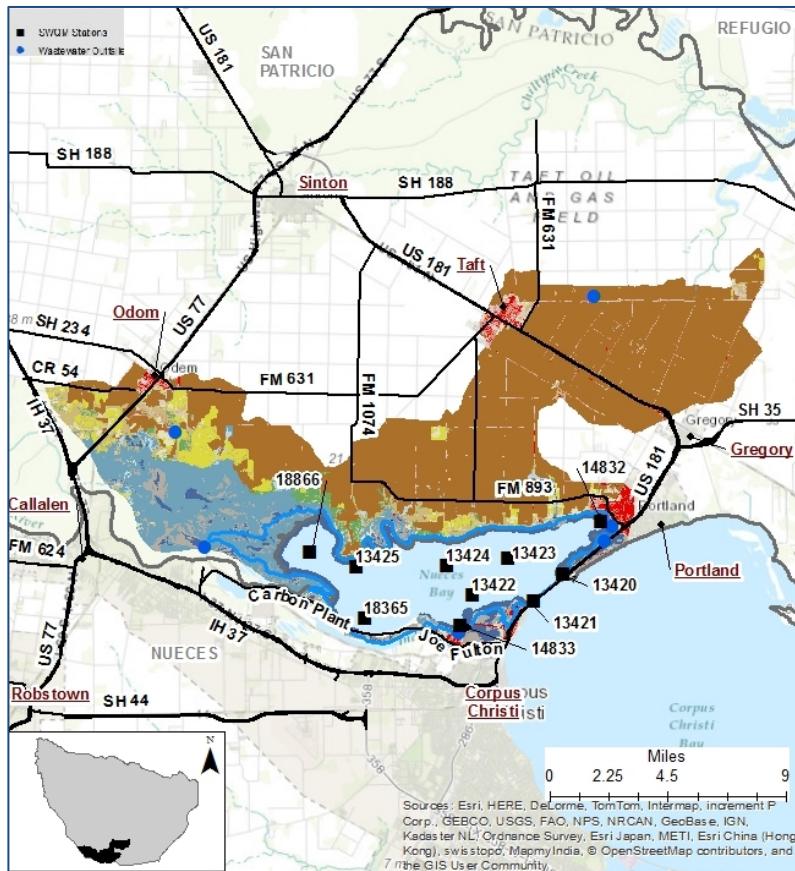


Figure 3-6. Corpus Christi Bay Beach Watch Locations

2482: Nueces Bay



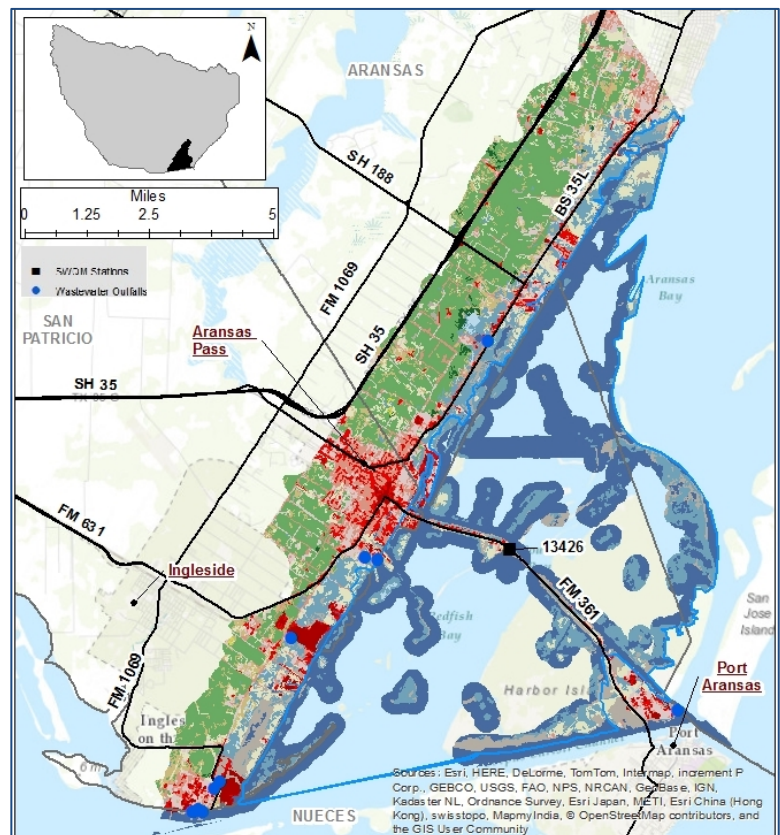
The bay is located in Nueces County. It is split between the San Antonio – Nueces and Nueces – Rio Grande Coastal Basins. Its watershed is 92,834 acres. The bay is bordered on the south by the City of Corpus Christi where there are many industries associated with the CCSC. A large portion of the Nueces Delta has been bought and designated as a preserve. The area north of the bay is primarily farm and ranch lands.

There is a concern for copper in water based on limited data. The DSHS shellfish restrictions for zinc in edible tissue are being carried forward in the Draft 2014 Integrated Report. The concern for bacteria for primary contact recreation based on Beach Watch data at Nueces Bay Causeway #3 has been removed.

2483: Redfish Bay

The bay is located in Nueces County. Its watershed is 45,936 acres. There is very little undeveloped land on the western shore of the bay. The main cities are Ingleside and Aransas Pass, with numerous small communities all the way to Rockport. Port Aransas encompasses most of the eastern shoreline.

There is a concern for copper in water based on limited data.



2483A: Conn Brown Harbor



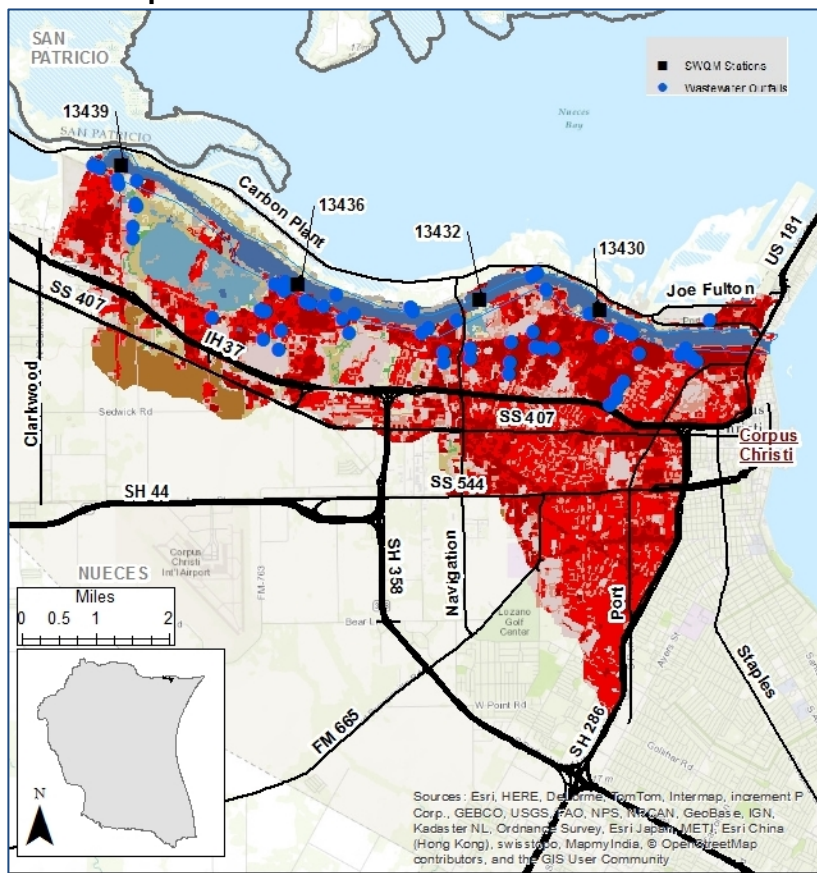
The harbor is with the City of Aransas Pass. The northeast end is in Aransas County and the southwest end is in San Patricio County.

Conn Brown Harbor is a commercial harbor, used primarily by shrimpers.

There is a concern for copper in water based on limited data.



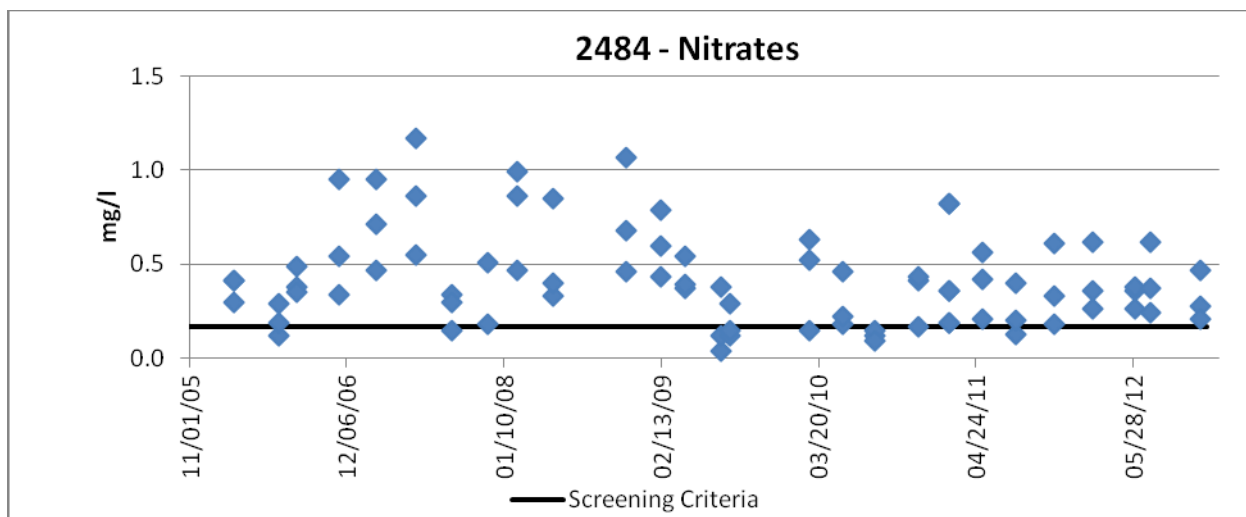
2484: Corpus Christi Inner Harbor

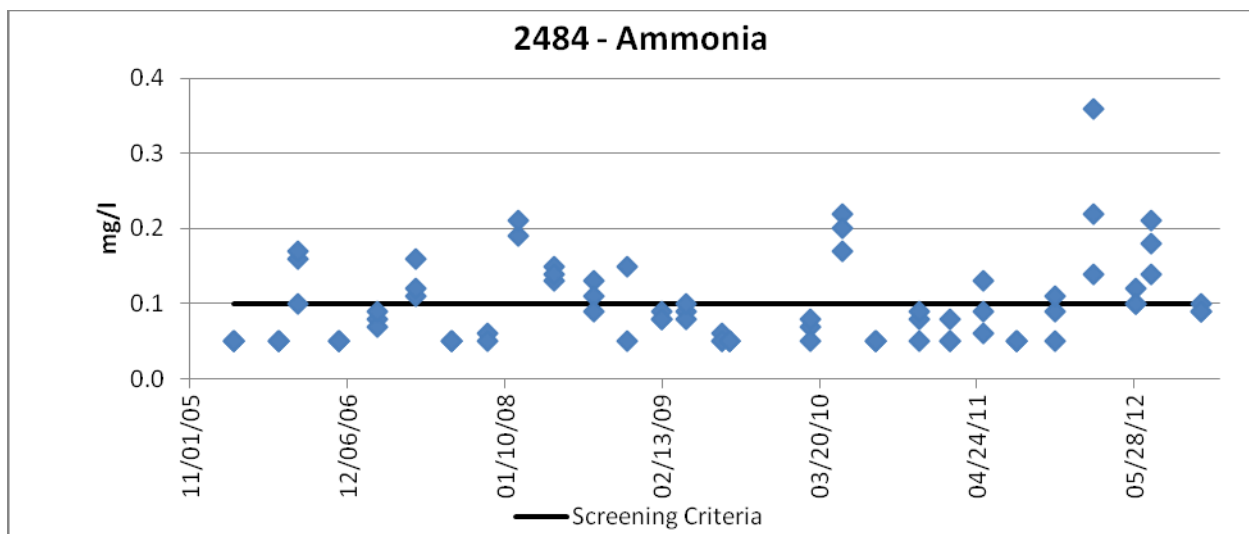


The Corpus Christi Inner Harbor (CCIH) is located in the City of Corpus Christi in Nueces County. Its watershed is 13,360 acres.

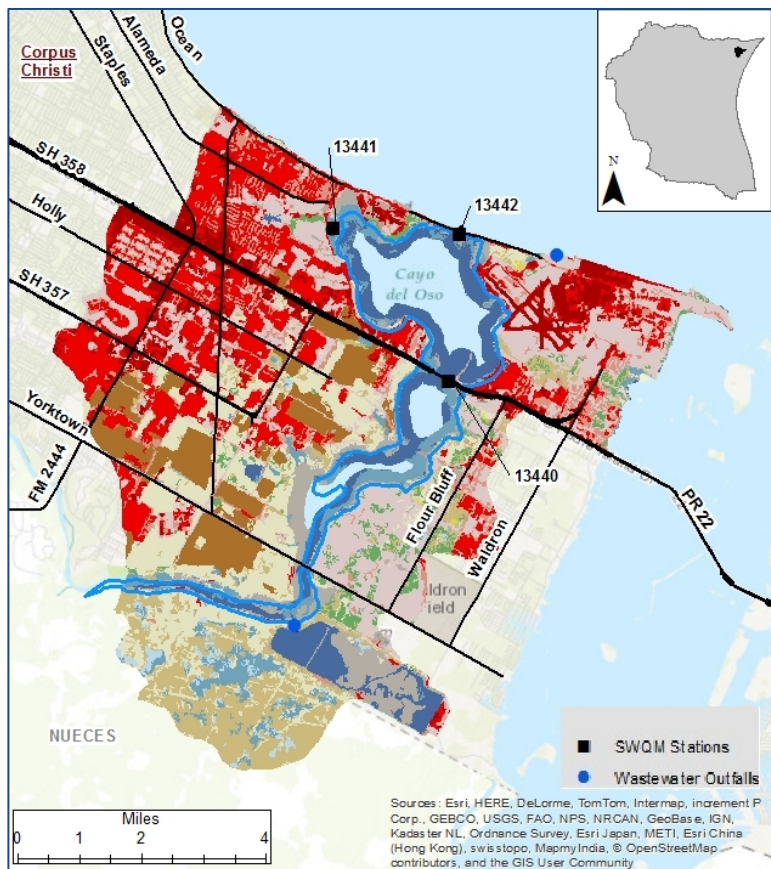
CCIH is home to the Port of Corpus Christi, the second deepest port in the State of Texas. Many refineries and other industries are located all along the harbor. There are also numerous permitted wastewater outfalls, many of which are for storm water. Only the outfalls for treated effluent are shown on the map.

The harbor has concerns for nitrates and ammonia which may be related to the numerous WWTP and storm water discharge permits.





2485: Oso Bay



The bay is located in the City of Corpus Christi in Nueces County. The bay is divided into three AUs; the upper bay from Holly Road to CR 24 (AU_01), middle bay from SH 358 to Holly Road (AU_02), and from Ocean Drive to SH 358 (AU_03). 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.

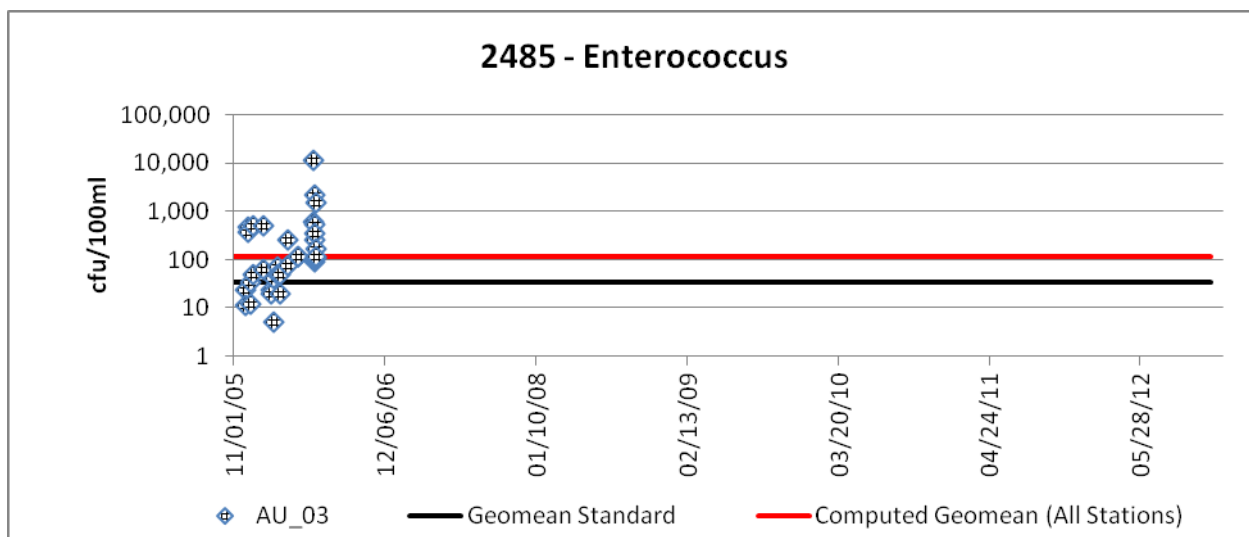
Oso Bay receives much of the storm water runoff from the City of Corpus Christi as well as the cooling water from the Barney Davis Power Plant. The housing developments around the bay range from large, multi-acre tracts to neighborhoods with many houses per acre.

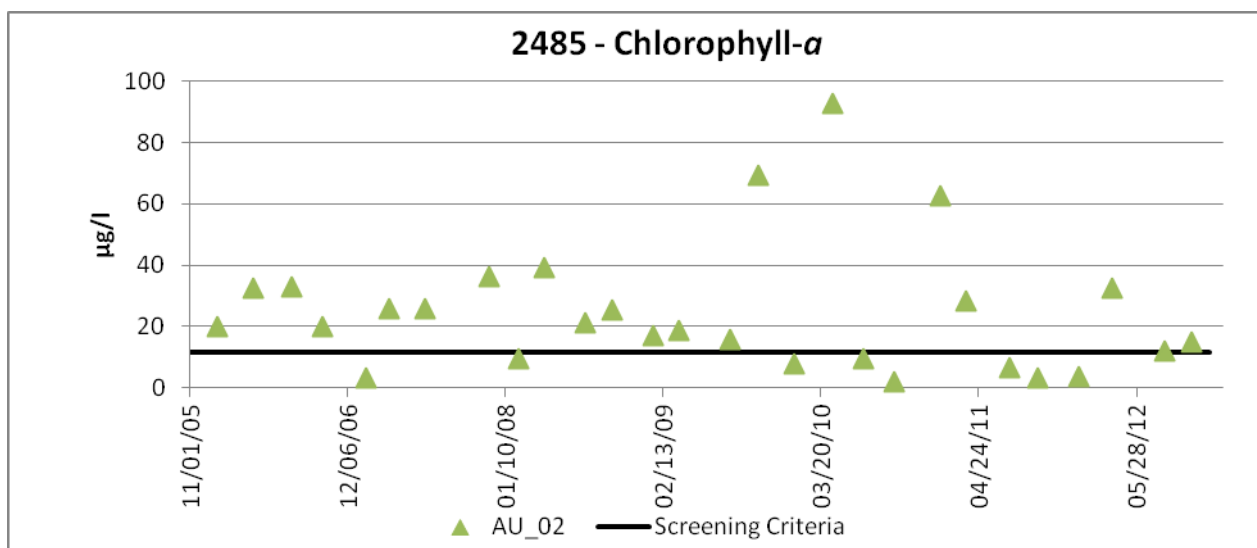
AU_03 has had an impairment for bacteria for primary contact recreation and oyster waters since 2004. A TMDL concluded that the Blind Oso differs significantly in physical characteristics and uses from the main portion of Oso Bay. It is extremely shallow, and has a soft muddy bottom and wetland areas. 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.

An impairment for 24-hr DO minimum in AU_02 is being carried forward in the Draft 2014 Integrated Report. A DO impairment for AU_01 and AU_03 has been removed as the data used the 2010 Texas Integrated Report shows that the DO

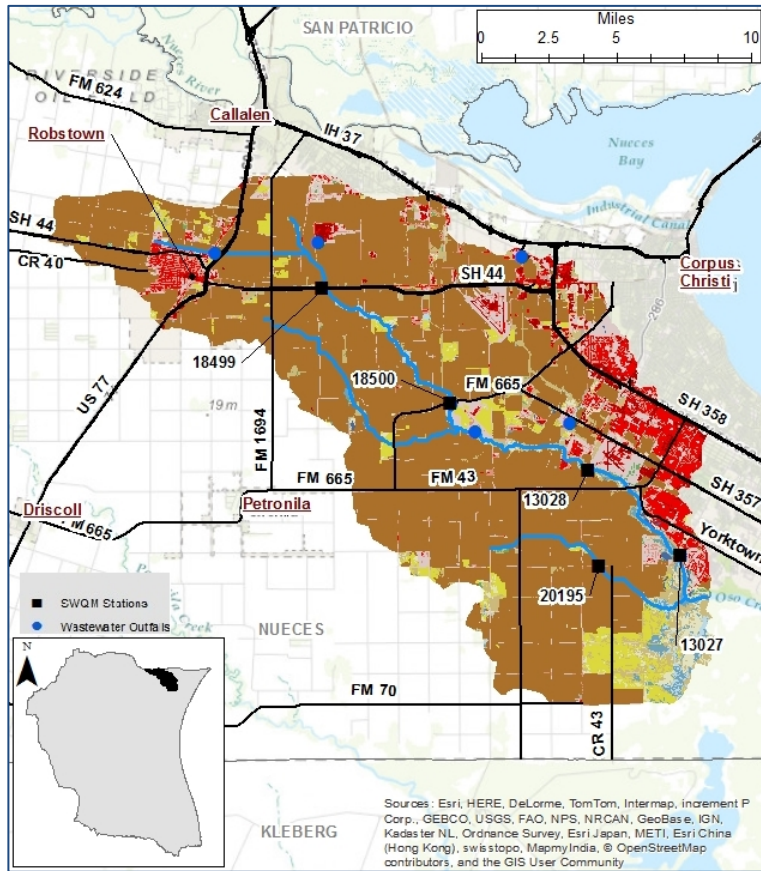
standards are now being met. Based on data collected for the TMDL, a revision to the DO criteria is being proposed: The TCEQ recommends changing the 24-hr average criteria from 5.0 mg/l to 4.5 mg/l. The recommended change for the 24-jr minimum criteria is from 4.0 mg/l to 2.0 mg/l. If the proposed revisions are approved, the bay would meet the DO standard.

AU_02 has a concern for chlorophyll-a. Chlorophyll-a concerns in AU_01 and Au_03 and a total phosphorus concern in AU-03 are being carried forward in the Draft 2014 Integrated Report.



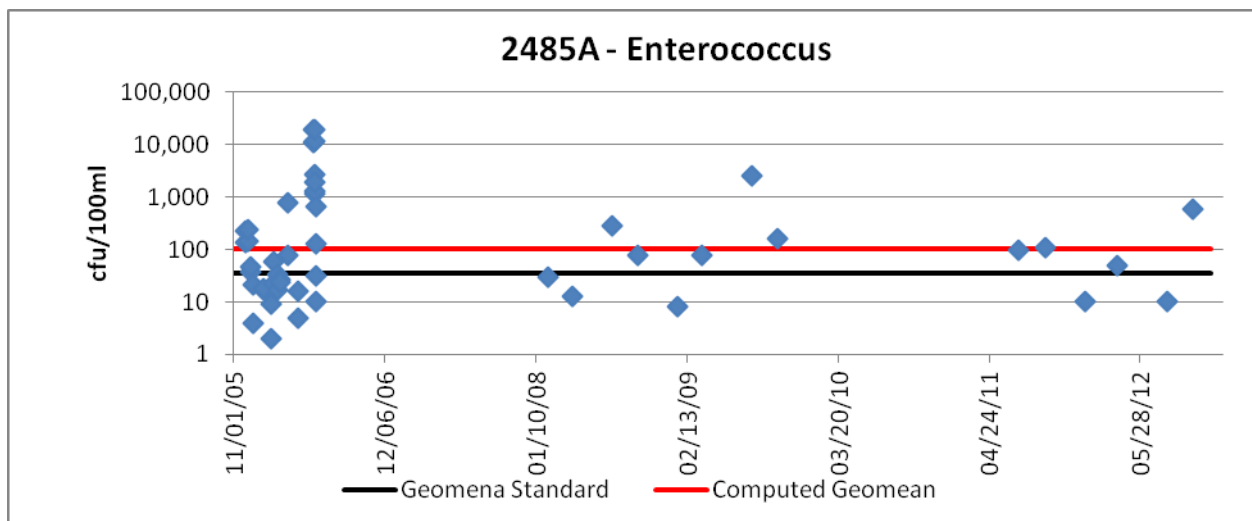


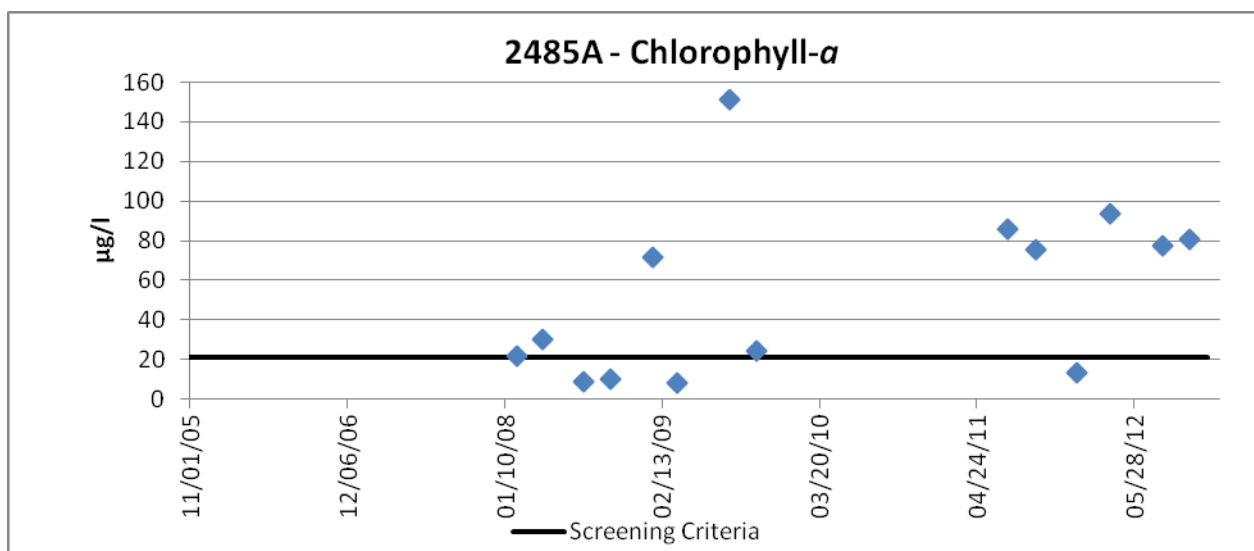
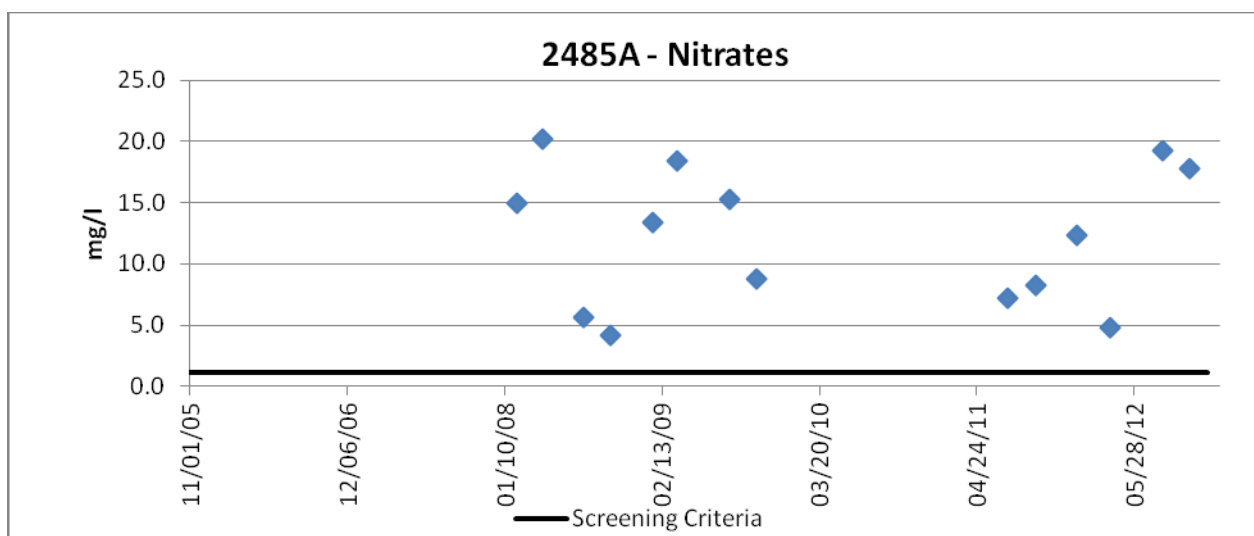
2485A: Oso Creek



Oso Creek flows 29.5 miles from a point 3 miles upstream of SH 44 west of Corpus Christi 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.

The creek has had an impairment for bacteria for primary contact recreation since 2002. The Center for Water Supply Studies and the Coastal Bend Bays Foundation are conducting a TMDL to address the issue. The creek also has concerns for nitrates, chlorophyll-a, and total phosphorus.

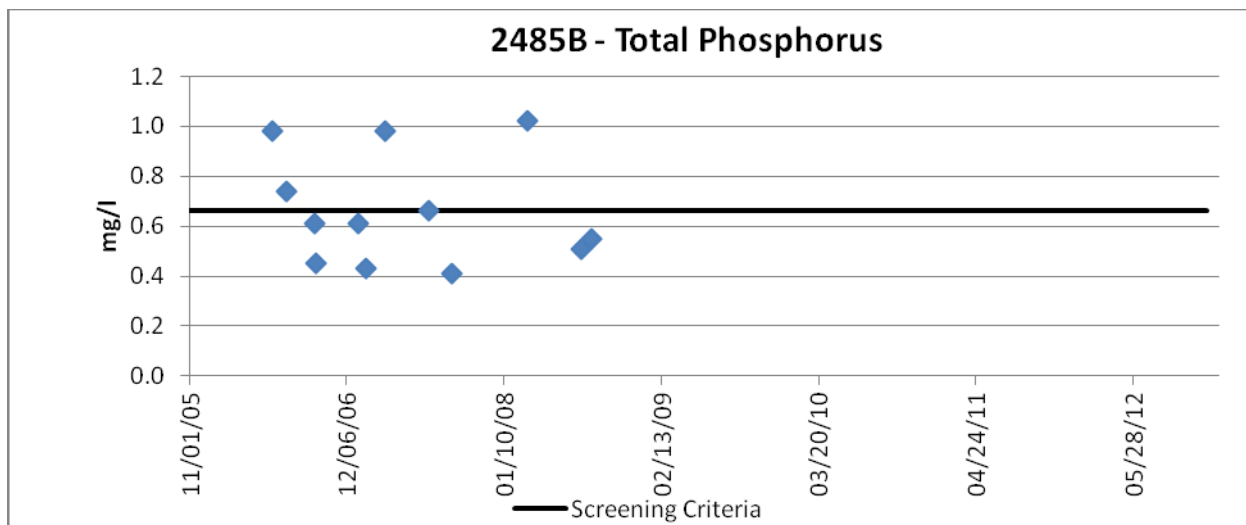




2485B: Unnamed Tributary of Oso Creek

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.

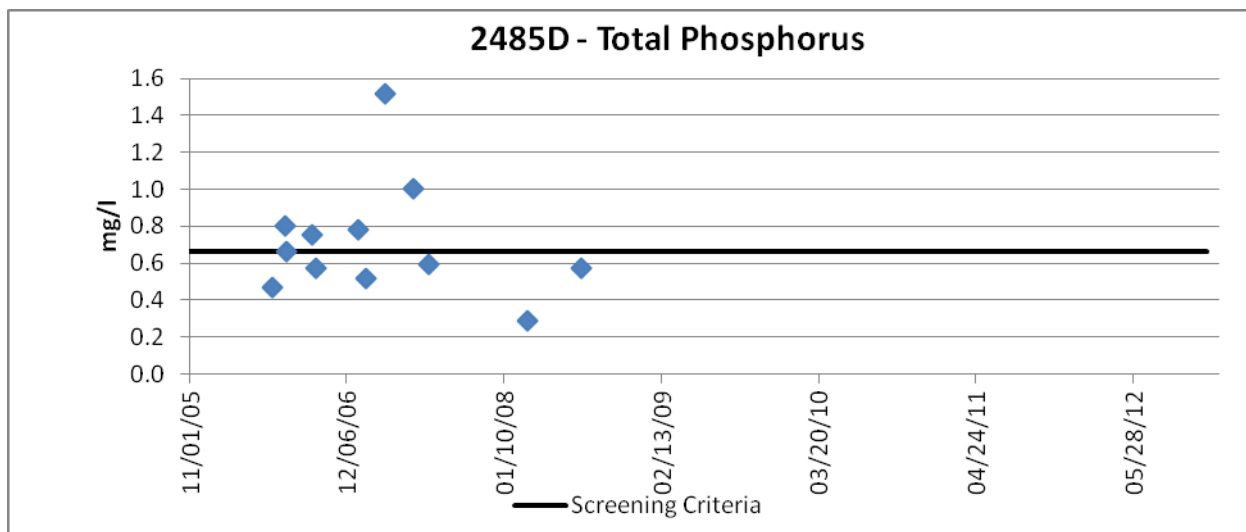
There are no active monitoring sites on the segment. Data for the assessment were collected during the TMDL studies. There is a concern for total phosphorus.



2485D: West Oso Creek

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.

There are no active monitoring sites on the segment. Data for the assessment were collected during the TMDL studies. There is a concern for total phosphorus.



The Laguna Madre is a very unique body of water. The only development is 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. The TCEQ is proposing to split the segment. If and when approved, Segment 2490 would be created to be the Upper Laguna Madre and Segment 2491 would become the Lower Laguna Madre.

There is little water exchange directly from the Gulf of Mexico. The Laguna is connected to Corpus Christi Bay and there are two channels through the island at Port Mansfield and Port Isabel. Additional channels open periodically with tropical storms and hurricanes.

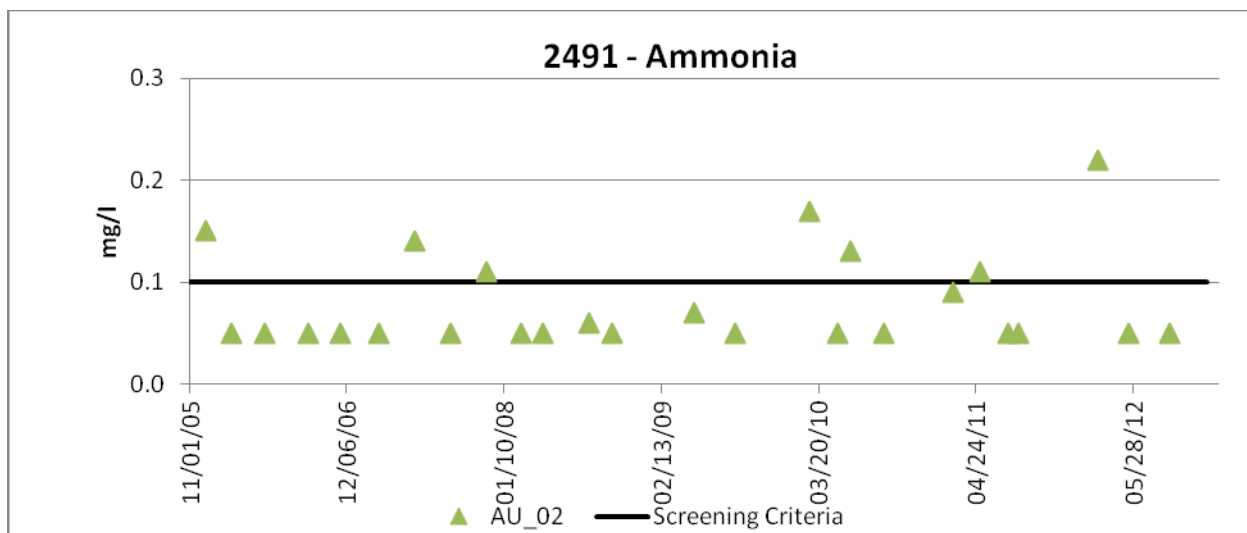
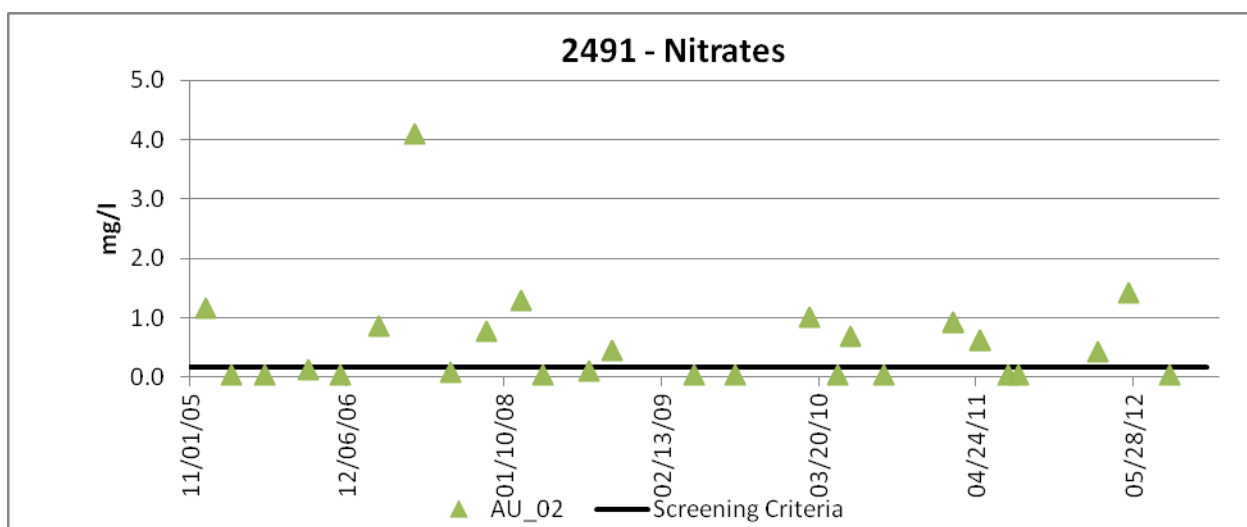
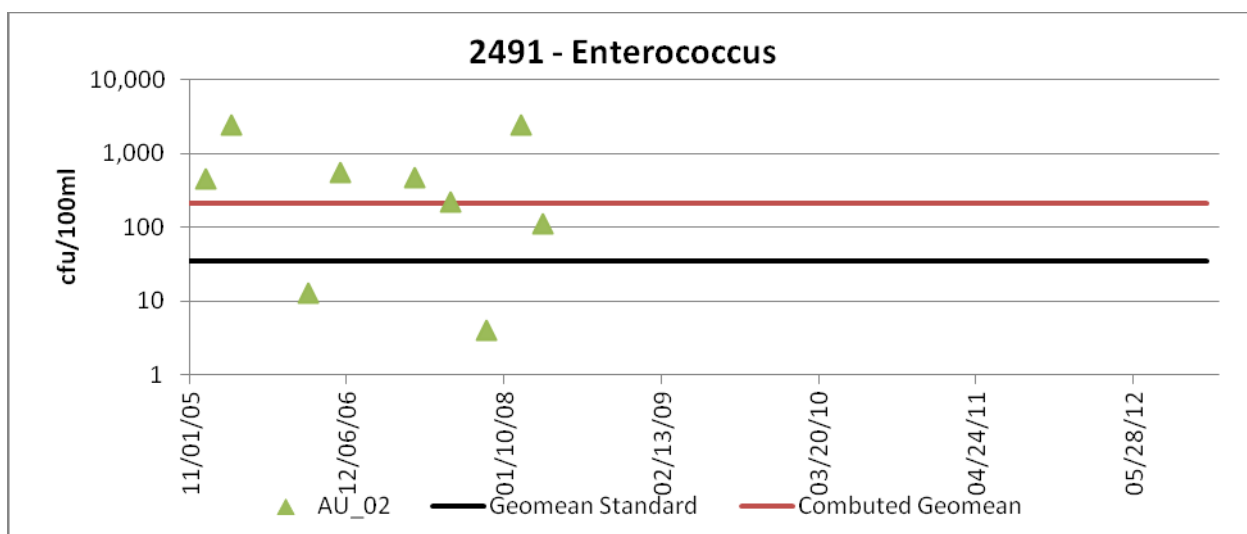
There are numerous WWTPs permitted to discharge to the Laguna Madre via the North

Floodway, some of which as far west as McAllen.

AU_02 has had an impairment for bacteria for primary contact recreation and oyster waters since 2006 and are being carried forward in the Draft 2014 Integrated Report. 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-01 and AU_02 have had an impairment for low DO since 1999. Based on data collected for the TMDL that was conducted to address the impairment, a revision to the DO criteria is being proposed: The TCEQ recommends changing the 24-hr 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 standard in all AUs.

AU_01 and AU_02 have concerns for chlorophyll-a which may be related to limited circulation. AU_02 also has concerns for nitrates and ammonia.

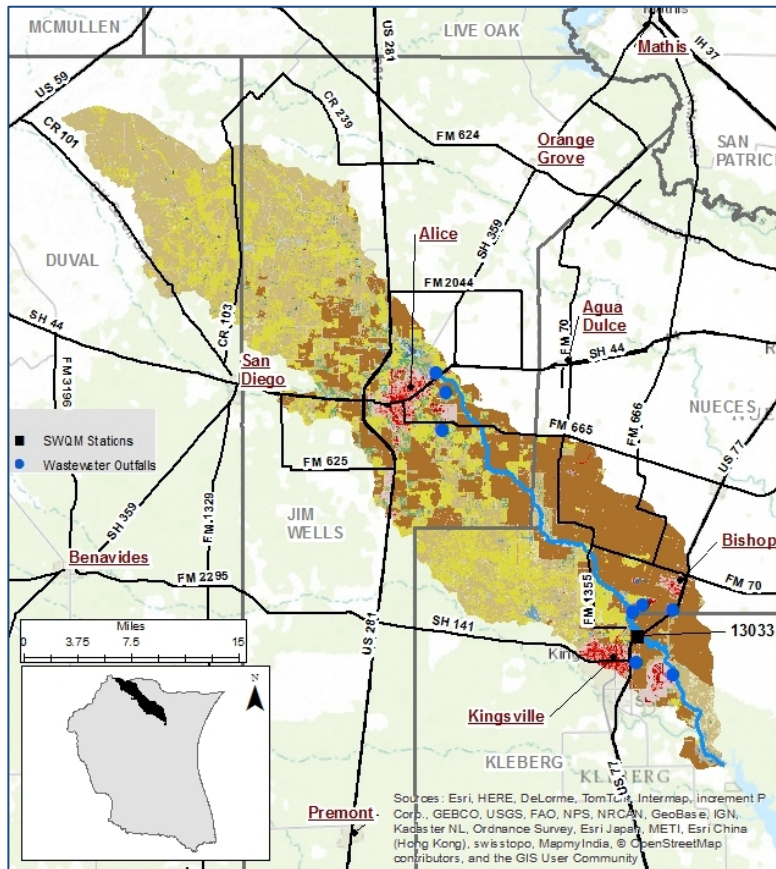


The North Floodway used to divert flood waters from the Arroyo Colorado. It is from 0.04 miles north of Campacuas Lake and 0.32 miles west of FM 491 in Mercedes, Texas to the confluence with the Lower Laguna Madre tidal flats. Data collection on this water body began in November 2011, so there is not yet enough data for any type of assessment.

The bay has concerns for chlorophyll-a, which may be related to limited circulation.



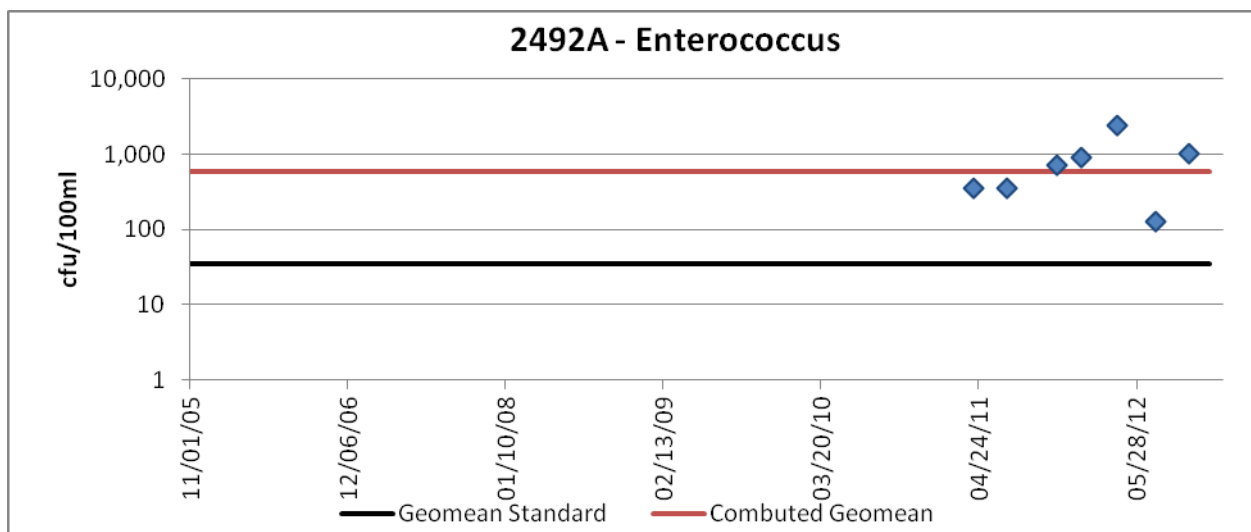
2492A: San Fernando Creek

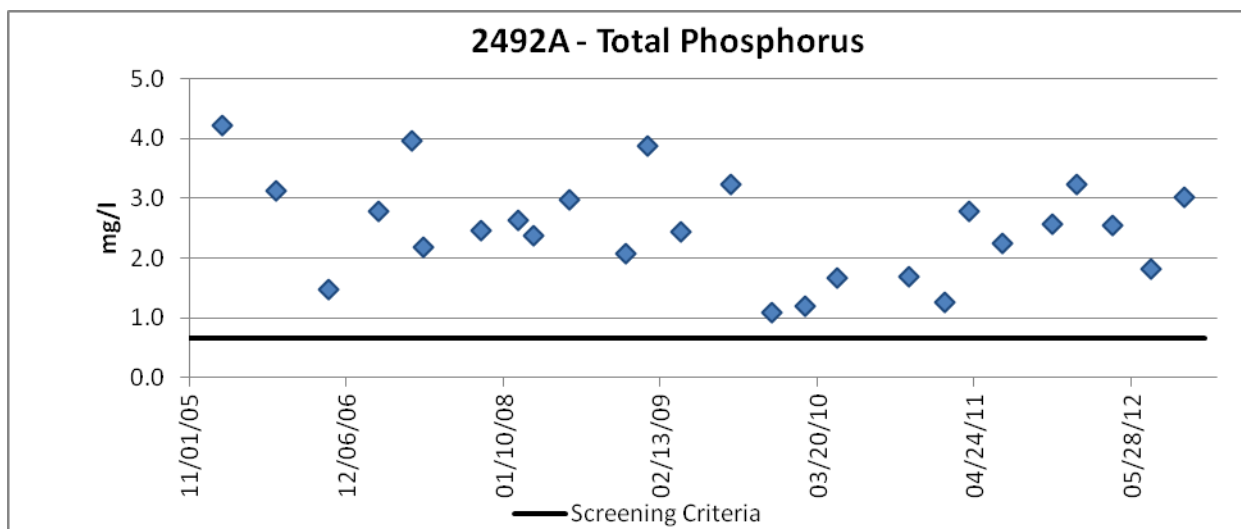
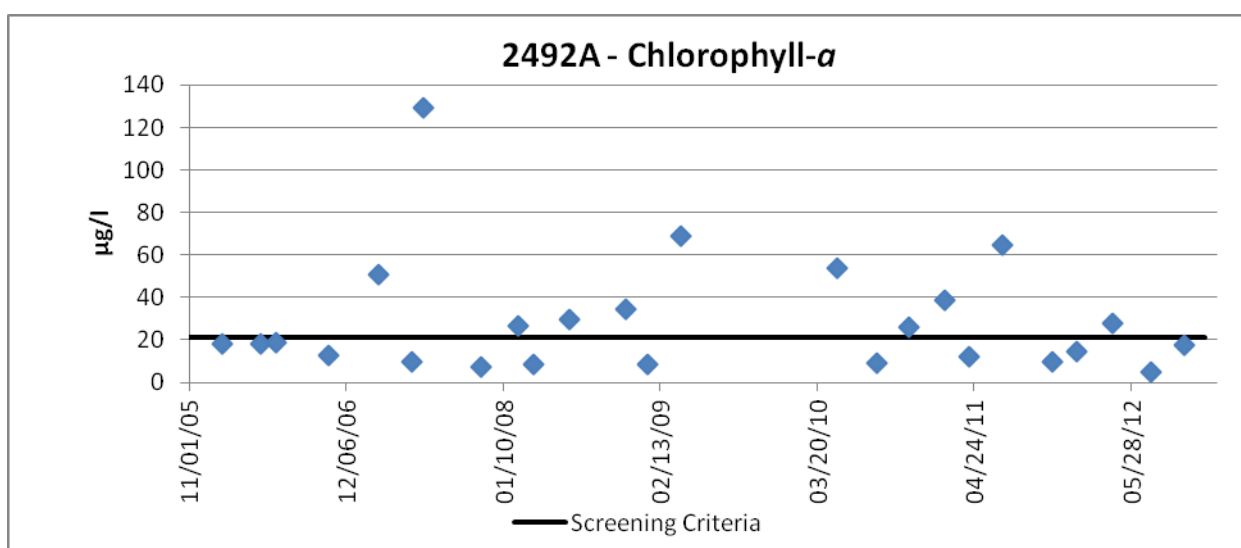
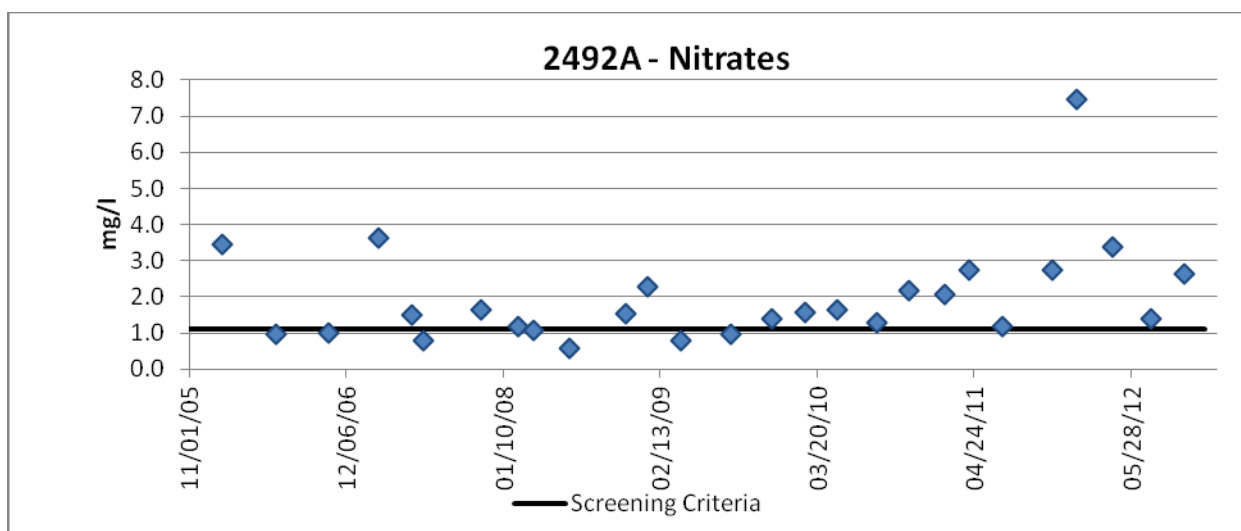


San Fernando Creek flows 45.6 miles from a point just east of the Nueces and Jim Wells county line to the confluence of the Cayo del Grullo arm of Baffin Bay in Kleberg County. Its watershed is 288,572 acres. While primarily rural, the creek flows through the City of Alice and the City of Kingsville.

The creek has had an impairment for bacteria for primary contact recreation since 2006 and is being carried forward in the Draft 2014 Integrated Report. There was gap in Enterococcus sampling, but the recent data confirms the impairment. There are a number WWTPs that discharge into the creek. There are also smaller communities on septic systems in the area.

The creek also has concerns for nitrates, chlorophyll-a, and total phosphorus.





2493: South Bay



South Bay is located south of the Brownsville Ship Channel in Cameron County. Its watershed, combined with that of the Segment 2494, the Brownsville Ship Channel, and Segment 2494A, the Port Isabel Fishing Harbor, is 225,554 acres.

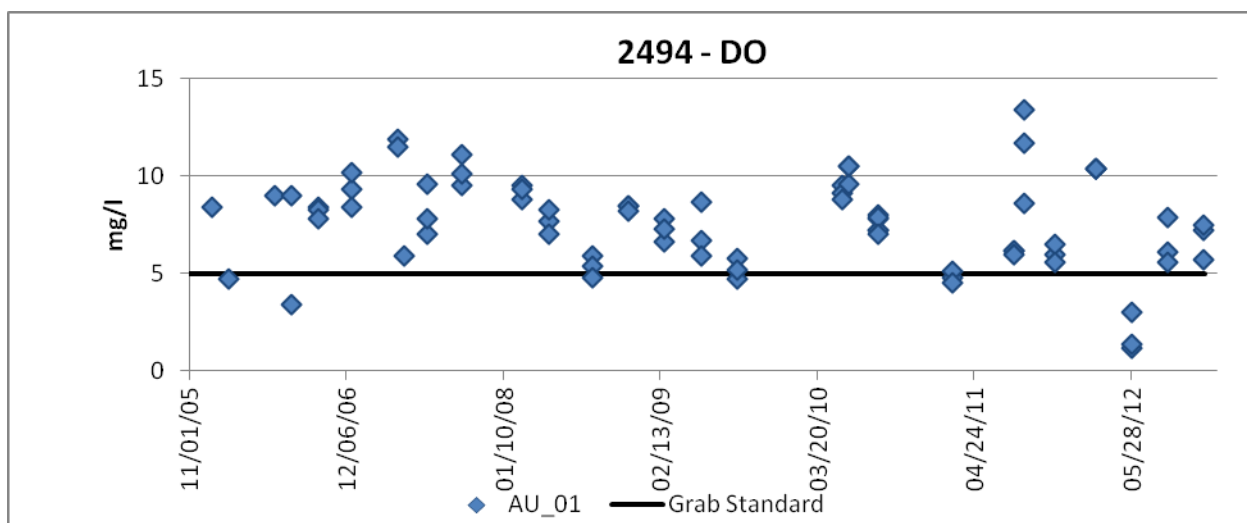
South Bay is the southernmost bay in Texas and is part of the South Bay Coastal Preserve. It supports the largest concentration of oysters in the Lower Laguna Madre and is relatively inaccessible.

All assessed parameters met the standards in the Draft 2014 Integrated Report.

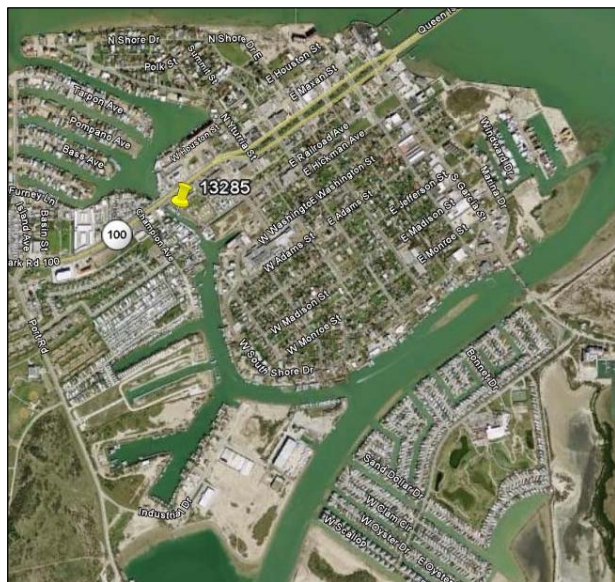
Map of the Rio Grande watershed showing SWQM Stations and Wastewater Outfalls. The map includes labels for various locations such as Combes, Harlingen, San Benito, Los Fresnos, Bayview, Laguna Vista, Port Isabel, Los Indios, Rancho Viejo, Brownsville, La Union, Matamoros, and South Bay. It also shows major roads like US 77, US 83, FM 1420, FM 508, FM 1421, FM 3248, FM 510, FM 1410, SH 100, SH 48, SH 4, and PR 100. A legend indicates SWQM Stations (black squares) and Wastewater Outfalls (blue circles). A scale bar shows 0 to 20 miles. An inset map shows the location of the study area within the state of Texas.

The ship channel also has a concern for low DO for the grab screening level. Not enough 24-hr DO events have been conducted to fully assess this concern.





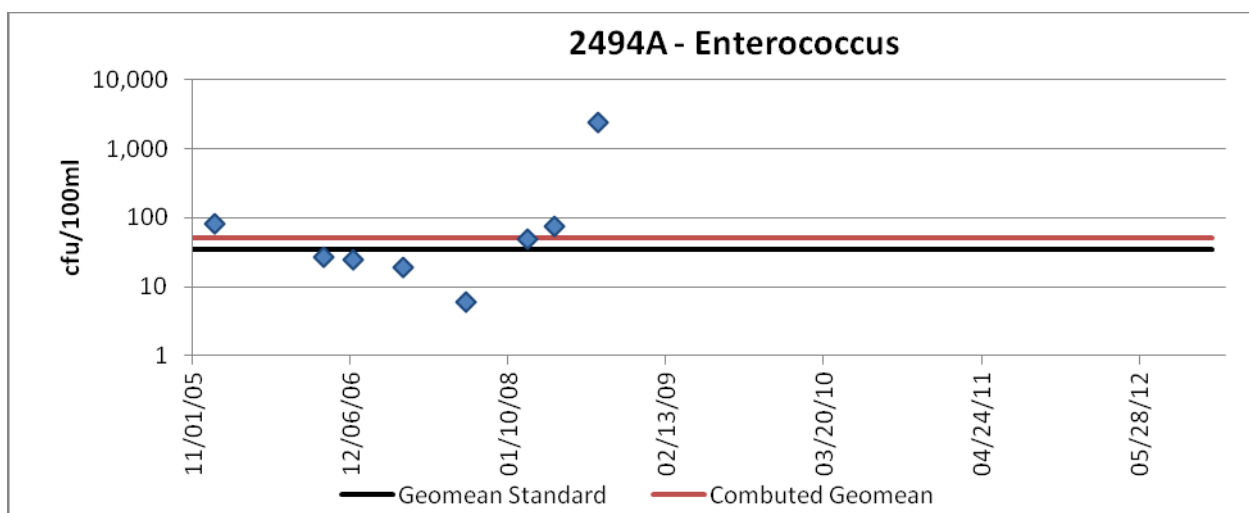
2494A: Port Isabel Fishing Harbor (Figure)



The 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.

The water body is listed as having an impairment for bacteria for primary contact recreation as a result of the 2010 Texas Integrated Report. The source of the bacteria is thought to be from NPS 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.



2501: Gulf of Mexico

The Gulf of Mexico along the entire Texas coast has been listed by the DSHS as being impaired for mercury in edible tissue (King Mackerel > 43") since 1998.

Table 3-8: 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	Entire segment	Bacteria (oyster waters)	Chlorophyll-a
2463 Mesquite Bay	01	Entire segment	none	none
2471 Aransas Bay	01	Entire segment	none	none
2471A Little Bay	01	Entire segment	none	Chlorophyll-a
2471RB	01	Rockport (Recreational Beaches)	none	none
2472 Copano Bay / Port Bay / Mission Bay	02	Copano Bay	Bacteria (oyster waters)	none
2473 St. Charles Bay	01	Entire segment	none	DO
2481 Corpus Christi Bay	01	From the CCSC east to Pelican Island, south to Demit Island including the La Quinta Channel and the CCSC adjacent to Redfish Bay	none	none
	02)	From the CCSC east to Pelican Island, south to Demit Island including the area from the CCSC to Demit Island (Oso Bay and City of Corpus Christi area).	none	none
	03	From Pelican Island south to Demit Island, to Mustang Island and the area along Mustang Island State Park to the CCSC	none	none
	04	From the JFK Causeway to a line from Demit Island across to Mustang Island State Park	none	none
2481CB	01	Corpus Christi Marina	none	none
	02	Corpus Christi Beach - Main	none	none
	03	Cole Park	Bacteria	none
	04	Ropes Park	Bacteria	none
	05	McGee Beach		
	06	Poenisch Park	Bacteria	none
	07	Emerald Beach	none	none
	08	University Beach	none	none
	09	Packery Channel Park	none	none
2482 Nueces Bay	01	Entire segmetn	Zinc in edible oyster tissue	Copper in Water
2483 Redfish Bay	01	Entire segment	none	none
2483A Conn Brown Harbor	01	Entire segment	none	Copper in Water
2484 Corpus Christi Inner Harbor	01	Entire segment	none	Ammonia, Nitrate

Table 3-8: List of Impairments and Concerns in the Bays and Estuaries and Gulf of Mexico (cont.)

Segment Name	AU	Description	Impairments	Concerns
2485 Oso Bay	01	Upper bay (Holly Road to CR 24)	none	Chlorophyll-a
	02	Middle bay (SH 358 to Holly Road)	DO	Chlorophyll-a
	03	Lower portion of bay (Ocean Drive to State Park Road 22)	Bacteria	Chlorophyll-, Total Phosphorus
2485A Oso Creek	01	Entire segment	Bacteria	Chlorophyll-a, Nitrate, Total Phosphorus
2485B Tributary of Oso Creek	01)	Entire segment	none	Total Phosphorus
2485D West Oso Creek	01	Entire segment	none	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	DO, Bacteria	Chlorophyll-a, Ammonia, Nitrate
	03	Lower portion south of the Arroyo Colorado confluence	none	DO
2491A North Floodway	01	Entire Segment	none	none
2492 Baffin Bay / Alazan Bay / Cayo Del Grullo / Laguna Salada	01	Entire Segment	none	Chlorophyll-a
2492A San Fernando Creek	01	Entire segment	Bacteria	Chlorophyll-a, Nitrate, Total Phosphorus
2493 South Bay	01	Entire segment	none	none
2494 Brownsville Ship Channel	01	Entire segment	Bacteria	DO
2494A Port Isabel Fishing Harbor	01	Entire segment	Bacteria	none
2501 Gulf of Mexico	06	Port Aransas area	Mercury in edible tissue	none
	07	Area between Port Aransas and Port Mansfield	Mercury in edible tissue	none
	08	Port Mansfield area	Mercury in edible tissue	none
	09	Port Isabel area	Mercury in edible tissue	none

4.0 STAKEHOLDER PARTICIPATION and PUBLIC OUTREACH

4.1 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 development of work plans and allocation of resources
- Development and review of major reports
- Establishing monitoring priorities and developing monitoring plans
- Improving awareness of water quality, water resources, and pollutant source issues
- Increasing opportunities for citizens to identify pressing issues, concerns, and contributing ideas to the CRP process
- Expanding 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 <http://www.nueces-ra.org/CP/CRP/public.php>, or contact NRA using the contact information at the end of this report.

4.2 Public Outreach

NRA participated 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 do help protect our rivers, lakes, and bays.

Watershed Model Demonstrations

NRA has two watershed models of the Nueces River Basin, and a third model 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. These models are taken to class rooms and outreach events and are used to demonstrate point and non-point 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 communities and how pollution in their communities affect those downstream. This education program reaches about 13,000 students each year.



Other Education Tools

NRA also used an **Aquifer model** in school presentations to show 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 Ag 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 is equipped with gutters and a rain water 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.



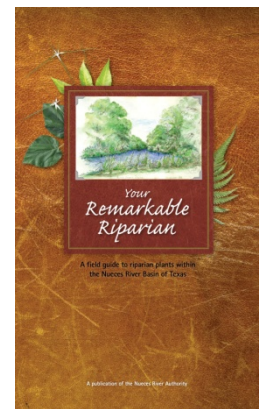
Up2U Campaign

NRA, with guidance from local partners, designed and launched print and media components of the Up2U Clean Rivers Program 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 advertizing 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.



Riparian Network

NRA facilitates riparian landowner education focusing of 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 and a companion booklet *Mangling Riparian Areas*. They can be viewed online at www.nueces-ra.org/CP/LS/literature/yrp.php. NRA works to integrate riparian understanding into all stakeholder processes associated with WPP's, RUAA's, and other Special studies.



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