Clean Rivers Program Guadalupe River Basin

GBRA Water Quality Monitoring

Lee Gudgell
March 23,2017

Objectives of CRP Water Quality Monitoring

- Provide Quality Assured Data to the TCEQ for use in Water Quality Decision Making.
- Identify and Evaluate Water Quality Issues.
- Promote Cooperative Watershed Planning.
- Recommend Management Strategies.
- Inform and Engage Stakeholders.

CRP Water Quality Monitoring

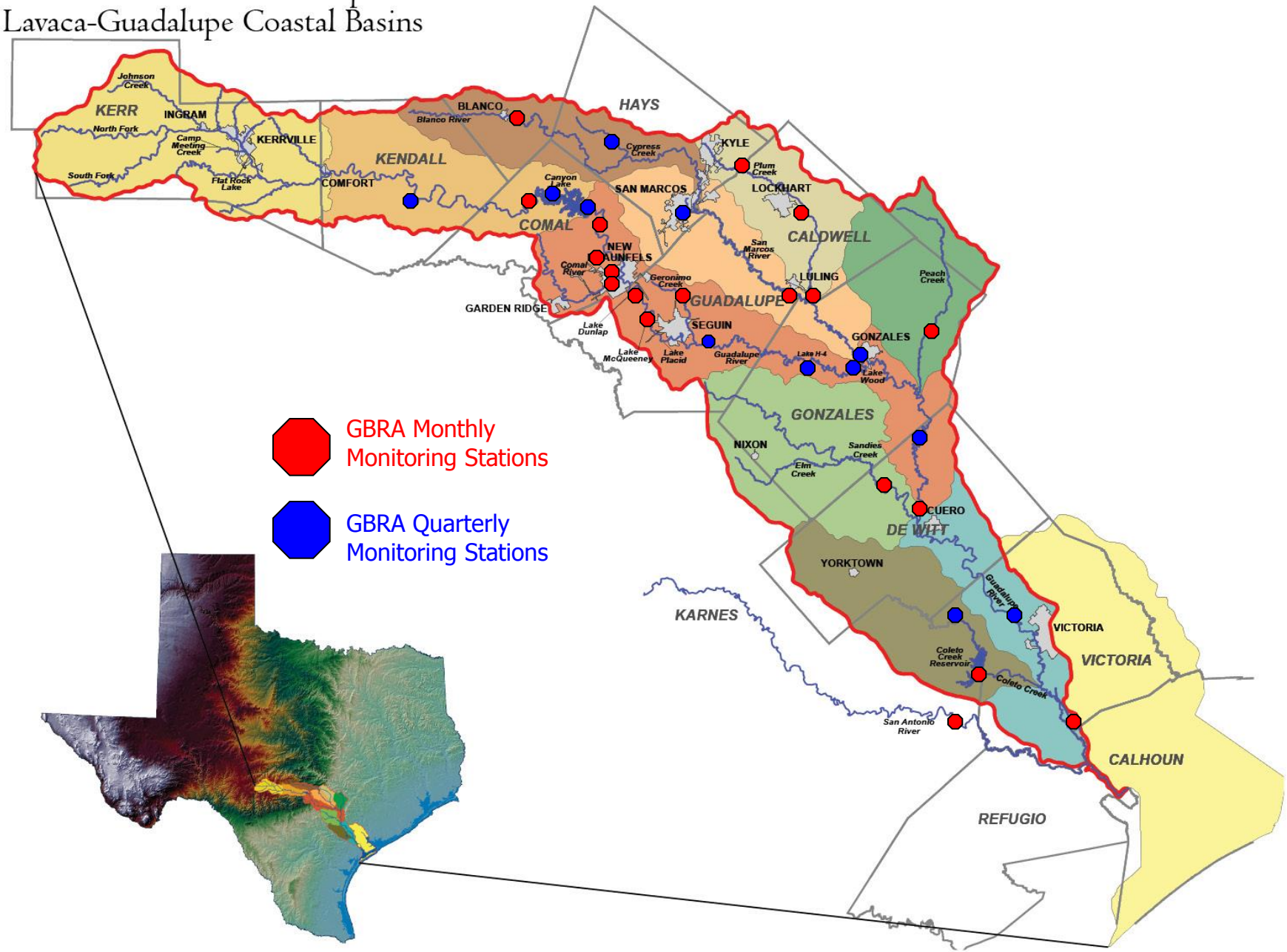
Sampling Entity	Conventional, Field & Bacteria	Biological & Habitat	24 Hour DO
GBRA	19 Sites Monthly; 12 Sites Quarterly	3 Sites 2x a year	2 Sites 2x a year
UGRA	11 Sites Quarterly; 6 Bacteria Sites Monthly		1 Site 2x a year
TCEQ	9 Sites Quarterly		
WVWA	9 Sites Quarterly		2 Sites 2x a year

GBRA Clean Rivers Program Operating Budget

FY 2018-2019 Budget		
FY 2018 (09/01/2017-08/31/2018)	FY 2019 (09/01/2018-08/31/2019)	FY2018-FY2019 (9/01/2017-08/31/2019)
$135,378.00	$135.378.00	$270,756.00

Contractual budget totals remain the same as FY 2016-FY 2017

Watersheds of the Guadalupe River and Lavaca-Guadalupe Coastal Basins



Monitoring Data

Stream assessments – Texas Water Quality Inventory

2014 Integrated Report for the Clean Waters Act Section 305(b) and 303(d) (Guadalupe River Basin)

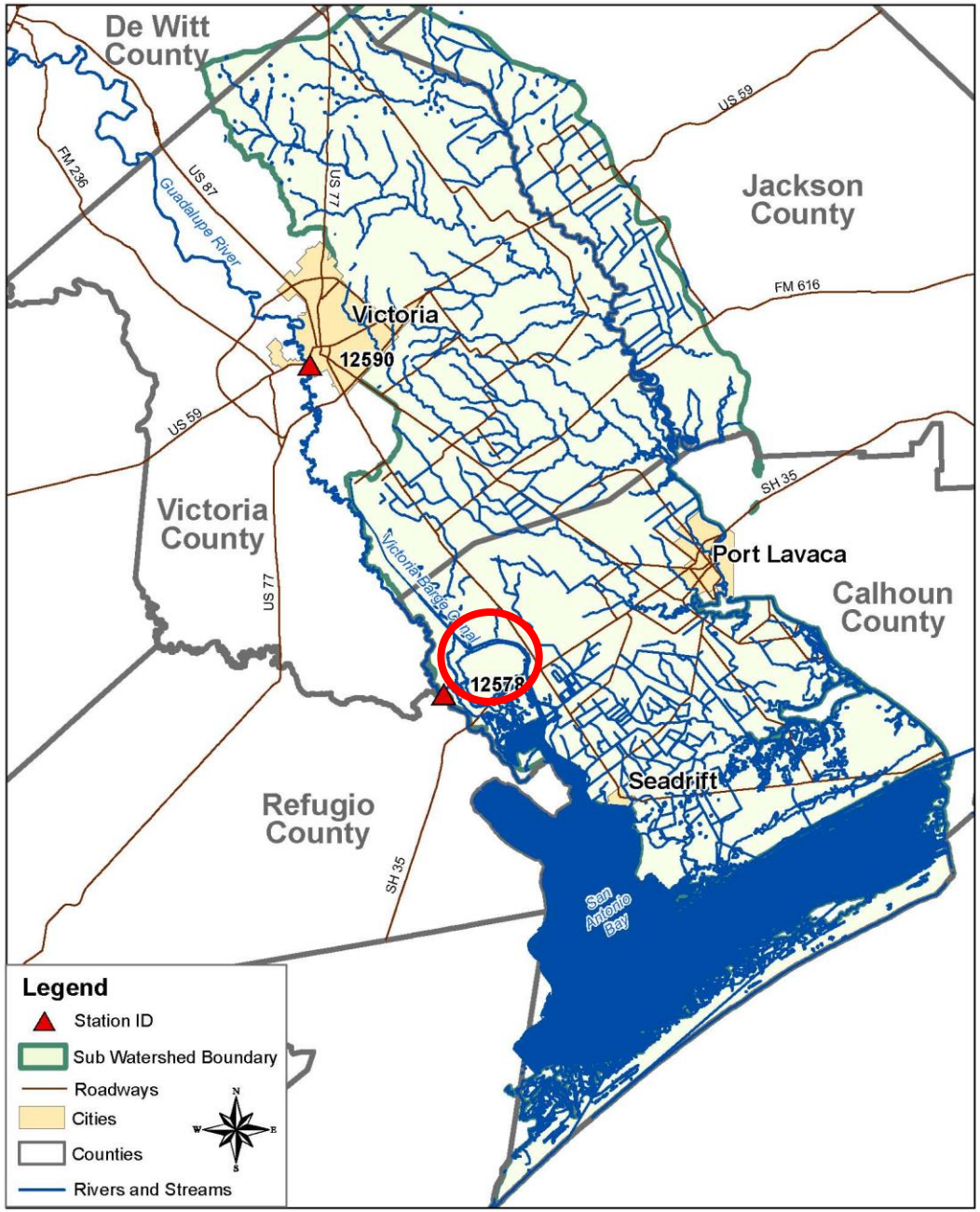
2014 Texas Integrated Report: Assessment Results for Basin 18 - Guadalupe River

Report Abbreviations	Description:
SEGID:	Unique Segment identification alpha-numeric code; can be stream, reservoir, estuary, oyster waters, beach watch, etc.
AUID:	Unique Assessment Unit code; this is a portion of the segment the AUID begins with and ends with _01, _02, etc. Some AUIDs are special units ending in "SA," or oyster water AUIDs are indicated by "OW" and beach watch AUIDs are indicated by abbreviations for name of beach in AUID.
ASMT Start Date:	The start date of the period of record data for this method was selected; the official 2014 period of record is from 12/1/2005 to 11/30/2012. Assessors have the option of going back 10 years (12/1/2002) to select more data, according to assessment guidance.
ASMT End Date	The end date of the period of record data for this method was selected; the official 2014 period of record dates are 12/1/2005 to 11/30/2012. Assessors have the option of including more recently collected data than 12/01/2012, if available.
# Assd:	Number of samples assessed; some data are averaged, as with profile data, some are eliminated because criteria do not apply during certain conditions such as low flow.
Mean Assd:	Mean of samples assessed; includes averaged methods like chronic criteria as well as geometric mean calculati ons for bacteria.
# Exceed:	The number of samples that exceed criteria for single sample, or binomial, methods (not averaged data).
Mean Exceed:	This is the mean of the samples that exceeded criteria for the single sample, or binomial, methods (not avera ged data).
Criteria:	Value that the data is compared against to determine level of support; Note: for acute metals in water, each value is compare d to a calculated criteria and not all criteria could be reported here, only the minimum in the range of criteria calculated are included.
DS Qual:	*Dataset Qualifier - indicates sample sizes:* **AD** = Adequate Data (10 or more samples) **LD** = Limited Data (less than 9, greater than 3) **ID** = Inadequate Data (less than 4) **JQ** = Level of support is based on judgment of the assessor **SM** = This assessment method is superseded by another method **TR** = Temporally Not Representative, used with NA **SR** = Spatially Not Representative, used with NA **OE** = Other information than ambient samples evaluated **OS** = Assessment area outside state boundaries
LOS:	*Level of support for this use, method, assessment parameter:* **FS** = Fully Supporting **NC** = No Concern **NA** = Not Assessed **NS** = Nonsupport **CS** = Screening Level Concern **CN** = Use Concern
CF:	Carry forward indicator check box: indicates that the Integrated level of support of CS, CN, or NS was carried forward from a previ ous assessment due to inadequate data for this method in this assessment.
Int LOS:	Integrated level of support. This is the overall level of support for this use, method, parameter group, which could be different from the LOS (described above) due to car ry forward information or other types of changes. New Code added in 2010: PI = Pending Issue
TCEQ Cause	This is the impairment description (e.g., bacteria, depressed dissolved oxygen, etc.)
Cat:	*This is the assessment category assigned to this impairment. Subcategories as follows:* **Category 4**: Standard is not attained or nonattainment is predicted in the near future due to one or more parameters, but no TMDLs are required. **4a** - All TMDLs have been completed and approved by EPA. **4b** - Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future. **4c** - Nonattainment of the standard for one or more parameters is shown to be caused by pollution, not by pollutants and that the w ater quality conditions cannot be changed by the allocation and control of pollutants through the TMDL process. **Category 5**: Standard is not attained or nonattainment is predicted in the near future for one or more parameters. **5a** - TMDLs are underway, scheduled, or may be scheduled for one or more parameters. **5b** - review of the standards for one or more parameters will be conducted before a management strategy is selected, including a possible revision to the water quality standards. **5c** - Additional data or information will be collected and/or evaluated for one or more parameters before a management strategy is selected.

Priority Water Bodies

- Victoria Barge Canal (Segment 1701)
  - Chlorophyll-a
  - Nitrate-Nitrogen
  - Listed with concerns in 2002

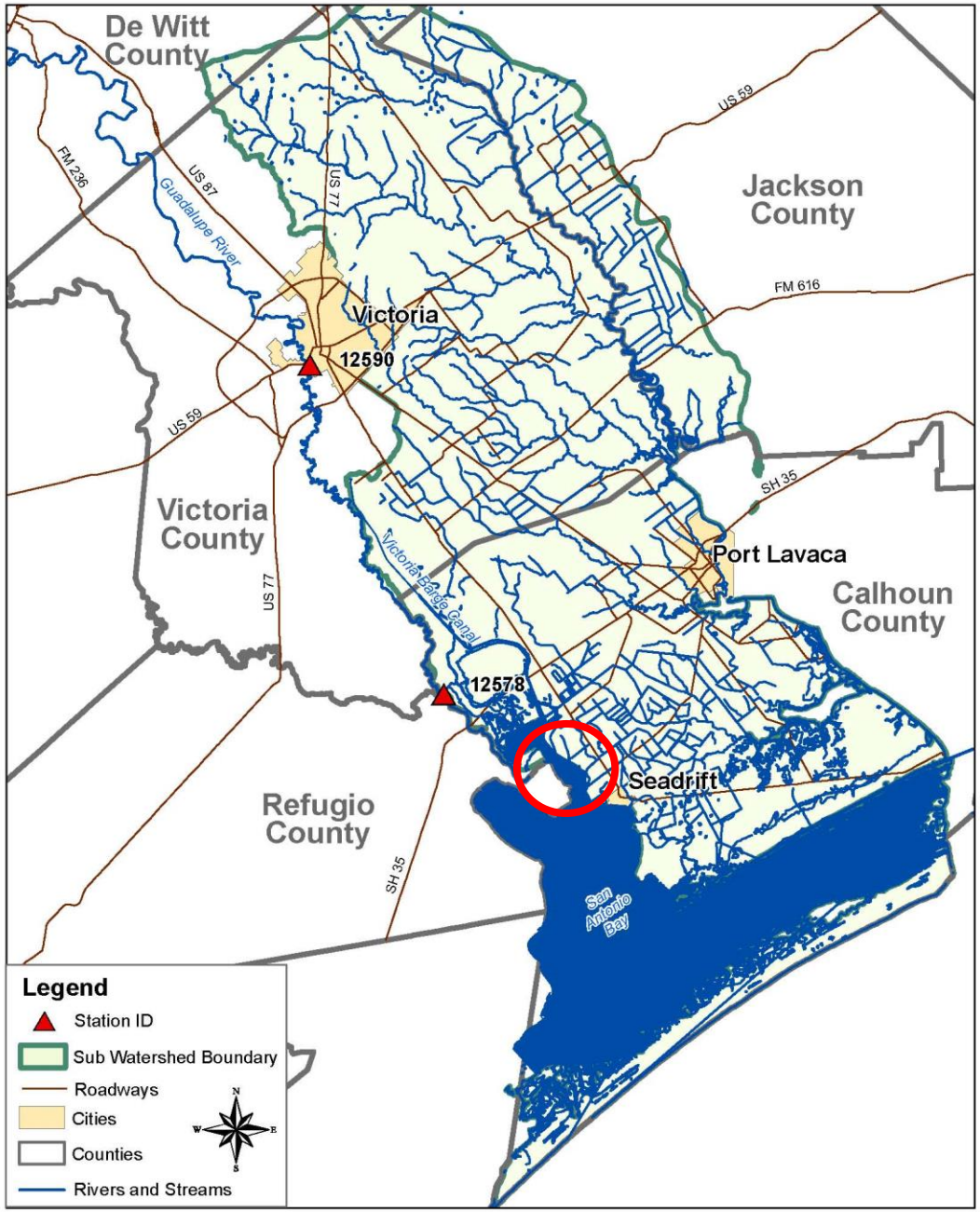
Guadalupe-Lavaca Coastal Basin



Priority Water Bodies

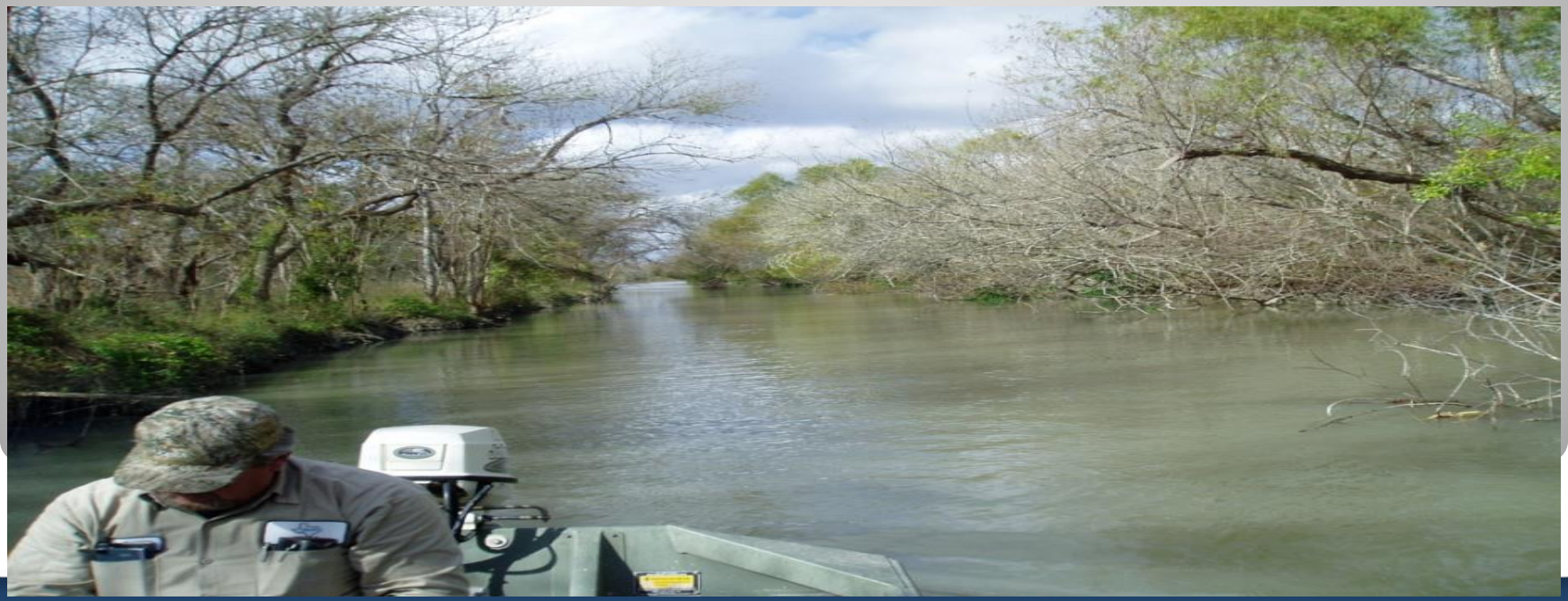
- Guadalupe River Tidal (Segment 1801)
  - Nitrate-Nitrogen
  - Listed with concerns in 2002

Guadalupe-Lavaca Coastal Basin

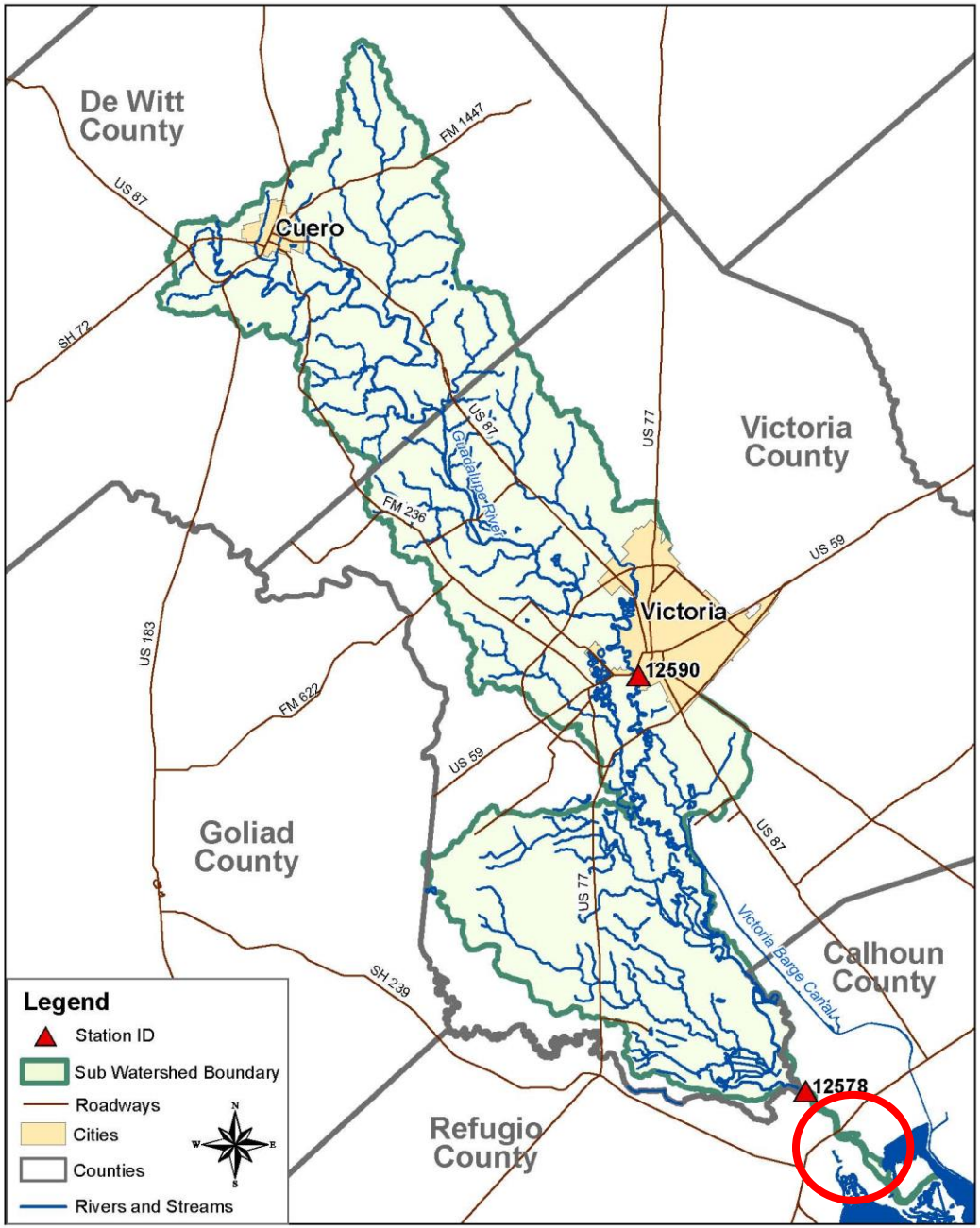


Priority Water Bodies

- Guadalupe River Below San Antonio River (Segment 1802)
  - Nitrate Nitrogen
  - Listed with concerns in 2002

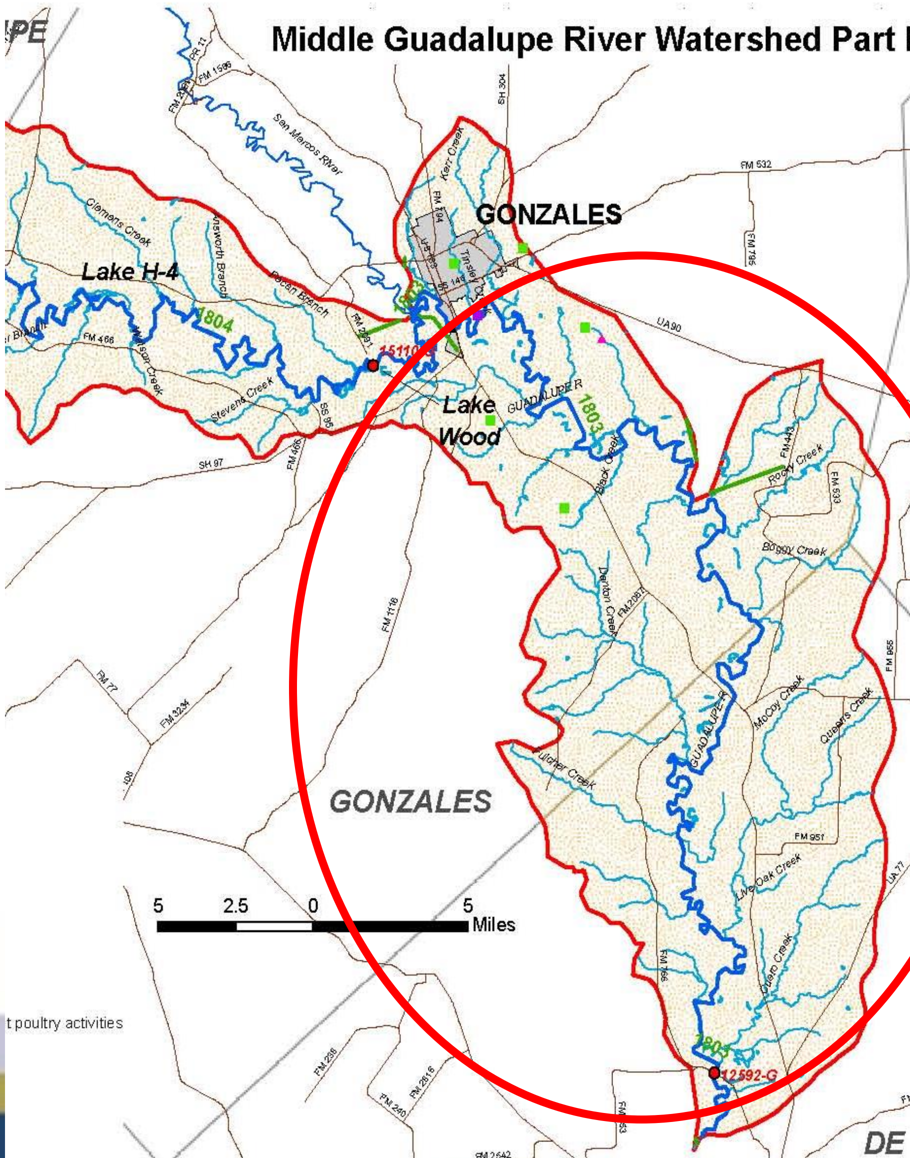


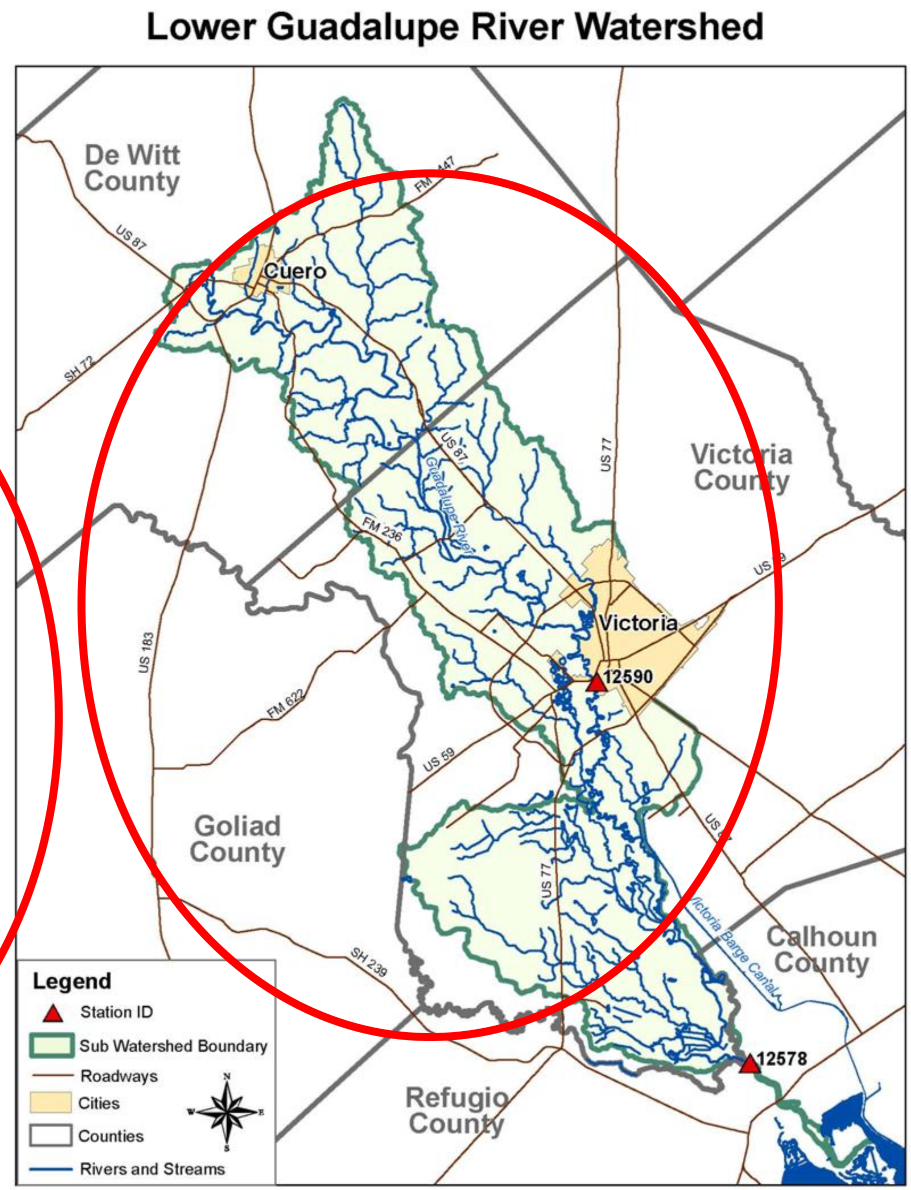
Lower Guadalupe River Watershed



Priority Water Bodies

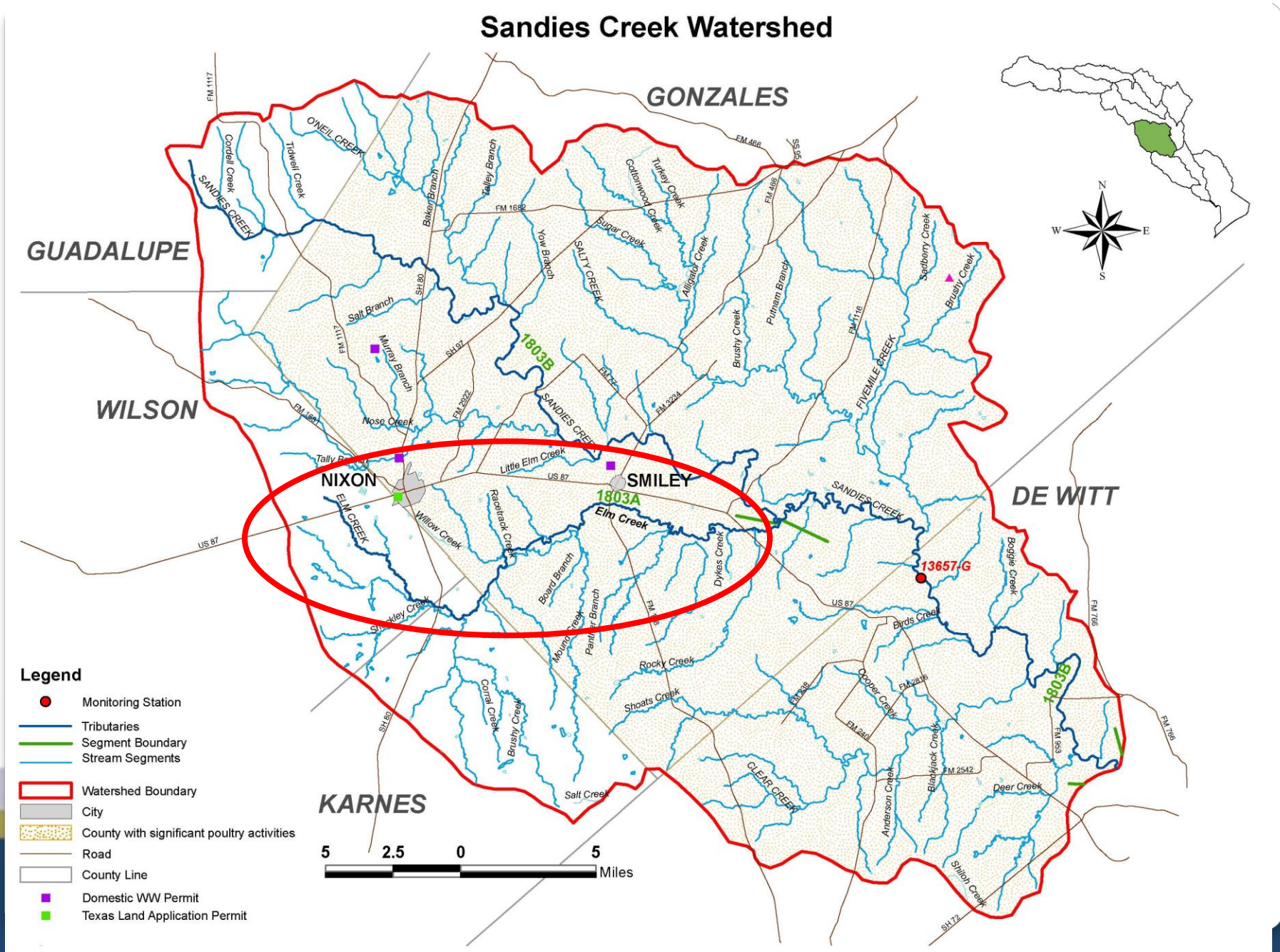
- Guadalupe River Below San Marcos River (Segment 1803)
  - 1803_04 – 25 mi from confluence with Coleto Creek upstream to confluence with Sandies Creek
  - Bacteria
  - Removed listing in 2014
  - 1803_01 –Lower 25 Miles
  - Nitrate Nitrogen Listed as a Concern in 2014


Middle Guadalupe River Watershed Part E
GONZALES
Lake H-4
Lake Wood
GONZALES
1804
1803
1805
12592-G
San Marcos River
Clemons Creek
Kerr Creek
Black Creek
Rocky Creek
Boggy Creek
Denton Creek
McCoy Creek
Queen's Creek
Live Oak Creek
Duero Creek
Fulcher Creek
Stevens Creek
GUADALUPE R
5 2.5 0 5 Miles
DE
t poultry activities


Lower Guadalupe River Watershed
De Witt County
Victoria County
Goliad County
Calhoun County
Refugio County
Cuero
Victoria
12590
12578
Guadalupe River
Victoria Barge Canal
US 87
US 77
US 183
US 59
SH 239
FM 236
FM 622
SH 72
Legend
Station ID
Sub Watershed Boundary
Roadways
Cities
Counties
Rivers and Streams

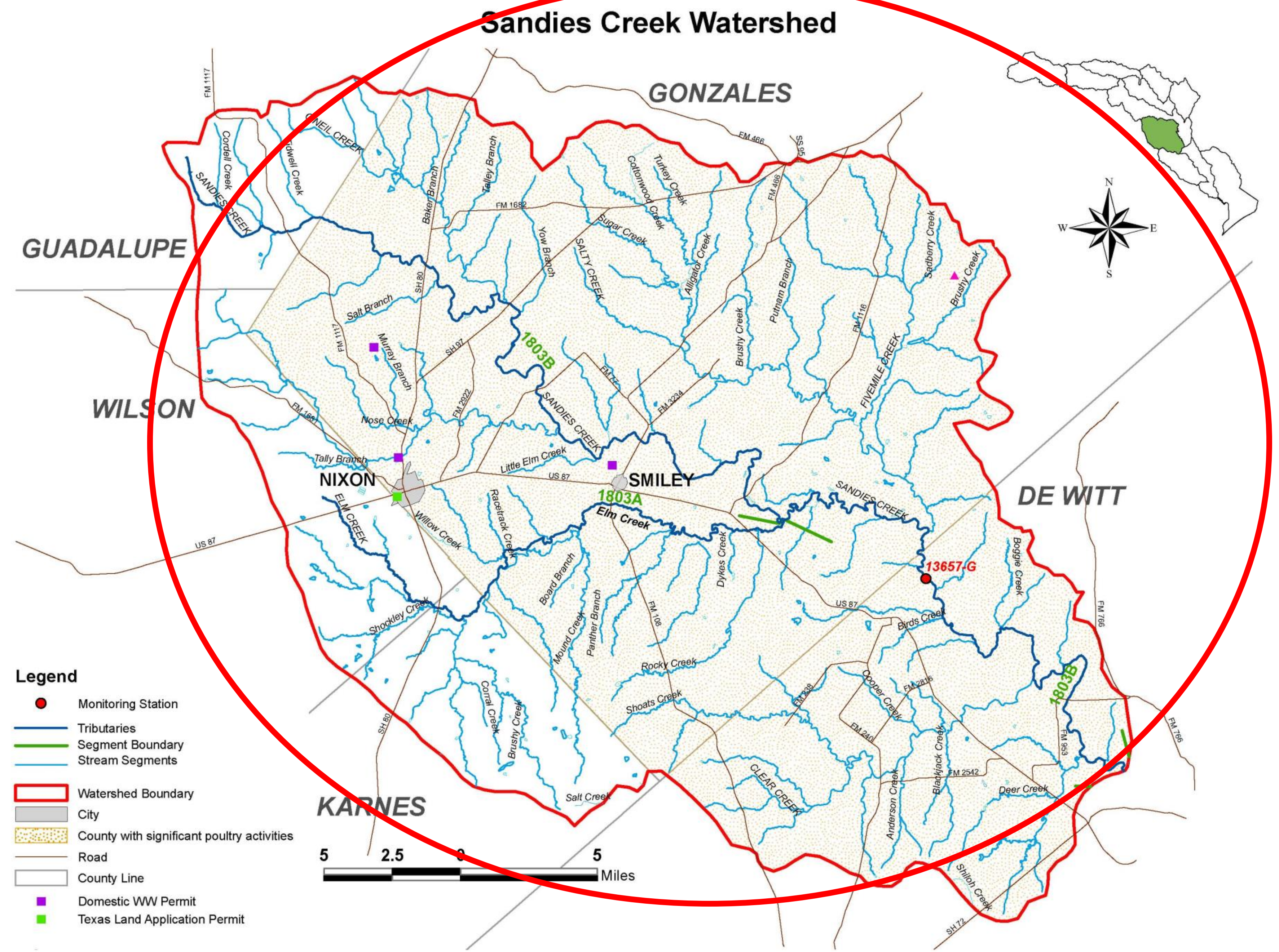
Priority Water Bodies

- Elm Creek (Segment No. 1803A)
  - Depressed Dissolved Oxygen listed in category 5b in 1999;
  - Chlorophyll-a listed as a concern
  - TCEQ Aquatic Life Standards are being Re-evaluated for this segment.


Sandies Creek Watershed
GONZALES
GUADALUPE
WILSON
KARNES
DE WITT
NIXON
SMILEY
1803A
1803B
1803B
13657-G
Elm Creek
SANDIES CREEK
SALTY CREEK
FIVEMILE CREEK
ONEIL CREEK
Little Elm Creek
Salt Branch
Nose Creek
Willow Creek
Racetrack Creek
Board Branch
Dykes Creek
Rocky Creek
Shoats Creek
Brushy Creek
Corral Creek
Salt Creek
CLEAR CREEK
Anderson Creek
Blackjack Creek
Deer Creek
Shiloh Creek
Boggie Creek
Birds Creek
Cooper Creek
Putnam Branch
Alligator Creek
Cottonwood Creek
Turkey Creek
Burger Creek
Yow Branch
Talley Branch
Baker Branch
Tidwell Creek
Cordell Creek
Murray Branch
Sadberry Creek
Brushy Creek
US 87
SH 80
SH 97
SH 72
FM 1682
FM 466
FM 1116
FM 2822
FM 2724
FM 1681
FM 1117
FM 766
FM 953
FM 2542
FM 2441
FM 2436
N
S
E
W
Legend
Monitoring Station
Tributaries
Segment Boundary
Stream Segments
Watershed Boundary
City
County with significant poultry activities
Road
County Line
Domestic WW Permit
Texas Land Application Permit
5 2.5 0 5
Miles

Priority Water Bodies

- Sandies Creek (Segment 1803A)
  - Depressed Dissolved Oxygen, Bacteria & Fish & Macroinvertebrates Communities
  - Listed in Category 5b in 1999
  - Chlorophyll-a and Impaired Biological Habitat listed as concerns.
  - GBRA will perform Aquatic Life Monitoring in FY17. TCEQ is also Evaluating Aquatic Life Standards.

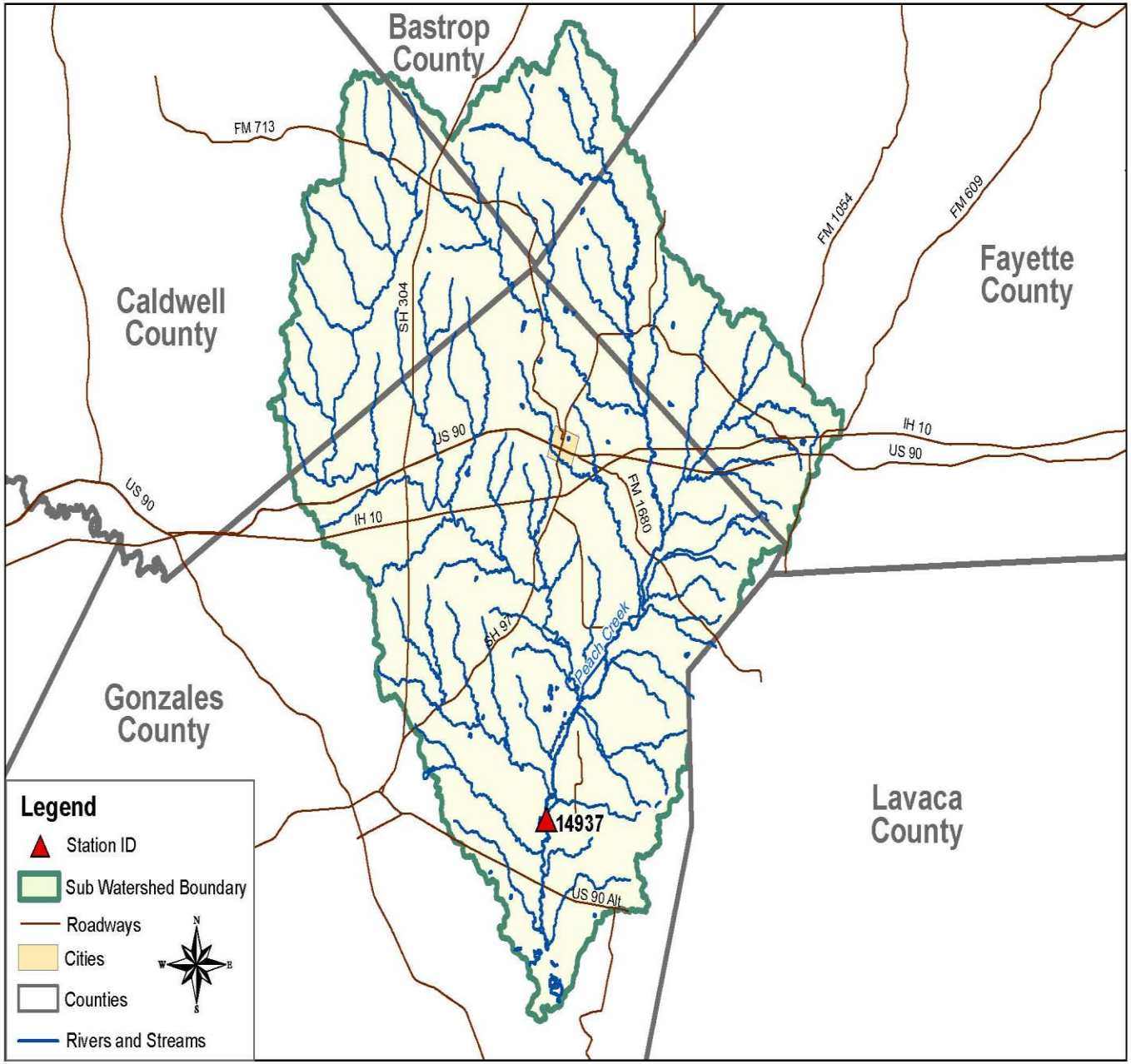


Sandies Creek Watershed
GONZALES
GUADALUPE
WILSON
DE WITT
KARNES
NIXON
SMILEY
1803B
1803A
13657-G
Legend
Monitoring Station
Tributaries
Segment Boundary
Stream Segments
Watershed Boundary
City
County with significant poultry activities
Road
County Line
Domestic WW Permit
Texas Land Application Permit
5
2.5
0
5
Miles

Priority Water Bodies

- Peach Creek (Segment No. 1803C)
  - Depressed Dissolved Oxygen & Bacteria listed in categories 5b and 5c in 2002.
  - Chlorophyll-a & Total Phosphorus listed as concerns
  - Denton Creek (1803F) & Sandy Fork (1803G) removed from list in 2014.

Peach Creek Watershed



Priority Water Bodies

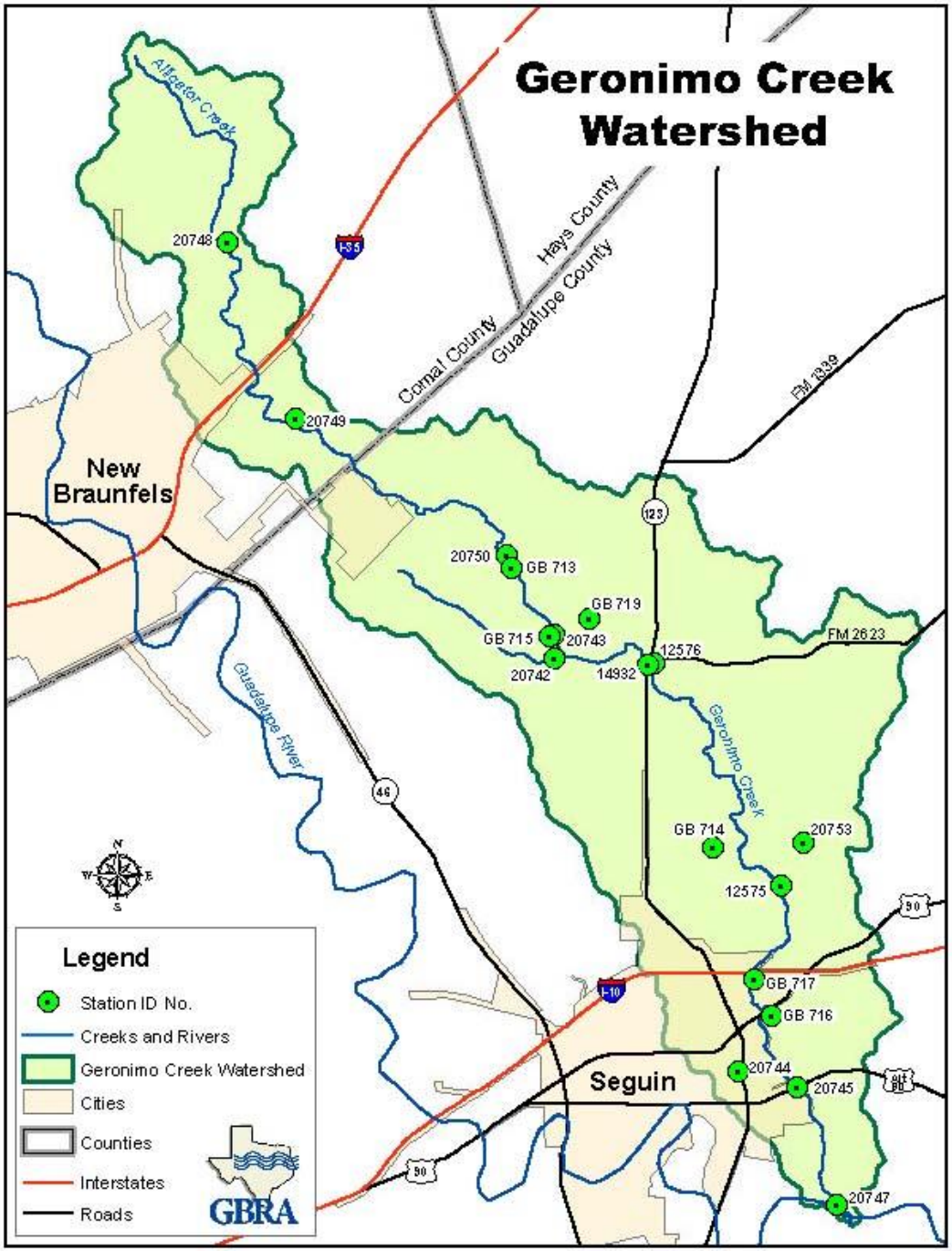
- Geronimo Creek (Segment No. 1804A)
  - Bacteria impairment listed in 2006 under category 5c
  - Nitrate Nitrogen listed as a concern
  - Baer Creek (1804D) listed as concern for Bacteria in 2014

Geronimo Creek WPP Monitoring

Sampling Entity	Routine	Targeted	Water Wells	Springs
GBRA	8 Sites Monthly	12 Sites 8x a year	2 Sites Quarterly	1 Site Quarterly

- The GBRA has been monitoring Geronimo Creek and its contributing tributaries in support of the development and implementation of the Geronimo Creek WPP for the TSSWCB since 2008 (NPS Grants 08-06, 11-06, 14-09, 17-57).

- The GBRA currently monitors for flow, field, bacteria and conventional parameters.


Geronimo Creek Watershed
Alligator Creek
20748
I-35
Hays County
Guadalupe County
Comal County
FM 3009
20749
New Braunfels
123
20750
GB 713
GB 719
GB 715
20743
20742
14932
12576
FM 2623
Guadalupe River
Geronimo Creek
46
GB 714
20753
12575
90
I-10
GB 717
GB 716
20744
Seguin
20745
Alt 90
90
20747
Legend
Station ID No.
Creeks and Rivers
Geronimo Creek Watershed
Cities
Counties
Interstates
Roads
GBRA

Plum Creek WPP Monitoring

Sampling Entity	Routine	Targeted	Springs	WWTFs	24 Hour DO
GBRA	8 Sites Monthly	37 Sites 8x a year	3 Sites Quarterly	7 Sites Monthly	8 Sites 8x per Year

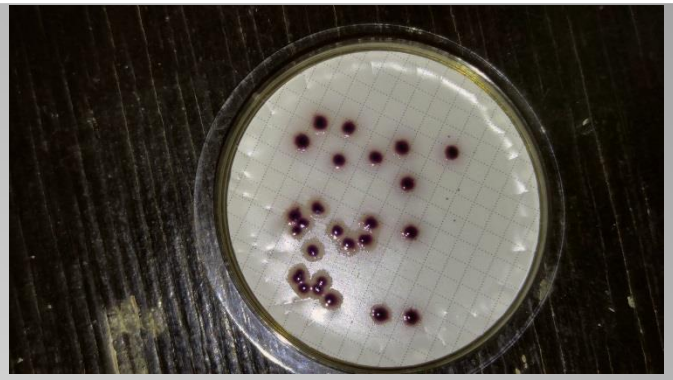
- The GBRA has been monitoring Plum Creek and its contributing tributaries in support of the development and implementation of the Plum Creek WPP for the TSSWCB since 2007 (NPS Grants 03-19, 10-54, 10-07, 14-11, 17-58).
- The GBRA currently monitors for flow, field, bacteria and conventional parameters.
- The GBRA will be performing an Aquatic Life Monitoring Assessment of the Town Branch (1810A) in FY 17 under the TCEQ CRP.

Plum Creek & Geronimo Creek Isotope Monitoring

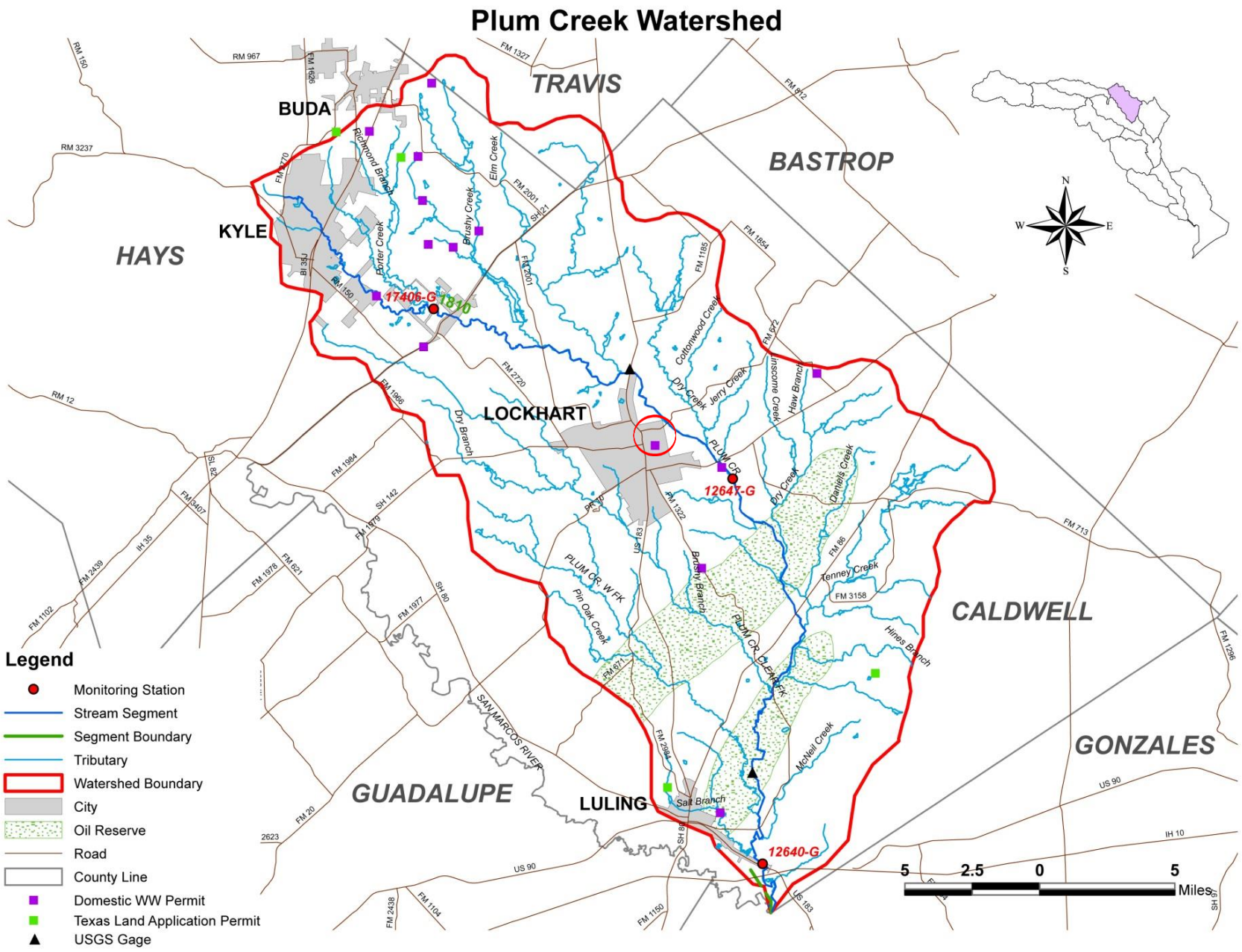
Watershed	Main Stem	Tributaries	Springs	Water Wells	Precipitation Collector	WWTFs
Plum Creek	3 Sites 4x	2 Sites 4x	1 Site 4x	1 Site 4x	1 Site 4x	5 Sites 1x
Geronimo Creek	2 Sites 4x		1 Site 4x	1 Site 4x		

- The TSSWCB contracted the GBRA (NPS Grant 13-07) to collect stream flow, field, conventional parameters & Nitrogen (^{15}N & ^{14}N) and Oxygen (^{18}O & ^{16}O) Isotopes with the USGS in FY15-16 in order to characterize the sources of nitrate nitrogen in the Plum Creek & Geronimo Creek Watersheds.
- The GBRA Collected samples with the USGS as a subcontractor and is currently working on a final report of the study findings to be delivered in FY 17.

Plum Creek BST

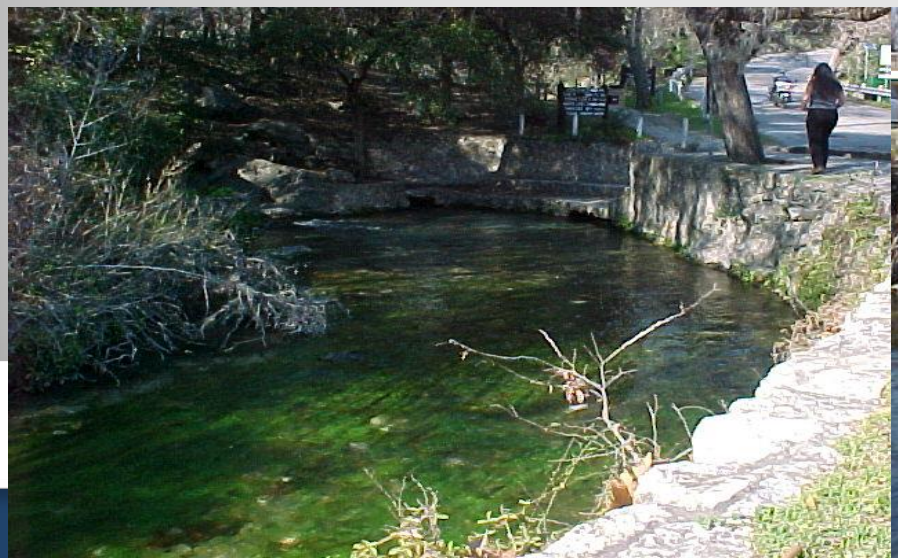


- The GBRA began collecting monthly *E. coli* samples from 5 stations under contract with the TSSWCB in FY 17 (NPS Grant 16-61) to identify the sources of E. coli bacteria.
  - **4 Plum Creek Main stem stations**,
  - **1 Plum Creek Tributary (Clear Fork)**
- The GBRA analyze all samples by membrane filtration and the colonies are shipped on ice to the TAMU Soil and Microbiology Laboratory for bacterial source tracking (BST) analyses.

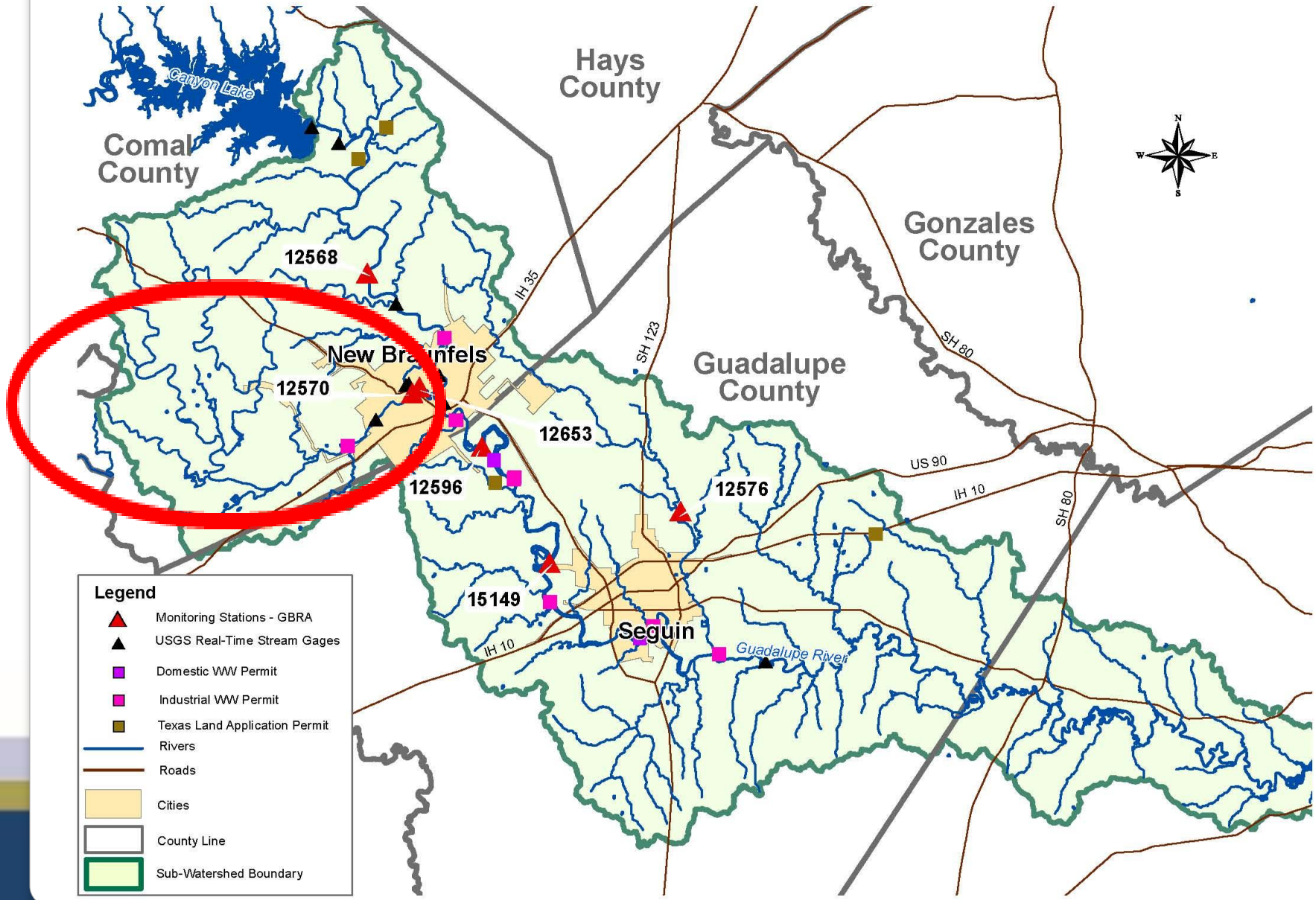

Plum Creek Watershed
TRAVIS
BASTROP
CALDWELL
GONZALES
GUADALUPE
HAYS
BUDA
KYLE
LOCKHART
LULING
17406-G
1810
12647-G
12640-G
PLUM CR
PLUM CR. W FK
PLUM CR. DRY CREEK
Richmond Branch
Brushy Creek
Elm Creek
Porter Creek
Cottonwood Creek
Dry Creek
Jerry Creek
Insoome Creek
Haw Branch
Dry Branch
Daniels Creek
Tenney Creek
Hines Branch
Pin Oak Creek
Salt Branch
McNeil Creek
SAN MARCOS RIVER
Legend
Monitoring Station
Stream Segment
Segment Boundary
Tributary
Watershed Boundary
City
Oil Reserve
Road
County Line
Domestic WW Permit
Texas Land Application Permit
USGS Gage
5 2.5 0 5
Miles

Priority Water Bodies

- Comal River (Segment 1811) and Dry Comal Creek (Segment 1811A)
  - The Comal River is currently not listed but bacteria has been increasing
  - The Dry Comal Creek was listed for bacteria under category 5c in 2010



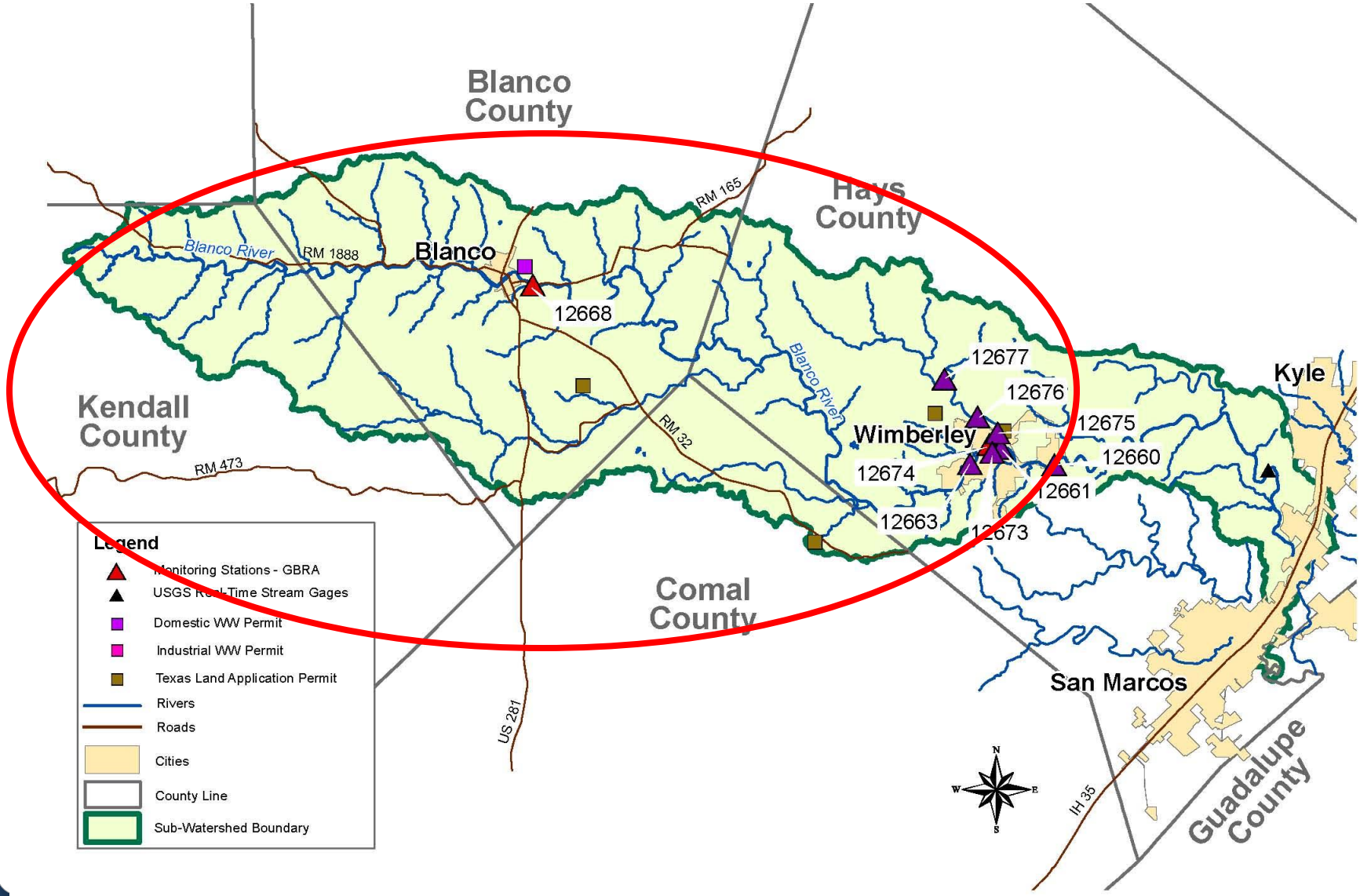
Middle Guadalpe River Watershed Part A



Priority Water Bodies

- Upper Blanco River (Segment 1813)
  - Listed for Depressed DO in 2006 but removed from list in 2014

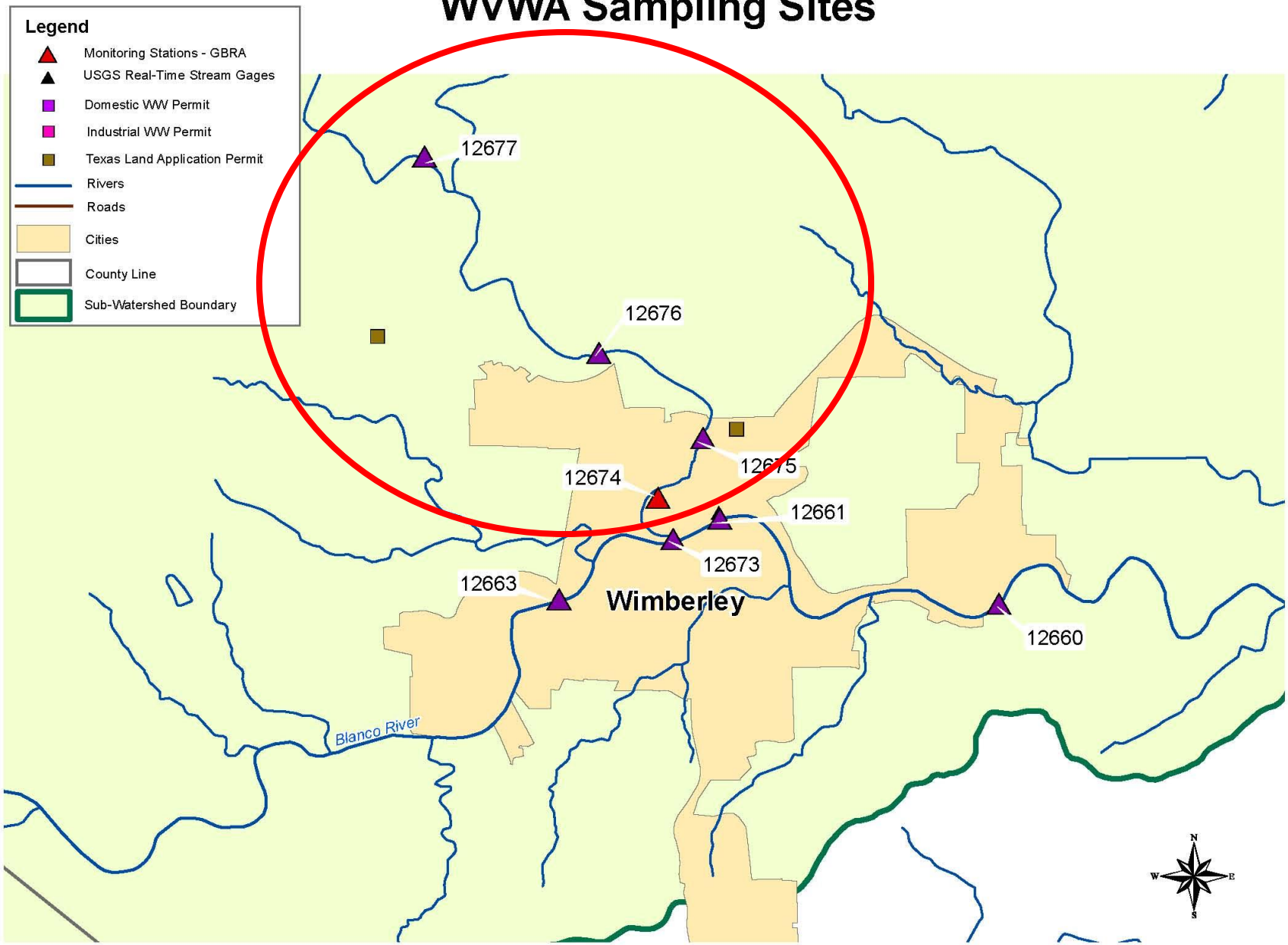
Blanco River Watershed



Priority Water Bodies

- Cypress Creek (Segment 1815)
- Listed as a concern in 2010 for Depressed Dissolved Oxygen and Impaired Biological Habitat
- Dissolved Oxygen may be moved to 5c in 2016

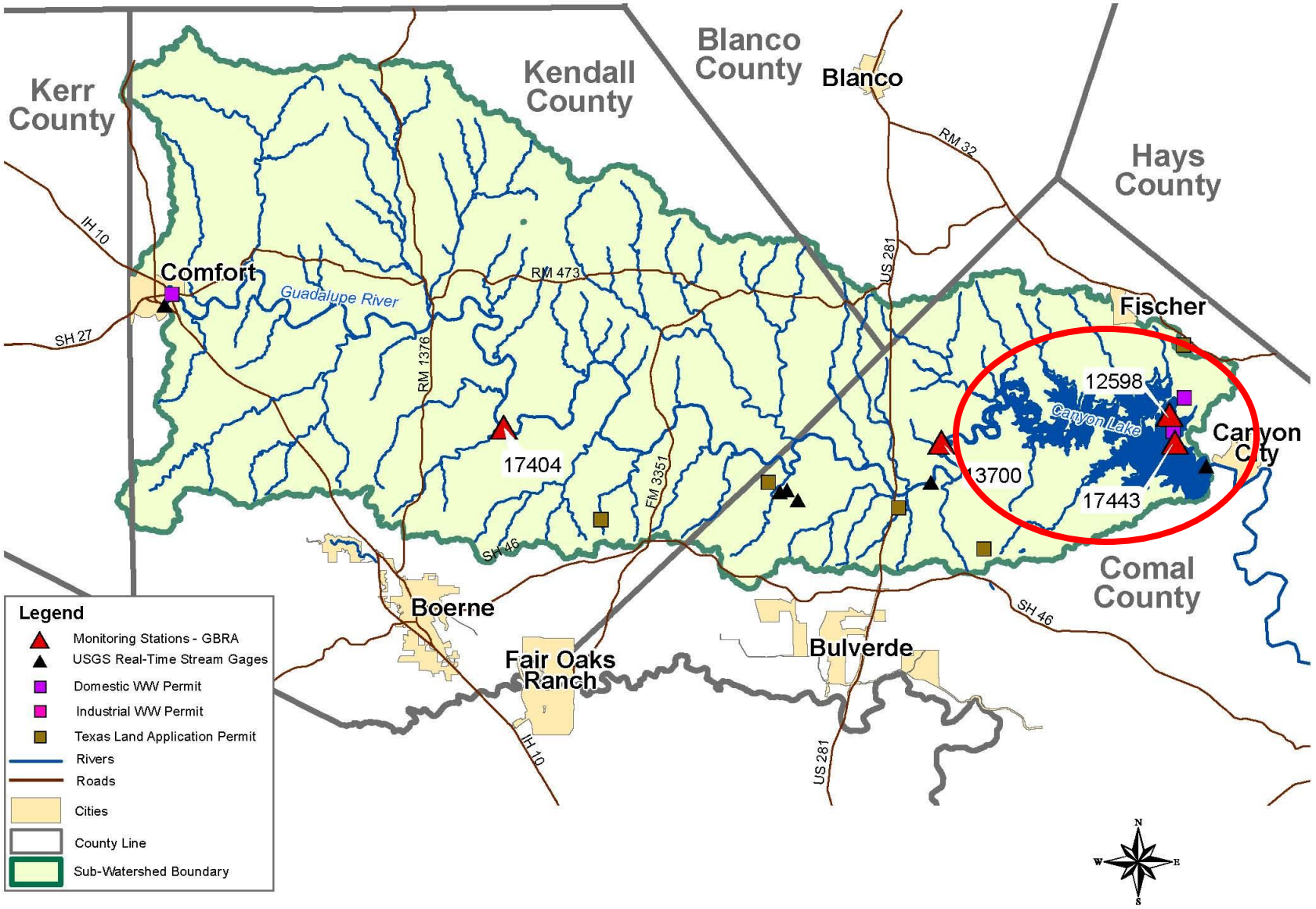
WVWA Sampling Sites



Priority Water Bodies

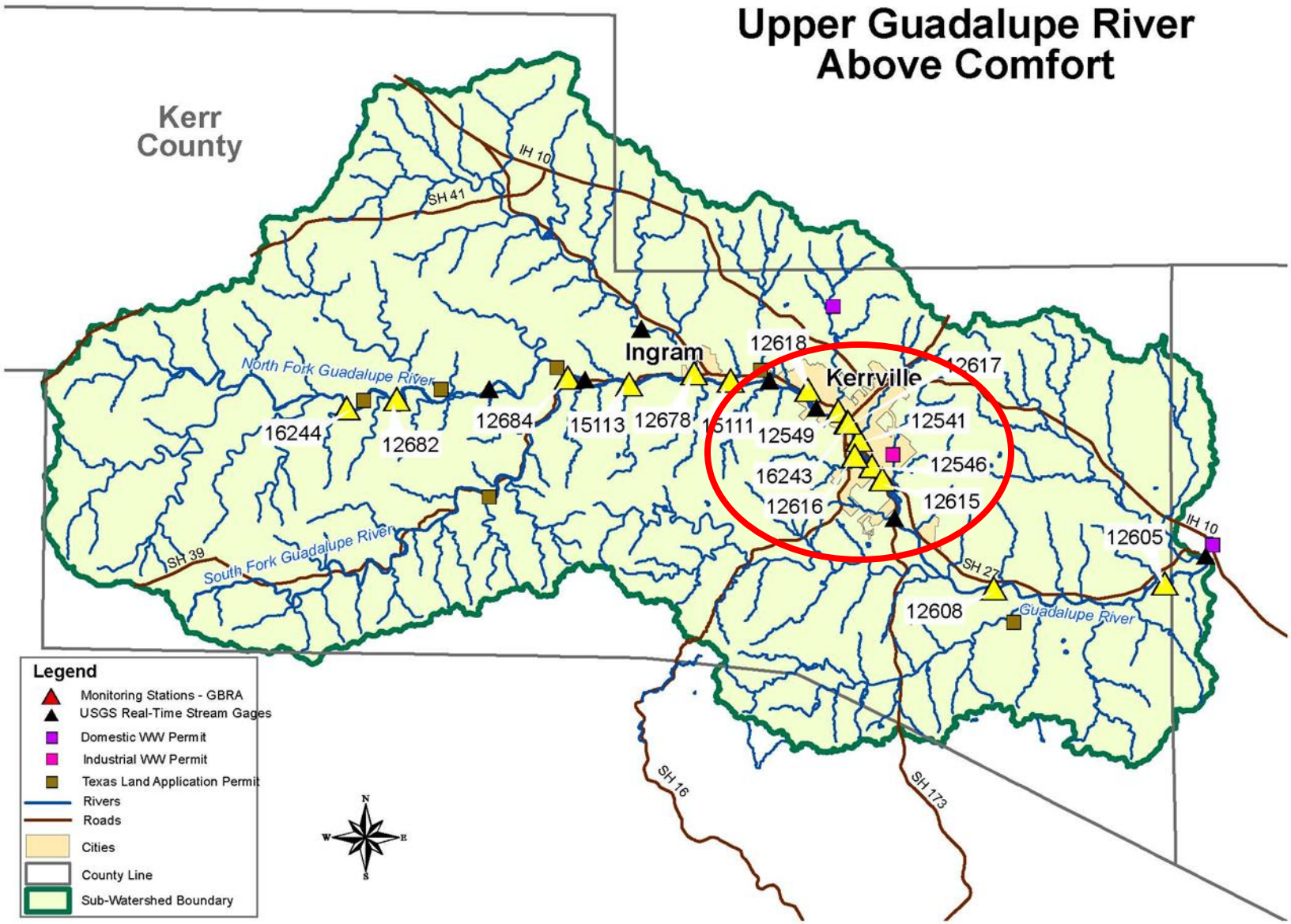
- Canyon Lake (Segment 1805)
  - Mercury in Edible Fish Tissue listed in 2006 under category 5c
  - Ammonia Nitrogen listed as a concern in 2014 at 1805_01 – Cove near Jacob's Creek

Guadalupe River Below Comfort



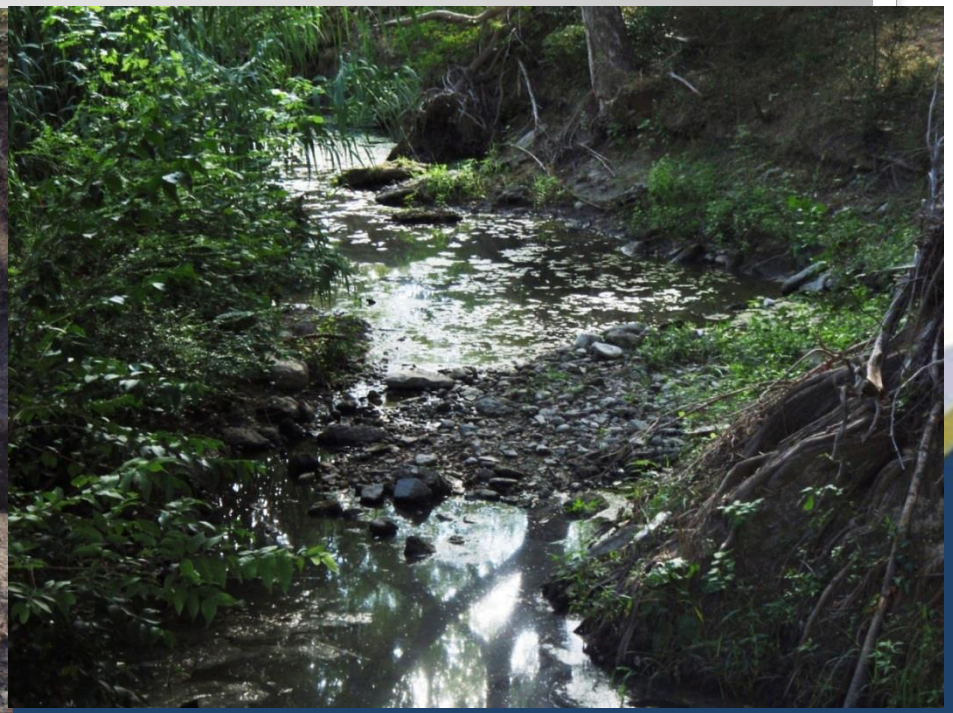
Priority Water Bodies

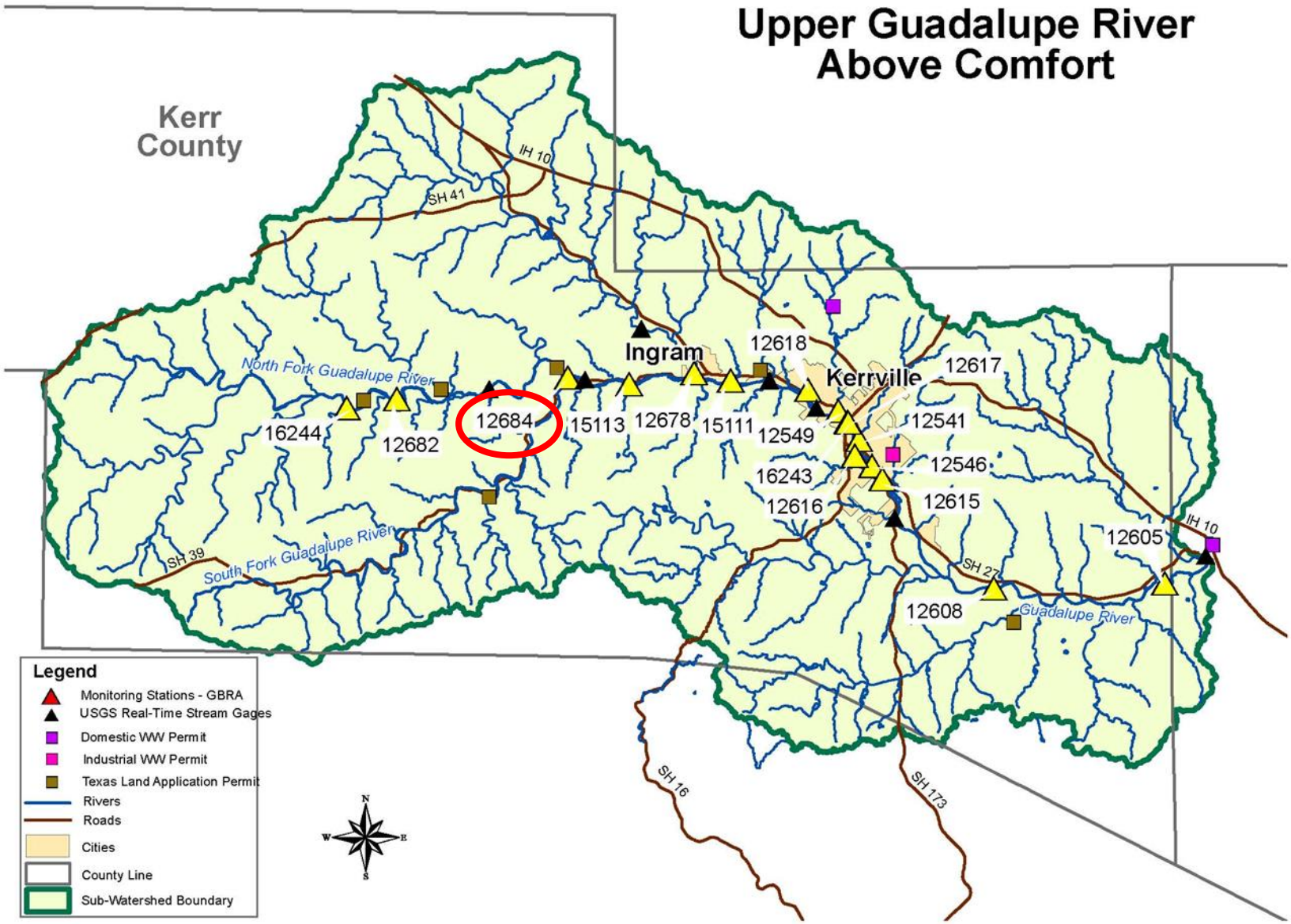
- Guadalupe River Above Canyon Reservoir (Segment 1806)
  - Bacteria at 1806_06 & 1806_08 Portions of the segment from confluence with Third Creek to confluence of Town Creek; Honey Creek to confluence of Joshua Creek - Kerr Co. Bacteria was listed in 1999 and later moved to category 4a and Removed in 2014.
  - Impaired Biological Habitat listed as a concern in 2014.


Upper Guadalupe River
Above Comfort
Kerr
County
IH 10
SH 41
North Fork Guadalupe River
South Fork Guadalupe River
SH 39
Ingram
Kerrville
16244
12682
12684
15113
12678
15111
12618
12617
12549
12541
12546
16243
12616
12615
12605
12608
SH 27
Guadalupe River
SH 16
SH 173
Legend
Monitoring Stations - GBRA
USGS Real-Time Stream Gages
Domestic WW Permit
Industrial WW Permit
Texas Land Application Permit
Rivers
Roads
Cities
County Line
Sub-Watershed Boundary
N
W
E
S

Priority Water Bodies

- Quinlan Creek (Segment 1806D) & Town Creek (Segment 1806E)
  - Listed for Bacteria in category 5a in 2010
  - Listed as a concern for Dissolved Oxygen



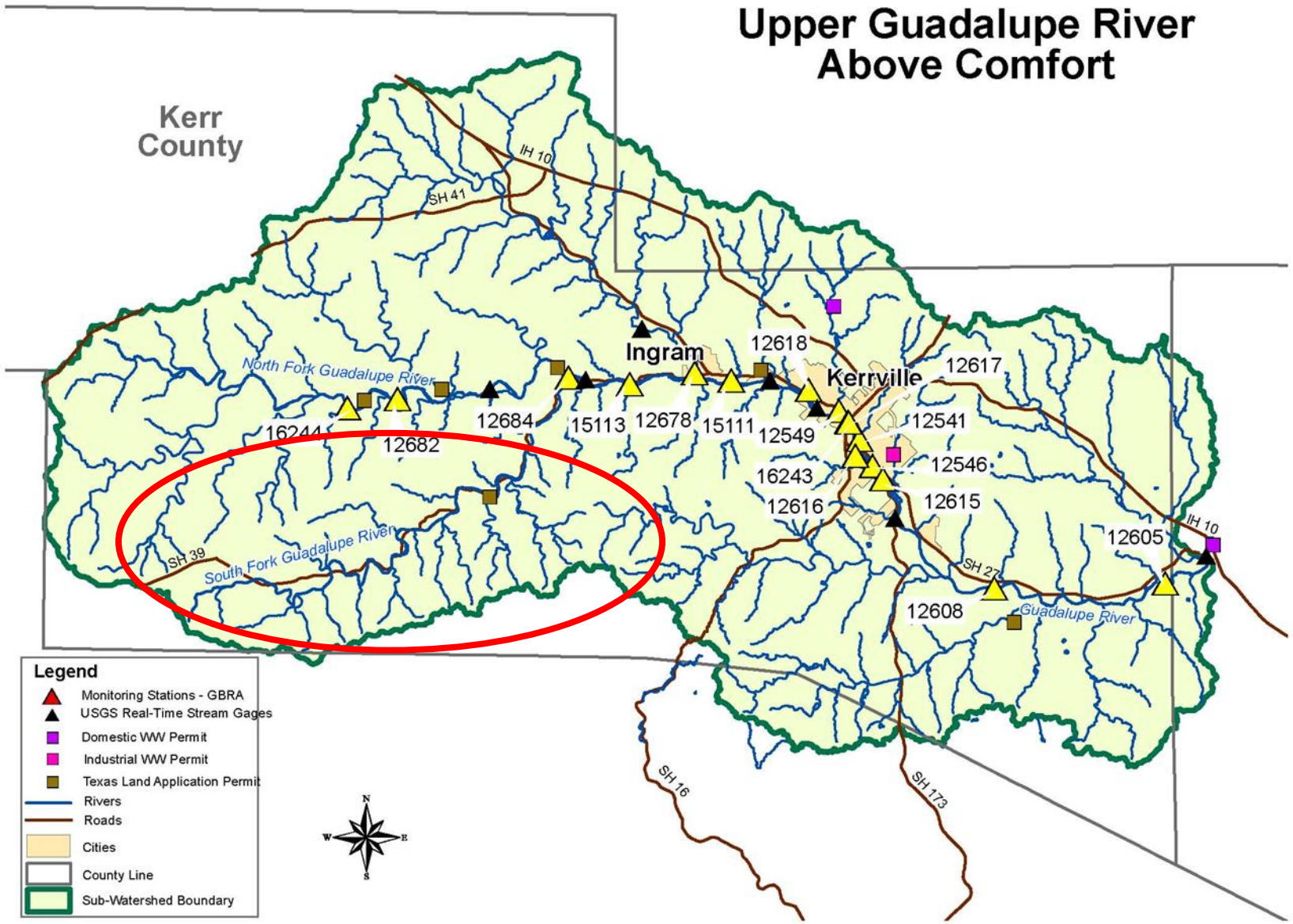

Upper Guadalupe River
Above Comfort
Kerr
County
IH 10
SH 41
North Fork Guadalupe River
South Fork Guadalupe River
SH 39
Ingram
Kerrville
Guadalupe River
SH 27
SH 16
SH 173
16244
12682
12684
15113
12678
15111
12549
12618
12617
12541
12546
16243
12616
12615
12605
12608
Legend
Monitoring Stations - GBRA
USGS Real-Time Stream Gages
Domestic WW Permit
Industrial WW Permit
Texas Land Application Permit
Rivers
Roads
Cities
County Line
Sub-Watershed Boundary
N
W
E
S

Priority Water Bodies

- Plum Creek (Segment 1810)
  - Listed for Bacteria in 2004 then moved to category 4b.
  - Listed for Depressed DO, Nitrate-Nitrogen, Total Phosphorus and Impaired Biological Habitat Concerns
  - Town Branch (1810A) tributary has concerns for Bacteria, DO and Nitrate-Nitrogen

Priority Water Bodies

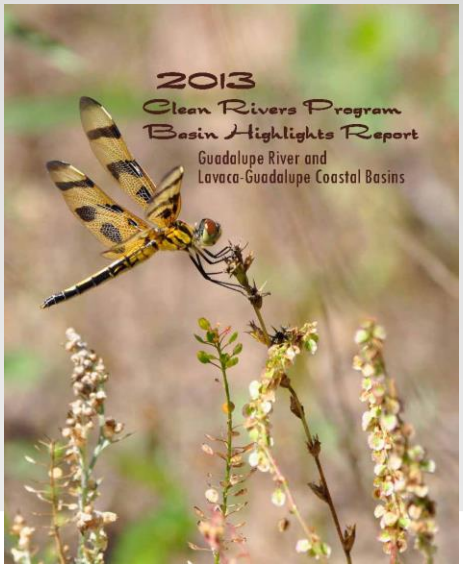
- South Fork of Guadalupe River (Segment 1818)
  - Listed as a concern for Depressed Dissolved Oxygen in 2014
  - **The GBRA & UGRA will be performing an Aquatic Life Monitoring Event at station 12684 (Hunt Lions Park) in FY 17.**


Upper Guadalupe River
Above Comfort
Kerr
County
IH 10
SH 41
North Fork Guadalupe River
South Fork Guadalupe River
SH 39
Ingram
Kerrville
12618
12617
12684
15113
12678
15111
12549
12541
12682
12546
16243
12616
12615
12605
SH 27
12608
Guadalupe River
SH 16
SH 173
Legend
Monitoring Stations - GBRA
USGS Real-Time Stream Gages
Domestic WW Permit
Industrial WW Permit
Texas Land Application Permit
Rivers
Roads
Cities
County Line
Sub-Watershed Boundary
N
W
E
S

Data Reporting

Basin Highlights Report -report of activities

Basin Summary Report – every five years (FY 2018)



Questions?

- Lee Gudgell
- Guadalupe-Blanco River Authority
- 830-379-5822
- lgudgell@gbra.org