Central and Southeast Texas Recreational Use-Attainability Analyses Project
Gibbons Creek (Segment 1209I) Basic RUAA

Results Report

Contract No. 582-9-90440

Prepared by:
George Guillen & Jenny Wrast
University of Houston-Clear Lake

Principal Investigator
George Guillen

Environmental Institute of Houston
University of Houston Clear Lake
2700 Bay Area Blvd
Houston, Texas 77058

October 6, 2010

PREPARED IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

The preparation of the report was financed through grants from the U.S. Environmental Protection Agency through the Texas Commission on Environmental Quality

Federal Grant #07-09 106 Categorical Water Pollution Control 98665304 (State USAS Grant #998807)

Federal Grant #09-11 106 Categorical Water Pollution Control 98665305 (State USAS Grant #998810)

TCEQ Contact:
Amanda Ross
Total Maximum Daily Load Team
Texas Commission on Environmental Quality
P.O. BOX 13087
Austin, Texas 78711-3087
512-239-6646
aross@tceq.state.tx.us

Table of Contents

Introduction 5
Problem Statement 5
Objectives 5
1. Reconnaissance and Site Selection 5
2. Basic Recreational Use Attainability Analysis 5
3. Public Participation 6
Study Area 6
Description of Water Body 6
Environmental Features and Population Characteristics 7
Watershed Characterization 7
Permitted Discharges (Municipal, Industrial, Stormwater) 7
Potential Nonpoint Sources 9
Site Reconnaissance Summary 9
Methodologies 11
RUAA Survey Site Selection and Descriptions 11
Sampling Methods 14
Field Survey Descriptions 14
Results 16
Physical Evaluation and Flow 16
Recreational Uses 18
Summary 20
Literature Cited 21
RUAA Summary Form 22

List of Figures

Figure 1. TCEQ permitted outfalls, and Public Parks adjacent to Gibbons Creek, Segment 1209I. 8

Figure 2. Basic RUAA survey sites on Gibbons Creek, Segment 1209I, selections based on river mile/assessment units, accessibility, and recreational features. 12

Figure 3. Photos taken at field survey sites 1, 2, 4, and 5 (as numbered) show the fluctuations in physical characteristics throughout Gibbons Creek, Segment 1209I 13

Figure 4. Basic RUAA survey sites on Gibbons Creek, Segment 1209I, with depictions of observed evidence of recreational uses, and impediments. No observations of recreational uses were documented during the field surveys. 19

List of Tables

Table 1. Site reconnaissance for Basic RUAA on Gibbons Creek, Segment 1209I. 10

Table 2. Survey sites for the Basic RUAA Survey on Gibbons Creek, Segment 1209I (corresponding to Figure 2 and Table 1) 10

Table 3. Physical parameters from the basic recreational use attainability analysis field surveys conducted on Gibbons Creek, Segment 1209I 17

Table 4. Physical Characteristics of Riparian Zone and Dominant substrate of the field survey sites sampled during the Basic Recreational Use Attainability Analysis on Gibbons Creek, Segment 1209I 17

Table 5. Recreational uses observed and documented on Gibbons Creek, Segment 1209I for the Basic Recreational Use Attainability Analysis. 18

Appendices

Appendix 1 Contact Information Forms and Supporting Documents

Appendix 2 Field Data Sheets

Appendix 3 Photographic Record

Appendix 4 Weather Condition Summary

Appendix 5 Google Earth Interactive Map

Introduction

Problem Statement

Recreational Use-Attainability Analyses (RUAAs) are scientific assessments that are used to determine existing and attainable recreational use for a water body and determine if that use might be different than the presumed recreational use, as specified in the Clean Water Act. In September 2009, a Basic RUAA was initiated on Gibbons Creek, Segment 1209I. This Basic RUAA Report will provide Texas Commission on Environmental Quality (TCEQ) Standards Group with relevant information to help determine the appropriate attainable recreation use for Gibbons Creek. The completion of this Basic RUAA consisted of several important interrelated components including 1) reconnaissance and site selection, 2) Basic RUAA and 3) public outreach. The objectives of each component are listed below.

Objectives

1. Reconnaissance and Site Selection

The primary objective of this phase is to select survey sites that would be accessible to users and most likely characterize recreational uses in the watershed. This was accomplished primarily with the input of local, state and regional agency staff familiar with the watershed, as well as aerial imagery. An initial stakeholder meeting occurred on March 9, 2010 at the Navasota Center, Navasota TX. Reconnaissance surveys were conducted on January 14 and 15, 2010 and provided the basis site selection for discussion in this meeting.

2. Basic Recreational Use Attainability Analysis

The primary objective of the Gibbons Creek RUAA was to characterize the recreational use and potential impediments to use for this stream. The RUAA field surveys were conducted on Sunday, May 30, 2010, to collect information on the water body and associated uses. These

field surveys were conducted at selected sites with the highest probability of detecting recreation use. The objective was to document and characterize observed use, site conditions (hydrology, physical attributes), and weather during the survey the RUAA field surveys.

3. Public Participation

The objective of the public participation phase of the Basic RUAA was to solicit as much information from various watershed stakeholders including agency staff, citizens, recreational user groups and other interested parties on the historical and current recreational uses in Gibbons Creek. This included soliciting information on recreational uses by sending out emails to key organizations and staff familiar with the watershed. The stakeholder contact list is provided in Appendix 1. In addition, on March 9, 2010 a stakeholder meeting was held to gather information on the watershed including likely recreational access points.

Study Area

Description of Water Body

Gibbons Creek is a tributary to the Navasota River watershed, which is located within the Brazos River Basin. Segment 1209I is an unclassified segment by the TCEQ and is approximately 23 miles in length. Segment 1209I begins at the confluence the Navasota River in Grimes County and continues to SH90 in Grimes County. Gibbons Creek is a perennial stream formerly known as Ben Fort Creek (TCEQ, 2008). It flows through gently sloping to nearly level clay loam terrain supporting stands of post oak, blackjack oak, elm, hackberry, water oak, and pecan along its banks. Located in the middle of the segment, Gibbons Creek Reservoir (Segment 1209N) is a 4-mile long reservoir that was dammed in the 1980s (Handbook of Texas, 2010). Gibbons Creek Reservoir is not included in Segment 1209I, and was not assessed in this

RUAA. Gibbons Creek (Segment 1209I) is on the state's 303(d) list for geometric mean values that exceed the bacteria criteria associated with primary contact recreation uses (TCEQ, 2008).

Environmental Features and Population Characteristics

The climate in the Navasota River Watershed is classified as having hot, humid summers and mild winters. Gibbons Creek has been disturbed by human activities that have altered both the land use and vegetation cover of the watershed. These activities include the construction of roads and instream sewer lines, conversion of land for agriculture, and the building of commercial businesses and residential neighborhoods. The area can be described as rural with a very sparse population density.

Watershed Characterization

The Navasota River watershed traverses flat to rolling terrain with local shallow depressions, surfaced by clay and sandy loams that support water-tolerant hardwoods, conifers, and grasses. The riparian zone is minimally impacted by development. The watershed of Gibbons Creek is predominantly rural with agriculture being the primary land use.

Permitted Discharges (Municipal, Industrial, Stormwater)

Gibbons Creek is affected by storm water runoff from agricultural, industrial, and urban areas. Under TPDES, the TCEQ has issued five permits to discharge treated wastewater to the Segment 1209I watershed (Figure 1). All five of these permits are held by the Texas Municipal Power Agency. Only one of the permitted discharges directly into the 1209I segment, the other four discharge into Gibbons Creek Reservoir (Segment 1209N).

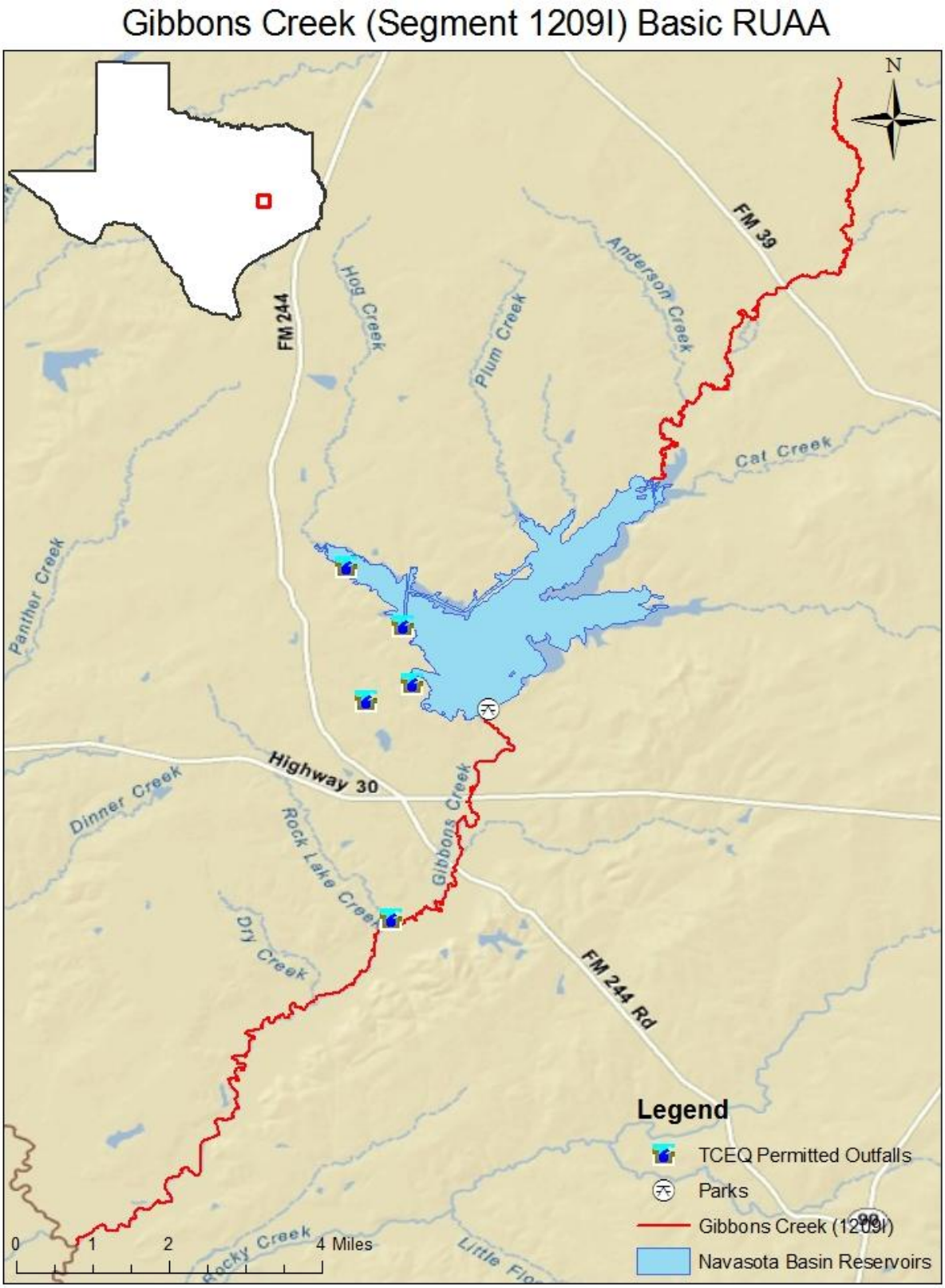

Figure 1. TCEQ permitted outfalls, and Public Parks adjacent to Gibbons Creek, Segment 1209I.

Potential Nonpoint Sources

Potential sources of nonpoint source pollution in the watershed include municipal point source discharges, on-site sewage facilities, and runoff from agricultural. For any urban collection and treatment system, sanitary sewer overflows and WWTF bypasses are possible sources of bacteria loadings to receiving waters. Gibbons Creek (Segment 1209I) watershed can be described as relatively rural. There are potentially a number of on-site sewage facilities (OSSFs or septic systems) in use in the watershed. OSSFs require routine repairs and maintenance to avoid failures causing potential leaks or overflows. Poorly maintained OSSFs are a potential source of bacteria loadings into Gibbons Creek.

Site Reconnaissance Summary

Perspective sites were chosen based on public access and documented uses from the stakeholder response to the request for information e-mail which is included in Appendix 1. Initial reconnaissance surveys were conducted on January 14 and 15, 2010. A total of nine perspective sites were visited (Table 1). Of these, five were chosen for field survey sites (Table 2). Site suggestions were submitted to TCEQ as part of the Quality Assurance Project Plan's (QAPP) Monitoring Plan, which was approved by TCEQ on May 27, 2010.

Table 1. Site reconnaissance for Basic RUAA on Gibbons Creek, Segment 1209I.

Recon Site	Description	Latitude	Longitude	Public Access	Water Access	Recommended Site
1	CR 126 at Gibbons Creek	30.73785	-96.00719	Private	N/A	No
2	FM 39 at Gibbons Creek	30.69207	-96.00501	Can park on any side of road	Fenced to bridge upstream, steep downstream	Yes
3	CR 176 at Gibbons Creek	N/A	N/A	Private	N/A	No
4	CR 164 at Gibbons Creek Reservoir	30.64843	-96.07610	Not accessible	N/A	No
5	Gibbons Creek Park at Gibbons Creek	30.61525	-96.05542	Fee to enter, ample parking	Lots of easy access east side of dam	Yes
6	SH 30 at Gibbons Creek	30.59468	-96.06464	Can pull off side of road	Unknown, flooded	Yes
7	FM 244 at Gibbons Creek	30.58159	-96.06810	Can park along any side of road upstream, right bank	Easy slopes	Yes
8	Unnamed Rd off SH 30 at Gibbons Creek	30.59428	-96.08965	Private	N/A	No
9	CR 190 at Gibbons Creek	30.52515	-96.11645	Can park along road	Fenced all sides to bridge	Yes

Table 2. Survey sites for the Basic RUAA Survey on Gibbons Creek, Segment 1209I (corresponding to Figure 2 and Table 1)

Recon Site	Field Survey Site	Description	Latitude	Longitude	Approx. River Mile
2	1	FM 39 at Gibbons Creek	30.69207	-96.00501	20.9
5	2	Gibbons Creek Park at Gibbons Creek (downstream of dam)	30.60877	-96.06537	12.6
6	3	SH 30 at Gibbons Creek (TCEQ site: 17904)	30.59468	-96.06464	11.1
7	4	FM 244 at Gibbons Creek (TCEQ site: 18800)	30.58159	-96.06810	9.8
9	5	CR 190 at Gibbons Creek (TCEQ site: 11756)	30.52515	-96.11645	2.5

Methodologies

RUAA Survey Site Selection and Descriptions

Gibbons Creek flows through mostly rural areas held by largely private property owners. The target density of survey sites should be approximately three (3) sites per every five (5) miles of stream (TCEQ, 2009). During our study, survey sites were established in areas where the water body is accessible to the public and has the highest potential for recreational use (road crossings, public lands/parks located near the water body, and populated areas). A total of five (5) survey sites were established (Table 2 & Figure 2). These sites were chosen based on public access potential and also providing sufficient spatial coverage throughout the segment. In portions where the recommended three (3) sites per every five (5) miles of stream was not possible, supplementary information was gathered through coordination with local authorities, conducting interviews, and using topographic maps and aerial photos.

Every effort was made to obtain supplementary recreational use information about the entire length of the segment, including areas other than the selected sites in this Basic RUAA. Topographic maps and aerial imagery were used to provide the needed geographic information about potential recreational opportunities, potential access points, and potential access obstacles along the Gibbons Creek. Review of these resources resulted in reconnaissance site selection. The subsequent reconnaissance site visits confirmed the limited public access along the Gibbons Creek. Fences, gates, and no trespassing signage are common public access limitations on the segment and resulted in less than three (3) sites for every five (5) miles of stream. Figure 3 shows representations of the variety of conditions seen along Gibbons Creek.

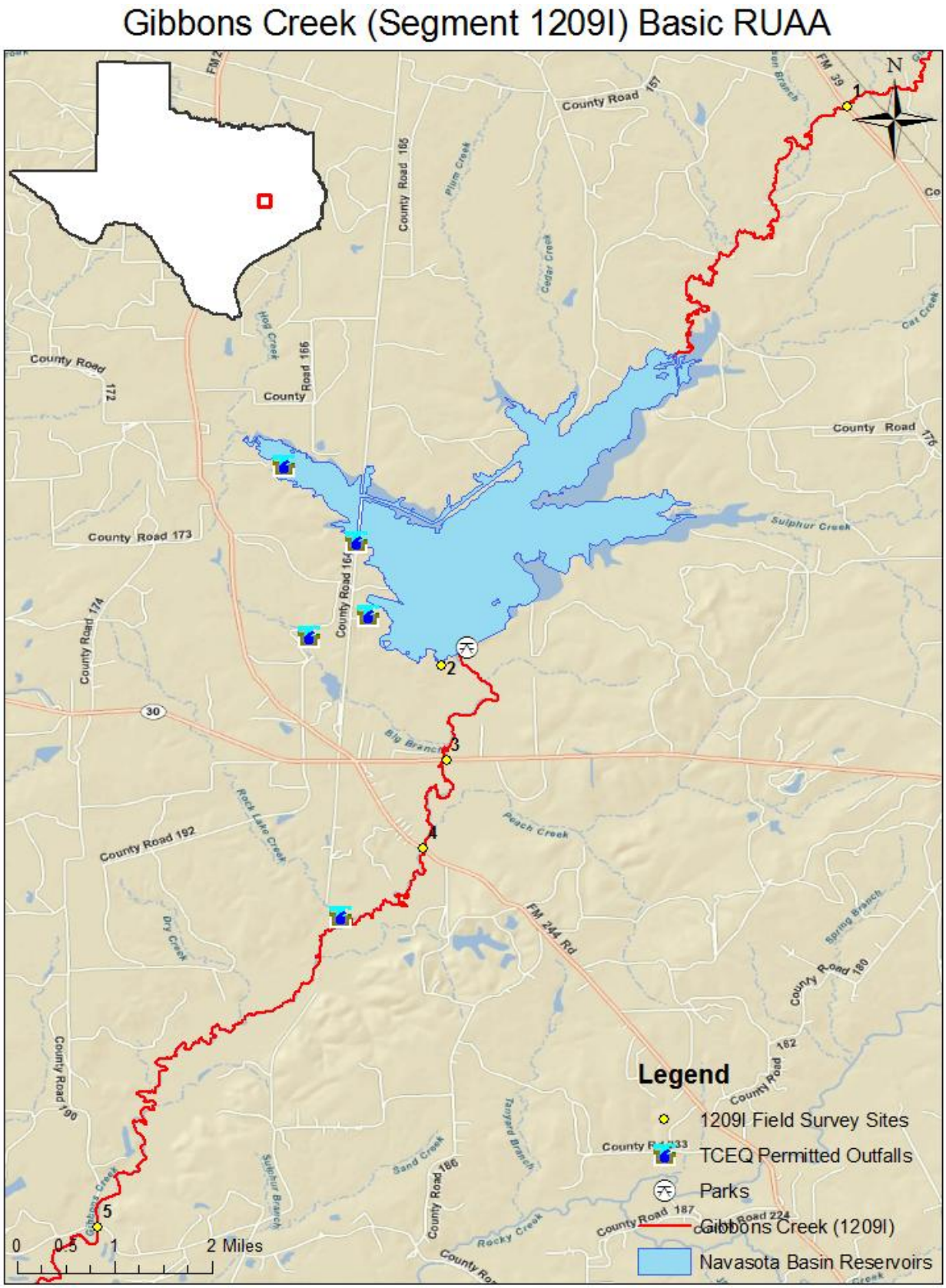

Figure 2. Basic RUAA survey sites on Gibbons Creek, Segment 1209I, selections based on river mile/assessment units, accessibility, and recreational features.

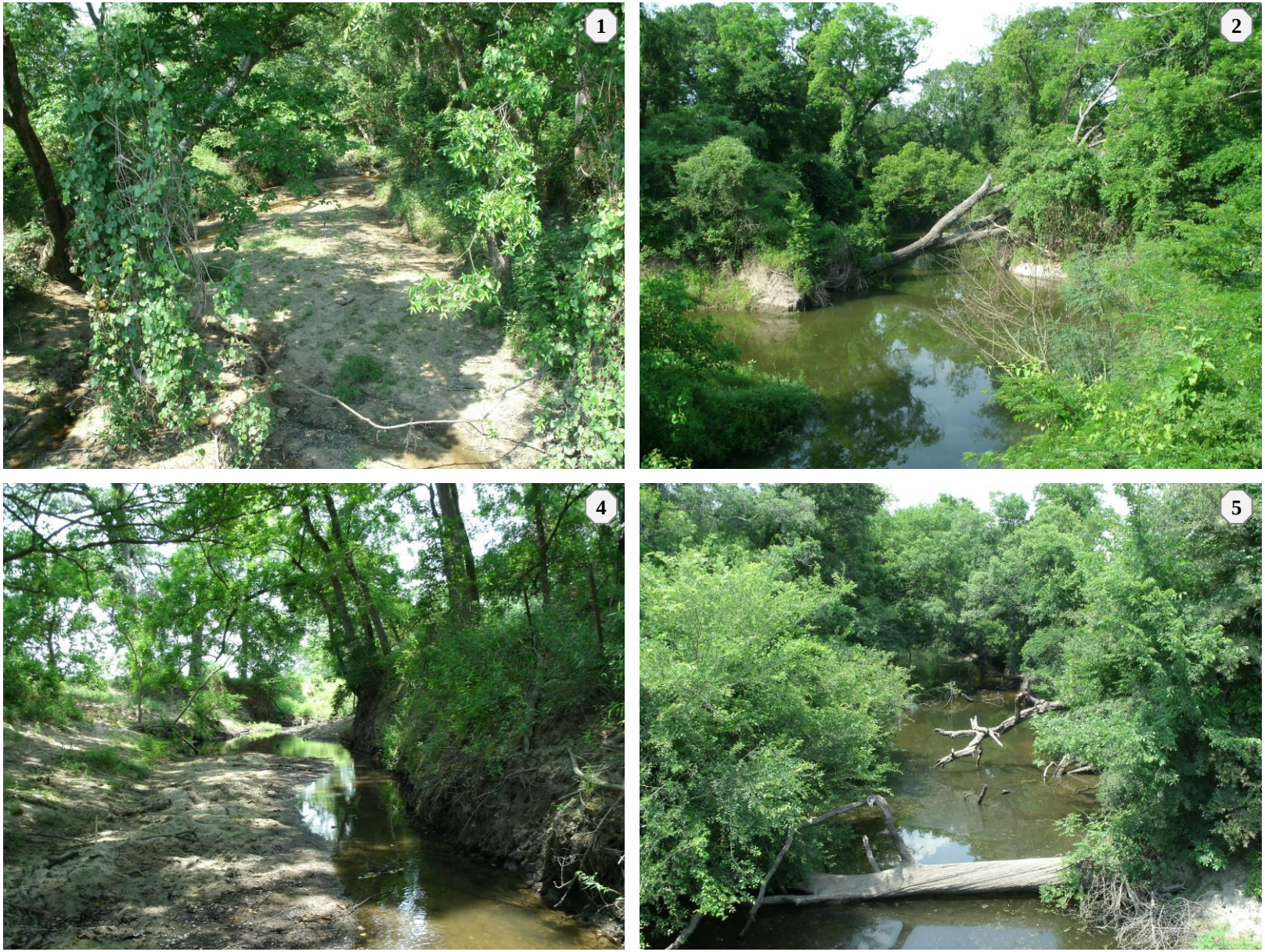

Figure 3. Photos taken at field survey sites 1, 2, 4, and 5 (as numbered) show the fluctuations in physical characteristics throughout Gibbons Creek, Segment 1209I

Sampling Methods

RUAAs are used to identify and assign attainable uses and criteria to individual water bodies. Applicable uses and associated criteria are defined in the Texas Surface Water Quality Standards (TSWQS). Until recently, Texas had two recreation use categories in the 2000 TSWQS: contact and noncontact recreation. These recreation use categories were expanded to include more categories: primary contact, and secondary contact recreation (1 & 2). Primary contact recreation consists of recreational activities involving a significant risk of ingestion of water including: wading by children, swimming, water skiing, diving, and surfing. Secondary contact recreation 1 is considered water recreation activities not involving a significant risk of water ingestion: including fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity. Secondary contact recreation 2 follows the same definition as secondary contact recreation 1 except that it occurs less frequently due to (1) physical characteristics of the water body and/or (2) limited public access.

According to TCEQ agency guidance, a Basic RUAA must be conducted on Gibbons Creek since it is an unclassified water body (Segment 1209I). RUAA Surveys were conducted during the normal warm season and periods when people would be most likely use the water body for contact recreational purposes. RUAA surveys were also conducted during optimal sampling conditions that are representative of the normal flow conditions of the stream and are not storm-influenced. RUAA field surveys for Gibbons Creek (Segment 1209I) were conducted Sunday, May 30, 2010. Weather conditions for this day and the prior 30 days can be found in Appendix 4. More specific procedures can be found in *TCEQ's RUAA Procedures Document, May 2009.*

Field Survey Descriptions

A Basic RUAA field survey begins with marking off a 300 meter (m) reach of the waterway, flagging every 30m. Sites with public accessibility limitations may not be fully assessed in this way. In instances such as these, a laser range finder was used to document the length of the stream reach that could be observed. A flow measurement (where possible) was then taken within the 300m stream reach. If the waterbody is wadeable, a depth measurement was taken every 30m and width measurements were taken at the widest, narrowest, and average width points within the 300m reach. Pictures are taken to document the survey at 30, 150, and 300m facing upstream, right bank, downstream, and left bank (Appendix 3). Air temperature, water temperature, and secchi depth were also recorded at an easily accessible location. Finally the Basic RUAA datasheets were completed to document any recreational uses, signs of recreational use, impeding conditions, or other field notes taken during the field survey. The depth measurements for the sites that were considered non-wadeable were taken from the bridge at the deepest point accessible.

Due to impediments affecting stream access, complete field survey methods were not possible at some locations on Gibbons Creek. Impediments to stream access, such as steep banks fences, log jams, and overgrown banks, at times limited the field survey team's ability to survey the complete 300m stretch of stream. In each case where this was a factor, the impediments were documented on the field data sheet and documenting pictures of these conditions were taken (Appendix 3). Specific impediments causing access constraints for each site can be found in Appendices 2 and 5.

Results

The field survey site visit was completed on each of the five sample sites on Sunday, May 30, 2010. All field data sheets are attached (Appendix 2).

Physical Evaluation and Flow

During the field surveys, the air and water temperatures fell within the range of acceptable temperatures for sampling described in the TCEQ procedures manual (Table 3). The average thalweg depth of Gibbons Creek was 0.58m and the average width is 14.8m. The average secchi tube reading taken at the field survey sites was 0.54m (Table 3). The average flow of Gibbons Creek based on measurements taken during field surveys was 0.40 cubic feet per second (cfs).

Gibbons Creek riparian zone can be generalized as forest and pasture (Table 4). The dominant substrate along the creek was generally composed of sand and mud/clay.

Table 3. Physical parameters from the basic recreational use attainability analysis field surveys conducted on Gibbons Creek, Segment 1209I * = no water access, ** = Too deep to take flow

Field Survey Site	Site Description	Air Temperature (°C)	Water Temperature (°C)	Average Depth (m)	Average Width (m)	Stream Flow (cfs)	Secchi Tube (m)
1	FM 39 at Gibbons Creek	30	24	0.15	6.70	*	*
2	Gibbons Creek Park at Gibbons Creek (downstream of dam)	32	30	>1.5	43.40	**	0.41
3	SH 30 at Gibbons Creek	35	27	0.93	5.25	0.36	0.28
4	FM 244 at Gibbons Creek	33	25	0.37	3.45	0.43	0.92
5	CR 190 at Gibbons Creek	32	25	0.88	15.24	*	*
	Total Average	**32.4**	**26.2**	**0.58**	**14.81**	**0.40**	**0.54**

Table 4. Physical Characteristics of Riparian Zone and Dominant substrate of the field survey sites sampled during the Basic Recreational Use Attainability Analysis on Gibbons Creek, Segment 1209I. Site 2 dominant primary substrate is unknown because the site was non-wadable.

Field Survey Site	Site Description	Left Bank Riparian Zone	Right Bank Riparian Zone	Dominant Primary Substrate
1	FM 39 at Gibbons Creek	Pasture	Pasture	Mud/Clay
2	Gibbons Creek Park at Gibbons Creek (downstream of dam)	Forest	Forest	Unknown
3	SH 30 at Gibbons Creek	Forest	Forest	Sand
4	FM 244 at Gibbons Creek	Forest/Pasture	Forest/Pasture	Sand
5	CR 190 at Gibbons Creek	Pasture	Pasture	Sand

Recreational Uses

Based on our field surveys, we personally observed secondary and non-contact recreation on Gibbons Creek (Segment 1209I). These uses occurred at site 2 (downstream side of the Gibbons Creek Reservoir dam) and were fishing, sitting, and standing. We observed evidence of water related activities (fishing) at field survey site 4 and foot path/prints at field survey sites 2 and 5 (Table 5, Figure 4, & Appendix 5). There were many noted impediments along Gibbons Creek that could limit the recreation including: culverts, private property, steep slopes, fences, debris in the water, and a low bridge (Table 5, Figure 4, & Appendix 5). It is important to note that directly upstream of field survey site 2, the Gibbons Creek Reservoir Park has a frequently used swimming beach, camping, boat launch, and pier open to the public. While noteworthy, these recreational uses are not listed in the Gibbons Creek Segment 1209I Basic RUAA report, because the reservoir is not included in TCEQ designated Segment 1209I. The Reservoir Park requires an entrance fee for users, and there is posted signage prohibiting swimming and tube fishing downstream of the dam within the park.

Table 5. Recreational uses observed and documented on Gibbons Creek, Segment 1209I for the Basic Recreational Use Attainability Analysis.

Field Survey Site	Site Description	Impediments	Observed	Evidence
1	FM 39 at Gibbons Creek	Culvert, Private property, Steep slopes, Fence		
2	Gibbons Creek Park at Gibbons Creek (downstream of dam)	Gibbons Creek Reservoir Dam, Private property	Fishing, Sitting, Standing	Fire pit/ring, Foot path/prints
3	SH 30 at Gibbons Creek	Private property, Fence, Debris in water		
4	FM 244 at Gibbons Creek	Culvert, Private property, Steep slopes, Fence, Debris in water		Fishing tackle
5	CR 190 at Gibbons Creek	Private property, Steep slopes, Fence, Debris in water, Low bridge		Foot path/prints

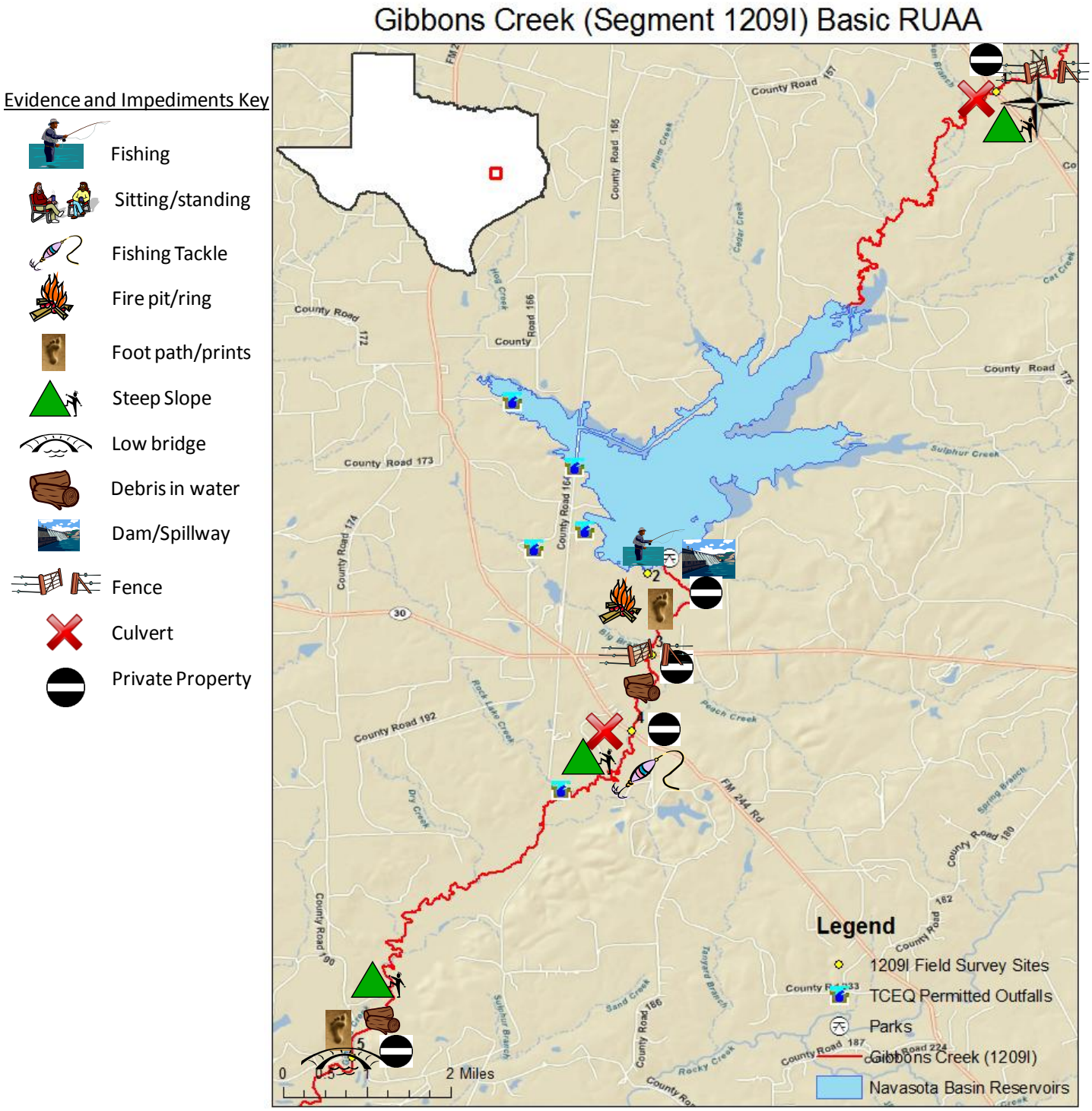

Figure 4. Basic RUAA survey sites on Gibbons Creek, Segment 1209I, with depictions of observed evidence of recreational uses, and impediments. No observations of recreational uses were documented during the field surveys. Locations are approximate. See Appendix 5: Google Earth Interactive Map for exact locations of uses, evidence, and impediments.

Summary

Five (5) field surveys were completed on Gibbons Creek (Segment 1209I) during this basic RUAA to evaluate whether the existing and/or attainable recreational uses of the creek might be different than the current presumed recreational use designation. Important data collected in this RUAA included general stream characteristics, observations and evidence of recreational use, surrounding conditions that promote recreation, and surrounding conditions that impede recreation, including channel obstructions. Also important is the photographic documentation supplementing and supporting all collected data.

While Gibbons Creek had several impediments to recreational use, such as private property, steep slopes, and fences, among others, the RUAA documented various recreation activities and evidence. During the field surveys, staff observed secondary contact recreation (fishing) and non-contact recreation (sitting, standing) on Gibbons Creek (1209I) at field survey site 2. Staff also documented evidence of both secondary and non-contact recreation (fishing, foot paths/prints, and fire pit). The average thalweg depth was 0.58m and the average width was 14.8m. The average flow of Gibbons Creek during the field survey was 0.4cfs. No primary contact recreation was documented during this Basic RUAA. There is one public recreation area in the form of a maintained park on the segment (field survey site 2). Basic RUAA analysis indicates that secondary contact (1 & 2) and non-contact recreation activities occur on Gibbons Creek (Segment 1209I).

Literature Cited

Handbook of Texas Online. 2010. Texas State Historical Association (TSHA) web resource: http://www/tshaonline.org.

Texas Commission on Environmental Quality (TCEQ). 2008. Texas 303(d) list (March 19, 2008). TCEQ, Austin, Texas.

Texas Commission on Environmental Quality (TCEQ). 2009. Recreational Use-Attainability Analyses (RUAAs) Procedures for a Comprehensive RUAA and a Basic RUAA Survey. TCEQ, Austin, Texas.

RUAA Summary Form

RUAA Summary

This form should be filled out after RUAA data collection is completed. Use the Contact Information Form, Field Data Sheets from all sites, Historical Information Review, and other relevant information to answer the following questions on the water body.

Name of water body: *Gibbons Creek*
Segment No. or Nearest Downstream Segment No.: *1209I*
Classified?: *No*
County: *Grimes*

1. Observations on Use
   a. Do primary contact recreation activities occur on the water body?
      ☐ frequently ☐ seldom ☐ not observed or reported ☐ unknown

   b. Do secondary contact recreation 1 activities occur on the water body?
      ☐ frequently ☐ seldom ☐ not observed or reported ☐ unknown

   c. Do secondary contact recreation 2 activities occur on the water body?
      ☐ frequently ☐ seldom ☐ not observed or reported ☐ unknown

   d. Do noncontact recreation activities occur on the water body?
      ☐ frequently ☐ seldom ☐ not observed or reported ☐ unknown

2. Physical Characteristics of Water Body
   a. What is the average thalweg depth? *0.58* meters

   b. Are there substantial pools deeper than 1 meter? ☐ yes ☐ no N/A

   c. What is the general level of public access?
      ☐ easy ☐ moderate ☐ very limited

3. Hydrological Conditions (Based on Palmer Drought Severity Index)
☐ Mild-Extreme Drought ☐ Incipient dry spell ☐ Near Normal ☐ Incipient wet spell ☐ Mild-Extreme Wet