

**San Miguel Creek (Segment 2108)  
Recreational Use Attainability Analysis**

*Prepared for:*

**Texas State Soil and Water Conservation Board  
Project 14-51**

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Mention of trade names or commercial products does not constitute their endorsement.

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## CHAPTER 1

### INTRODUCTION

#### **Problem Statement**

The Texas State Soil and Water Conservation Board (TSSWCB) is leading an effort to examine the bacteria impairment in San Miguel Creek (Segment 2108). The watershed for San Miguel Creek is located in eastern Frio county, southwestern Astascosa County and part of the northernmost McMullen County. San Miguel Creek is a classified stream segment by the Texas Commission on Environmental Quality (TCEQ) and is divided into two assessment units, (Segment 2108\_01 and 2108\_02). Segment 2108 was first listed for bacteria in the 2006 Texas Integrated Report and Texas 303(d) List based on elevated levels of indicator bacteria *E. coli* that exceeded the geometric mean criteria established in the *Texas Surface Water Quality Standards* (TSWQS) (TCEQ, 2010a). The most recent assessment, the Draft 2014 Texas Integrated Report, lists the creek as nonsupporting the bacteria standard. Additionally, the Draft 2014 Texas Integrated Report lists Chlorophyll-*a* as a concern for Segment 2108 (TCEQ, 2014).

San Miguel Creek is designated for primary contact recreation use in the TSWQS (TCEQ, 2010a). Recent revisions to the TSWQS include an expansion of the contact recreation use into four categories: Primary Contact Recreation (PCR), Secondary Contact Recreation 1 (SCR1), Secondary Contact Recreation 2 (SCR2) and Noncontact Recreation (NCR). Below is a breakdown of definitions of each designation and the corresponding bacterial concentrations.

- Primary contact recreation (PCR): Activities that are presumed to involve a significant risk of ingestion of water (e.g. wading by children, swimming, water skiing, diving, tubing, surfing and the following whitewater activities: kayaking, canoeing, and rafting).
- Secondary contact recreation 1 (SCR1): Activities that commonly occur but have limited body contact incidental to shoreline activity (e.g. fishing, canoeing, non-whitewater kayaking and rafting, sailing and motorboating). These activities are presumed to pose a less significant risk of water ingestion than primary contact recreation but more than secondary contact recreation 2.
- Secondary contact recreation 2 (SCR2): Activities with limited body contact incidental to shoreline activity (e.g. fishing, canoeing, non-whitewater kayaking and rafting, sailing and motorboating) that are presumed to pose a less significant risk of water ingestion than secondary contact recreation 1. These activities occur less frequently than secondary contact recreation 1 due to physical characteristics of the water body or limited public access.
- Noncontact recreation (NRC): Activities that do not involve a significant risk of water ingestion, such as those with limited body contact incidental to shoreline activity, including birding, hiking, and biking. Noncontact recreation use may also be assigned where primary and secondary contact recreation activities should not occur because of unsafe conditions, such as ship and barge traffic.

**Table 1-1.** Recreational Use Designations and Criteria for Listed Water Bodies

Recreational Use Designations	E. coli (Freshwater) CFU/100 mL
Primary Contact Recreation (PCR)	126
Secondary Contact 1 (SCR1)	630
Secondary Contact 2 (SCR2)	1030
Noncontact Recreation (NCR)	2060

The TSWQS also specify a process to evaluate the uses of a waterbody through a use attainability analysis (UAA). To identify and assign attainable uses and criteria to individual waterbodies, UAAs evaluate the physical, chemical, biological, and economic factors affecting attainment of a waterbody use (40 Code of Federal Regulations §131.10(g)). A recreational use attainability analysis (RUAA) is a specific type of UAA focused on determining the appropriate recreational use of a waterbody, which was implemented in this study.

### Objectives

The objective of this project is to perform and report the findings of a Comprehensive RUAA for San Miguel Creek following the most recent version of the *Procedures for a Comprehensive RUAA and a Basic RUAA Survey* (TCEQ, 2014). An RUAA consists of three parts: field surveys to document waterbody characteristics and signs of recreation, interviews with stakeholders regarding past and current use of the waterbody, and a historical review regarding recreational use of the waterbody. San Miguel Creek is comprised of two assessment units (AU) defined by TCEQ (TCEQ, 2010b). A total of twenty seven sites were selected for the study. All field surveys were performed by Nueces River Authority (NRA) – Coastal Bend Division located in Corpus Christi, Texas under a TSSWCB-approved Quality Assurance Project Plan.

### Stakeholder and Agency Involvement

The TSSWCB and its program partners maintain an inclusive public participation process. A contact list was created by the NRA that identified representatives from local and state agencies, local officials, interested parties and landowners that own property adjacent to San Miguel Creek. NRA attended County Commissioners Court meetings as well as SWCD meetings to inform officials of the project. Notice of a public meeting was sent out to stakeholders and the first public meeting was held in Pearsall on April 9, 2014 to discuss the project goals and objectives and to seek survey locations for the field component of the study. Given the highly rural nature of the watershed and the limited number of stream road crossings, permission to access private property to conduct field surveys was critical. The first public meeting was successful in acquiring approximately half of the survey sites that were obtained for the San Miguel Creek RUAA. Additional efforts were necessary to acquire additional survey sites for the study. NRA sent letters and began calling landowners on the creek to inform them of the project and the need to acquire survey sites. Networking with stakeholders resulted in a number of additional contacts and survey site locations. However, many large gaps between survey sites existed in the more remote portions of the watershed. In areas where permission to access the creek was not granted, partial RUAA Surveys were conducted but were restricted to the area adjacent to bridge crossings. On July 7, 2015, a progress update meeting was held in Pearsall to discuss findings from the first RUAA survey on San Miguel Creek and the timeline to complete goals and project objectives.

## CHAPTER 2 STUDY AREA

### Description of San Miguel Creek

San Miguel Creek is a tributary of Choke Canyon Reservoir within the Nueces River Basin and is composed of two assessment units (AU 2108\_01 and 2108\_02) representing the entire waterbody. The flow type for San Miguel Creek, as defined by TCEQ designations, is intermittent with perennial pools in the lower half and ephemeral in the upper half. San Miguel Creek flows approximately 66 miles (106 km) from the confluence of San Francisco Perez and Chacon creeks in Frio County through southwestern Atascosa County to the confluence of Mustang Branch Creek and Choke Canyon Reservoir in northern McMullen County (Figure 2.1). The watershed covers approximately 535,610 acres and is almost entirely rural. The towns of Devine (population 4,543), Natalia (population 1,470) and Moore (population 644) have permitted wastewater treatment facilities (WWTFs) that discharge into the headwater tributaries of San Miguel Creek including: San Francisco Perez and Chacon in Medina County, and Black Creek in northern Frio County respectively. There is a United States Geological Survey (USGS) stream flow gauge (Station number 08206700) and a Clean River Program (CRP) monitoring station (Station ID 12983) located at State Highway (SH)-16 in the lower portion of the watershed.



**Figure 2-1.** General Map of the San Miguel Creek Watershed (Segment 2108).

**Description of San Miguel Creek Watershed**

The watershed for San Miguel Creek is very rural and dominated by large, privately owned ranches. It is not uncommon to measure ranch sizes in the hundreds or thousands of acres, and in a few cases, tens of thousands of acres. Many of the large ranches are operated by a ranch manager and employ many workers to maintain the property and fence lines. NRA witnessed, on numerous occasions, workers repairing or expanding fence lines up and down the watershed. Many of the properties visited in the RUAA were secured by locked gates that required a combination or a key to access the property along with landowner permission. NRA field staff, at a few survey locations, drove 5 miles or more on private property to access a site (Figure 2-2).

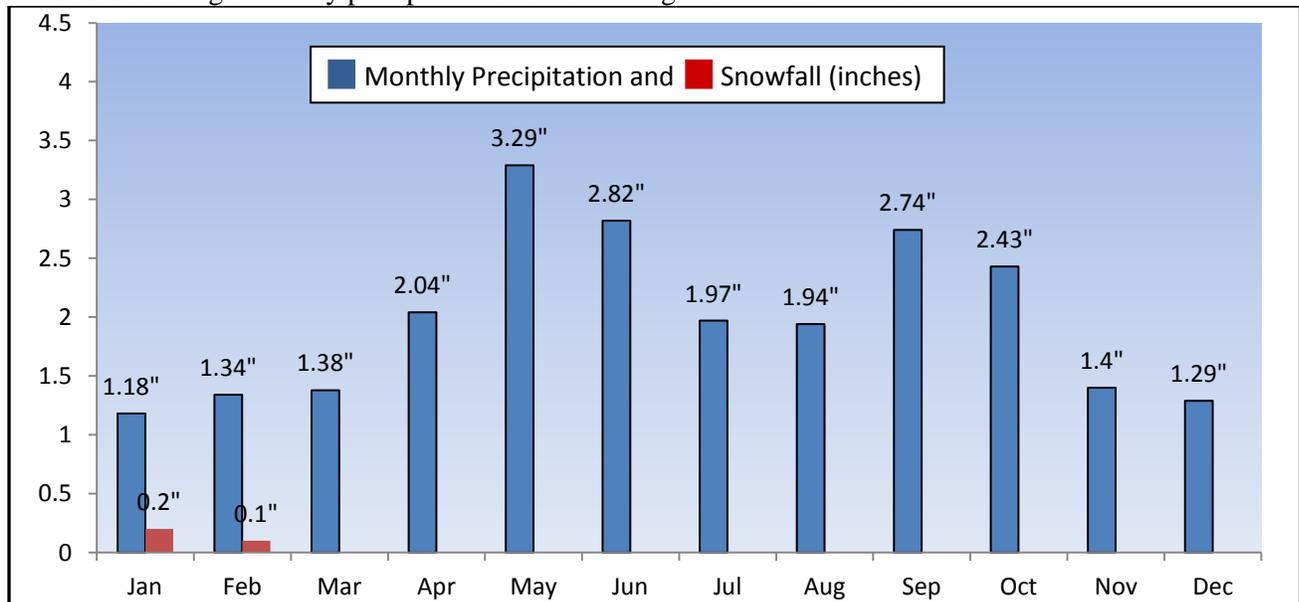


**Figure 2-2.** Long roads on private property.

**Climatic Conditions**

Annual precipitation for the San Miguel Creek Watershed was based on data from Pearsall, Texas. Average annual precipitation from 1981-2010 was 23.82 inches. According to the Handbook of Texas online for Frio County, the average low and high temperatures in the winter are 39°F and 64°F; the average extremes in the summer are 74°F and 98°F. Frio county farmers can expect a growing season of 276 days and an average of 25 inches of rainfall a year; the last freeze typically occurs in late February and the first freeze of the new winter in early December. The sun shines an average 66 percent of all daylight hours (WRCC, 2015).

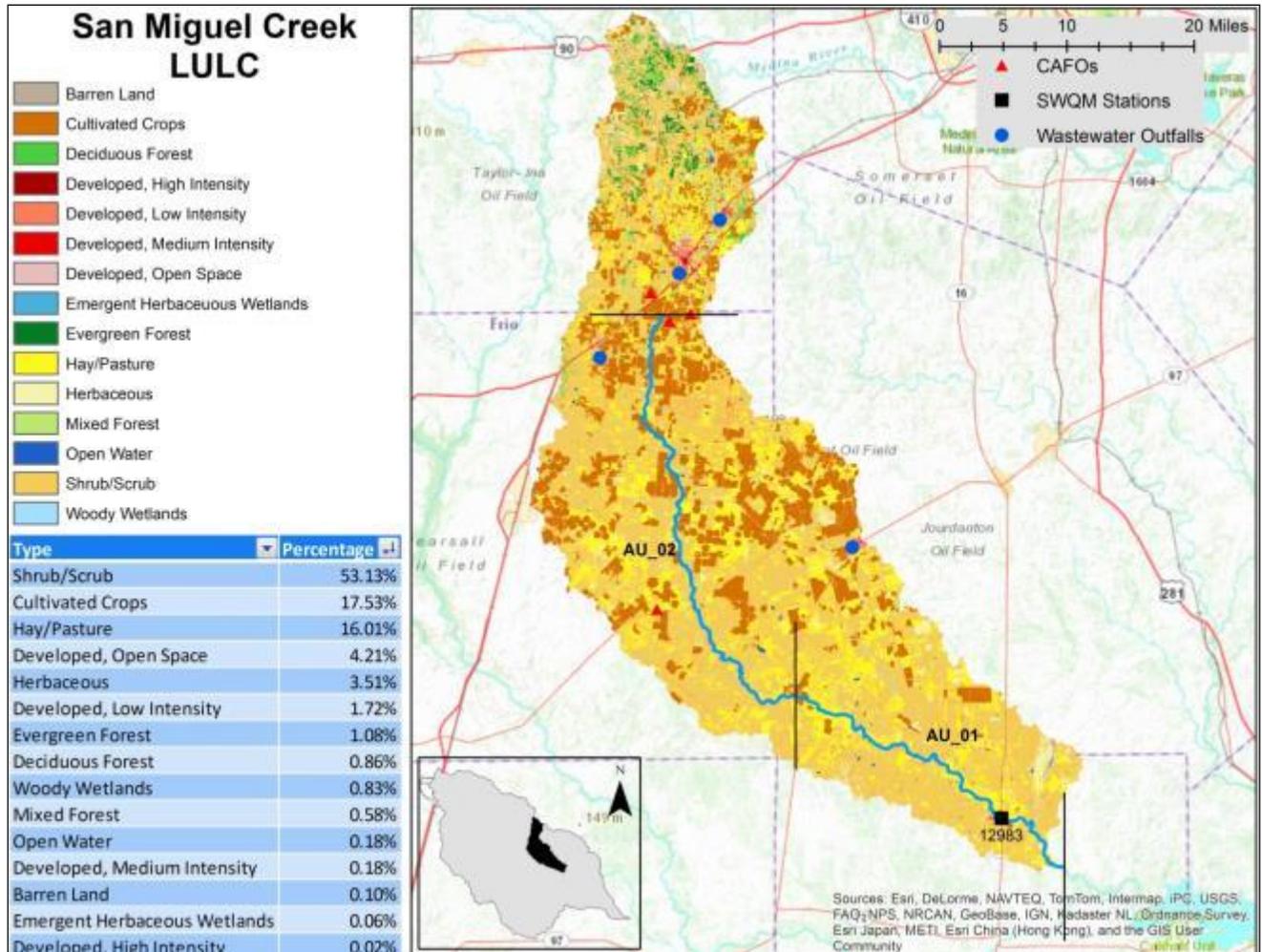
**Table 2-1.** Average monthly precipitation in the San Miguel Creek watershed.



## Land Use and Land Cover

The land use/land cover data for Segment 2108 was obtained from the 2006 National Land Cover Database of the USGS. The land use/land cover categories for National Landcover Database (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.
- Developed High Intensity – Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80-100% of the total cover.
- 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.
- Open Water – All areas of open water, generally with less than 25 percent cover of vegetation or soil.



**Figure 2-3.** Land use/land cover within the San Miguel Creek Watershed.

### Regulated Sources

Potential sources of fecal pollution, as measured by indicator bacteria *E. coli*, can be divided into two primary categories: *regulated* and *unregulated*. Pollution sources that are regulated have permits issued by TCEQ under the Texas Pollutant Discharge Elimination System (TPDES) and/or by the United States Environmental Protection Agency (USEPA) under the National Pollutant Discharge Elimination System (NPDES) and are generally point sources. Examples of regulated sources are domestic wastewater treatment facility (WWTF) discharges; stormwater discharges from industries, construction, and municipal separate storm sewer systems (MS4s) of cities; and concentrated animal feeding operations (CAFOs). These various regulated sources are required to have either an individual permit that is specific for their facility or operate under a general permit.

### Wastewater Treatment Facilities

There are no permitted domestic WWTFs that discharge directly to Segment 2108 at the time this report was written. WWTF outfalls exist on tributaries and include the cities of Charlotte, Devine, Moore, and Natalia (NRA, 2013). The City of Pearsall is just outside of the watershed for San Miguel Creek and drains to the Frio River.

**Table 2-2.** WWTFs in San Miguel Creek Watershed.

Permit #	Municipality	Population	Permitted Quantity (gpd)	Discharge Location
WQ0010142-001	Charlotte	1,782	220,000	Lagunillas Creek
WQ0010160-001	Devine	4,543	650,000	San Francisco Perez Creek
WQ0014239-001	Moore	644	65,000	Black Creek
WQ0011806-001	Natalia	1,470	190,000	Chacon Creek

### 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 (UA).” An “UA” 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 San Miguel Creek is not considered to be located in an UA based on population density and is not required to obtain a permit for a MS4.

### Concentrated Animal Feeding Operations (CAFO)

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. All CAFO designations require written authorization from TCEQ to operate. There were two permitted CAFO operations within the Segment 2108 watershed at the time this report was written (TCEQ, 2015).

[http://www2.tceq.texas.gov/wq\\_dpa/index.cfm](http://www2.tceq.texas.gov/wq_dpa/index.cfm)

**Table 2-3.** CAFOs in the San Miguel Creek Watershed.

Size	Permit #	County	Location	Site Name	Animal Type/#	Estimated Amount/year (acre-feet or tons)	Status
Large	TXG920530	Frio	Devine	Luckey Custom Feedlot	Cattle/ 22,500	123.28 acre-feet 20,942 tons	Active
Large	TXG921216	Frio	Devine	Rancho Las Presa Nueva	Cattle/ 5,500	10 acre-feet 8,357 tons	Active

### Permitted Land Application of Sewage and Septic Sludge

A call was made to TCEQs Wastewater Permitting Section on September 3, 2015 to query the database for registered land application sites. A member of the TCEQ Municipal Permits Team indicated that there are currently no registered land application sites in Atascosa or Frio counties that receive Class B sewage sludge or septic sludge. There is one domestic sludge facility located 0.8 miles east of SH-16 on Roarke Road in McMullen County that processes up to 99,492 gallons of sludge per year.

### **Potential Unregulated Sources**

Unregulated sources are typically nonpoint source in nature, meaning the pollution originates from multiple diffuse locations and is usually carried to surface waters by rainfall runoff, and the sources generally are not regulated by permit under the TPDES and NPDES. The specifics of unregulated sources will only be summarized within this report, including a variety of sources such as wildlife (mammals and birds), unmanaged feral animals (e.g., feral hogs), on-site sewage facilities (OSSFs), pets, and livestock.

### Non-Permitted Agricultural Activities and Domesticated Animals

Statistics of livestock in Atascosa, Frio and McMullen counties, based on estimates obtained from United States Department of Agriculture (USDA) National Agricultural Statistics Service website (USDA, 2012), indicate that a variety of livestock reside within the watershed (Table 2-4). It should be noted that the livestock numbers obtained by the USDA represent the number of livestock present in Atascosa, Frio and McMullen counties predate the RUAA surveys by a few years, and those numbers likely change throughout the years 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).

**Table 2-4.** Livestock statistics for Atascosa, Frio, and McMullen counties. (Source USDA, 2012).

Livestock	Number within Atascosa, Frio, and McMullen counties	Estimated Number within San Miguel Creek Watershed
Cattle and Calves	76,352	18,189
Domestic Pigs	5,602	1,335
Horses	6,627	1,579
Goats	6,136	1,462
Sheep and Lamb	3,870	922
Poultry	2,562	611
Deer	*87,684	*20,889
Feral Hogs	**67,517	**16,084

\*Estimate based on density of 39 deer/1000 acres (TPWD, 2013).

\*\*Estimate based on density of 1 hog/33.3 acres (Reidy, 2007)

### 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.

Feral hogs have been documented in San Miguel Creek. Feral hogs are not natural wildlife, they are an invasive species and as unmanaged or feral animals, they also contribute bacteria to streams in a manner similar to wildlife. Feral hogs are noted for moving in groups along waterways, and particularly in times of drought will congregate near perennial water sources to drink and wallow. Texas Parks and Wildlife Department (TPWD) classifies feral hogs as unprotected, exotic, non-game animals (Taylor, 1991). Although found throughout much of Texas, there is a scarcity of data on feral hog densities in Texas. Studies in comparable bottomland habitats indicate typical densities of nearly 1 hog for every 33.3 acres (Reidy, 2007).

#### 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 watershed for San Miguel Creek is devoid of communities served by wastewater collection systems with the exception of the municipalities near the headwater creeks (Table 2.2). OSSFs are the primary way of treating domestic waste in the San Miguel Creek Watershed.

Approximately one hundred landowners own property adjacent to San Miguel Creek based on county appraisal information provided by Atascosa, Frio and McMullen county appraisal districts. A total of 1,571 properties were identified in the watershed which likely includes: absentee landowners, oil and gas holding companies, ranches, hunting leases, family trusts and residents. Due to the size of the properties, an estimation of the number would most likely include one OSSF per property at the least.

An estimation of the number of individuals living in the San Miguel Creek Watershed was made using United States Census Data from 2013. Excluding cities (because they are served by WWTFs), there were 24,223 people residing in rural Atascosa, Frio, and McMullen counties. Based on the average population density of those three counties an estimated 5,770 people live in the San Miguel Creek Watershed and use OSSFs as their primary wastewater treatment method.

For San Miguel Creek, it is estimated that there are approximately two thousand OSSFs in the watershed, and OSSFs likely number in the low hundreds at properties adjacent to the creek.

It must be noted that many people work in oil related professions in Atascosa, Frio, and McMullen counties but do not reside there. In many cases, contractors and employees use an alternative method of waste treatment, portable restrooms (Skid-O-Kans). Waste from these restrooms are generally removed from job sites and disposed of. Instances where portable bathroom waste is improperly treated was not approximated.

#### Upstream Sources/Historical Data

San Miguel Creek receives flow from San Francisco Perez and Chacon creeks. From TCEQ, bacteria data were available for TCEQ station 12983 (San Miguel Creek at SH-16/site SM05 of the RUAA). The 2006 water quality assessment indicates that for data collected between 1999 and 2004 that San Miguel Creek is not supporting of the criterion for primary contact recreation

use (TCEQ, 2010b). The 2006 water quality assessment indicates a geometric mean for Segment 2108 of 259 CFU/100 mL for *E. coli* based on 10 samples. In 2014, it was assessed as having a geometric mean for *E. coli* of 151 cfu/100ml. The criterion for primary contact recreation for *E. coli* is 126 CFU/100mL.

### **Historical Information on Recreational Use**

A review of historical information was performed regarding recreational water uses for San Miguel Creek. The review considered the time period of November 28, 1975 to the present in accordance with 40 CFR Part 131 (USEPA regulations related to UAAs). Government offices, libraries, historical societies, and newspapers were searched and contacted in addition to internet searches. The following is a summary of the review and searches:

#### Government Sources

- City of Pearsall & Tilden  
Nothing was found concerning recreational activities for Segment 2108
- Public Libraries  
Nothing was found concerning recreational activities for Segment 2108  
<https://pleasanton.biblionix.com/catalog>  
<http://pearsall.booksys.net/opac/ppl/index.html#menuHome>

#### Historical Society Sources

- Spoke with Jayne Varga with the McMullen County Historical Society. No recreational activities ever recorded as far as she knew.
- NRA explored various links and online texts. Nothing significant was found.

#### Newspapers

- Frio and La Salle County  
<http://frio-nuecescurrent.com/>  
Spoke to a representative that works at the newspaper. Nothing was found concerning recreational activities for Segment 2108
- McMullen County  
<http://mysoutex.com/>  
NRA searched the data base. Nothing was found concerning recreational activities for Segment 2108.
- Atascosa County  
<http://www.pleasantonexpress.com/>  
NRA searched the archives. Nothing was found concerning recreational activities for Segment 2108.

### Internet Searches

- <https://tshaonline.org/handbook/online/articles/hcm09> ---Nothing significant relating to recreational activities on Segment 2108.
- <http://www.cityofpearsall.org/>---Nothing significant relating to recreational activities on Segment 2108.
- <http://www.mcmullencounty.org/Home.aspx>---Nothing significant relating to recreational activities on Segment 2108.
- <http://www.bigfoottx.com/>---Nothing significant relating to recreational activities on Segment 2108.
- <https://www.facebook.com/atascosahistory>---Nothing significant relating to recreational activities on Segment 2108.
- <https://www.facebook.com/photo.php?fbid=1088801076902&set=a.1088800596890.10778.1732732702&type=1&theater>, 1 person holding a fish that was caught in the San Miguel Creek near Tilden. Photo was posted on March 16, 2010.
- <https://www.facebook.com/photo.php?fbid=1099160215874&set=a.1099159655860.11769.1732732702&type=1&theater>--- Several people fishing in the San Miguel Creek near Tilden. Photo was posted on March 15, 2010.
- <https://www.facebook.com/photo.php?fbid=1088804676992&set=a.1088800596890.10778.1732732702&type=1&theater> ---1 person holding a fish that was caught in the San Miguel Creek near Tilden. Photo was posted March 16, 2010.

## CHAPTER 3

### STUDY METHODOLOGY

#### Survey Methodology

The following text provides details of the data collection activities designed to obtain the necessary field-related information for an RUAA. A Comprehensive RUAA was conducted for San Miguel Creek (Segment 2108). The major field components of a Comprehensive RUAA are summarized as the following:

- Site reconnaissance (completed August 2014)
- Site selection (completed December 2014)
- Field surveys (See Table 3-1 below for dates)

**Table 3-1.** Field survey dates

Survey #1	June 16, June 18, June 19, June 25 and June 30, 2015
Survey #2	July 14, July 16, July 21, July 22 and July30, 2015

The first two components, site reconnaissance and site selection, did not constitute formal data collection activities requiring an approved QAPP. These two components were critical to the success of data collection activities. Under the last bullet; the field surveys, which included various field activities, was covered by a TSSWCB approved QAPP.

#### Site Reconnaissance and Site Selection Strategy

The site reconnaissance was conducted prior to performing field survey activities. The reconnaissance had the purpose of collecting background information and selecting appropriate sites for the field survey. To the degree possible, the site reconnaissance was coordinated with the process to involve the watershed stakeholders and increase local landowner interest in water quality issues in San Miguel Creek. The site selection process took into account locations along San Miguel Creek that were accessible to the public, had the highest potential for recreational use, and had TCEQ monitoring stations where historical data may have been previously collected. The site selection process also considered bridge crossings along the river, as well as access through private lands adjacent to the river.

In the March 2014 procedures for performing a RUAA (TCEQ, 2014), it states “In general, choose three (3) sites per every five (5) miles of stream. Based on that criterion, the recommended potential number of sites for the sixty six mile reach on San Miguel creek was forty sites. However, the rural nature of the watershed and the limited number of road crossings made accessibility of the stream challenging. Map reconnaissance and a ground survey of the study area yielded twelve locations in the sixty six mile reach that could provide public access. These sites were located at the bridge crossings across the watershed. NRA attempted to secure additional survey sites on private property at the public meetings and through telephone calls to land owners. However, many landowners did not wish to participate in the study and did not allow permission to access their property. Subsequently, the number of sites was limited to twenty seven sites.

The following information was compiled using GIS based tools prior to, during, and immediately following the site reconnaissance:

- The land cover and land use characteristics of the watershed (see Figure 2-3);
- The hydrologic characteristics, such as stream type, streamflow, hydrologic alterations, etc. and
- The location of proposed sites for data collection following TCEQ guidance (TCEQ, 2014).

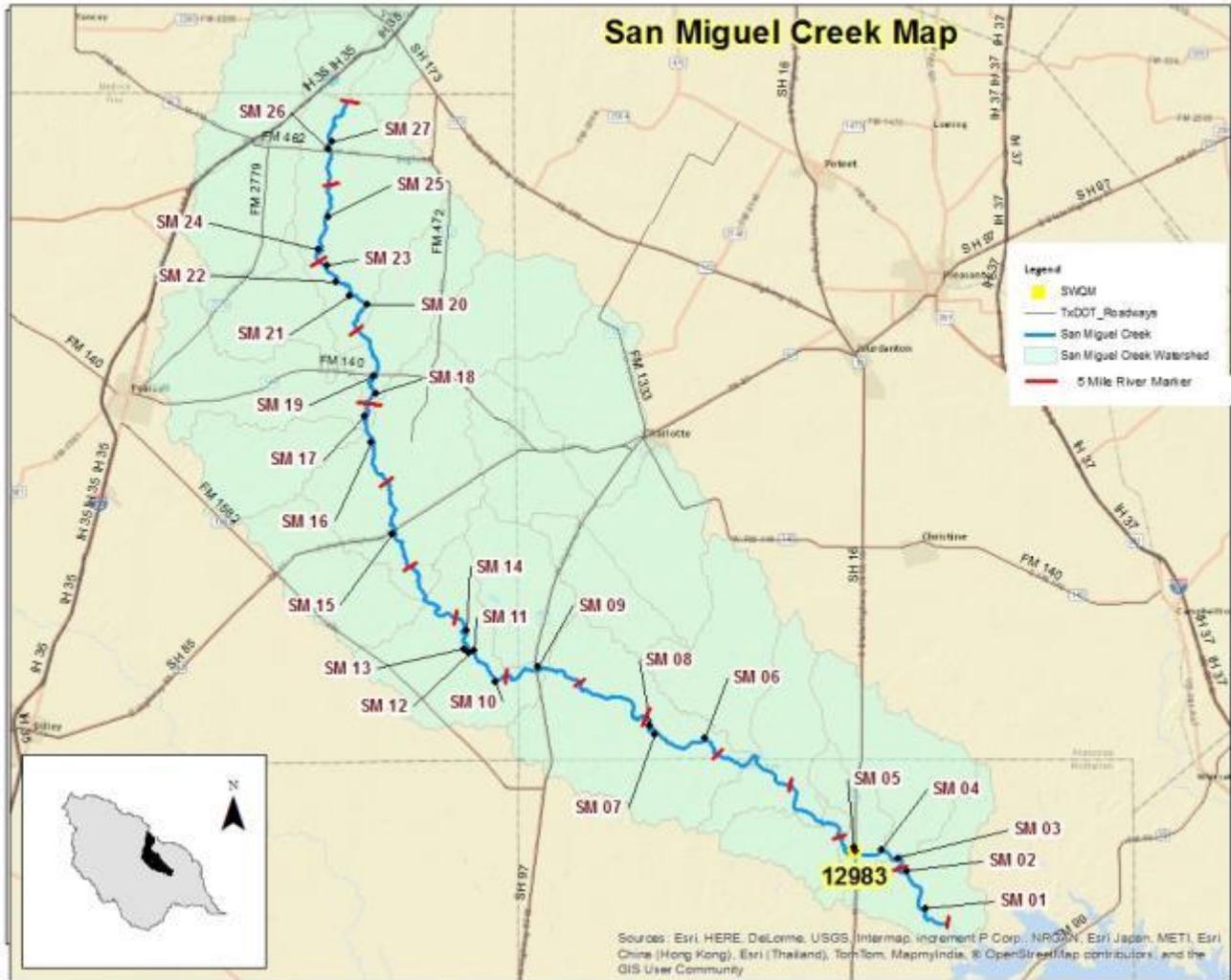
To acquire survey sites for the RUAA, NRA began by requesting county generated appraisal information for Atascosa, Frio and McMullen counties from the appraisal districts in those counties. NRA determined which properties bordered the creek and sent out letters inviting landowners to a public meeting to discuss the RUAA process.

On April 10<sup>th</sup>, 2014, NRA held a public meeting in Pearsall to discuss the RUAA and to locate landowners that were willing to provide access to their property for survey sites. NRA identified a number of willing participants at the meeting. However, survey site locations acquired did not achieve the number of proposed sites outlined in the March 2014 RUAA procedures document indicating a target of three sites for every five miles of stream. The public meeting resulted in acquiring 14 sites for the RUAA. Locating additional landowners proved to be difficult due to a number of reasons including: absentee landowners and landowners being untrusting of government entities. Many landowners simply did not respond to letters seeking cooperation. An attempt was made by NRA to locate landowners by attending SWCD and Commissioners Court meetings.

NRA asked landowners with large tracts of land to allow permission for multiple survey sites on their property. A total of twenty nine sites were identified and the Site Selection Packet was submitted to TCEQ for approval in December 2014. Although fewer sites were identified than recommended for the study, approval of the Site Selection Packet was granted. However, a landowner with two survey sites asked to be removed from the study at the advice of his family and lawyer just two weeks before the first survey was to begin.

### **Survey Site Descriptions**

Twenty seven sites were selected for the RUAA survey on San Miguel Creek (Figure 3-1). These sites were selected as a result of public accessibility and landowner cooperation. Twelve publically accessible sites were located within the watershed; the other fifteen sites were accessible only through private property. Without the voluntary cooperation of landowners, NRA staff would not have been able to access many of the sites.



**Figure 3-1.** Map of RUAA Survey Locations in the San Miguel Creek Watershed.

Moving from the most downstream site, up the creek, the selected sites were:

**Site SM01** is located on private property at the end of Tyler Ranch Road in McMullen County. The property is bordered by game fences and secured from the public with a manned gate. Once on the property, an approximately 3 mile drive down a caliche road and an approximately 0.5 mile drive through a pasture is required to reach the site. The site is a concreted low water crossing used by vehicles and or all terrain vehicles (ATVs).

**Site SM02** is located on private property at the end of Tyler Ranch Road in McMullen County. The property is bordered by game fences and secured from the public with a manned gate. The site is approximately 2.5 miles from the gate at the property boundary. The site is an unimproved low water crossing used by vehicles and/or ATVs.

**Site SM03** is located on private property at the end of Tyler Ranch Road in McMullen County. The property is bordered by game fences and secured from the public with a manned gate. Once

on the property, an approximate 2 mile drive down a caliche road is necessary to arrive at the site. The site is an unimproved low water crossing used by vehicles and/or ATVs.

**Site SM04** is located just off Tyler Ranch Road in McMullen County on private property. One locked gate must be opened before an approximate 0.25 miles drive down a dirt road to access the site. The site location is an unimproved low water crossing used by vehicles and/or ATVs.

**Site SM05** is located partially on the public right of way under the bridge at the SH-16 crossing in McMullen County. The site is accessible by the public on the downstream portion only. Upstream, the creek is inaccessible due to a barbed wire/high game fence. This site is also the location of a USGS gauging station and a CRP routine water quality monitoring station. Landowner permission, allowing across-fence access, was required to complete the survey.

**Site SM06** is located at the crossing of County Road (CR) 3430 in southern Atascosa County. The site is a low water crossing constructed of concrete with no pass-through culvert. Although the area adjacent to the creek is privately owned, there are no fences restricting access upstream or downstream from the crossing. The survey was conducted downstream from the bridge.

**Site SM07** is located on private property off of CR-347 on a large ranch south of Charlotte. Access to the property is through a locked gate. Once on the property, an approximate 5 mile drive is required to reach the crossing. The site location is a low water crossing constructed of concrete with no pass-through culvert. It can be used by vehicles and ATVs.

**Site SM08** is located on private property off of CR-347 on a large ranch south of Charlotte. Access to the property is through a locked gate. Once on the property, an approximately 5 mile drive is required to reach the crossing. The site location is a low water crossing constructed of concrete with no pass-through culvert. It can be used by vehicles and ATVs. SM08 is a 0.3 mile drive upstream from SM07.

**Site SM09** is located at the bridge crossing of Farm to Market (FM) 97 in south western Atascosa County. Landowner permission was not granted to conduct the survey on the full 300m reach and the creek was not accessible from the right of way because of surrounding fencing. Therefore, a partial survey, at 0m from atop the bridge and adjacent to the creek, was performed.

**Site SM10** is located at the bridge crossing of CR 3871 (Hindes Road) in south eastern Frio County. SM10 is only accessible to the public at the area adjacent to the bridge. Upstream and downstream access was blocked by fences and landowner permission was not granted to conduct the survey on the full 300m reach. A partial survey, at 0m, was performed.

**Site SM11** is located on private property off of FM 1582 on a large ranch. A 15 mile drive down a caliche road is required to reach the property which is secured at two locations by both a locked fence and combination locked gate. Once on the property, the creek is accessible from a dirt road that parallels the creek for approximately 1 mile.

**Site SM12** is located on private property off of FM 1582 on a large ranch. A 15 mile drive down a caliche road is required to reach the property which is secured at two locations by both a combination locked fence and combination locked gate. Once on the property, the creek is accessible from a dirt road that parallels the creek for approximately 0.5 miles.

**Site SM13** is located on private property off of FM 1582 on a large ranch that neighbors the property in which SM11 and SM12 are located. A 15 mile drive down a caliche road is required to reach the property which is secured at two locations by both a combination locked fence and combination locked gate. Once on the property, a 0.25 drive around a bend in the road is required to reach the low water bridge crossing.

**Site SM14** is located on private property off of FM 1582 on a large ranch that neighbors the property in which SM11 and SM12 are located. A 15 mile drive down a caliche road is required to reach the property which is secured at two locations by both a combination locked fence and combination locked gate. SM14 is accessible from a dirt road that parallels the creek on the property.

**Site SM15** is located on top of the bridge crossing of San Miguel Creek and of Interstate Highway (IH) 85 in Frio County. The creek is completely inaccessible due to a game fence that surrounds the creek on all sides beneath the bridge. Landowner permission was not granted to conduct a survey on the creek itself. A partial survey, conducted at 0m from the bridge, was performed and included pictures from atop of the bridge and a depth measurement below the bridge.

**Site SM16** is located at the bridge crossing of CR 3314 (Goldfinch Road) in Frio County. SM16 is only accessible to the public at the area adjacent to the bridge. Permission was granted to survey the 300m reach downstream from the bridge. A barbed wire fence downstream from the bridge was present but not functional after the May 2015 flood.

**Site SM17** is located on private property between FM 140 and CR 3314 (Goldfinch Road) in Frio County. Access to the property is secured by a locked gate. A dirt road parallels the creek along the property. SM17 is located at a low water crossing used by vehicles. The survey took place on the 300m stretch upstream from the crossing.

**Site SM18** is located on private property between FM 140 and CR 3314 (Goldfinch Road) in Frio County. Access to the property is secured by a locked gate that is used by the oil and gas industry to access a wellpad. A caliche road, approximately 1 mile long, leads to a low water bridge crossing. The survey took place on the 300m stretch upstream from the bridge crossing.

**Site SM19** is located at the bridge crossing of FM 140 in Frio County. Public access to the creek was available directly underneath the bridge via the right of way, but was restricted up and downstream by private property fences. Landowner permission, allowing across-fence access downstream was required to complete the survey.

**Site SM20** is located at the bridge crossing of CR 2500 (Saddler Road) in Frio County. SM20 is only accessible at the area adjacent to the bridge. Landowner permission was not granted to conduct the survey on the full 300m reach. A partial survey, conducted at 0m, was performed.

**Site SM21** is located at the bridge crossing of CR 2400 (Peck Bush Road) in Frio County. SM21 is only accessible at the area adjacent to the bridge. Landowner permission was not granted to conduct the survey on the full 300m reach. A partial survey, conducted at 0m, was performed.

**Site SM22** is located on private property between FM 2515 (Biedigger Road) and CR 2400 (Peck Bush Road) in Frio County. SM22 is only accessible through fenced private property. A dirt road that parallels the creek on the property leads to the site.

**Site SM23** is located on private property between FM 2515 (Biedigger Road) and CR 2400 (Peck Bush Road) in Frio County. SM23 is only accessible through fenced private property. A dirt road leads down to the creek where a low water crossing exists. The survey took place on the 300m stretch downstream from the low water crossing.

**Site SM24** is located at the bridge crossing at FM 2515 (Biedigger Road) in Frio County. The creek is bordered by barbed wire fence that limits accessibility upstream and downstream of the bridge crossing. Landowner permission, allowing across-fence access, was required to complete the survey.

**Site SM25** is located at the bridge crossing of CR 2410 (San Miguel Road) in Frio County. SM25 is only accessible at the area adjacent to the bridge. Landowner permission was not granted to conduct the survey on the full 300m reach. A partial survey, conducted at 0m, was performed.

**Site SM26** is located at the bridge crossing at FM 462 in Frio County. The stream is accessible to the public by using the bridge right of way. Landowner permission was requested and granted to survey the full downstream reach.

**Site SM27** is located at the bridge crossing at FM 462 in Frio County. The stream is accessible to the public by using the bridge right of way. Landowner permission was requested and granted to survey the full upstream reach

Table 3-2 summarizes the station location information.

San Miguel Creek Recreation Use Attainability Analysis

**Table 3-2.** Location and description of RUAA monitoring sites.

TCEQ ID	Map Legend	Site Description	Latitude	Longitude	Distance to Previous Station (km)	Distance from Lower Segment Boundary (km)	Private or Public Access	Private Access Landowner Approved
---	---	[SEGMENT & AU01 lower boundary at Choke Canyon Reservoir]	---	---	---	0.00	---	---
	SM01	San Miguel Creek Downstream of SH-16	28.5487	-98.4961	0.00	3.13	Private	Yes
	SM02	San Miguel Creek Downstream of SH-16	28.5731	-98.5095	3.96	7.09	Private	Yes
	SM03	San Miguel Creek Downstream of SH-16	28.5816	-98.5153	2.30	9.39	Private	Yes
	SM04	San Miguel Creek Downstream of SH-16	28.5867	-98.5275	1.77	11.16	Private	Yes
12983	SM05	San Miguel Creek @ SH -16	28.5870	-98.5465	2.17	13.33	Public/Private	Yes
	SM06	San Miguel Creek @ CR-343	28.6606	-98.6615	18.96	33.63	Public/Private	Yes
	SM07	San Miguel Creek between I-97 and CR 343	28.6681	-98.6980	4.76	38.17	Private	Yes
	SM08	San Miguel Creek (between I-97 and CR 343)	28.6690	-98.7005	0.30	38.47	Private	Yes
	SM09	San Miguel Creek @ FM 97	28.7078	-98.7877	13.67	52.14	Public	No
	SM10	San Miguel Creek @ CR 3871 (Hindes Road)	28.7029	-98.8198	4.46	56.60	Public	No
	SM11	San Miguel Creek (between I-85 and TX-97)	28.7188	-98.8346	2.75	59.35	Private	Yes
	SM12	San Miguel Creek (between I-85 and TX-97)	28.7202	-98.8366	0.30	59.65	Private	Yes
	SM13	San Miguel Creek (between I-85 and TX-97)	28.7228	-98.8401	0.61	60.26	Private	Yes
	SM14	San Miguel Creek (between I-85 and TX-97)	28.7322	-98.8407	1.44	61.70	Private	Yes
	SM15	San Miguel Creek @ I- 85	28.8011	-98.8952	13.40	75.10	Private	No
	SM16	San Miguel Creek @ CR 3314 (Goldfinch Road)	28.8609	-98.9118	8.90	84.00	Public/Private	Yes
	SM17	San Miguel Creek between FM 140 and CR 3314	28.8795	-98.9157	2.71	86.71	Private	Yes
	SM18	San Miguel Creek (between FM 140 and CR 3314)	28.8906	-98.9123	1.91	88.62	Private	Yes
	SM19	San Miguel Creek @ FM 140	28.9042	-98.9095	2.43	91.05	Public/Private	Yes
	SM20	San Miguel Creek @ CR 2500 (Sadler Road)	28.9497	-98.9183	6.96	98.01	Public	No
	SM21	San Miguel Creek @ CR 2400 (Bush Road)	28.9572	-98.9265	1.58	99.59	Public	No
	SM22	San Miguel Creek between FM 2515 and CR 2400	28.9657	-98.9380	2.01	101.60	Private	Yes
	SM23	San Miguel Creek between FM 2515 and CR 2400	28.9763	-98.9481	1.87	103.47	Private	Yes
	SM24	San Miguel Creek @FM 2515 (Biedigger Road)	28.9865	-98.9514	1.79	105.26	Public/Private	Yes
	SM25	San Miguel Creek @ CR 2410 (San Miguel Road)	29.0092	-98.9470	3.20	108.46	Public	No
	SM26	San Miguel Creek @ FM 462	29.0523	-98.9433	6.22	114.68	Public/Private	Yes
	SM27	San Miguel Creek upstream of FM 462	29.0583	-98.9448	1.0	115.68	Public/Private	Yes

### **Field Survey Data Collection Activities**

As specified in the procedures for a Comprehensive RUAA (TCEQ, 2014), two different field surveys at the twenty seven sites occurred during the warm season (air temperature greater than or equal to 70°F) when human recreational activities were most likely to occur (March - October). Data collection activities for each of the two field surveys included the following activities at each site:

- average depth at thalweg and substantial pool depths, lengths, and widths,
- observational/anecdotal data required by the RUAA,
- photographic record.

#### Average Depth at Thalweg and Substantial Pool Depths

Determination of thalweg and substantial pool depths is applicable to contact recreation use determination for intermittent and perennial freshwaters (TCEQ, 2014). The thalweg is defined as the deepest depth of a transect perpendicular to the stream channel. As instructed in the RUAA procedures manual (TCEQ, 2014), a 300m reach at each station was evaluated to determine average depth at the thalweg. Eleven transects at 30m intervals were established in the 300m stream reach at sites with sufficient water.

Determination of the thalweg in both wadeable and non-wadeable streams was determined as described in the RUAA Procedures (TCEQ, 2014), Section E – Item 1 Wadeable Streams and Item 2 Non-wadeable Streams. Measuring each transect was accomplished, where wadeable, using a Hydrolab Datasonde calibrated for depth at each survey location.

#### Observational /Anecdotal Data

Anecdotal information was recorded on field data sheets during all surveys and studies using the field data sheets from the TSSWCB-approved QAPP. Types of observational and anecdotal records included, but were not limited to, the following:

- channel flow status,
- stream type (e.g., ephemeral, intermittent, etc.),
- general weather conditions (cloud cover/rain), including antecedent 30-day conditions and rainfall record,
- substrate type,
- accessibility, and
- anecdotal information related to observed human contact activities.

#### Photographs

NRA staff created photographic records of each site during the site surveys. Photographs included an upstream view, left and right bank views, downstream view (as described in the Field Data Sheets), any evidence of observed uses or indications of human use, and hydrologic modifications, etc. Any items of interest observed, e.g., obstructions, were also photographed. Photographs were used to document evidence of recreational use (e.g., fishing tackle) and actual recreation. Photographs were also used to document a lack of use (e.g., dry creek beds) or impediments to recreational use.

## CHAPTER 4

### PHYSICAL SURVEY RESULTS

#### General description of Stream and Survey Sites

The RUAA surveys were conducted in Segment 2108 in Summer 2015. Survey #1 was conducted on June 16, June 18, June 19, June 25 and June 30. Survey #2 was conducted on July 14, July 16, July 21, July 22, and July 30. Surveys and associated interviews were performed on weekdays at landowner request to observe recreational activities in and around San Miguel Creek.

The first field surveys were scheduled to be conducted in May 2015 but were rescheduled to June 2015 due to a widespread rain event that resulted in a flood (a maximum flow of 5000 cubic feet per second (CFS) was recorded). The first field survey conducted in June saw maximum flow rates in the 30 CFS range. All twenty seven sites had flowing water at the time the June surveys were performed. The second field survey occurred during low flow conditions in the lower half of the watershed and no flow conditions in the upper half of the watershed. At sites that had sufficient water, eleven transects (cross sections) were measured along a 300m reach at 30m increments. All measurements are reported from 0m to 300m (upstream or downstream depending on property boundary considerations) on field data sheets provided electronically as an appendix to this report (See Chapter 6).

Table 4-1 shows the rainfall data for 30-days antecedent to the RUAA surveys.

Table 4-2 describes the appearance of the stream channel and riparian corridor at each site for both surveys.

Table 4-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys. Access (public or private) to each site and level of effort to access the stream from the bank at each site is also provided in Table 4-3.

Table 4-4 and 4-6 shows the maximum, minimum and average widths of the stream at each site for survey #1 (Table 4-4) and survey #2 (Table 4-6).

Table 4-5 and 4-7 shows the length, width and depth of the stream at sites with observed pools for survey #1 (Table 4-5) and survey #2 (Table 4-7).

Table 4-8 shows the stream aesthetics and wildlife observations for each site and survey. In general, the majority of observed tracks and fecal droppings reported in Table 4-8 were wildlife in origin. Tracks included birds, raccoon, deer, bovine, and feral hogs. Observed trash was predominantly plastics and was most common at bridge crossings. Evidence of major dumping was observed at site SM20. Trash on private lands, which was rarely observed, appeared to have washed in during high flow periods.

A description of each site is presented along with selected photos taken during the surveys. All photos are provided electronically as an appendix to this report (See Chapter 6).

**Table 4-1.** Rainfall records were obtained from the Wunderground Weather Station KPEZ in Pleasanton for the month prior to RUAA surveys. Survey #1 was conducted on June 16, June 18, June 19, June 25 and June 30. Survey #2 was conducted on July 14, July 16, July 21, July 22, and July 30. Dates of surveys are highlighted in grey shades.

Date	Rainfall (in)	Date	Rainfall (in)
<b>May 2015</b>		23	0.08
16	0.07	24	0.17
17	0.27	25 - Survey #1	0.47
18	0.00	26	0.36
19	0.61	27	0.11
20	0.18	28	0.00
21	0.12	29	0.16
22	0.04	30 - Survey #1	0.14
23	0.28	<b>July 2015</b>	
24	0.28	1	0.22
25	0.34	2	0.01
26	0.01	3	0.05
27	0.15	4	0.00
28	0.16	5	0.00
29	0.00	6	0.00
30	0.00	7	0.19
31	0.00	8	0.00
<b>June 2015</b>		9	0.00
1	0.14	10	0.00
2	0.18	11	0.00
3	0.00	12	0.00
4	0.46	13	0.00
5	0.00	14 - Survey #2	0.00
6	0.00	15	0.00
7	0.30	16 - Survey #2	0.00
8	0.00	17	0.00
9	0.57	18	0.00
10	0.54	19	0.00
11	0.27	20	0.02
12	0.08	21 - Survey #2	0.43
13	0.35	22 - Survey #2	0.15
14	0.01	23	0.00
15	0.52	24	0.00
16 - Survey #1	0.02	25	0.00
17	0.23	26	0.00
18 - Survey #1	0.18	27	0.00
19 - Survey #1	0.20	28	0.00
20	0.10	29	0.00
21	0.22	30 - Survey #2	0.00
22	0.02		

**Table 4-2.** Stream channel and corridor assessment per site sampled in San Miguel Creek.

Assessment Unit	Site Number	Stream Bank	Stream Channel Appearance	Dominant Substrate	Corridor Appearance	Riparian Size	Park	Landscape Surroundings
2108	SM01	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Pasture
		Left						
	SM02	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Pasture
		Left						
	SM03	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Pasture
		Left						
	SM04	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Native
		Left						
	SM05	Right	Natural	Mud/Clay Gravel	Forest, Shrub	Large	No	Native
		Left						
	SM06	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Native
		Left						
	SM07	Right	Natural	Mud/Clay	Forest	Large	No	Pasture
		Left						
	SM08	Right	Natural	Mud/Clay	Forest	Large	No	Native
		Left						
	SM09	Right	Natural	Mud/Clay Gravel	Forest, Shrub Denuded/Eroded	Large	No	Native
		Left						
	SM10	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Native
		Left						
	SM11	Right	Natural	Mud/Clay Gravel	Forest, Pasture	Large	No	Native
		Left						
SM12	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Native	
	Left							
SM13	Right	Natural	Mud/Clay Gravel	Forest, Shrub	Large	No	Native	
	Left							
SM14	Right	Natural	Mud/Clay Gravel	Forest, Shrub Denuded/Eroded	Large	No	Native	
	Left							
SM15	Right	Natural	Mud/Clay, Cobble Gravel, Sand	Forest Denuded/Eroded	Large	No	Native	
	Left							
SM16	Right	Natural	Mud/Clay, Gravel, Sand	Forest, Denuded/Eroded	Large	No	Native	
	Left							
SM17	Right	Natural	Mud/Clay	Forest	Large	No	Native	
	Left							
SM18	Right	Natural	Mud/Clay Gravel	Forest	Large	No	Native	
	Left							
SM19	Right	Natural	Mud/Clay	Forest, Herbaceous marsh, Pasture, Denude/Eroded	Large	No	Native	
	Left							
SM20	Right	Natural	Mud/Clay	Forest Denuded/Eroded	Large	No	Native	
	Left							
SM21	Right	Natural	Mud/Clay Gravel, Sand	Forest	Large	No	Native	
	Left							
SM22	Right	Natural	Sand, Silt, Mud/Clay, Gravel	Forest, Pasture Denuded/Eroded	Large	No	Native	
	Left							

**Table 4-2 (continued).** Stream channel and corridor assessment per site sampled in San Miguel Creek.

Assessment Unit	Site Number	Stream Bank	Stream Channel Appearance	Dominant Substrate	Corridor Appearance	Riparian Size	Park	Landscape Surroundings
2108	SM23	Right	Natural	Mud/Clay Sand	Forest Denuded/Eroded	Large	No	Native
		Left						
	SM24	Right	Natural	Mud/Clay Sand, Silt, Gravel	Forest Denuded/Eroded	Large	No	Native
		Left						
	SM25	Right	Natural	Mud/Clay, Cobble Sand, Silt, Gravel	Forest Denuded/Eroded	Large	No	Native
		Left						
	SM26	Right	Natural	Mud/Clay Gravel	Forest Denuded/Eroded	Large	No	Native
		Left						
	SM27	Right	Natural	Mud/Clay Sand, Silt, Gravel	Forest Denuded/Eroded	Large	No	Native

**Table 4-3.** Thalweg depth, streamflow type, and site accessibility for the assessment unit and each site for the surveys conducted.

Assessment Unit (AU)	Segment Length (miles)	# of Sites	# of Recreational Areas in AU	Avg. Thalweg for Assessment Unit (m)		Stream Flow Type	General Access	Bank Access
				Survey #1 June 2015	Survey #2 July 2015			
2108	66	27	0	0.55	0.34	Intermittent w/perennial pools, Ephemeral	Private	MD
Site	Reach Length (meters)	# of transects	# of Recreational Areas	Avg. Thalweg (m) by site		Stream Flow Type	General Access	Bank Access
				Survey #1 June 2015	Survey #2 July 2015			
SM01	300	11	0	0.77	0.72	Intermittent w/perennial pools	Private	MD
SM02	300	11	0	0.36	0.30	Intermittent w/perennial pools	Private	ME
SM03	300	11	0	0.81	0.50	Intermittent w/perennial pools	Private	MD
SM04	300	11	0	0.38	0.35	Intermittent w/perennial pools	Private	ME
SM05	300	11	0	0.77	0.42	Intermittent w/perennial pools	Public/Private	D
SM06	300	11	0	0.59	0.41	Intermittent w/perennial pools	Public/Private	MD
SM07	300	11	0	0.79	0.71	Intermittent w/perennial pools	Private	ME
SM08	300	11	0	1.15	0.98	Intermittent w/perennial pools	Private	ME
SM09	10	1	0	*0.5	*0.35	Intermittent w/perennial pools	Public	ME
SM10	10	1	0	*0.33	*0.22	Intermittent w/perennial pools	Public	E
SM11	300	11	0	0.94	0.63	Intermittent w/perennial pools	Private	ME
SM12	300	11	0	1.02	0.74	Intermittent w/perennial pools	Private	ME
SM13	300	11	0	1.16	.94	Intermittent w/perennial pools	Private	MD
SM14	300	11	0	0.69	0.52	Intermittent w/perennial pools	Private	MD
SM15	10	1	0	*0.39	*0.53	Intermittent w/perennial pools	Private	D
SM16	300	11	0	0.16	0.05	Intermittent w/perennial pools	Public/Private	ME
SM17	300	11	0	0.33	0.20	Intermittent w/perennial pools	Private	MD
SM18	300	11	0	0.84	0.53	Intermittent w/perennial pools	Private	MD
SM19	300	11	0	0.04	0.13	Intermittent w/perennial pools	Public/Private	D
SM20	10	1	0	*0.13	*0.0	Ephemeral	Public	D
SM21	10	1	0	*0.10	*0.0	Ephemeral	Public	D
SM22	300	11	0	0.17	0.0	Ephemeral	Private	ME
SM23	300	11	0	0.10	0.0	Ephemeral	Private	ME
SM24	300	11	0	0.59	0.0	Ephemeral	Public/Private	MD
SM25	10	1	0	*0.32	*0.0	Ephemeral	Public	ME
SM26	300	11	0	0.51	0.0	Ephemeral	Public/Private	D
SM27	300	11	0	0.84	0.0	Ephemeral	Public/Private	MD

E = Easy, ME = Moderately Easy, MD = Moderately Difficult, D = Difficult \*Thalweg under the bridge only.

**Table 4-4.** Width measurements of San Miguel Creek during Survey #1.

Assessment Unit	Date	Site Number	Maximum Width (m)	Minimum Width (m)	Average Width (m)	Observed Flow (Yes/No)	
2108	6/16/2015	SM01	7.6	3.0	5.1	Yes	
		SM02	7.7	1.1	4.5		
		SM03	8.8	3.2	4.9		
		SM04	8.1	1.9	5.1		
	6/25/2015	SM05	7.5	4.5	5.5		
	6/16/2015	SM06	7.0	3.1	5.2		
	6/30/2015	SM07	11.3	3.9	7.0		
		SM08	13.8	3.1	6.8		
	6/19/2015	*SM09	N/A	N/A	*6.6		
		*SM10	N/A	N/A	*2.7		
		SM11	8.3	3.0	5.7		
		SM12	7.7	4.2	5.4		
		SM13	17.3	5.5	9.6		
		SM14	12.6	4.5	9.4		
	6/25/2015	SM15	N/A	N/A	N/A		
	6/18/2015	**SM16	N/A	N/A	N/A		No
		SM17	N/A	N/A	N/A		No
	6/30/2015	SM18	5.9	7.3	4.7		Yes
	6/18/2015	**SM19	N/A	N/A	N/A		No
		**SM20	N/A	N/A	N/A		
		**SM21	N/A	N/A	N/A		
	6/30/2015	SM22	5.0	1.5	3.7		Yes
		SM23	5.2	3.0	4.1		
	6/25/2015	SM24	13.0	2.9	6.5		
		*SM25	*6.0	*3.1	*5.5		
		SM26	15.5	3.7	5.3		
		SM27	15.5	5.3	7.5		

\*Not a complete survey; area adjacent to the bridge only.

\*\*Pools were observed. See Table 4-5 for pool measurements.

**Table 4-5.** Pool measurements of San Miguel Creek during Survey #1.

Site	Date	Pool #	Length (m)	Width (m)	Depth (m)
SM16	6/18/2015	1	30.0	5.0	0.30
		2	75.0	5.0	0.30
SM17	6/18/2015	1	>300	4.3	0.33
SM19	6/18/2015	1	25	2.0	0.12
		2	35	2.0	0.10
		3	50	2.0	0.11
*SM20	6/18/2015	1	N/A	N/A	0.13
*SM21	6/18/2015	1	N/A	N/A	0.10

\*Measurements were made from on top of the bridge.

**Table 4-6.** Width measurements of San Miguel Creek during Survey #2.

Assessment Unit	Date	Site Number	Maximum Width (m)	Minimum Width (m)	Average Width (m)	Observed Flow (Yes/No)
2108	7/16/2015	SM01	7.3	2.7	5.0	Yes
		SM02	7.5	1.0	4.5	
		SM03	8.2	1.7	4.7	
		SM04	7.7	1.5	4.5	
		SM05	7.4	4.2	5.5	
		SM06	6.7	2.1	4.8	
	7/22/2015	SM07	9.8	2.0	6.1	
		SM08	13.6	2.5	6.5	
	7/21/2015	*SM09	N/A	N/A	*6.2	
		*SM10	N/A	N/A	*1.5	
		SM11	5.1	0.3	2.7	
		SM12	5.1	2.3	3.9	
		SM13	5.3	4.5	7.0	
		SM14	7.7	2.3	5.1	
	7/14/2015	SM15	N/A	N/A	N/A	No
		**SM16	N/A	N/A	N/A	
		**SM17	5.0	0.0	4.2	
		**SM18	4.3	0.7	3.7	
		**SM19	N/A	N/A	N/A	
		*SM20	DRY	DRY	DRY	
	*SM21	DRY	DRY	DRY		
	7/30/2015	SM22	DRY	DRY	DRY	
		SM23	DRY	DRY	DRY	
		SM24	DRY	DRY	DRY	
		*SM25	DRY	DRY	DRY	
		SM26	DRY	DRY	DRY	
		SM27	DRY	DRY	DRY	

\*Not a complete survey; area adjacent to the bridge only.

\*\*Pools were observed. See Table 4-7 for pool measurements.

**Table 4-7.** Pool Measurements of San Miguel Creek during Survey #2.

Site	Date	Pool #	Length (m)	Width (m)	Depth (m)
SM15	7/14/2015	1	Unknown	Unknown	Unknown
		2	Unknown	Unknown	Unknown
SM16	7/14/2015	1	2.0	3.2	0.56
SM17	7/14/2015	1	>300	4.5	0.20
SM18	7/14/2015	1	>300	3.7	0.53
SM19	7/14/2015	1	20	1	0.08
		2	30	2	0.07
		3	80	2	0.75

San Miguel Creek Recreation Use Attainability Analysis

**Table 4-8.** Stream aesthetics and wildlife observations in the San Miguel Creek Watershed

Station	Survey date	Water aesthetics						Wildlife observations				Stream garbage		
		Aquatic vegetation	Algae cover	Odor	Color	Bottom deposit	Water surface	Reptile	Water dependent birds	Mammals	Evidence	Large in channel	Small in channel	Bank
SM01	6/16/15	A	R	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM02	6/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM03	6/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM04	6/16/15	A	R	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/16/15	A	R	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM05	6/25/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	MP/Wildlife	Tracks	N	N	R
	7/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	MP/Wildlife	Tracks	N	N	R
SM06	6/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
	7/16/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
SM07	6/30/15	A	C	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/22/15	A	C	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM08	6/30/15	A	C	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/22/15	A	C	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM09	6/19/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks/fecal	N	N	R
	7/21/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks/fecal	N	N	C

San Miguel Creek Recreation Use Attainability Analysis

Station	Survey date	Aquatic vegetation	Algae cover	Odor	Color	Bottom deposit	Water surface	Reptile	Water dependent birds	Mammals	Evidence	Large in channel	Small in channel	Bank
SM10	6/19/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
	7/21/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
SM11	6/19/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/21/15	A	A	N	Brown	Mud/Clay	algae	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM12	6/19/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/21/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM13	6/19/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/21/15	A	R	N	Brown	Mud/Clay/Gravel	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM14	6/19/15	A	R	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/21/15	A	R	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM15	6/25/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks/fecal	N	N	R
	7/14/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks/fecal	N	N	R
SM16	6/18/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
	7/14/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	R	N
SM17	6/18/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
	7/14/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
SM18	6/30/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
	7/14/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	MP/Wildlife	Tracks	N	N	N
SM19	6/18/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	R
	7/14/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM20	6/18/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	SP/Wildlife	Tracks	R	R	R
	7/14/15	N/A	N/A	N/A	N/A	Mud/Clay	N/A	N	N	N	N	R	R	R

San Miguel Creek Recreation Use Attainability Analysis

Station	Survey date	Aquatic vegetation	Algae cover	Odor	Color	Bottom deposit	Water surface	Reptile	Water dependent birds	Mammals	Evidence	Large in channel	Small in channel	Bank
SM21	6/18/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	SP/Wildlife	Tracks	R	R	N
	7/14/15	N/A	N/A	N/A	N/A	Mud/Clay	N/A	N	N	N	N	N	N	N
SM22	6/30/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay	N/A	SP	N	SP/Wildlife	Tracks	N	N	N
SM23	6/30/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay	N/A	N	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM24	6/25/15	A	A	N	Brown	Mud/Clay	Clear	SP	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay	N/A	N	N	LP Livestock/Wildlife	Tracks/fecal	N	N	N
SM25	6/25/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay/Gravel	N/A	N	N	SP/Wildlife	Tracks	N	N	N
SM26	6/25/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay/Gravel	N/A	N	N	SP/Wildlife	Tracks	N	N	N
SM27	6/25/15	A	A	N	Brown	Mud/Clay/Gravel	Clear	SP	N	SP/Wildlife	Tracks	N	N	N
	7/30/15	N/A	N/A	N/A	N/A	Mud/Clay/Gravel	N/A	N	N	SP/Wildlife	Tracks	N	N	N

N/A = dry site A = absent, R = rare, C = common, Ab = abundant, N = none, SP = slight presence, MP = moderate presence, LP = large presence

Physical Description of Site SM01

SM01 was visited on June 16 and July 16, 2015. This site is located on private property off of Tyler Ranch Road in northern McMullen County. The property is secured from the public by tall game fences and a gate guard who manages oilfield traffic. Once on the property, a caliche road approximately 5 miles long leads to the landowner’s house. SM01 is located down a dirt road that cuts through a pasture behind the landowner’s house.

The site is located at a concrete fortified low water crossing that allows for easy access to the creek. Bank access to the creek at areas beyond the low water crossing was difficult due to steep and vegetated banks. The concrete crossing is the only observable manmade hydrologic modification of the stream in the 300m reach. The riparian zone is dominated by forest and grasses. Streamflow was observed on both survey site visits following the flood in May 2015. A moderate amount of woody debris was observed at the site.



**Figure 4-1.** Upstream view at 150m during Survey 1.



**Figure 4-2.** Downstream view at 300m during Survey 1.



**Figure 4-3.** Downstream view at 0m during Survey 2.



**Figure 4-4.** Upstream view at 300m during Survey 2.

Physical Description of Site SM02

SM02 was visited on June 16 and July 16, 2015. This site is located on private property off of Tyler Ranch Road in northern McMullen County. The property is secured from the public by tall game fences and a gate guard who manages oilfield traffic. Once on the property, a caliche road approximately 5 miles long leads to the landowner’s house. SM02 is located at a low water crossing off the road leading to the property approximately 1 mile from the landowner’s house.

Bank access to the creek at areas beyond the low water crossing was moderately easy due to lightly vegetated banks, shallow water, and moderate bank angles. Streamflow was observed on both survey site visits following the flood in May 2015. Woody debris was observed in the 300m reach but no logjams or other natural or manmade modifications to streamflow were observed. A snake was observed on the second site survey on a steep bank.



**Figure 4-5.** Downstream view at 0m during Survey 1.



**Figure 4-6.** Upstream view at 150m during Survey 1.



**Figure 4-7.** Downstream view at 150m during Survey 2.



**Figure 4-8.** Right bank view at 300m during Survey 2.

Physical Description of Site SM03

SM03 was visited on June 16 and July 16, 2015. This site is located on private property off of Tyler Ranch Road in northern McMullen County. The property is secured from the public by tall game fences and a gate guard who manages oilfield traffic. Once on the property, a caliche road approximately 5 miles long leads to the landowner’s house. SM03 is located at a low water crossing off the road leading to the property approximately 2 miles from the landowner’s house.

Bank access to the creek at areas beyond the low water crossing was moderately easy due to lightly vegetated banks, shallow water, and moderate bank angles. The riparian zone was a mix of forest and grasses. Streamflow was observed on both survey site visits following the flood in May 2015. Woody debris was observed in the form of logjams but no other natural or manmade modifications to streamflow were observed.



**Figure 4-9.** Downstream view at 0m during Survey 1.



**Figure 4-10.** Upstream view at 150m during Survey 1.



**Figure 4-11.** Upstream view at 150m during Survey 2.



**Figure 4-12.** Left bank view at 300m during Survey 2.

### Physical Description of Site SM04

SM04 was visited on June 16 and July 16, 2015. SM04 is located on private property off of Tyler Ranch Road in northern McMullen County. The property is secured from the public by a locked gate. Once on the property, an approximately 0.25 mile drive leads to an unfortified low water crossing used by vehicles and ATVs.

Bank access to the creek at the low water crossing was easy. Ease of bank access to the creek at areas beyond the low water crossing was moderately easy due to lightly vegetated banks and a shallow, gravel bottom. Numerous clam shells were observed at the 0m transect and just upstream from the survey location. An armadillo was observed on the second survey site visit at the 150m transect location. The 300m stretch was noted as having an abundant amount of algae along the banks in the shallow sections of the stream. Woody debris was limited to a few downed trees. No logjams or other natural or manmade modifications to streamflow were observed.



**Figure 4-13.** Upstream view at 0m during Survey 1.



**Figure 4-14.** Upstream view at 150m during Survey 1.



**Figure 4-15.** Downstream view at 150m during Survey 2.

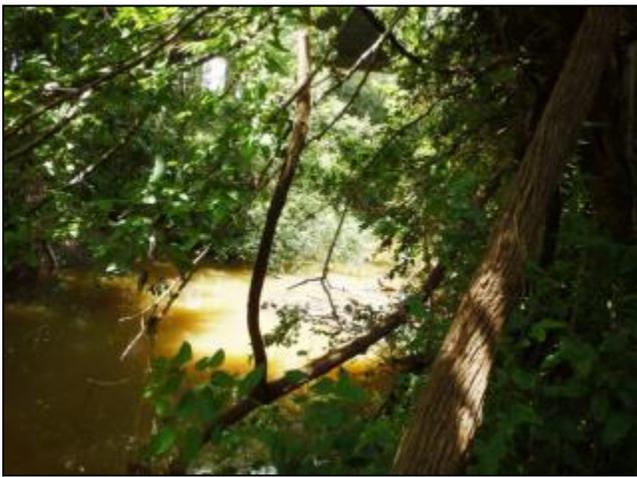


**Figure 4-16.** Downstream view at 300m during Survey 2.

### Physical Description of Site SM05

SM05 was visited on June 25 and July 16, 2015. The site is located at the bridge crossing at SH 16 in McMullen County north of Tilden. Access to the creek is available to the public only by the right of way directly underneath the bridge. The property on the upstream side is secured from the public by a barbed wire fence. Landowner permission was requested and granted in order to access the full reach of the survey. No fences exist downstream of the bridge.

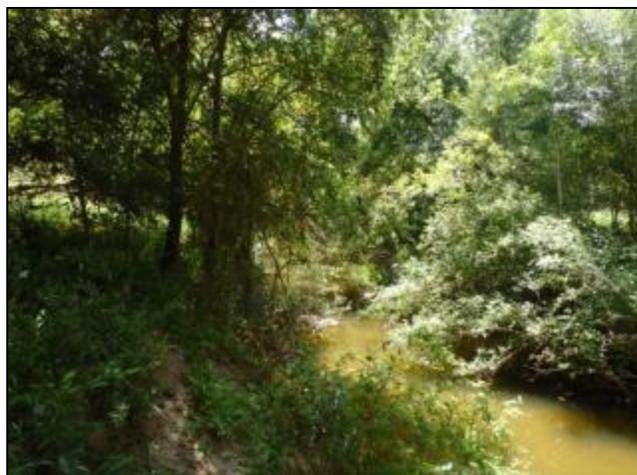
Bank access along the entire 300m reach is difficult due to extremely steep banks and heavy vegetation. The riparian zone was dominated by forest, grasses and shrub. Streamflow was observed on both survey site visits following the flood in May 2015. No natural or manmade modifications to streamflow were observed in the 300m reach with the exception of the bridge at SH-16. Evidence of wildlife included observations of frogs and abundant wildlife tracks.



**Figure 4-17.** Upstream view at 150m during Survey 1.



**Figure 4-18.** Downstream view at 300m during Survey 1.



**Figure 4-19.** Downstream view at 0m during Survey 2.



**Figure 4-20.** Right bank view at 150m during Survey 2.

Physical Description of Site SM06

SM06 was visited on June 16 and July 16, 2015. The site is located at a low water bridge crossing on County Road 3430 in southern Atascosa County. Access to the creek is available to the public only by the right of way directly adjacent the bridge. There are no fences restricting access upstream or downstream from the crossing but barbed wire fences do exist on the property boundary adjacent to the road. Landowner permission was requested and granted in order to access the full reach of the survey.

Bank access is easy at the low water bridge crossing but moderately difficult at areas beyond the crossing due to steep bank angles, woody debris, and thick vegetation. Streamflow was observed during both survey site visits following the flood in May 2015. No natural or manmade modifications to streamflow were observed in the 300m reach with the exception of the low water bridge. Woody debris in the stream was common. Evidence of wildlife included a gar swimming just upstream from the survey site and an abundance of frogs and spiders. Clam shells were observed in the shallow water near the low water bridge crossing. No algal cover was noted on the bridge itself.



**Figure 4-21.** Downstream view at 150m during Survey 1.



**Figure 4-22.** Downstream view at 300m during Survey 1.



**Figure 4-23.** Upstream view at 0m during Survey 2.



**Figure 4-24.** Left bank view at 150m during Survey 2.

Physical Description of Site SM07

SM07 is located at a concrete fortified low water crossing on private property 4.76km upstream of SM06 in southwestern Atascosa County. SM07 was visited on June 30 and July 22, 2015. Landowner permission to access the property was requested and granted. Once on the property, an approximately 5 mile drive down a dirt road is required to reach an area where the road parallels the creek.

Bank access is easy at the low water bridge crossing and moderately easy beyond the crossing. The riparian area is dominated by grasses and forest. Streamflow was observed during both survey site visits following the flood in May 2015. No natural or manmade modifications to streamflow were observed in the 300m reach with the exception of the low water crossing. A moderate amount woody debris was observed. Evidence of wildlife included abundant frogs and spiders. Minimal amounts of algal cover was observed on the concrete at the low water crossing.



**Figure 4-25.** Downstream view at 0m during Survey 1.



**Figure 4-26.** Right bank view at 150m during Survey 1.



**Figure 4-27.** Upstream view at 0m during Survey 2.



**Figure 4-28.** Upstream view at 300m during Survey 2.

### Physical Description of Site SM08

SM08 is located at a concrete fortified low water crossing on private property 30km upstream of SM07 in southwestern Atascosa County. Landowner permission to access the property is requested and granted for SM08. Once on the property, an approximately 5 mile drive down a dirt road is required to reach an area where the road parallels the creek. SM08 was visited on June 30 and July 22, 2015.

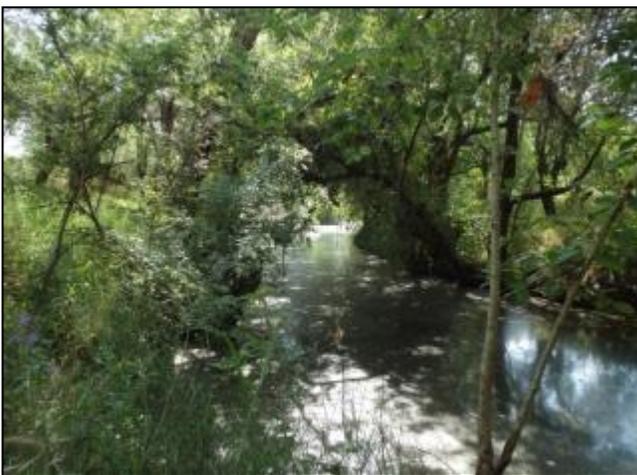
Bank access is easy at the low water bridge crossing and moderately easy beyond the crossing. The riparian zone is dominated by grasses and forest. Streamflow was observed during both survey site visits following the flood in May 2015. No natural or manmade modifications to streamflow were observed in the 300m reach with the exception of the low water bridge. Evidence of wildlife included abundant frogs and spiders. Algal cover was observed on the concrete at the low water crossing.



**Figure 4-29.** Downstream view at 0m during Survey 1.



**Figure 4-30.** Right bank view at 150m during Survey 1.



**Figure 4-31.** Upstream view at 300m during Survey 2.



**Figure 4-32.** Upstream view at 300m during Survey 2.

Physical Description of Site SM09

SM09 is located at the crossing on FM 97 in western Atascosa County. Access to the creek is available to the public only by the right of way directly underneath the bridge. Fences blocked public access to the creek both upstream and downstream. Landowner permission was requested but not granted to conduct the full 300m survey on the creek. A partial survey under the bridge was performed. SM09 was visited on June 19 and July 21, 2015.

Public accessibility at SM09 is limited to the area adjacent to and under the bridge only. The creek is bordered by a high fence and liner upstream (Figure 4-33) and barbed wire fences downstream and on the right and left banks. However, the fence on the right bank was in state of disrepair and allowed easy access to the creek. Streamflow was observed during both survey site visits following the flood in May 2015. Numerous tracks were observed under the bridge indicating people and raccoon had been present. Human shoeprints along with a bedroll and food related trash was observed under the bridge. Swallow nests and droppings were observed under the bridge as were the remains of 4 dead gar in the wetted portion of the creek. Remains of wildlife were noted on the bridge and included a raccoon and a bird carcass.



**Figure 4-33.** Upstream view from bridge during Survey 1.



**Figure 4-34.** Left bank view during Survey 1.



**Figure 4-35.** Downstream view during Survey 2.



**Figure 4-36.** Upstream view during Survey 2.

Physical Description of Site SM10

SM10 is located 4.46km upstream of SM09 at the low water crossing at CR 3871 (Hindes Road) in eastern Frio County. Public access to the creek was available only by the right of way. Private property fences restricted access both upstream and downstream. Landowner permission was requested but not granted to conduct a survey on the full reach. A partial survey adjacent to the bridge was performed. SM10 was visited on June 19 and July 21, 2015.

Public accessibility at SM10 is limited to the area adjacent to the low water crossing only. Upstream, a barbed wire fence exists. Downstream, a high fence with a liner was placed across the stream channel. Concrete and other road materials exist in the vicinity of the crossing as well. The riparian zone upstream and downstream of the crossing indicates the forest canopy is dense. Woody debris was observed upstream from the crossing. Frogs were observed in the pool downstream from the crossing. No other wildlife was reported during the site surveys.



**Figure 4-37.** Downstream view from bridge during Survey 1.

**Figure 4-38.** Upstream view from bridge during Survey 1.



**Figure 4-39.** Downstream view during Survey 2.

**Figure 4-40.** Downstream view during Survey 2.

Physical Description of Site SM11

SM11 is located on private property secured behind two combination locked gates 2.75km upstream from SM10 in eastern Frio County. Once on the property, the creek is accessible from a dirt road that parallels the creek for approximately 1 mile. Landowner permission to access the creek was requested and granted. SM11 was visited on June 19 and July 21, 2015.

Bank access is moderately easy throughout the 300m reach. The riparian area is dominated by forest and pasture. Streamflow of approximately 30 CFS was estimated during the first survey and under 1 CFS was estimated during the second survey. Water appearance during the second field survey was noted as having a biofilm and floating algae in a stagnant portion of the creek. Woody debris was limited to a few downed trees in the creek. No manmade modifications to streamflow were observed. Evidence of wildlife included an abundance of frogs and spiders.



**Figure 4-41.** Downstream view at 0m during Survey 1.



**Figure 4-42.** Downstream view at 150m during Survey 1.



**Figure 4-43.** Downstream view at 0m during Survey 2.



**Figure 4-44.** Upstream view at 0m during Survey 2.

Physical Description of Site SM12

SM12 was visited on June 19<sup>th</sup> and July 21<sup>st</sup>, 2015. SM12 is located on private property off of CR 1582 in eastern Frio County. A 15 mile drive down a caliche road is required to reach the property entrance which is secured at two locations by locked gates. Once on the property, the creek is accessible from a dirt road that parallels the creek. Landowner permission to access the creek was requested and granted to conduct the survey.

Bank access is moderately easy. The riparian area is dominated by grasses and forest. Bank angles were generally not very steep and allowed opportunities to access the creek. Streamflow was observed during both survey site visits following the flood in May 2015. Logjams were observed. No manmade modifications to streamflow were observed in the 300m reach with the exception of a fence on the boundary of the property. Evidence of wildlife included abundant frogs, spiders and dung beetles.



**Figure 4-45.** Downstream view at 0m during Survey 1.



**Figure 4-46.** Right bank view at 150m during Survey 1.



**Figure 4-47.** Downstream view at 300m during Survey 2.



**Figure 4-48.** Upstream view at 150m during Survey 2.

Physical Description of Site SM13

SM13 is located on private property 3.66km upstream from CR3871 behind a fence and locked gate in eastern Frio County. Landowner permission to access the creek was requested and granted for SM13. Once on the property, the creek is accessible from a dirt road that parallels the creek. SM13 was visited on June 19 and July 21, 2015.

Bank access is easy at the low water bridge crossing and moderately difficult beyond the crossing. The riparian area is dominated by grasses and forest. The greatest depth reading (1.97m) was observed just upstream from the bridge during the first survey. Streamflow was observed on both survey site visits following the flood in May 2015. No manmade modifications to streamflow were observed in the 300m reach with the exception of the bridge and low water crossing at the 0m transect. Evidence of wildlife included abundant frogs, spiders, and a gar.



**Figure 4-49.** Right bank view at 0m during Survey 1.



**Figure 4-50.** Right bank view at 300m during Survey 1.



**Figure 4-51.** Upstream view at 0m during Survey 2.



**Figure 4-52.** Upstream view at 300m during Survey 2.

Physical Description of Site SM14

SM14 is located on private property behind fences and a combination locked gate 1.44km upstream from SM13 in eastern Frio County. Landowner permission was requested and granted to access the creek. Once on the property, the creek is accessible from a dirt road that parallels the creek. SM14 was visited on June 19 and July 21, 2015.

Bank access is moderately difficult. The riparian area is dominated by grasses and forest. Bank angles were generally steep and allowed few opportunities to access the creek. Streamflow was observed during both survey site visits following the flood in May 2015. Woody debris was observed. No manmade modifications to streamflow were observed in the 300m reach. Evidence of wildlife included abundant frogs, spiders and mountain lion tracks along the dirt road that parallels the creek.



**Figure 4-53.** Down stream view at 0m during Survey 1.



**Figure 4-54.** Upstream view at 150m during Survey 1.



**Figure 4-55.** Downstream view at 150m during Survey 2.

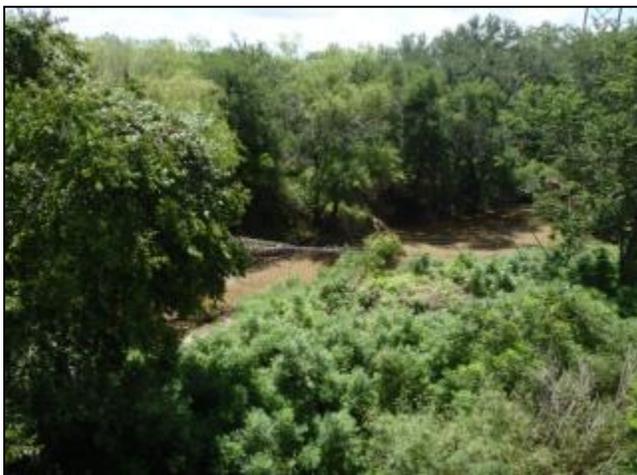


**Figure 4-56.** Upstream view at 300m during Survey 2.

Physical Description of Site SM15

SM15 is located on top of the bridge crossing of San Miguel Creek and I-85 in Frio County. The creek is completely inaccessible due to a game fence that surrounds it on all sides beneath the bridge. Landowner permission was requested but access was not granted to conduct the survey on the creek. A partial survey, conducted at 0m from the bridge surface, was performed. SM15 was visited on June 19 and July 14, 2015.

The riparian area adjacent to the creek was observed to be dense forest with a partially denuded and eroded bank. Under the bridge, concrete, rip rap and a discarded bench seat from a vehicle were observed. Bank angles under the bridge were very steep. Streamflow was observed during the first survey site visits following the May 2015 flood but returned to no flow conditions during the second survey site visit. Three pools were observed during the second survey: a pool upstream extending beyond sight, a small pool under the bridge, and a pool beginning just downstream of the bridge and extending beyond sight.



**Figure 4-57.** Downstream view from bridge during Survey 1. **Figure 4-58.** Upstream view from bridge during Survey 1.



**Figure 4-59.** View under the bridge during Survey 2.

**Figure 4-60.** Pool under the bridge during Survey 2

### Physical Description of Site SM16

SM16 is located at CR 3314 (Goldfinch Road) 8.90km upstream of SM15 in eastern Frio County. Public access from the road was not restricted by fences upstream or downstream. Landowner permission was requested and granted to access the full 300m reach beyond the right of way. SM16 was visited on June 18 and July 14, 2015.

SM16 is located at a low water bridge crossing. Streamflow was absent during both RUAA survey site visits. An abundance of cobble, sand and road construction material existed to a point approximately 50m downstream during both site surveys. Downstream from the construction materials, the creek was noted as having abundant wooded debris in the streambank. Water was pooled at the bridge crossing and downstream at the 150m mark and to a point well past the 300m mark. Steep and muddy banks line the creek. Several relic items were observed in the creek including a 1960s era Mountain Dew glass bottle and a pair of license plates from 1935.



**Figure 4-61.** Upstream view at 150m during Survey 1.



**Figure 4-62.** Downstream view at 300m during Survey 1.



**Figure 4-63.** Downstream view at 300m during Survey 2.



**Figure 4-64.** Left bank view at 150m during Survey 2.

Physical Description of Site SM17

SM17 is located 2.71km upstream from SM16 on private property behind a locked gate between CR 3314 (Goldfinch Road) and FM 140 in eastern Frio County. Landowner permission to access the creek was required and granted to reach the survey site. Once on the property, the creek is accessible from a dirt road that parallels the creek. SM17 is located at a low water crossing that was partially washed out during the May 2015 flood. SM17 was visited on June 18 and July 14, 2015.

Bank access is easy at the low water crossing and moderately difficult beyond the crossing. The riparian zone is a mix of forest, grasses and in places, a denuded and eroded bank following the May 2015 flood. Bank angles were generally steep and allowed few opportunities to access the creek. A moderate amount of woody debris was observed in the creek. Streamflow was absent during both survey site visits. Evidence of wildlife included abundant frogs and spiders.



**Figure 4-65.** Downstream view at 150m during Survey 1.



**Figure 4-66.** Right bank view at 300m during Survey 1.



**Figure 4-67.** Right bank view at 300m during Survey 2.



**Figure 4-68.** Upstream view at 300m during Survey 2.

Physical Description of Site SM18

SM18 is located on private property 1.91km upstream from SM17. Landowner permission was granted to access the creek. A locked gate for oil and gas workers was present at the property line restricting public access to the creek. Once on the property, SM18 is an approximate 0.75 mile drive down a dirt road to reach the low water crossing. The 300m reach extends upstream from the crossing. SM18 was visited on June 18 and July 14, 2015.

Bank access is easy at the low water crossing and moderately difficult beyond the crossing. The riparian area is a mix of forest and grasses. Gravel and road material were observed in the stream channel just downstream from the low water crossing. Bank angles were generally steep and allowed few opportunities to access the creek. Streamflow was absent during both survey site visits but a pool existed the entire 300m reach for SM18. Evidence of wildlife included abundant frogs and spiders.



**Figure 4-69.** Upstream view at 300m during Survey 1.



**Figure 4-70.** Upstream view at 150m during Survey 1.



**Figure 4-71.** Left bank view at 300m during Survey 2.



**Figure 4-72.** Downstream view at 300m during Survey 2.

Physical Description of Site SM19

SM19 is located at the crossing of FM-140 2.43km upstream of SM18 in Frio County. Public access to the creek was available only by the right of way underneath the bridge. Private property fences restricted access both upstream and downstream. Landowner permission to access the full 300m reach was required and granted. SM19 on San Miguel Creek was visited on June 18 and July 14, 2015.

Bank access is difficult at the FM-140 crossing due to the barbed wire fence and very steep angles associated with the bridge support. Ease of bank access beyond the bridge is moderately difficult due to dense vegetation along the banks. The riparian area is a mix of herbaceous marsh and pasture. Streamflow was absent during both survey site visits but pools existed at several locations along the 300m survey area. Downstream of the 300m transect, the riparian zone changes dramatically from herbaceous marsh and pasture to forest with denuded or eroded banks with shallow bank angles. Evidence of wildlife included abundant frogs and spiders and evidence of crawfish (exoskeleton). Evidence of cattle was also observed in the pasture. The landowner mentioned the pasture had been cleared by the Corps of Engineers many years back to reduce flooding.



**Figure 4-73.** Downstream view at 0m during Survey 1.



**Figure 4-74.** Downstream view of a pool during Survey 1.



**Figure 4-75.** Downstream view at 150m during Survey 2.



**Figure 4-76.** Upstream view of pool during Survey 2.

Physical Description of Site SM20

SM20 is located 6.96km upstream of SM19 at the crossing of FM 2500 (Sadler Road) in Frio County. Landowner permission was not granted to conduct a survey on the full 300m reach of the creek. Public access was accessible in the right of way of the bridge but due to steep banks and hazardous conditions a partial survey, conducted at 0m on the bridge surface, was performed. SM20 was visited on June 18 and July 14, 2015.

Bank access is difficult due to steep and muddy banks when the creek is flowing. Upstream, a barbed wire fence exists. Downstream, a high fence exists across the stream channel. Animal carcasses, trash, and other materials exist under the bridge. The riparian zone upstream and downstream of the crossing indicates the forest canopy is dense with areas of denuded or eroded bank. Woody debris was observed upstream and downstream from the crossing. No evidence of wildlife was reported during either of the site surveys.



**Figure 4-77.** Downstream view during Survey 1.



**Figure 4-78.** Trash and debris during Survey 1.



**Figure 4-79.** Upstream view during Survey 2.



**Figure 4-80.** Left bank at bridge during Survey 2.

Physical Description of Site SM21

SM21 is located at the crossing of FM 2400 (Peck Bush Road) in Frio County. Public access is limited to the right of way directly below the bridge but is restricted upstream and downstream by private property fences. Landowner permission was requested to access the full 300m reach but not granted. A partial survey, conducted at 0m from the bridge, was performed. SM21 was visited on June 18 and July 14, 2015.

Bank access is difficult due to steep banks and thick vegetation. Upstream, a wire fence exists. Downstream, a barbed wire fence exists but was in disrepair following the May 2015 flood event. Rocks and other road materials exist at the base of the bridge. The riparian zone upstream and downstream of the crossing indicates the forest canopy is dense. Woody debris was observed downstream from the crossing. No evidence of wildlife was reported during either of the site surveys.



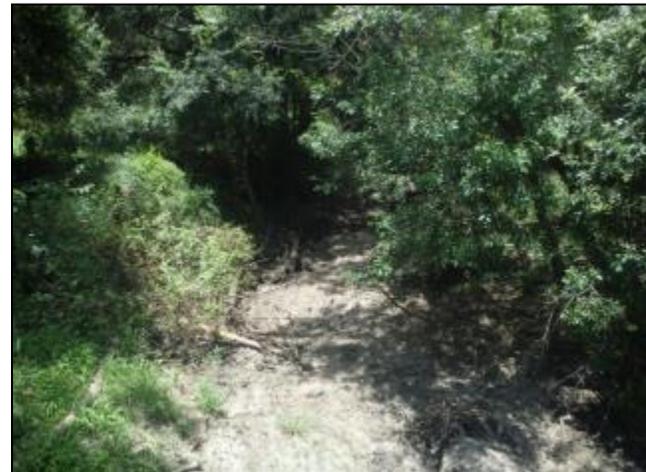
**Figure 4-81.** Downstream view during Survey 1.



**Figure 4-82.** Upstream view during Survey 1.



**Figure 4-83.** Downstream view during Survey 2.



**Figure 4-84.** Downstream view during Survey 2.

Physical Description of Site SM22

SM22 is located behind a locked gate on private property 2.01km upstream from the SM21 in Frio County. Landowner permission to access the property is required for SM22. Once on the property, a dirt road approximately 0.75 miles long leads to creek. SM22 was visited on June 18 and July 14, 2015.

Bank access to the creek is moderately easy in the 300 m reach. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. No pools were observed in the 300m reach during the second survey. Woody debris was observed in the 300m reach and logjams were noted. The riparian zone is a mix of forest and grasses with a spattering of denuded banks after the May 2015 flood event. Evidence of wildlife included abundant frogs and spiders.



**Figure 4-85.** Downstream view at 0m during Survey 1.



**Figure 4-86.** Downstream view at 300m during Survey 1.



**Figure 4-87.** Upstream view at 0m during Survey 2.



**Figure 4-88.** Downstream view at 150m during Survey 2.

Physical Description of Site SM23

SM23 is located at a natural bottom low water crossing in Frio County approximately 0.75 miles behind a locked gate on private property. Landowner permission to access the property was requested and granted for SM23. SM23 was visited on June 30 and July 30, 2015.

Bank access to the creek is moderately easy in the 300m reach. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. No pools were observed in the 300m reach during the second survey. Woody debris was observed and a logjam was noted at the 300m transect. The riparian zone is a mix of forest and grasses with a mix of bare and denuded banks following the May 2015 flood event. Evidence of wildlife included abundant frogs and spiders.



**Figure 4-89.** Upstream view at 0m during Survey 1.



**Figure 4-90.** Downstream view at 300m during Survey 1.



**Figure 4-91.** Downstream view at 0m during Survey 2.



**Figure 4-92.** Upstream view at 300m during Survey 2.

Physical Description of Site SM24

SM24 is located at the crossing of FM 2515 (Biedigger Road) in Frio County 5.67km upstream from SM21. Public access is restricted to the right of way below the bridge Landowner permission was requested to access the full 300m reach but only downstream access was granted. SM24 was visited on June 25 and July 30, 2015.

Bank access is moderately difficult in the 300m reach. A barbed wire fence surrounds the property and crosses the creek at the 60m transect. Steep and tall banks approximately 3m high were observed beyond the 150m mark. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. The riparian zone is a mix of forest and grass along with partially denuded and eroded banks following the recent flood. An abundance of woody debris including logjams was observed in the 300m reach surveyed. Evidence of wildlife included animal tracks in the dry streambed on the second survey. An indigo snake was observed along the bank during the first survey site visit.



**Figure 4-93.** Downstream view at 0m during Survey 1.



**Figure 4-94.** Upstream view at 300m during Survey 1.



**Figure 4-95.** Downstream view at 0m during Survey 2.



**Figure 4-96.** Upstream view at 150m during Survey 2.

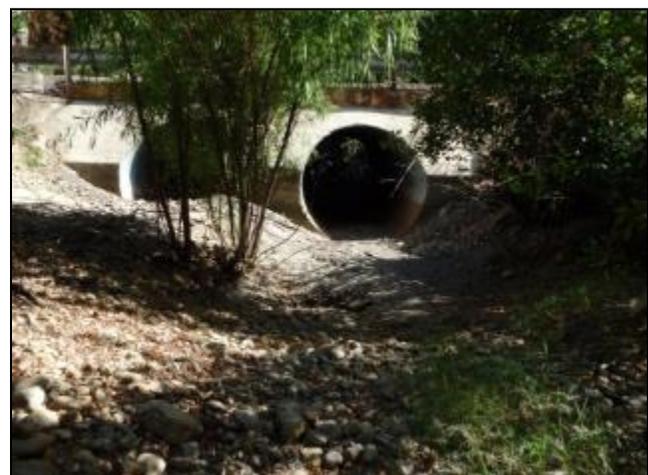
Physical Description of Site SM25

SM25 is located at the crossing of CR 2410(San Miguel Road) 3.20km upstream of SM24. Public access is limited to the bridge right of way but is restricted by private property fences both upstream and downstream. Permission to cross the fences to conduct the full 300m reach was not granted. Therefore, a partial survey adjacent to the low water crossing was performed. SM25 was visited on June 25 and July 30, 2015.

Bank access is moderately easy adjacent to the low water crossing but restricted by fences upstream and downstream of the crossing. Rocks and other road materials exist at the base of and downstream of the bridge. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. The riparian zone upstream and downstream of the crossing indicates the forest canopy is fairly dense with steep and partially denuded banks. Woody debris was observed downstream from the crossing. Upstream the creekbed was denuded following the flood in May 2015. No evidence of wildlife was reported during either of the site surveys.



**Figure 4-97.** Downstream view from bridge during Survey 1. **Figure 4-98.** Upstream view from bridge during Survey 1.



**Figure 4-99.** Upstream view of bridge during Survey 2. **Figure 4-100.** Upstream view of bridge during Survey 2.

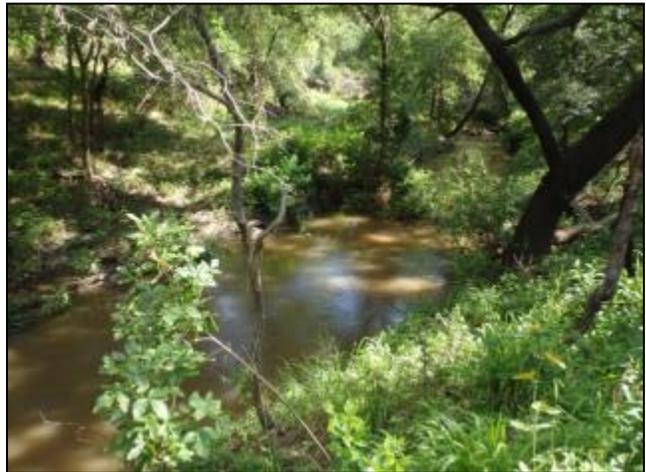
Physical Description of Site SM26

SM26 is located 6.22km upstream from SM25 where it crosses FM 462 in northern Frio County. Public access was limited to the right of way below the bridge although landowner was preparing to fix the fence that was swept away by the previous flood in May 2015. Landowner permission to access the full reach was granted. SM26 starts at the bridge and extends 300m downstream. SM26 was visited on June 25 and July 30, 2015.

Bank access at the bridge crossing is easy but becomes difficult at areas beyond the crossing due to extremely thick vegetation. A barbed wire fence borders the property along FM 462 but does not cross the creek. A low water crossing exists approximately 50m downstream from the bridge. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. The riparian zone downstream of the crossing is dense forest. No pools were observed in the 300m reach during the second survey. Woody debris was observed downstream from the crossing. Evidence of wildlife included abundant frogs and spiders. A crawfish exoskeleton was observed approximately 20m downstream from the bridge crossing. Clam shells were observed approximately 75m downstream from the bridge crossing.



**Figure 4-101.** Downstream view at 150m during Survey 1.



**Figure 4-102.** Upstream view at 300m during Survey 1.



**Figure 4-103.** Upstream view of culvert during Survey 2.



**Figure 4-104.** Right bank view at 300m during Survey 2

Physical Description of Site SM27

SM27 is located at FM 462 and extends 300m upstream of the crossing onto private property. Public access was limited to the right of way below the bridge although landowner was preparing to fix the fence that was swept away by the previous flood in May 2015. Landowner permission to access the full 300m was requested and granted. SM27 was visited on June 25 and July 30, 2015.

Bank access at the bridge crossing is easy but becomes difficult at areas beyond the crossing. Streamflow was observed during the first RUAA site visit but the stream was dry by the second survey. The riparian zone is dense forest. No pools were observed in the 300m reach during the second survey. Evidence of wildlife included abundant frogs and spiders. Clam shells and raccoon tracks were observed at the 150m transect. Evidence of hogs was observed at the 90m transect.



**Figure 4-105.** Upstream view at 150m during Survey 1.



**Figure 4-106.** Downstream view at 0m during Survey 1.



**Figure 4-107.** Upstream view at 150m during Survey 2.



**Figure 4-107.** Downstream view at 300m during Survey 2.

## CHAPTER 5

### OBSERVATIONS AND INTERVIEWS

NRA field staff conducted site surveys during warm weather (> 70° F), when the chance for recreational activity was most likely to occur. Twelve of the twenty seven selected sites were at locations that provided public access to a portion of the stream adjacent to the bridge. The remaining fifteen sites were located on private property. Landowners and stakeholders were interviewed using the Comprehensive RUAA Interview Forms provided by TCEQ. A total of 17 interviews were collected from landowners along San Miguel Creek and from other stakeholders with knowledge of the San Miguel Creek watershed. Many of the interviews were conducted at the first two public meetings. Other interviews were granted by landowners during site surveys.

#### Activities Observed

No recreational activities were observed by NRA employees during either of the two field surveys. No evidence of either primary or secondary contact recreation was observed during either of the two field surveys. Table 5-1 summarizes noted activities.

**Table 5-1.** Activities are listed as the number of times personal use, observed use, or heard of use was documented from interview form. .

Site Name	Number of Interviews	Swimming	Adult Wading	Children Wading	Hunt	Fish	Boat, Canoe, Kayak
SM01	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM02	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM03	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM04	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM05	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM06	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM07	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM08	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM09	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM10	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM11	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM12	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM13	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM14	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM15	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM16	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM17	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM18	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM19	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM20	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM21	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM22	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM23	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM24	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM25	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM26	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
SM27	0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0
General Use	17	1,0,1	0,0,0	0,0,0	6,5,5	3,2,3	0,0,0
SUM	17	1,0,1	0,0,0	0,0,0	6,5,5	3,2,3	0,0,0

## CHAPTER 6

### ORGANIZATION OF ELECTRONIC FILES AND RUAA SUMMARY

#### Organization of Electronic Files

Copies of all interviews from each survey, field data sheets, the contact information form, the RUAA summary form, and transect and other pictures are provided electronically as an appendix to this report on the project website

<http://www.nueces-ra.org/SMC/>

Electronic files are organized by survey and provided with the following file structure:

RUAA-2015\_San Miguel\_Creek (2108)

Other\_RUAA\_Information

General Interviews

RUAA\_Survey1\_June\_2015\_Survey2\_July\_2015

Field\_Data\_Sheets

RUAA Survey1\_June\_2015

SM01_photos	SM10_photos	SM19_photos
SM02_photos	SM11_photos	SM20_photos
SM03_photos	SM12_photos	SM21_photos
SM04_photos	SM13_photos	SM22_photos
SM05_photos	SM14_photos	SM23_photos
SM06_photos	SM15_photos	SM24_photos
SM07_photos	SM16_photos	SM25_photos
SM08_photos	SM17_photos	SM26_photos
SM09_photos	SM18_photos	SM27_photos

RUAA\_Survey2\_July\_2015

Field\_Data\_Sheets

SM01_photos	SM10_photos	SM19_photos
SM02_photos	SM11_photos	SM20_photos
SM03_photos	SM12_photos	SM21_photos
SM04_photos	SM13_photos	SM22_photos
SM05_photos	SM14_photos	SM23_photos
SM06_photos	SM15_photos	SM24_photos
SM07_photos	SM16_photos	SM25_photos
SM08_photos	SM17_photos	SM26_photos
SM09_photos	SM18_photos	SM27_photos

Under each site folder for photos, as appropriate, are subfolders labeled other, rec\_signs, source\_signs, and transect\_photos. Photos are found in a folder denoting the which survey (first or second) and include survey dates (mm/dd/yyyy). All photos are labeled with site (Site #), transect location (site) and orientation (upstream/.downstream/rightbank/leftbank)with other descriptive information. For example under the transect folder, the photo name Site #1(150m) upstream.jpg indicates that the picture was taken at site SM01 at the 150-m transect and represents the upstream orientation of the picture.

## Summary

RUAA surveys were conducted at 27 sites along San Miguel Creek (2108) in mid to late June 2015 (Survey #1) and mid to late July, 2015 (Survey #2). The creek had water at all survey sites during the first survey following a brief flood in May 2015. By the second survey, dry conditions had returned to the watershed resulting in very low flow conditions in the downstream portion of the creek and no flow/dry conditions in the upper reaches.

Stream depths recorded during the RUAA surveys indicate San Miguel Creek is a wadeable stream during low flow conditions. The only non wadeable depth, 1.97m (6.5ft) was observed during the first survey just upstream from the 0m transect at SM13. The average depth of the creek during the first survey was .55m. The average depth of the creek during the second survey was 0.34m (Table 4-3).

During the two surveys, there were no contact recreation activities of any kind observed by NRA field staff. Fish were observed in pools as far upstream as SM14. The remains of four alligator gar were observed at SM09 during the first survey just downstream of the bridge crossing at FM 97. A single blue catfish approximately 15 inches long was observed but not photographed at SM14 and a spotted gar was photographed at SM13 during the second survey.

Recreational activities reported by interviewees are summarized in Table 5.1. Interview forms indicate landowners have occasionally fished the creek in the past when the creek had sufficient water but hunting is more common. One landowner reported Primary Contact Recreation (PCR) activities on the interview form for sites SM01, SM02, and SM03 in the most downstream portion of the creek when there is sufficient water.

Much of the riparian zone for San Miguel Creek has been undisturbed by landowners except for areas where stream crossings were constructed. Access at the crossings is generally very easy. Access beyond the crossings becomes much more difficult due to steep well defined banks that are lined by tree roots. Much of the riparian zone of San Miguel Creek consists of a mix of forest and grasses with abundant woody debris and numerous logjams throughout the entire reach. The banks were observed to be near vertical at many locations contributing to difficulty of access.

Fine sediments are common up and down the creek and affect the appearance of the water. During low flow conditions, pools become stagnant and can develop a biofilm of algae on the water surface which also affects the appearance of the water.

While conducting the stream surveys, no characteristics, such as boat docks, parks, playgrounds, biking trails, campgrounds or sports fields, were encountered that would promote recreation.



**Figure 6-1.** Ring shaped life preserver decoration at SM13

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