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

Results Report

Contract No. 582-9-90440
EIH Technical Report #10-011

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 7, 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

List of Figures

List of Tables

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 Shepherd Creek, Segment 1209J. 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 Shepherd 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 13, 2010 and provided the basis site selection for discussion in this meeting.

2. Basic Recreational Use Attainability Analysis

The primary objective of the Shepherd Creek RUAA was to characterize the recreational use and potential impediments to use for this stream. The RUAA field surveys were conducted on the Saturday, May 29, 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 Shepherd 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

Shepherd Creek is a tributary to the Navasota River watershed, which is located within the Brazos River Basin. Segment 1209J is an unclassified segment by the TCEQ and is approximately 13.8 miles in length. Segment 1209J begins at the confluence the Navasota River Madison County and continues to a point 0.7 miles upstream of FM 1452 in Madison County (TCEQ, 2008). Shepherd Creek is a spring-fed perennial stream that is surrounded by gently sloping to nearly level terrain surfaced by loam and clay that support pecan-elm, water oak-elm, elm hackberry, and post oak-black hickory woods along its banks. (Handbook of Texas, 2010). Shepherd Creek (Segment 1209J) 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. Shepherd 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 Shepherd Creek is predominantly rural with agriculture being the primary land use.

Permitted Discharges (Municipal, Industrial, Stormwater)

Shepherd Creek is affected by storm water runoff from agricultural, industrial, and urban areas. Under TPDES, the TCEQ has issued no permits to discharge treated wastewater to the Segment 1209J watershed.

Potential Nonpoint Sources

Potential sources of nonpoint source pollution in the watershed include on-site sewage facilities, and runoff from agricultural land. For any urban collection and treatment system, sanitary sewer overflows are possible sources of bacteria loadings to receiving waters. Shepherd Creek (Segment 1209J) watershed can be described as relatively rural with no permitted waste water treatment facilities within the watershed. 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 Shepherd Creek.

Directly adjacent to Shepherd Creek there are agriculture grazing tracts. These tracts at times provide livestock with direct access to the creek. Potential direct access was witnessed at reconnaissance survey sites 1, 2 and 3. Direct contact with agriculture cattle grazing can increase fecal bacteria in waterways. Also notable, dead animal carcasses were found at the two middle sites on Shepherd Creek. It appears that these are common dumping sites for dead animals and other garbage.

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 seven perspective sites were visited (Table 1). Of these, only four sites were publicly accessible and 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 Shepherd Creek, Segment 1209J.

Recon Site	Site Description	Latitude	Longitude	Public Access	Water Access	Recommended Site
1	FM 1452 @ Shepherd Creek	30.97086	-96.12264	Can pull off side of road	Very easy slopes to water	Yes
2	CR 349 @ Shepherd Creek	30.94361	-96.13160	Can pull off on side of road upstream, right bank	Fenced all sides	Yes
3	Bundle Road @ Shepherd Creek	30.92534	-96.13874	Can pull off downstream, left bank	Barbed wire fence to bridge upstream, heavy vegetation downstream	Yes
4	No Name Road @ Shepherd Creek	N/A	N/A	Private	N/A	No
5	US 190 @ Shepherd Creek	30.89538	-96.15326	Can pull off on any side	Can reach from upstream right bank and downstream left bank	Yes
6	Homer Ln @ Shepherd Creek	N/A	N/A	Private driveway	N/A	No
7	Dirt Road @ Shepherd Creek	N/A	N/A	Private	N/A	No

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

Recon Site	Field Survey Site	Site Description	Latitude	Longitude	Approx. River Mile
1	1	FM 1452 @ Shepherd Creek	30.97086	-96.12264	14.6
2	2	CR 349 @ Shepherd Creek	30.94361	-96.13160	11.8
3	3	Bundle Road @ Shepherd Creek	30.92534	-96.13874	9.7
5	4	US190 @ Shepherd Creek (TCEQ site: 11790)	30.89538	-96.15326	5.9

Methodologies

RUAA Survey Site Selection and Descriptions

Shepherd 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 1). 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 Shepherd Creek. Review of these resources resulted in reconnaissance site selection. The subsequent reconnaissance site visits confirmed the limited public access along the Shepherd 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 2 is a photographic representation of the various conditions found along Shepherd Creek.

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. Recently these recreation use categories were expanded to include two more categories: Secondary Contact Recreation (1 & 2). 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 is considered aquatic recreational pursuits not involving a significant risk of water ingestion: including fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity.

According to TCEQ agency guidance, a Basic RUAA must be conducted on Shepherd Creek since it is an unclassified water body (Segment 1209J). 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 Shepherd Creek (Segment 1209J) were conducted Saturday, May 29, 2010. Weather summaries for this day and the previous 30 days can be found Appendix 4. More specific procedures can be found in *TCEQ's RUAA Procedures Document, May 2009.*

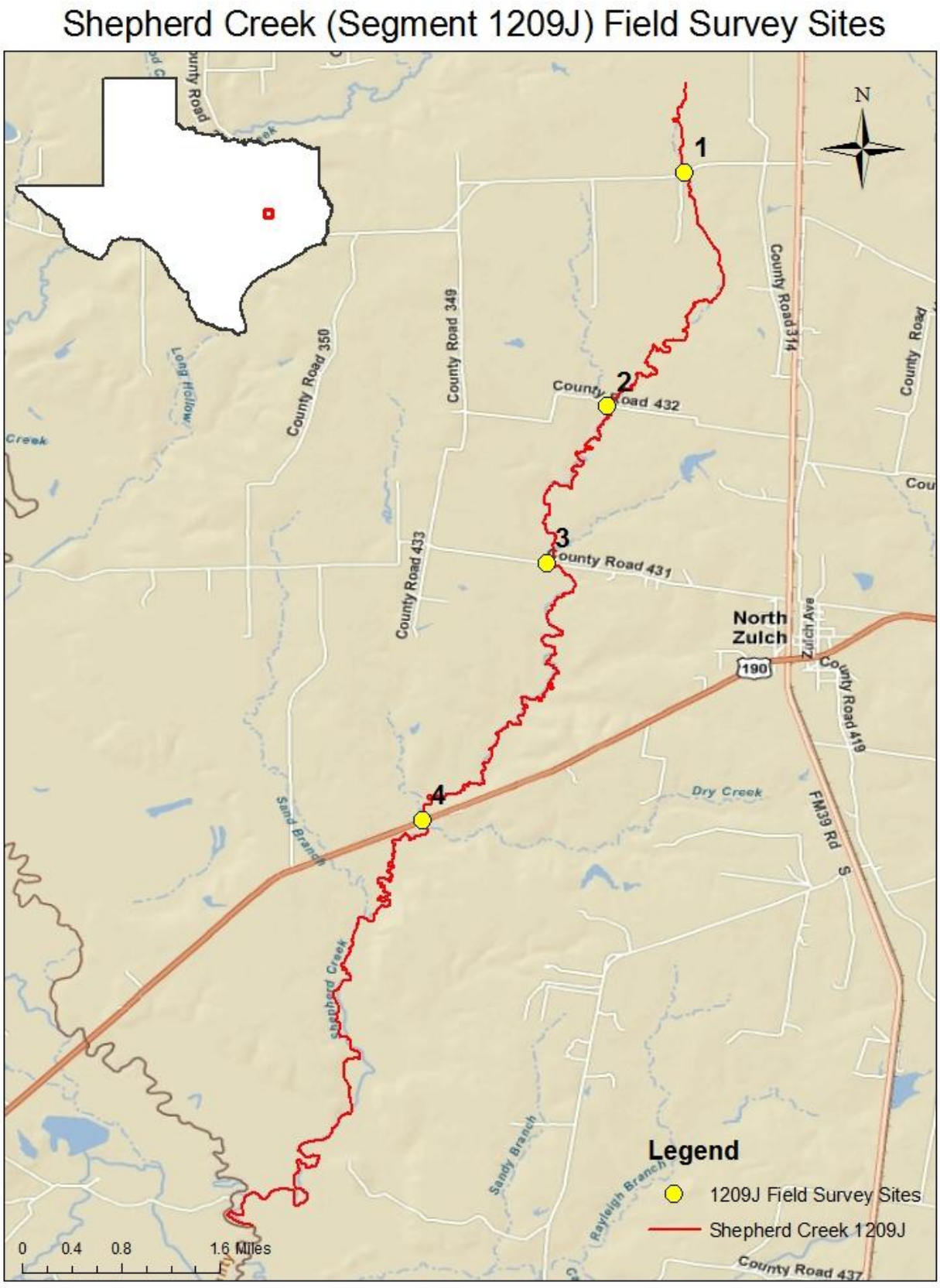

Figure 1. Basic RUAA survey sites on Shepherd Creek, Segment 1209J, selections based on river mile/assessment units, accessibility, and recreational features.

Figure 2. Pictures of field survey sites 1, 2, and 3 (as labeled) of Shepherd Creek, Segment 1209J, that depict the various physical characteristics and conditions observed along the creek

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 Shepherd 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 four sample sites on Saturday, May 29, 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 depth of Shepherd Creek was 0.42m and the average width is 4.12m. The secchi tube reading taken at the field survey site number 1 (the only site with accessible water) was 0.203m (Table 3). Flow was not taken at Shepherd Creek during the field surveys due to accessibility, however it was noted that at field survey sites 1 and 2 there was no flow (stagnant pools), and at field survey sites 3 and 4 there was barely a trickle.

Shepherd Creek riparian zone can be generalized as forest and pasture (Table 4). The dominant substrate along the creek was generally composed of a combination of rip rap, cobble, and gravel.

Recreational Uses

Based on the field surveys, there was no observed recreation on Shepherd Creek (Segment 1209J). Unfortunately, there was evidence of use in the form of trash dumping at field survey sites 2 and 3 (Table 5, Figure 3, & Appendix 5). There were many noted impediments along Shepherd Creek that could limit the recreation including: Culverts, private property, steep slopes, fences, debris in the water, and a log jam (Table 5, Figure 3, & Appendix 5). Shepherd Creek is highly impacted by trash dumping (including large appliances and dead animals), making the stream recreationally unusable. While no dumping signage was present at field survey sites 2 and 3, it appears that

enforcement is not sufficient to restrict the dumping activities. The dumping has restricted flow in the stream significantly, and until the stream is cleared and cleaned, the impediments to the stream greatly influence the attainable recreational use of the waterbody.

Table 3. Physical parameters from the basic recreational use attainability analysis field surveys conducted on Shepherd Creek, Segment 1209J. * = Due to amount of debris, stream width and/or depth was indiscernible.

Field Survey Site	Site Description	Air Temperature (°C)	Water Temperature (°C)	Average Depth (m)	Average Width (m)
1	FM 1452 @ Shepard Creek	33.0	30.0	0.12	1.02
2	CR 349 @ Shepherd Creek	29.0	25.0	0.10	*
3	Bundic Rd @ Shepherd Creek	34.0	26.0	*	*
4	US 190 @ Shepherd Creek	33.0	25.0	1.05	7.22
	Total Average	32.3	26.5	0.42	4.12

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

Field Survey Site	Site Description	Left Bank Riparian Zone	Right Bank Riparian Zone	Dominant Primary Substrate
1	FM 1452 @ Shepard Creek	Pasture	Pasture	Rip rap
2	CR 349 @ Shepherd Creek	Forest	Forest	Unknown
3	Bundic Rd @ Shepherd Creek	Forest/Pasture	Forest/Pasture	Cobble
4	US 190 @ Shepherd Creek	Forest	Forest	Gravel

Table 5. Evidence of recreational uses observed and documented impediments to recreation on Shepherd Creek, Segment 1209J, for the Basic Recreational Use Attainability Analysis. During the field surveys, no observed recreational use was documented.

Field Survey Site	Site Description	Impediments	Evidence
1	FM 1452 @ Shepard Creek	Fences, Private Property, Culvert	
2	CR 349 @ Shepherd Creek	Fence, Barbed Wire, Private Property, Large Trash Piles	Large Trash Piles
3	Bundic Rd @ Shepherd Creek	Fence, Private Property, Large Trash Piles, Log Jam, Steep Slopes, Barbed Wire	Large Trash Piles
4	US 190 @ Shepherd Creek	Fence, Private Property, Culvert, Steep Slopes, Debris in Water	

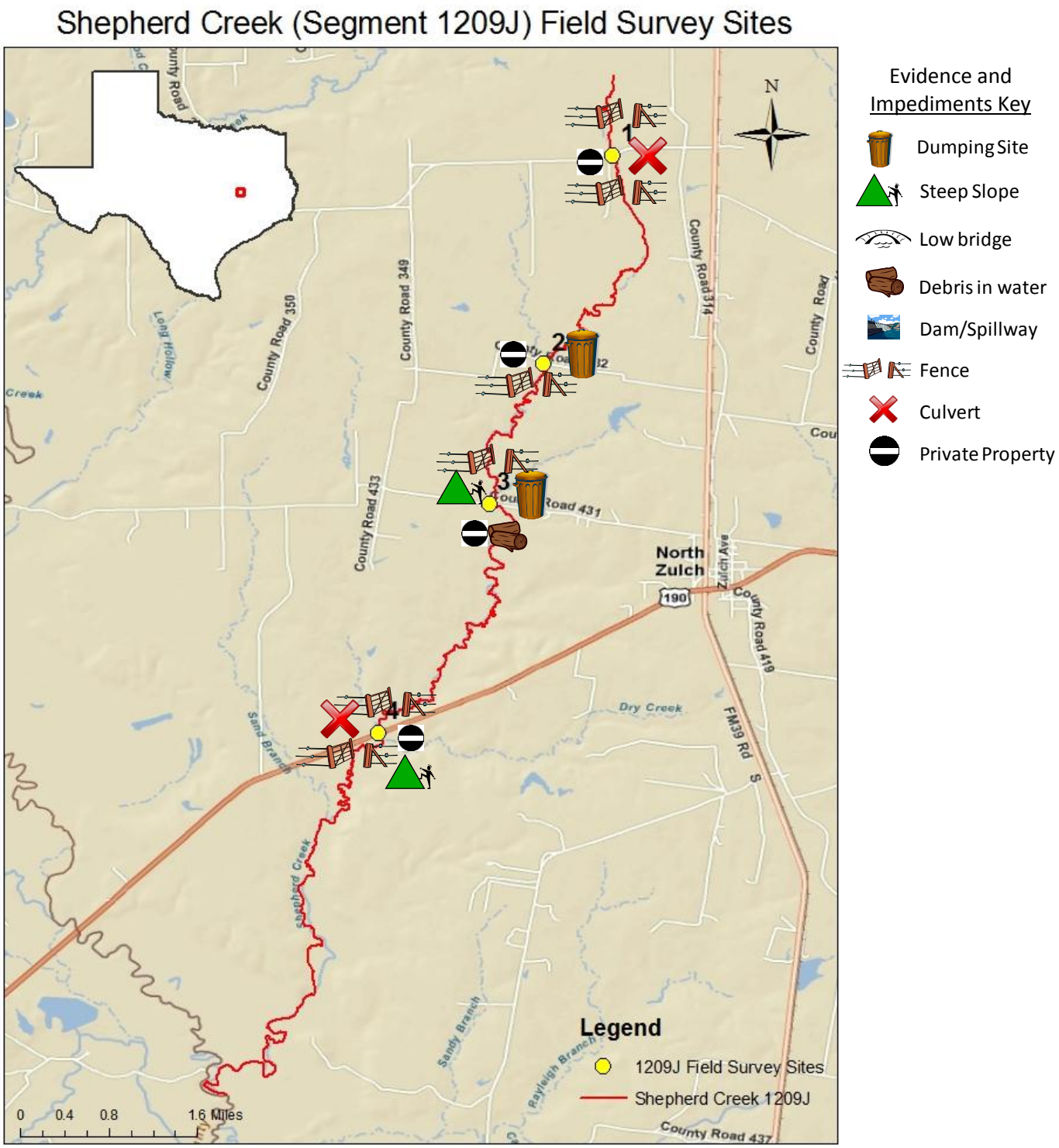

Figure 3. Basic RUAA survey sites on Shepherd Creek, Segment 1209J, with depictions of observed evidence of recreational uses, and impediments. No observations of recreational uses were documented during the field surveys. Locations are approximate. See Appendix 5: Google Earth Interactive Map for exact locations of evidence of use and impediments.

Summary

Four (4) field surveys were completed on Shepherd Creek (Segment 1209J) 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 uses. 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.

There were many noted impediments along Shepherd Creek that could limit the recreation including: Culverts, private property, steep slopes, fences, debris in the water, and a log jam (Table 5, Figure 3, & Appendix 5). Shepherd Creek is highly impacted by trash dumping (including large appliances and dead animals), making recreation on the stream unlikely. The dumping has restricted flow in the stream significantly, and until the stream is cleared and cleaned, the impediments to the stream greatly influence the attainable recreational use of the waterbody. Little to no trash was observed at field survey sites 1 and 4; however, recreational use is restricted by fences that cross the water both upstream and downstream of the bridge access points. During the field surveys, staff did not observe any recreational use of Shepherd Creek. Staff did observe evidence of human use (trash dumping) at two field survey sites. The average thalweg depth was 0.42m, and the average width was 4.12m. No flow measurements were able to be taken at any of the four field survey sites on Shepherd Creek. No public recreation areas in the form of maintained parks were found as part of this RUAA. Basic RUAA summary analysis indicates that non-contact recreation activities may occur on Shepherd Creek (Segment 1209J).

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: *Shepherd Creek*
Segment No. or Nearest Downstream Segment No.: *1209J*
Classified?: *No*
County: *Madison*

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? *0.42* 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