Aransas Creek: Historical Water Quality, Source Survey and Geographical Information Systems Inventory

Prepared for:

Texas State Soil and Water Conservation Board
Project 11-52

Prepared by:

Sam Sugarek
Beth Almaraz
Jeffrey Blake

Nueces River Authority
Coastal Bend Division
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11-52-FR-TASK5-ARANSASRUAA

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Cover photograph is Aransas Creek at station ACk03 taken by NRA on August 31st, 2012.

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CHAPTER 1

Introduction

Problem Statement

Aransas Creek (2004A) is located in western Bee County and part of the easternmost portion of Live Oak County near the towns of Beeville (population 31,860) and Skidmore (population 925) in South East Texas. Aransas creek was placed on the Texas 303(d) List in 2006 based on elevated levels of indicator bacteria *Escherichia. Coli* that exceeded the geometric mean criteria established in the *Texas Surface Water Quality Standards* (TCEQ, 2010a). Concerns for dissolved oxygen have also continued as part of the 2008 and 2010 water quality assessments. Designated uses for 2004A include primary contact recreation, general use, and fish consumption with an assumed high aquatic life use.

Study Area

The Aransas Creek watershed is approximately 45,170 acres beginning in western Bee County and flows approximately 20 miles to its confluence with the Aransas River two miles north of Skidmore (at 28º17' N, 97º40'W) in Bee County (Figure 1-1). The climate in Bee County is subtropical and humid, with mild winters and warm summers. As described in the Handbook of Texas Online for Aransas Creek the creek traverses flat to rolling terrain surfaced by clay and sandy loam that supports water-tolerant hardwoods and grasses.

The watershed of 2004A is largely rural and is dominated by shrub/scrub (33%), hay/pasture (32%), and cultivated crops (26%) (Figure 2-1). Tributaries to Aransas Creek include Dry Creek, Elm Creek, and Olmos Creek.

The flow type for Aransas Creek is classified as intermittent with perennial pools, which means it maintains persistent pools even when the flow in the stream is less than 0.1 cubic feet per second (TCEQ, 2012). However, in years with normal precipitation, the lower half (downstream of FM 1349) the creek is more perennial in nature with flows persisting long after rain events. The upper half of the watershed (upstream of FM 1349) more closely fits the definition of an ephemeral stream which is a stream that flows only during or immediately after a rainfall event, and contains no refuge pools capable of sustaining a viable community of aquatic organisms (TCEQ, 2012).

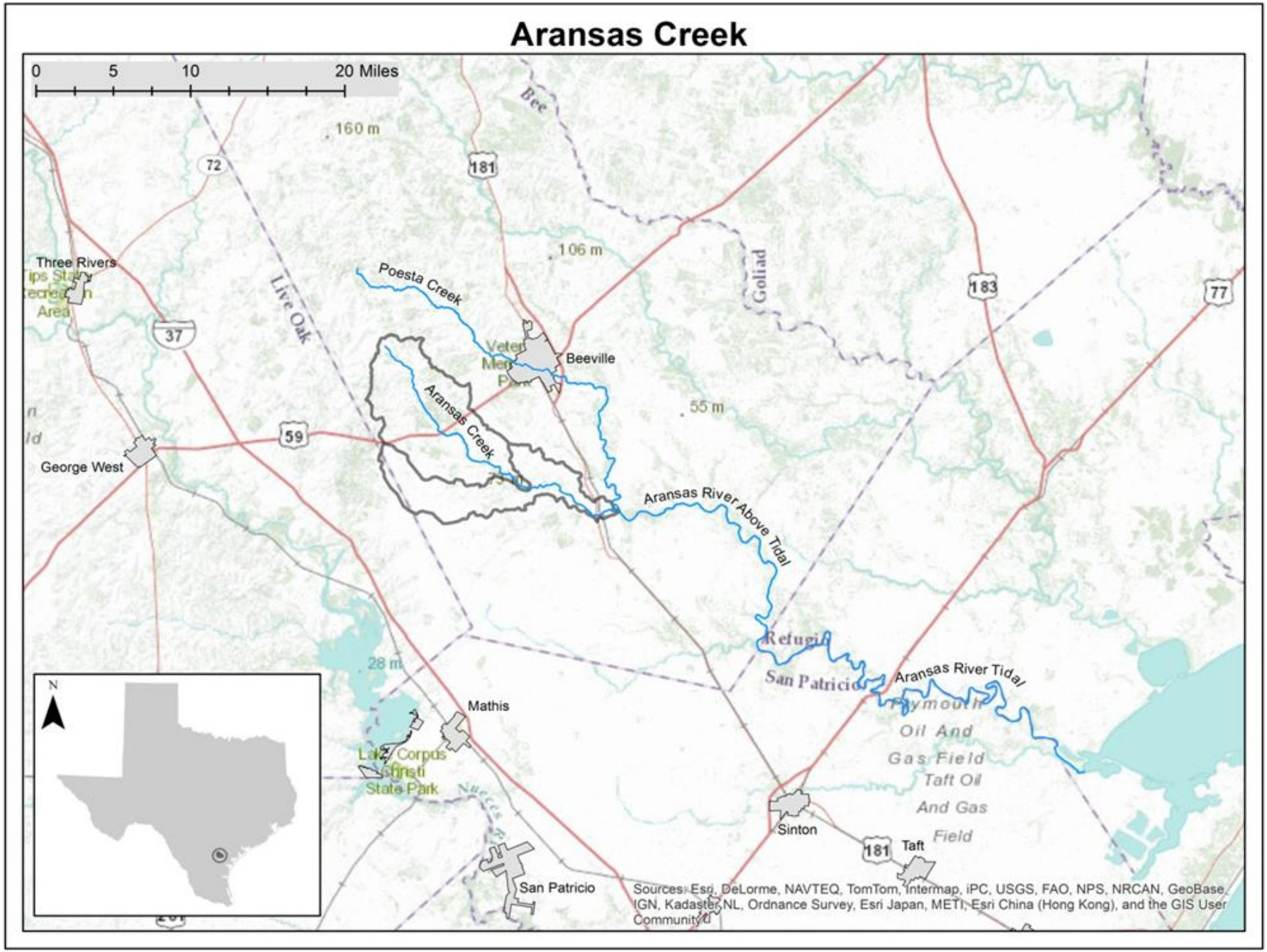


Figure 1-1. General Map of Aransas Creek

CHAPTER 2

GIS Inventory

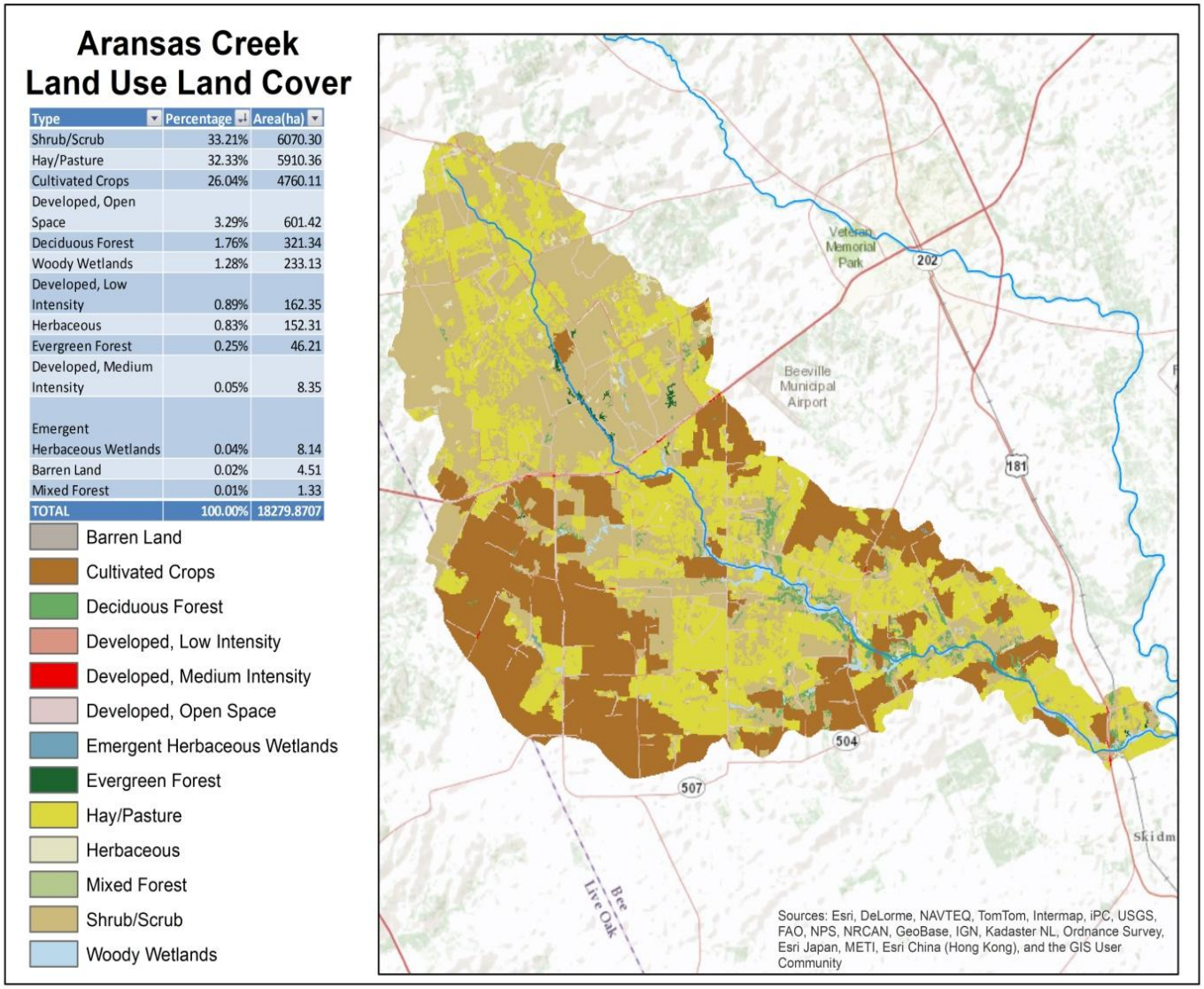
A comprehensive GIS inventory was developed for the Aransas Creek watershed using information from existing sources. This chapter describes the findings of the GIS Inventory and the sources of specific GIS layers.

Land Use and Land Cover Classification

The land use/land cover data for 2004A was obtained from the 2006 National Land Cover Database of the U.S. Geological Survey. The land use/land cover categories for NLCD are described in (Homer et al., 2004) as the following:

- Shrub/Scrub – Shrub/Scrub—Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- Hay/Pasture - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
- Cultivated Crops – Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards.
  Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
- Developed, Open Space – Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- Developed, Low Intensity - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20–49 percent of total cover. These areas most commonly include single-family housing units.
- Developed Medium Intensity – Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50–79 percent of the total cover. These areas most commonly include single-family housing units.
- Deciduous Forest – Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
- Woody Wetlands – Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Herbaceous – Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

- Evergreen Forest – Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
- Emergent Herbaceous Wetlands – Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Barren Land – Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits, and other accumulations of earthen material. Generally, vegetation accounts for less than 15 percent of total cover.
- Mixed Forest – Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.



Type	Percentage	Area(ha)
Shrub/Scrub	33.21%	6070.30
Hay/Pasture	32.33%	5910.36
Cultivated Crops	26.04%	4760.11
Developed, Open Space	3.29%	601.42
Deciduous Forest	1.76%	321.34
Woody Wetlands	1.28%	233.13
Developed, Low Intensity	0.89%	162.35
Herbaceous	0.83%	152.31
Evergreen Forest	0.25%	46.21
Developed, Medium Intensity	0.05%	8.35
Emergent Herbaceous Wetlands	0.04%	8.14
Barren Land	0.02%	4.51
Mixed Forest	0.01%	1.33
TOTAL	100.00%	18279.8707

Figure 2-1. Land use/land cover within the Aransas Creek watershed.

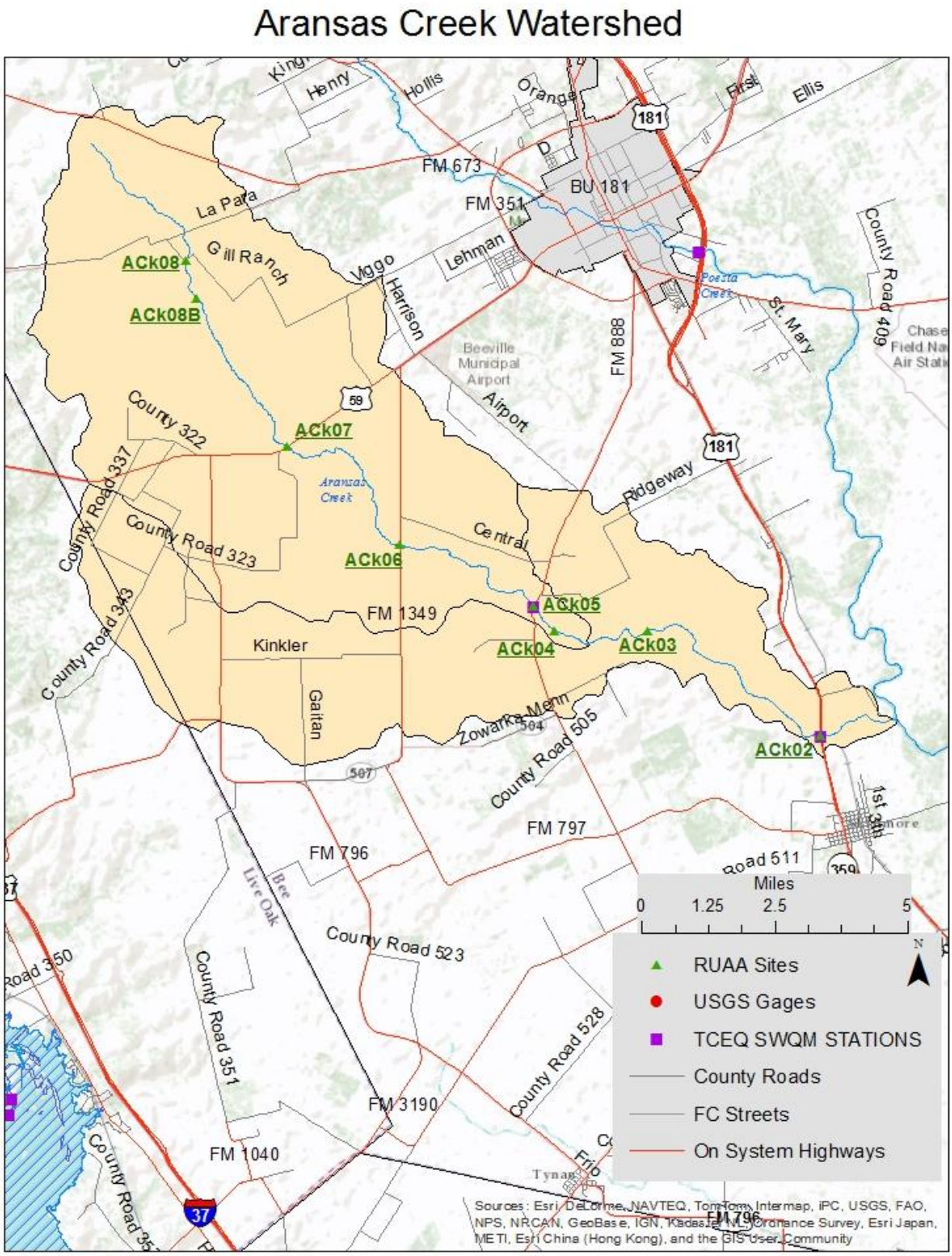


Figure 2-2. Map of Aransas Creek watershed showing monitoring sites used for the RUAA.

Table 2-1. Location and description of RUAA monitoring sites.

TCEQ ID	Map Legend	Site Description	Latitude	Longitude	Distance to Previous Station (km)	Distance from Upper Segment Boundary (km)	Distance from Lower Segment Boundary (km)	Private or Public Access	Private Access Landowner Approved
- - -	- - -	[SEGMENT & AU01 upper headwaters of the stream about 10 km upstream of US HWY 59]	- --	- ---	- - -	0.0	32.92	- - -	- - -
	ACk08	Aransas Creek at Gill Ranch Road	28.391117	-97.864800	4.50	4.50	28.42	Private	Yes
	ACk08B	Aransas Creek South of Gill Ranch Road	28.381850	-97.861783	1.22	5.72	27.2	Private	Yes
	ACk07	Aransas Creek at US 59	28.346333	-97.837133	5.00	10.72	22.20	Private	Yes
	ACk06	Aransas Creek at FM 1349	28.322733	-97.806517	5.21	15.93	16.99	Private	Yes
20066	ACk05	Aransas Creek at FM 888	28.307841	-97.770129	4.63	20.56	12.36	Public	Yes
	ACk04	Aransas Creek downstream of FM 888	28.301938	-97.764333	0.90	21.46	11.46	Private	Yes
	ACk03	Aransas Creek midway between US 181 and FM 888	28.301938	-97.739100	2.93	24.39	8.53	Private	Yes
12941	ACk02	Aransas Creek at US 181	28.276667	-97.691950	6.28	30.60	2.25	Public	Yes
- - -	- - -	[SEGMENT & AU01 lower boundary with Poesta Creek and Aransas River]	- --	- - --	.28	32.92	0.00	- - -	- - -

Chapter 3

Inventory of Historical Data

Historical Water Quality Data

Historical water quality and stream flow data was obtained through TCEQ's publically available online database known as Surface Water Quality Monitoring Information Systems (SWQMIS) and NRA's own water quality database found at http://www.nueces-ra.org/CP/CRP/SWQM/index.php.

Upstream Sources/Historical Data

Aransas Creek is an isolated waterbody, meaning that it receives no flow from upstream sources. From TCEQ, bacteria data were available for TCEQ stations 12941 (Aransas Creek at US 181/site ACk02) and TCEQ station 20066 (Aransas Creek at FM 888/site ACk05). The 2006 water quality assessment indicated that for data collected at station 12941 between 1999 and 2004 is not supporting of the criterion for primary contact recreation use based on a geometric mean of 248 CFU/100 mL for *E. coli* based on 10 samples. Data collected at station 20066 was done in conjunction with TSSWCB project 06-15, *Surface Water Quality Monitoring to Support Development and Implementation of Bacteria TMDLs in the Copano Bay Watershed*. Data collected from 2007 through 2011indicated a geometric mean of 130 CFU/100 mL for *E. coli* based on 35 samples. The criterion for primary contact recreation for *E. coli* is 126 CFU/100mL.

Streamflow Data

There are no active or retired stream gauges on the Aransas Creek to get historical streamflow data from.

Streamflow data for Aransas Creek was available under TSSWCB project 06-15 for TCEQ at station 20066 (Aransas Creek at FM 888) from 2007 through 2011. From the 35 site visits by NRA field staff, typical baseline streamflow at this location was approximately 1.0 CFS or less. A high flow event in August of 2008 resulted in flows in the 300 CFS range. The watershed was in the early stages of drought but did maintain flows at this station between rain events.

Information for site 12941 (Aransas Creek at US 181) goes back to 1988 but streamflow data is sparsely available. Data that is available comes from site visits by NRA while conducting 24 hour dissolved oxygen monitoring for the Texas Clean Rivers Program. Site visits indicate that flows could be sustained between rain events during wet years but the effects of drought would result in zero streamflow if drought conditions are persistent. NRA witnessed the effects of extreme drought during the study period for this RUAA and photo documented evidence during the field surveys.

Precipitation and Temperature Records

The National Weather Service (NWS) maintains a meteorological monitoring station near the city of Beeville. Average daily weather data for a period of 30 years (1981-2010) from the NWS station were downloaded using the National Climatic Data Center (NCDC) website (NCDC,

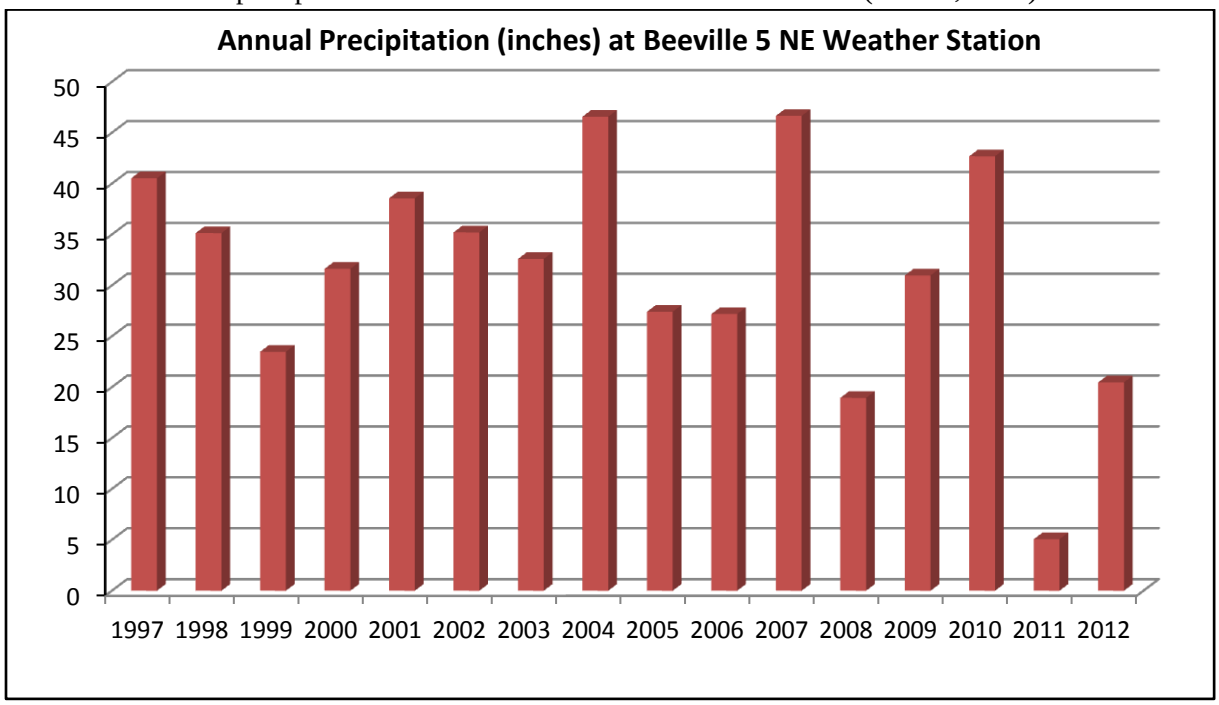
2013). Annual precipitation data for a period of 16 years (1997 – 2012) is presented below in table 3-2.

Annual precipitation data obtained from the NWS is variable from year to year. Precipitation amounts recorded during the study period for this RUAA (June 2011 – May 2013) are well below historical averages. The weather station recorded just 5.06 inches in 2011 and 20.47 inches in 2012. Average annual precipitation for the Beeville 5 NE station is 31.97 inches.

Table 3-1. Average precipitation and temperature at Beeville 5 NE from 1981-2010 (NCDC, 2013)

	Precipitation (in)	Min Temp (°F)	Avg Temp (°F)	Max Temp (°F)
January	1.96	43.7	54.3	64.9
February	1.74	46.9	57.6	68.3
March	2.28	53.4	63.8	74.2
April	2.55	60	70.3	80.7
May	2.88	67.8	77.4	86.9
June	3.86	72.3	82	91.8
July	3.39	73.5	83.7	93.9
August	2.3	73.4	84.4	95.4
September	3.74	69.5	80.1	90.7
October	3.45	61.5	72.7	83.9
November	2.14	53.4	64.1	74.9
December	1.68	45.2	55.9	66.5

Table 3-2. Annual precipitation totals at Beeville 5 NE from 1997-2012 (NCDC, 2013)



Chapter 4
Bacteria Source Survey

Sources of fecal contamination, measured by the indicator bacteria *E.coli* in freshwater, can be divided into two categories: *regulated* or *non-regulated.* Regulated sources are issued permits by the TCEQ under the Texas Pollutant Discharge Elimination System (TPDES) and/or by the USEPA under the National Pollutant Discharge Elimination System (NPDES). Regulated sources are generally point source in nature meaning that they are from a single identifiable source in the environment. Examples of regulated sources include: wastewater treatment facilities, municipal storm sewer systems, concentrated animal feeding operations, and land application of sewage and septic sludge. Non-regulated sources are typically non-point source in nature, meaning the pollution originates from multiple diffuse locations and is transported to surface waters during rainfall runoff events. Non-regulated sources are not regulated by a permit under the TPDES or NPDES, these include: wildlife (mammals and birds), unmanaged feral animals (e.g., feral hogs), on-site sewage facilities (OSSFs), pets, and livestock.

Regulated Sources

Wastewater Treatment Facilities

There are no permitted domestic wastewater treatment facility (WWTF) discharges within the 2004A watershed at the time this report was written.

Regulated Stormwater

The TPDES and the NPDES MS4 Phase I and II rules require municipalities and certain other entities in urban areas to obtain permits for their stormwater systems. Phase I permits are individual permits for large and medium sized communities with populations exceeding 100,000, whereas Phase II permits are for smaller communities that are located within an "Urbanized Area." An "Urbanized Area" is defined by the U.S. Census Bureau as an area with populations greater than 50,000 and with an overall population density of at least 1,000 people per square mile. Further, TCEQ is also authorized to "designate" MS4 Phase II applicable coverage outside of UAs if the area's population is greater than 10,000 with a density of at least 1,000 people per square mile. The watershed for Aransas Creek is not considered to be located in an Urbanized Area based on population density and is not required to obtain a permit for a MS4.

Concentrated Animal Feeding Operations (CAFOs)

The TCEQ defines an animal feeding operation (AFO) as a lot or facility, other than an aquatic animal production facility, where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and in which the animal confinement areas do not sustain crops, vegetation, forage growth, or post-harvest residues in the normal growing season over any portion of the lot or facility. AFOs are categorized based on

size and fall into 3 main categories: Large, medium, and small CAFOs. All CAFO designations require written authorization from TCEQ to operate. There are no permitted CAFO operations within 2004A watershed at the time this report was written.

Permitted Land Application of Sewage and Septic Sludge

A query performed on December 20, 2012 of the TCEQ database for registered land application sites by a member of the TCEQ Municipal Permits Team indicated that there are currently no registered land application sites in Bee County that receive Class B sewage sludge or septic sludge.

Non-Regulated Sources

Non-Regulated Agricultural Activities and Domesticated Animals

Statistics of livestock in Bee County based on estimates obtained from United States Department of Agriculture (USDA) National Agricultural Statistics Service website (USDA, 2011) indicate that a variety of livestock reside within the watershed (Table 4-1). It should be noted that the livestock numbers obtained by the USDA represent the number of livestock present in Bee County at the time the survey was conducted, and those numbers likely change throughout the year due to economic factors and environmental conditions (e.g., market values, drought, etc.) Activities such as livestock grazing close to waterbodies and agricultural use of manure as fertilizer, can contribute *E. coli* to nearby waterbodies. Furthermore, pets can also be sources of *E. coli* bacteria, because storm runoff carries the animal wastes into streams (USEPA, 2009).

The Aransas Creek watershed is located entirely within Bee County and comprises about 8 percent of the county. Animal population estimates for Aransas Creek were derived as a direct proportion of the watershed area within Bee County.

Table 4-1. Livestock statistics for Bee County (Source USDA, 2011).

Livestock	Number within Bee County	Estimated Number within Aransas Creek Watershed
Beef Cattle	29,776	2,388
Horses	1,232	101
Goats	2,458	197
Sheep	594	48
Domestic Hogs	100	8
Poultry	993	80
Deer	35,419	2,841
Feral Hogs	7,067	1,369

Wildlife and Unmanaged Nondomestic Animals

E. coli bacteria are common inhabitants of the intestines of all warm blooded animals, including wildlife, such as deer, raccoons, and birds. With access to the stream channel, direct deposition of animal waste can be a concentrated source of bacteria loading to a waterbody. Fecal bacteria from wildlife are also deposited onto land surfaces, where it may be washed into nearby streams by rainfall runoff.

Failing On-Site Sewage Facilities (OSSFs)

OSSFs, also known as septic systems, are often used in rural areas that do not have the ability to connect to a central wastewater collection system. The following information was obtained through communications with the Bee County permit log for OSSF and through the Coastal Bend Council of Government's (CBCOG) Geographic Information System (GIS) department's database for emergency responders.

A query of OSSFs for Bee County indicated 918 permitted septic systems were installed or inspected since 2000. Of these 918 OSSFs, 45 were located within the watershed for Aransas Creek. It should be noted that the total OSSF count does not include "grandfathered" OSSFs that are exempt from permitting requirements. To get a more accurate number for the total number of OSSFs in the Aransas Creek Watershed, NRA contacted the CBCOG and was able to get a list of residential dwellings using their GIS database for emergency responders. NRA estimated the number of OSSFs by counting residential dwellings and assuming each uses a septic system to treat sewage since there are no connections to WWTFs in the area. Based on that data, NRA estimates that there are approximately 502 potential OSSFs located in the Aransas Creek watershed in Bee County.

Observed Sources

For the bacteria source survey conducted for this RUAA, NRA is including all information gathered while conducting reconnaissance trips, field surveys and source survey reconnaissance trips. NRA field staff directly observed a limited number of potential sources of bacteria to Aransas Creek. Although many potential sources of bacteria have been identified for the watershed, direct observations were limited to a bat colony, livestock, and illegal dumping at site ACk05. NRA did not observe any point source discharge of effluent into the stream from any source.

Bats

A bat population was observed under the bridge at the crossing of Aransas Creek at US 181 (Site ACk02). Figure 4-1 show stains under US 181 attributed to bat urine/guano. Roosting was observed under the entirety of the bridge and directly over Aransas Creek. Figure 4-2 shows fecal material dropped by the bats onto the streambed. It is important to note that the creek was in flood stage 5 days prior to taking the picture (figure 4-2). The input of fecal material at this

site, combined with typical streamflow rates typically less than 0.5 CFS, likely contributes significant amounts of fecal bacteria, phosphorus and nitrates to the creek.

Figure 4-1. Stains from bat urine/guano under the bridge at ACk02.

Figure 4-2. Bat guano on the creek bed at ACk02 five days after a flood.

Feral Hogs

Also mentioned earlier in this chapter under the Wildlife and Unmanaged Nondomestic Animals section, numerous feral hogs have been observed in the watershed for Aransas Creek. NRA encountered a group (sounder) of approximately 30 wild hogs crossing the highway west of Skidmore while conducting reconnaissance. Evidence of hogs also occurred at survey stations ACk03 and ACk06 (figures 4-3 and 4-4). The landowner at ACk03 mentioned that feral hogs frequent the creek from his property. No hogs were photographed during the site surveys.

Figure 4-3. Evidence of feral hogs at ACk03.

Figure 4-4. Evidence of feral hogs at ACk06.

Wildlife

Evidence of wildlife in the form of raccoons, deer and bird species was observed at ACk02, ACk04 and ACk05. Raccoon tracks were visible in the dried pool within the 300 m reach associated with survey site ACk05 (figure 4-5). A flock of quail was photographed on Ridgeway lane that crosses through the Aransas Creek watershed. Numerous white-tailed deer were observed as well but not photo-documented.

Figure 4-5. Raccoon tracks near ACk05.

Figure 4-6. Quail on Ridgeway Lane.

Livestock

Evidence of livestock in the form of cattle was observed at sites ACk02, ACk07, ACk08, and ACk08B during monitoring surveys that occurred in August and September 2012. Cattle were also observed in the inaccessible property upstream from sites ACk02, and ACk05 which are the only two publically accessible sites in the Aransas Creek watershed.

Figure 4-7. Livestock observed at ACk08

Figure 4-8. Fecal material near ACk08

Illegal Dumping

Illegal dumping was observed under the bridge crossing at FM 888 (ACk05 and TCEQ site 20066). Illegal dumping is not generally regarded as an indicator of a bacteria non-point source problem although it has the potential if the items dumped are diapers (figures 4-9 and 4-10). NRA came across a large bag loaded with soiled diapers that was discarded at this bridge crossing. Site ACk05 is a dumping ground for items such as old vehicle seats, fast food trash, religious candles, and tires.

Figure 4-9. Trash at site ACk05

Figure 4-10. NRA removing trash from ACk05

CHAPTER 5
Summary and Recommendations

The watershed for Aransas Creek is located in a sparsely populated area near the towns of Beeville (population 31,860) and Skidmore (population 925) in south Texas. The watershed is largely rural and is dominated by shrub/scrub (33%), hay/pasture (32%), and cultivated crops (26%). Streamflow in the lower portion of the creek is generally very low (less than 1.0 cubic feet per second) between rainfall events.

According to estimates from the Coastal Bend Council of Governments (CBCOG), approximately 502 residential dwellings exist in the watershed and are served by on-site sewage facilities. When septic systems are inundated with water during storm events their effectiveness becomes compromised and allow for contamination of surface waters.

The watershed of Aransas Creek is devoid of state regulated bacteria sources such as wastewater treatment facilities, municipal storm sewer systems, concentrated animal feeding operations, and land application of sewage and septic sludge sites. As none of these sources are located in the watershed, bacterial contribution from these activities can be ruled out for Aransas Creek.

The bacteria sources, based on the information gathered by Nueces River Authority personnel, would likely be due to unregulated or non-permitted bacteria sources associated with non-point source fecal contamination. Non-regulated sources such as on-site sewage facilities (septic systems), domesticated animals (pets and livestock), and unmanaged non-domestic animals (wildlife) have been documented in the watershed. NRA has documented the existence of feral hogs, deer, raccoons, bats, cattle, and avian wildlife while conducting site reconnaissance and field surveys. Also of note, the site that was used for assessment of Aransas Creek (TCEQ site 12941/ACk02) has a significant bat population residing directly above the wetted portion of the creek. Additionally, disturbances in the creek bed caused by feral hogs were well documented at sites ACk03 and ACk06 at the time of the site surveys in August and September of 2012.

REFERENCES

Homer, C., C. Huang, L. Yang, B. Wylie and M. Coan. 2004. Development of a 2001 National Landcover Database for the United States. Photogrammetric Engineering and Remote Sensing, Vol. 70, No. 7, July 2004, pp. 829-840.

NCDC, National Climatic Data Center. 2013. Online Climate Data Directory, Surface Daily Data. Available at: http://www.ncdc.noaa.gov and http://www.ncdc.noaa.gov/cdoweb/datasets/ANNUAL/stations/COOP:410639/detail detail (link verified June 17th, 2013).

TCEQ (Texas Commission on Environmental Quality). 2010a. Texas Surface Water Quality Standards. Texas Administrative Code §307.1-307.10. Adopted by the Commission: June 30, 2010; Effective July 22, 2000 as the state rule. Austin, Texas. Available at http://www.tceq.texas.gov/waterquality/standards/2010standards.html#the-2010-standards (link verified January 29th, 2013).

TCEQ (Texas Commission on Environmental Quality). 2012. Recreational Use-Attainability Analyses (RUAAs) - Procedures for a Comprehensive RUAA and a Basic RUAA Survey. February 2012. Available on-line at: http://www.tceq.state.tx.us/assets/public/waterquality/standards/ruaa/Recreational%20UA%20Procedures_Final_2012.pdf (link verified 6/20/2013)

USDA, U.S. Department of Agriculture. 2011. National Agricultural Statistics Service. Available at http://www.nass.usda.gov/Statistics_by_State/Texas/Publications/County_Estimates/index.asp (accessed January 9th, 2013).

USEPA, U.S. Environmental Protection Agency. 2009. In: Drinking Water Contaminants. Available online at http://water.epa.gov/drink/contaminants/ (link verified September 15, 2011).