

Dallas-Fort Worth Metroplex Urban Creeks
Trinity River Bacteria TMDL Project
Recreational Use-Attainability Analysis Report

Report to TMDL Team
Texas Commission on Environmental Quality
Project and Work Order Number
582-5-70859-26

Jeff Stroebel
Tim Jones
Larry Hauck
Texas Institute for Applied Environmental Research
Tarleton State University
Stephenville, Texas

November 2010

Table of Contents

CHAPTER 1	Introduction	1-1
CHAPTER 2	Study Area Overview and Methodology	2-1
CHAPTER 3	Sycamore Creek (Segment 0806E)	3-1
CHAPTER 4	Cottonwood Branch (Segment 0822A)	4-1
CHAPTER 5	Grapevine Creek (Segment 0822B)	5-1
CHAPTER 6	Copart Branch Mountain Creek (Segment 0841E)	6-1
CHAPTER 7	Cottonwood Creek (Segment 0841F)	7-1
CHAPTER 8	Dalworth Creek (Segment 0841G)	8-1
CHAPTER 9	Delaware Creek (Segment 0841H)	9-1
CHAPTER 10	Estelle Creek (Segment 0841J)	10-1
CHAPTER 11	Fish Creek (Segment 0841J) & North Fork Fish Creek (Segment 0841Q)	11-1
CHAPTER 12	Kirby Creek (Segment 0841N)	12-1
CHAPTER 13	West Irving Creek (Segment 0841U)	13-1
CHAPTER 14	References	14-1

CHAPTER 1

INTRODUCTION

Problem Statement

The Texas Commission on Environmental Quality (TCEQ) has led an effort to assess the water quality of the following urban creeks in the Dallas-Ft. Worth Metroplex area of North Central Texas:

- Sycamore Creek (Segment 0806E),
- Cottonwood Branch (Segment 0822A),
- Grapevine Creek (Segment 0822B),
- Copart Branch Mountain Creek (Segment 0841E),
- Cottonwood Creek (Segment 0841F),
- Dalworth Creek (Segment 0841G),
- Delaware Creek (Segment 0841H),
- Estelle Creek (Segment 0841J),
- Fish Creek (Segment 0841K),
- Kirby Creek (Segment 0841N), and
- West Irving Creek (Segment 0841U).

Each of these streams was first placed on the State of Texas 303(d) list in 2006 (TCEQ, 2007) and has remained on subsequent biennial 303(d) listings up to and including the draft 2010 list (TCEQ, 2010a). The cause of impairment in each of these streams is concentrations of the indicator bacteria *Escherichia coli* (*E. coli*) that exceed the criteria used to evaluate attainment of the contact recreation use

Each of the 11 streams referred to above has a presumed contact recreation use based on the *Texas Surface Water Quality Standards* adopted on June 30, 2010 (TSWQS; TCEQ, 2010b). Questions have, however, been raised by stakeholders generally across the state and particularly in the watersheds of these streams as to the appropriateness of the current primary contact recreation use designation to nearly all Texas water bodies, including these 11 streams. The recently adopted TSWQS revisions include an expansion of the former contact recreation use into three categories: Primary Contact Recreation (PCR), Secondary Contact Recreation 1 (SCR1), and Secondary Contact Recreation 2 (SCR2).

The recent TSWQS also specifies a means to evaluate the uses of a water body through a process referred to as a use-attainability analysis (UAAs). UAAs are assessments of the physical, chemical, biological, and economic factors affecting attainment of water body use (40 Code of Federal Regulations § 131.10(g)), which are conducted to identify and assign attainable uses and criteria to individual water bodies. Recreational use-attainability analysis (RUAA) is a specific type of UAA focused on determining the appropriate recreational use of a water body.

The 303(d) listing of each of these 11 streams for bacteria concentrations exceeding that criteria used to evaluate attainment of primary contact recreation use and the recent TSWQS that provide additional categories of recreational use support conducting RUAs on each of these 11 streams.

Objectives

Comprehensive RUAA surveys were performed on the 11 study streams following the Texas Commission on Environmental Quality (TCEQ) May 2009 *Procedures for a Comprehensive RUAA and a Basic RUAA Survey* (TCEQ, 2009). The 11 study streams included: 1) Sycamore Creek, 2) Cottonwood Branch, 3) Grapevine Creek, 4) Copart Branch Mountain Creek, 5) Cottonwood Creek, 6) Dalworth Creek, 7) Delaware Creek, 8) Estelle Creek, 9) Fish Creek, 10) Kirby Creek, and 11) West Irving Creek. All surveys were performed by Texas Institute for Applied Environmental Research (TIAER) staff located on the Tarleton State University Stephenville, Texas campus.

The objectives of the Comprehensive surveys and ancillary public information activities were to:

- Have approved a special study quality assurance plan (SS QAP) providing quality assurance and quality control (QA/QC) for the surveys
- Perform a reconnaissance trip and determine appropriate sites on each study stream for performing the RUAA surveys
- Perform three RUAA surveys on each of the study streams under appropriate hydrological and meteorological conditions
- Develop a report for TCEQ of the findings of the RUAA surveys
- Perform public information meetings

In total these objectives are designed to provide TCEQ the information to allow their evaluation of the recreational use category for each stream.

Summary Status of Objectives

The project SS QAP was approved by TCEQ on July 14, 2009. The SS QAP in conjunction with the TCEQ TMDL Program QAPP provide the guidance for conducting RUAA surveys to ensure all information are collected under appropriate procedures and with all necessary quality assurance and quality control. Included within the SS QAP was a monitoring plan detailing specific locations where RUAA surveys would be conducted on each of the 11 streams. Initial site locations were determined from information obtained on a reconnaissance trip of each stream performed on April 22 and 23, 2009. The initial stream sites were presented at a June 11, 2009 informational meeting of relevant cities, regional agencies, and state agencies, and feedback from attendees during the meeting and immediately following the meeting culminated in a final set of survey sites for each stream.

At the June 11, 2009 meeting TCEQ and TIAER presented the concept of Comprehensive RUAs, the then proposed TSWQS revisions regarding three categories of recreation use (PCR, SCR1, and SCR2), and the previously mentioned discussions on site selection. Entities represented at this meeting included:

Texas Commission on Environmental Quality, Region 4 Office
Texas Parks and Wildlife Department
Texas State Soil and Water Conservation Board
Texas AgriLife Research
Tarrant Regional Water District
Trinity River Authority
Dallas Ft. Worth International Airport
City of Coppell
City of Dallas
City of Ft. Worth
City of Grand Prairies
City of Irving
City of Arlington staff could not attend but were updated through a subsequent telephone conversation

Three RUAA surveys were performed for the sites along each stream. The information and data collected during each survey are discussed in the next chapter on methodologies. Each survey began during the work week but also included visitation of sites during the weekend to maximize opportunity to observe recreational activities in and around each site. Interviews of the public in the vicinity of each site were also part of the surveys. Weather conditions for each survey were selected to occur during warm weather (air temperatures > 70°F) and under streamflow conditions conducive to safe recreation use if such use does occur. For these survey conditions appropriate streamflow conditions were defined as those not strongly influenced by rainfall induced stormwater runoff for several days prior to the surveys, meaning that sustained or typical dry, warm-weather streamflow was occurring.

Initial scheduling of the first survey was for late July 2009, as soon as logistically feasible after the July 16th approval of the SS QAP, to be followed by a second survey in late August 2009, and a third in early summer of 2010. However, the weather did not cooperate as the Dallas Ft. Worth area experienced some welcomed rainfall events in late July, which necessitated postponement of the first survey such that two 2009 surveys were conducted in August 2009. The three RUAA surveys were conducted on the following dates:

Tuesday, August 4, 2009 through Saturday, August 8, 2009
Tuesday, August 25, 2009 through Saturday, August 29, 2009
Thursday, May 27, 2010 – Monday, May 31, 2010 (Memorial Day weekend)

An information public meeting was conducted on April 9, 2010 to provide interested parties an update on the progress of the Comprehensive RUAA and the initial findings from the first two surveys conducted in 2009. A second informational meeting on April 22, 2010 focused on only two of the streams (Cottonwood Branch and Grapevine Creek) and included presentations and discussions not only on the RUAA, but also progress on developing bacteria total maximum daily loads (TMDLs) for these two streams. The two meetings included attendees representing the following:

Texas Commission on Environmental Quality, Region 4 Office
Texas Parks and Wildlife Department
Dallas Ft. Worth International Airport
City of Coppell
City of Dallas
City of Ft. Worth
City of Grand Prairies
City of Irving
North Central Texas Council of Governments
U.S. Geological Survey
and a representative of the general public

Also as part of the public interaction process, agencies and cities were asked if a recreational use-attainability analysis was appropriate for the 11 streams included in this study. The following responses were obtained, where a response of “Yes” indicates that it was appropriate to conduct these studies and “No” would be a contrary response that the studies should not be conducted:

Texas State Soil & Water Conservation Board, Mr. Aaron Wendt, response of *Yes* on June 9, 2009
Texas Commission on Environmental Quality, Mr. John Mummert, response of *Yes* on June 11, 2009
Texas Parks & Wildlife Department, Ms. Jennifer Bronson, response of *Yes* on September 1, 2009
Trinity River Authority, Ms. Angela Kilpatrick, response of *Yes* on August 18, 2010.
Tarrant Regional Water District, Mr. Mark Ernst, response of *Neutral* on July 22, 2010
North Central Texas Council of Government, Mr. Sam Brush, response of *Neutral* on August 18, 2010.
City of Irving, Mr. Bob Ressler, response of *Yes* on June 16, 2009
City of Fort Worth, Ms. Casey Nettles, response of *Yes* on June 18, 2009
City of Grand Prairies, Ms. Echo Rexroad, response of *Yes* on June 25, 2009
City of Irving, Ms. Karen Sidall, response of *Yes* on July 13, 2010 (TIAER interacted with the City of Irving repeatedly in the summer of 2009 in deciding upon site locations and getting interview information but neglected to formally ask this question until July 2010.)

Presentation of the information and data collected in performing the Comprehensive RUAA constitute the remainder of this report.

CHAPTER 2

STUDY AREA OVERVIEW AND METHODOLOGY

Overview of Study Area

The 11 streams that are the focus of the RUAA surveys lie within the Dallas-Ft. Worth Metroplex area and also within Dallas and Tarrant Counties (Figure 2-1.) Each of the study streams has a presumed primary contact recreation use under the recently adopted Texas Surface Water Quality Standards (TCEQ, 2010b). A brief description of each study stream follows immediately below with more detailed information provided within the individual report chapters for each stream. The description provided for each stream is the segment description provided in the 2008 303(d) List (TCEQ, 2008b), which was the working stream description at the time the RUAA surveys were planned.

Sycamore Creek (0806E)

Segment 0806E is a five-mile stretch of the creek running generally south to north from the confluence with the Echo Lake tributary near S. Riverside Drive to the confluence with the West Fork Trinity River (0806) in Fort Worth, Texas. Located in southeast Fort Worth, the watershed surrounding Sycamore Creek is residential, interspersed with commercial areas and some light industry. TCEQ information indicates that streamflow is perennial and the presumed aquatic life use is high (TCEQ, 2010c).

Cottonwood Branch (0822A)

Segment 0822A is a six mile unclassified stream running upstream from its confluence with Hackberry Creek to Valley View Road in Irving, Texas, Dallas County. Cottonwood Branch flows generally west to east from near State Highway (SH) 161 on the east side of Dallas/Fort Worth International Airport (DFW International Airport), through Irving, Texas, and to a confluence with Hackberry Creek near Dallas, Texas just west of the Elm Fork Trinity River. TCEQ lists flow type for this stream as intermittent with pools and based on this flow regime assigned a presumed aquatic life use of limited (TCEQ, 2010c).

Grapevine Creek (0822B)

Segment 0822B is small tributary of the Elm Fork Trinity River (0822) below Lake Lewisville. Grapevine Creek originates in Tarrant County on the north end of DFW International Airport and flows generally northeast through Grapevine, Texas and forms the boundary between Coppell and Irving, Texas prior to entering the Elm Fork Trinity River near Carrollton, Texas north of Dallas. TCEQ lists flow type for this stream as intermittent and based on this flow regime assigned a presumed aquatic life use of minimal (TCEQ, 2010c).

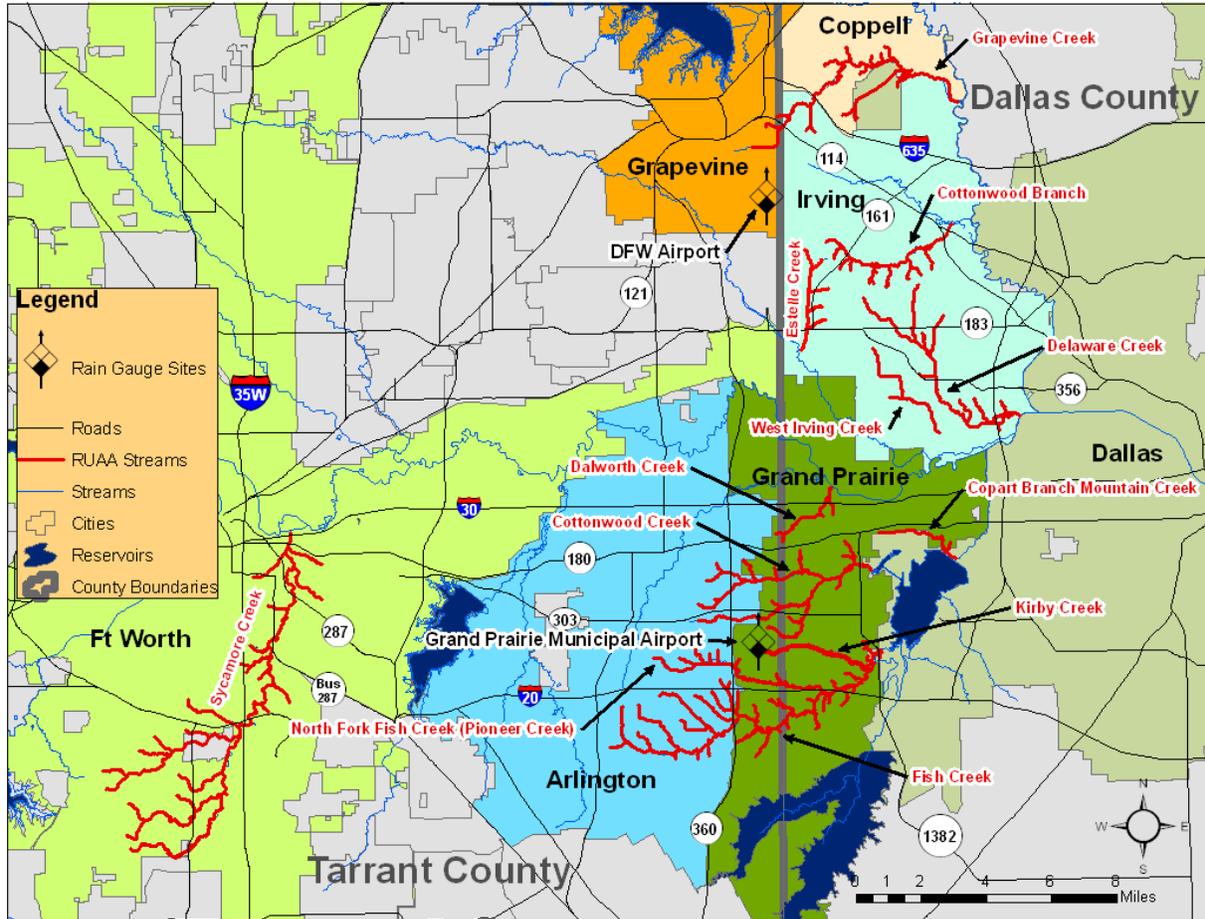


Figure 2-1 Map of Dallas/Fort Worth Metroplex showing location of urban creeks.

Copart Branch Mountain Creek (0841E)

Segment 0841E is 2.8 mile stretch of the creek running upstream from confluence with Mountain Creek to approximately 0.3 miles upstream of Camden Road on Dallas Naval Academy, Dallas County. The watershed surrounding Copart Branch is densely commercial with a large portion of the businesses being auto salvage. TCEQ lists flow type for this stream as intermittent with pools and based on this flow regime assigned a presumed aquatic life use of limited (TCEQ, 2010c).

Cottonwood Creek (0841F)

Segment 0841F is 6.5 mile stretch of the creek running upstream from approx. 0.1 mi. upstream of Mountain Creek Reservoir in Dallas County, to SH 360 in, Tarrant County. TCEQ lists the flow type for Cottonwood as perennial and based on this flow regime assigned a presumed aquatic life use of high (TCEQ, 2008).

Dalworth Creek (0841G)

Segment 0841G is 2.2-mile unclassified segment running upstream from the confluence with Lower West Fork Trinity River (0841) to County Line Road (currently identified on maps as NW19th Street) in Grand Prairie, Texas. TCEQ lists this water body as perennial for flow type and based on this flow type has assigned a presumed aquatic life use of high (TCEQ, 2010c).

Delaware Creek (0841H)

Segment 0841H is an 8.5-mile unclassified segment running upstream from its confluence with Lower West Fork Trinity River (0822) to Finley Road in Irving, Texas. TCEQ lists the flow type for Delaware Creek as intermittent with pools and based on this flow type has assigned a presumed aquatic life use of limited (TCEQ, 2010c).

Estelle Creek (0841J)

Segment 0841J is a 4-mile reach running upstream from its confluence with Bear Creek (0841B) to Valley View Lane in Irving, Texas. This unclassified creek is little more than a concrete drainage way, except for a pooled area near West Pioneer Dr. The flow type for this creek is listed by TCEQ as intermittent and based on this flow type the assigned aquatic life use is minimal (TCEQ, 2010c).

Fish Creek (0841K)

Fish Creek is a 10.5-mile stretch of the creek running upstream from approximately 100-m downstream of FM 382 in Grand Prairie, Texas, to approximately 0.25 miles upstream of Collins Road in Arlington, Texas. The flow type listed by TCEQ for Fish Creek is perennial and based on this flow type the presumed aquatic life use is high (TCEQ, 2010c).

Kirby Creek (0841N)

Segment 0841N is a 4-mile unclassified segment running upstream from confluence with Fish Creek in Grand Prairie, Texas, to just upstream of Great Southwest Parkway in Arlington, Texas. Flow type for this creek is listed as perennial and the presumed aquatic life use based on flow type is high (TCEQ, 2010c).

West Irving Creek (0841U)

Segment 0841U is a 4-mile reach running upstream from approximately 0.4 miles downstream of Oakdale Road to just south of Sowers Road entirely within the City of Irving, Texas. Flow type for West Irving Creek is listed as intermittent and the presumed aquatic life use is minimal based on the flow type (TCEQ, 2010c).

Historical Information

A review of historical information was performed regarding recreational water uses for each of the 11 RUAA streams. The review considered the time period of November 28, 1975 to the present. In accordance with 40 CFR Part 131 (EPA standards regulation). Government offices, libraries, historical societies, newspapers, and universities were searched and contacted in addition to generic internet searches. The following is a summary of the review and searches.

The Handbook of Texas Online

<http://www.tshaonline.org>

Searched the handbook by stream name and by community. Nothing significant was found.

Trinity River Vision

<http://www.trinityrivervision.org>

No information found specifically for these urban creeks

Government sources:

City of Grand Prairie including City of Grand Prairie Parks Department and Keep GP Beautiful and Adopt a Stream.

No additional information was found beyond the information that was provided through interviews for this RUAA and which are reported elsewhere in this report.

City of Arlington Parks Department

parksdepartment@arlingtontx.gov

No additional information was found specifically for these urban creeks.

City of Irving Drainage Program Coordinator (Karen Siddall) [../TRB-WO%2325-FY10/RUAA_Tasks/Final_Report_TCEQ/Draft_Report_TCEQ_Aug10/Timsedit/parksdepartment@arlingtontx.gov](mailto:..../TRB-WO%2325-FY10/RUAA_Tasks/Final_Report_TCEQ/Draft_Report_TCEQ_Aug10/Timsedit/parksdepartment@arlingtontx.gov)

Ms. Siddall provided a report on an erosion control study dated March 1992 that covered all of the parks and recreational areas in Irving. The report had only one mention of recreation and that was Frisbee golfers in Fritz Park retrieving their discs from Delaware Creek.

Ms. Siddall also sent a copy of a photo in the Irving Rambler (Vol. 6, Issue 26, June 20, 2009) showing kids on bikes in the middle of Delaware Creek in Centennial Park.

Ms. Siddall mentioned at the June 11, 2009 RUAA planning meeting infrequent high water rescues of youths who get in some of the city's urban creeks during and immediately after rainfall runoff events. Specific creek names were not provided.

Historical Society Sources:

Arlington Historical Society

<http://www.arlingtontxhistoricalsociety.org/index.html>

fielderh@swbell.net

No information on the urban creeks provided from this source.

Dallas Historical Society

<http://www.dallashistory.org/index.html>

Referred to the GB Dealey Library (see library sources below).

The Portal to Texas History

<http://texashistory.unt.edu/>

Searched resources from 1970 – 2009 using creek names as search terms. Nothing pertinent was found through this search.

Library Sources:

G. B. Dealey Library (in the West Texas room of the Hall of State)

<http://www.dallashistory.org/about/research.htm>

Hall of State: Grand Avenue

Dallas, TX 75210

Susan Richards, Researcher

Ms. Richards reported that she found nothing specifically for these urban creeks

Irving Library

http://catalog.cityofirving.org/rooms/portal/page/Sirsi_HOME

Senior Archivalist: Jan Hart

Ms. Hart indicated that she searched but could find nothing on these urban creeks.

Grand Prairie Library

<http://www.gptx.org/index.aspx?page=293>

Phone: 972- 237-5700

TIAER staff made a phone call to the library and was told the only thing they could offer was some floodplain documents which were unlikely to provide us the information we were seeking.

Coppell Library

library@coppelltx.gov

Ms. Tracy Williams of the Coppell Library indicated that she searched everything they had, including newspaper articles, and found nothing on Grapevine Creek. She said she had some floodplain maps and an environmental impact statement, but after some discussion about the documents it was agreed that these documents did not include useful information for the purposes of this study.

Academia:

TIAER staff searched colleges and universities online for professors and/or programs that might provide leads or information but this search availed nothing worth a follow-up.

The search for historical information on recreational uses in these 11 urban creeks at the resources mentioned above resulted in only very limited findings. At most resources, nothing was found specific to these streams. A conversation with Ms. Siddall of the City of Irving resulted in some information regarding recreational uses near and in stream within the City of Irving.

Climatic Conditions

North Central Texas, the regional area containing the 11 creeks for this study, has a subtropical climate characterized by hot summers and mild winters, resulting in a wide annual temperature range (NWS, 2009a). Fair skies generally accompany the highest temperatures of summer, which are often above 100° F; however, the low temperature rarely exceeds 80° F at night (NWS, 2009a). Winters are mild, but northern cold fronts occur about three times each month, and often are accompanied by sudden drops in temperature. Periods of extreme cold that occasionally occur are short lived, so that even in January mild weather occurs frequently (NWS, 2009a). The

frost-free period generally lasts for about 249 days, with the last frost occurring in mid March and the first frost occurring in mid to late November (NWS, 2009a). Annual average precipitation is approximately 35.5 inches (902 mm) based on recorded measurements at DFW International Airport from 1994 through 2008 (NWS, 2009b).

Antecedent rainfall data associated with the three RUAA surveys were obtained for locations at the DFW International Airport and Grand Prairie Airport (Table 2-1 and Table 2-2, respectively). The locations of these two airports are depicted by the rain gauge symbols on Figure 2-1. Note that the dates of the three surveys are shown on each table by gray shading. The late July 2009 rainfall dates and associated amounts that resulted in postponement of the first scheduled survey until early August are clear from the data in both tables.

METHODOLOGIES

The following text provides details of the data collection activities designed to obtain the necessary field-related information for a RUAA. A Comprehensive RUAA was conducted for the Trinity River Basin unclassified segments 0806E, 0822A, 0822B, 0841E, 0841F, 0841G, 0841H, 0841J, 0841K, 0841N, and 0841U. The major components of a Comprehensive RUAA are summarized as the following:

- Site reconnaissance (completed May 2009)

- Site selection (completed June 2009)

- Field surveys (2009 - August 4 – 7 and August 25 – 29, 2009; 2010 – May 27 – 31, 2010)

The first two components, site reconnaissance and site selection, did not constitute formal data collection activities requiring a SS QAP. These two components, however, were critical to the success of data collection activities under the last bullet; the field survey, which did include various field activities (e.g., streamflow measurement) covered by an approved SS QAP.

Site Reconnaissance and Site Selection

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. The site selection process took into account locations where the identified segments were accessible to the public and had the highest potential for recreational use. The site selection process considered parks and bridge crossings along the various streams included in this study.

The number of sites selected attempted to adhere to the guidelines in the May, 2009 draft procedures for performing a RUAA (TCEQ, 2009) wherein it states “In general, choose three (3) sites per every five (5) miles of stream.” Because each segment of this study varied in length, TIAER tried to identify an appropriate number of sites on each stream based on the 3/5 criterion.

The following information was compiled using Geographic Information System (GIS) based tools prior to, during, and immediately following the site reconnaissance:

- locate areas in which each segment was accessible to the public and had the highest potential for recreational use;

Table 2-1 Rainfall records for DFW International Airport for July and August 2009 and April and May 2010. (Dates of surveys are highlighted in gray shades)

July 2009		August 2009		April 2010		May 2010	
Date	Rainfall (in)	Date	Rainfall (in)	Date	Rainfall (in)	Date	Rainfall (in)
1	0	1	0.63	1	0	1	T
2	0	2	0	2	0.09	2	0
3	0	3	0	3	0	3	0.16
4	0	4	0	4	T	4	0
5	0.07	5	0.02	5	0	5	0
6	T	6	T	6	0	6	0
7	0	7	0	7	T	7	0
8	0	8	0	8	0	8	0
9	0.12	9	0	9	0	9	0.08
10	0	10	0	10	0	10	0
11	0	11	0	11	0	11	0
12	0	12	0	12	0	12	0
13	0	13	0	13	0	13	0
14	0	14	T	14	0	14	0.6
15	0	15	0	15	T	15	T
16	0	16	0	16	0.02	16	0
17	T	17	0	17	1.26	17	0.02
18	0	18	0	18	0.27	18	0
19	0.01	19	0	19	T	19	0
20	0.01	20	0	20	0	20	T
21	0.09	21	0.99	21	0	21	0
22	0	22	0	22	T	22	0
23	T	23	0	23	0.08	23	0
24	0	24	0	24	0.31	24	0
25	0	25	0	25	0	25	0
26	T	26	0	26	0	26	0
27	0.63	27	T	27	0	27	T
28	T	28	0	28	0	28	0
29	T	29	0	29	0	29	0
30	1.01	30	0	30	T	30	0.23
31	0.15	31	0			31	0

locate wastewater treatment plant outfall locations and potential point sources;

characterize the watershed, including land use;

determine hydrologic characteristics, such as stream type, streamflow, hydrologic alterations, etc.; and

locate proposed sites for data collection

Field Survey Data Collection Activities

The procedures for a Comprehensive RUAA (TCEQ, 2009) specify two different field surveys occur on different weekends or the summer holiday during the warm season (air temperature greater than or equal to 70°) and when human recreational activities were most likely to occur

Table 2-2 Rainfall records for Grand Prairie Airport for July and August 2009 and April and May 2010. (Dates of surveys are highlighted in gray shades)

July 2009		August 2009		April 2010		May 2010	
Date	Rainfall (in)	Date	Rainfall (in)	Date	Rainfall (in)	Date	Rainfall (in)
1	0	1	0	1	0	1	0.04
2	0	2	0	2	0	2	0
3	0	3	0	3	0	3	0
4	0	4	0	4	0	4	0
5	0	5	0	5	0	5	0
6	0.07	6	0	6	0	6	0
7	0	7	0	7	0	7	0
8	0	8	0	8	0	8	0
9	0	9	0	9	0	9	0.13
10	0	10	0	10	0	10	0
11	0	11	0	11	0	11	0
12	0	12	0	12	0	12	0
13	0	13	0	13	0	13	0
14	0	14	0	14	0	14	0.02
15	0	15	0	15	0.02	15	0
16	0	16	0	16	0	16	0
17	0.36	17	0	17	0.45	17	0
18	0	18	0	18	0.16	18	0
19	0	19	0	19	0	19	0
20	0	20	0	20	0	20	0
21	0	21	0	21	0	21	0
22	0	22	0	22	0	22	0
23	0	23	0	23	0.01	23	0
24	0	24	0	24	0.19	24	0
25	0	25	0	25	0	25	0
26	0.35	26	0	26	0	26	0
27	0.85	27	0.02	27	0	27	0
28	0	28	0	28	0	28	0
29	0	29	0	29	0	29	0
30	0.51	30	0	30	0	30	0
31	0.43	31	0			31	0

(March - October). Further, field surveys were conducted when stream flow conditions were normal, avoiding unusual antecedent conditions of extreme drought and wet weather. For this study the decision was made by TCEQ to go beyond the minimum of two different field surveys and to conduct a third survey.

The data collection activities for each of the three field surveys included the following activities at each selected site:

- instantaneous streamflow
- average depth at thalweg and substantial pool depths
- observational/anecdotal data required by the recreational UAA
- air and water temperature measurements
- photographic record

Instantaneous Streamflow Measurements

An instantaneous water velocity measurement was made at each site using the most applicable current meter. The collection of velocity measurements under wadeable stream conditions was performed using either a SonTek Flow Tracker Acoustic Doppler Velocimeter or a Teledyne RDI StreamPro™ Acoustic Doppler Current Profiler (ADCP). Velocity measurements followed protocols outlined in the TCEQ Surface Water Quality Monitoring Procedures Manual, Volume 1 (2008a). TIAER personnel used the stream flow measurement form developed by TIAER, which follows guidance and contains the information in TCEQ manuals (TCEQ, 2008a and 2009).

Streamflow determination used existing United State Geological Survey (USGS) gage stations if the station was located within a quarter mile of a site (TCEQ, 2009). No USGS gage stations, however, were located on the small urban creeks of this study. TIAER field staff used the Stream Flow (Discharge) Measurement Form and followed the procedures outlined in the most recent TCEQ Surface Water Quality Monitoring Procedures, Volume 1, RG-415 (TCEQ, 2008a).

Average Depth at Thalweg and Substantial Pool Depths

Determination of thalweg depths and substantial pool depths is applicable to contact recreation use determination for unclassified intermittent and perennial freshwaters according to TCEQ (2008a). The thalweg is defined as the deepest depth of a transect perpendicular to the stream channel.

As instructed in the RUAA procedures manual (TCEQ, 2009), a 300-meter (m) reach at each station was evaluated to determine average depth at the thalweg. At least 11 transects at 30-m intervals were established in the 300-m stream reach of each station. By convention, the 0-m transect was established at the most downstream point of the reach and the 300-m transect defined the most upstream point of the reach.

Determination of the thalweg in both wadeable and non-wadeable streams was determined as described in the Procedures for a Comprehensive RUAA and a Basic RUAA Survey (TCEQ, 2009), Section E – Item 1 Wadeable Streams and Item 2 Non-wadeable Streams.

Measuring each transect was accomplished, where wadeable, using a surveyor's rod to measure depth. At some locations, where water depth did not allow wading, or submerged obstructions created unsafe situations, a Teledyne RDI StreamPro™ Acoustic Doppler Current Profiler (ADCP) was used to identify the thalweg.

Observational /Anecdotal Data

Anecdotal information was recorded on field data sheets during all surveys and studies using the field data sheets for Basic and Comprehensive UAA Surveys from the draft guidance (TCEQ, 2009).

Types of observational and anecdotal records included, but were not limited to, the following:

- channel flow status,
- stream type (e.g., ephemeral, intermittent, etc.),
- streamflow,

general weather conditions (cloud cover/rain), including 30-day conditions and antecedent rainfall record,
substrate type,
accessibility, and
anecdotal information related to observed human contact activities.

Air and Water Temperature Measurements

Water temperature was measured using a 600 XLM YSI multiprobe and a 650 MDS data-logger. Water temperature, in degrees C, was logged onto the appropriate field data sheet. Air temperature was measured by a handheld thermometer in degrees C. Both instruments were checked against a NTIS certified thermometer on an annual basis.

Photographs

TIAER staff created photographic records of each site during the site survey. Photographs included an upstream view, left and right bank views, downstream view at the 0-m, 150-m and 300-m transects (as described in the Field Data Sheets), any evidence of observed uses or indications of human use, hydrologic modifications, etc. Photographs were taken to show evidence of recreational use (e.g. rope swings) and actual recreation (e.g., fishing). Photographs were also taken to show a lack of use, such as dry streambeds. When necessary for interpretation, photographs are provided with an obvious scale for reference. Photographs are cataloged in a manner that indicates the site location, date, view orientation and what is being shown. Because of legal concerns, photographs of minors were not taken except at a distance, from the back, or with parent's permission, which at times limited documentation.

CHAPTER 3

SYCAMORE CREEK (SEGMENT 0806E)

Watershed Characterization

Segment 0806E is a five mile stretch of Sycamore Creek running generally south to north from the confluence with the Echo Lake tributary near S. Riverside Drive to the confluence with the West Fork Trinity River (0806) in Fort Worth, Texas (Figure 3-1). Located in southeast Fort Worth, the watershed surrounding Sycamore Creek is residential, interspersed with commercial areas and some light industry (land use on Figure 3-2 and aerial photograph on Figure 3-3). TCEQ describes the flow type for this stream as perennial. Though primarily natural in appearance, the channel is affected by numerous bridge crossings, low water crossings and, in Sycamore Park, a low water dam creating a long pool and landscaped banks using large stones to form steps to the stream bed. There are no NPDES outfalls in the stream watershed. TCEQ information indicates that streamflow is perennial and the presumed aquatic life use is high (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams, including Sycamore Creek. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in station selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Sycamore Creek site selection the major interaction occurred with City of Fort Worth staff.

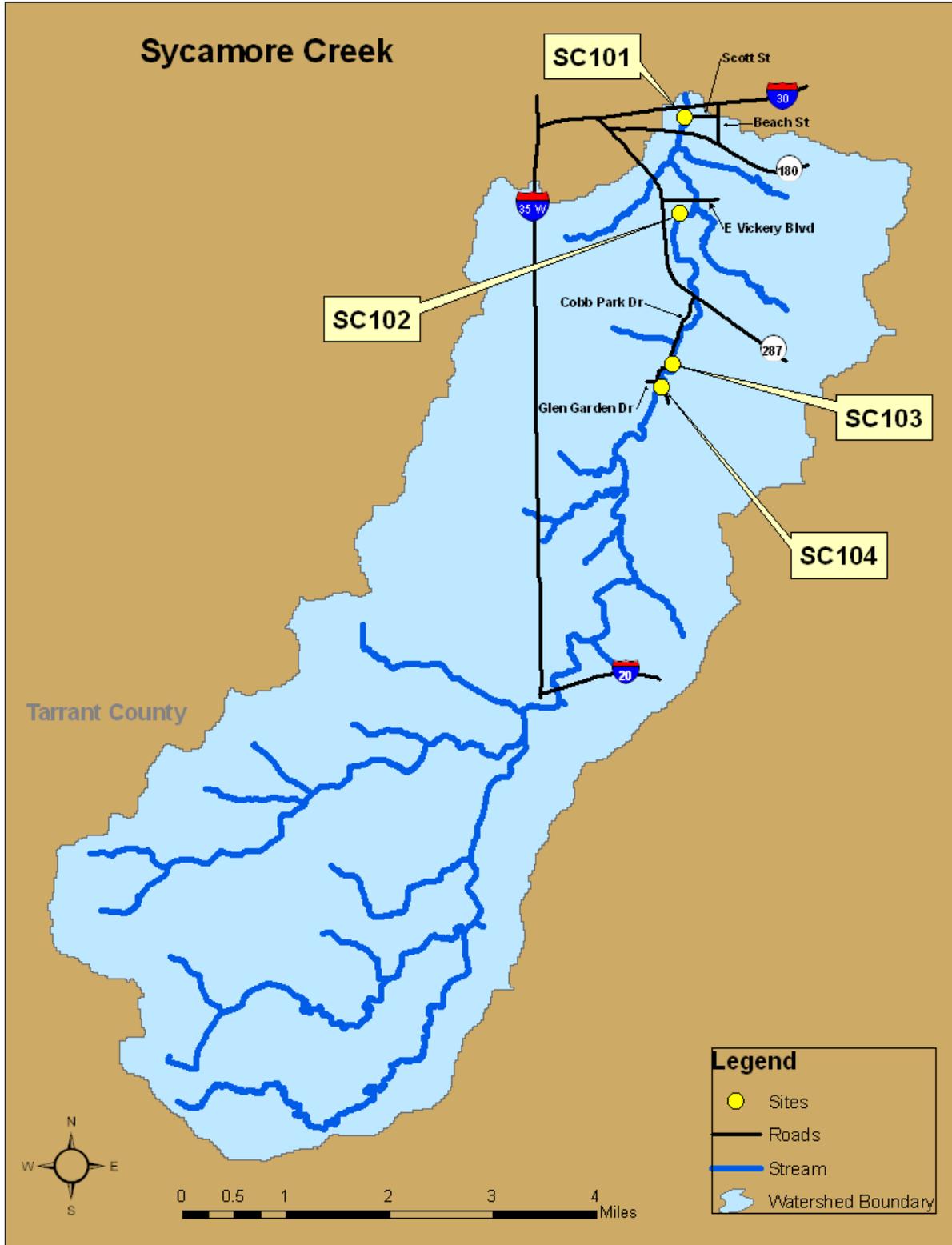


Figure 3-1 Sycamore Creek (Segment 0806E) showing RUAA sites

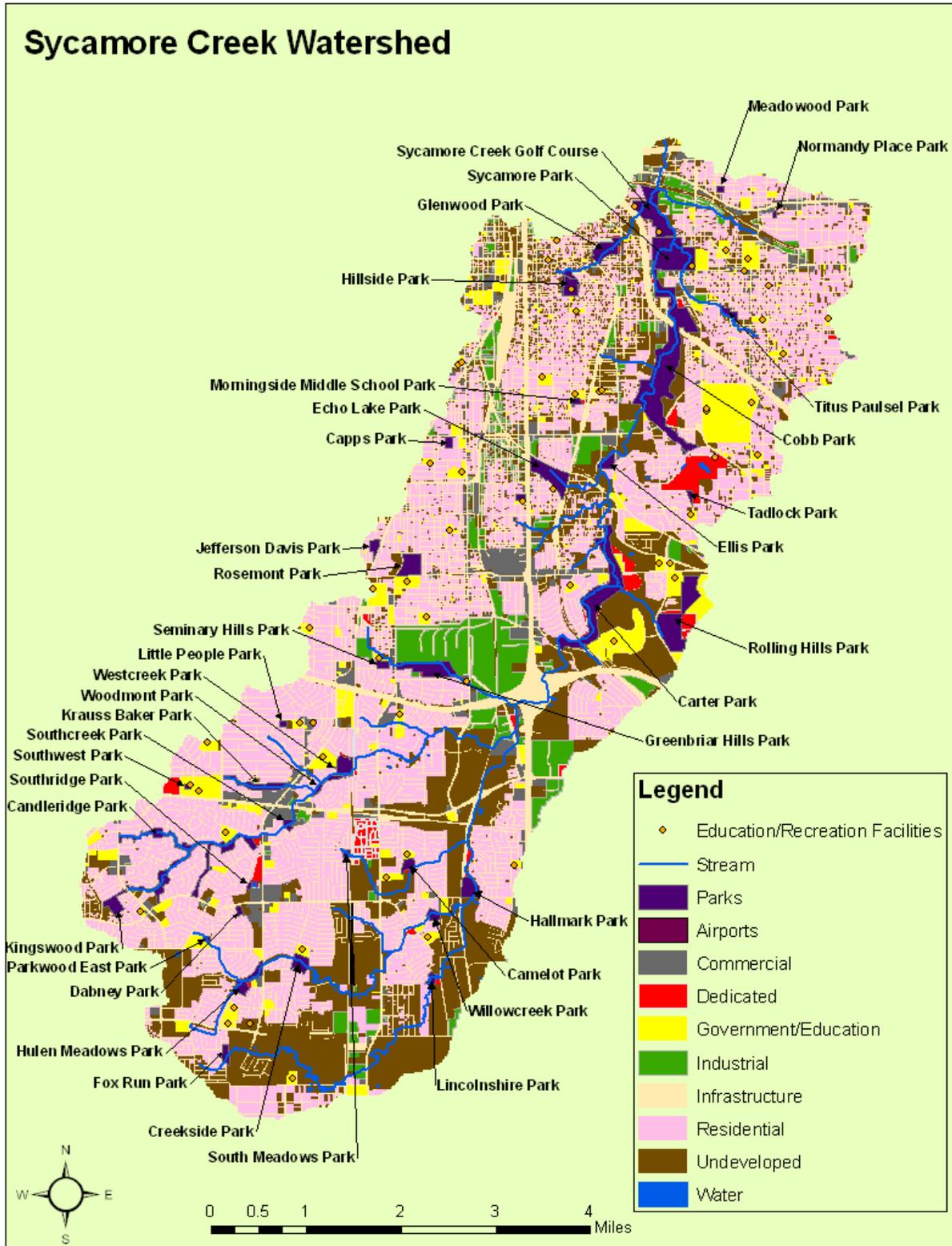


Figure 3-2 Land use/land cover for Sycamore Creek watershed (Source: NCTCOG, 2007 & 2009)

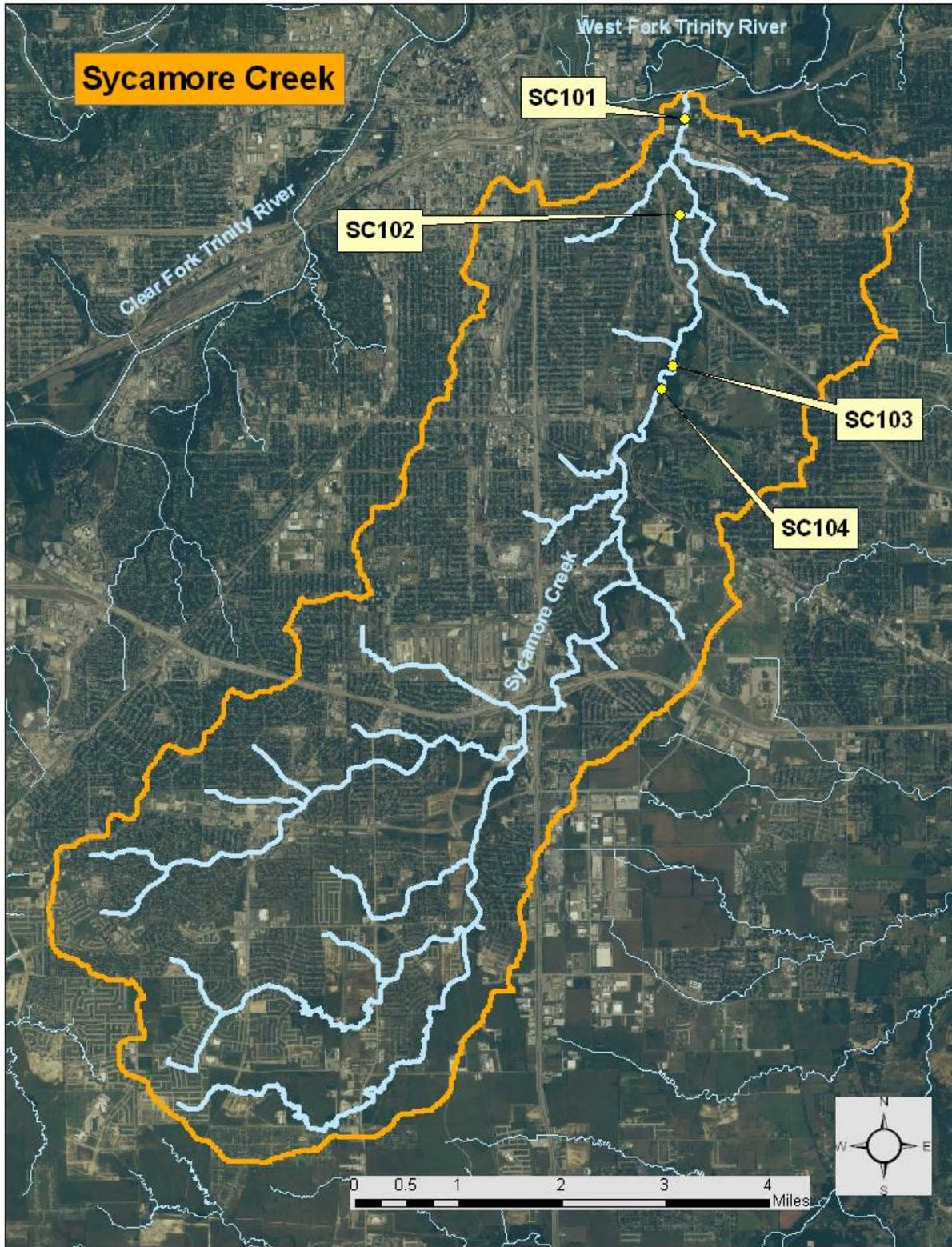


Figure 3-3 Aerial photograph of Sycamore Creek watershed (Source: NAIP, 2005)

Survey Site Descriptions

The survey sites selected for Sycamore Creek (Segment 0806E) are provided in Figure 3-1. Three appropriate sites for the performance of a RUAA and one additional site for interviews only (Site SC104) were identified in this stream segment. A brief description of each site follows.

Site SC101 (TCEQ Station 17369) is located on Sycamore Creek at the western end of Scott Street in Ft. Worth, Texas. The reach begins approximately 179 m upstream of IH 30 and runs toward the confluence with the West Fork Trinity River. There is a park with a hike and bike trail beyond the lower portion of the reach and evidence of homeless camps near the Scott Street access point.

Site SC102 is located on Sycamore Creek upstream of E.Vickery Blvd. in Ft. Worth. There is a large park at this location with a bedrock stream bottom and the large stone steps provide easy access for contact recreation, including wading.

Site SC103 is located on Sycamore Creek in Cobb Park near the Redbud Picnic area in Ft. Worth. There are play and sports facilities and picnic tables located at this park area. Numerous individuals were observed utilizing the facilities on the initial scouting trip. There is a low water crossing at this point which makes the stream very accessible for aquatic recreation.

Site SC104 is located on Sycamore Creek near Glen Garden Drive in Ft. Worth. There is a park located at this area with a play structure for children. However, access to the stream at this site is more challenging and less inviting than the sites listed above. TIAER field staff only conducted interviews at this location.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Sycamore Creek.

Surveys conducted on Sycamore Creek were conducted during varying air and water temperatures as shown in Table 3-1. Water temperatures were warm enough for recreational activities to occur.

Table 3-1 Temperatures measured at each site along Sycamore Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Sycamore Creek	SC101	31.3	28.5	27.2	28.4	28.0	25.1
	SC102	34.7	32.0	26.8	33.5	37.0	27.1
	SC103	36.0	29.8	33.0	29.1	32.0	25.2
	SC104	Interview location only					

Table 3-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 3-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys.

Table 3-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site SC101

The stream at Site SC101 is natural in appearance with a bedrock bottom and shrub/tree dominated streambanks. A concrete drainage pad at the west end of Scott Street allows access to the stream, but requires some care in selecting footing. Overall access to the stream is moderately easy. The site is located in a residential and light commercial business area north of IH30. The area west of the stream is an undeveloped field. Table 3-2 describes the stream channel and riparian zone appearance at SC101. A homeless camp was located on the left bank of the stream between the 150-m and 180-m transects. The camp appeared abandoned during the third survey conducted May 27-31, 2010. [Photogroup 3-1](#) depicts the tree/shrub dominated streambanks and the homeless camp.

The surveyed reach at Site SC101 was a wadeable stream with a rock bottom. Some portions of the stream contained gravel and cobble along the edges, but overall the dominant substrate was bedrock. During the first two surveys, no pools were identified in the study reach. During the third survey, three pools were identified and their dimensions are listed in Table 3-5.

The drainage pad located at the 150-m transect was rough concrete down the streambank with several large concrete blocks located at the bottom of the bank in the stream. The 0-m transect was located just above the IH30 bridge crossing. The stream channel at that location became a concrete lined channel. [Photogroup 3-2](#) shows the access point at the 150-m transect and the concrete lined channel at the 0-m transect.

Table 3-4 shows the hydrographic parameters collected at the site during each of the three surveys. The stream was relatively shallow and streamflow measurements were less than 3.0 cfs during each of the surveys. A concrete drainage ditch fed into the stream on the right bank at the 30-m transect. A concrete weir was located at the 120-m transect and a temporary rock dam was identified during the third survey at the 240-m transect. [Photogroup 3-3](#) shows the aforementioned structures.

Parking options at the site were limited to the end of Scott Street in front of a guardrail which keeps vehicles from traveling down the drainage ditch to the stream at the 150-m transect. The steep banks of the stream make the concrete ditch the easiest access point. Trinity Trails hike/bike path is located on the downstream side of the Interstate State 30 bridge crossing, just beyond the study reach.

Table 3-2 Stream channel and riparian zone assessment for Sycamore Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Sycamore Creek	SC101	Right Bank	Natural	Shrub/tree dominated	Moderate	None	Business facility/Natural
		Left Bank		Shrub/tree dominated	Moderate		Natural
	SC102	Right Bank	Upper 1/3 Natural; Lower 2/3 channelized	upper ¼ shrub dominated; lower ¾ Rip Rap below mowed/maintained	Moderate	Sycamore Park	Natural / Park
		Left Bank			Moderate		
	SC103	Right Bank	Natural	R/L Forest and shrub dominated	Moderate	Cobb Park	Natural
		Left Bank			Moderate		Natural/Park
SC104	Interview location only						

Table 3-3 Physical Descriptors of Sycamore Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Sycamore Creek	0806E	5.0	4	2	0.45	0.46	0.46	perennial
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
SC101	300	11	0	0.43	0.38	0.36		
SC102	300	11	1	0.40 ^a , 0.12, 1.16	0.35 ^a , 0.10, 1.03	0.39 ^a , 0.14, 1.06		
SC103	300	11	1	0.53 ^a , 0.24, 1.04	0.65 ^a , 0.37, 1.14	0.63 ^a , 0.25, 1.29		
Site SC104 was an interview location only								
^a The three depths provided are average, below dam, and above dam								

Table 3-4 Additional hydrographic parameters of Sycamore Creek.

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Sycamore Creek	SC101	13.9	4.4	10.0	2.36	Normal
		SC102	20.5	1.2	15.0	1.83	Normal
		SC103	33.0	0.92	4.2	1.48	Normal
August 25-28, 2009	Sycamore Creek	SC101	13.5	3.6	10.0	0.91	Normal
		SC102	20.5	0.45	15.0	0.65	Normal
		SC103	33.0	0.86	4.9	0.36	Normal
May 27-31, 2010	Sycamore Creek	SC101	13.4	2.3	5.94	1.94	Normal
		SC102	20.35	1.35	9.3	2.0	Normal
		SC103	32.3	1.32	8.76	0.71	Normal

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow
 Site SC104 was an interview location only

Table 3-5 Pool dimensions at Site SC101.

Survey Dates	Length (m)	Width (m)	Depth (m)
May 27-31, 2010	28.2	13.4	0.57
	24.8	10.3	0.96
	>30.0	11.2	0.79

Aquatic vegetation and algae cover over the 300-m reach were absent to rare during the three surveys. A nutria was observed entering a pipe near the 0-m transect during the third survey. No other vertebrates were observed during any of the surveys. The water was generally clear to green in color. No odors were detected during any survey. Large garbage in the stream channel was rare while small garbage was rare to common and, when present, consisted of plastic bags and bottles, aluminum cans, cups and crates. During the second survey, remnants from an assumed party were discovered on a gravel bar in the stream ([Photogroup 3-4](#)). Garbage was abundant on streambanks during all three surveys.

Physical Description of Site SC102

Sycamore Creek at Site SC102 in Sycamore Park is a channelized stream in the lower 200 m of the reach and a natural stream for the remaining 100-m. A concrete low water dam with a bike/walk path crossing is located at the 210-m transect. Above the dam, the stream is natural in appearance forming a large deep pool that extends well beyond the 300-m transect of the reach. Below the dam, the stream is a bedrock channel with concrete blocks creating stair steps on both the right and left bank. The area above the stair steps on the right site is mowed and maintained while the area above the left bank is more natural, though some maintenance occurs. Access to the stream at and below the dam is easy as over this 200-meters of the stream rock stair steps go from the top of the bank to the streambed. Table 3-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 3-5](#) shows the streambanks, accessibility, and low-water dam and the large pool above the dam.

A children play structure, picnic tables, tennis courts, and baseball fields are some of amenities located in the park. There is a concrete walk/bike trail throughout the park and several picnic tables are located underneath large oaks trees. The lawns associated with the park are mowed and maintained by the city. [Photogroup 3-6](#) depicts some of the amenities of the park and a bridge at the 180-m transect, which allows people to travel from one side of the park to the other.

The surveyed reach at Site SC102 was a wadeable stream. Upstream of the dam the banks were natural in appearance with trees/shrubs being the dominant riparian vegetation. Thalweg depths above the dam were typically over 1.0 m during all three of the surveys. Stream depths below the dam were typically less than 0.2 meters during each survey. Table 3-3 shows the average thalweg depths collected at Site SC102. The thalweg depths are reported in three categories (average overall depth, below dam depth, and above dam depth) to show the change in stream conditions along the 300-m reach.

There were no pools identified at Site SC102 other than the large pool above the concrete dam. This segment of the stream was fairly uniform with typical depths over 1.0 m and widths of approximately 15 m. The pool continued well beyond the 300-m transect of the study reach. Photographs of the pool are located in previously presented [Photogroup 3-5](#).

The park is located in a residential area with several entry points from major roads around the park. There is ample parking located in the park, both in large parking lots and along the side of the park road that runs through the park. A golf course is located across East Vickery Boulevard, north of the site. Aesthetically, the park appears inviting for recreation, although the only

appealing location for water recreation is the segment from the 0-m transect to the 210-m transect. There were no fences or signs observed prohibiting water recreation at the site.

Aquatic vegetation at the site was absent, while algae cover ranged from common to abundant. Water at SC102 was clear in the lower 200-m and green above the dam. The water surface was generally free of any scum or film. The stream had a slight odor (characterized as “rare” on the survey field data sheets) during two of the three surveys with odor being absent the third survey. There was a slight to moderate presence of water dependent birds and a slight presence of snakes. A moderate presence of wild mammals, squirrels, a dead opossum and a dead raccoon was observed at the site. No other vertebrates were observed, although fecal droppings and tracks were observed. Large in-stream garbage consisting of large plastic bags and a toilet bowl was observed during two of the surveys. Small garbage in the channel and on the banks was rare and, when present, consisted of plastic bags and bottles.

Physical Description of Site SC103

Sycamore Creek at Site SC103 in Cobb Park is a natural stream with a low-water crossing located at the 210-m transect. The stream above the low water crossing is a large pool greater than 300 meters long with an average width of 30 meters and depths over 1.0 m. The stream below the crossing was relatively shallow and much narrower than in the upstream transects. The dominant substrate of both segments was bedrock. Dominant vegetation of the banks of both sides of the stream was tree/shrub. Depths above the low water crossing were deep enough for immersion, but the stream below the dam was more inviting for wading. Access to the stream was easy at the low water crossing, which allowed travel both upstream and downstream. There was a pipe gate across the entrance to the low water crossing to keep vehicles from crossing the stream. Table 3-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 3-7](#) depicts the stream channel and riparian zone appearance in the upper half of the study reach. [Photogroup 3-8](#) depicts the stream channel and riparian zone in the lower half of the reach.

The reach surveyed at Site SC103 was wadeable for its entire 300-m length. The bedrock bottom made walking relatively easy. Depths above the crossing were greater than 1.0-m while depths below the crossing were typically less than 0.5-m. Table 3-3 shows the average thalweg depths collected at SC103 during the three surveys. In order to show the difference in the depths above and below the crossing, three thalweg depth averages were given in the table; overall reach, below the crossing and above the crossing.

Two pools were identified in the study reach during each site survey. One pool was immediately below the low-water crossing. The second pool was upstream of the low-water crossing and extended beyond the 300-m transect. Dimensions of the pools are found in Table 3-6.

Site SC103 in Cobb Park is located within a high residential area with Cobb Park Drive West running along the western side of the stream. Redbud Trail is the name of the low water crossing of the stream. There are mowed and maintained sports fields in the area and picnic tables underneath oak trees ([Photogroup 3-9](#)). City of Fort Worth staff recommended not visiting the park after dark.

Table 3-6 Pool dimensions at Site SC103

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	18.0	33.0	0.86
	>100	33.0	>1.0
August 25-28, 2009	18.0	33.0	0.85
	>100	33.0	>1.0
May 27-31, 2010	18.0	33.0	0.86
	>100	33.0	>1.0

Aquatic vegetation at the site was absent to rare and algae cover was common. There was a slight presence of water dependent birds and domestic pets with no other observances of vertebrates. Fecal droppings and tracks were observed. Water below the low-water crossing was clear but was green in color above the crossing. Scum was observed on the water surface during one of the surveys, but was clear during the other two surveys. Channel and bank garbage, both large and small, was common during two of the three surveys, but was rare during the third. Garbage consisted of plastic bags and cups, glass containers, discarded household items and automotive items, such as tires. Odor of the stream was absent during the first survey, faint during the second and common during the third. During two of the surveys, there was a distinct sewage smell in the air.

Physical Description of Site SC104

Sycamore Creek at Site SC104 in Glen Garden Park is a natural stream with a small play structure and parking lot located off of Old Mansfield Road. The dominant substrate of the stream appears to be gravel. Footpaths were observed at the site; however, they were covered with broken glass and many glass bottles were observed around the park area. The banks of the stream are natural in appearance with trees/shrubs being the dominant vegetation. The area where the play structure is located is mowed and maintained by the city. [Photogroup 3-10](#) depicts the riparian zone of the banks and the substrate of the stream.

A children play structure and pavilion structure are located east of the parking lot. Several visits to the site for interviews revealed bottles and cups strewn about, as the trash barrels located by the pavilion appeared to be ignored. Access to the stream appears to be moderately easy but dangerous based on the broken glass and bottles along the footpath. [Photogroup 3-11](#) depicts the structures at the small park and the areas of trash and broken glass. During TIAER's visits to the site, not one person was observed utilizing the play structure. One interview from a city employee stated that he had never observed the play structure being utilized either. Overall, not much activity was observed at this location.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. Two of the three selected sites were located in residential areas at public parks. Paved parking lots, hike/bike trails, well established roads in the area, bridges and public access made the facilities well suited for public recreation. The third site was close to a hike/bike trail and a suspected homeless camp. Table 3-7 shows although people were observed, no primary contact recreational activities were observed by TIAER personnel at any of the sites located on Sycamore Creek. The "number observed" column shows

the approximate number of persons observed at the site when the survey was performed, with primary contact recreation activities listed as individual columns.

Table 3-7 Primary contact recreation activities evaluation during the surveys of Sycamore Creek.

Date	Site Number	Number Observed ¹	Wading Children	Wading Adults	Swimming	Water Skiing	Diving	Tubing	Surfing	Whitewater activities	Other
August 4-8, 2009	SC101	None	-	-	-	-	-	-	-	-	-
	SC102	1-10	-	-	-	-	-	-	-	-	-
	SC103	11-20	-	-	-	-	-	-	-	-	-
August 24-29, 2009	SC101	1-10	-	-	-	-	-	-	-	-	-
	SC102	1-10	-	-	-	-	-	-	-	-	-
	SC103	11-20	-	-	-	-	-	-	-	-	-
May 27-31, 2010	SC101	None	-	-	-	-	-	-	-	-	-
	SC102	11-20	-	-	-	-	-	-	-	-	-
	SC103	1-10	-	-	-	-	-	-	-	-	-
¹ None; 1-10; 11-20; 20-50; >50											

Table 3-8 shows that no secondary contact recreation activities were observed at the sites along Sycamore Creek. People were observed within eight meters of the stream at two of the three sites, Site SC102 and Site SC103. People were either walking or jogging across the low water crossing at the 210-m transect of the stream at Site SC102. In addition, during two of the three surveys, people were observed sitting on the stair-step blocks near the 30-m transect. When the persons saw us walking toward them, they left the site immediately before an interview could be conducted. The age of the persons was suspected to be high school age.

Table 3-8 Secondary contact recreation activities observed during the surveys of Sycamore Creek.

Date	Site Number	Number Observed ¹	Fishing	Boating	Non-whitewater activities	< 8 m from shore	Other
August 4-8, 2009	SC101	None	-	-	-	-	-
	SC102	1-10	-	-	-	X	-
	SC103	11-20	-	-	-	-	-
August 24-29, 2009	SC101	1-10	-	-	-	X	-
	SC102	1-10	-	-	-	-	-
	SC103	11-20	-	-	-	-	-
May 27-31, 2010	SC101	None	-	-	-	-	-
	SC102	11-20	-	-	-	X	-
	SC103	1-10	-	-	-	-	-
¹ None; 1-10; 11-20; 20-50; >50							

At Site SC101, people were observed sitting and lying down near a tent at the homeless camp, which was more than eight meters from the stream. However, one of the occupants was observed defecating on a gravel bar near the stream. No photographic documentation is provided for this activity. In addition, evidence was discovered during one trip indicating that people were sitting on a gravel bar in the stream channel. Cigarette butts were also observed on the edge of the concrete pad at the 150-m transect. Although field personnel did not observe the

activity in the stream, there is a high probability that some form of activity did occur in the stream channel. [Photogroup 3-12](#) depicts the evidence of some activity in the stream channel.

People were observed at Site SC102 during all three of the surveys. Persons were observed running and walking, bicycling, playing tennis and just sitting, either in their cars or at picnic tables. Of the runners and walkers, some were exercising while others, carrying bags of what appeared to be groceries, appeared to be traveling through the park on their way home. One person was performing yoga under a shade tree. None of the people observed were using the stream for recreation.

At Site SC103 people were observed at the site during two of the three surveys. Activities here were mainly confined to standing and sitting around the picnic tables, eating lunch, and playing dominoes. The observed walking activities consisted of persons walking to and from their vehicles to either leave the site or join in the conversation at the tables; walking for exercise was not observed. During the third survey, only one person was observed walking around collecting aluminum can tabs from the ground and trash containers. Of the persons observed, none appeared to be dressed for water recreation or appeared to be contemplating water recreational activities.

Some activities were observed over the surveyed reach of each site that were not associated with water recreation. These activities included walking, running/jogging, biking and tennis, to mention a few. Table 3-9 shows the general activities observed at each site during each survey. People were observed alone, as couples, and in large groups. No one observed during the surveys seemed to be interested in recreating in the water or dressed for water recreation. Individuals were utilizing the park amenities, such as the hike/bike paths for exercise and picnic tables for eating their lunch. Some were just sitting on park benches watching people or wildlife. Some persons were sitting in their cars underneath a shade tree. One person was observed collecting beer can tabs from trash cans and from the ground. [Photogroup 3-13](#) shows some persons at picnic tables and cars located at the park.

People were interviewed at the three sites where RUAA surveys were conducted and one additional site, Site SC104 at Glen Gardens Park. TIAER personnel, wearing identification tags, asked the individuals to participate in the RUAA interviews. Site SC104 was suggested as an interview location by City of Ft. Worth personnel because of some presumed activity occurring at that location. Most people were willing to accommodate being interviewed, but some did not want to answer any questions. TIAER personnel tried not to interfere with the activities of individuals and tried to make the questions as brief as possible. Some people gave names and phone numbers, some gave just names and others chose not to give any information other than their opinions. In order to not invade their privacy, no interviews were attempted at the homeless camp at Site SC101.

Table 3-10 records the activities reported during interviews either conducted by the interviewee or activities of others they have observed. The numbers under the column headings indicate the number of times an activity was mentioned during all of the interviews.

Table 3-9 Summary of general activities observed during surveys of Sycamore Creek

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	SC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SC102	1-10	-	-	X	-	-	X	-	-	X	-	-	-	X	X	-
	SC103	11-20	-	-	X	-	X	X	-	-	X	-	-	-	-	X	X
August 24-29, 2009	SC101	1-10	-	-	-	-	X	X	-	-	-	-	-	-	-	X	X
	SC102	1-10	-	-	X	-	-	X	-	-	X	-	-	-	-	X	-
	SC103	11-20	-	-	X	-	X	X	-	-	X	-	-	-	-	X	X
May 27-31, 2010	SC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SC102	11-20	-	-	X	X	-	X	-	-	X	-	-	-	X	X	X
	SC103	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	X

¹ None; 1-10; 11- 20; 20-50; >50

Table 3-10 Activities reported in interviews at sites along Sycamore Creek.

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Sycamore Creek	SC101	-	-	-	-	-	-	-	1	-
	SC102	-	-	1	4	-	-	-	2	-
	SC103	-	-	-	1	-	-	-	5	-
	SC104	-	-	-	-	-	-	-	1	-

A total of 16 interviews were attempted or collected at the four locations located along Sycamore Creek. Some of the interviews were site specific while others talked about the creek as a whole. The consensus of the people we talked with was that they would not recreate in the water. The common interviewee responses were the water was nasty, gross, dangerous, or trashy. Only one person, familiar with the stream for 30 plus years, stated that when she was a child, she did wade in the stream at the Cobb Park location. Not one other interviewee claimed to have recreated in the stream, though some interviewees had observed or heard of recreation activities in the stream.

Most of the people interviewed stated that they have observed or heard of people wading in the stream, both children and adults. They usually made reference to the two sites located at Sycamore Park and Cobb Park. It was also stated that fishing does occur in the stream, but they didn't think the fish are eaten. One group of people playing dominoes at a picnic table in Cobb Park stated that the bad sewage smell prevented them from going any closer to the stream than the picnic tables. It was further stated that there is frequent traffic where people drive up and park along the road, go into the trees alongside the stream, and return to their cars and leave after only a couple of minutes. The type of activities that occurred at these times was only speculation by the interviewee.

One interview from a city employee spoke of the homeless camp at Site SC101. It stated that the camp is there year round and that bathing and "adult" recreation has been observed at the site. It was further stated that the creek as a whole is not used for contact recreation, mainly catch and release fishing. No children have ever been observed on the playground equipment at Site SC104, Glen Gardens Park.

One person interviewed at Site SC102 stated that many families come to the park in the evenings and Sunday afternoons and wade in the stream in the areas of the stair-step blocks. Field personnel did visit the site on a Sunday and a couple of evenings and never were able to verify this information. A couple of people stated that they came to the park to play tennis, nothing else. They had no desire to get into the water or couldn't swim; they just play tennis for recreation.

A police officer informed us at Site SC102 that it was illegal to get into the stream. An interview was attempted, but the officer acted as if he did not have time to answer any questions and subsequently left. No signs prohibiting entrance into the stream were identified by field crews at any of the locations surveyed.

Copies of the interviews conducted along Sycamore Creek are located in Appendix A-4.

Summary

RUAA surveys were conducted at three sites (SC101, SC102, and SC103) along Sycamore Creek on August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Only interviews and observations of activities in and around the stream were made at a fourth site, SC104. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey at Sites SC101, SC102, and SC103 are located in the Appendix A-1, A-2, A-3 and A-4, respectively.

Several activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 3-4. There were reports of people recreating in the stream at two locations, Sites SC102 and SC103. The occupants of the homeless camp at Site SC101 appear to utilize the stream in a variety of ways, but none of these activities were observed by TIAER personnel. Fishing, catch and release, was reported to occur along the stream although not verified by field personnel. The city park department maintains the grounds in the parks.

The effluent sewage smell in the area of Cobb Park was one of the reasons mentioned for not eating the fish caught or recreating in the stream. The amounts of garbage in the channel and on the banks at this location may also deter recreation.

Both observations and interviews indicated that most people who make use of the park facilities do not use the Sycamore Creek for recreation, except for the reported wading by children at Sites SC202 and SC203 and the water-related activities associated with the homeless camp at Site SC101. Many interviewees described the water as “too nasty” to recreate in. There were no signs warning against trespassing and/or swimming observed at any of the sites surveyed.

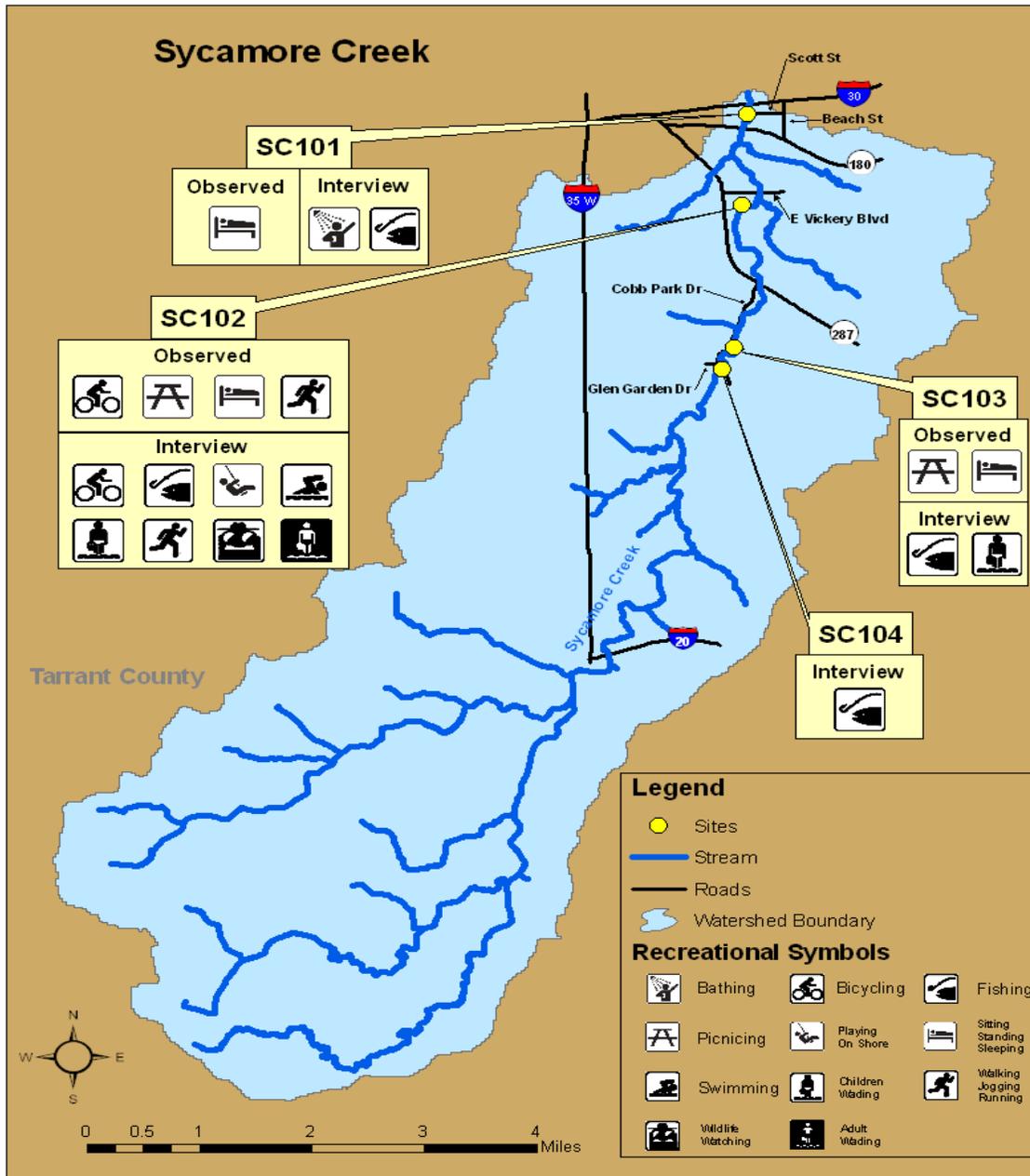


Figure 3-4 Summary of activities observed and reported in interviews at sites along Sycamore Creek

Sycamore Creek (Segment 0806E) Photogroups



Photogroup 3-1 Sycamore Creek Site SC101 depicting stream and tree/shrub dominated riparian zone and on the lower row a distant photograph through the trees of a tent at the homeless camp near the creek. [\[Return to Text\]](#)



Photogroup 3-2

Sycamore Creek showing concrete pieces in stream and concrete apron leading to stream at the 150-m transect (upper row, note right photograph is looking up the apron) and stream and banks at the 0-m transect at IH-30 (middle and lower rows; note in lowermost photograph the pedestrian bridge in the background that is part of a hike/bike trail). (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 3-3 Sycamore Creek Site SC101 showing storm drain entering creek at 30-m transect (top portion of upper row, left side photograph); weir or low dam at 120-m transect (following two photographs); and temporary rock dam (lower row, right photograph). [\[Return to Text\]](#)



Photogroup 3-4 Sycamore Creek Site SC101 showing remnants of suspected party including camp fire. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)

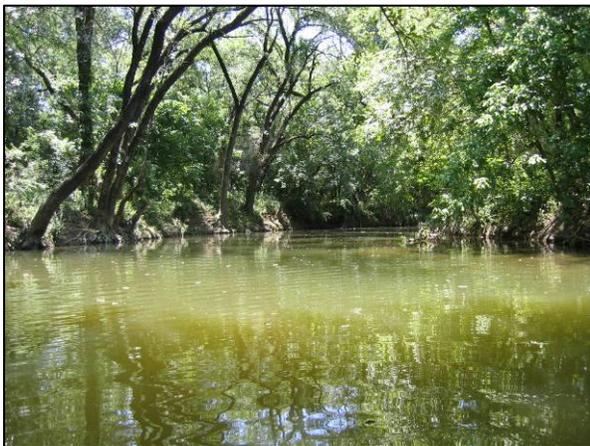


Photogroup 3-5

Sycamore Creek Site SC102 showing stream below low water dam at 210-m transect (upper row & middle row left) and large pool and dam (middle row right and lower row) above this transect. (Individual in upper right photograph is TIAER staff.) [\[Return to Text\]](#)



Photogroup 3-6 Sycamore Creek Site SC102 showing area within Sycamore Park and the bridge crossing the stream. [Return to Text](#)



Photogroup 3-7 Sycamore Creek Site SC103 showing stream channel, pooled conditions, and riparian vegetation. [Return to Text](#)



Photogroup 3-8 Sycamore Creek Site SC103 showing additional areas of stream channel and riparian vegetation. [\[Return to Text\]](#)



Photogroup 3-9 Sycamore Creek Site SC103 showing Cobb Park. [\[Return to Text\]](#)



Photogroup 3-10 Sycamore Creek Site SC104 showing stream and riparian zone. [\[Return to Text\]](#)



Photogroup 3-11 Sycamore Creek Site SC104 showing conditions in Glen Garden Park. [\[Return to Text\]](#)



Photogroup 3-12 Sycamore Creek showing evidence of human activity in the stream channel, including cigarette butts, remnants of camp fire, and signs of party on gravel bar. (Note that some photographs are repeats of previous photographs; Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 3-13 Sycamore Creek showing activities observed on parks along creek. [\[Return to Text\]](#)

CHAPTER 4

COTTONWOOD BRANCH (SEGMENT 0822A)

Watershed Characterization

Segment 0822A is a six mile unclassified segment defined as running upstream from its confluence with Hackberry Creek to Valley View Road in Irving, Texas, Dallas County. Cottonwood Branch flows generally west to east from near State Highway (SH) 161 on the east side of Dallas/Fort Worth International Airport (DFW Airport), through Irving, Texas, and to a confluence with Hackberry Creek near Dallas, Texas just west of the Elm Fork Trinity River (Figure 4-1). Additionally, this stream flows through a densely populated residential area, two golf courses and North Lake College and the land use of the watershed is predominately residential (land use on Figure 4-2; aerial photograph on Figure 4-3). Though accessible at many points, the stream is posted as non-recreation use by the Dallas County Utility and Reclamation District (DCURD) for much of its length. Though stretches of the creek appear natural, much of the stream has been channelized into concreted water ways. Additionally, there are several “lakes” that have been created within the boundaries of the golf courses. Four sites were selected for RUAA locations in this stream. There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists flow type for this stream as intermittent with pools and based on this flow regime assigned a presumed aquatic life use of limited (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Cottonwood Branch site selection the major interaction occurred with City of Irving staff.

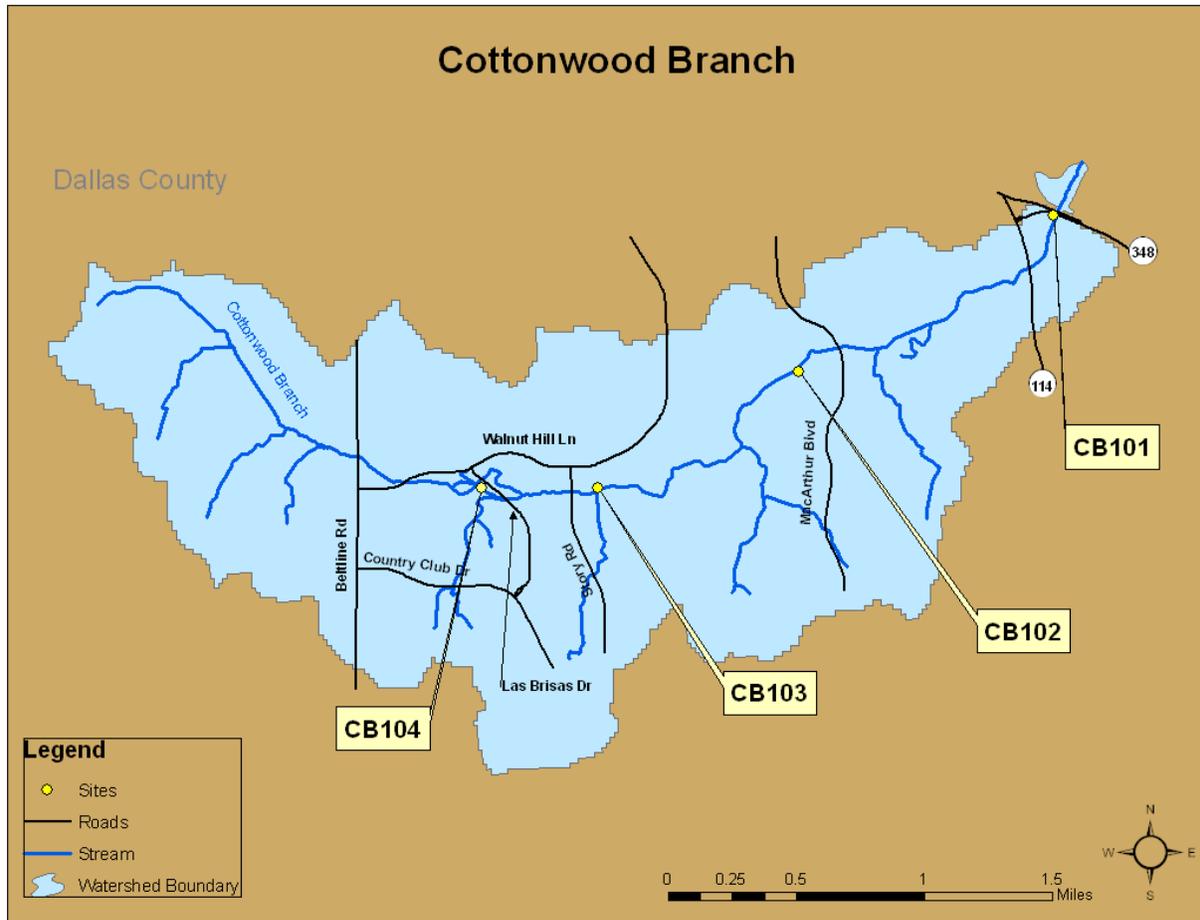


Figure 4-1 Cottonwood Branch (0822A) showing RUA sites

Survey Site Descriptions

The survey sites selected for Cottonwood Branch (Segment 0841H) are shown in Figure 4-1. Four sites were identified as suitable RUA locations along this stream. A brief description of each site follows.

Site CB101 (TCEQ Station 17168) is located on Cottonwood Branch at Highway Spur 348 near the confluence with Hackberry Creek, in Irving, Texas. Though not particularly inviting for swimming, there is potential for boat access from Hackberry Creek and fishing from the bank.

Site CB102 (TCEQ Station 18359) is located on Cottonwood Branch on the campus of North Lake College approximately 433 m upstream of McArthur Blvd. in Irving. At this location the stream is under the jurisdiction of DCURD and, according to college employees, access is strictly prohibited, though the stream runs through two golf courses as well as the college campus. Though recreation in the water is prohibited, the banks are not fenced thus the stream is accessible from the campus.

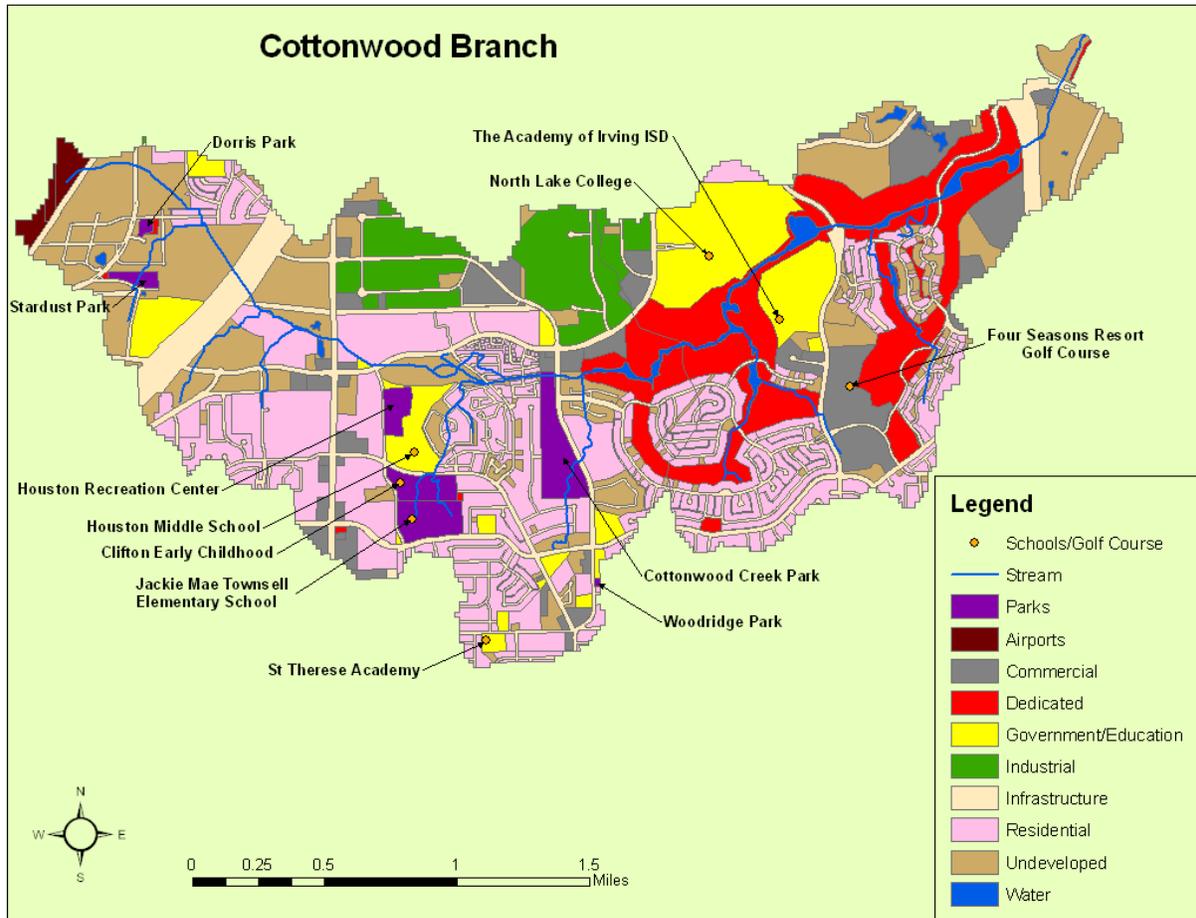


Figure 4-2 Land use/land cover for Cottonwood Branch Watershed (Source: NCTCOG, 2007 & 2009)

Site CB103 (TCEQ Station 17166) is located on Cottonwood Branch at N. Story Rd. in Irving. The area is residential and light commercial with easy access to the stream from both banks.

Site CB104 is located on Cottonwood Branch at the crossing of Las Brisas Dr., in Irving. The general area between Las Brisas and Walnut Hill Lane is undeveloped and could be accessed easily from the bank from the 0-m to the 150-m transects. Upstream of the 150-m transect, a steep bank at the crossing and dense vegetation along the remainder of the 150-m reach deters access.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Cottonwood Branch.

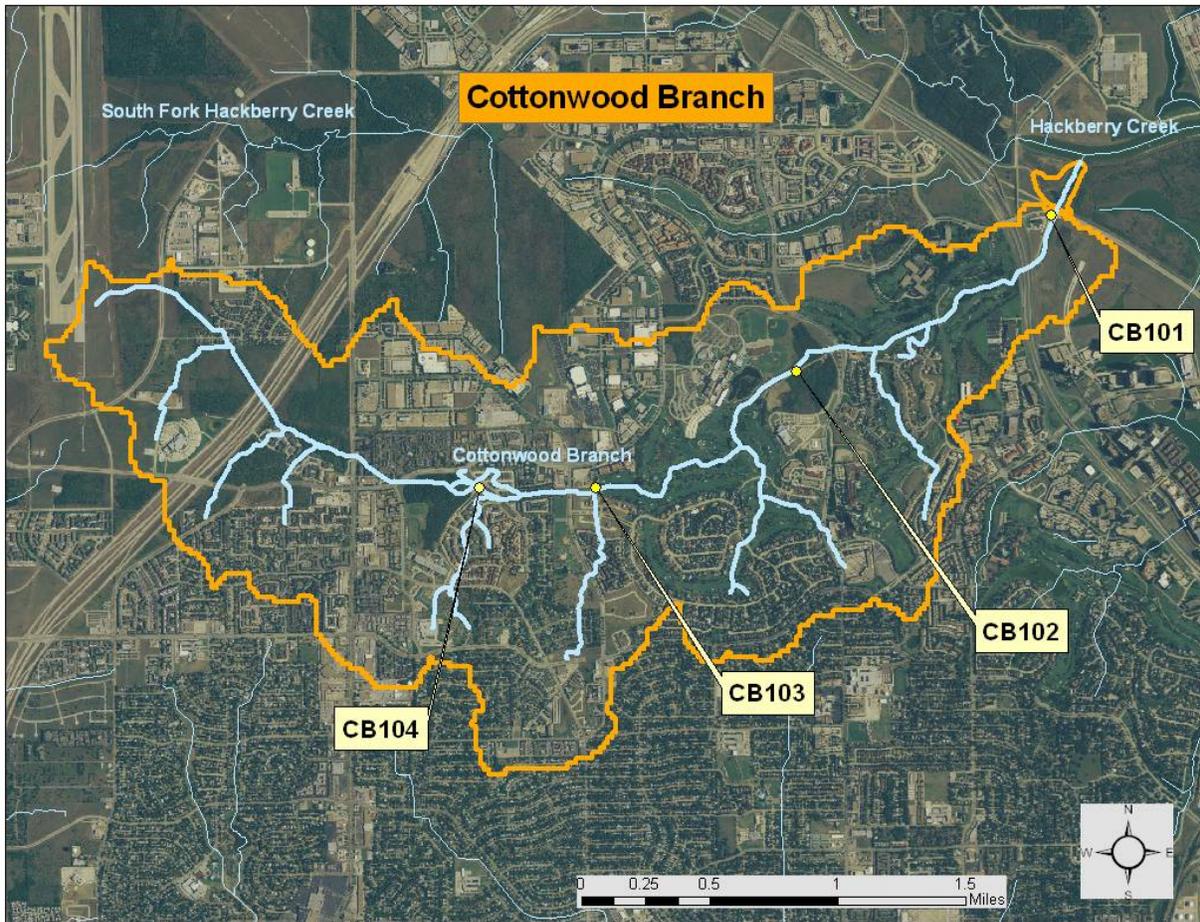


Figure 4-3 Aerial photograph of Cottonwood Branch Watershed (Source: NAIP, 2005)

Surveys conducted on Cottonwood Branch were conducted during varying air and water temperatures as show in Table 4-1. Water temperatures were warm enough for recreational activities to occur.

Table 4-1 Temperatures measured at each site along Cottonwood Branch

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Cottonwood Branch	CB101	34.9	30.9	30.0	29.7	37.0	31.2
	CB102	30.6	32.5	30.0	30.3	33.0	32.1
	CB103	33.5	32.5	31.0	31.3	33.0	36.1
	CB104	30.6	30.7	32.0	29.2	37.0	28.2

Table 4-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 4-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys. The thalweg depth at some locations was estimated based on the depth of water at the edge of the pool or stream. At these locations, the stream was considered non-wadeable and only width measurements were collected. Although unwadeable depths were recorded as >1.0 m, a depth value of 1.0 m was used to calculate the average thalweg depth for the stream segment.

Table 4-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site CB101

The stream at Site CB101 is channelized with steep concrete walls and a concrete walkway atop the left bank and mowed and maintained grass corridor above the right bank. Cottonwood Branch flows from a golf course upstream through a small concrete canal and falls down a concrete waterfall structure just above the 300-m transect. Much of the banks on both sides was undeveloped but there was a construction site beyond the mowed corridor on the right bank and a hotel with a large parking lot is located on the left bank between the 0 and 150-m transects. There are steps leading from the hotel parking lot to the concrete walkway. Table 4-2 describes the stream channel and riparian zone appearance at this site. Access to the edge of the stream is relatively easy while access to the stream itself is moderately difficult. [Photogroup 4-1](#) depicts the stream channel banks and adjacent corridors and Cottonwood Branch has a small canal leading from the golf course that expands into a larger concrete channel. There is a dam located just downstream of the 0-m transect which maintains the level of the stream ([Photogroup 4-2](#)).

The surveyed reach at Site CB101 was a wadeable stream, but due to the steep concrete banks, accessibility was difficult. Depth measurements were collected utilizing an RDA acoustic Doppler current profiler, ADCP. The flow measurements were collected in the small channel above the 300-m transect which flows into the stream.

Due to the concrete sides of the channel and the dam below the 0-m transect maintaining the water level, the dimensions of the stream channel did not change between surveys (Table 4-4; [Photogroup 4-3](#)).

The site is located in an urban/suburban area with major highways on the north and south ends of the reach. The only parking facility available is the parking lot associated with the hotel. There was a slight presence of water dependent birds with no other vertebrates observed. The stream contained no aquatic vegetation with algae cover observed to be rare during one of the surveys, otherwise algae cover was absent. No odors were detected during any of the three surveys. No bank garbage was observed during any of the surveys and garbage in the channel, both large and small, was absent to rare. Observed garbage was plastic bags and bottles and paper. Avian fecal droppings were observed at the site, but no tracks were observed.

Table 4-2 Stream channel and riparian zone assessment for Cottonwood Branch during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Cottonwood Branch	CB101	Right Bank	Dam above; channelized below	Concrete / Mowed	Small	None	Construction area
		Left Bank		Concrete	Small		Hotel
	CB102	Right Bank	Low water crossing at 150m; lake below; channelized	Maintained road; natural	Moderate	None	Natural
		Left Bank		Natural to top of bank; mowed / maintained above bank	Moderate		College campus
	CB103	Right Bank	Dam above and at 150m; channelized	Concrete mowed/maintained	Small	None	Apartment complex; recreational field; golf course estates
		Left Bank		Concrete mowed/maintained	Small		Business facilities
	CB104	Right Bank	Low water bridge over 2 culverts at 150m; lake below	Upper ½ shrub dominated; Lower half mowed/maintained	Moderate	None	Open field with construction evident; natural
		Left Bank		Upper ½ shrub dominated; Lower half mowed/maintained	Moderate		Natural; street then apartment complex

Table 4-3 Physical Descriptors of Cottonwood Branch. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Cottonwood Branch	0822A	6.0	4	0	0.71	0.73	0.73	intermittent w/ pools
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
CB101	300	11	0	0.54	0.54	0.54		
CB102	300	11	0	>1.0*	>1.0*	>1.0*		
CB103	300	11	0	>1.12, 0.79**	>1.12, 0.79**	>1.01, 0.83**		
CB104	300	11	0	0.50	0.58	0.56		

* Non-wadeable stream. Estimated depth;
 ** first value is thalweg depth for entire reach, second value is thalweg depth for wadeable transects

Table 4-4 Additional hydrographic parameters of Cottonwood Branch

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Cottonwood Branch	CB101	18.0	18.0	18.0	3.54	Normal
		CB102	37.8	17.4	20.0	Not measurable	Normal
		CB103	14.0	1.7	12.0	0.50	Normal
		CB104	40.5	0.7	2.2	0.02	Normal
August 25-28, 2009	Cottonwood Branch	CB101	18.0	18.0	18.0	No Flow	Normal
		CB102	37.8	17.4	20.0	Not measurable	Normal
		CB103	14.0	1.7	12.0	0.73	Normal
		CB104	40.5	0.45	1.4	0.11	Normal
May 27-31, 2010	Cottonwood Branch	CB101	18.0	18.0	18.0	2.30	Normal
		CB102	37.8	17.4	20.0	Not measurable	Normal
		CB103	14.7	2.0	11.7	0.18	Normal
		CB104	40.5	0.74	1.54	0.15	Normal

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Physical Description of Site CB102

The Cottonwood Branch at Site CB102 is a channelized, non-wadeable stream with a dam below the 0-m transect, which creates a large impoundment. There is a concrete crossing at the 150-m transect that people utilize to cross the stream. The study reach is fairly uniform with a mud/clay bottom. Northlake College main campus, a local community college, is located adjacent to the stream along the left (north) bank. The right side of the stream is more natural in appearance, although it is utilized by the golf course for storage of sand and deposition of grass and tree trimmings. Residences and the Academy of Irving ISD campus were observed at an appreciable distance beyond the riparian zone of the right bank. Access to the stream from the college campus side is easy but is more difficult from the right side of the stream. A local golf course has a gate entering the site from MacArthur Road, which was found shut after hours and on weekends. TIAER personnel received permission to access the site from golf course personnel. Table 4-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 4-4](#) and [Photogroup 4-5](#) depict the aforementioned observations and features.

Transect width measurements for Site CB102 are located in Table 4-5. Width measurements were obtained using a range finder. Based on the height of the dam below the study reach, depths of the stream were estimated to be greater than 1.0 meter as shown in Table 4-3.

Table 4-5 Transect width measurements at Site CB102

Survey Dates	Transect Location (m)	Width (m)
August 4-8, 2009	0	20
August 25-28, 2009	30	20
May 27-31, 2010	60	20
	90	20
	120	20
	150	17
	180	20
	210	20
	240	20
	270	20
	300	20

From an informal conversation with a Northlake College groundskeeper, the water in the stream is classified as under the jurisdiction of DCURD, Dallas County Utility and Reclamation District, and consequentially access into the stream is prohibited. [Photogroup 4-6](#) displays a DCURD no trespassing sign on the fence at the site entrance under the MacArthur Rd. bridge over Cottonwood Branch.

The banks of the stream are natural in appearance with shrubs and grasses being the dominant riparian cover, though a few small willow trees were present. The left side is mowed and maintained by the college grounds crew. On the right side shrub and grass dominate with a small vehicle trail running along side the stream. The golf course utilizes this road as golf course grounds keepers were observed traveling the road. [Photogroup 4-7](#) shows the vegetation along the banks and the mowed area maintained by the campus grounds crew.

Aquatic vegetation at the site was abundant with algae cover increasing from rare to common to abundant during the three surveys. There was a slight to moderate presence of water dependent

birds with no other vertebrates observed. No surface debris, film or scum was observed at the site and no unusual odors were detected. Fecal droppings, largely avian, and tracks were observed at the site. No large garbage was observed in the stream. Small garbage consisting of plastic bags, bottles, and paper trash were observed along the banks and in the stream channel.

Physical Description of Site CB103

The Cottonwood Branch at Site CB103 is a concrete channelized stream for the lower half and a more natural appearing stream for the upper half. The study reach at this site was only 270 meters in length due to a no trespassing sign at the 270-m transect and a fence on a golf course that impeded access below the 0-m transect ([Photogroup 4-8](#)).

At the 240-m transect a series of gabions lead to the concrete channel beneath the bridge. These structures act as a dam for the upper portion of the stream above the bridge crossing, and above the 270-m transect is another dam creating a pool ([Photogroup 4-9](#)). The riparian zone on the lower half of the reach is a mowed and maintained corridor. The riparian zone on the upper half of the reach is natural. [Photogroup 4-10](#) depicts the riparian zones at each end of the reach.

At Site CB103, the lower 120 meters is a non-wadeable, wide, deep stream with depths greater than 1.0 meter. A depth measurement of 1.45 meters was collected off of a pipe crossing the stream at the 0-m transect. The width of the lower portion of the stream was 14 meters. The dominant substrate in this portion of the stream is concrete. From the 120-m transect to just below the 150-m transect, the stream is flowing through the gabions and sometimes was not observed on the surface as it filtered through the rock structure. From just below the 150-m transect to the 180-m transect, the stream is narrow and shallow as it is flowing on the concrete bottom of the bridge crossing ([Photogroup 4-10](#), right side photograph). At the 180-m transect, the stream becomes a wadeable, more natural channel that is wide with some deep pools that continues up to the 270-m transect. The primary substrate in the natural portion of the stream is mud/clay. Table 4-3 shows the average thalweg at this site for the entire study reach using an estimated depth for the non-wadeable portion, and then the wadeable portion, from the 150-m transect to the 270-m transect. The estimated depth for the non-wadeable portion was based on the measured depth from a pipe crossing the stream at the 0-m transect. Field personnel walked out on the pipe to collect a depth measurement and assumed that the remainder was the same depth, thus unwadeable.

Access to the stream edge was moderately easy, as was access to the stream. There is a small concrete path to walk along the top of the concrete lined channel of the lower portions of the study reach. Footpaths were observed along the top of the right streambank in the upper portions of the stream. A golf course is located on the south east side of the stream, a shopping strip mall is located to the northwest, and a large parking lot is located north east of the stream. A large fenced in field is located southwest of the stream.

There was a slight to moderate presence of water dependent birds observed at the site ([Photogroup 4-11](#)). A snake was observed during one of the three trips with no other vertebrates observed. Fecal droppings were observed during all three surveys and tracks were observed during one trip. Aquatic vegetation and algae cover were rare to common. Garbage along the

banks was rare while large garbage in the stream was absent to rare. Small garbage in the channel was rare to common consisting of plastic bags, bottles, and paper.

Physical Description of Site CB104

CB104 is a natural stream in the upper half of the reach and impounded in the lower. Access to both the edge of the stream and into the stream is easy. There are two round concrete culverts located at the 150-m transect where the stream flows into the impoundment. The length of the pipes is approximately 25 meters and the pipes are covered with rocks and concrete. The length of the impoundment is approximately 70 meters, beginning near the 120-m transect and ending around the 60-m transect. Below the impoundment at the 60-m transect, Cottonwood Branch resumes stream characteristics and flows beneath Las Brisas Drive. The bridge crossing is concrete on the left side and decorative concrete blocks along the right side. Grass dominates the riparian zone below the pipe culverts while dense stands of shrubs and small trees dominate the riparian zones above the culverts. There is one apartment complex located just beyond the right bank riparian zone and one apartment complex located across Las Brisas Drive beyond the left riparian bank. The 300-m reach was located in a highly residential area comprised of mainly apartment complexes with a few single-family dwellings. Table 4-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 4-12](#) and [Photogroup 4-13](#) provide a visual reference to the impoundment and riparian zones at this site.

The surveyed reach at Site CB104 was wadeable for a majority of the reach but non-wadeable in the large pool described above. The large pool, resulting from the impoundment by the bridge crossing on Las Brisas Drive, was recorded as having a length of 70 meters, a width of 40.5 meters, and a depth greater than 1.0 meter. The impoundment was deep enough for recreation and access was easy. The riparian zones above the pipe culvert were dense shrubs which made walking in the stream difficult. The dominant substrate of the stream was silt/gravel. The stream above the pipe culverts is more difficult to access than the area around the impoundment and the stream is relatively narrow and shallow. Vegetation in some locations was almost touching from one side of the stream to the other ([Photogroup 4-13](#); upper right and lower left photographs). A tributary entered at the 180-m transect, and the tributary at this location was deeper and wider than Cottonwood Branch ([Photogroup 4-14](#)) and during the first survey caused confusion as to which channel was the correct one.

Aquatic vegetation at the site was abundant and algae cover was rare to common. No odor was detected and no surface film or scum was observed. There was a slight to moderate presence of water dependent birds and fecal dropping and tracks were observed during all three surveys. No other vertebrates were observed during any of the three surveys.

Garbage in the channel and on the banks was common for both large and small garbage. Two grocery carts and one golf cart were observed in the stream. Other garbage consisted of plastics, bags and bottles, and paper trash. [Photogroup 4-15](#) depicts the major objects found in the stream.

Activities: Observed and Interviewed

During each RUAA survey field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. Table 4-6 shows the types of general

Table 4-6 Summary of general activities observed during surveys of Cottonwood Branch

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	CB101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB102	1-10	-	-	-	-	X	-	-	-	-	-	-	-	X	-	X
	CB103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB104	1-10	-	-	X	X	X	-	-	X	-	-	-	-	X	-	-
August 24-29, 2009	CB101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB102	1-10	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
	CB103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May 27-31, 2010	CB101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB102	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
	CB103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CB104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ None; 1-10; 11- 20; 20-50; >50

activities observed at the sites during the three surveys. The “number observed” column shows the approximate number of persons observed at the site when the survey was performed.

Table 4-7 shows the types of activities identified during individual interviews of city employees and individuals at the site.

Table 4-7 Activities reported in interviews at sites along Cottonwood Branch

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Cottonwood Branch	CB101	-	-	-	-	-	-	-	-	-
	CB102	-	-	-	-	-	-	-	2	-
	CB103	-	-	-	-	-	-	-	1	-
	CB104	-	-	-	-	-	-	-	-	-

At Site CB101, no types of recreation, primary or secondary, or general activities were identified during the RUAA surveys or from interviews. Site CB103 had one interview which identified one person fishing in the pond one time, but no other activities were identified. Sites CB102 and CB104 had observed and interview identified activities that included fishing, walking, biking, standing and playing on the shore.

At Site CB102, the site adjacent the Northlake College Campus, a person was identified fishing during two of the three surveys ([Photogroup 4-16](#)). During the third survey at the site, high school aged students, apparently leaving school, were using the concrete crossover walking toward the college campus. Students were observed carrying books and backpacks and traveling in groups of two or more. Since the persons walking were school age and minors, no pictures were collected due to possible legal ramifications. One interview was collected from a City of Irving employee stated that he had observed and heard of fishing occurring at the site more than once.

During one of the trips to look for potential persons to interview at Site CB102, a fisherman was observed and approached from the college campus side of the stream. The gentleman stated that he did fish in the stream that borders the college campus, but only catch and release. He does not eat the fish and does not put his hands in the water while fishing. He further stated that he fishes one to two times a month and has observed others fishing as well.

No interviews were collected at Site CB104 due to potential interviewees being under age or declining to be interviewed. Two under age persons were observed standing on the culvert crossing at the 150-m transect and throwing rocks into the pond ([Photogroup 4-17](#)). They inquired as to what we were doing and volunteered that they do not recreate in the water. They lived in a local apartment complex and crossed the field on their way to and from school. A few other persons, less than 5, were observed walking across the field, and one person was observed riding a bicycle across the field. No other activities were observed. Of the activities identified,

the risk of potential water recreation was minimal. The activities noted for the two youths were standing, playing on shore, and walking.

Copies of the interviews conducted along Cottonwood Branch are located in Appendix B-4.

Summary

RUAA surveys were conducted at four sites along Cottonwood Branch on August 4-8, 2009, August 25-29, 2001, and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures, and interviews from each survey are located in Appendix B-1, B-2, B-3 and B-4, respectively.

Few activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 4-4. Both observations and interviews indicated that other than fishing at CB102, no other types of water recreation occur along Cottonwood Branch. People were observed in the vicinity of the stream along Cottonwood branch but other than the fishing mentioned above, no other activities were observed or reported.

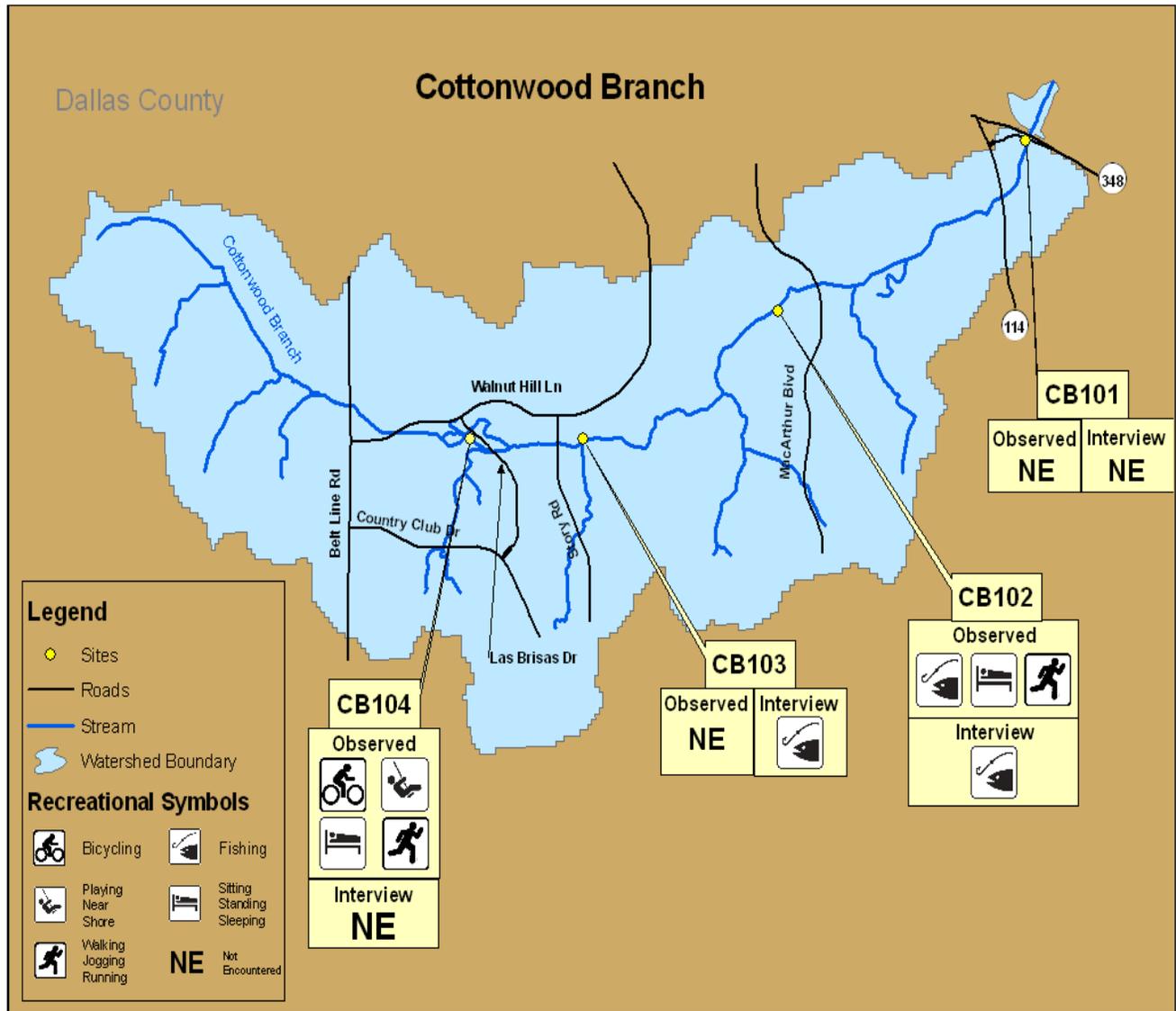


Figure 4-4 Summary of activities observed and reported in interviews at sites along Cottonwood Branch

Cottonwood Branch (Segment 0822A) Photogroups



Photogroup 4-1 Cottonwood Branch Site CB101 showing streambanks and in bottom right photograph the drop structure for Cottonwood Creek at the golf course. [\[Return to Text\]](#)



Photogroup 4-2 Cottonwood Branch Site CB101 showing small dam just downstream of 0-m transect. [\[Return to Text\]](#)



Photogroup 4-3 Cottonwood Branch Site CB101 showing consistency of channel dimensions. [\[Return to Text\]](#)



Photogroup 4-4 Cottonwood Branch Site CB102 showing general stream characteristics and concrete stream crossing. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 4-5 Cottonwood Branch Site CB102 showing access from golf course and view of Northlake College at stream. [\[Return to Text\]](#)



Photogroup 4-6 Cottonwood Branch Site CB102 showing DCRUD no trespassing sign on fence. [\[Return to Text\]](#)

[Remainder of page intentional left blank]



Photogroup 4-7 Cottonwood Branch Site CB102 showing bank vegetation and maintained areas near stream at Northlake College. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 4-8 Cottonwood Branch Site CB103 showing access restrictions that limited reach length to 270-m. (Field crew shown in photographs) [\[Return to Text\]](#)



Photogroup 4-9 Cottonwood Branch Site CB103 showing dam above 270-m transect (lower right photograph) and the gabions and concrete channel in the vicinity of the 240-m transect. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 4-10 Cottonwood Branch Site CB103 showing riparian zone. (Field staff shown on photograph on right) [\[Return to Text\]](#)



Photogroup 4-11 Cottonwood Branch Site CB103 showing example of water fowl (duck). [\[Return to Text\]](#)



Photogroup 4-12 Cottonwood Branch Site CB104 showing stream and surrounding riparian zone at 0-m transect (upper row of photographs) and impoundment at 60-m transect (lower row of photographs). [\[Return to Text\]](#)



Photogroup 4-13 Cottonwood Branch Site CB103 showing impoundment at 150-m transect (upper left) and natural channel at 300-m transect (other two photographs). (Individual in upper left picture is TIAER staff.) [\[Return to Text\]](#)



Photogroup 4-14 Cottonwood Branch Site CB103 at 180-m transect showing tributary to Cottonwood Branch [\[Return to Text\]](#)



Photogroup 4-15 Cottonwood Branch Site CB104 showing debris and trash at 210-m, 240-m, and 270-m transects. [[Return to Text](#)]



Photogroup 4-16 Cottonwood Branch Site CB102 showing fishing activities (right photograph person fishing barely visible as white dot near center of photograph and immediately to right of water). [[Return to Text](#)]



Photogroup 4-17 Cottonwood Branch Site CB104 showing youths throwing rocks into impounded water (members of field crew to the right). [Return to Text](#)

CHAPTER 5

GRAPEVINE CREEK (SEGMENT 0822B)

Watershed Characterization

Segment 0822B is small tributary of the Elm Fork Trinity River (0822) below Lake Lewisville. Grapevine Creek originates in Tarrant County on the north end of DFW Airport and flows generally northeast through Grapevine, Texas and forms the boundary between Coppell and Irving, Texas prior to entering the Elm Fork Trinity River near Carrollton, Texas north of Dallas (Figure 5-1). This creek runs through residential developments in the lower and middle portions of the reach and industrial/commercial in the upper portion (land use on Figure 5-2 and aerial photograph on Figure 5-3). TCEQ lists flow type for this stream as intermittent. The middle portion of the reach, from North MacArthur Blvd. to Southwestern Blvd., appears natural. The lower and upper portions both exhibit evidence of channelization and levees have been built to abate flooding from North MacArthur Blvd. to near the confluence with Elm Fork Trinity River. Three sites were selected in Grapevine Creek for performance of an RUAA. There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists flow type for this stream as intermittent and based on this flow regime assigned a presumed aquatic life use of minimal (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Grapevine Creek site selection the major interaction occurred with City of Irving staff.

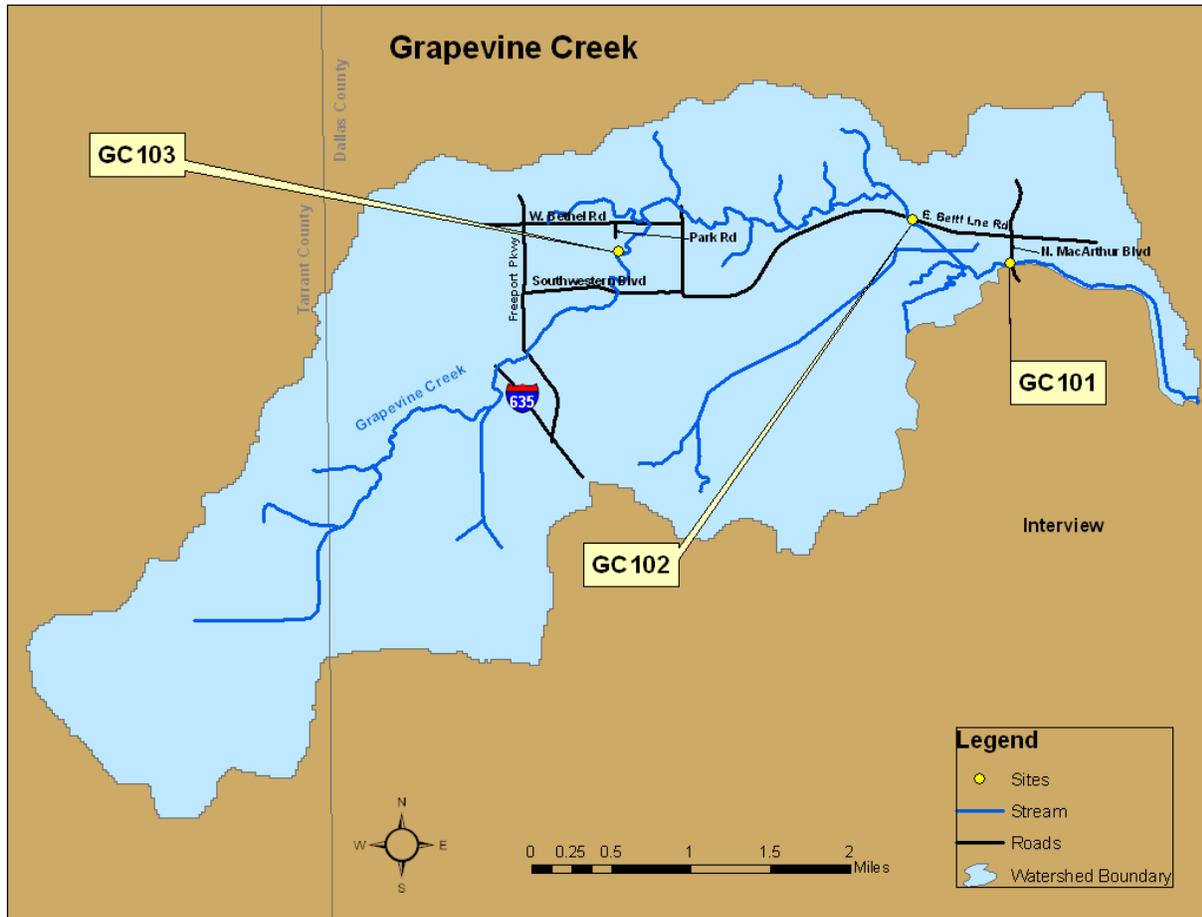


Figure 5-1 Grapevine Creek (0822B) showing RUAA survey sites

Survey Site Descriptions

The survey sites selected for Grapevine Creek (Segment 0822B) are provided in Figure 5-1. Three sites were identified as suitable RUAA locations along this stream. A brief description of each site follows.

Site GC101 (TCEQ Station 20311) is located at N. McArthur Blvd. in Irving, Texas. Grapevine Cr. at this area is bordered by light commercial and residential development. The stream is accessible at this point for contact recreation.

Site GC102 (TCEQ Station 17169) is located approximately 30 m downstream of E. Beltline Rd. between Irving and Coppell, Texas. This location is accessible from up or downstream.

Site GC103 is located in Coppell at Park Rd. off W. Bethel Rd. This site is located in Grapevine Springs Park and is easily accessed from the bank.

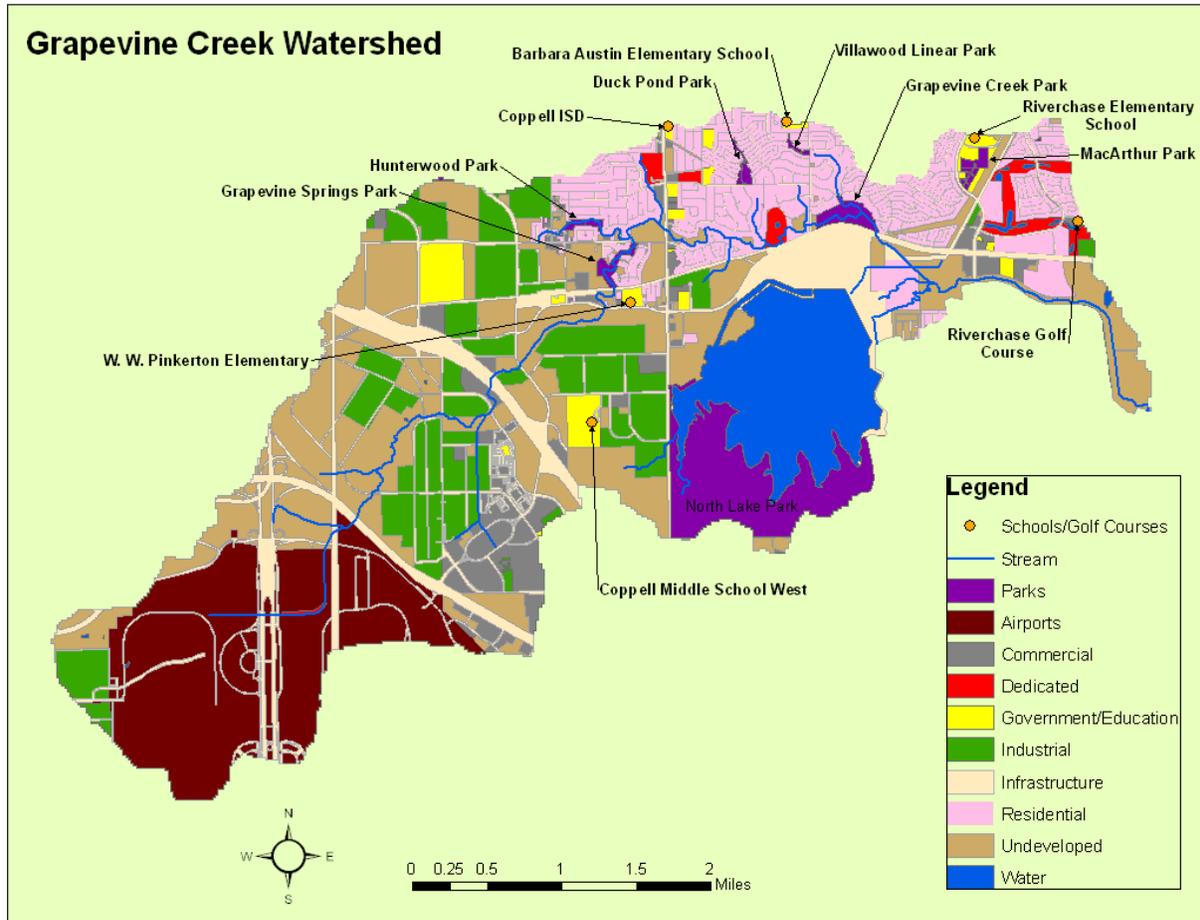


Figure 5-2 Land use/land cover for Grapevine Creek Watershed (Source: NCTCOG, 2007 & 2009)

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Grapevine Creek.

Surveys conducted on Grapevine Creek were conducted during varying air and water temperatures as show in Table 5-1. Water temperatures were warm enough for recreational activities to occur.

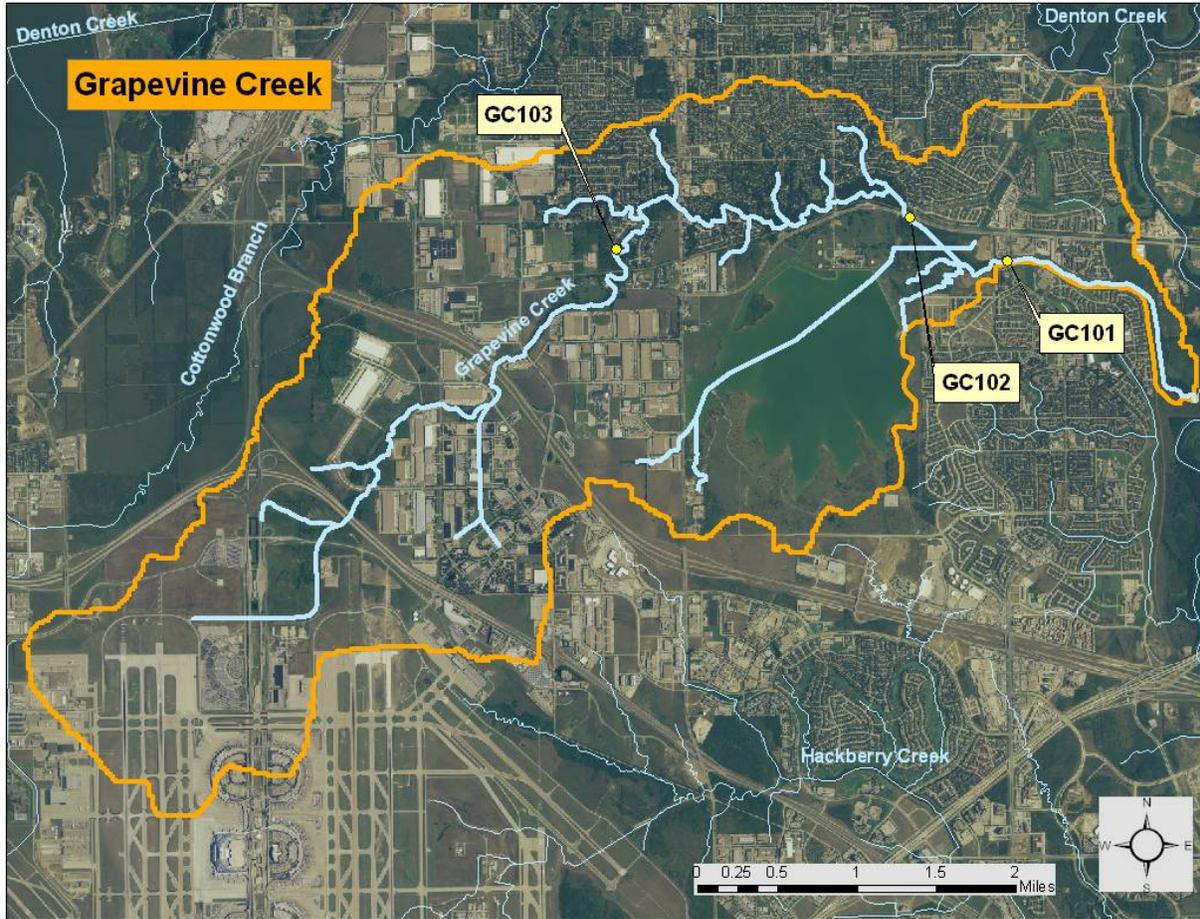


Figure 5-3 Aerial photograph of Grapevine Creek Watershed (Source: NAIP, 2005)

Table 5-1 Temperatures measured at each site along Delaware Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Grapevine Creek	GC101	29.8	28.5	26.2	30.4	28.5	25.6
	GC102	30.3	27.7	23.7	29.6	29.0	24.3
	GC103	29.2	27.1	27.0	29.0	28.0	24.3

Table 5-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 5-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys.

Table 5-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge are also listed for each site and survey.

Table 5-2 Stream channel and riparian zone assessment for Grapevine Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Grapevine Creek	GC101	Right Bank	Low water crossing; Rock dam; ½ channelized; ½ natural	Shrub/tree dominated	Large	None	Urban
		Left Bank		Shrub/tree dominated	Large		Urban
	GC102	Right Bank	Upper ½ channelized; Lower ½ natural	Shrub/tree dominated	Large	None	Natural
		Left Bank		Shrub/tree dominated	Moderate		Natural
	GC103	Right Bank	Channelized; dam just above 30m transect	Upper ½ tree/shrub; Lower ½ mowed/maintained	Large	Grapevine Springs Park	Upper ½ Natural Lower ½ Park
		Left Bank			Large		

Table 5-3 Physical Descriptors of Grapevine Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Grapevine Creek	0822B	5.5	3	1	0.42	0.42	0.44	Intermittent
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
GC101	300	11	0	0.44	0.52	0.44		
GC102	300	11	1	0.35	0.32	0.39		
GC103	300	11	0	0.46	0.42	0.49		

Table 5-4 Additional hydrographic parameters of Grapevine Creek

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Grapevine Creek	GC101	11.5	1.8	5.3	0.82	Normal
		GC102	6.5	1.5	5.3	0.77	Normal
		GC103	11.6	2.2	5.3	0.62	Normal
August 25-28, 2009	Grapevine Creek	GC101	11.4	1.6	5.5	0.31	Normal
		GC102	6.5	2.1	5.3	0.26	Normal
		GC103	11.6	2.2	5.3	0.17	Normal
May 27-31, 2010	Grapevine Creek	GC101	12.6	2.02	5.2	1.61	Normal
		GC102	6.8	1.85	6.0	1.50	Normal
		GC103	12.6	2.54	3.91	0.95	Normal

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Physical Description of Site GC101

The stream at Site GC101 is channelized from the 0-m transect to the 150-m transect and natural from the 150-m transect to the 300-m transect. The banks of the stream are steep with dense vegetation making accessibility to the stream moderately difficult. Part of the riparian zone in the lower half of the reach is mowed and maintained in the area behind a strip mall located north of the stream. Remnants of a rock dam are located at the 210-m transect and a low water crossing is located at the 270-m transect. Table 5-2 describes the stream channel and riparian zone appearance at this site. Site GC101 is located in an urban/suburban location at the N. MacArthur Blvd. bridge crossing of Grapevine Creek. The site is in a heavy populated area and accessible by the public. There were no fences impeding access to the stream. [Photogroup 5-1](#) and [Photogroup 5-2](#) depict the stream channel banks, riparian corridors, and low water crossing.

The surveyed reach at Site GC101 was a wadeable stream with the lower half being relatively narrow and shallow and the upper half being more natural with deep and wide areas. Dominant substrate of the channel was mud/clay with some stretches of the stream containing gravel. Two pools were identified during each of the surveys and the dimensions of the pools are listed in Table 5-5.

Table 5-5 Pool dimensions at Site GC101

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	41.3	9.7	0.9
	41.0	11.5	1.21
August 25-28, 2009	41.3	9.7	1.0
	41.0	11.4	1.25
May 27-31, 2010	23.0	9.7	0.64
	40.0	12.6	1.4

Parking locations were identified north of the stream at the shopping facilities. Both aquatic vegetation and algae cover were rare to common during the three surveys. There was a slight presence of water dependent birds and snakes with no other vertebrates identified. Tracks and fecal droppings were observed. No scum or film was observed on the surface. No unusual odors were detected. Stream channel and bank garbage, both large and small, was generally rare but on one visit, small garbage was recorded as common. Garbage, when present, generally consisted of plastic bags and bottles.

Physical Description of Site GC102

Grapevine Creek at Site GC102 is a mostly natural wadeable stream located at East Belt Line Road and Grapevine Creek in a largely suburban area. The upper half of the stream is partially channelized with gabions located along the left bank. The right side of the upper half, and both sides of the lower half, are natural in appearance. The concrete apron of the bridge provides moderately easy access to the stream, although no immediate parking is available. The only observed potential parking was on the right-of-way, next to East Belt Line Road. A railroad trestle crosses the creek at the 240-m transect and a pipeline crosses the stream at the 120-m transect. Table 5-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 5-3](#) and [Photogroup 5-4](#) depict the stream appearance and pipeline and railroad crossings.

The surveyed reach at Site GC102 was a wadeable stream, relatively narrow and shallow with a few deep pockets in the upper half of the reach. Dominant substrate of the channel was sand with some small gravel intermixed throughout the reach. One pool was identified during two of the surveys and two pools were identified during the third survey. Dimensions of the pools are provided in Table 5-6.

Table 5-6 Pool Dimensions at Site GC102

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	41.0	6.47	0.65
August 25-28, 2009	40.0	6.45	0.63
May 27-31, 2010	90.0	6.00	0.79
	19.0	5.83	1.30

With the exception of the apron at the E. Belt Line bridge crossing, the banks of the stream are natural in appearance with shrubs and grasses dominating the riparian cover, though some large trees are interspersed along the bank. Grapevine Creek Park is shown on some maps to be located at the upper end of the study reach, although no entrances to the park were located by TIAER personnel. The park appears to be a wooded area with no park structures identified during the scouting trips and surveys. The area north of the stream is residential and the area south of the site is natural rangeland. Approximately 300 meters southwest of the stream is North Lake, with an electric generating station located on the northern shore (Figure 5-2 & 5-3).

Aquatic vegetation was rare to common as was algae cover was during the three surveys. There was a slight presence of water dependent birds during the initial survey with no additional observations noted during the two subsequent surveys. There was no other observation of other vertebrates during any of the three surveys. Bank and channel garbage observed during the first two surveys was rare. During the third survey, bank garbage was still rare while large garbage in the stream was not observed at all. Small channel garbage, consisting of plastic bags and bottles, was commonly observed. No surface scum or film was noted and no unusual odors were detected. Both fecal droppings and animal tracks were observed during all three surveys.

Physical Description of Site GC103

Grapevine Creek at Site GC103 is a channelized stream running through Grapevine Springs Park. The stream appears to have been diverted from its original path to flow through the park. A dam located upstream of the park directs water into the park through a decorative rock channel that adds to the aesthetics. Based on aerial maps, it appears that the stream reconnects with the natural channel just downstream of the park area. The study reach at this site contained two wooden bridges and a concrete dam on the lower half of the reach. A pipeline and a railroad crossing were located on the upper half of the reach, near the 300-m transect. [Photogroup 5-5](#) and [Photogroup 5-6](#) depict the aforementioned structures.

The park at Site GC103 contains large trees with mowed and maintained areas from the 30-m transect to the 120-m transect. Below the 0-m transect and from the 120-m transect to the 300-m transect, the riparian zones transition from mowed and maintained to a more natural tree and shrub riparian zone. Table 5-2 describes the stream channel and riparian zone appearance at this site. In the park the stream is bordered by decorative rock walls on both sides that afford several easy access points to the water. There are picnic tables and grills located beneath the large trees

and walking trails throughout the park. Above the park, the closeness of trees and shrubs make access to the stream more difficult. [Photogroup 5-7](#) and [Photogroup 5-8](#) show the banks of the stream and decorative walls of the stream and available park amenities.

The reach surveyed at Site GC103 is a wadeable stream with a bedrock bottom. Depths of the stream remained relatively constant, generally less than 1.0 meter. One pool was identified during the third survey. Dimension of the pool were 13 meters long and 12.6 meters wide with a maximum depth of 0.5 meters. Some large rocks were located in the stream channel at the 300-m transect near the railroad trestle (previous Photogroup 5-6).

The area around the site is highly residential and developing, with obvious growth occurring during the time period of the three surveys. One business facility is located past the wooded area southwest of the site. The only entrance to the park is located off West Bethel Road with a small parking lot (capacity of approximately ten cars) on the north side of the park. A new senior center was built west of the site during the time the surveys were conducted.

There was a slight presence of domestic pets observed at the site with no other mammals noted. Tracks and fecal dropping were observed during all three surveys. Aquatic vegetation was rare with algae cover rare to common. Large garbage in the channel was rare to absent, while small channel garbage was rare, and when present consisted of plastic bags and bottles. Bank garbage was generally rare with one observance of no bank garbage. Foam was observed on the surface of the stream during the first survey, while the stream appeared clear the other two visits. No unusual odor was detected in the clear stream. The stream has sufficient depth to support some types of recreation and has a very nice appeal.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. Table 5-7 show the types of general activities observed at each site for each survey. Table 5-8 show the types of activities identified during the interviews.

Site GC101 revealed no types of primary recreation during the RUAA surveys or from interviews. ATV tracks were observed beneath the bridge during the first visit. Footprints were observed beneath the bridge during the second trip. [Photogroup 5-9](#) shows the ATV tracks and footprints. Dense vegetation along the banks of the stream made access moderately difficult. TIAER personnel made a path through the shoulder tall vegetation and slid into the stream from the bank to conduct the surveys, no footpaths were observed.

No primary contact recreation was identified at Site GC102. ATV tracks and bare-foot prints were observed beneath the bridge crossing in the sand. Graffiti was also located on the apron of the bridge. [Photogroup 5-10](#) depicts the aforementioned tracks and graffiti. During the third survey, a jogger was observed running beneath the bridge. The jogger came down the north side of the bridge, ran beneath the bridge, and ran back up the south side of the bridge. No other activities were identified at Site GC102 which would involve water recreation, primary or secondary contact. In an interview with a City of Irving employee, ATV tracks are often seen

Table 5-7 Summary of general activities observed during surveys of Grapevine Creek

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	GC101	None	-	-	-	-	-	-	-	-	-	X*	-	-	-	-	-
	GC102	None	-	-	-	-	-	-	-	-	-	X*	-	-	-	-	-
	GC103	1-10	-	-	X	-	X	X	-	-	-	-	-	-	-	X	-
August 24-29, 2009	GC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GC102	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GC103	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
May 27-31, 2010	GC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GC102	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	GC103	1-10	-	-	X	-	X	-	-	-	-	-	-	-	-	X	-

¹None; 1-10; 11- 20; 20-50; >50
 * Tracks

Table 5-8 Activities reported in interviews at sites along Grapevine Creek.

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Grapevine Creek	GC101	-	-	-	-	-	-	-	-	-
	GC102	-	-	-	-	-	-	-	-	-
	GC103	-	3	-	2	-	-	1	-	-

beneath the bridge and graffiti was noted as being on the concrete apron beneath the bridge. The employee has neither seen nor heard of any form of water recreation in the stream.

At Site GC103, Grapevine Springs Park, several people were observed utilizing the park, but not for contact recreation (e.g., [Photogroup 5-11](#)). People were observed sitting on benches, walking on paths, with and without domestic pets (dogs and a cat). A Boy Scout meeting was being held during the second survey, and a young lady was conducting a photo shoot during the first visit. Aesthetically, the park is well maintained and inviting. According to several interviews, the park is the best kept secret in Coppell, as not many people seem to know about the park and the park is generally not very crowded.

One of the six interviews attempted was uninformative in that one of the two persons asked TIAER personnel if the location was Grapevine Springs Park. Two of the remaining five interviews revealed primary contact recreation occurring below the dam at the 0-m transect of the reach. The remaining three interviews stated that they personally did not use the stream for recreation and had not seen or heard of anyone else recreating in the stream.

The two interviewees indicating primary contact occurred adding that they allowed their kids to wade just below the lower dam in the shallow, moving water. The stream at that location contains a bedrock bottom and is clear. The water above the dam was generally slow moving, quite a bit deeper, and, although still clear, contained some algae, which some perceive as dirty. The word “dirty” was used by one individual to describe the water in the stream. The children of this person, however, did indicate a willingness to get in the water, but were prohibited by their mother.

The Boy Scout leader was also interviewed and stated that his troop does many activities at the park but none involve contact recreation. The troop may cross the stream on stones, but do not get in the stream. Other people have been observed in the park crossing the stream on stones, but again, no contact recreation was observed.

One gentleman, who was walking his dogs, indicated that he comes daily to walk the trails with his dogs and frequently sees other people walking their pets as well. He stated that people utilize the park for eating lunch at picnic tables, but he has never observed any contact with the water.

One woman, who was walking her cat, indicated that she frequently brings her children to the park as an escape from television and video games. She allows her children to run the trails and sometimes wade in the riffle areas downstream of the dam. She has infrequently observed other children with a blow-up raft floating down the stream below the study reach.

Another gentleman stated that he has frequently observed high school aged youths wading in the stream. He does allow his own children to wade in the stream beneath the dam, but not very often. He would not allow them to enter into the deeper portions of the stream above the dam near the 30-m transect.

Copies of the interviews conducted along Grapevine Creek are located in Appendix C-4.

Summary

RUAA surveys were conducted at three sites along Grapevine Creek on August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures, and interviews from each survey are located in the Appendix C-1, C-2, C-3 and C-4, respectively.

Few activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 5-4.

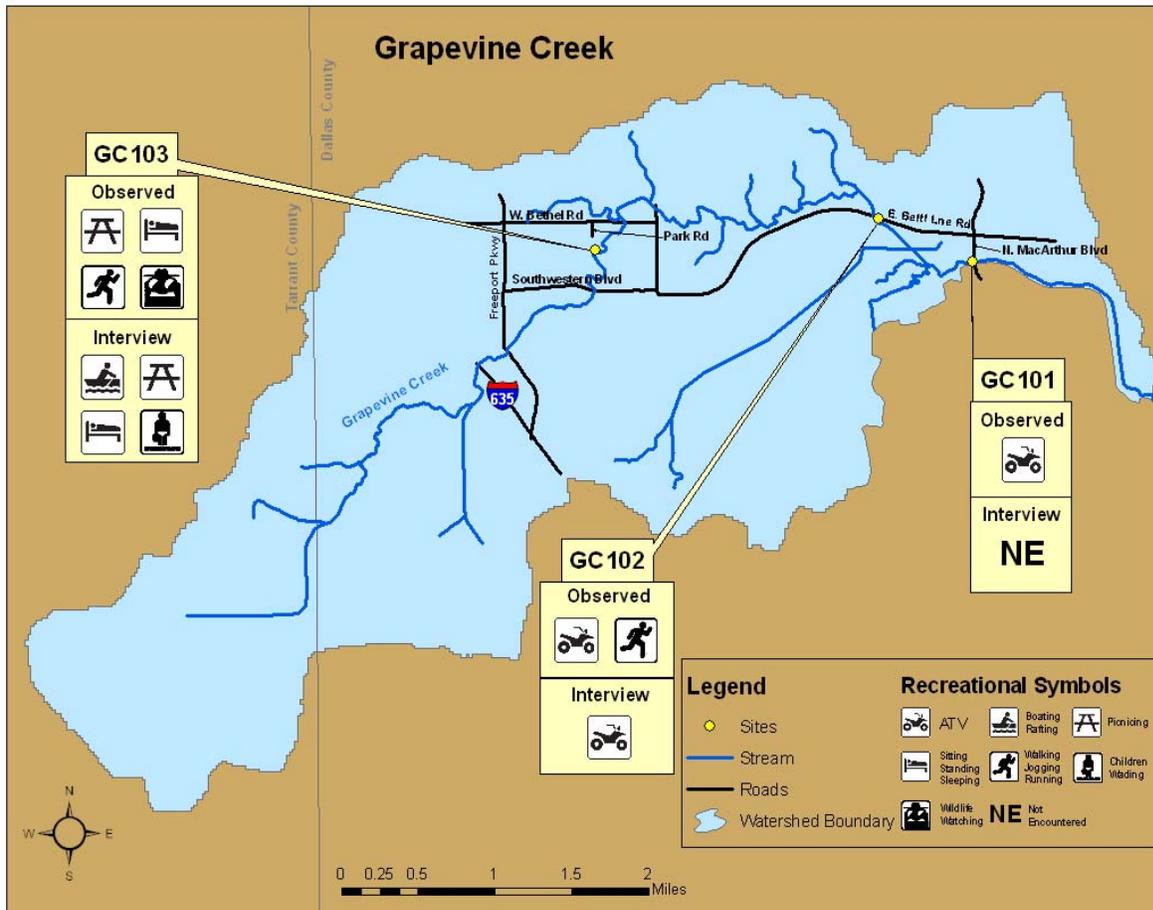


Figure 5-4 Summary of activities observed and reported in interviews at sites along Grapevine Creek. (Note: The interview of rafting at GC103 is with blow-up raft, not white-water rafting.)

Both observations and interviews indicated that primary contact recreation does occur at Site GC103 in Grapevine Springs Park. Children waded in the lower portions of the stream with the bedrock bottom and moving, shallow water. ATV tracks and footprints were observed by TIAER personnel at Sites GC101 and GC102, and verified for Site GC102 in an interview with a City of Irving employee. No other forms of recreation or evidence of recreation were identified at either site. Water depths are sufficient for contact recreation in Grapevine Creek but were only reported to occur at Site GC103, Grapevine Springs Park. Dense vegetation and limited parking options make recreation difficult at Sites GC101 and GC102.

Grapevine Creek (Segment 0822B) Photogroups

**Photogroup 5-1**

Grapevine Creek Site GC101 showing creek upstream and downstream at 0-m transect (upper row), downstream at 300-m transect (middle row left), and riparian zone on lower half of reach (middle row right) and at 210-m transect (lower row). [\[Return to Text\]](#)



Photogroup 5-2 Grapevine Creek Site GC101 showing low water crossing at 270-m transect. [[Return to Text](#)]



Photogroup 5-3 Grapevine Creek Site GC102 showing upper half of stream with gabions at 300-m transect (upper row) and natural channel of lower half at 150-m and 0-m transects (lower row). (Individual pictured is TIAER staff.) [[Return to Text](#)].



Photogroup 5-4 Grapevine Creek Site GC102 showing pipeline and railroad crossings. (Individuals pictured are TIAER staff.) [Return to Text](#)



Photogroup 5-5 Grapevine Creek Site GC103 showing streambanks and bridges in Grapevine Spring Park. (Individuals pictured are TIAER staff.) [Return to Text](#)



Photogroup 5-6 Grapevine Creek Site GC103 at 300-m transect looking downstream. [\[Return to Text\]](#)



Photogroup 5-7 Grapevine Creek Site GC103 showing banks of stream at and below the 120-m transect (upper row) and above the 120-m transect (lower row). (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 5-8 Grapevine Creek Site GC103 showing amenities in Grapevine Springs Park [\[Return to Text\]](#)



Photogroup 5-9 Grapevine Creek Site GC101 showing ATV tracks and footprints. [\[Return to Text\]](#)



Photogroup 5-10 Grapevine Creek Site GC102 showing ATV tracks, graffiti on bridge apron, and barefoot tracks. [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 5-11 Grapevine Creek Site GC103 showing picnic type activities in Grapevine Springs Park (center of photo under trees). [\[Return to Text\]](#)

CHAPTER 6

COPART BRANCH MOUNTAIN CREEK (SEGMENT 0841E)

Watershed Characterization

Segment 0841E is a 2.8 mile creek running upstream from confluence with Mountain Creek to approximately 0.3 miles upstream of Camden Road on Dallas Naval Academy, Dallas County (Figure 6-1). Much of the watershed surrounding Copart Branch is densely commercial with a large portion the businesses being auto salvage, though the land use in the southern portion of the watershed is governmental (i.e., the Dallas Naval Academy) (land use on Figure 6-2 and aerial photograph on Figure 6-3). Access to this stream is limited by chain link fencing at two of the crossings and the other access points are over grown with poison ivy and other dense vegetation. There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists flow type for this stream as intermittent with pools and based on this flow regime assigned a presumed aquatic life use of minimal (TCEQ, 2008).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Copart Branch site selection the major interaction occurred with City of Irving staff.

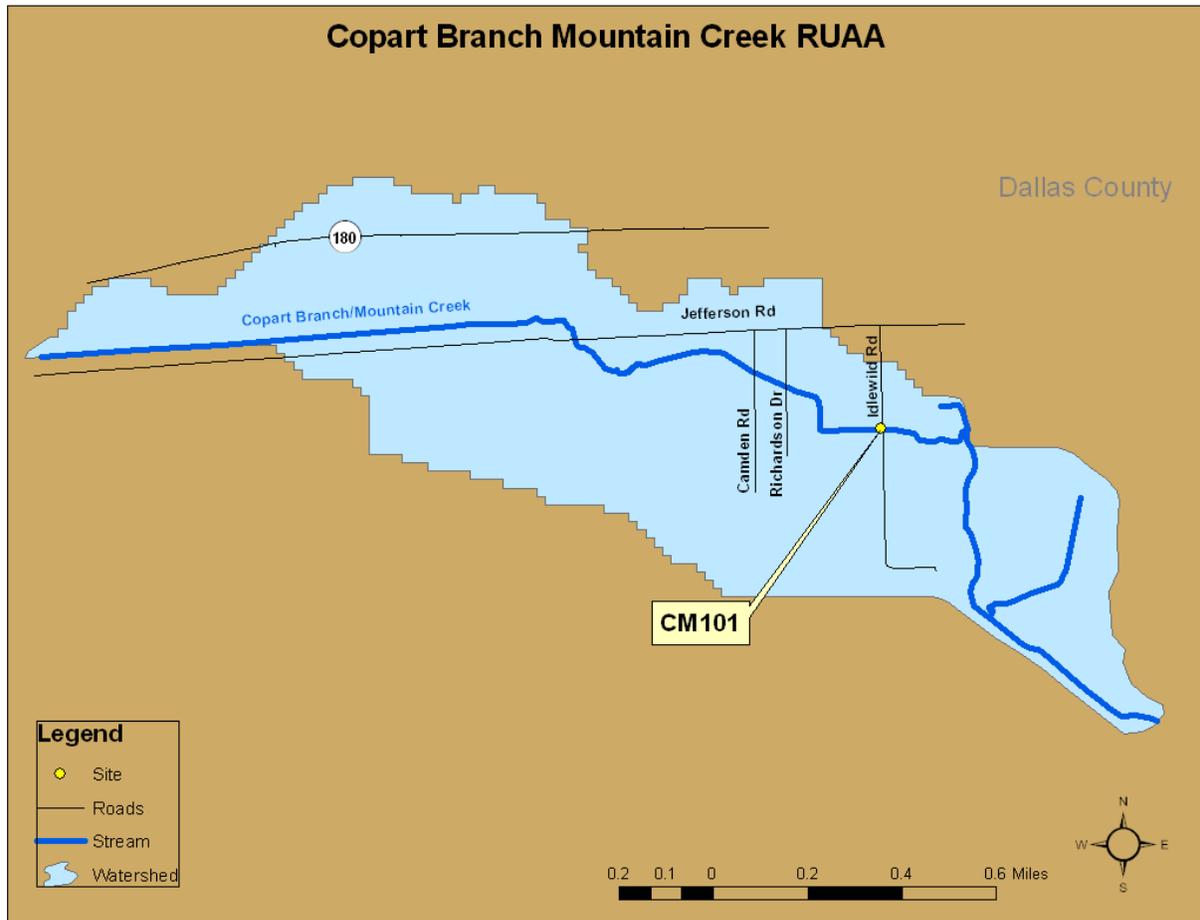


Figure 6-1 Copart Branch (Segment 0841E) showing RUAA sites

Survey Site Description

The survey site, CM101, selected for Copart Branch Mountain Creek (Segment 0841E) is shown in Figure 6-1. The short stream distance and inaccessibility to most of this creek limited the number of RUAA sites to one. A brief description of the site follows.

Site CM101 (TCEQ Station 17672) is located at Copart Branch downstream of Idlewild Rd. west of Mountain Creek, in Grand Prairie, Texas. The area is heavy commercial with no residential development near the stream. Access is limited by chain link fences that line the stream at the road crossing ([Photogroup 6-1](#)) and down both sides past numerous wrecking yards used for stockpiling old cars. The stream below this station appears channelized and the banks appeared to be levied. Access to the stream at this location was obtained through contacting the owner of the business upstream of Idlewild Rd. The property owners downstream of Idlewild were contacted for access permission but this request was denied.

Two additional sites at road crossings were considered during the initial reconnaissance trip. Both sites were dismissed because of access difficulties or hazardous conditions. A brief description of the two sites that were not included in the RUAA surveys follows.

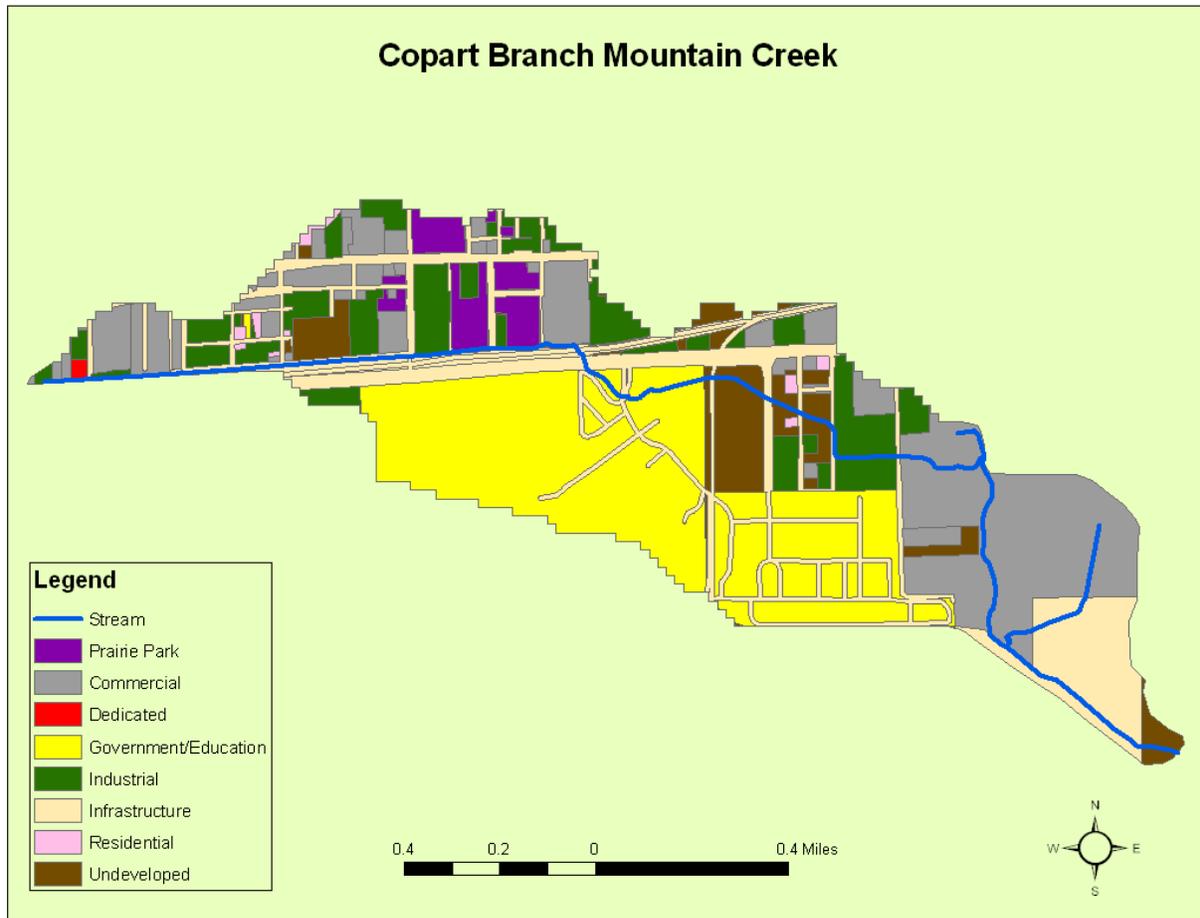


Figure 6-2 Land use/land cover for Copart Branch Watershed (Source: NCTCOG, 2007 & 2009)

A potential site was identified at the Camden Drive road crossing of Copart Branch Mountain Creek (Figure 6-1; [Photogroup 6-2](#)). The adjacent area upstream consisted of trees and dense vegetation, much of which was poison ivy. There were no footpaths or walkways observed leading to the stream. The area downstream was much the same with more trees and vegetation, including poison ivy. A concrete guardrail was located on the downstream side of the crossing. There were no visual signs of recreation, primary or secondary, identified at this site. The site was located in a highly commercial land use area with no residential areas identified in the immediate area. The density of the poison ivy at this location was instrumental in the decision not to use this location due to the health risk to personnel.

A second potential site was identified at the Richardson Drive crossing of Copart Branch Mountain Creek (Figure 6-1; [Photogroup 6-3](#)). The area upstream consisted of trees and vegetation along the banks of the stream, most of which was poison ivy and beggar's lice. The downstream area contained a chain link fence at the road which prevented anyone from entering the stream or banks. No visual signs such as footpaths, trails, or fishing gear were observed in

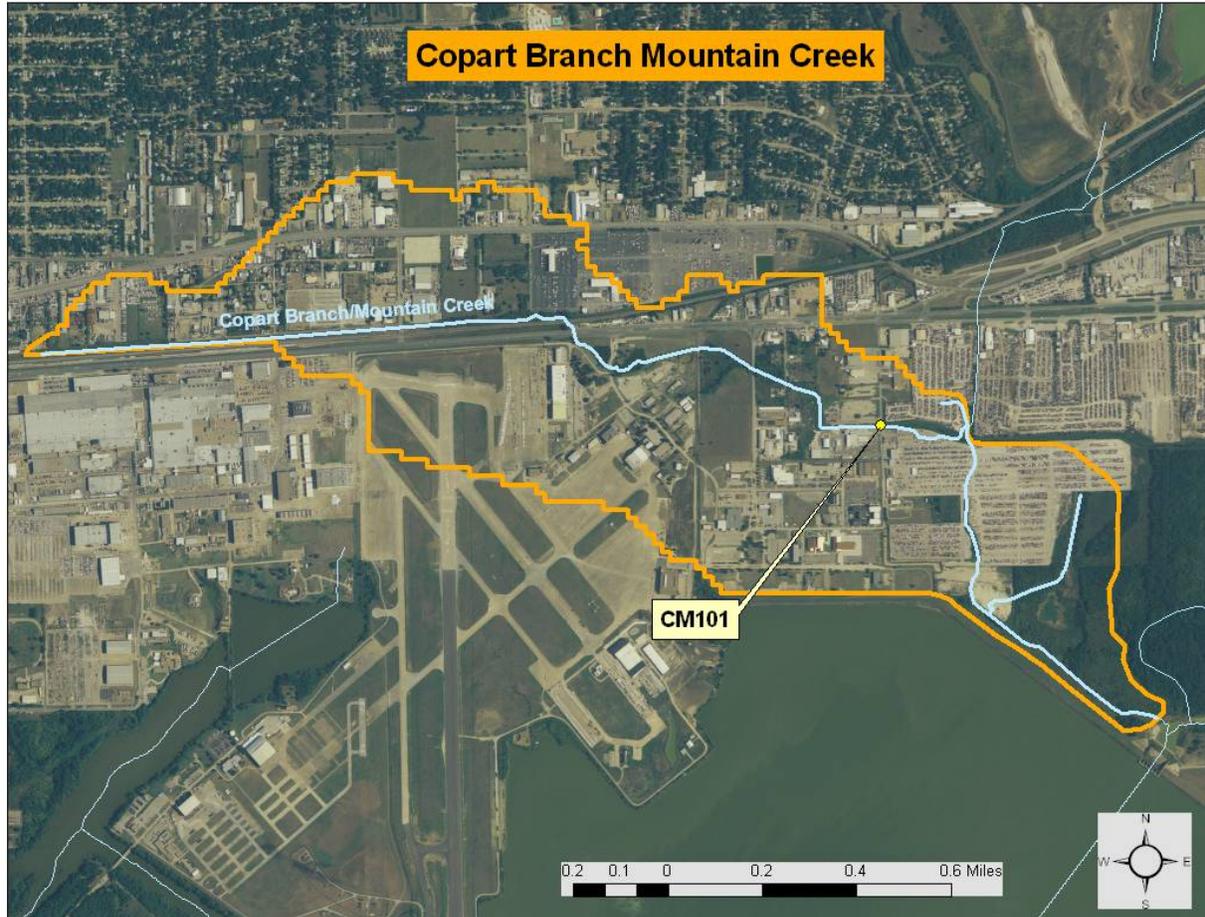


Figure 6-3 Aerial photograph of Copart Branch watershed (Source: NAIP, 2005)

the area. As at Camden Drive, the health hazard risk to the field staff was one factor involved in the decision not to use this location. The other limiting factor was the fence that prohibited access downstream.

It should be noted that during the August 8, 2010 survey at Site CM101, TIAER personnel did drive by Camden Drive and noted that nobody was observed recreating in the area of the stream or in the stream itself ([Photogroup 6-4](#)).

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Copart Branch Mountain Creek.

Surveys conducted on Copart Branch were conducted during varying air and water temperatures as show in Table 6-1. Water temperatures were warm enough for recreational activities to occur.

Table 6-1 Temperatures measured at Site CM101 along Copart Branch Mountain Creek

August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
30.8	27.1	23.7	27.2	35.0	26.3

Table 6-2 contains information on the appearance of the stream channel and riparian zone at Site CM101.

Table 6-3 shows the average thalweg depth for Site CM101 during each of the RUAA surveys. The reach length for the site was 300 meters with a total of 11 transects surveyed.

Table 6-4 shows the maximum, minimum and average widths at Site CM101 for each survey. The observed flow and total discharge are also listed for the site for each survey.

Physical Description of Site CM101

The stream at Site CM101 on Copart Branch Mountain Creek is channelized with a round pipe culvert/bridge located at the 0-m transect and a concrete box-culvert/bridge at the 150-m transect. The entire length of the reach is located behind a chain link fence which is locked after business hours and on weekends. Once inside the fenced area, there are no obstacles that would prevent a person from readily gaining access to the stream. Permission for accessing the stream was obtained from the property owner, a mobile food catering service with facilities on the south side of the creek. Employee parking was restricted to the north side of Copart Branch Mountain Creek.

The surveyed reach at Site CM101 was a wadeable stream with gently sloping banks which lead to the edge of the stream. The slopes were maintained by the catering service. A gravel road was located on the north side of the stream, used to access the employee parking lot. In May 2009, employee cars of the employees were parked along the gravel road, but on subsequent visits, no parking fire lane signs were installed and parking was restricted to the parking lot located north of the 150-m transect. [Photogroup 6-5](#) shows the employee trimming the riparian zone, employee parking, and the newly installed no parking signs.

At CM101 the stream was generally narrow and shallow with depths typically less than 1.0 meter. The stream had a mud/clay dominated substrate. Little to no algae was observed; however, aquatic vegetation was abundant, especially from the 210-m to the 300-m transect ([Photogroup 6-6](#)). No odors were detected on any trip. Depth measurements were collected in this densely vegetated area during the first survey, but based on the difficulty in obtaining the measurements, they were not attempted on the second survey. During the May 2010, it was observed that a diversion channel had been constructed to bypass the thick vegetation, so the depths were collected in that channel on that visit ([Photogroup 6-7](#)).

There was a slight to moderate presence of water dependent birds with fecal droppings and nests observed. A domestic pet was observed during the first survey, with no other vertebrates observed during the two other surveys. No garbage was observed on the banks or in the stream during any of the three surveys.

Table 6-2 Stream channel and riparian zone assessment for Site CM101 on Copart Branch Mountain Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys.

Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Right Bank	Concrete culvert/bridge at 150m; Round pipe culvert/bridge at 60m; channelized	R/L upper 1/3 Herbaceous marsh; R/L lower 1/3 mowed/maintained corridor	Upper 1/3 moderate; Lower 1/3 small	None	Business facility
Left Bank			Upper 1/3 moderate; Lower 1/3 small		Employee parking

Table 6-3 Physical Descriptors of Site CM101 on Copart Branch Mountain Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Copart Branch	0841E	2.8	1	0	0.36	0.26*	0.11	Intermittent w/ pools

* - Unable to measure all transects due to very dense vegetation

Table 6-4 Additional hydrographic parameters of Site CM101 on Copart Branch Mountain Creek

Survey Dates	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	8.2	0.45	1.0	1.47	Normal
August 25-28, 2009	8.2	0.45	1.0	1.48	Normal
May 27-31, 2010	6.2	0.07	0.65	0.04	Low

¹ no flow, low flow, normal flow, high flow

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and days when recreational activities were apt to be observed. During the three surveys, the only people observed at the sites other than TIAER field personnel were employees of the mobile catering service. Persons were observed walking across the bridge to their vehicles leaving work. One person was observed maintaining the riparian area of the stream during the first survey. During each planned RUAA survey trip, at least one other attempt was made to visit the site other than at the time of the survey, i.e. weekend days, to see if people were utilizing the stream. No one was ever observed recreating in or near the stream during any site visit.

An interview of the mobile catering service owner was conducted. He related that he has been in the area 30 to 40 years and has never observed anyone recreating in the area. He further stated that years ago the streamflow was contained in a four-inch pipe, but when the Naval Air Station was built, the flow rate increased to an amount greater than what the pipe could handle and the stream was created. Evidence of the PVC pipe was observed at the 30-m transect as depicted in [Photogroup 6-8](#). He further stated that following our visits to the facility in 2009 the flow rate decreased to what it measured in May. Finally, he stated that the diversion channel was constructed due to beavers building dams creating the marsh type environment observed above the 210-m transect. They were attempting to drain the marsh area but the beavers just built dams farther upstream. A copy of the interview sheet is located in Appendix D-4.

Summary

RUAA surveys were conducted at Site CM101 on Copart Branch Mountain Creek August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. No types of contact recreation, primary or secondary, were identified at this location (see summary on Figure 6-4). The activity documented as other on the figure is the employee who was trimming the grass in the riparian zone of the stream. People observed in the area were employees going to and from work and were never seen near the stream.

Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in Appendix D-1, D-2, D-3 and D-4, respectively.

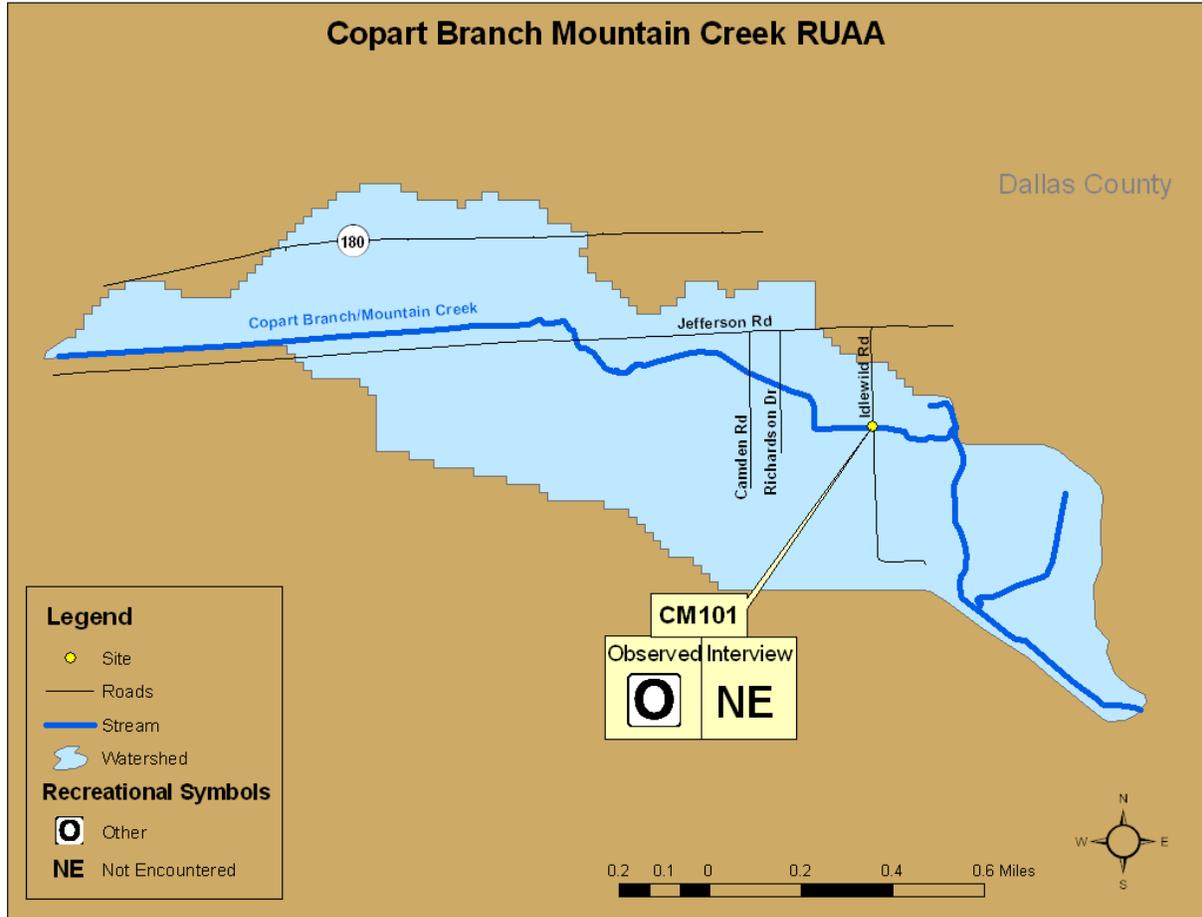


Figure 6-4 Summary of activities observed and reported in interviews at Site CM101 on Copart Branch Mountain Creek

Copart Branch Mountain Creek (Segment 0841E) Photogroups



Photogroup 6-1 Copart Branch Site CM101 (Idlewild Rd.) looking downstream (left) and upstream (right). [Return to Text](#)



Photogroup 6-2 Copart Branch at Camden Drive showing dense vegetation along the stream at the road crossing. [Return to Text](#)



Photogroup 6-3 Copart Branch at Richardson Drive showing heavy bank vegetation on upstream side and fence along downstream side of the road. [\[Return to Text\]](#)



Photogroup 6-4 Copart Branch at Richardson Drive during August 8, 2010 survey showing absence of human activity in the vicinity of road crossing. [\[Return to Text\]](#)



Photogroup 6-5 Copart Branch Site CM101 showing grass trimming on creek bank on August 5, 2009. [\[Return to Text\]](#)



Photogroup 6-6 Copart Branch Site CM101 between the 210-m and 300-m transects showing emergent aquatic vegetation. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 6-7 Copart Branch Site CM101 showing by-pass channel constructed around area of thick vegetation. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 6-8 Copart Branch Site CM101 showing what is possibly a remnant section of the 4-in diameter pipe that contained the flow in past years. [\[Return to Text\]](#)

CHAPTER 7

COTTONWOOD CREEK (SEGMENT 0841F)

Watershed Characterization

Segment 0841F is 6.5 mile stretch running upstream from approx. 0.1 mi. upstream of Mountain Creek Reservoir in Dallas County, to SH 360 in, Tarrant County (Figure 7-1). The watershed surrounding Cottonwood Creek is densely residential on the eastern and western ends and commercial/industrial in the central section (land use on Figure 7-2 and aerial photograph on Figure 7-3). Four sites were selected for RUAA performance in this creek. There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists the flow type for Cottonwood as perennial and based on this flow regime assigned a presumed aquatic life use of high (TCEQ, 2008).

Additional Information

The review of historical information and climatic conditions are found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Cottonwood Creek site selection the major interaction occurred with City of Arlington and City of Grand Prairie staff.

Survey Site Descriptions

The survey sites selected for Cottonwood Creek (Segment 0841F) are provided in Figure 7-1. Four appropriate sites for the performance of a RUAA were identified in this stream. A brief description of each site follows.

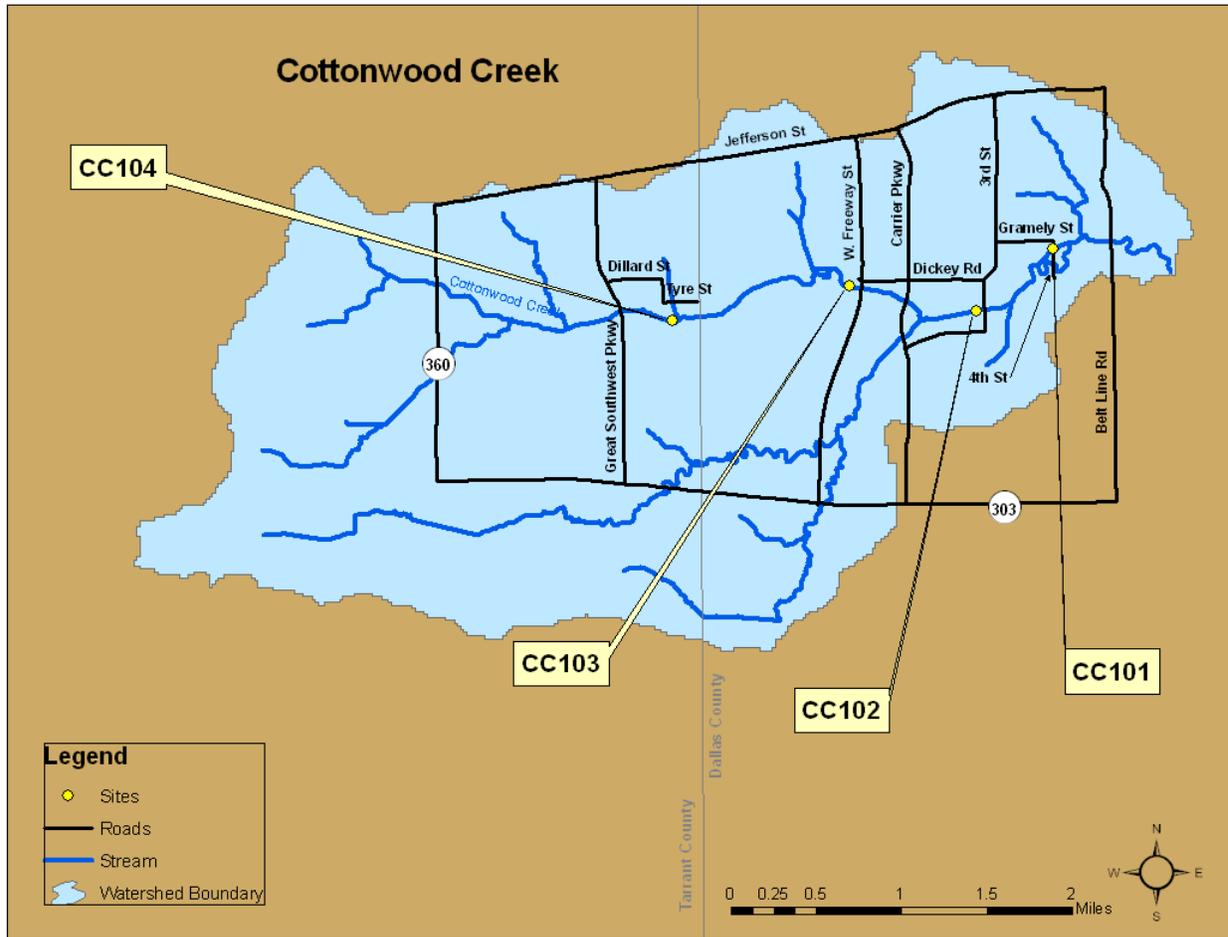


Figure 7-1 Cottonwood Creek (0841F) showing RUA survey sites

Site CC101 is located at Colgate Park off SE 4th Street in Grand Prairie. A local resident indicated that the park was abandoned some time ago but local children still use the park for bike riding. He also indicated that he observed youngsters in the stream frequently, and TIAER staff observed three children walking their bikes through the stream on the day of initial scouting.

Site CC102 (TCEQ Station 17674) is located immediately upstream of SW 3rd Street in Grand Prairie. There is a large park at this location with sports fields and a lot of open space. There were numerous individuals at this location at the initial scouting trip.

Site CC103 (TCEQ Station 17673) is located on Cottonwood Creek immediately upstream of W. Freeway St. (SH161) in Grand Prairie. The area upstream of the SH161 is a largely open and is characterized by a series of large impoundments created by dams. Though no activity was observed and the area appeared to be fenced on the north and south, access is available from Tyre Park on the west and from the area of Robinson Rd. to the east. From conversations with city employees, it was reported people were observed with fishing poles walking in the area of the impoundments. It was determined that based on possible fishing activities and no fences from Robinson Rd. and the area of Tyre Park, that an RUA should be conducted at this

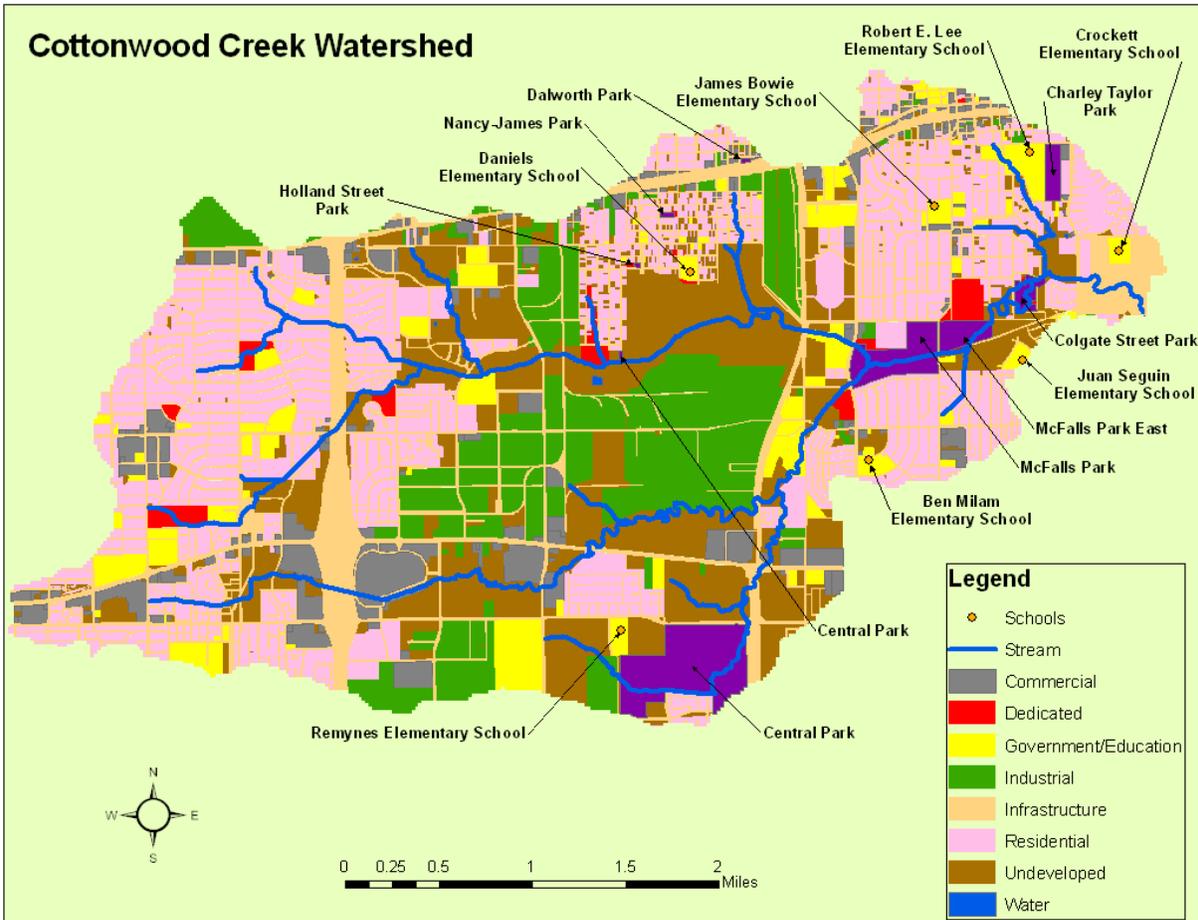


Figure 7-2 Land use/land cover for Cottonwood Creek Watershed (Source: NCTCOG, 2009 & 2010)

location. During the process of conducting the RUAAs, additional fencing was being constructed along Robinson Rd to keep people from entering the area of the impoundments.

Site CC104 is located on Cottonwood Creek at Tyre Park off Tyre Street in western Grand Prairie. This is a park contains play structures, a swimming pool, and a large amount of open, groomed space. Several individuals were observed in the park at the initial visit.

Results and Discussions

General Description of Stream and Survey Sites

The RUAAs surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Cottonwood Creek.

Surveys conducted on Cottonwood Creek occurred during varying air and water temperatures as shown in Table 7-1. Water temperatures were warm enough for recreational activities to occur.

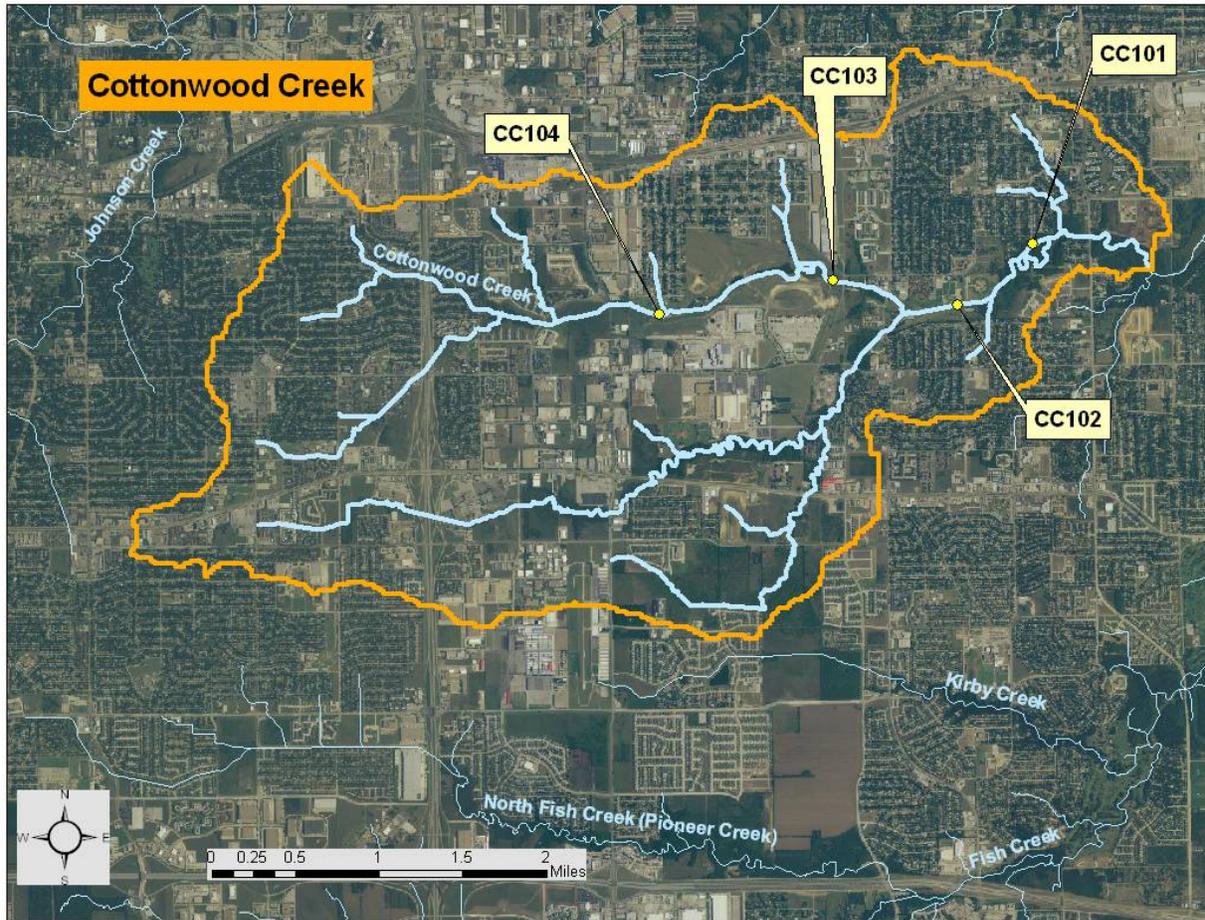


Figure 7-2 Cottonwood Creek (0841F) showing RUAA survey sites (Source: TNRIS, 2010)

Table 7-1 Temperatures measured at each site along Cottonwood Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Cottonwood Creek	CC101	33.5	31.7	37.0	31.0	37.0	29.1
	CC102	34.8	31.6	36.0	33.5	37.0	31.1
	CC103	35.8	30.2	36.0	33.3	35.0	32.7
	CC104	34.5	34.2	37.0	33.9	36.0	29.4

Table 7-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 7-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys.

Table 7-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Table 7-2 Stream channel and riparian zone assessment for Cottonwood Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Cottonwood Creek	CC101	Right Bank	Old bridge crossing at 90m; remainder natural	Shrub dominated	Large	Colgate Park; abandoned	Natural
		Left Bank		Shrub dominated	Large		Natural
	CC102	Right Bank	Natural; bridge crossing at 60m	Mowed/maintained above banks; natural along banks	Large	Cottonwood Park	Park
		Left Bank			Large		Park
	CC103	Right Bank	Concrete low water dam at 30m; large pool above 30m	Mowed/maintained	Large	None	Natural
		Left Bank		Mowed/maintained	Large		Natural
	CC104	Right Bank	Channelized at 0m transect; remainder natural	Mowed/maintained above banks; natural along banks; concrete banks at 0m	Large	Tyre Park	Natural
		Left Bank			Large		Park

Table 7-3 Physical Descriptors of Cottonwood Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Cottonwood Creek	0841F	6.5	4	3	0.59*	0.54*	0.56*	Intermittent
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
CC101	300	11	1	0.52	0.30	0.45		
CC102	300	11	1	0.52	0.44	0.44		
CC103	300	11	0	**	**	**		
CC104	300	11	1	0.32	0.43***	0.36		
<p>* To calculate avg. Thalweg for Stream Segment, a depth of 1.0m was used for station CC103, a non-wadeable stream. ** Non-wadeable stream. *** Due to difficult and unsafe conditions, depths were collected at only 3 transects.</p>								

Table 7-4 Additional hydrographic parameters of Cottonwood Creek

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Cottonwood Creek	CC101	13.3	2.25	12.0	5.57	Normal
		CC102	8.0	6.0	7.0	5.92	Normal
		CC103	110.0	7.0	90.0	0.39	Normal
		CC104	9.5	0.9	7.0	0.59	Normal
August 25-28, 2009	Cottonwood Creek	CC101	13.3	1.8	12.0	0.63	Normal
		CC102	8.0	6.0	7.0	0.53	Normal
		CC103	110.0	7.0	90.0	0.36	Normal
		CC104	9.5	0.9	7.0	0.24	Normal
May 27-31, 2010	Cottonwood Creek	CC101	11.6	3.1	6.55	0.96	Normal
		CC102	8.02	5.5	6.75	0.98	Normal
		CC103	110.0	7.0	90.0	0.37	Normal
		CC104	9.0	0.68	6.7	0.10	Normal

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Physical Description of Site CC101

The stream at Site CC101 near Colgate Park is a natural stream located in a highly residential neighborhood. An abandoned collapsed concrete road crossing is located at the 90-m transect. The somewhat steep banks are natural with shrubs and trees being the dominant vegetation. The stream substrate is primarily mud/clay. The remains of the bridge crossing provide the easiest location within the study reach to cross the stream. The stream is accessible at other locations, but vegetation and steep banks make entry into the stream more difficult. Table 7-2 describes the stream channel and riparian zone appearance at this site. Overall access to the stream is moderately difficult. [Photogroup 7-1](#) depicts the crossing and vegetated streambanks.

The surveyed reach at Site CC101 was a wadeable stream with depths generally around 0.5 meters. One pool was identified during the third survey with dimensions of 30 meters long and 11.6 meters wide with a thalweg of 0.51 meters. Two obstructions were identified during the third trip at the 180-m and 210-m transects ([Photogroup 7-2](#)).

Table 7-4 shows the hydrographic parameters collected at the site during each of the three surveys. Flow measurements collected during each survey show discharges less than 1.0 cfs during two of the surveys and one measurement around 5.0 cfs during the third survey.

Available parking for the location was limited to the end of SE 4th Street. The street at one time crossed over the stream but appeared to have been abandoned some time ago ([Photogroup 7-3](#)). There were posts and signs located at the end of the paved street stating that the road ended. There were no signs prohibiting people from walking to or across the stream.

Aquatic vegetation at the site was absent and algae cover was absent to rare. A slight presence of water dependent birds and one snake was observed during one of the surveys. No other vertebrates were observed in the study reach, although fecal droppings and tracks were present. Unusual odors were rare and the surface of the stream was clear. Large garbage in the stream was common, while small garbage in the stream was rare. Large garbage consisted primarily of remnants from household appliances. Bank garbage consisting of plastic bottles and bags, paper was also abundant. The aesthetics of the stream were not pleasant due to the level of trash observed throughout the stream. [Photogroup 7-4](#) shows the garbage along the banks of the stream

Physical Description of Site CC102

Cottonwood Creek at Site CC102 in Cottonwood Park is a natural stream with a foot-bridge crossing the stream at the 60-m transect. The stream is also accessible from the SW 3rd Street bridge crossing at the 0-m transect. The remainder of the stream is steep banked with dense vegetation that makes the overall access to the stream moderately difficult. Above the riparian areas the park grounds are maintained by the city park service. A baseball complex, soccer fields, and a swimming pool are some of the amenities located in Cottonwood Park. Ample parking serves these facilities. Table 7-2 describes the stream channel and riparian zone at CC102. [Photogroup 7-5](#) and [Photogroup 7-6](#) show the streambanks and facilities around the stream.

The surveyed reach at Site CC102 was a fairly uniform wadeable stream, with only 2.0 m difference between the minimum and maximum widths. Table 7-4 shows the maximum, minimum, and average width of the study reach. Once in the stream, walking was easy on the gravel substrate. One obstruction, a set of aluminum bleachers that had collected debris, was observed at the 60-m transect ([Photogroup 7-7](#)). No other obstructions were observed during the three surveys.

The riparian zones on both sides of the stream are mowed and maintained and are inviting for play. The foot-bridge crossing at the 60-m transect allows for passage from one side of the park to the other. There is a dam across the stream above the 300-m transect that is posted “Keep Off Dam”. [Photogroup 7-8](#) shows the dam and posted sign.

Aquatic vegetation and algae cover were absent during the first survey and rare during the later two. There was a slight to moderate presence of water dependent birds in the stream and a snake was observed during one trip. One domestic pet was observed in the mowed field south of the stream during one survey. There were no observations of any other vertebrates during any of the three surveys, although tracks and fecal droppings were noted. There was one instance of faint odor in the stream. Water was brown in color and no film or scum was observed on the surface. Channel garbage, both large and small, was rare to common, as was bank garbage. Garbage observed consisted of plastics, bags and bottles, paper, bleachers, tires, a bicycle and a shopping cart.

Physical Description of Site CC103

Cottonwood Creek at Site CC103 is a concrete channelized stream from the 0-m transect to the 30-m transect and an impoundment from the 30-m transect to beyond the 300-m transect. A large concrete dam with a walkover is located at the bottom of the reach with a metal gate to impede crossing although two individuals were observed circumventing the fence. The site is located on private property owned by Poly-America, and TIAER personnel had to obtain security clearance to enter the property. Once clearance was granted, TIAER personnel wore visitor badges while on the property. Security personnel escorted field staff to the site area to conduct the survey. Upon departing the site, TIAER personnel had to relinquish their security badges and sign out at the guard shack. During the time of the third survey, a fence was being constructed along Robinson Road to prevent entry to the area around the impoundment. Once on the property, access to the stream was moderately easy. The riparian zones around the impoundment were mowed and maintained, except the area immediately adjacent to the water. Table 7-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 7-9](#) and [Photogroup 7-10](#) depict the large impoundment with mowed riparian zones and the new fence construction along the perimeter of the property.

The reach surveyed at Site CC103 was non-wadeable. Due to the nature of the impoundment and the depth of the lakes it was speculate the dominant substrate was silt. Width measurements were collected at each transect using a range finder and are listed in Table 7-5. The stream at the 0-m transect went through an opening in the concrete channel that was one foot wide and depth of the stream was not deeper than 0.15 meters during any of the three surveys.

Table 7-5 Transect width measurements at CC103

Date	Transect Location (m)	Width (m)
August 4-8, 2009	0	7.0
August 25-28, 2009	30	28.5
May 27-31, 2010	60	47.0
	90	63.0
	120	71.0
	150	93.0
	180	105.0
	210	105.0
	240	115.0
	270	110.0
	300	87.0

Site CC103 is located in a mostly industrial area with some residences at the northwest corner of the property. SH161 borders the eastern end of the site. Parking options for access to the site are limited to the right of way on SH161 and possibly Robinson Road, which intersects SH161 just northeast of the site. Above the 300-m transect is another dam which creates another impoundment farther up the stream ([Photogroup 7-11](#)).

Aquatic vegetation and algae cover were rare during all three site surveys. A slight to moderate presence of water dependent birds was observed. No other vertebrates were observed at the site although fecal dropping and tracks were observed. The green water had no apparent odor and the surface was clear. Stream garbage, both large and small, was absent. Bank garbage was absent to rare although some paper trash was observed along the banks during one visit.

Physical Description of Site CC104

Site CC104, at Tyre Park, is a natural channel which flows into a concrete lined channel above the impoundment associated with Site CC103. The streambanks are grass and shrub dominated. The park area outside of the left riparian zone is mowed and maintained by the city. Tyre Park has a baseball backstop, swimming pool, pond, walk paths, and a covered pavilion for picnicking. Though difficult, access to the stream can be reached through the dense vegetation almost anywhere along the left bank provided one is willing to forge through the vegetation. The easiest access occurs at the concrete ditch at the 0-m transect. No access point or paths were observed from the right bank. At some distance beyond the right bank the chain link fence of an industrial facility ran along the entire reach and the vegetation was unmaintained. Table 7-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 7-12](#) and [Photogroup 7-13](#) depict the concrete lined channel, streambank and park amenities.

The surveyed reach at Site CC104 was a wadeable stream in depth but the mud/clay substrate was difficult to negotiate. In the August 25-28, 2009 survey, walking in the stream was difficult due to the presence of previously encountered deposits of silty mud. Walking became so laborious and difficult that the decision was made to only collect depth measurements at the 0-m, 150-m and 300-m transects. Aquatic vegetation was dense in some areas which added to the difficulty in walking. During the May 2010 survey, the substrate appeared to have been scoured and walking was much easier allowing all 11 transects to be measured. In 2010, two beaver dams were encountered at the 90-m and 180-m transects ([Photogroup 7-14](#)).

A railroad trestle was located just above the 300-m transect of the study reach. The substrate around the 300-m transect was more shale than mud/clay. During the three surveys, several pools were identified and the dimensions are listed in Table 7-6.

Table 7-6 Pool Dimensions at Site CC104

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	31.5	9.2	0.99
	17.5	5.5	0.61
August 25-28, 2009	30.2	12.0	0.95
	20.0	5.4	0.61
May 27-31, 2010	11	6.9	0.54
	30	6.7	0.45
	104	9.0	0.91
	27	12.0	0.98

Measured streamflow during each survey was less than 1.0 cfs as shown in Table 7-4. The table also shows the uniformity of the stream between the three surveys. Table 7-3 shows the average thalweg depth observed during each of the surveys to be less than 0.5 meter.

Aquatic vegetation was common and algae cover was rare to common. Water color ranged from clear to green. No unusual odor was detected until the third survey and then it was only slight. The surface of the stream was clear of film or scum. There was a slight presence of water dependent birds, and fecal dropping were observed during all three surveys. No additional vertebrates were seen and no tracks were observed. The presence of the beaver dams would indicate their presence in the stream, but none were observed by TIAER field personnel. Garbage, large and small, in both the stream and on the banks was absent to rare. When present, garbage consisted of plastic bags, bottles and small pieces of paper.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. The selected sites were located in areas with residential areas nearby. At two locations, paved parking lots were available and the parks offered many amenities for the promotion of public recreation, although water recreation was not observed. Two sites, Sites CC102 and CC104, had public swimming pools located in the parks adjacent to the stream. Table 7-7 shows no primary contact recreational activities were observed by TIAER personnel at any of the four sites located on Cottonwood Creek. The “number observed” column shows the approximate number of persons observed at the site when the survey was performed. The primary contact recreation activities are listed as individual columns.

Table 7-8 shows the number of secondary contact recreation activities observed at the sites along Cottonwood Creek. A few people were observed within eight meters of the streams at three of the four sites during at least one assessment period. At Site CB102 individuals were observed sitting on the bridge crossing the stream at the 60-m transect. They were not dressed for water recreation and were present the entire time TIAER personnel conducted the survey.

Table 7-7 Primary contact recreation activities evaluation during the surveys of Cottonwood Creek

Date	Site Number	Number Observed ¹	Wading Children	Wading Adults	Swimming	Water Skiing	Diving	Tubing	Surfing	Whitewater activities	Other
August 4-8, 2009	CC101	None	-	-	-	-	-	-	-	-	-
	CC102	11-20	-	-	-	-	-	-	-	-	-
	CC103	None	-	-	-	-	-	-	-	-	-
	CC104	1-10	-	-	-	-	-	-	-	-	-
August 24-29, 2009	CC101	None	-	-	-	-	-	-	-	-	-
	CC102	None	-	-	-	-	-	-	-	-	-
	CC103	None	-	-	-	-	-	-	-	-	-
	CC104	None	-	-	-	-	-	-	-	-	-
May 27-31, 2010	CC101	None	-	-	-	-	-	-	-	-	-
	CC102	>50	-	-	-	-	-	-	-	-	-
	CC103	None	-	-	-	-	-	-	-	-	-
	CC104	1-10	-	-	-	-	-	-	-	-	-
¹ None; 1-10; 11-20; 20-50; >50											

Table 7-8 Secondary contact recreation activities observed during the surveys of Cottonwood Creek

Date	Site Number	Number Observed ¹	Fishing	Boating	Non-whitewater activities	< 8 m from shore	Other
August 4-8, 2009	CC101	None	-	-	-	-	-
	CC102	11-20	-	-	-	X	-
	CC103	1-10	-	-	-	X	-
	CC104	1-10	-	-	-	X	-
August 24-29, 2009	CC101	None	-	-	-	-	-
	CC102	None	-	-	-	-	-
	CC103	None	-	-	-	-	-
	CC104	None	-	-	-	-	-
May 27-31, 2010	CC101	None	-	-	-	-	-
	CC102	>50	-	-	-	-	-
	CC103	None	-	-	-	-	-
	CC104	1-10	-	-	-	-	-
¹ None; 1-10; 11-20; 20-50; >50							

At Site CB103, two people were observed crossing the low-water crossing at the shallow edge of the apron of the concrete dam. While stepping around the gate across the dam, the individuals stepped into the edge of the water along the concrete apron.

At Site CB104, two youths walked to the concrete lined channel at the 0-m transect to inquire about our activities. They wanted to know if we were getting the snakes out of the stream. One of the youths did walk into the concrete channel, but did not get into the water. After watching us work for a while, they proceeded to leave the area.

It should be reiterated that in a scouting trip to Site CC101, youths were observed crossing the stream at the 90-m transect. [Photogroup 7-15](#) shows the youths pushing their bicycles through the stream.

The aforementioned instances were the only times TIAER personnel observed people close to the edge of the stream. There were a number of activities observed at the sites that were greater than eight meters from the streams. Table 7-9 shows the general types of activities observed over the reach at each site along Cottonwood Creek and the approximate number of people observed while conducting the surveys. The number of people listed in the table is the number observed by TIAER personnel while collecting the physical characteristics at each site. The sites were visited additional times during the weeklong trip, but the number of people observed during the subsequent visits was not recorded on this table.

During the August 4-8, 2009 trip to Site CC102, TIAER personnel observed a soccer game being played in the field just upstream of the study reach. People were seen sitting in chairs, standing and walking to and from the parking lot to attend the game or leave the game. During the May 27-31, 2010 trip to Site CC102, a baseball tournament was being played on the fields associated with the complex. There were well over 50 people in attendance, not counting the players involved in the games. One bicyclist was observed riding through the parking lots and people were walking throughout the complex and associated parking lots. In addition, the public pool was open and many people were observed swimming. [Photogroup 7-16](#) shows the activities observed away from the stream but taking place in the park area.

During the May 27-31, 2010 trip to Site CC104, people were observed preparing for a picnic beneath the covered pavilion located north of the stream, but still in the park. Children were also seen riding their bikes through the parking lot waiting for the swimming pool to open. One pool employee opened the pool as TIAER personnel were leaving the site. [Photogroup 7-17](#) depicts the persons preparing for a picnic and an employee cleaning the pool.

As previously stated, more than one visit occurred per survey at the sites where activities were observed. The surveys may have been conducted in the morning or afternoon, but interviews were scheduled after normal work hours on weekdays or early mornings on weekends, while temperatures were cooler.

Individuals were approached at the four sites by TIAER personnel wearing identification tags and asked to participate in an interview. Most people were willing to accommodate, but there were some that did not want to answer any questions. TIAER personnel tried not to interfere

Table 7-9 Summary of general activities observed during surveys of Cottonwood Creek

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	CC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC102	11-20	-	-	X	-	X	X	-	-	-	-	-	-	X	X	X
	CC103	1-10	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-
	CC104	1-10	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-
August 24-29, 2009	CC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC102	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC103	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC104	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May 27-31, 2010	CC101	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC102	>50	-	-	-	X	-	-	-	-	-	-	-	-	-	X	X
	CC103	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CC104	1-10	-	-	-	X	-	-	-	-	X	-	-	-	-	X	-

¹None; 1-10; 11-20; 20-50; >50

with individuals activities and tried to perform the interview as briefly as possible. Some people gave names and phone numbers, some gave just names and others chose not to give any information other than their opinions. There was one instance where a language barrier prevented interviews from occurring all together.

A total of 15 interviews were attempted during the surveys of the four sites on Cottonwood Creek. Table 7-10 records the activities reported during interviews either conducted by the interviewee or activities they have observed by others. The numbers under the column headings indicate the number of times an activity was mentioned during all of the interviews.

Table 7-10 Activities reported in interviews at sites along Cottonwood Creek

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Cottonwood Creek	CC101	1	1	1	1	-	-	-	-	1
	CC102	1	-	-	4	-	-	-	2	-
	CC103	-	-	-	-	-	-	-	1	-
	CC104	-	-	-	1	-	-	-	2	-

At Site CC101 three interviews were conducted, two in person and one by mail from a city employee. The interview from the city employee stated that he had neither heard of nor observed contact recreation at Site CC101. The reasons given were shallow depth and no safe place for recreation. The second interview was from a woman who was walking her dog adjacent to the stream. She has been familiar with the stream in the old Colgate Park area for 22 years. She stated that she and her family used to wade in the stream years ago when her kids were younger. Currently, she said that youths still swim and wade in the stream when the level is elevated and is flowing. Many of the local kids still utilize the crossing to get to and from neighborhood parks. She stated that she wished the city would repair the crossing to make it safer for children when they cross the stream. She further stated that if the stream were cleaned up, more kids would likely recreate in the stream.

The third interview collected was from a couple at a home near the creek. It was stated that over the past 16 years, the couple had observed kids frequently cross the stream at the old bridge crossing to get to the abandoned park on the other side. They had also observed some fishing. Like the other interviewee, they too wish the city would rebuild the bridge.

At Site CC102, Cottonwood Park, seven interviews were collected; two from city employees and five from people utilizing the park facilities. None of the people interviewed recreated in the stream. Four of the seven interviews revealed that children have been observed wading in the water near the concrete dam just upstream of the study reach. One city employee stated that since the keep off dam sign has been erected, he doesn't see as much activity. He further stated that many years ago the stream used to be used for swimming and wading more frequently, but the creek was cleaner back then. He also stated that people do feed the ducks that inhabit the area of the stream around the dam, although no ducks were observed by TIAER personnel within

the 300-m reach. Both city employees stated that they had either heard of or observed fishing at the site.

The main reason given for the limited recreational use was the aesthetics of the stream. Interviewees shared comments such as the stream looks nasty or dirty and just looks unsafe. Individuals added why would anyone want to get in that water when a clean public swimming pool is located in the park?

One interview for Site CC103 was collected from a City of Grand Prairie employee. His interview stated that he and his family do not recreate in the stream because it is located on private property and the other portion is heavily wooded. He has never observed anyone at the location but has heard of people fishing at the location. The PolyAmerica plant safety officer insisted no one is allowed on the property and if they are observed on the property, they are promptly asked to leave. They do not allow recreation; fishing, swimming, or any other activities in the portion of the stream within their property. At the time of the last survey conducted in May of 2010, they were constructing a fence to keep people from gaining access to the property. In hindsight this may not have been an optimal location for a survey site due to increasing restrictions on access. There was, however, strong opinion at the June 11, 2009 planning meeting and in follow-up discussions that this location should be one of the sites, so TIAER staff complied with that opinion.

Five interviews were attempted at Site CC104, Tyre Park. One interview was unsuccessful due to a language barrier. A second interview with the swimming pool employee revealed that he was unaware there was a stream running adjacent to the pool. He stated that if the stream water looked anything like the water in the pond adjacent to the pool, it was nasty and why would anyone want to get in that water when a pool is right here.

According to a City of Grand Prairie employee, the stream is not intended for recreational use and the water is too shallow in the creek for recreation. He also stated that the stream is not accessible. TIAER personnel found that accessibility is difficult, but not impossible. There was one location along the streambank where access is moderately easy, but additional access was difficult.

The two remaining interviews both stated that fishing has occurred in the stream within the last 25 years. One gentleman stated that when he was younger and the stream was cleaner, he would wade and fish in the stream. Currently, there is not enough water depth for recreation and the stream is full of cottonmouth snakes. He added, "Why would someone swim in the creek when a public swimming pool is located in the park?" The second gentleman stated that he does fish for crayfish every spring and has observed fishing, albeit infrequently, year round at the site.

Copies of all of the interviews conducted along Cottonwood Creek grouped by site are located in Appendix E-4.

Summary

RUAAs surveys were conducted at four sites along Cottonwood Creek August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix E-1, E-2, E-3 and E-4, respectively.

A variety of activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 7-4. The park facilities are well maintained by the parks department and they are utilized by people in a variety of ways.

Both observations and interviews indicated that most people who utilize the park facilities do not intend to enter the stream or impoundments along the stream. Many interviewees described the water as “too nasty” to recreate in. That being said, there were several reports of children wading in the stream at the dam above Site CC102, although not as frequently since the keep off dam sign was posted. There are still neighborhood children who cross the stream at Site CC101 and who may wade in the stream when stream levels are elevated. Overall, it appears that primary contact recreation may occur infrequently in this Cottonwood Creek, but historically recreation may have occurred much more frequently when the stream exhibited a cleaner appearance.

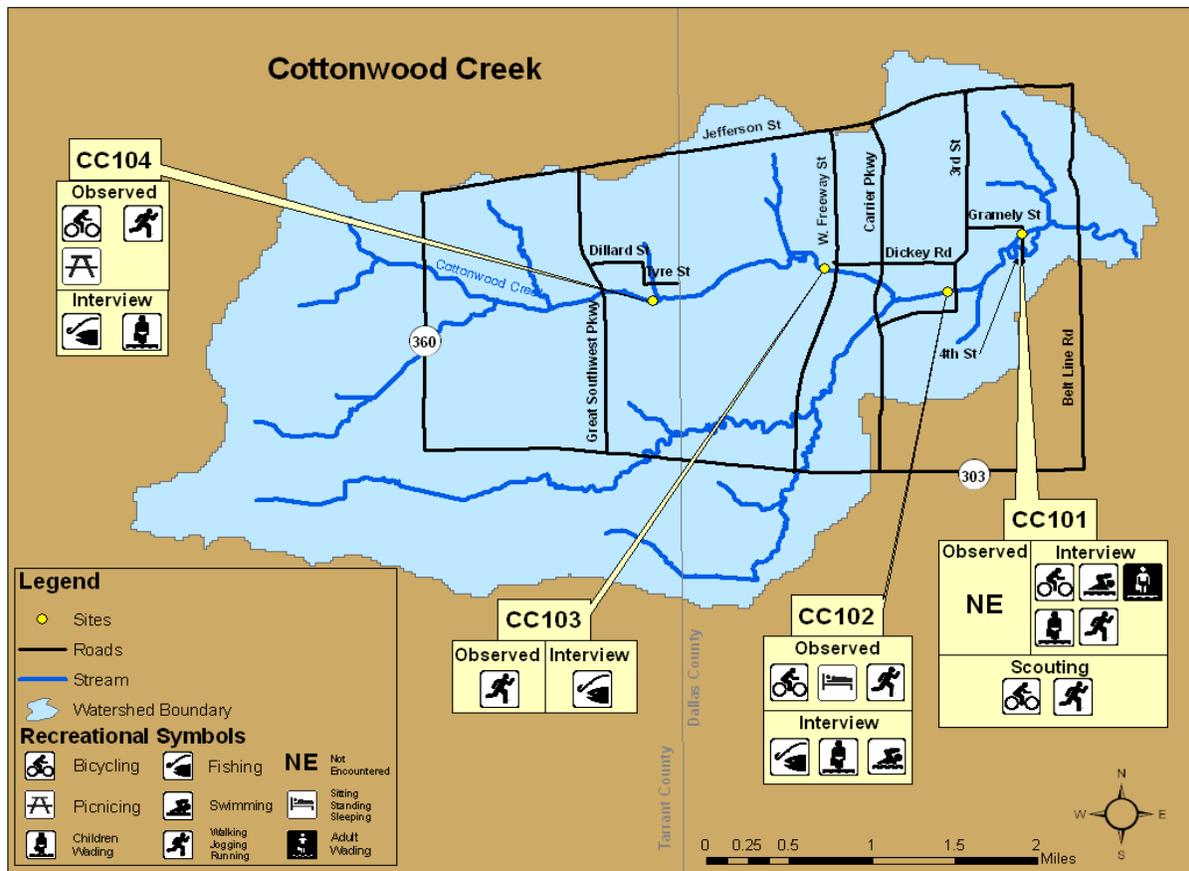


Figure 7-4 Summary of activities observed and reported in interviews at sites along Cottonwood Creek

Cottonwood Creek (Segment 0841F) Photogroups



Photogroup 7-1 Cottonwood Creek Site CC101 showing access at remnant bridge crossing, and the stream at 0-m and 300-m transects. [\[Return to Text\]](#)



Photogroup 7-2 Cottonwood Creek Site CC101 showing obstructions from leaning trees at 180-m and 210-m transects. [\[Return to Text\]](#)



Photogroup 7-3 Cottonwood Creek Site CC101 showing abandoned road crossing providing access to stream. [\[Return to Text\]](#)



Photogroup 7-4 Cottonwood Creek Site CC101 showing garbage along banks of creek at 120-m, 150-m, 210-m, and 270-m transects. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 7-5

Cottonwood Creek Site CC102 showing stream views upstream and then downstream at the 0-m (upper row), 150-m (middle row), and 300-m (lower row) transects. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 7-6 Cottonwood Creek Site CC102 showing facilities at Cottonwood Park.
[\[Return to Text\]](#)



Photogroup 7-7 Cottonwood Creek Site CC102 showing aluminum bleachers and accumulated debris at 60-m transect. [\[Return to Text\]](#)



Photogroup 7-8 Cottonwood Creek Site CC102 showing dam and keep off sign near the 300-m transect. [\[Return to Text\]](#)



Photogroup 7-9 Cottonwood Creek Site CC103 showing impoundment. [\[Return to Text\]](#)



Photogroup 7-10 Cottonwood Creek Site CC103 showing impoundment and security fencing being constructed around private property including the impounded area. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 7-11 Cottonwood Creek Site CC103 showing another dam upstream of the 300-m transect. [\[Return to Text\]](#)



Photogroup 7-12 Cottonwood Creek Site CC104 showing stream channel (upper row) and streambank vegetation (lower row). [\[Return to Text\]](#)



Photogroup 7-13 Cottonwood Creek Site CC104 showing facilities at Tyre Park, including swimming pool (lower row). [\[Return to Text\]](#)



Photogroup 7-14 Cottonwood Creek Site CC104 showing beaver dams at 90-m and 180-m transects. [\[Return to Text\]](#)



Photogroup 7-15 Cottonwood Creek Site CC101 showing children on bicycles (background) crossing creek. (Field crew in foreground.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 7-16 Cottonwood Creek Site CC102 showing some of the observed recreational activities in Cottonwood Park. [Return to Text](#)



Photogroup 7-17 Cottonwood Creek Site CC104 showing some of observed activities at Tyre Park. [Return to Text](#)

CHAPTER 8

DALWORTH CREEK (SEGMENT 0841G)

Watershed Characterization

Segment 0841G is 2.2 mile unclassified segment running upstream from the confluence with Lower West Fork Trinity River (0841) to County Line Road (currently identified on maps as NW19th Street) in Grand Prairie, Texas (Figure 8-1). The watershed surrounding the creek is densely residential from south of IH 30 to Roman Road (land use on Figure 8-2 and aerial photograph on Figure 8-3). The creek flows north under IH 30 to the confluence with the West Fork Trinity River through an area that appears channelized and is lined with rip-rap near the freeway, below the riprap area the stream becomes more natural in appearance. From just upstream of Roman Road to downstream of Blackburn Street, the channel of this stream is a concrete ditch lined with chain link fencing that discourages access. There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists this water body as perennial for flow type and based on this flow type has assigned a presumed aquatic life use of high (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Dalworth Creek site selection the major interaction occurred with City of Grand Prairie staff.

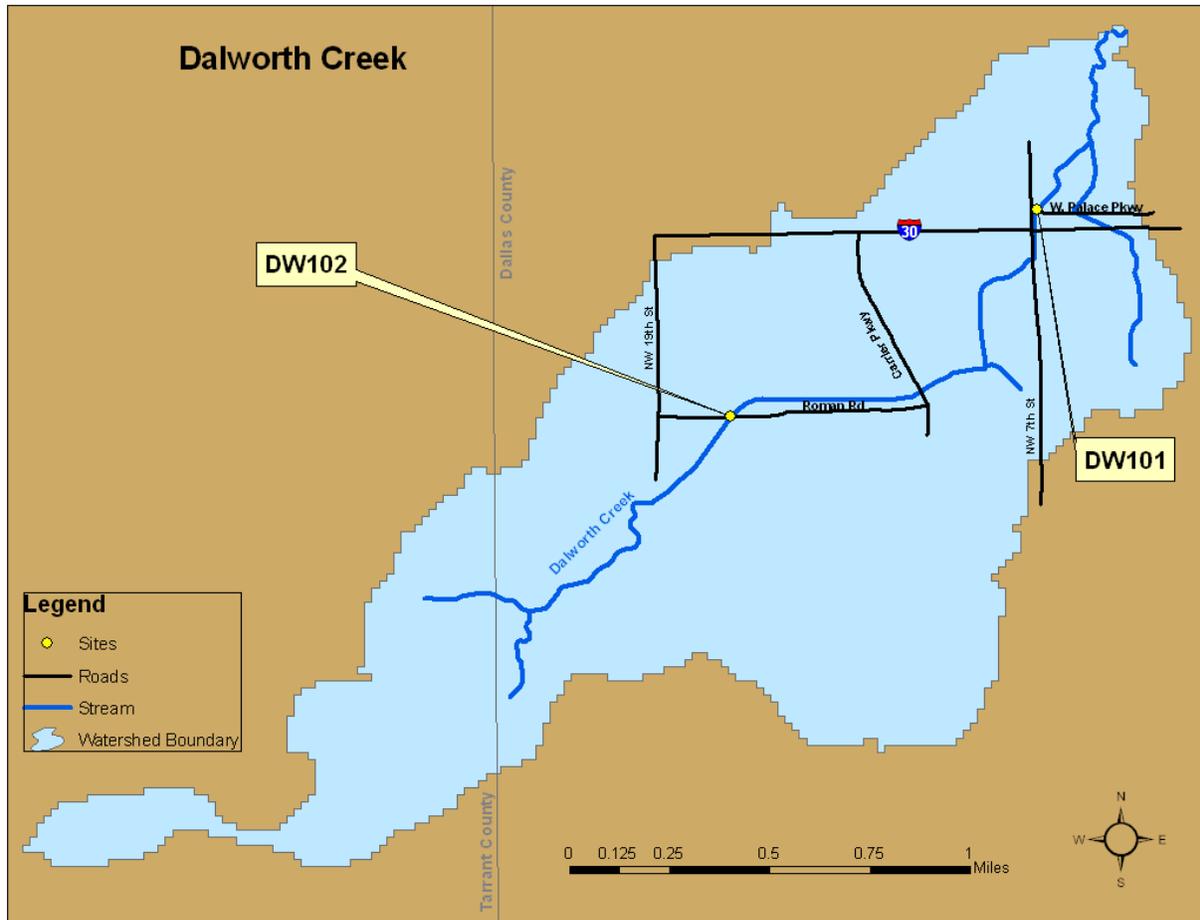


Figure 8-1 Dalworth Creek (0841G) showing RUA survey sites

Survey Site Descriptions

The survey sites selected for Dalworth Creek (Segment 0841G) are provided in Figure 8-1. Two RUA sampling sites were selected on this small creek. A brief description of each site follows.

Site DW101 (TCEQ Station 17671) is located on Dalworth Cr. immediately downstream of West Palace Pkwy. (the frontage road for IH 30) in Grand Prairie. This stream is accessible from the road and appears to have a relatively natural riparian zone beyond the rip-rap stabilized section at the road.

Site DW102 is located on Dalworth Cr. at Roman Road, in Grand Prairie. Like all other street crossings observed on the creek, this road crossing is fenced from access at the road and along both sides of the concreted channel that is typical of the entire reach. This site was selected because it runs near Hill Street Park and youths were seen sitting on the bank of the channel past the end of the fencing during the initial scouting survey. It should be further clarified that while Hill Street Park is near the stream, there is an old fence and a dense tree line along the fence that was walked by the reconnaissance crew. No access points or pathways into the undeveloped land between the park and stream were found along the fence.

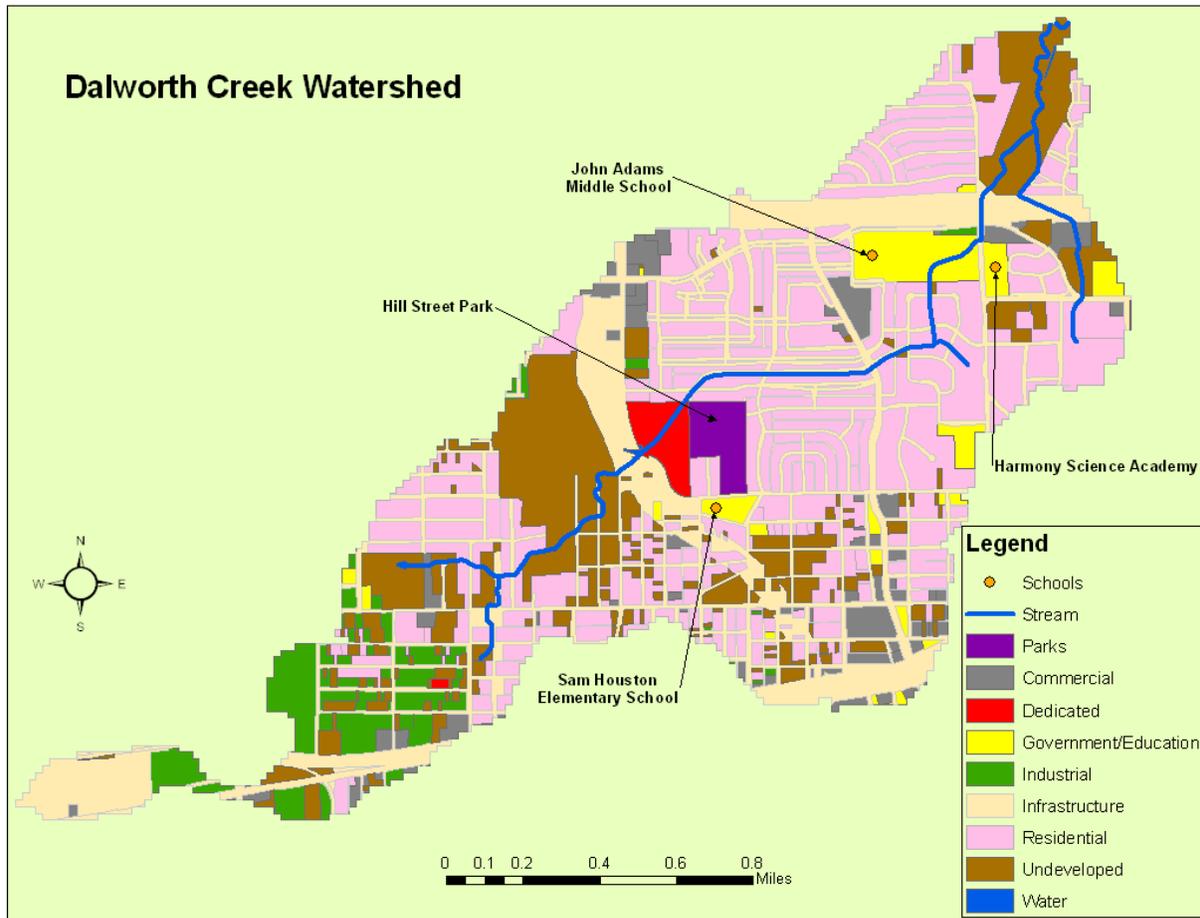


Figure 8-2 Land use/land cover for Dalworth Creek Watershed (Source: NCTCOG, 2007 & 2009)

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Dalworth Creek.

Surveys conducted on Dalworth Creek were conducted during varying air and water temperatures as show in Table 8-1. Water temperatures were warm enough for recreational activities to occur. Water temperature was not recorded on the second survey at Site DW101 due to the lack of water. The water that was present was too shallow to obtain an accurate temperature measurement.

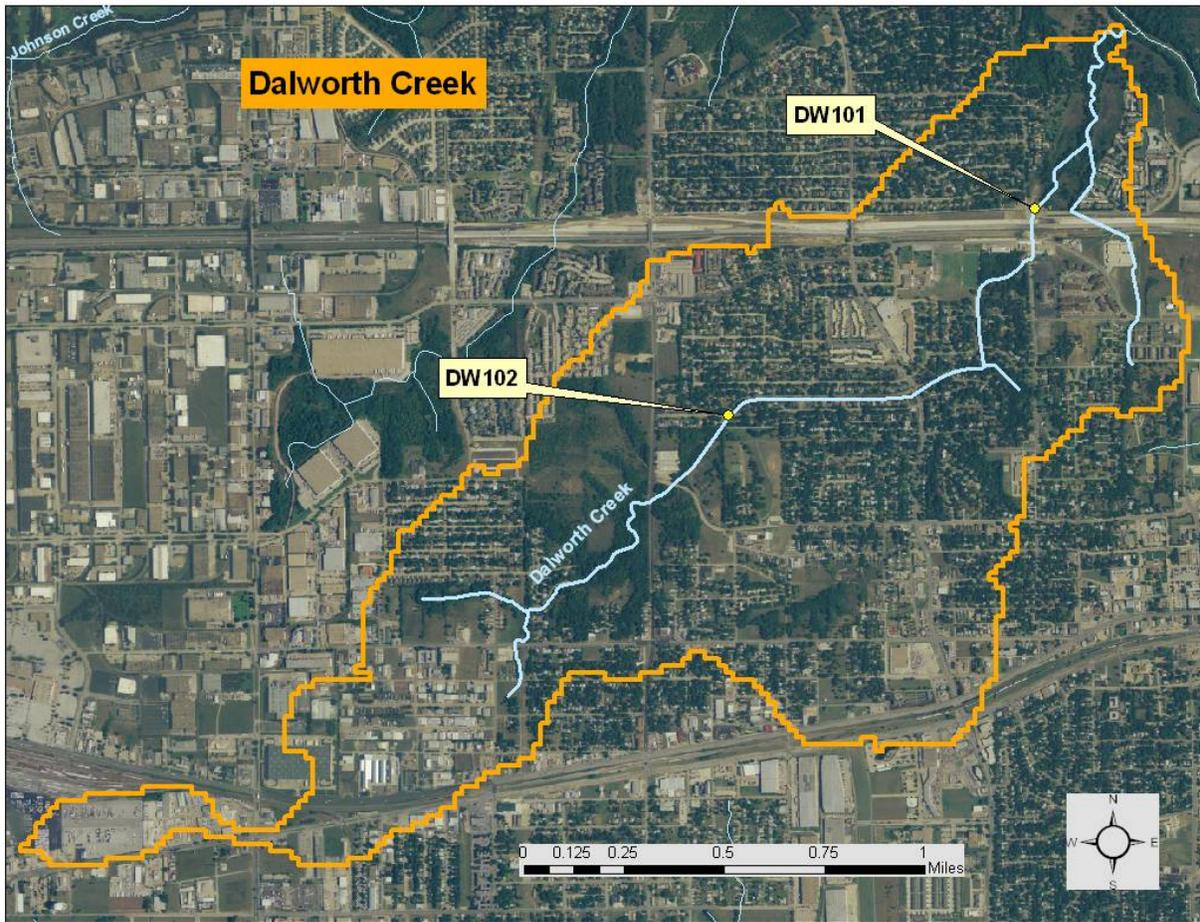


Figure 8-3 Aerial photograph of Dalworth Creek Watershed (Source: NAIP, 2005)

Table 8-1 Temperatures measured at each site along Dalworth Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Dalworth Creek	DW101	31.7	27.5	26.0	25.9	33.0	28.6
	DW102	31.5	26.5	30.6	n/a	35.0	28.0

Table 8-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 8-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys.

Table 8-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Table 8-2 Stream channel and riparian zone assessment for Dalworth Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Dalworth Creek	DW101	Right Bank	Channelized upper 40m with gabions; remainder natural	Forest and shrub dominated	Large	None	Natural
		Left Bank					
	DW102	Right Bank	Upper ¼ natural; Lower ¾ channelized	Upper ¼ shrub dominated; Lower ¾ urban	upper ¼ moderate; Lower ¼ small	None	Urban
		Left Bank					

Table 8-3 Physical Descriptors of Dalworth Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Dalworth Creek	0841G	2.2	2	0	0.12	0.08	0.14	perennial
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
DW101	300	11	0	0.17	0.16	0.19		
DW102	300	11	0	0.07	0.005	0.09		

Table 8-4 Additional hydrographic parameters of Dalworth Creek

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Dalworth Creek	DW101	8.65	0.28	1.55	0.15	Normal
		DW102	7.45	0.0	0.55	0.0	No Flow
August 25-28, 2009	Dalworth Creek	DW101	8.62	0.22	1.5	0.05	Normal
		DW102	2.92	0.0	0.8	0.0	No Flow
May 27-31, 2010	Dalworth Creek	DW101	4.5	0.22	2.25	0.06	Low
		DW102	4.0	0.15	1.0	0.05	Low

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Physical Description of Site DW101

The stream at Site DW101 is channelized in the upper 60 meters of the reach and natural for the remaining 240 meters downstream. The upper 60 meters is contained within a large concrete culvert that runs from the access road of IH30 with three to four foot tall gabions located on both sides of the stream as well as across the streambed. The lower 240 meters of the study reach is a natural stream with a mud/clay substrate with steep banks both right and left. Access to the stream is moderately difficult. The site is located on private property although no fences or barriers completely prevent access to the stream. The riparian zone between the 300-m and 240-m transects are mowed and maintained by the landowner. [Photogroup 8-1](#) depicts the steepness of the banks on both sides of the stream and the gabions mentioned in the upper portion of the study reach.

The surveyed reach at Site DW101 was identified as a wadeable stream. There was a transition zone around the 240-m transect where the bottom of the stream went from the constructed gabions to a more natural mud/clay bottom. The substrate afforded difficult walking due to the slickness of the clay. Other than the 60-meter stretch in the upper portion of the reach, the stream was fairly narrow with an average width of about 1.5 meters and average thalweg depths less than 0.2 meters. The stream widths in the upper portions of the study reach were over four meters. One pool was identified between the 180-m transect and the 210-m transect. The dimensions of the pool were 24.7m long, 4.3m wide with a thalweg depth of 0.91m. One tree obstruction was identified during the third survey at the 30-m transect. A utility pipeline crossed the stream at the 180-m transect. [Photogroup 8-2](#) displays the narrowness of the stream, the tree obstruction and utility pipeline.

The Site DW101 is located at the intersection of NW 7th Street and W. Palace Parkway. There is a guardrail that runs north and south along the edge of the road near the stream. Parking is accessible in the mowed area on the east side of the stream between the 300-m and 240-m transects. [Photogroup 8-3](#) depicts the potential parking areas.

The riparian zones are shrub and forest dominated with steep banks leading to the edge of the stream. Access to the stream beyond the mowed areas is moderately difficult due to the thickness of the vegetation. Once at the edge of the stream, access to the water is easy.

Emergent aquatic vegetation varied from sparse to common depending on the survey, and algae cover varied from absent to rare. Water dependent birds were observed on the first survey with no other mammals or invertebrates. During the two subsequent surveys no mammals or other vertebrates were observed but fecal droppings and tracks were seen throughout the reach. Large garbage in the stream was rare, while small garbage in the stream was rare to common. Garbage along the banks was common, and the water of the stream was generally odorless and clear.

Physical Description of Site DW102

At the Dalworth Creek at Site DW102 the stream above the 240-m transect is natural, while below the 240-m transect, the stream is a concrete lined channel. Site DW102 is located in a residential area with moderately difficult access to the stream. [Photogroup 8-4](#) depicts the concrete lined channel, the natural channel streambanks, and the transition area between the two stream types. Table 8-2 describes the stream channel and riparian zone appearance at this site.

The 300-m reach surveyed at Site DC102 was wadeable the entire length. The banks of the stream were shrub dominated with trees from the 300-m transect to the 240-m transect. In the more natural portion of the stream, the substrate consisted of rocks and pieces of concrete. Several large concrete drainage pipes were located near and above the 300-m transect, which created an obstruction. From the 240-m transect to the 0-m transect the stream and banks were concrete lined with a small grassy area atop the channel and a chain link fence running along both sides the top of the streambank. There were a couple of additional drainage pipes located at the 100-m and 200-m transects which drained into the stream. [Photogroup 8-5](#) and [Photogroup 8-6](#) depict some the aforementioned conditions observed at the site.

Site DW102 is located in a highly residential area with the public Hill St. Park immediately to the southeast of the site. Dense vegetation in the upper portion of the stream and chain link fences along the lower portions of the stream make accessibility moderately difficult, but not impossible. There were footpaths leading through the vegetation to the stream near the 240-m transect. Graffiti was observed on the walls of the concrete channel and an abandoned bicycle was also observed in the concrete channel ([Photogroup 8-7](#)). Parking is available on Roman Road; a well traveled residential street near the 150-m transect, which has a box culvert across the stream ([Photogroup 8-8](#)).

No surface scum or aquatic vegetation was observed at DW102. Algal cover ranged from common to abundant. There were no observations of any mammals or other vertebrates during any of the three surveys; however, tracks and fecal dropping were observed during each of the three surveys. Garbage in the stream and along the banks of the stream was rare.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. One person, the landowner of DW101, was observed at the site during the first survey. He was there to mow the grassy areas around the upper portions of the site. According to the landowner, youths infrequently were observed near the stream, but if he observes them, he will chase them away and informs them that it is private property. He stated that they may wade in the stream and do some fishing. He often has to chase dirt bikers off of his property. When the landowner was younger, 20+ years ago, he took his children to the stream to fish and wade in the water.

One other interview of a city official familiar with the stream stated that he knew of no recreation that occurred at either site. He stated that DW101 was not intended for recreation use and DW102 was hidden from the public.

Copies of interviews are located in Appendix F-4.

Summary

RUAA surveys were conducted at two sites along Dalworth Creek August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix F-1, F-2, F-3 and F-4, respectively.

No activities were observed by TIAER field staff during the surveys and only a few were reported by interviewees. These activities are summarized in Figure 8-4.

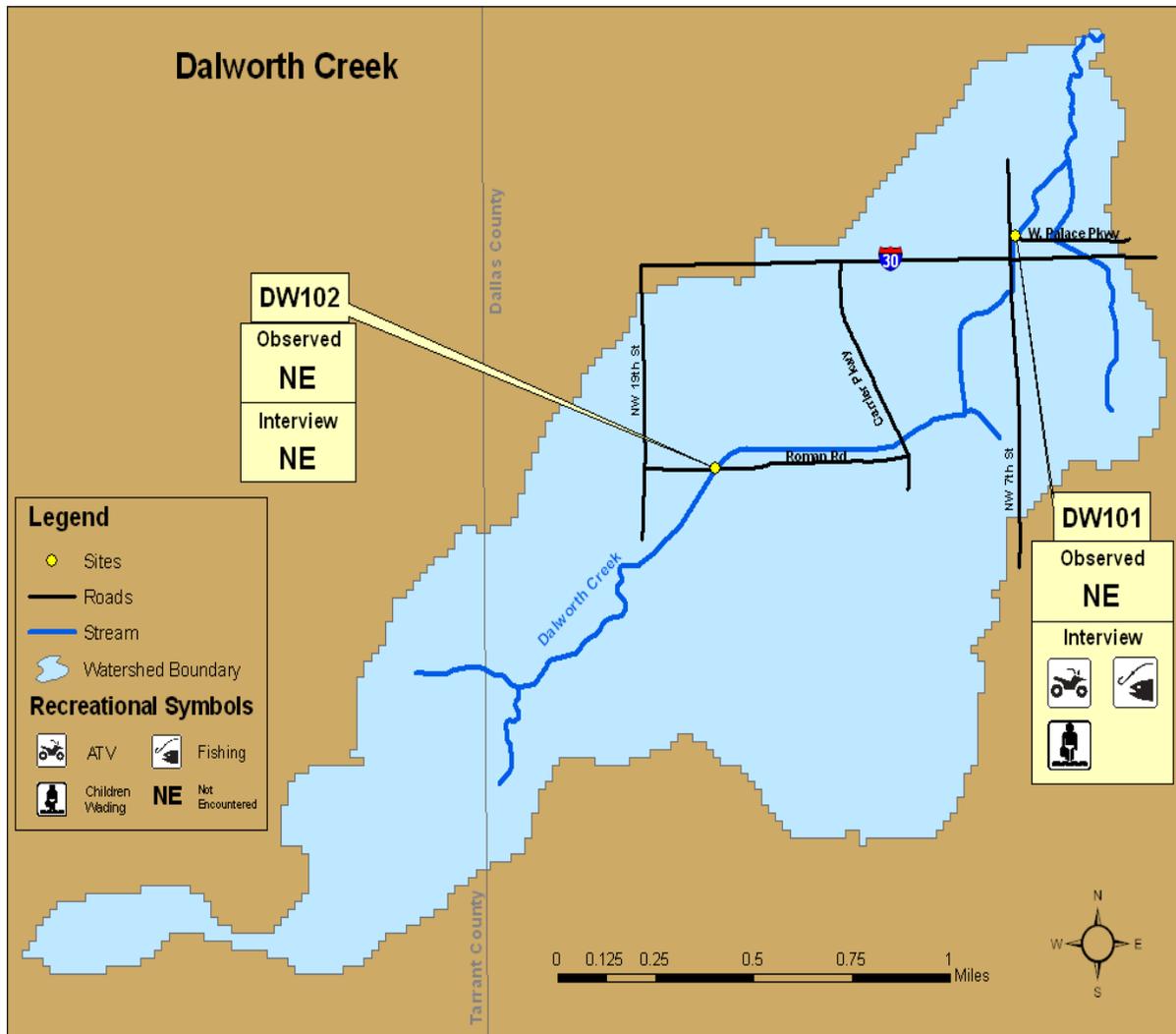


Figure 8-4 Summary of activities observed and reported in interviews at sites along Delaware Creek

According to the landowner at DW101, children may infrequently wade and fish in the stream, but when discovered, are asked to leave the premises. Dirt bike and ATV riders use the area and have several paths below the survey reach. The actual paths could not be verified by TIAER field personnel. Again, when the landowner observes these riders, they are asked to leave the property. No other activities, observed or interviewed, were identified by TIAER personnel during any of the three surveys.

Dalworth Creek (Segment 0841G) Photogroups



Photogroup 8-1 Dalworth Creek Site DW101 depicting steepness of bank and gabions. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 8-2 Dalworth Creek Site DW101 showing stream size, utility pipeline crossing and fallen tree obstruction. [\[Return to Text\]](#)



Photogroup 8-3 Dalworth Creek Site DW101 showing areas where vehicle parking could occur. [\[Return to Text\]](#)



Photogroup 8-4 Dalworth Creek Site DW102 showing concrete lined channel, natural streambank, and transition between the two channel types. (Note: Person in bottom photograph is a member of the survey crew.) [\[Return to Text\]](#)



Photogroup 8-5 Dalworth Creek Site DW102 showing concrete pipes at 100-m and 200-m transects. [\[Return to Text\]](#)



Photogroup 8-6 Dalworth Creek Site DW102 showing natural channel with concrete pipe, channelized portion, and storm drains entering stream. [[Return to Text](#)]



Photogroup 8-7 Dalworth Creek Site DW102 showing graffiti on channel walls and bicycle in bottom of channel. [\[Return to Text\]](#)



Photogroup 8-8 Dalworth Creek Site DW102 looking at Roman Road crossing showing box culvert and parking on Roman Road. (Note survey staff in stream at a distance.) [\[Return to Text\]](#)

CHAPTER 9

DELAWARE CREEK (SEGMENT 0841H)

Watershed Characterization

Segment 0841H is an 8.5 mile unclassified segment running upstream from its confluence with Lower West Fork Trinity River (0822) to Finley Road in Irving, Texas (Figure 9-1). Delaware Creek is mostly channelized, and modified as a concrete-lined ditch with pools created by small dams at park locations. The watershed of this creek is highly residential with some light commercial and several city parks (land use on Figure 9-2 and aerial photograph on 9-3). There are no NPDES WWTP outfalls in the segment watershed. TCEQ lists the flow type for Delaware Creek as intermittent with pools and based on this flow type has assigned a presumed aquatic life use of limited (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in station selection for the RUAA surveys incorporates the following:

- Proposed survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Delaware Creek site selection the major interaction occurred with City of Irving staff.

Survey Site Descriptions

The survey sites selected for Delaware Creek (Segment 0841H) are provided in Figure 9-1. Five sites were identified as suitable RUAA locations along this stream. A brief description of each site follows.

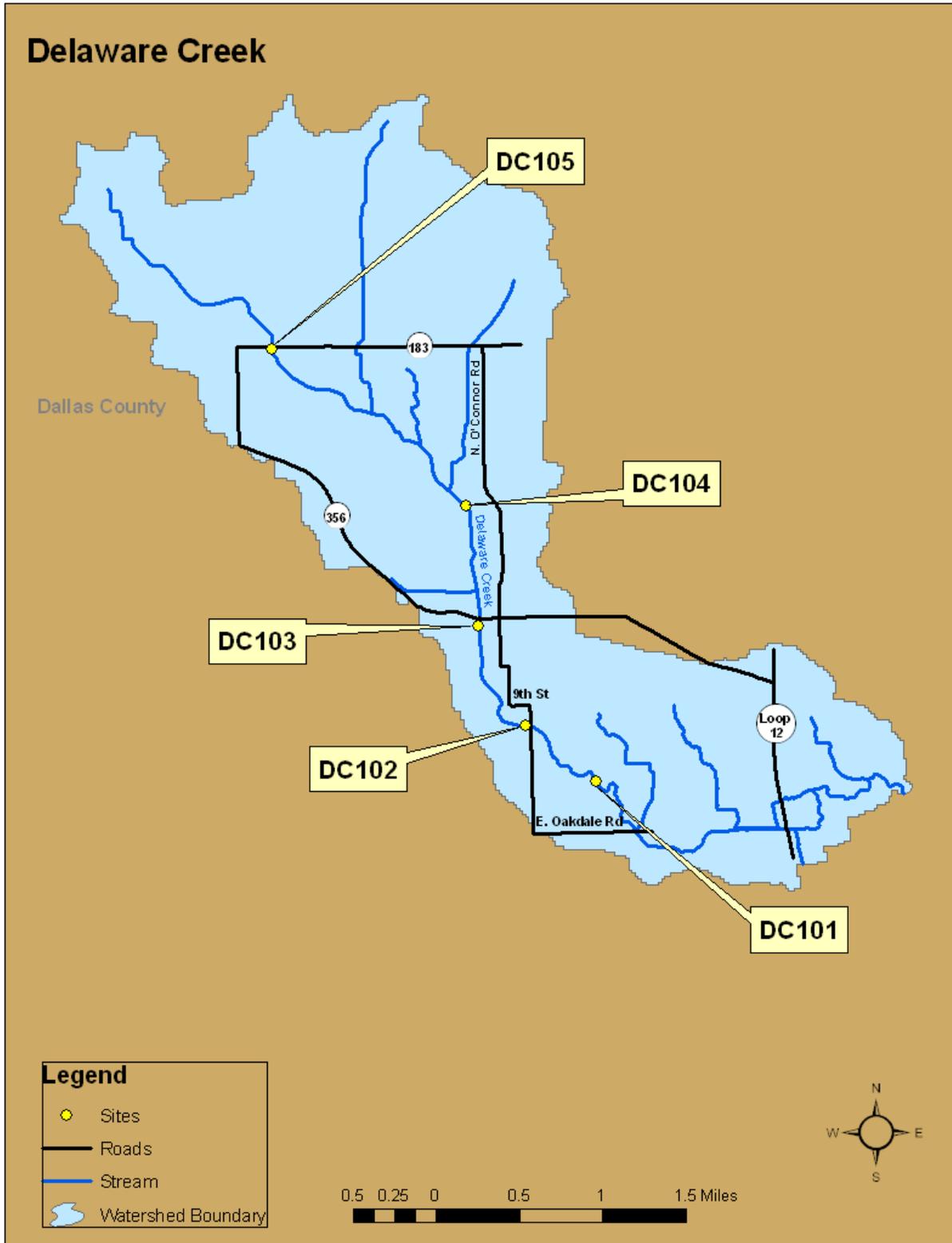


Figure 9-1 Delaware Creek (0841G) showing RUAA sites

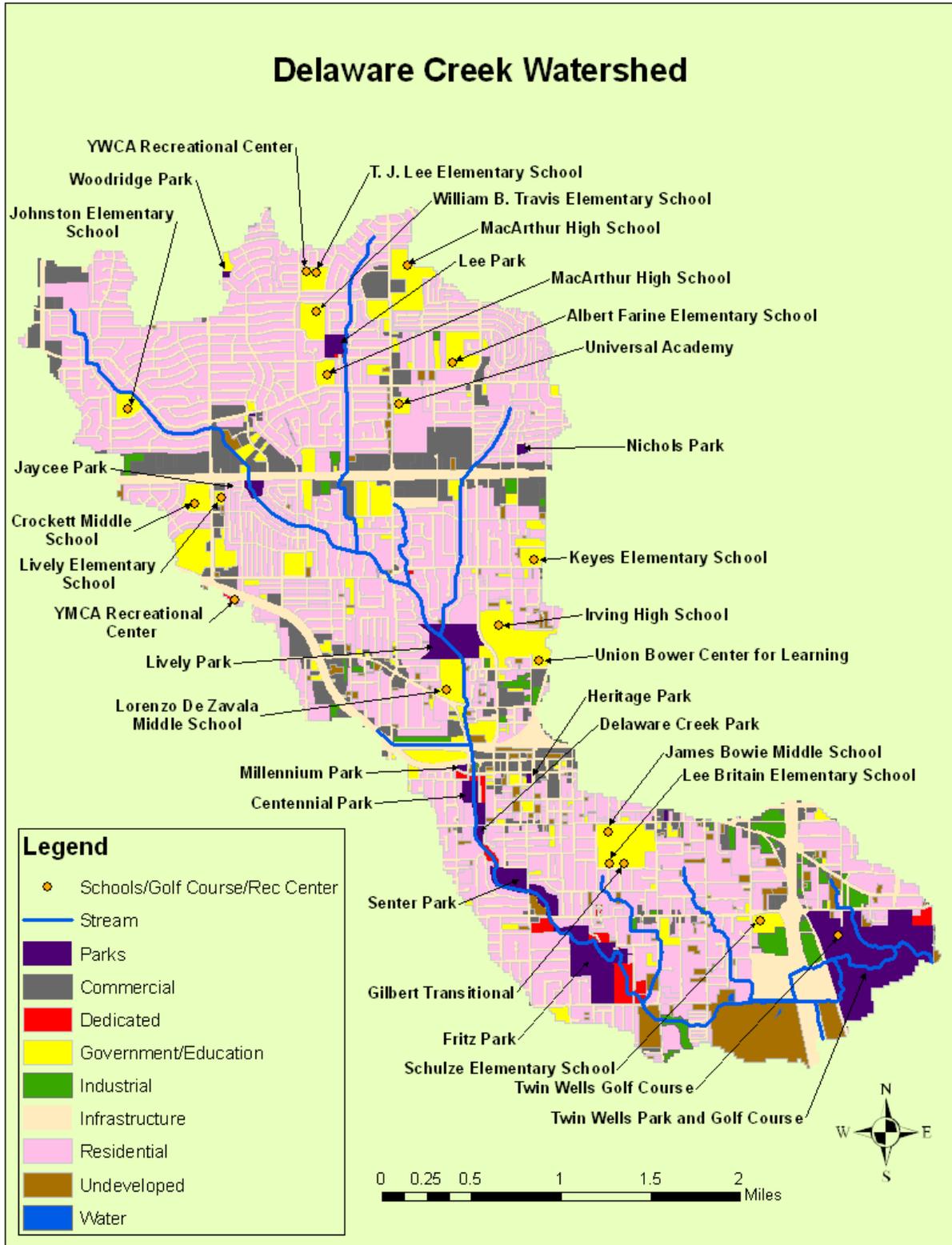


Figure 9-2 Land use/land cover for Delaware Creek Watershed (Source: NCTCOG, 2007 & 2009)

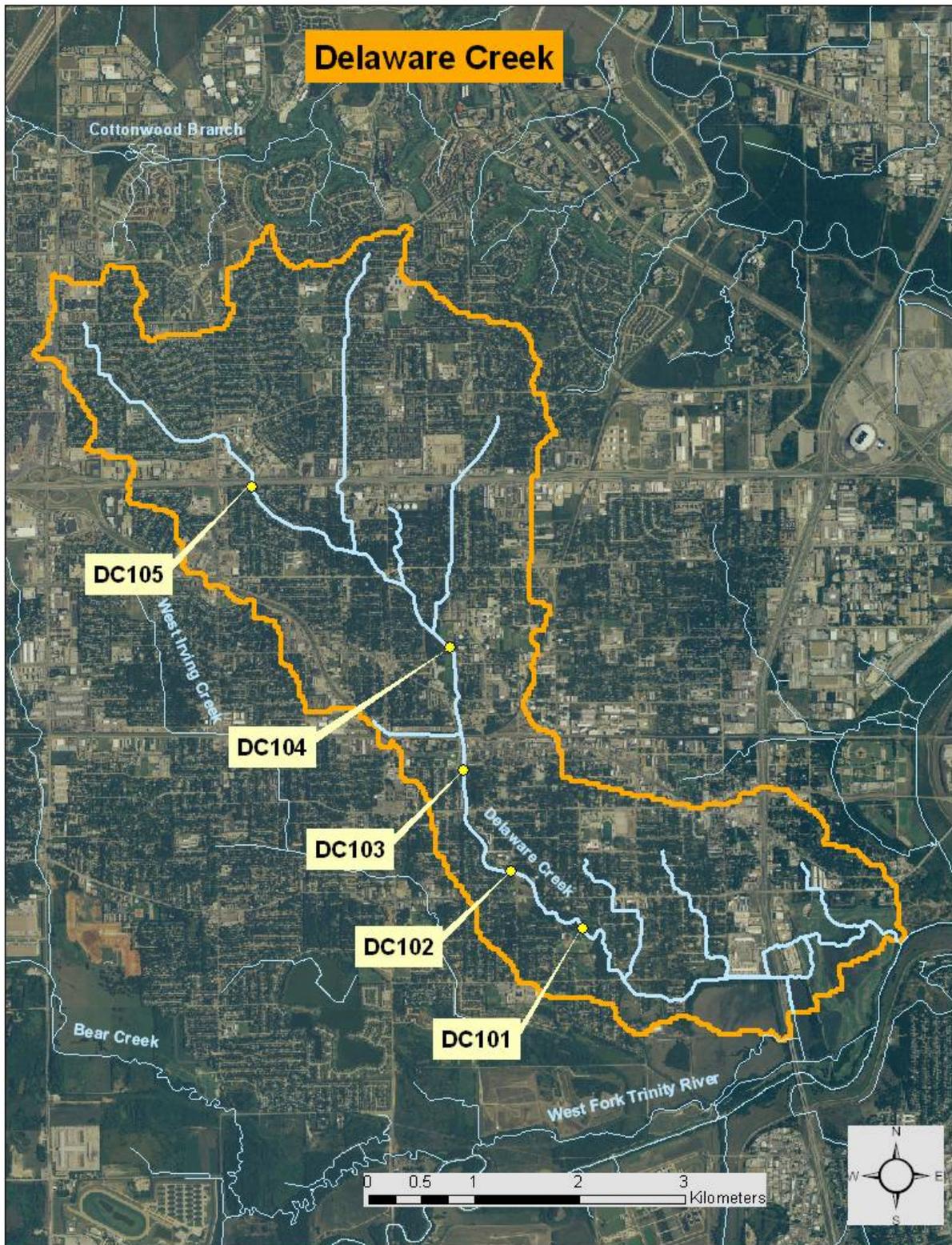


Figure 9-3 Aerial photograph of Delaware Creek watershed (Source: NAIP, 2005)

Site DC101 (TCEQ Station 15617) is located at Delaware Cr. and Fritz Park 756 meters upstream of E. Oakdale Rd. in Irving. The stream is accessible from the park though the stream is posted keep out until it reaches the downstream portion where the channel becomes more natural, where it is filled with large blocks of cement and rip rap.

Site DC102 is located at Delaware Cr. and Senter Park near W. 9th in Irving. The stream is dammed at this park forming a large pool that runs through the park. There are numerous play structures and a large public swimming pool at the park. The stream is accessible from the bank, but is posted no trespassing along its length.

Site DC103 (TCEQ Station 10871) is located at the upper end of Centennial Park and W. 2nd in Irving. This creek in this area is also characterized by a long pooled area formed by a downstream dam near W. 6th St. As observed at other locations along Delaware Creek, the stream at this site was posted no swimming, wading, or diving.

Site DC104 is located at Lively Park off N. O'Conner Rd. in Irving. The stream at this location is accessible from the bank but is little more than a concreted drainage ditch.

Site DC105 (TCEQ Station 10875) is located at US 183 in Irving in Jaycee Park in Irving. As common in the parks along Delaware Creek, the stream is dammed creating a large pool in the upper half of the reach. As at other pooled areas downstream, there are postings prohibiting swimming and wading. The pool is accessible from the bank. Below the dam the stream is reduced to a concrete drainage ditch and a mere trickle of water.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Delaware Creek.

Surveys conducted on Delaware Creek were conducted during varying air and water temperatures as show in Table 9-1. Water temperatures were warm enough for recreational activities to occur.

According to one interview with a City of Irving Parks and Recreation Department official, the streams are in the parks for aesthetic purposes and they were not constructed with water recreation intended. The interviewee further elaborated that the dams and impoundments were meant to enhance the appearance of the stream and allow people to fish, watch associated water fowl, or just enjoy the appearance and sound of water. Further, it was mentioned that there is a city ordinance against diving, wading or swimming in any stream within the City of Irving, and signs are posted. [Photogroup 9-1](#) shows no trespassing signs posted at multiple locations in each park. A copy of the interview with the City of Irving official, Interview_DC101_A, is located in Appendix G-4.

Table 9-1 Temperatures measured at each site along Delaware Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Delaware Creek	DC101	35.0	33.0	24.8	28.8	34.0	28.4
	DC102	34.0	32.0	23.8	30.0	34.0	31.5
	DC103	35.0	34.0	23.7	29.4	32.0	32.0
	DC104	37.2	35.0	27.0	29.0	36.0	31.0
	DC105	31.5	34.2	24.0	29.7	32.0	30.5

Table 9-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 9-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys. The thalweg depth at some locations was estimated based on the depth of water at the edge of the pool or stream. Posted signs at all of the park locations prohibited swimming, diving or wading. Based on visual observations by field personnel, depths appeared greater than 1.0 meter at some sites. At these locations, the stream was considered as non-wadeable and only width measurements were collected. Although depths were recorded as > 1.0 m, a depth value of 1.0 m was used to calculate the average thalweg depth for the stream segment.

Table 9-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site DC101

Delaware Creek at Site DC101 in Fritz Park is channelized and impounded. A bridge and low-water crossing allow access to both sides of the park. The streambanks are mowed to the top of tall walls that define the stream boundary along much of the reach. These walls are constructed of decorative concrete blocks that make access to the stream difficult at these locations. Table 9-2 describes the stream channel and riparian zone appearance at this site. Access to the stream is moderately easy upstream and downstream of these walls. A waterfall feature and concrete stage have been constructed along the bank of the stream. A disc golf course is located on one side of the stream and there are several concrete walking/biking paths throughout the park. There is a large play structure, picnic tables and a gazebo. Large oak trees are located throughout the park and the park is well maintained. [Photogroup 9-2](#) and [Photogroup 9-3](#) depict some of the aforementioned features of the park and stream.

The surveyed reach at Site DC101 contained both wadeable and non-wadeable portions. There was a dam just above the 60-m transect which impounds Delaware Creek at this location. A drainage culvert right bank empties into the creek near the 60-m transect ([Photogroup 9-4](#)).

Table 9-2 Stream channel and riparian zone assessment for Delaware Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Delaware Creek	DC101	Right Bank	Dams along stream; channelized	Mowed/maintained	Large	Fritz Park	Park / residential / urban
		Left Bank		Mowed/maintained	Large		
	DC102	Right Bank	Dams along stream; channelized	Natural/urban	Moderate	Senter Park	Park / residential / urban
		Left Bank		Mowed/maintained	Large		
	DC103	Right Bank	Dam along stream; channelized	Mowed/maintained	Moderate	Centennial Park	Park / residential / urban
		Left Bank		Mowed/maintained	Moderate		
	DC104	Right Bank	Channelized	Concrete channel w/ mowed/maintained atop culvert	Moderate	Lively Park	Park / residential / urban
		Left Bank			Moderate		
	DC105	Right Bank	Upper ½ water impoundment; Lower ½ channelized	Concrete channel w/ mowed/maintained atop culvert	Upper ½ moderate Right/Left; Lower ½ small Right/Left	Jaycee Park	Park / residential / urban
		Left Bank					

Table 9-3 Physical Descriptors of Delaware Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Delaware Creek	0841H	8.5	5	5	0.69	0.68	0.73	Intermittent w/ pools
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
DC101	300	11	1	>0.96 ^a , 0.72, 1.06	>0.95 ^a , 0.71, 1.06	>1.14 ^a , 0.60, 1.48		
DC102	300	11	1	>1.0 ^a	>1.0 ^a	>1.0 ^a		
DC103	300	11	1	>1.0 ^a	>1.0 ^a	>1.0 ^a		
DC104	300	11	1	0.04	0.02	0.04		
DC105	300	11	1	>0.44 ^a , 0.01, 0.95	>0.44 ^a , 0.02, 0.95	>0.46 ^a , 0.03, 0.98		

^a Non-wadeable stream. Estimated some depths, where stream was non-wadeable.

^b Three depths provided are average, below dam, and above dam

Table 9-4 Additional hydrographic parameters of Delaware Creek.

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Delaware Creek	DC101	33.0	6.7	20.0	0.67	Normal
		DC102	34.0	19.0	20.0	0.33	Normal
		DC103	66.0	24.0	50.0	Not measureable	Normal
		DC104	4.35	0.71	1.42	0.42	Normal
		DC105	35.0	0.0	18.0	0.0	No Flow
August 25-28, 2009	Delaware Creek	DC101	33.0	6.7	20.0	0.02	Normal
		DC102	34.0	19.0	20.0	0.0	No Flow
		DC103	66.0	24.0	50.0	0.0	No Flow
		DC104	3.8	0.39	0.85	0.08	Normal
		DC105	35.5	0.0	18.0	0.0	No Flow
May 27-31, 2010	Delaware Creek	DC101	33.0	6.5	20.0	0.75	Normal
		DC102	34.0	19.0	20.0	0.28	Normal
		DC103	66.0	24.0	50.0	Not measureable	Normal
		DC104	4.81	0.84	2.9	0.95	Normal
		DC105	35.5	0.77	18.0	0.09	Low

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Depth measurements were collected from the 0-m transect to the 150-m transect with little problems. From the 180-m transect to the 300-m transect, measurements were collected either at the stream edge or from the foot bridge. Depths in this portion of the reach were all greater than 1.0 meter. Table 9-3 displays the average thalweg depth at the site for each of the three surveys.

Since actual thalweg depth measurements could not be obtained by wading, only width measurements were collected at each of the 30-m transects from 180m to 300m at Site DC101. Table 9-5 shows the width of the stream at each transect where depth was not obtained.

Table 9-5 Pool width measurements at Site DC101

Survey Dates	Transect Location (m)	Width (m)
August 4-8, 2009	180	20
August 25-28, 2009	210	33
May 27-31, 2010	240	27
	270	15
	300	14

Table 9-4 shows the hydrographic parameters collected at the site during each of the three surveys. The stream below the impoundment appeared more natural than the impounded portion above. The lower portion was relatively narrow and shallow, although large slabs of concrete interfered with wading. The stream depths and widths were much wider and deeper above the dam structure where stream channel had been altered. Flow measurements collected during each survey show discharges less than 1.0 cfs.

Below the dam at the 60-m transect, the banks were littered with large pieces of concrete. Though sparse, grass was the dominant vegetation in this segment of the reach. Water depths were about 0.5 meters. (See [Photogroup 9-5](#) that depict these conditions.)

Depths greater than one meter were measured above the dam at the 60-m and the 150-m transects. However, these areas were posted by the City of Irving prohibiting contact recreation. [Photogroup 9-6](#) depicts the pools and rock dam located at the 150-m transect.

Four parking lots provide ample parking for individuals wishing to use the park. Large grassy hills offer ample locations to enjoy the serenity of the park. The left bank adjacent to the disc golf course slopes gently to the water offering moderately easy access to the stream. The right bank, on the other hand, is primarily a vertical wall that makes entering the stream challenging. Along the right bank, vertical distances to the water measured four to five meters, while in the upper 90 meters and the lower 50 meters, banks heights range from less than 0.5 meter to 1.0 meter. It should be noted that where the banks are high, the parks department has installed a wooden fence to keep people away from the edge. [Photogroup 9-7](#) depicts some of the streambanks located along the edge of the stream.

Ample barrels for trash disposal are located throughout the park. As the city routinely collects garbage, trash in the park was rarely observed, though when present was generally plastic bags and bottles.

The stream is generally aesthetically pleasing. Aquatic vegetation and algae was recorded as rare and no unusual odors were detected. There was a slight presence of water dependent birds but no observance of other aquatic vertebrates. Squirrels and domestic pets were the only other animals observed at Site DC101.

Physical Description of Site DC102

The Delaware Creek at Site DC102, Senter Park, is a concrete channelized, impounded stream with a dam on the lower end of the 300-m reach. Below the dam the stream is a drainage ditch containing very little water under normal flow conditions. Access to the stream below the dam is easy. Table 9-2 describes the stream channel and riparian zone appearance at this site.

A play structure, picnic tables, sand volleyball court, and tennis courts are some of amenities located in the park. There is a concrete walk/bike trail along the edge of the stream which connects Senter Park to Centennial Park, the site selected for DC103. A large building, assumed to be a recreation or learning center, is located on the premises. [Photogroup 9-8](#) provides visual images of the amenities located at this site.

The surveyed reach at Site DC102 was classified as a non-wadeable stream. The vertical banks were constructed of decorative concrete blocks. A split-rail fence posted with no trespassing signs was located along the top of the wall to discourage approaching the streambank. There was a dam located at the 0-m transect and second dam 230-m upstream of the first. Macrophytes were observed in the stream just upstream of the 150-m transect. There is a low water crossing that is part of the trail system upstream of the 300-m transect. [Photogroup 9-9](#) provides visual images of the dams and macrophytes observed at the site.

Pool width measurements for Site DC102 are located in Table 9-6. Width measurements were obtained using a range finder. Depth from the edge of the stream was approximately 0.3 meters deep, although, based on dam height, the center of the stream appeared to be deeper than 1.0 meter. [Photogroup 9-10](#) contains examples of the pools created by the dams. Table 9-3 displays the average thalweg depth at the site for each of the three surveys. The average discharge collected during each of the surveys was less than 1.0 cfs as shown in Table 9-4.

The park is located near a well traveled road in a residential area. There is a large parking lot with ample parking. The grassy area and trees are well maintained. Other than the decorative fence, nothing impedes approaching the edge of the stream.

Below the 0-m transect the stream was narrow and shallow which could entice recreation in the channel, such as skating and cycling. Access into the stream channel at the dam was relatively easy after stepping through the fence. Above the dam, entry into the stream was more difficult due to the high wall of the bank, though it was still possible.

At the 300-m transect, access to the stream was again easier. The wooden fence ends just before the reach ends, and a pipe fence starts just after the end of the reach. At this point the distance from the streambank to the water is relatively small. [Photogroup 9-11](#) shows the potential ease of access into the stream at the 300-m transect.

Table 9-6 Pool width measurements at Site DC102

Survey Dates	Transect Location (m)	Width (m)
August 4-8, 2009	0	20
August 25-28, 2009	30	20
May 27-31, 2010	60	20
	90	20
	120	20
	150	23
	180	24
	210	19
	240	20
	270	20
	300	34

Other than water dependant birds, no other vertebrates were observed. The stream was odorless with minimal amounts of garbage in the stream or on the streambanks. Aquatic vegetation was common and algae cover was rare to common. There were no obvious films on the surface of the water.

Physical Description of Site DC103

The Delaware Creek at Site DC103, Centennial Park, is a concrete channelized, impounded stream with a dam on the lower end of the segment. A large aerator is located in the middle of the pool. Walking/biking trails run along both sides of the stream. Access to the stream from the banks is easy. The lawn along the stream is well maintained by the City of Irving Parks and Recreation Department. There is one bridge crossing on the upstream end of the pool leading to a large covered pavilion on the left side. A historic building stands along the walking trail on the right side of the stream. Park benches are located along the walk/bike trail for sitting and observation. There are numerous signs posted at this park which state no diving, no wading, no swimming. [Photogroup 9-12](#) depicts some of the aforementioned structures at this site.

The reach surveyed at Site DC103 was classified as a non-wadeable pool. The 0-m transect was located upstream of a dam and the 300-m transect is located at a foot-bridge that crosses the stream. There are no fences preventing access to the edge of the pool like at other sites along Delaware Creek. [Photogroup 9-13](#) show the relative ease of reaching the edge of the stream.

Pool width measurements for Site DC103 are located in Table 9-7. Width measurements were obtained using a range finder. Based on the depth of water obtained immediately above the dam, the thalweg depth was estimated to be >1.0 meter (Table 9-3). Flow was not measureable during the three surveys (Table 9-4).

Table 9-7 Pool width measurements at Site DC103

Date	Transect Location (m)	Width (m)
August 4-8, 2009	0	34
August 25-28, 2009	30	52
May 27-31, 2010	60	45
	90	37.5
	120	24.5
	150	24
	180	61
	210	66
	240	47
	270	31
	300	24

[Photogroup 9-14](#) shows the stream below the dam and the algae cover and shallow depth from a distance.

The park at Site DC103 is located in a highly residential area with roads located on the north and south ends of the park. One large parking lot is located on the northern end of the park with crosswalks leading to the walking paths surrounding the impoundment. During the surveys, water dependent birds and domestic pets were the only types of vertebrates observed. [Photogroup 9-15](#) shows ducks and a dog with owner.

The water was clear and odorless, and small amounts of garbage and debris was observed in the stream. Bank garbage was rare, mainly consisting of plastic bags and bottles. A spray park is located across the street from the W. 2nd entrance. From interviews with people at the park, children do play in the sprinklers at that location, but according to a city official, the water used is city water, not stream water.

Physical Description of Site DC104

The stream at Site DC104 in Lively Park is a concrete lined channel that is easily accessible. Limited water in the channel results in depths insufficient for recreation under normal flow conditions. The dominant facility at DC104 is a skate park that is highly used by skaters. Additional amenities include picnic tables, park benches, a swimming pool, baseball field, and a lighted, crushed granite walking/jogging trail on the right side of the stream. From the park complex, this trail can be accessed via a foot bridge. Between the last August 2009 and the May 2010 surveys, a no trespassing sign had been posted at the top of the streambank at numerous locations. [Photogroup 9-16](#) provides a visual reference to some of these amenities.

The surveyed reach at Site DC104 was a wadeable stream in a concrete lined channel. The 0-m transect of the reach was set beneath the foot bridge that spanned the stream. At the 180-m transect, a concrete lined tributary entered the main channel on the right. [Photogroup 9-17](#) shows the appearance of the stream at the 0-m transect, the 300-m transect and the tributary confluence at the 180-m transect.

As previously shown in [Photogroup 9-16](#), the riparian zones were mowed and maintained with no fence deterrence. The concrete channel was rather steep, but does not impede entrance to the

channel. Individuals were observed crossing the stream at locations other than the bridge; both walking and riding bikes.

Flow measurements obtained during each survey indicated that discharges were less than 1.0 cfs as shown in Table 9-4. The table also shows the relative narrowness of the flowing stream. Table 9-3 shows the average thalweg depth observed during each of the surveys to be less than 0.1 meter.

As expected with such shallow depths, algae cover was very common and other aquatic vegetation was absent. The water was odorless with no film or scum on the surface. Water dependent birds were observed during one of the surveys, and wild animals, mainly squirrels, were also observed throughout the length of the reach. An occasional domestic pet was observed but no other vertebrates were noted. [Photogroup 9-18](#) portrays the urban wildlife (squirrels) observed at the site.

Physical Description of Site DC105

The stream at Site DC105 in Jaycee Park is a concrete-lined channel with a dam located at the approximate center of the 300-m study reach. The dam creates an impoundment for the upper 150 m of the reach. The lower 150 m is narrow, shallow stream in the bottom of the channel. Access to the stream is easy. There is a play structure, picnic tables, and park benches in the vicinity of the impoundment. Two signs at the streambank state no swimming, and there are also similar signs in the parking lot of the facility. [Photogroup 9-19](#) contains visual images of the above mentioned structures.

The surveyed reach at Site DC105 was wadeable from 0 to 150 m but non-wadeable for the remaining 150 m. A dam at approximately 160 m upstream of the 0-m transect created the impoundment that extended beyond the 300-m transect. Depths of the impoundment at the bank ranged between 0.9 meters and 1.0 meter, with depths greater than 1.0 meter assumed farther from the edge. Below the impoundment, the narrow, shallow stream depths were less than 0.05 meters. Table 9-3 shows the average thalweg depth at the site was less than 0.5 meters. Table 9-8 shows the width measurements of the pool, where depth measurements were collected from the edge of the pool.

Table 9-8 Pool width measurements at Site DC105.

Date	Transect Location (m)	Width (m)
August 4-8, 2009	180	18
August 25-28, 2009	210	18
May 27-31, 2010	240	18
	270	18
	300	18

Flow measurements collected during each of the surveys show no flow during two of the trips and flow less than 0.10 cfs during the third (Table 9-4). On the two surveys where no flow was recorded, water was trickling over the dam, but downstream the concrete channel was dry.

One parking lot is located on the northeast side of the park, which is accessed from the east-bound frontage road along of SH183. Puritan Drive crosses the channel just below the dam at

the 150-m transect. The area surrounding the park is highly residential. There were no fences or high banks that would prevent or impede individuals from getting to the water. The walls of the concrete lined channel are not particularly steep and the maintained grass makes access to the stream relatively easy. [Photogroup 9-20](#) shows the ease of stream access.

As shown in Photogroup 9-20, the riparian areas around the stream are grass and maintained by the City of Irving Parks and Recreation Department. The water was odorless. The water surface was clear of film and scum, but small debris such as leaves, twigs and feathers were noted. There was a large presence of water dependent birds with no other vertebrates observed. No large garbage was observed at the site in the channel or on the banks. Small bank or channel garbage was rare to non-existent. When present, small garbage consisted of plastic bags, bottles and small pieces of paper.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. The selected sites were located in residential areas at public parks. Paved parking lots, hike/bike trails, well established roads in the area, bridges and public access made the facilities well suited for public recreation. Table 9-9 shows that although many activities were observed, no primary contact recreational activities were observed by TIAER personnel at any of the five sites located on Delaware Creek. The “number observed” column shows the approximate number of persons observed at the site when the survey was performed, with primary contact recreation activities listed as individual columns.

Table 9-10 shows the number of secondary contact recreation activities observed at the sites along Delaware Creek. People were observed close to the edge of the streams at all of the sites during at least one assessment period. The “other” activities noted included duck feeding, photography and sitting on the edge of the stream (Site DC105) and practicing volleyball along the concrete channel walls at Site DC104 ([Photogroup 9-21](#)).

There were a number of activities observed over the surveyed reach of each site that were not associated with water ([Photogroup 9-22](#) and [Photogroup 9-23](#)), such as walking, running/jogging, biking and disc golf. The parks were well utilized by the citizenry and no visits to any of the parks along Delaware Creek resulted in no individuals being observed.

During the August 24-29, 2009 trip to Site DC101, one person was observed walking along the streambank carrying a fishing pole ([Photogroup 9-24](#)). He was not observed fishing and attempts to talk with the individual were unsuccessful.

Table 9-11 shows the general types of activities observed over the reach at each site along Delaware Creek and the approximate number of people observed while conducting the RUAA surveys. The number of people listed in the table is the number observed by TIAER personnel while collecting the physical characteristics at each site. The sites were visited additional times during the weeklong trip for interviews only, but the number of people observed during the subsequent visits was not recorded on this table.

Table 9-9 Primary contact recreation activities evaluation during the surveys of Delaware Creek.

Date	Site Number	Number Observed ¹	Wading Children	Wading Adults	Swimming	Water Skiing	Diving	Tubing	Surfing	Whitewater activities	Other
August 4-8, 2009	DC101	1-10	-	-	-	-	-	-	-	-	-
	DC102	11-20	-	-	-	-	-	-	-	-	-
	DC103	1-10	-	-	-	-	-	-	-	-	-
	DC104	20-50	-	-	-	-	-	-	-	-	-
	DC105	1-10	-	-	-	-	-	-	-	-	-
August 24-29, 2009	DC101	1-10	-	-	-	-	-	-	-	-	-
	DC102	1-10	-	-	-	-	-	-	-	-	-
	DC103	1-10	-	-	-	-	-	-	-	-	-
	DC104	1-10	-	-	-	-	-	-	-	-	-
	DC105	1-10	-	-	-	-	-	-	-	-	-
May 27-31, 2010	DC101	11-20	-	-	-	-	-	-	-	-	-
	DC102	20-50	-	-	-	-	-	-	-	-	-
	DC103	20-50	-	-	-	-	-	-	-	-	-
	DC104	11-20	-	-	-	-	-	-	-	-	-
	DC105	11-20	-	-	-	-	-	-	-	-	-

¹None; 1-10; 11-20; 20-50; >50

Table 9-10. Secondary contact recreation activities observed during the surveys of Delaware Creek.

Date	Site Number	Number Observed ¹	Fishing	Boating	Non-whitewater activities	< 8 m from shore	Other
August 4-8, 2009	DC101	1-10	-	-	-	X	-
	DC102	11-20	-	-	-	X	-
	DC103	1-10	-	-	-	X	-
	DC104	20-50	-	-	-	X	X
	DC105	1-10	-	-	-	X	X
August 24-29, 2009	DC101	1-10	-	-	-	X	-
	DC102	1-10	-	-	-	-	-
	DC103	1-10	-	-	-	X	-
	DC104	1-10	-	-	-	-	-
	DC105	1-10	-	-	-	X	-
May 27-31, 2010	DC101	11-20	-	-	-	-	-
	DC102	20-50	-	-	-	X	-
	DC103	20-50	-	-	-	X	-
	DC104	20-50	-	-	-	-	-
	DC105	11-20	-	-	-	X	-

¹None; 1-10; 11-20; 20-50; >50

As previously stated, more than one visit occurred per survey at the sites where activities were observed. The surveys may have been conducted in the morning or afternoon, but interviews were scheduled after normal work hours on weekdays or early mornings on weekends, when temperatures are more likely to favor outdoor activities.

People were approached at the five sites by TIAER personnel wearing identification tags and asked to participate in an interview. Most people were willing to accommodate, but there were some that did not want to participate. TIAER personnel tried not to interfere with an individuals activities, thus the interview process was kept as brief as possible. Some people gave names and phone numbers, some gave just names and others chose not to give any information other than their opinions. There were a few instances where a language barrier prevented interviews from occurring all together.

Out of the 47 interviews conducted in the entire study area of Delaware Creek, the most common response from all interviewees was “nasty.” It was commonly related that the water just appeared too nasty to get into – be it floating debris, a film on the surface of the water, or all of the water fowl feathers floating on the surface. Many shared that the water did not look inviting. Most people also pointed out the signs prohibiting people from recreating in the stream.

Table 9-12 records the activities reported during interviews either conducted by the interviewee or activities by others they have observed. The numbers under the column headings indicate the number of times an activity was mentioned during all of the interviews.

At Site DC101, several people said they observed adults enter the stream to retrieve golf discs. Some people, familiar with the creek more than 20 years, claimed that they used to get in the water when they were younger and the stream was cleaner. Now the water looks nastier and does not look as appealing.

There were many instances where fishing had been observed by the interviewees. Most suspected it was catch and release, as they reported never seeing anyone leave with fish on a stringer. There were a few reports of youths playing in the water near some of the dams, specifically in the vicinity of Sites DC101 and DC103, and that this activity usually occurred after a rainfall event when the water levels were higher.

At Site DC104 there was a report of some youths coming up out from the concrete lined channel with wet shorts. The interviewee speculated these youths were skating in the channel and may have fallen into the small trickle of water in the center of the channel.

One woman reported that her daughter and son-in-law did swim in the impoundment at Site DC103. She stated that her children “weren’t scared” and swam in several of the ponds on Delaware Creek. She also stated that they swam in Lake Lewisville, Lake Ray Hubbard and other lakes around the DFW metroplex. As at other streams surveyed, there was a suspicion that some interviewees would tell us what they thought we wanted to hear.

Table 9-11 Summary of general activities observed during surveys of Delaware Creek

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	DC101	1-10	-	-	X	-	-	X	-	-	X	-	-	-	X	X	X
	DC102	11-20	-	-	X	-	X	X	-	-	-	-	-	-	X	X	X
	DC103	1-10	-	-	X	X	X	X	-	-	-	-	-	X	X	X	-
	DC104	20-50	-	-	X	-	X	X	-	X	-	-	-	-	X	X	X
	DC105	1-10	-	-	X	-	X	X	X	X	-	-	-	X	X	X	X
August 24-29, 2009	DC101	1-10	-	-	X	-	-	X	-	-	-	-	-	X	X	X	X
	DC102	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	DC103	1-10	-	-	X	X	X	X	-	-	-	-	-	X	X	X	-
	DC104	1-10	-	-	X	-	-	X	-	-	-	-	-	-	-	X	-
	DC105	1-10	-	-	X	-	X	X	-	-	X	-	-	X	X	X	-
May 27-31, 2010	DC101	11-20	-	-	X	-	-	X	-	-	-	-	-	X	-	X	X
	DC102	20-50	-	-	X	X	X	X	-	-	X	-	-	-	X	X	-
	DC103	20-50	-	-	X	X	X	X	-	-	X	-	-	-	X	X	-
	DC104	20-50	-	-	X	X	X	X	X	-	-	-	-	-	X	X	-
	DC105	11-20	-	-	X	-	X	X	-	-	X	-	-	X	X	X	-

¹ None; 1-10; 11- 20; 20-50; >50

Table 9-12 Activities reported in interviews at sites along Delaware Creek.

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Delaware Creek	DC101	2	8	9*	8	2	-	1	7	-
	DC102	-	5	-	-	4	-	1	5	1
	DC103	1	3	1	1	3	2	-	4	1
	DC104	-	1	-	-	-	-	-	-	-
	DC105	-	2	-	-	3	1	2	3	-

* - Adults were retrieving Frisbee discs.

One gentleman interviewed at Site DC101 disclosed that there are parties at this location every weekend. He felt in danger because of these activities. He said he has observed people entering the stream during these parties and recreating.

According to several interviews at Site DC105, the park is a popular place for people to come and eat lunch, feed the ducks, and just relax. The large shade trees are nice and it is located off of the feeder road of SH183, so it is easy to enter and leave. The playground is popular for families with younger children. A few persons interviewed stated that their children enjoyed feeding the ducks and geese.

Other than the people who retrieve the golf discs from the water at Site DC101, the occurrences of people actually in the stream is infrequent. Some of the people could not recall the last time they observed anyone fishing.

Copies of all of the interviews conducted along Delaware Creek grouped by site are provided in Appendix G-4.

Summary

RUAA surveys were conducted at five sites along Delaware Creek on August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix G-1, G-2, G-3 and G-4, respectively.

A variety of activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 9-4. The park facilities are well maintained by the parks department and they are utilized by many people in a variety of ways.

Both observations and interviews indicated that most people who utilize the park facilities do not enter the stream or impoundments along the stream. Many interviewees described the water as “too nasty” to recreate in or, as is the case at Site DC104 in Lively Park, the water was too shallow during normal flow conditions. The parks adjacent to the stream are predominately used to exercise, ride bikes, skate, play disc golf or relaxation in the shade.

There were, however, a few reports of youths playing in the water near some of the dams, specifically in the vicinity of Sites DC101 and DC103, and that this activity usually occurred after a rainfall event when the water levels were higher. Infrequent fishing was reported by some interviewees. All parks along Delaware Creek are clearly posted with signs warning against trespassing and/or swimming, wading, and diving.



Figure 9-4 Summary of activities observed and reported in interviews at sites along Delaware Creek

Delaware Creek (Segment 0841H) Photogroups



Photogroup 9-1 Typical no trespassing and no swimming signs posted in parks along Delaware Creek. [\[Return to Text\]](#)



Photogroup 9-2 Physical setting at Site DC101, Delaware Creek (Group 1 of 2). [\[Return to Text\]](#)



Photogroup 9-3 Physical setting at Site DC101, Delaware Creek (Group 2 of 2).
[\[Return to Text\]](#)



Photogroup 9-4 Delaware Creek Site DC101 near 60-m transect showing small dam and drainage culvert. (Individual pictured is TIAER staff.)
[\[Return to Text\]](#)



Photogroup 9-5 Delaware Creek Site DC101 below 60-m transect showing rocks and concrete debris [\[Return to Text\]](#)



Photogroup 9-6 Delaware Creek Site DC101 showing pools in the 60-m to 150-m transect area. (Individual pictured is TIAER staff.) [[Return to Text](#)]

[Remainder of page intentionally left blank]



Photogroup 9-7 Delaware Creek Site DC101 showing streambanks along the 300-m reach. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 9-8 Delaware Creek Site DC102 showing amenities of Senter Park
[\[Return to Text\]](#)



Photogroup 9-9 Delaware Creek Site DC102 depicting dams and macrophytic growth. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 9-10 Delaware Creek Site DC102 showing pools behind dams. [\[Return to Text\]](#)



Photogroup 9-11 Delaware Creek Site DC102 showing ease of access to water
[\[Return to Text\]](#)



Photogroup 9-12 Delaware Creek Site DC103 showing features at Centennial Park
[\[Return to Text\]](#)



Photogroup 9-13 Delaware Creek Site DC201 showing access to stream. [Return to Text](#)



Photogroup 9-14 Delaware Creek Site DC103 showing stream below dam. [Return to Text](#)



Photogroup 9-15 Delaware Creek Site DC103 showing dogs and ducks. (Individuals pictured in right photograph are TIAER staff.) [Return to Text](#)



Photogroup 9-16 Delaware Creek Site DC104 showing amenities and conditions in Lively Park. [Return to Text](#)



Photogroup 9-17 Delaware Creek Site DC104 at 0-m 300-m transects, and tributary entry at 180-m transect. Note: People in creek are TIAER survey crew. [\[Return to Text\]](#)



Photogroup 9-18 Delaware Creek Site DC104 showing limited urban wildlife encountered. [\[Return to Text\]](#)



Photogroup 9-19 Delaware Creek Site DC105 showing creek and surrounding Jaycee Park [Return to Text](#)

[Remainder of page intentionally left blank]



Photogroup 9-20 Delaware Creek Site DC105 showing stream accessibility and general conditions. [\[Return to Text\]](#)



Photogroup 9-21 Delaware Creek Sites DC104 and DC105 depicting activities near water. [Person in foreground of right-hand photo is on survey crew.] [\[Return to Text\]](#)



Photogroup 9-22 Activities observed at parks along Delaware Creek (Group 1 of 2).
[Return to Text](#)



Photogroup 9-23 Activities observed at parks along Delaware Creek (Group 2 of 2).
[\[Return to Text\]](#)



Photogroup 9-24 Delaware Creek Site DC101 showing young man with fishing pole
[\[Return to Text\]](#)

CHAPTER 10

ESTELLE CREEK (SEGMENT 0841J)

Watershed Characterization

Segment 0841J is defined as a 4-mile reach running upstream from its confluence with Bear Creek (0841B) to Valley View Lane in Irving, Texas (Figure 10-1). This unclassified creek is little more than a concrete drainage way, except for a pooled area near West Pioneer Dr. The watershed of Estelle Creek has areas of residential development, some commercial properties, and areas of undeveloped open fields (land use on Figure 10-2 and aerial photograph on Figure 10-3)). There are no NPDES WWTP outfalls in the segment watershed. The flow type for this creek is listed by TCEQ as intermittent and based on this flow type the assigned aquatic life use is minimal (TCEQ, 2008).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in station selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Dalworth Creek site selection the major interaction occurred with City of Irving staff.

Survey Site Descriptions

The survey sites selected for Estelle Creek (Segment 0841J) are provided in Figure 10-1. Two sites were selected in this stream. A brief description of each site follows.

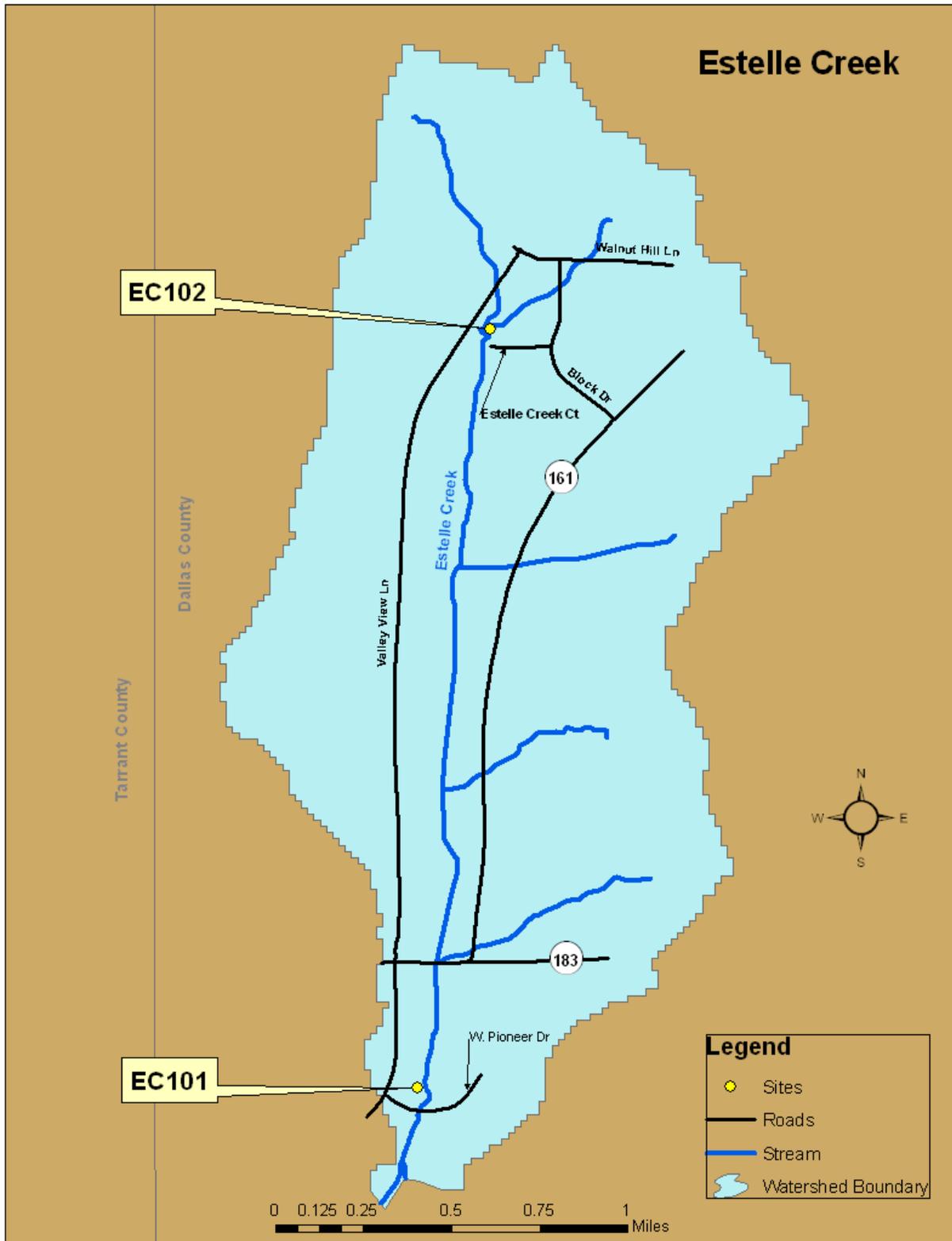


Figure 10-1 Estelle Creek (0841J) showing RUA survey sites.

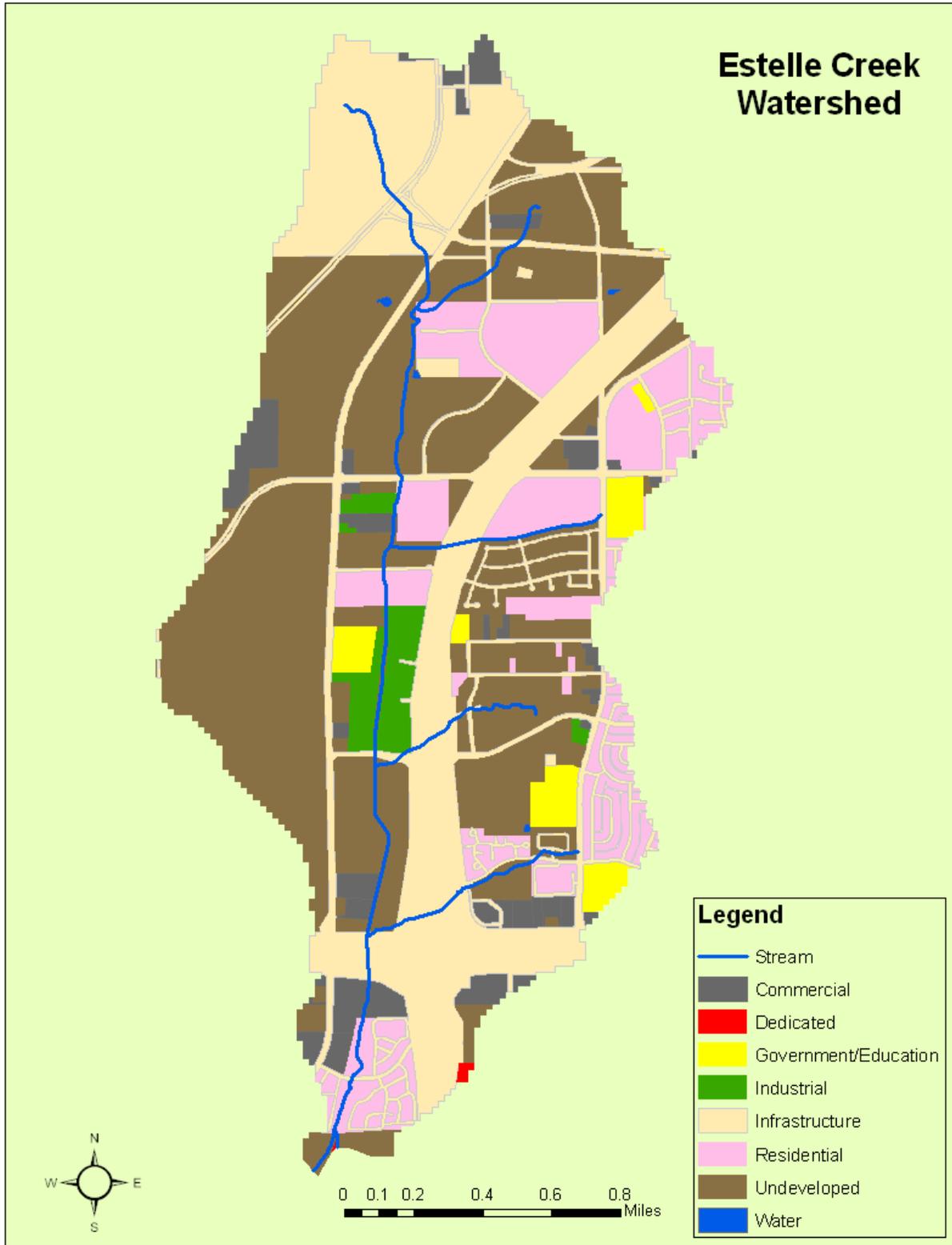


Figure 10-2 Land use/land cover for Estelle Creek Watershed (Source: NCTCOG, 2007 & 2009)

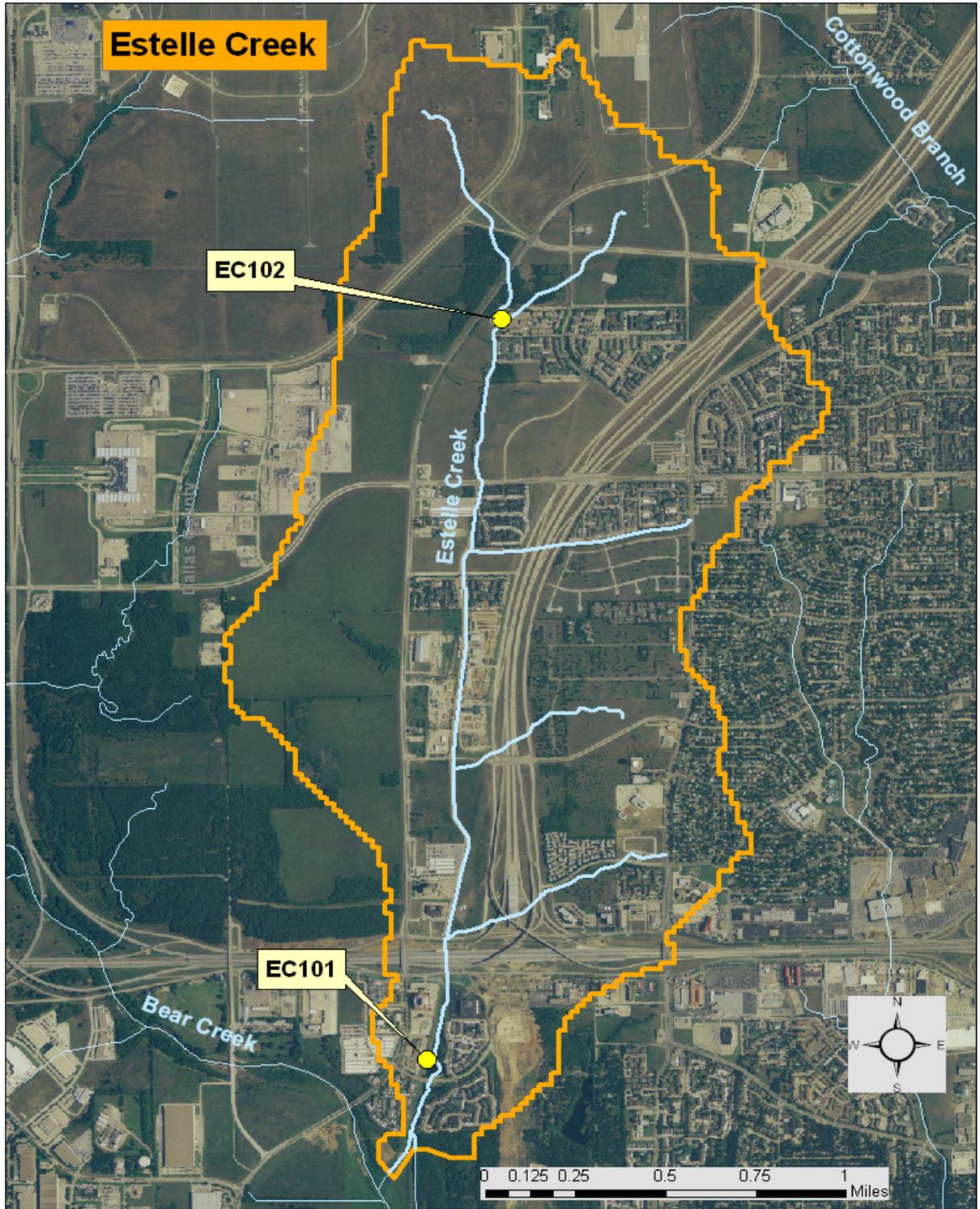


Figure 10-3 Aerial photograph of Estelle Creek watershed (Source: NAIP, 2005)

Site EC101 (TCEQ Station 17174) is approximately 79 m upstream of W. Pioneer Dr. in Irving, where a dam forms a pool near several apartment complexes. The area around the bank is groomed and appears to be accessible from either side.

Site EC102 is located on the upstream portion of Estelle Cr. at the Estelle Creek Apartments off Block Rd. in Irving. West of the apartment complex the stream reach is natural in appearance and easily accessed. North of the complex, the stream is concreted for approximately 100 meters before returning to a natural setting.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Estelle Creek.

Surveys conducted on Estelle Creek were conducted during varying air and water temperatures as show in Table 10-1. Water temperatures were warm enough for recreational activities to occur.

Table 10-1 Temperatures measured at each site along Estelle Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Estelle Creek	EC101	28.4	29.1	23.4	29.2	31.0	27.6
	EC102	30.1	26.7	25.6	26.1	33.0	24.2

Table 10-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 10-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys. The thalweg depth at some locations was estimated based on the depth of water at the edge of the pool or stream. Where depth was assumed >1.0 m, a depth of 1.0 was used to calculate the average thalweg depth for the stream segment.

Table 10-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site EC101

The stream at Site EC101 is channelized with an impoundment, a low water crossing/dam, and modified natural stream. The surrounding areas include a strip shopping mall and hotel to the west of the stream and an apartment complex with security gate to the east. The riparian areas are mowed and maintained grass corridors. Parking lots associated with the strip shopping center and hotel allow for ample parking and access to the stream is easy. [Photogroup 10-1](#) depicts some of the aforementioned features of the site and stream.

Table 10-2 Stream channel and riparian zone assessment for Estelle Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Estelle Creek	EC101	Right Bank	Dam in upper 1/3; Impoundment below; channelized	Mowed/maintained	Moderate	None	Apartment Complex
		Left Bank		Mowed/maintained	Moderate		Strip mall / Hotel
	EC102	Right Bank	Channelized	Shrub dominated	Large	None	Natural
		Left Bank		Mowed/maintained	Small		Apartment complex

Table 10-3 Physical Descriptors of Estelle Creek. Stream flow type from TCEQ (2008b)

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Estelle Creek	0841J	4.0	2	0	>0.55	>0.55	>0.53	Intermittent
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
EC101	300	11	0	>1.0*	>1.0*	>1.0*		
EC102	300	11	0	0.10	0.10	0.06		

* Non-wadeable stream; estimated depths greater than 1m.

Table 10-4 Additional hydrographic parameters of Estelle Creek

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Estelle Creek	EC101	48.0	15.25	15.25	0.21	Normal
		EC102	5.3	0.06	1.0	<0.01	Normal
August 25-28, 2009	Estelle Creek	EC101	48.0	15.25	15.25	1.82	Normal
		EC102	5.4	0.10	1.2	<0.01	Normal
May 27-31, 2010	Estelle Creek	EC101	48.0	15.25	15.25	0.66	Low
		EC102	5.6	0.15	1.16	0.01	Low

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

The surveyed reach at Site EC101 was determined to be a non-wadeable stream. Depth measurements of the stream were attempted from the stream banks and depths over 1.0-m deep were measured. Table 10-5 shows the width of the stream at each transect. Since the walls of the stream were vertical concrete walls, the widths of the stream were assumed not change between surveys.

Table 10-5 Transect width measurements at Site EC101

Survey Dates	Transect Location (m)	Width (m)
August 4-8, 2009	0	48.5
August 25-28, 2009	30	38.5
May 27-31, 2010	60	35.5
	90	27.5
	120	20.0
	150	16.0
	180	15.25
	210	15.25
	240	15.25
	270	15.25
	300	15.25

The riparian area around the large impoundment was mowed grass, from the edge of the stream to the top of the bank. There was an aerator located on the southern end of the pond. A security fence was present around the perimeter of the apartment complex but no other obstructions were observed that would impede a person from accessing the stream. The stream above a low-water dam at the 210-m transect was also manicured, except at the edges where vegetation appeared more natural. [Photogroup 10-2](#) depicts the conditions of the areas surrounding the stream.

Aquatic vegetation was common to abundant at the site with abundant rafts of algae cover. Domestic pets were observed at the site and are assumed to belong to residents of the apartment complex. There was a moderate presence of water dependent birds with fecal dropping also observed. No other vertebrates were observed. Unusual odors were detected only rarely. Considerable amounts of algae were observed floating on the surface. The dominant substrate was assumed to be silt.

Physical Description of Site EC102

Estelle Creek at Site EC102 is a channelized stream with natural segments and concrete channel segments. From approximately the 90-m transect to the 240-m transect, the stream is in a concrete lined channel. The remaining portions of the stream are natural with a mud/clay substrate. An apartment complex is located adjacent to the stream with parking lots located at the top of the stream banks. Table 10-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 10-3](#) shows the stream descriptions and apartment complex in relation to the stream.

The surveyed reach at Site EC102 was wadeable. The right bank of the stream was natural the entire length of the reach. The left bank was concrete from the 0-m to 60-m transect. From the 60-m transect to the 180-m transect the bank was mowed and maintained along the edges of the apartment complex. From the 180-m transect to the

300-m transect the left bank was natural. Access to the stream was easy. [Photogroup 10-4](#) provides visual images of the different riparian types observed at the transects.

A snake was observed during the first survey and a domestic pet was observed during the second trip. No other vertebrates were observed. No odors were detected during the surveys. Aquatic vegetation was rare to common and algae cover was common. Stream and bank garbage was generally rare but on one visit small channel garbage, plastic bags and bottles, was reported as common. There was no obvious film or scum on the surface of the water during any of the three surveys.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. In addition to the time periods during the surveys, the sites were visited for the sole purpose of conducting interviews. The RUAA surveys for both sites were conducted on Thursday, August 6, 2009, Friday, August 28, 2009 and Friday, May 28, 2010. Additional visits to both sites were conducted on Friday, August 7, 2009, Saturday, August 29, 2009 and Sunday, May 30, 2010. It should be noted that field personnel also drove by Site EC101 a second time on Sunday, May 30, 2010 and another time on Monday, May 31, 2010. No water-related recreation activities were observed at either of the survey sites on any visit by field staff.

At Site EC102, persons with a landscaping company were observed maintaining the grounds of the apartment complex during two different surveys. At Site EC101, two persons were observed during two different surveys crossing the low-water dam located at the 210-m transect. Neither individual stopped to interact with the water. Attempts to conduct interviews with these individuals were unsuccessful.

A total of six interviews were collected from persons with knowledge of Estelle Creek. One interview collected from a City of Irving employee stated that he has not used the stream for recreational use and has never observed anyone else recreating in the stream either.

A second interview was collected from a gentleman walking in an apartment complex parking lot. He claimed that based on the non-inviting appearance of the stream, neither he nor his family utilized the stream for recreation. In addition, the shallow depths and vegetation in the stream also acted as a deterrence for recreation. He also had not observed or heard of others recreating in the stream.

Three additional interviews were collected from managers of apartments complexes located along Estelle Creek. Two of the interviewees indicated that they had not observed any form of recreation activities in the stream. One woman, from Estelle Creek North Apartments, indicated that the stream was part of the city drainage and was not aesthetically inviting. The other woman, from Camden Valley Ridge Apartments, stated that there is typically insufficient water depth to promote recreation. In addition, the maintenance supervisor from Camden Valley Ridge Apartments, who was present during the interview, also agreed with an absence of water recreation occurring in the stream.

The third apartment complex interviewee stated that she had not observed any contact recreation, but had observed infrequent fishing occurring in the stream. In her opinion, the stream was nasty and not meant for recreation.

One final interview was collected from an individual who lives in the area of Estelle Creek and travels throughout the watershed routinely. Though familiar with the stream for 23 years, he reported that he has never recreated in the stream or observed any recreational activities occurring in the stream. Most of the parts of the stream he has observed are at bridge crossing locations. He believes the stream to be polluted and fears disease from contact with the water.

Copies of the interviews conducted along Estelle Creek are located in Appendix H-4.

Summary

RUAA surveys were conducted at two sites along Estelle Creek during August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix H-1, H-2, H-3 and H-4, respectively.

No contact recreation, either primary or secondary, was observed by TIAER field staff during the surveys. One interview reported individuals fishing in the impoundment at Site EC101. Figure 10-4 summarizes the observed and interview reported activities at the two sites.

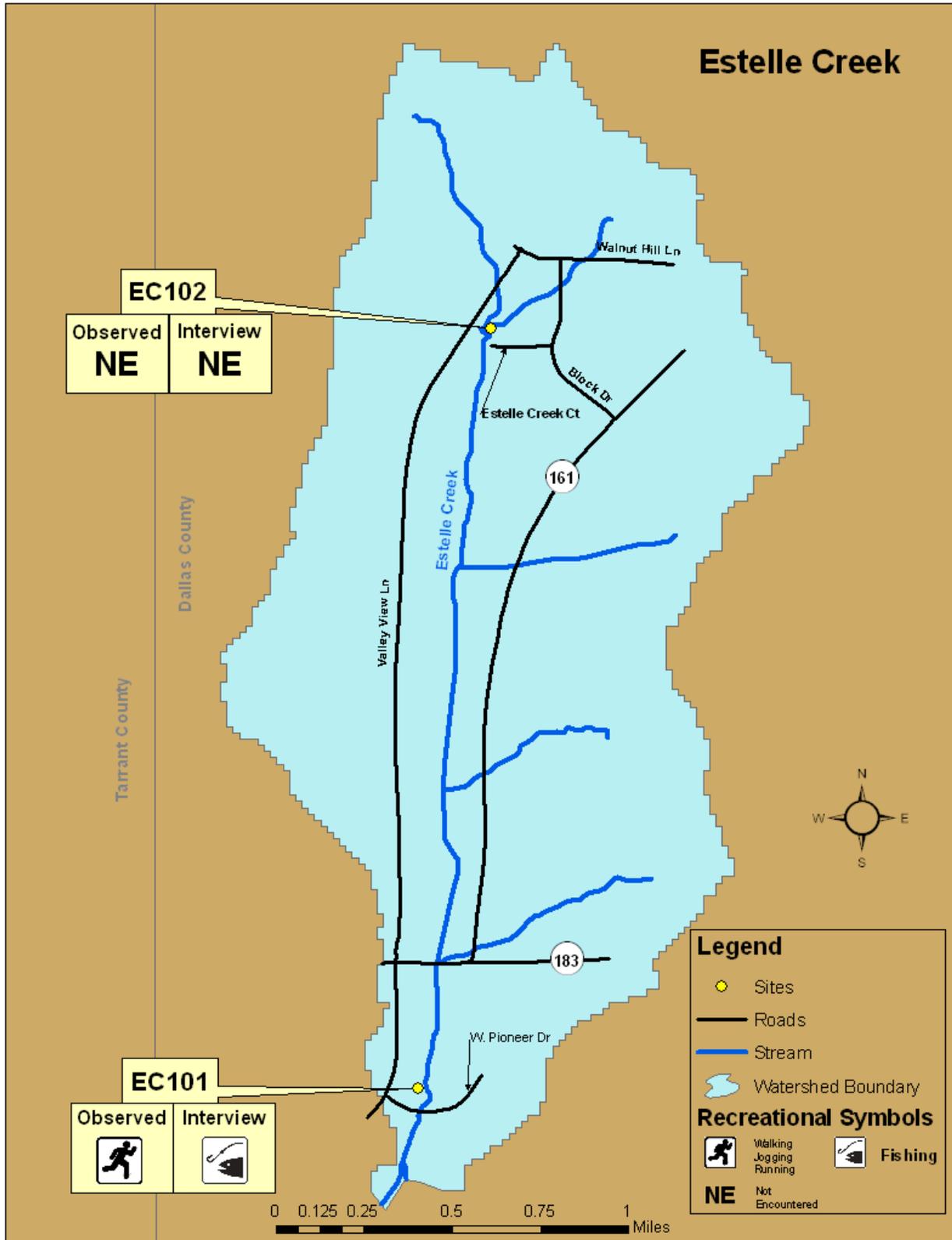


Figure 10-4 Summary of activities observed and reported in interviews at sites along Estelle Creek

Estelle Creek (Segment 0841J) Photogroups



Photogroup 10-1 Estelle Creek Site EC101 showing features at site. (Individual barely visible in top left photograph is TIAER staff.) [\[Return to text\]](#).



Photogroup 10-2 Estelle Creek Site EC101 showing riparian area. (Right photograph includes member of field staff.) [\[Return to text\]](#)



Photogroup 10-3 Estelle Creek Site EC102 showing stream conditions and proximity to apartment complex. [Return to text](#)



Photogroup 10-4 Estelle Creek Site EC102 showing riparian zone. (Upper left photograph shows member of field staff.) [\[Return to text\]](#)

CHAPTER 11

FISH CREEK (SEGMENT 0841J)

&

North Fork Fish Creek (Segment 0841Q)

Watershed Characterization

According to the TCEQ 2008 Water Quality Inventory and 303(d) List (TCEQ, 2008b) Segment 0841K includes the north and south branches of Fish Creek. The draft 2010 Integrated Report (TCEQ, 2010), however, clearly separates the Fish Creek system into Fish Creek (Segment 0841J), formerly the south branch, and North Fork Fish Creek (Segment 0841Q), formerly the north branch and locally referred to as Pioneer Creek (Figure 11-1). Segment 0841J of Fish Creek is a 10.5 mile stretch running upstream from approximately 100-m downstream of FM 382 in Grand Prairie, Texas, to approximately 0.25 miles upstream of Collins Road in Arlington, Texas. Segment 0841Q, North Fork Fish Creek, is approximately 5 miles long and flows west to east from Collins Road in Arlington parallel to IH 20 to the confluence with the south branch underneath IH 20. The land use in the watershed of the combined streams is predominately residential with a significant amount of undeveloped land (land use on Figure 11-2 and aerial photograph on Figure 11-3). Note that because of the large number of schools in the watershed, on Figure 11-2 each school is marked by a dot on the map but not labeled because of space constraints. The flow type listed by TCEQ for both branches of Fish Creek is perennial, and based on this flow type the presumed aquatic life use is high (TCEQ, 2010c).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some

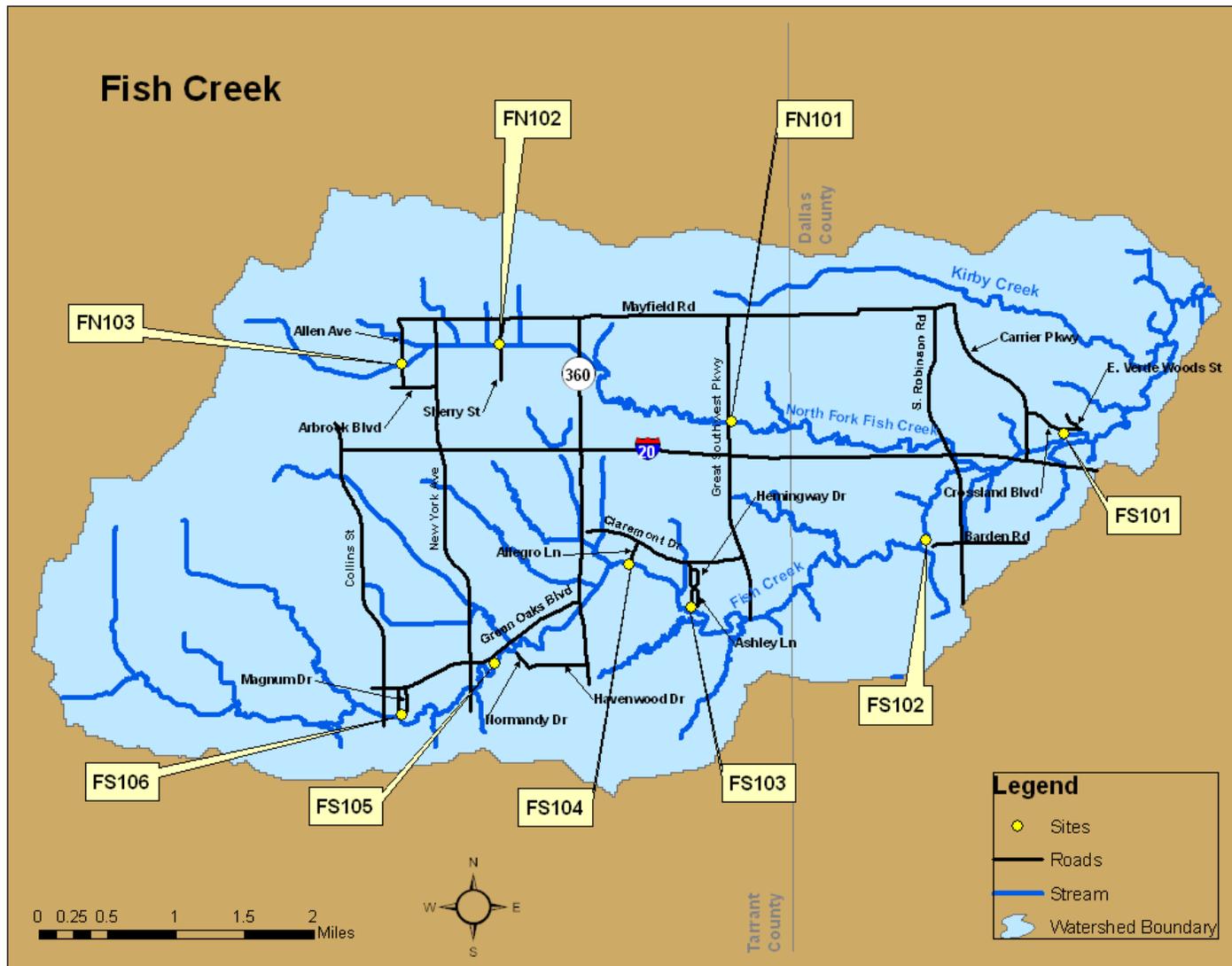


Figure 11-1 Fish Creek (0841K) and North Fork Fish Creek (Segment 0841Q) showing RUA survey sites.

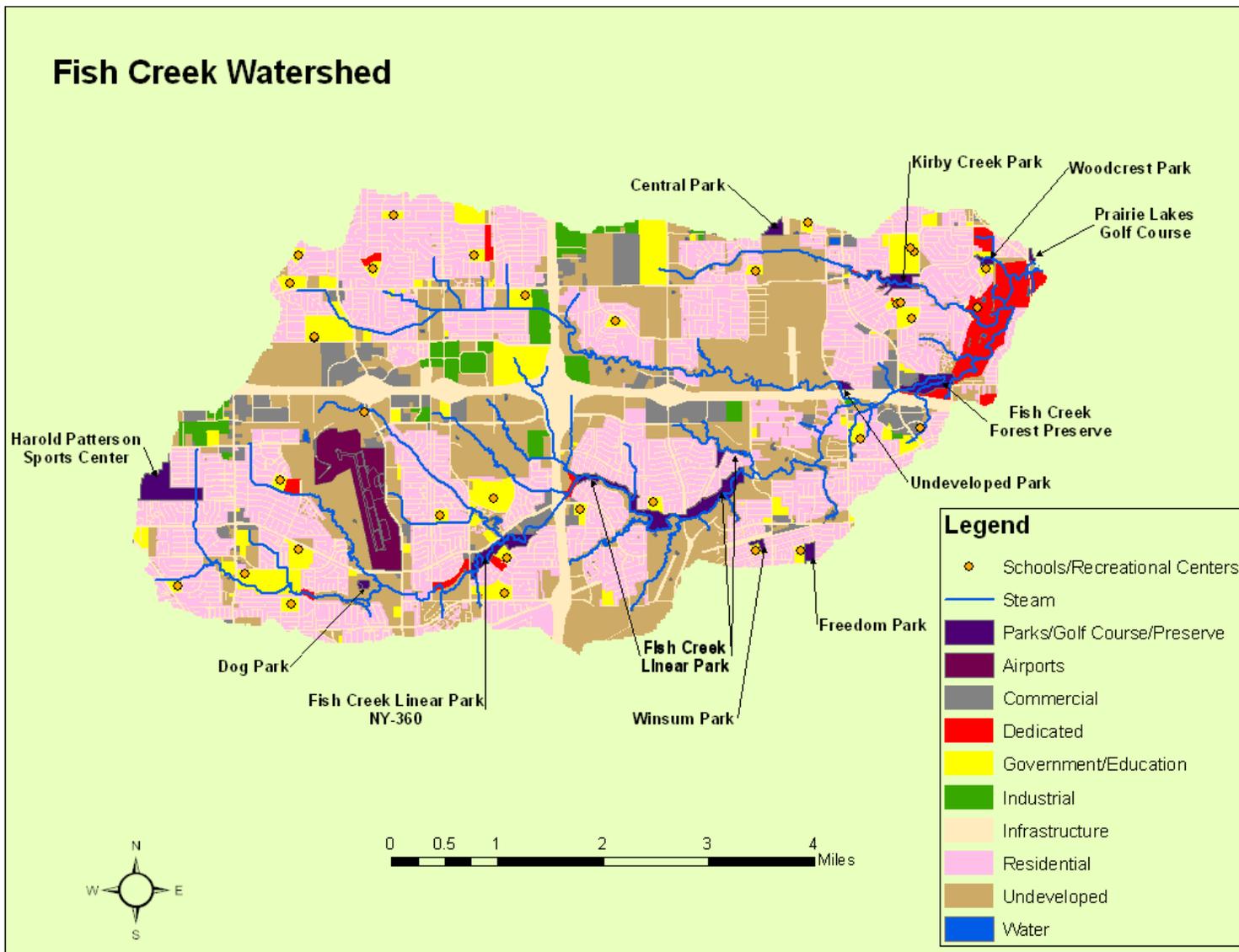


Figure 11-2 Land use/land cover for Fish Creek and North Fork Fish Creek watershed (Source: NCTCOG, 2007 & 2009)

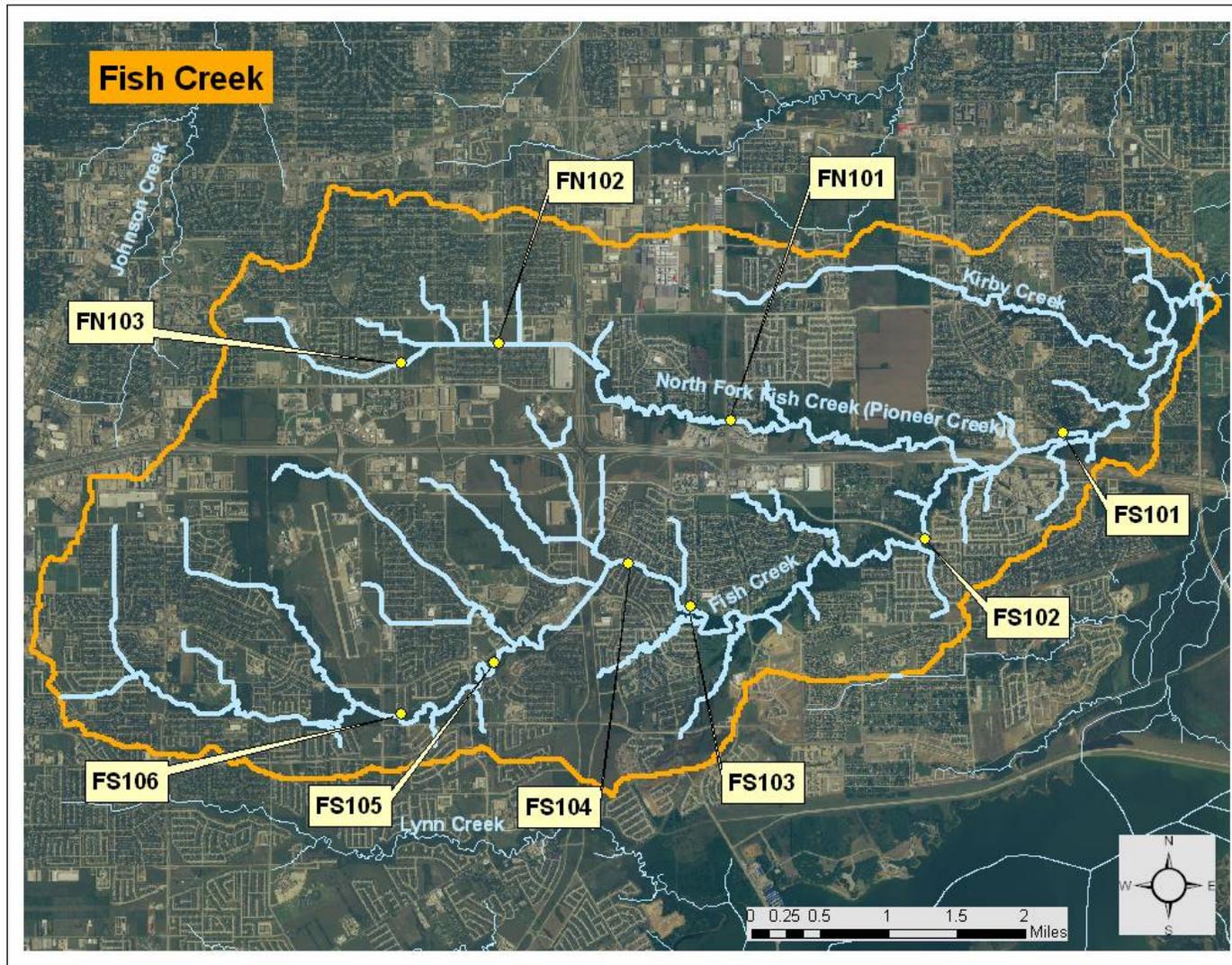


Figure 11-3 Aerial photograph of Fish Creek and North Fork Fish Creek watershed (Source: NAIP, 2005)

dropped. The sites listed below reflect the results of input received following the meeting. For Fish Creek and North Fork Fish Creek site selection the major interaction occurred with City of Arlington and City of Grand Prairie staff.

Survey Site Descriptions

The survey sites selected for Fish Creek (Segment 0841K) and North Fork Fish Creek (Segment 0841Q) are provided in Figure 11-1. Six sites were selected along Fish Creek and three sites along North Fork Fish Creek. A brief description of each site follows.

Fish Creek

Site FS101 (TCEQ Station 20342) is located on Fish Creek in Fish Creek Preserve, 662 meters downstream of S Carrier Parkway and 59 meters due south of the intersection of E Crossland Boulevard and E Verde Woods Street in Grand Prairie. There is a hike/bike trail in the area and the creek is accessible from this location.

Site FS102 is located at Barden Rd and Fish Creek in Grand Prairie. There is a hike and bike trail under the road at this location and access to the creek is moderately difficult due to dense vegetation and steep banks. The area around this location is residential and commercial.

Site FS103 is located at Fish Creek near Starrett Elementary school off Hemingway Dr. and Ashley Ln. in Grand Prairie. There is an access point at this location and a rope swing in a tree that indicates that this was once used recreationally. The pool that existed at one time has filled in with endemic gravels; presumably washed in during a period of high flow.

Site FS104 is located at Fish Creek off Allegro Lane in Grand Prairie. There is a play structure at this location as well as a hike and bike bridge across the stream. Access to the creek can occur under the bridge.

Site FS105 is located at the end of Normandy Drive off Havenwood Dr. in Arlington, Texas. Bryant Elementary school and a family park are just upstream of Normandy and the stream is accessible via a well traveled dirt path that passes through the trees at the end of Normandy Drive. Additionally, a bike path that crosses upstream from Normandy Drive affords relatively easy access to the creek. Otherwise, the area surrounding the stream is densely vegetated, with giant ragweed and poison ivy, making access at other points difficult.

Site FS106 is located on Fish Creek at Beagle Dr. off Magnum Dr in Arlington. There is access at this location and several children were observed in the neighborhood.

North Fork Fish Creek (Pioneer Creek)

Site FN101 is located on North Fork Fish Creek (Pioneer Creek) just upstream of Great Southwest Parkway in Grand Prairie. This area is residential on the north side with commercial development on the south. The stream is natural in appearance and is accessible from a commercial parking lot on the southwest corner of Great Southwest Parkway and Fish Creek North Branch.

Site FN102 is located at Sherry Street west of SH 360 in Arlington. If parking on the south side of the creek, there is a foot bridge that must be used to cross North Fork Fish Creek. Once on the north side, the site is accessible using the steep sides of the concrete channel.

Site FN103 (TECQ Station 17187) is located at Allen Ave. approx. 260 meters north of E. Arbrook in Arlington. A portion of the reach is natural downstream of Allen Ave. but is a concreted channel on the upstream side of Allen Ave. Houses back up to the stream on both sides of the upstream reach but appear to be fenced to limit access. Access can occur at Allen Ave.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Fish Creek.

Surveys conducted on Fish Creek and North Fork Fish Creek were conducted during varying air and water temperatures as shown in Table 11-1. Water temperatures were warm enough for recreational activities to occur.

Table 11-1 Temperatures measured at each site along Fish Creek and North Fork Fish Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Fish Creek	FS101	27.4	27.4	29.0	27.0	32.0	25.6
	FS102	31.3	28.0	26.1	27.6	36.0	26.7
	FS103	32.8	27.6	28.0	27.9	35.0	26.1
	FS104	36.0	28.9	28.1	30.9	36.0	27.7
	FS105	36.2	28.7	31.2	dry	33.0	27.0
	FS106	33.1	28.4	34.1	28.1	34.0	28.2
North Fork Fish Creek	FN101	29.5	32.7	35.0	37.8	36.0	27.8
	FN102	38.5	36.0	36.0	n/a*	33.0	37.0
	FN103	35.7	32.4	36.7	37.4	32.2	28.9

* Water depth too shallow for an accurate temperature

Table 11-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 11-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys of Fish Creek and North Fork Fish Creek. Site FS101 was the only site where wading was not able to be performed at all transects. The thalweg depth was estimated based on observations by field personnel and assumed to be greater than 1.0 m at the upper 240 m of the reach. At these transects, the stream was considered as non-wadeable and only width measurements were collected. Where depth was assumed to be >1.0 m, a depth of 1.0 m was used to calculate the average thalweg depth for the stream segment.

Table 11-2 Stream channel and riparian zone assessment for Fish Creek and North Fork Fish Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Fish Creek	FS101	Right Bank	Natural	Tree/shrub dominated	Large	Fish Creek	Forest
		Left Bank		Mowed/maintained	Large	Linear Park	Park
	FS102	Right Bank	Natural	Shrub dominated	Moderate	Fish Creek	Natural / residential
		Left Bank		Shrub dominated	Large	Linear Park	Natural
	FS103	Right Bank	Natural	Shrub/tree dominated	Large	Fish Creek	Natural
		Left Bank		Shrub/tree dominated	Moderate	Linear Park	School/residential
	FS104	Right Bank	Natural	Tree/shrub dominated	Large	Fish Creek	Natural
		Left Bank		Tree/shrub dominated	Moderate	Linear Park	Natural/residential
	FS105	Right Bank	Natural	Tree/shrub dominated	Large	Fish Creek	Natural
		Left Bank		Tree/shrub dominated	Large	Linear Park	Natural
	FS106	Right Bank	Lower 1/3 natural; Upper 2/3 channelized	Tree/shrub dominated	Large	Fish Creek	Natural
		Left Bank		Tree/shrub dominated	Large	Linear Park	Natural/residential
North Fork Fish Creek	FN101	Right Bank	L/R ½ shrub dominated; L/R ½ denuded/eroded bank	Shrub dominated	Large	None	Natural
		Left Bank		Shrub dominated; natural	Large		Natural
	FN102	Right Bank	Channelized	Concrete	Small	None	Residential
		Left Bank		Concrete	Small		Mowed/maintained
	FN103	Right Bank	Channelized	Lower ¼ shrub dominated; Upper ¾ concrete	Lower ¼ large; Upper ¾ small	None	Lower ¼ natural; Upper ¾ residential
		Left Bank					

Table 11-3 Physical Descriptors of Fish Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Fish Creek	0841K	6.5	6	6	>0.46*	>0.40*	>0.50*	perennial
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
FS101	300	11	1	>1.10*	>1.11*	>1.1*		
FS102	300	11	1	0.42	0.44	0.49		
FS103	300	11	1	0.43	0.38**	0.48		
FS104	300	11	1	0.26	0.23**	0.31**		
FS105	300	11	1	0.25	0.11	0.22		
FS106	300	11	1	0.31	0.13	0.41		

* Non-wadeable stream. Estimated some depths, where stream was unwadeable

** Not all 11 measurements were collected due to safety concerns.

Table 11-4 shows the average thalweg depth for each reach and site during each of the RUAA surveys of North Fork Fish Creek.

Table 11-5 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site FS101

The stream at Site FS101 is natural stream with a concrete hike/bike trail located on the north side of the stream. The trail runs alongside the stream the entire reach and is part of the Fish Creek Linear Park. At this location the north side of the stream is a grass field mowed and maintained by the city parks department up to the top of the streambank. Both streambanks are shrub/tree dominated with steep banks. There is a large pavilion with a small parking lot associated with the park. The site is located in a residential area with light commercial businesses in the area. South of the stream is a natural shrub/tree dominated area beyond which lies Interstate-20. Table 11-2 describes the stream channel and riparian zone appearance at this site. Access to the top of the streambank is easy due to the maintained nature of the area while access to the stream is moderately difficult due to the steep banks and dense vegetation. [Photogroup 11-1](#) and [Photogroup 11-2](#) depict the hike/bike path, pavilion, entry point utilized by field personnel and the streambanks of the stream.

The surveyed reach at Site FS101 contained both wadeable and non-wadeable portions. The lower 60 meters of the reach was wadeable with depths less than one meter. In the areas above the 60-m transect, depths increased quickly to well over 1.0 m. During the first survey, wading was attempted in this area but was stopped due to depths being over 1.5 meters and no shallow areas observed upstream. Based on the uniformity of the stream, a width of seven meters was obtained at a wadeable transect and used as the width for all of the non-wadeable transects of the reach.

The dominant substrate of the stream was mud/clay. There were footpaths observed atop the streambank but no obvious entry points to the stream were found. Fishing tackle was observed in the stream but it was unknown if it was washed down from another location on the stream or if it originated at this location. There were no obstructions observed at any transect of the reach.

Table 11-5 shows the hydrographic parameters collected at the site during each of the three surveys. Flow measurements collected during each survey show discharges around 2.0 cfs or less.

Two pools were identified during the three surveys and the dimensions are listed in Table 11-6. The first pool was located between the 0-m and 30-m transects. The area above the 60-m transect was originally thought to be a glide, although visible movement of the water was not observed and it was determined to be a very large pool.

During the first two surveys, aquatic vegetation or algae cover was absent. During the third survey both were recorded as rare. The stream was brown in color during the first two surveys and green the third. No unusual odors were detected during any survey. Scum was observed on the surface only during the first two surveys. There was a slight presence of domesticated pets,

Table 11-4 Physical Descriptors of North Fork Fish Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
North Fork Fish Creek	0841K	4.0	3	0	0.10	<0.08	0.11	Perennial
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
FN101	300	11	0	0.21	0.17	0.23		
FN102	300	11	0	0.01	<0.01	0.01		
FN103	300	11	0	0.08, 0.23, 0.03*	0.07, 0.18, 0.03*	0.10, 0.33, 0.03*		

* Three depths provided are average, below transition, and above transition

Table 11-5 Additional hydrographic parameters of Fish Creek and North Fork Fish Creek Creek.

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Fish Creek	FS101	7.5	1.4	7.0	1.55	Normal
		FS102	6.8	1.4	5.0	1.22	Normal
		FS103	6.1	0.52	5.0	0.54	Normal
		FS104	6.3	0.25	2.5	0.27	Normal
		FS105	5.5	0.31	2.0	<0.05	Normal
		FS106	5.1	0.5	3.5	<0.01	Normal
	North Fork Fish Creek	FN101	10.35	1.55	3.7	0.38	Normal
		FN102	2.85	0.60	0.80	0.06	Normal
		FN103	4.4	0.25	0.8	<0.01	Normal
August 25-28, 2009	Fish Creek	FS101	7.5	1.4	7.0	2.02	Normal
		FS102	6.65	1.65	5.0	1.57	Normal
		FS103	6.0	0.5	5.0	0.13	Normal
		FS104	6.3	0.09	2.5	<0.01	Low
		FS105	3.0	0.0	3.0	0.0	No Flow
		FS106	5.2	0.0	2.5	0.0	No Flow
	North Fork Fish Creek	FN101	10.4	0.38	3.7	0.04	Normal
		FN102	2.36	0.14	0.67	0.0	No Flow
		FN103	4.4	0.0	2.2	0.0	No Flow
May 27-31, 2010	Fish Creek	FS101	7.5	1.4	7.0	2.15	Normal
		FS102	7.4	1.34	5.9	1.35	Normal
		FS103	9.1	0.85	4.5	0.55	Normal
		FS104	4.9	1.33	3.0	0.57	Low
		FS105	5.8	0.53	1.7	0.53	Normal
		FS106	6.0	1.83	2.86	0.14	Normal
	North Fork Fish Creek	FN101	10.9	1.1	3.8	0.2	Normal
		FN102	2.75	1.0	1.2	0.18	Low
		FN103	9.8	0.53	2.1	0.08	Low

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

Table 11-6 Pool dimensions at Site FS101

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	30.0	7.3	0.81
	>100.0	7.0	>1.0
August 25-28, 2009	30.0	7.3	1.3
	>100.0	7.0	>1.0
May 27-31, 2010	24.0	7.4	0.75
	>100.0	7.0	>1.0

with owners at the site. No other vertebrates were observed during any of the three surveys. Both bank and channel garbage, large and small, consisting of plastic bags and bottles and automobile tires, was rare to common

Physical Description of Site FS102

The Fish Creek at Site FS102 is a natural appearing stream located at Bardin Road. Fish Creek Trails hike/bike path coursed along the north side of the stream as the path curls beneath the Bardin Road bridge. There was a protective pipe railing along the edge of the path nearest the stream. The floodplain of the stream was not mowed or maintained and consisted of dense shrubs. The grass areas above the hike/bike path were mowed and maintained by the city. The streambanks were steep and densely vegetation which made access to the edge of the stream and to the stream difficult. Table 11-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 11-3](#) shows the hike/bike path and streambanks of the site.

The dominant substrate of the stream at this site was mud/clay with areas of gravel. There were several obstructions identified in the study reach. Just downstream of the 0-m transect is a large pipe crossed the streambed, three log jams were identified at the 30-m, 60-m and 180-m transects, and there was a small metal pipe crossing the stream at the 90-m transect as well as a concrete storm water drainage pad on the left bank. The features mentioned above are depicted in [Photogroup 11-4](#).

The surveyed reach at Site FS102 was a wadeable stream with a total of five pools identified during two of the three RUAA surveys. No pools were identified during the first survey of the site. Table 11-7 shows the dimensions of the identified pools.

The stream is located in a highly residential area. The area east of the stream contains several residences which were observable from the stream. The left riparian zone was natural and tree/shrub dominated. No parking is immediately available for the casual visitor at this site.

Table 11-7 Pool dimensions at Site FS102

Survey Dates	Length (m)	Width (m)	Depth (m)
August 25-28, 2009	35	6.65	1.2
May 27-31, 2010	28	5.4	0.85
	60	6.5	1.04
	25	5.9	0.90
	38	6.0	1.13

Aquatic vegetation at Site FS102 was absent to rare, while algae cover was absent to common. Odor of the stream was absent to rare while the color ranged from clear to green. Scum was observed on the stream during the third survey. There was a slight presence of water dependent birds during all three surveys and one snake was observed during one survey. No other vertebrates were observed at the site, although fecal droppings and tracks were observed during all three surveys. Bank garbage was rare during each survey. Channel garbage, both large and small, ranged from rare to common and consisted of plastic bags and bottles, tires, small appliances, and automobile parts.

Physical Description of Site FS103

The Fish Creek at Site FS103 is a natural channel located in a highly residential area. Grand Prairie ISD Starrett Elementary School is located north of the 0-m transect. The area south of the stream is tree/shrub dominated. North of the stream, the riparian zone is tree/shrub dominated and is not maintained by the city. Fish Creek Trail hike/bike path identified at Sites FS101 and FS102 continues at this site on the north side of the stream. A width of two to three meters is mowed and maintained on either side of the path, but the maintained area does not continue to the edge of the stream. Beyond the maintained area on the creek side of the trail, the vegetation is dense and foreboding, and poison ivy is common. There is a play structure associated with the school and part of the large mowed area is utilized as a soccer field. A rope swing was located at the 0-m transect, although the depth of the stream at the current time prevents the swing from being utilized for aquatic recreation. The streambanks are tree/shrub dominated and steep making access moderately difficult. Table 11-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 11-5](#) and [Photogroup 11-6](#) depict the aforementioned items.

Available parking is limited to the sides of neighborhood streets and the parking lot of the elementary school. While access to the stream was moderately difficult, there were two footpaths identified through the vegetation along the sides of the stream. One footpath was located at the 0-m transect and another was located at the 300-m transect. Both of the footpaths were observed on both sides of the stream indicating some crossing of the streambed occurred at these locations ([Photogroup 11-7](#)).

The reach surveyed at Site FS103 was a wadeable stream. The dominant substrate of the stream was mud/clay with gravel encountered within the reach. Thalweg depth measurements were collected at all transects during two of three surveys. Depth measurements for the 210 to 270-m transects were not collected during the second survey because of inaccessibility above the 180-m transect. A large fallen tree, deep pockets of water and the hazardous slick substrate encountered below the 300-m transect proved limiting in terms of safe wading. Table 11-3 shows the thalweg depths collected at this site.

Five pools were identified during the three surveys of the stream. Table 11-8 shows the dimensions of the pools identified.

Obstructions were identified at several locations of the stream. Three log jams were observed at the 120-m, 180-m, and 270-m, transects and one pipe at the 60-m transect ([Photogroup 11-8](#)).

Table 11-8 Pool dimensions at Site FS103

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	33.0	7.6	1.2
August 25-28, 2009	35.0	7.5	1.02
May 27-31, 2010	42.0	7.2	1.07
	30.0	9.1	1.2
	68.0	4.5	1.1

Aquatic vegetation and algae cover was absent to rare. Unusual odor was detected only rarely. Water color was clear to green. Scum was observed on the surface of the water during two of the three surveys. There was a slight presence of snakes during the first survey. Domestic pets were observed during the third survey. There were no other observances of vertebrates during any of the three surveys. Bank garbage was rare, but when present, consisted of plastic bags, bottles, and paper. Channel garbage, both large and small, was rare during the first two trips, but common during the final survey. Channel garbage consisted largely of plastic bags and bottles although tires and pieces of metal from either household appliances or automobiles were encountered.

Physical Description of Site FS104

The stream at Site FS104 is a natural channel within the recurring Fish Creek Linear Park. As observed at downstream locations, the Fish Creek Trails, the hike/bike path, passed north of the stream at this site. The grass border along the trail was maintained by the city. The 300-m transect was established a foot-bridge that crossed the stream at this site. Beneath the bridge, a foot path leads to the streambank. The gently sloped bank made access to the stream at this location moderately easy. Overall, bank and stream access was moderately difficult due to dense vegetation (tree/shrub dominated) along the riparian zone of the stream. In addition, boulders in the stream channel make walking in the stream very difficult. Table 11-2 describes the stream channel and riparian zone appearance at this site. There is a play structure located beside the hike/bike path which is utilized by neighborhood children. [Photogroup 11-9](#) and [Photogroup 11-10](#) depict the hike/bike trail with play structure, the riparian zone, and stream channel appearance.

Access to the stream was moderately difficult, though footpaths to the stream were observed at the 0-m transect and the 300-m transect ([Photogroup 11-11](#)). The dominant substrate of the stream was cobble to boulder in size, which made walking in the stream very difficult and dangerous. Due to the risk of personal injury, only the 0-m, 150-m and 180-m transect depths were collected during the second survey. During the third survey, conditions had changed somewhat and field personnel were able to collect nine of the eleven depths. During one of the surveys, neighborhood children sitting on the bridge crossing the stream volunteered the comment that field personnel were going into the “scary” part, which led field staff to assume they rarely ventured into that portion of the stream. This segment of FS104 was a cobble-bottom stream that was wadeable in depth but dangerous to attempt.

Flow measurements obtained during each survey indicated discharges less than 1.0 cfs as shown in Table 9-4. The table also shows the narrow width of the flowing stream. Table 9-3 display the average thalweg depth collected during each of the surveys. [Photogroup 11-12](#) shows the

low flow condition at the site during the second survey. No pools were identified during any of the three surveys.

Aquatic vegetation at the site was absent to rare while algae cover ranged from absent to rare on the first two surveys to common during the third trip. No unusual odors were detected and the water color was brown during the first two surveys and clear during the third. No scum or film was observed during any of the three surveys. There was a slight presence of water dependent birds documented one time with no other vertebrates being observed, although tracks and fecal dropping were observed. Bank garbage consisting of plastic bags and bottles was common during all three surveys. Channel garbage varied from common to rare for both large and small garbage and mainly consisted of metal debris.

Physical Description of Site FS105

Site FS105 is a natural stream located in a highly residential neighborhood behind the Arlington ISD Bryant Elementary School. Banks are not as tall as banks encountered at sites surveyed downstream, but they are fairly steep. The left and right riparian zones are grass/shrub dominated with trees scattered throughout. There is a tributary that feeds into the stream at the 30-m transect. The Fish Creek Trials hike/bike path associated with Fish Creek Linear Park is located along the southern side of the stream and crosses the stream just above the 300-m transect. Access to the stream is available at the hike/bike path crossing above the 300-m transect and dirt path that leads to the stream and across at the 0-m transect. Overall, access to the stream is moderately easy. There is a play structure located at the public school and part of the school yard is utilized as a soccer field. Table 11-2 describes the stream channel and riparian appearance. [Photogroup 11-13](#) and [Photogroup 11-14](#) show the streambank vegetation, tributary, play structure, hike/bike path, and entry points to the stream.

The surveyed reach at Site FS105 was wadeable with a gravel bottom. The substrate changed to a very unusual concrete block bottom between the 240-m and 270-m transects ([Photogroup 11-14](#); upper left photograph). During the first two surveys, no stream channel obstructions were observed. However, during the third survey, five log jams were encountered near the 60-m, 120-m and 180-m transects ([Photogroup 11-15](#)).

No pools were identified during the first two surveys. However, four pools were identified during the third survey. The dimensions of the pool are listed in Table 11-9.

Table 11-9 Pool dimensions at Site FS105

Survey Dates	Length (m)	Width (m)	Depth (m)
May 27-31, 2010	22	4.3	0.60
	37	4.6	0.38
	17	4.0	0.81
	22	5.8	0.87

Flow measurements, collected during each of the surveys, were <0.01 and 0.0 cfs in August 2009. In May 2010, staff measured 0.5 cfs (Table 11-5). The table also shows the narrow characteristics of the stream, with maximum widths less than 6.0 m and average widths ≤ 3.0 m. During one of the surveys, two youths came down the path and jumped across the stream from bank to bank, without touching the water.

Parking in this area is available at the cul-de-sac on Normandy Drive and the parking lot of the elementary school. There were no fences or high banks that would impede individuals from getting to or into the stream. Both sides of the hike/bike path are mowed and maintained for a few meters but the area between the path and the stream is densely vegetated ([Photogroup 11-16](#)).

Aquatic vegetation was absent while algae cover was absent to rare during all surveys. A faint odor was detected in the stream during one survey. Water color was clear to green. Scum was observed on the water surface during the first two surveys when flow was minimal to absent. On the third survey, when the stream was flowing around 0.5 cfs, there was no scum observed on the surface. There was a slight presence of snakes during one survey. No other vertebrates were observed, although tracks and fecal dropping were identified. Bank and channel garbage was rare to common and, when present, primarily consisted of plastic bags and bottles, though tires and a refrigerator were observed.

Physical Description of Site FS106

Fish Creek at Site at FS106 is a natural stream located in a residential neighborhood on Beagle Drive between Creekrige and Magnum Drives. Arlington Municipal Airport is located approximately 600 meters northeast of the site. The area west and south of the stream is natural in appearance up to Harwood Road. The area north is residential with the Fish Creek Trails hike/bike trail located between the stream and residences. The riparian zone to the top of the streambank is tree/shrub dominated. A mowed buffer is present between the trees and hike/bike trail. Access to the stream is moderately difficult with steep banks and dense vegetation from the bank rim to the stream. No footpaths were observed through the vegetation, therefore TIAER personnel were obliged to create one. Table 11-2 describes the stream channel and riparian zone appearance at this site. A storm water drainage pipe was located at the 300-m transect along the left bank. [Photogroup 11-17](#) shows the riparian areas around the stream and the storm water drain pipe.

The surveyed reach at Site FS106 was wadeable stream with a cobble dominant substrate. The banks of the stream were bare with exposed tree roots. One segment of the reach from the 120-m transect to the 210-m transect went from a largely un-vegetated stream to a densely vegetated channel. Also the 210-mark, the right bank of the stream went from natural to rock gabions that rose all the way to the edge of Harwood Road. There was a drainpipe located at the 150-m transect in the wall formed by the gabions. [Photogroup 11-18](#) depicts the aforementioned features at Site FS106.

Two log jams were observed at the 180-m transect and the 240-m transect ([Photogroup 11-19](#)). A total of five pools were identified during the three surveys. One pool was identified during each of the first two trips and three pools were identified during the third survey. Dimensions of the pools are listed in Table 11-10.

Only curbside parking was available along Beagle Dr. There were no fences or other features that would impede individuals from getting to the water, although the dense vegetation makes it difficult.

Table 11-10 Pool dimensions at Site FS106

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	24.9	6.0	0.56
August 25-28, 2009	30.0	5.7	0.55
May 27-31, 2010	28.0	5.3	0.39
	41	6.0	0.66
	90.5	5.7	0.84

Aquatic vegetation was common at the site while algae cover was rare to common. An unusual odor was detected at the site during one survey; otherwise the stream odor was normal. Scum was observed on the surface of the water during two of the surveys. Water color was clear during two surveys and green during the other. There was a slight presence of water dependent birds during one survey with no other vertebrates being observed, although track and fecal droppings were identified. Bank and channel garbage, both large and small, was rare except for the third survey when all were common. Garbage consisted of plastic bottles, plastic bags, paper, tires, and dishwasher parts.

Physical Description of Site FN101

North Fork Fish Creek at Site FN101 is a natural stream. The 0-m transect was set near a concrete culvert immediately upstream of Great Southwest Parkway. The banks of the stream are very steep and where vegetation occurred was densely vegetated with trees and shrubs. Access to the streambank and stream is moderately difficult. The only public access was at Great Southwest Parkway where the bank is steep and overgrown. A path through the bank vegetation was identified during the second survey at the 0-m transect, but it was speculated it was likely a result of the road construction occurring at that site rather than by individuals seeking recreation. Road construction at this location made public access difficult. Table 11-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 11-20](#) depicts the observed path, concrete culvert and banks of the stream.

The surveyed reach at Site FN101 was a wadeable stream with a shale bottom. Walking in the stream was relatively easy with depths generally less than 0.5 m. Table 11-4 shows the average thalweg depths for each survey. In addition to the depth measurements, Table 11-5 shows flow measured at less than 0.5 cfs during each of the three surveys. The steep banks of the stream were almost vertical in some locations and consisted of shale layers. Previously referenced Photogroup 11-20 shows the shale bottom and the vertical shale banks.

A total of seven pools were identified during the surveys and their dimensions are displayed in Table 11-11.

Due to the road construction, TIAER field personnel parked in a business owned parking lot located immediately south of the site and walked through the vegetation to the site. The area north of the site between the 0-m and 210-m transects is natural and from the 210-m transect to the 300-m transect is residential. The areas south of the study reach are natural beyond which is light commercial business facilities and IH 20. There were no fences or posted signs that would impede reaching the stream.

Table 11-11 Pool dimensions at Site FN101

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	35.0	10.4	0.48
	17.1	5.4	0.74
August 25-28, 2009	35.0	10.35	0.45
	21.3	5.0	0.71
May 27-31, 2010	25.0	4.2	0.8
	60.0	9.2	0.58
	10.0	10.9	0.43

Aquatic vegetation at the site was absent to rare while algae cover was common. The clear stream contained no scum or foam on the water surface. No unusual odors were detected. There was a slight presence of water dependent birds and domesticated pets observed during one survey, with no other vertebrates observed. Tracks and fecal dropping were reported. Large garbage in the stream channel was absent to rare during the three surveys. Small channel and bank garbage was rare and when present consisted of plastic bags, bottles and cups. Overall, the stream was aesthetically appealing but water levels were low.

Physical Description of Site FN102

The stream at FN102 is a concrete lined channel with a foot-bridge across the stream. The 300-m transect was located at this point and 30 m intervals were measured downstream until the 300-m reach had been defined. The downstream most point became the 0-m transect. Access to the stream is moderately easy as the concrete bank of the channel is steep but manageable. A mowed field borders the concrete channel on the left. Residential back yard fences line the top of the right side. A concrete storm water channel entered the main channel from the left at the 30-m transect and a round concrete storm water pipe was observed near the 300-m transect. Table 11-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 11-21](#) contains images of the channel and riparian areas.

The surveyed reach at Site FN102 was a wadeable stream with depths of 0.01 m or less measured during each of the three surveys. As mentioned above, the area is residential. TIAER staff parked at the dead-end of Sherry Street near the guard rail that borders the channel; although, there were no parking signs at this location. During the May 2010, the mowed field located north of the reach had a fenced in area in which it appeared gas-well drilling was beginning to occur.

Tables 11-4 and 11-5 show the average thalweg depths and hydrographic parameters collected at the site during each survey. It should be noted that the temperatures collected at this site and as listed in Table 11-1 were very high and were taken from very shallow water flowing over concrete. During the second survey, water could not be found of sufficient depth to completely submerge the thermometer for an accurate temperature reading.

Aquatic vegetation in the channel was absent to rare but algae cover was common. The water was clear and no surface film or scum was observed. No unusual odors were detected. A slight presence of water dependent birds was observed during one of the three surveys, but no other vertebrates were observed during the other two visits. Avian fecal dropping were noted. Large garbage in the channel was absent to rare, but consisted of household trash when present. Small

garbage in the channel and bank garbage consisting of plastic bags and bottles was considered rare to common during the three surveys.

Physical Description of Site FN103

The stream at Site FN103 is a natural channel from the 0-m transect up through the 60-m transect. From above the 70-m transect, the stream flows west through a concrete channel beginning above the 300-m transect, continuing through the 70-m transect, and finally into the pool below the Allen Avenue crossing. The lower 60 m of the reach is natural in appearance with streambanks dominated by shrubs, grasses though willow trees are present. The upper 240 m of the reach is a concrete channel with backyard fences lining both streambanks. Table 11-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 11-22](#) contains visual images of the channel and riparian areas.

Three round storm water drains were identified at the site. One drain was located on the right bank of the 60-m transect and two other drains are located on each bank of the 90-m transect. Access to the site is limited to the area around the Allen Avenue crossing the stream below the 90-m transect. The access point to the stream used by TIAER was on the southeast corner of the Allen Avenue bridge. This approach was through a fallow pasture adjacent to the streambank. At the bank, dense vegetation, including trumpet creeper vines made access to the stream moderately difficult at best. [Photogroup 11-23](#) depicts the access point to the stream.

The surveyed reach at Site FN103 was wadeable with the dominant substrate for the upper portion of the reach being concrete. The lower, more natural portion contained a dominant substrate of mud/clay. Depths of the stream were, particularly in the concrete channel were shallow and only four pools were identified during the three surveys. Dimensions of the pools are located in Table 11-12.

Table 11-12 Pool dimensions at Site FN103

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	33.0	4.4	0.69
August 25-28, 2009	30.0	4.4	0.62
May 27-31, 2010	16.0	2.4	0.77
	17.0	4.0	0.72

Table 11-5 displays flow measurements collected during each of the surveys. Table 11-4 shows the average thalweg depth for each survey of the site. The average thalweg depth is provided as three values; one was the overall reach average, one was the average depth below the transition zone at 70-m transect and one was the average above the 70-m transition zone.

Aquatic vegetation and algae cover were both ranged rare to common. The stream was clear in color and overall no scum or foam was observed on the surface of the stream. No unusual odors were detected. A slight presence of water dependent birds was observed while no other vertebrates were noted. Fecal dropping were observed during all three surveys, while tracks were observed during two of the three surveys. Large garbage in the channel was rarely observed. The observance of small channel garbage and bank garbage was rare to common and consisted of plastic bags, cups, broken toys, and yard waste.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. The selected sites were located in residential areas with well established roads and public access. Although activities were observed at several of the sites, no primary or secondary contact recreational activities were observed by TIAER personnel at any of the sites located on Fish Creek. Table 11-13 shows the types of general activities observed by TIAER field personnel. The “number observed” column shows the approximate number of persons observed at the site when the survey was performed, with general activities listed as individual columns.

At Site FS101, an individual interviewed stated that the bike/hike path is utilized by people to walk, run and ride bikes. The mowed field is utilized to play Frisbee, throw balls, play with pets or just sit under shade trees. It was further stated that persons do travel into the brush, east of the mowed field, as couples or large groups and stay “hidden” for a period of time. It was assumed by this individual that drinking, drugs or “adult recreation” was occurring based on the age of the individuals, he was speculating as to their activities. As for activities in the stream, he has never seen anyone in or near Fish Creek at Site FS101.

At Site FS103, TIAER staff documented a rope swing, though streambed below the swing is now a gravel bar (previous Photogroup 11-7). At the June 11, 2009 meeting of entities interested in the RUAA project, an attendee mentioned that she grew up near Fish Creek and her brother and friends would swing on the rope into the water at this location. That comment provided the information that influenced the selection of this location as a sampling site.

Though multiple visits were made to each site in Fish Creek and North Fork Fish Creek, only 13 interviews resulted. On most visits no one was present. Of the collected interviews, all 13 occurred at the Fish Creek sites. No interviews were collected from any of the North Fork Fish Creek sites. Table 11-14 show the types of activities identified during the interviews on Fish Creek.

The most common response given for not recreating in the stream was the water was “nasty.” Two responders reported children (youths) wading in the stream at Sites FS103 and FS104. In addition to wading, it was reported that youths often throw rocks into the stream at Site 104. It was reported by the interviewee that she only observed youths wading after a rainfall event, when stream levels are elevated and moving. The rest of the time they just throw things into the water.

At Site FS105 two people indicated that the footpath leading to the stream is utilized by youths leaving school who jump across the stream on their way home. TIAER personnel did watch this occur during one of the surveys conducted in August of 2009, but interviews were not collected due to the age of the youths. (Note: the youths observed by staff were not young children, but youths in their early teens who were athletically developed. Although the site is directly behind an elementary school, there is a junior high school just a few blocks south on Cornwell Drive).

Table 11-13 Summary of general activities observed during surveys of Fish Creek and North Fork Fish Creek*

Date	Site Number	Number Observed ¹	Drinking Water in mouth	Bathing	Walking Jogging Running	Bicycling	Standing	Sitting	Lying down	Playing on shore	Picnicking	Motorcycle /ATV	Hunting/trapping	Wildlife watching	< 8 m from shore	> 8 m from shore	Other
August 4-8, 2009	FS101	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	FS102	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	FS103	1-10	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X ²
	FS104	1-10	-	-	X	-	X	-	-	-	-	-	-	-	X	-	-
	FS105	1-10	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-
	FS106	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August 24-29, 2009	FS101	1-10	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-
	FS102	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FS103	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X ²
	FS104	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	FS105	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FS106	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May 27-31, 2010	FS101	1-10	-	-	X	-	-	-	-	-	-	-	-	-	-	X	-
	FS102	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FS103	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X ²
	FS104	1-10	-	-	X	X	-	-	-	-	-	-	-	-	-	X	X ³
	FS105	1-10	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-
	FS106	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ None; 1-10; 11- 20; 20-50; >50
² Rope swing at 300-m transect
³ Skateboarding

*No activities were observed at any of the North Fork Fish Creek sites during any survey.

Table 11-14 Activities reported in interviews at sites along Fish Creek (No interviews obtained on North Fork Fish Creek)

Watershed	Site Name	Swimming	Walking Jogging Running	Wading		Standing Sitting Sleeping	Wildlife Watching	Picnicking	Fishing	Bicycling
				Adults	Children					
Fish Creek	FS101	-	1	-	-	-	-	-	-	1
	FS102	-	-	-	-	-	-	-	-	-
	FS103	-	-	-	1	-	-	-	-	-
	FS104	-	-	-	1	-	-	-	-	-
	FS105	-	-	-	-	-	-	-	-	-
	FS106	-	-	-	-	-	-	-	1	-

Although no activities, either primary or secondary contact or general, were observed or revealed through interviews at the North Fork Fish Creek sites, evidence was found to indicate some type of activity at FN101. ATV tracks were observed in the stream leading from off the bank of a backyard that abuts up to the creek through the culvert that flows under Great Southwest Parkway. In addition to the ATV tracks, a tarp and tent poles were discovered on a flat rock ledge on the left bank at Site FN101 during the May 2010 survey. [Photogroup 11-24](#) shows the ATV tracks and tarp and tent poles mentioned above.

[Photogroup 11-25](#) shows the graffiti painted on the concrete banks of the stream at Sites FN102 and FN103.

Copies of all of the interviews conducted along Fish Creek are provided in Appendix I-4. No interviews could be obtained for North Fork Fish Creek.

Summary

RUAA surveys were conducted at six sites along Fish Creek and three sites along North Fork Fish Creek August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures, and interviews from each survey are located in the Appendix I-1, I-2, I-3 and I-4, respectively.

Minimal activities were observed by TIAER field staff during the surveys or reported by interviewees. These activities are summarized in Figure 11-4. The Fish Creek Trails hike/bike path that winds throughout the extensive Fish Creek Linear Park and mowed fields maintained by the parks department are mainly utilized by many people for walking, jogging, bicycling and playing ball.

Both observations and interviews indicated that most people who utilize the hike/bike trail do not intend to recreate in the stream. Many interviewees described the water as “too nasty” or “too shallow” to recreate in. The play structures in some of the neighborhoods, adjacent to the hike/bike trail, are utilized by families with smaller children. These structures are located along the Fish Creek Trails but the stream is not visible from these structures due to the dense, natural riparian zone that borders the creek for the entire distance surveyed.

Two interviews of youths wading during elevated stream levels were reported for Sites FS103 and FS104. No other forms of primary contact recreation were identified. A rope swing was located at Site FS103, though the pool at this site is presently filled with gravel and sediment and no longer conducive to such activity. Infrequent fishing was reported at site FS106 by one interviewee. It should be noted that no footpaths to the stream were identified at Site FS106 by TIAER personnel.

**Fish Creek (Segment 0841J)
&
North Fork Fish Creek (Segment 0841Q)
Photogroup**



Photogroup 11-1 Fish Creek Site FS101 showing amenities along Fish Creek Linear Park (top row) and access point to stream used by field staff (lower row). (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 11-2 Fish Creek Site 103 showing streambanks and typical stream characteristics. [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 11-3 Fish Creek Site FS102 showing hike/bike path (upper left) and general stream and streambank characteristics. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-4 Fish Creek Site FS102 showing various obstructions in stream and storm drain entry (lower right). (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-5 Fish Creek Site FS103 showing natural stream characteristics (upper and middle rows), elementary school (lower row, left) and hike/bike path.

[\[Return to Text\]](#)



Photogroup 11-6 Fish Creek Site FS103 showing play structure and soccer fields near stream and photographs of rope swing (field crew shown in photograph). [\[Return to Text\]](#)



Photogroup 11-7 Fish Creek Site FS103 showing footpaths at 0-m and 300-m transects providing access to creek from both banks. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 11-8 Fish Creek Site FS103 showing obstructions of trees at 120-m, 180-m, and 270-m transects and pipe crossing at 60-m transect. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 11-9 Fish Creek Site FS104 showing adjacent hike/bike trail and play structure (upper left photograph; note wooded area to right contains the creek), parking near creek, and general characteristics of the creek. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-10 Fish Creek Site FS104 showing typical stream characteristics and riparian zone with wooded/shrub area immediately adjacent to stream and mowed park area further from stream. [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 11-11 Fish Creek Site FS104 showing footpaths to stream. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-12 Fish Creek Site FS 104 showing low flow encountered during second survey. (Individual pictured is TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-13 Fish Creek Site FS105 showing general stream and bank characteristics. (Individuals pictured are TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-14 Fish Creek Site FS105 showing stream and streambank characteristics (upper left photograph the concrete block streambed), stream tributary (upper right), access point (middle left), and surround area, including footpath leading to creek. [\[Return to Text\]](#)



Photogroup 11-15 Fish Creek Site FS105 showing debris and tree obstructions at and around the 60-m, 120-m, and 180-m transects. [[Return to Text](#)]

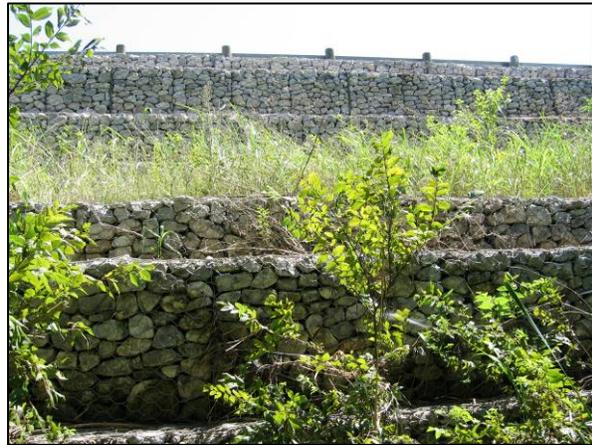


Photogroup 11-16 Fish Creek Site FS105 showing hike/bike trail and mowed areas adjacent to trail. [\[Return to Text\]](#)

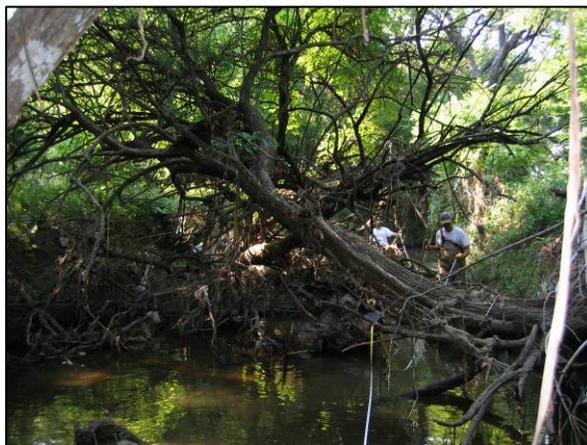
[Remainder of page intentionally left blank]



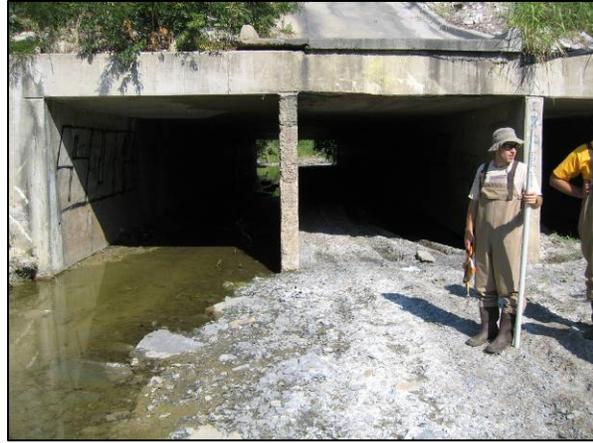
Photogroup 11-17 Fish Creek Site FS106 showing hike/bike trail (upper row), typical stream and streambank characteristics, and storm drain entry (lower right). Note: Middle right photograph shows temporary markings from field crew used in surveying. [\[Return to Text\]](#)



Photogroup 11-18 Fish Creek Site FS106 showing area of cobble dominated substrate (upper left), area of abundant stream vegetation between 120-m and 210-m transects, and gabions along right bank in the areas of the 150-m transect. (Individual photographed is TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-19 Fish Creek Site FS106 showing obstacles from fallen trees and associated debris at the 180-m and 240-m transects. [Note field crew in both photographs] [\[Return to Text\]](#)



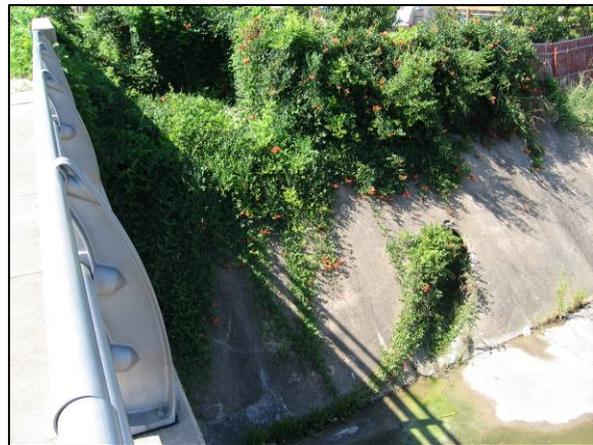
Photogroup 11-20 North Fork Fish Creek Site FN101 showing footpath to stream at 0-m transect (upper left), culvert at 0-m transect, and general stream and streambank characteristics at 0-m, 150-m, and 300-m transects. (Individuals photographed are TIAER staff.) [\[Return to Text\]](#)



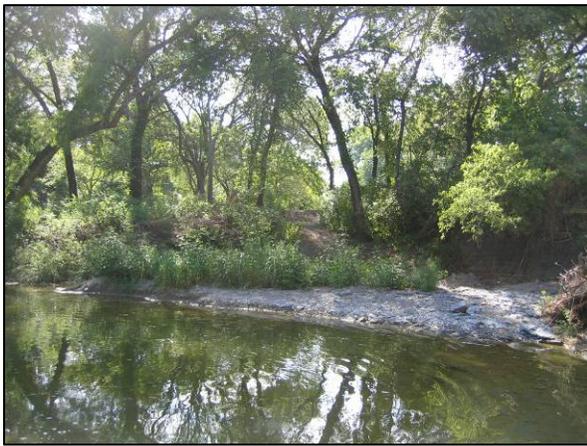
Photogroup 11-21 North Fork Fish Creek Site FN102 showing concrete lined channel along entire length of reach. (Individuals photographed are TIAER staff.)
[\[Return to Text\]](#)



Photogroup 11-22 North Fork Fish Creek Site FN103 showing natural channel between 0-m and 60-m transects and concrete channel for remainder of reach. (Note backyard fences visible near concrete channel; Individual photographed is TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-23 North Fork Fish Creek Site FN103 showing various access points (besides possible gates in backyard fences). ([Note that with the exception of one access point (middle left photograph) these access points were heavily vegetated; Individual pictured is TIAER staff.] [\[Return to Text\]](#)



Photogroup 11-24 North Fork Fish Creek showing ATV tracks and trail at Site FN101 (upper row and lower row left) and tent stakes and tarp for tent at Site FN101. (Individuals photographed are TIAER staff.) [\[Return to Text\]](#)



Photogroup 11-25 North Fork Fish Creek Sites FN102 and FN103 showing graffiti on concrete embankments. [\[Return to Text\]](#)

CHAPTER 12

KIRBY CREEK (SEGMENT 0841N)

Watershed Characterization

Segment 0841N is a 4 mile segment running upstream from confluence with Fish Creek in Grand Prairie, Texas, to just upstream of Great Southwest Parkway in Arlington, Texas (Figure 12-1). The watershed of Kirby Creek is primarily residential with some interspersed undeveloped open fields (land use on Figure 12-2 and aerial photograph on Figure 12-3)). A major portion of the channel west of SH 161 is a concrete ditch while east of SH 161 the stream becomes more natural in appearance. There are no NPDES WWTP outfalls in the segment watershed. Flow type for this creek is listed as perennial and the presumed aquatic life use based on flow type is high (TCEQ, 2008).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For Kirby Creek site selection the major interaction occurred with City of Grand Prairie staff.

Survey Site Descriptions

The survey sites selected for Kirby Creek (Segment 0841N) are provided in Figure 12-1. Two sites were selected along Kirby Creek. A brief description of each site follows.

Site KC101 (TCEQ Station 17675) is located on Kirby Creek at Corn Valley Road in Grand Prairie. The site was located at Kirby Creek Park jointly operated by the City of Grand Prairie

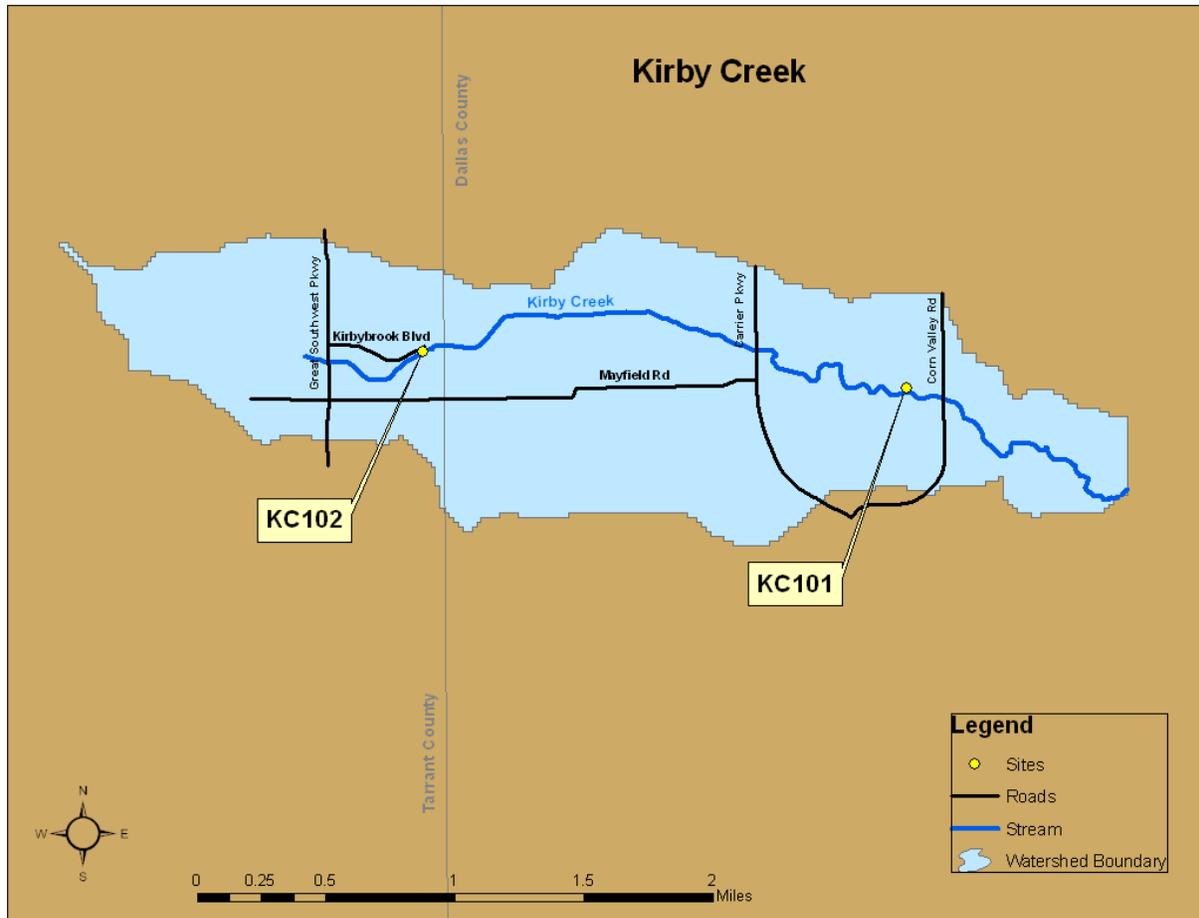


Figure 12-1 Kirby Creek (Segment 0841N) showing RUA survey sites

and the Grand Prairie ISD. The park which is adjacent to the South Grand Prairie High School campus houses the GPISD Natural Science Education Center. The program facilitator at the facility indicated that several hundred students per year pass through the nature center and perform Texas Stream Team activities in Kirby Creek at this location (as well as locations in Cottonwood and Fish Creeks).

Site KC102 is located in a residential area near Kirbybrook Blvd in Grand Prairie. The creek at this location is concrete and highly channelized. At the intersection of Kirbybrook Blvd., Kirbybrook Trail and Southbrook Trails, the channel skirts a large pond. Signs were posted prohibiting trespassing onto the pool area.

Results and Discussions

General Description of Stream and Survey Sites

The RUA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around Kirby Creek.

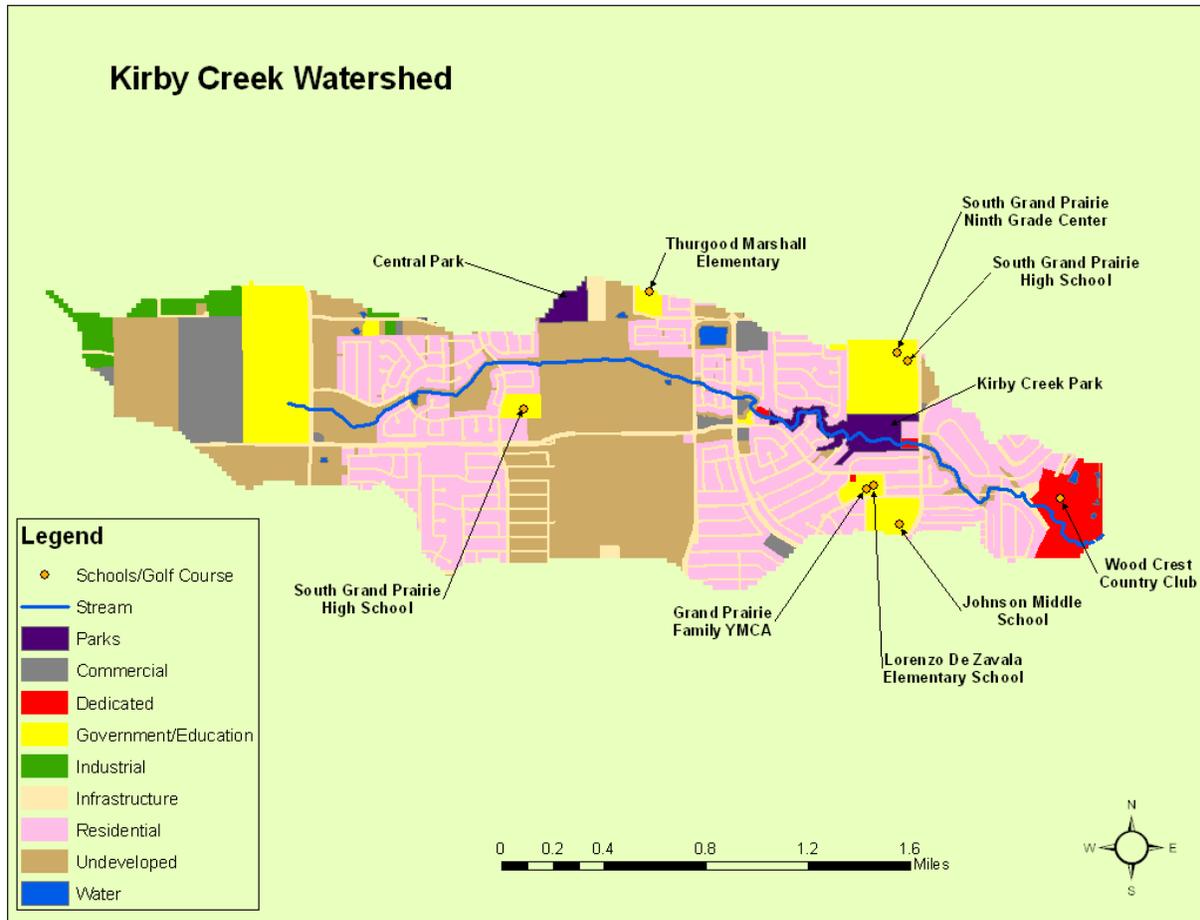


Figure 12-2 Land use/land cover for Kirby Creek Watershed (Source: NCTCOG, 2007 & 2009)

Surveys conducted on Kirby Creek occurred during varying air and water temperatures as shown in Table 12-1. Water temperatures were warm enough for recreational activities to occur.

Table 12-1 Temperatures measured at each site along Kirby Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
Kirby Creek	KC101	27.0	26.0	27.0	27.1	31.0	22.8
	KC102	36.0	31.0	37.4	n/a*	35.0	28.3

* - Water depth was too shallow for accurate temperature reading.

Table 12-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 12-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys.

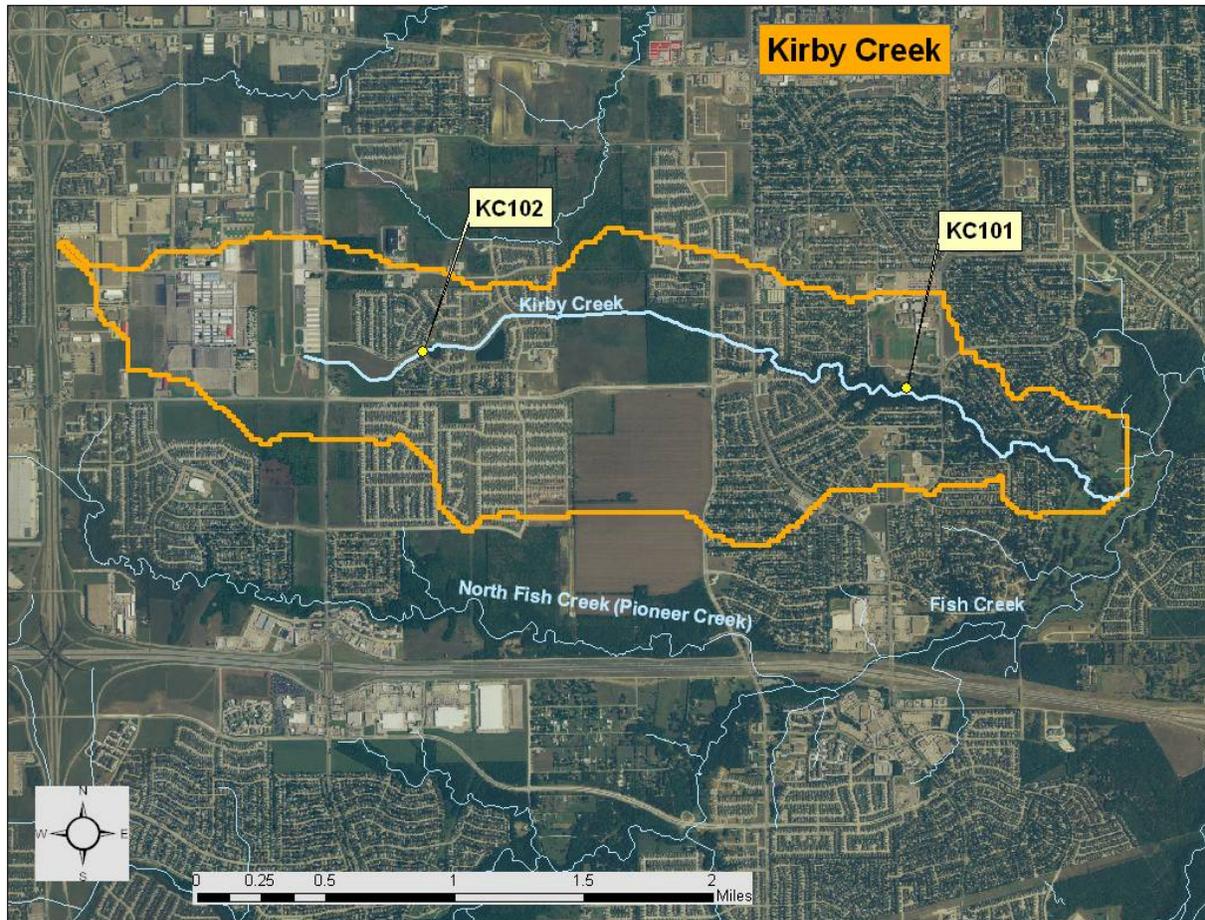


Figure 12-3 Aerial photograph of Kirby Creek Watershed (Source: NAIP, 2005)

Table 12-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey.

Physical Description of Site KC101

The stream at Site KC101 has a deeply incised channel and is natural in appearance. The Natural Science Education Center is located adjacent to the stream as part of the Grand Prairie Independent School District. There is a large mowed area that serves as an amphitheater with numerous benches and a large open area ample for demonstrations. Large trees are located along both sides of the stream and a residential area is located along the right, side of the stream. Beyond the entrance road to the nature center and parking lot is South Grand Prairie High School and associated athletic fields. Access to the stream is moderately easy. Table 12-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 12-1](#) depicts the education center and mowed and maintained area surrounding the upper portion of the study reach.

The surveyed reach at Site KC101 was a wadeable stream with sand being the dominant substrate. Both right and left banks were steep with moderately easy access points at the 0-m and 270-m transects. According to an instructor at the nature center, the 270-m transect is area where she takes classes to study the stream. Between the 270 m and 0 m transect, footpaths

Table 12-2 Stream channel and riparian zone assessment for Kirby Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys.

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
Kirby Creek	KC101	Right Bank	Natural	Wooded	Moderate	Natural Science Education Center	Natural/residential
		Left Bank		Wooded	Moderate		Natural/park
	KC102	Right Bank	Channelized	Concrete	Small	None	Residential
		Left Bank		Concrete	Small		Residential

Table 12-3 Physical Descriptors of Kirby Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
Kirby Creek	0841N	4.0	2	1	0.23	0.22	0.28	Intermittent
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
KC101	300	11	1	0.42	0.40	0.50		
KC102	300	11	0	0.04	0.03	0.05		

Table 12-4 Additional hydrographic parameters of Kirby Creek

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	Kirby Creek	KC101	8.6	0.75	3.5	0.30	Normal
		KC102	2.9	0.45	1.35	0.42	Normal
August 25-28, 2009	Kirby Creek	KC101	8.4	0.69	3.3	0.11	Normal
		KC102	4.3	0.50	0.95	0.03	Normal
May 27-31, 2010	Kirby Creek	KC101	6.35	1.0	2.3	0.74	Normal
		KC102	9.1	0.45	1.3	0.096	Normal

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

and nature trails wound through the forested riparian zone atop the left bank, but none offered stream access.

The right bank was densely vegetated and dominated by trees and shrubs. A residential area was located beyond the right bank riparian zone. [Photogroup 12-2](#) depicts the entry points to the stream and the footpaths atop the left bank.

Depth measurements were collected from all 11 transects during each survey as shown in Table 12-3. The sand substrate that dominated the reach made it difficult to walk in some areas. Several obstructions were identified along the stream channel which helped create three to four identifiable pools. Table 12-5 shows the dimensions of each of the pools identified for each survey.

Table 12-5 Pool dimensions at Site KC101

Survey Dates	Length (m)	Width (m)	Depth (m)
August 4-8, 2009	15.4	5.1	1.12
	32.0	5.2	0.93
	52.0	3.5	0.91
	81.0	8.6	0.91
August 25-28, 2009	15.4	5.1	0.79
	51.0	3.3	0.69
	30.0	5.0	0.70
May 27-31, 2010	30.0	6.35	1.2
	30.0	4.75	0.79
	39.0	5.35	1.05
	75.0	6.0	0.85

The number of channel obstructions observed varied with the three surveys. [Photogroup 12-3](#) and [Photogroup 12-4](#) depict obstructions located at the 90-m, 120-m, 130-m and 150-m transects. The obstructions consisted mainly of limbs, logs and trash. One large tractor tire was photographed in one of the obstructions. One storm water drainage pipe was also observed at the 240-m transect ([Photogroup 12-5](#)).

There was one parking lot associated with the Natural Science Education Center located near the upper end of the reach. The road leading to the education center and parking lot is gated and has restricted hours of access. The footpaths appeared well traveled during the two August 2009 surveys, but appeared more overgrown in May 2010.

Aquatic vegetation and algae cover were absent to rare. There was a slight presence of water dependent birds with no other vertebrates observed. Tracks of mammals and fecal dropping from mammals and birds were observed. Large garbage, tires and appliance remnants, was rare to common. Small bank and channel garbage was rare to common, and when present consisted mainly of plastic bags and bottles.

Physical Description of Site KC102

The Kirby Creek at Site KC102 is a concrete lined channel. The 0-m transect is located on the upstream side of a box culvert that channels water beneath Southwood Trail. The stream flows

into a large impoundment on the downstream side of the road and is posted no trespassing. A chain-link secured community swimming pool is located on the north side of the pond. There is one drainage culvert which flows into the stream at the 240-m transect and another pair of drainage pipes at the 150-m transect. Riparian zones on both sides of the stream are mowed and maintained for approximately the lower 100 meters. The upper 200 meters is predominantly grasses and shrubs which is not obviously mowed or maintained. An entrance ramp with a bar gate is located at the 0-m transect. Parking is available on the side of the street and access to the stream is easy. Table 12-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 12-6](#) shows some of the aforementioned characteristics of the site.

The surveyed reach at Site KC102 was a wadeable stream with depths not greater than 0.15 meters. The site is located in a highly residential area with yards of houses backing up to the stream ([Photogroup 12-7](#)). Graffiti on the banks of the concrete walls of the stream indicate that people do get into the stream. TIAER personnel observed several graffiti locations that were painted over from one survey to the next. The entire length of the stream was relatively shallow and narrow with not much water for contact recreation ([Photogroup 12-8](#)).

Aquatic vegetation was absent to rare while algae cover was rare to common. Scum was observed on the surface during two of the three surveys. No unusual odors were detected during any visit. Garbage on the banks and in the stream was absent to rare, but when present consisted mainly of small plastics and bottles. There was one observation of a domestic pet with no other vertebrates observed. Ducks were observed on the pond beneath the 0-m transect, but they were not observed in the 300-m study reach. Fecal droppings were observed during all three of the surveys.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and on days when recreational activities were apt to be observed. Neither primary nor secondary contact recreation was observed at either of the Kirby Creek sites during any of the three RUAA surveys or interview sessions. Two persons were observed fishing in the pool ([Photogroup 12-9](#)) and one person was observed walking down the road below Site KC102 during the August 4-8, 2009 survey. The persons fishing were standing behind a guardrail and the person walking appeared to be going to a residence.

During the last survey at site KC101, May 27-31, 2010, a group of approximately 50 young high school ROTC students were conducting an end of the year party ([Photogroup 12-10](#)). The leader of the group was interviewed and knew of no recreation occurring in the stream at any time. He, in turn, asked the entire group if anyone ever recreated in the stream or knew of anyone who did. Their reply was that no recreation occurs in the stream. The only activity anyone knew of was the classes at the education center which uses the stream for the Texas Stream activities. The youths stated that the water was nasty and questioned why anyone would want to get in the water when there are public and private pools available.

A formal interview of the instructor at the education center was unable to be completed. Several attempts were made to complete the interview sheet but none were successful. Informally, she stated that she does take the children to the stream and they may get in the water about ankle

deep in order to collect water samples or look for bugs. Nobody associated with the class recreates in the water.

One City of Grand Prairie employee completed the interview form and stated that he heard of people catching minnows for fishing at the KC101 site. No other forms of recreation were identified at this site. He stated that at Site KC102, he has heard of children swimming, wading and fishing in the pool below the study reach. He further indicated that the area has been posted for restricted use. Attempts to follow-up on the definition of “restricted use” were unsuccessful.

Copies of all of the interviews conducted along Kirby Creek grouped by site are located in Appendix J-4.

Summary

RUAA surveys were conducted at two sites along Kirby Creek on August 4-8, 2009, August 25-29, 2001 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix J-1, J-2, J-3 and J-4, respectively.

Very few activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 12-4. The instances of swimming, wading and fishing from the City of Grand Prairie employee interview are displayed at the impoundment just below Site KC102.

Overall, the upper site, Site KC102, has a limited amount of water for recreation, other than the large impoundment below the site. Site KC101 has accessibility difficulties. Interviews reveal that most people have no desire to recreate in the stream when public and private pools are available. The one area where it supposedly did occur is posted no trespassing.

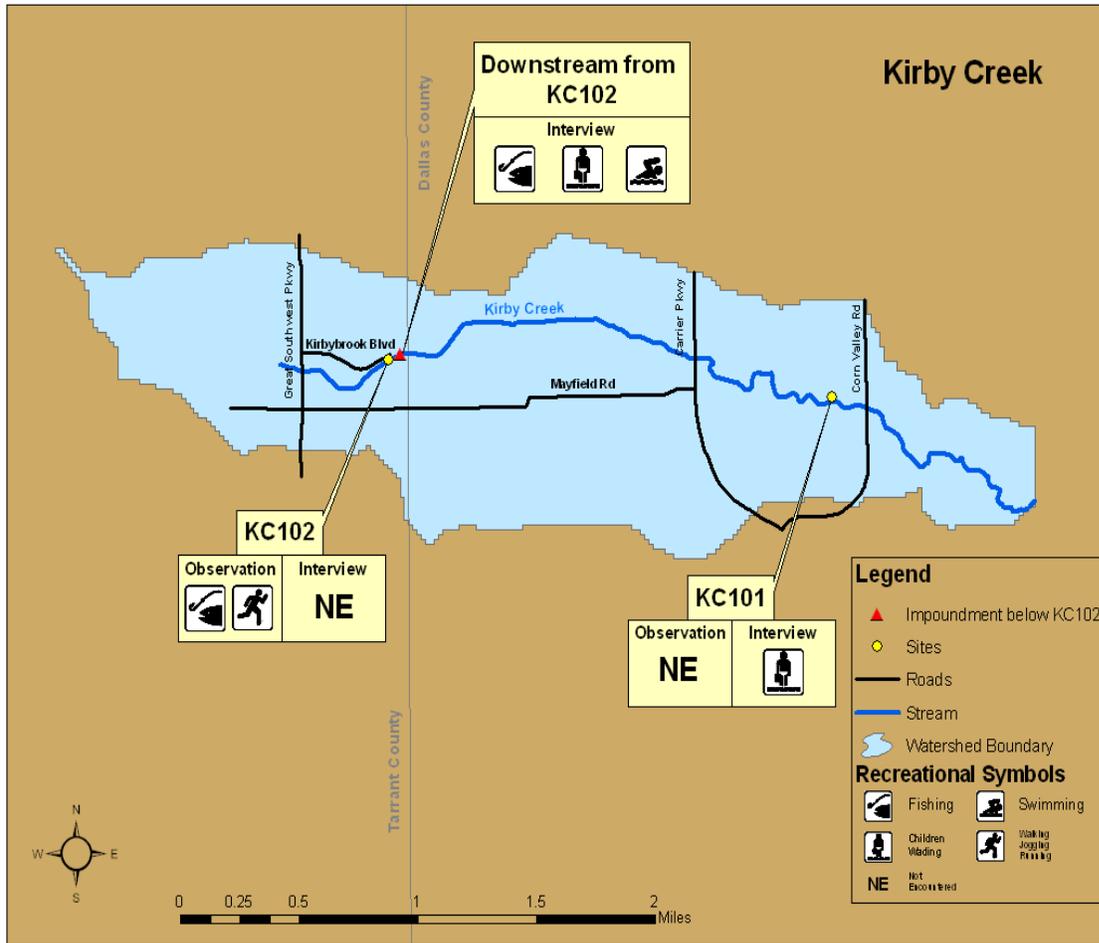


Figure 12-4 Summary of activities observed and reported in interviews at sites along Kirby Creek.

Kirby Creek (Segment 0841N) Photogroups



Photogroup 12-1 Kirby Creek Site KC101 showing Natural Science Education Center Grounds of the upper portion of the study reach [Return to Text](#)



Photogroup 12-2 Kirby Creek Site KC101 showing footpaths and easy access points to stream. (Individual photographed is TIAER staff.) [Return to Text](#)



Photogroup 12-3 Kirby Creek Site KC101 showing obstructions observed at several transects during the surveys. [Return to Text](#)



Photogroup 12-4 Kirby Creek Site KC101 showing obstruction containing large tire
[\[Return to Text\]](#)



Photogroup 12-5 Kirby Creek Site KC101 showing entry point of stormwater drain pipe at 240-m transect. (Individuals photographed are TIAER staff.) [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 12-6 Kirby Creek Site KC102 showing general characteristics of stream and adjacent area [\[Return to Text\]](#)



Photogroup 12-7 Kirby Creek Site KC102 showing proximity of residential backyard fences adjacent to stream [[Return to Text](#)]



Photogroup 12-8 Kirby Creek Site KC102 showing channelized stream channel and normal water levels (Upper photographs at 150-m transect and lower photographs at 300-m transect looking downstream and upstream; Field staff shown in photographs). (Individual photographed is TIAER staff.) [[Return to Text](#)]



Photogroup 12-9 Kirby Creek Site KC102 showing youths fishing in impounded pool
[\[Return to Text\]](#)



Photogroup 12-10 Kirby Creek Site KC101 showing in distance, under the trees, some of the school-aged children at the end-of-school year party (because of age of persons involved, close up photographs were avoided) [\[Return to Text\]](#)

CHAPTER 13

WEST IRVING CREEK (SEGMENT 0841U)

Watershed Characterization

Segment 0841U is a 4-mile reach running upstream from approximately 0.4 miles downstream of Oakdale Road to just south of Sowers Road entirely within the city of Irving, Texas (Figure 13-1). West Irving Creek is channelized and concrete for majority of its length. The land use of West Irving Creek watershed is predominately residential ((land use on Figure 13-2; aerial photograph on Figure 13-3). . There are no NPDES WWTP outfalls in the segment watershed. Flow type for West Irving Creek is listed as intermittent and the presumed aquatic life use is limited based on the flow type (TCEQ, 2008).

Additional Information

The review of historical information and climatic conditions is found in Chapter 2.

Site Selection Strategy

An objective of the survey efforts under the RUAA was to include an appropriate number of sites in each of the eleven streams. The urban nature of much of the watershed contributes to numerous road crossings and neighborhood parks at which the various streams may be accessed.

The strategy used in site selection for the RUAA surveys incorporates the following:

- Survey locations were found (completed May – June 2009) in each of the eleven streams described in the section above.

- Existing TCEQ stations were used whenever these stations were located in areas that afford at least some access opportunity for various forms of recreational use. Some TCEQ monitoring stations may not provide inviting access for recreational contact.

- Special attention was focused on the numerous parks located on many of the streams in the RUAA study.

On June 11, 2009, TIAER presented a list of proposed sites to an aggregate of state and local agencies, i.e., the TCEQ, TSSWCB, Trinity River Authority, Texas Parks and Wildlife, North Central Texas COG, DFW Airport, and the cities of Fort Worth, Dallas, Grand Prairie, Irving, and Coppell. As a result of the meeting, some locations were moved, some added and some dropped. The sites listed below reflect the results of input received following the meeting. For West Irving Creek site selection the major interaction occurred with City of Irving staff.

Survey Site Descriptions

The survey sites selected for West Irving Creek (Segment 0841U) are provided in Figure 13-1. Two sites were selected along West Irving Creek. A brief description of each site follows.

Site WI101 (TCEQ Station 17179) is located on West Irving Creek at W. Vilbig St. in Irving. Upstream of W. Vilbig St., the creek runs next to Shady Grove Trail Park that has open space

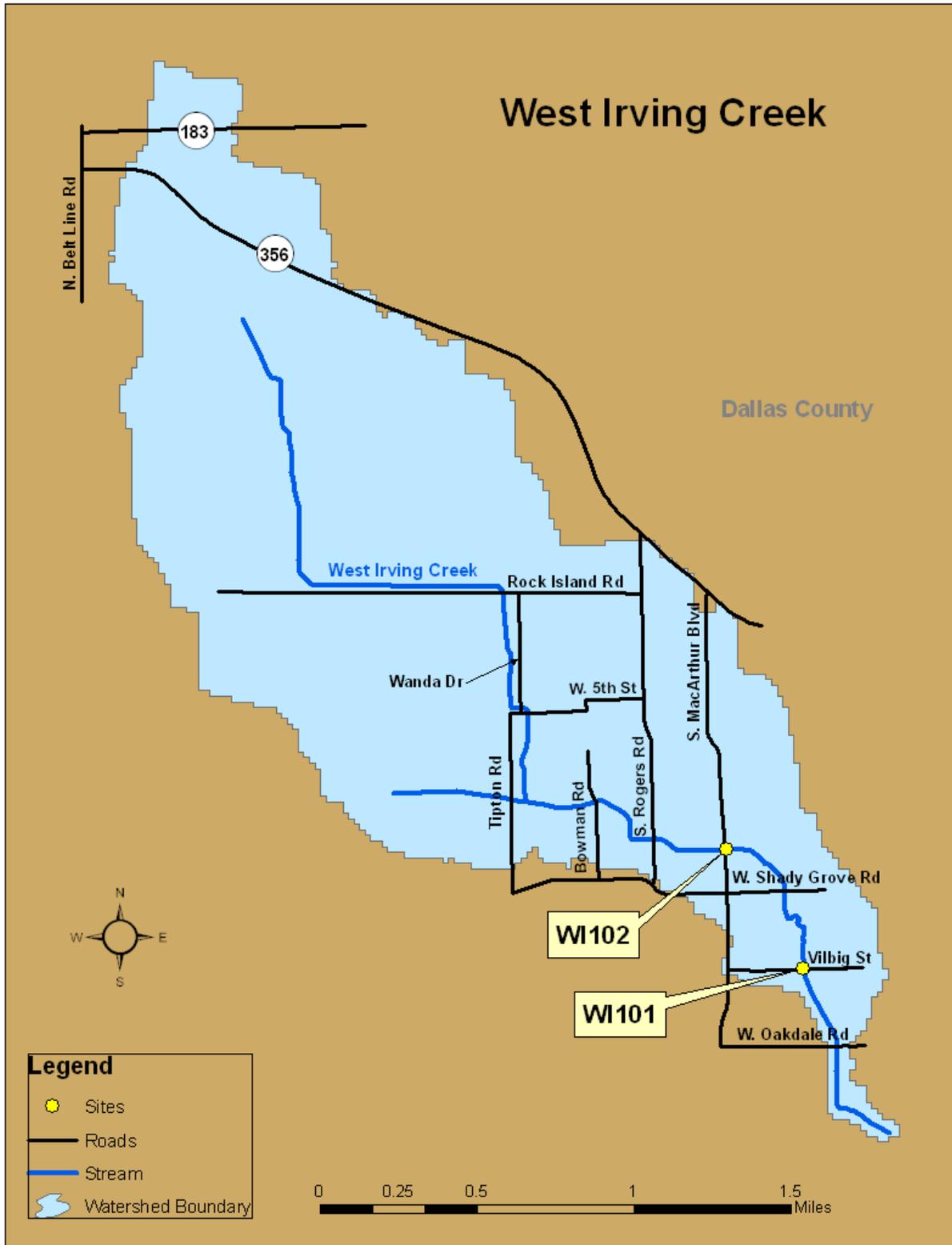


Figure 13-1 West Irving Creek (Segment 0841U) showing RUA survey sites

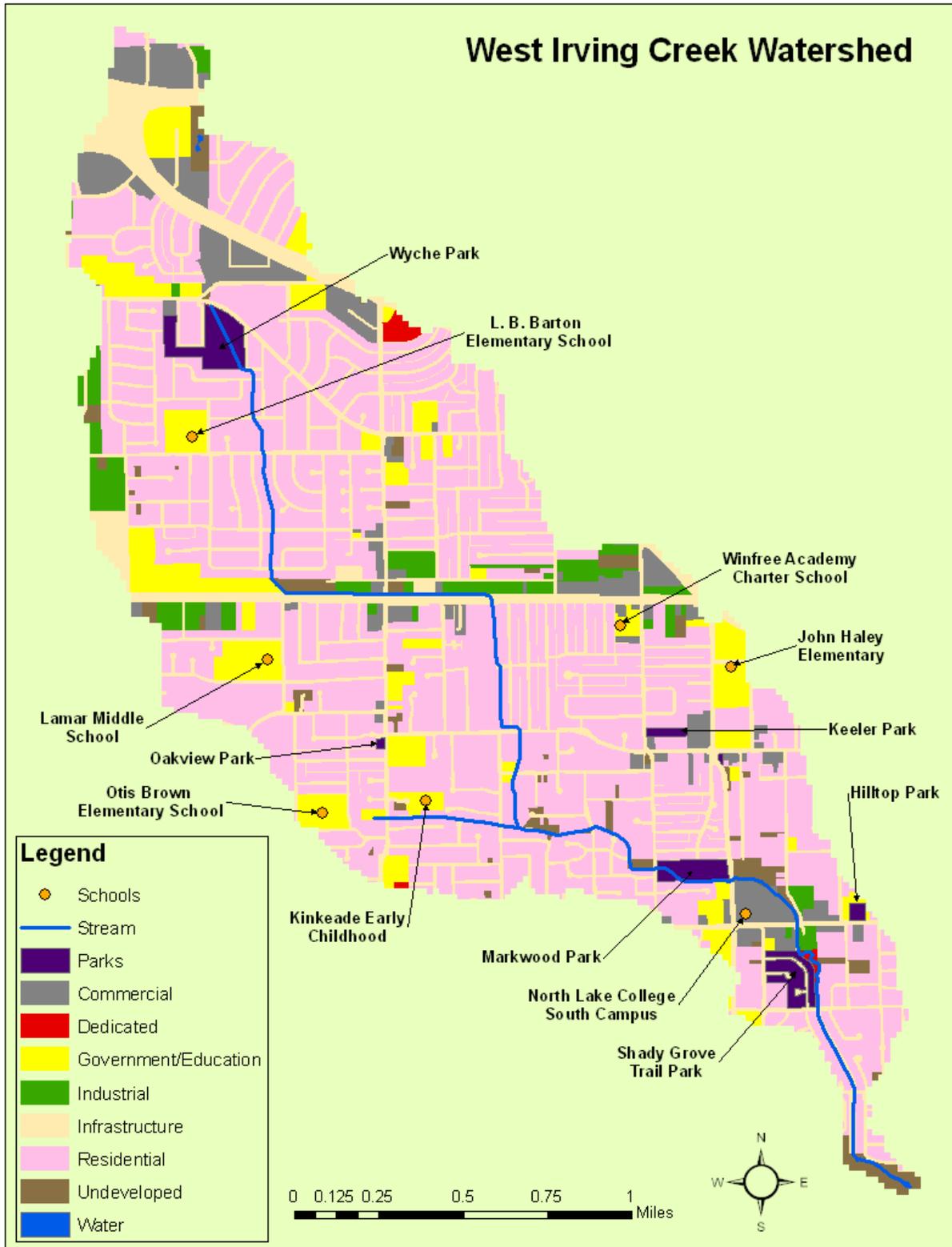


Figure 13-2 Land use/land cover for West Irving Creek Watershed (Source: NCTCOG, 2007 & 2009)

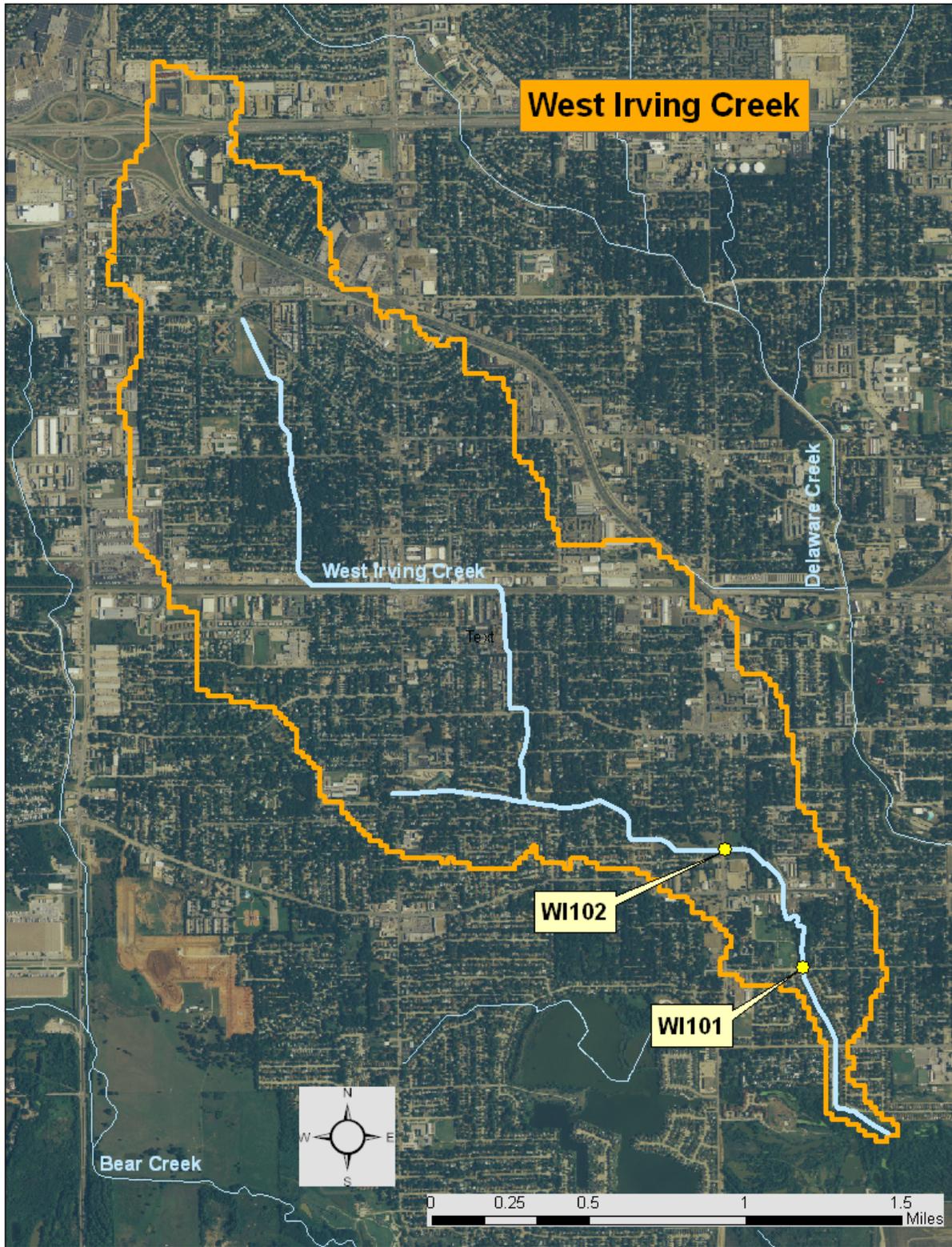


Figure 13-3 Aerial photograph of West Irving Creek Watershed (Source: NAIP, 2005)

and play structures. The only access point to the stream at this site is from the southeast corner of the park upstream of the W. Vilbig St. bridge crossing. Access from other areas of the park is very difficult due to dense vegetation and steep banks. One footpath was found in the riparian zone upstream of W. Vilbig, but it did not reach the streambank. Below the road crossing, access to the channel was fenced at the bridge and fenced back yards lined the right and left banks for the entire reach.

Site WI102 is located at a new park between S. McArthur Blvd. and S. Rogers Rd in Irving. The stream is accessible from the park on the north side and from a vacant lot downstream of McArthur.

Other locations along West Irving Creek were investigated as potential sites but were deemed inappropriate for a RUAA survey. At these other sites the stream is a concrete lined channel within an urban residential environment without amenities such as park facilities. Descriptions of the other sites are provided below to document the urban residential nature of the West Irving Creek along the majority of its length.

West Irving Creek at the Rock Island Road crossing is a concrete channel with little water observed ([Photogroup 13-1](#)). An apartment complex parking lot was located on the east side of the stream with a walkover to the complex that was situated on the left. Fences are located atop the culvert to make access to the stream difficult. Close to Rock Island Road, there is a portion which may offer public access; and this area appeared mowed and maintained. Upstream of the crossing, the road is under construction and access to the concrete lined channel is difficult.

West Irving Creek near 5th Street was investigated and the stream continued as a concrete lined channel with very little flow ([Photogroup 13-2](#)). A chain link fence is located atop the concrete lined stream channel and access to the stream at this location was moderately difficult.

West Irving Creek at Wanda Drive is a concrete lined channel in a residential area ([Photogroup 13-3](#)). Chain link fences are located atop the concrete channel and the only access to the stream was at the road crossing. Access would be classified as moderately difficult and no evidence of recreational activity was observed at the site.

The creek crossing at Tipton Road is a concrete-lined tributary to West Irving Creek in a residential area ([Photogroup 13-4](#)). Backyard fences abut the stream channel making access from residences difficult. Access from the Tipton Road crossing is relatively easy. Very little water was observed in the stream and no evidence of water recreation was observed. The confluence with West Irving Creek at this location is slightly downstream. West Irving Creek is also concrete lined in this area and contained very little water at the time of the visit.

West Irving Creek at Bowman Street is a concrete lined channel in a residential area ([Photogroup 13-5](#)). The right bank is shrub/tree dominated atop the concrete channel and the left bank is a mowed and maintained grass corridor. Access to the stream appeared easy. No observed evidence of recreation was identified at this site.

West Irving Creek at West Shady Grove Road appeared natural upstream of the road and as a concrete lined channel below ([Photogroup 13-6](#)). This potential site was located just to the north of Site WI101. Due to the similarities and proximity of Site WI101 and this location, the presence of the park at WI101 (no park was observed here) swayed the selection of Site WI101. Access to the stream from the Shady Grove location appeared to be moderately easy.

West Irving Creek at the West Oakdale Road crossing is a concrete lined channel in a residential neighborhood ([Photogroup 13-7](#)). A chain link fence is atop the upstream left bank of the channel and the upstream right bank has trees/shrubs to the edge of the stream. Residential backyard fences are located on the downstream sides of the channel. Access to the stream appeared moderately easy with very little water observed in the channel. No signs of recreation were observed.

Results and Discussions

General Description of Stream and Survey Sites

The RUAA surveys were conducted on August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. The surveys and associated interviews were performed on weekdays, weekends and holidays at opportune times to observe recreational activities in and around West Irving Creek.

Surveys conducted on West Irving Creek occurred during varying air and water temperatures as show in Table 13-1. Water temperatures were warm enough for recreational activities to occur.

Table 13-1 Temperatures measured at each site along West Irving Creek

Assessment Unit	Site Number	August 4-8, 2009		August 24-29, 2009		May 27-31, 2010	
		Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)	Air Temp (C)	Water Temp (C)
West Irving Creek	WI101	32.5	30.5	23.5	26.8	31.0	27.8
	WI102	33.0	31.5	23.0	28.5	34.0	28.0

Table 13-2 contains information on the appearance of the stream channel and riparian zone at each site.

Table 13-3 shows the average thalweg depth for each reach and site during each of the RUAA surveys. For Site WI101, the upper portion of the stream is a natural channel and the lower portion of the reach is in a concrete lined channel. The thalweg depth is listed in three categories, overall average depth, depth of the natural portion and depth of the concrete lined portion. For Site WI102, the depth measurements were collected during the first trip. Due to safety concerns over the difficulty in wading the stream, the depths were not re-measured during the following two surveys. The concerns at this site influencing the option not to try to wade the stream at this location are described herein. The dominant substrate at this site was very soft silt into which field personnel sank to their knees during the first survey. Extraction was only accomplished after considerable effort that included twisting, contortions and the difficulty in keeping waders in place. Because of concerns over the potential physical harm that could result from the difficulties created by this substrate, it was determined that field staff would not risk

Table 13-2 Stream channel and riparian zone assessment for West Irving Creek during August 4-8, 2009, August 24-29, 2009 and May 27-31, 2010 surveys.

Assessment Unit	Site Number	Side of Stream	Stream Channel Appearance	Riparian Appearance	Riparian Size	Park	Landscape Surroundings
West Irving Creek	WI101	Right Bank	Lower ½ concrete; Upper ½ natural	Lower ½ Concrete; Upper ½ shrub	Small	Shady Grove Trail Park	Upper right Park; All other areas residential
		Left Bank			Small		
	WI102	Right Bank	Natural	Shrub dominated	Moderate	Tim Markwood Park	
		Left Bank		Mowed/maintained	Moderate		

Table 13-3 Physical Descriptors of West Irving Creek. Stream flow type from TCEQ (2008b).

Stream	Segment #	Length (miles)	# of Sites	# of Recreational Areas on Stream	Avg. Thalweg Depth (m) for Stream Segment			Stream Flow Type
					August 4-8, 2009	August 25-29, 2009	May 27-31, 2010	
West Irving Creek	0841U	4.0	2	1	0.68	0.68	0.68	intermittent
					Avg. Thalweg Depth (m) for Site Reach			
Site Name	Reach length (m)	# of Transects	# of Recreational Areas at Site	August 4-8, 2009	August 25-29, 2009	May 27-31, 2010		
EC101	300	11	1	0.48, 1.07, 0 ^a	0.48, 1.07, 0 ^a	0.47, >1.0, 0.03 ^a		
EC102	300	11	1	0.88 ^b	0.88 ^b	0.88 ^b		

^a Three depths provided are average, above concrete channel, concrete channel
^b Depth measurements were collected during August 4-8, 2009 survey. Based on substrate and safety concerns, the depths were not re-measured. Based on stream level and flow rate, conditions did not change significantly, so the same depth measurements were used for latter two surveys.

entering the stream on subsequent visits. Since water levels in the pooled area above MacArthur Blvd were unchanged and flow rates were identical during the second survey and minimally change during the third, the depths were not re-measured.

Table 13-4 shows the maximum, minimum and average widths at each site for each survey. The observed flow and total discharge and also listed for each site and survey. For Site WI101 during the third survey, there was flow in the concrete channel portion of the channel. Average widths were recorded for the upper portion and also the lower portion separately.

Physical Description of Site WI101

West Irving Creek at Site WI101 is a channelized stream with the 0-m to 150-m transect being in a concrete-lined channel and the 180-m to 300-m transects being a natural channel. The site is located in a highly residential area with backyard fences located atop the streambank on both sides of the lower 150 meters of the reach and atop the left bank of the upper 150 meters. Shady Grove Trail Park is located along the right bank of the upper 150 meters reach. There is a play structure, picnic areas, basketball court, and walking paths associated with the park. The park is mowed and maintained by the City of Irving Parks and Recreation Department. Table 13-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 13-8](#) and [Photogroup 13-9](#) depict the channel types and the park facility located adjacent to the stream.

Park parking is available along West Vilbig Street and access to the edge of the stream is moderately easy. The only access point to the stream at this site is from the southeast corner of the park upstream of the W. Vilbig St. bridge crossing. Access from other areas of the park is very difficult due to dense vegetation and steep banks. One footpath was found in the riparian zone upstream of W. Vilbig, but it did not reach the streambank. Below the road crossing, access to the channel was fenced at the bridge and fenced back yards lined the right and left banks for the entire reach. The small riparian zones are concrete on the lower half and wooded/shrubs on the upper half. [Photogroup 13-10](#) shows the locations of backyard fences in relation to the stream and the riparian zones.

The substrate at Site WC101 was a combination of mud/clay in the upper 150 m and concrete in the lower. Depth measurements collected in the upper half were difficult to obtain due to large rocks on the stream bed and the depth of water. Due to the large submerged rocks that were not visible from the water surface, safety concerns dictated these measurements were only collected during the first survey.

Aquatic vegetation and algae cover was absent during the first two surveys when the stream was not flowing. Aquatic vegetation was rare and algae cover was common during the third survey when the stream was flowing. No surface film or scum was observed during any of the three surveys. No unusual odors were detected. There was a slight presence of domestic pets, and water dependent birds were observed during one survey. There were no other observances of vertebrates. Garbage, large and small, was rare in the channel and on the bank.

Physical Description of Site WI102

The West Irving Creek at Site WI102 is a natural stream, though impounded, with the 0-m transect just below a concrete culvert at MacArthur Blvd. The riparian zone on the right bank is

Table 13-4 Additional hydrographic parameters of West Irving Creek.

Survey Dates	Assessment Unit	Site Number	Maximum width (m)	Minimum Width (m)	Average Width (m)	Discharge (cfs)	Observed Flow Condition ¹
August 4-8, 2009	West Irving Creek	WI101	13.2	0.0	8.55	0.0	No Flow
		WI102	22.0	17.0	17.0	0.0	No Flow
August 25-28, 2009	West Irving Creek	WI101	13.2	0.0	8.55	0.0	No Flow
		WI102	22.0	17.0	17.0	0.0	No Flow
May 27-31, 2010	West Irving Creek	WI101	18.7	0.79	1.2 (dn) / 8.7 (up)	0.09	Low
		WI102	22.0	2.30	17.0	<0.10	Low

¹ Possible flow condition categories: no flow, low flow, normal flow, high flow

shrub/tree dominated with a gentle to steep slope. The left bank riparian zone is mowed and maintained by the City of Irving and has the newly built Tim Markwood Park adjacent to the stream. The park contains play structures and a concrete walking trail winds through the park. Other than the 0-m transect below the road, the remaining 270 m of the reach was measured in the impoundment created by the MacArthur Blvd crossing. Upstream of the 300 m transect the pool terminated at the crossing at S. Rogers Road. Table 13-2 describes the stream channel and riparian zone appearance at this site. [Photogroup 13-11](#) depicts the stream, riparian zones and park located at the site.

The majority of the reach (270 m) at Site WI102 was a marginally wadeable stream with depths deep enough for contact recreation. There were no fences or guardrails preventing entrance to the stream. As stated above, concerns over staff safety encountered on the first visit to this site influenced the option not to try to wade the stream at this location on either of the subsequent visits. As water levels in the pooled area above MacArthur Blvd were unchanged and flow rates were identical during the second survey and minimally change during the third, the depths were not re-measured.

The park is located between South MacArthur Boulevard and South Rogers Road in a densely populated residential area. Parking was available at a business to the south of the site. Additional parking was located on the north side of the park at the end of a cul-de-sac off of Fair Oaks Drive. The park was well manicured and clean of trash. Residences are located north and south of the stream with backyard fences atop the bank on the right south side of the stream ([Photogroup 13-12](#)).

Aquatic vegetation observed at the site was rare and algae cover was rare to common. No unusual odors were detected. The water surface was free of scum or film. There was a slight presence of water dependent birds with no additional vertebrates observed. Small garbage in the channel of the stream was rare to common consisting of plastic bags and bottles. Large trash in the channel and trash on the streambanks was rare.

Activities: Observed and Interviewed

During each RUAA survey, field personnel visited the sites during times of days and days when recreational activities were apt to be observed. It should be noted that according to an interview with a City of Irving Parks and Recreation Department official there is a city ordinance against entering a stream within the City of Irving city limits.

During the RUAA surveys, nobody was observed recreating in or near the stream at either site. There was a bicycle observed in the concrete channel of Site WI101 with graffiti also observed underneath the road culvert ([Photogroup 13-10](#); middle left photograph). There was an observation of sticks stuck into the mud at WI102 indicating someone may have been near the stream, possibly fishing or playing ([Photogroup 13-13](#)).

In addition to conducting interviews during the RUAA surveys, subsequent trips were made to the sites in an attempt to gather additional interviews. Phone and mail-in interviews were also collected for information pertaining to contact recreation activities. Of 11 interviews conducted, there was no mention of any water-related activities occurring at either site on West Irving

Creek. Additional interviews were attempted, but the persons either declined to talk or a language barrier prevented the interview from being conducted.

According to the interviews, the main reason for no one recreating in the stream was the appearance of the water. The water looked too nasty, was polluted, or had raw sewage in it according to one person. It was stated that one person wouldn't even let their dog get into the water. No one interviewed knew of the city ordinance prohibiting entrance into the stream. Their concern was the appearance.

Activities observed at both sites occurred more than eight meters from the stream. Many people utilized the walking trails at the parks for exercise. A game of basketball was also observed on the basketball court at Site WI101, which was well over 100 m away from the stream. People with small children were observed utilizing the play structures at both of the parks and the picnic tables at Site WI101. [Photogroup 13-14](#) depicts some of the activities observed at the two locations along West Irving Creek.

Copies of all of the interviews conducted along West Irving Creek grouped by site are located in Appendix K-4.

Summary

RUAAs were conducted at two sites along West Irving Creek August 4-8, 2009, August 25-29, 2009 and May 27-31, 2010. Copies of all field data sheets, flow sheets, transect pictures and interviews from each survey are located in the Appendix K-1, K-2, K-3 and K-4, respectively.

A minimal amount of activities were observed by TIAER field staff during the surveys and reported by interviewees, and these activities are summarized in Figure 13-4. The park facilities are well maintained by the City of Irving Parks and Recreation Department and are utilized by many people.

Both observations and interviews indicated most people utilizing the park facilities have no interest in entering the stream or impoundments along the stream. Interviewees described the water as "too nasty" or "too polluted" for recreation. The parks adjacent to the stream are predominately used to exercise, play basketball, and use the play structures or just for relaxation. Fishing was not reported by any interviewees. The sticks stuck in the mud at Site WI102 suggest that activity could possibly occur, although no fishing tackle or evidence of fishing was observed.

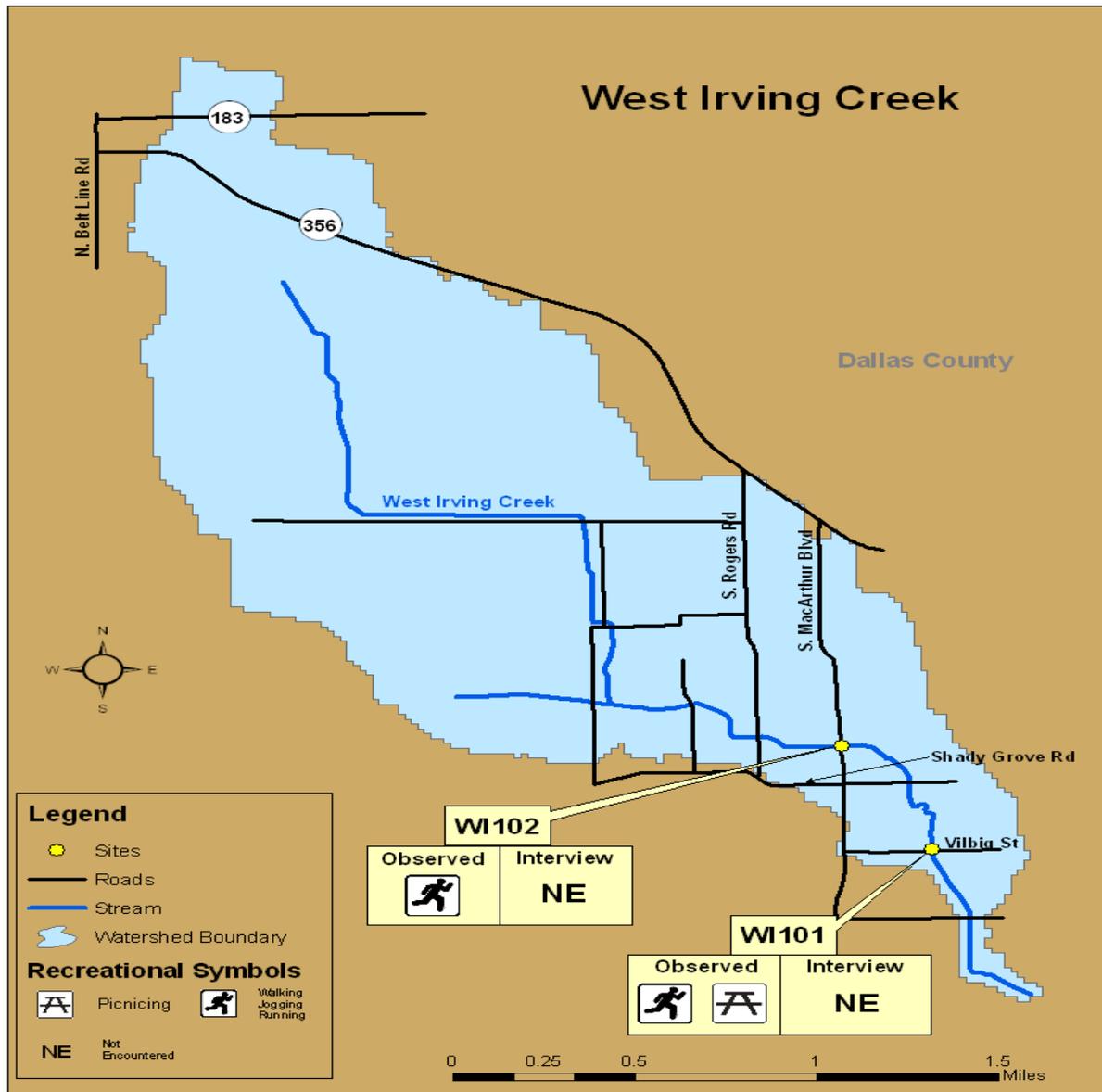


Figure 13-4 Summary of activities observed and reported in interviews at sites along West Irving Creek.

West Irving Creek (Segment 0841U) Photogroups



Photogroup 13-1 West Irving Creek at Rock Island Road looking upstream and downstream [\[Return to Text\]](#)



Photogroup 13-2 West Irving Creek at 5th Street showing stream at this location [\[Return to Text\]](#)



Photogroup 13-3 West Irving Creek at Wanda Driver showing upstream and downstream views [\[Return to Text\]](#)



Photogroup 13-4 A tributary West Irving Creek at Tipton Road showing upstream and downstream views (field crew in downstream view). [\[Return to Text\]](#)



Photogroup 13-5 West Irving Creek at Bowman Street showing upstream and downstream views [\[Return to Text\]](#)



Photogroup 13-6 West Irving Creek at Shady Grove Road showing upstream and downstream views [\[Return to Text\]](#)



Photogroup 13-7 West Irving Creek at West Oakdale Read showing upstream and downstream views [\[Return to Text\]](#)

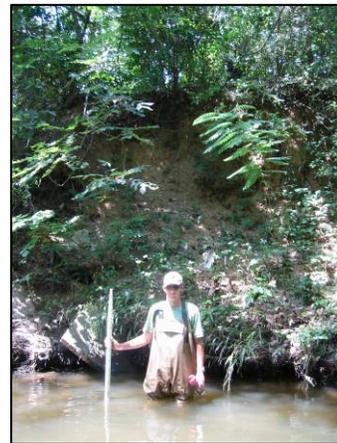


Photogroup 13-8 West Irving Creek Site WI101 showing natural channel (180-m to 300-m transects) and concrete channel (0-m to 150-m transects). [\[Return to Text\]](#)



Photogroup 13-9 West Irving Creek Site WI101 showing Shady Grove Trail Park [[Return to Text](#)]

[Remainder of page intentionally left blank]



Photogroup 13-10 West Irving Creek Site WI101 showing areas adjacent to stream at 0-m, 150-m and 300-m transects (top, middle and bottom photographs). (Field crew only persons in photographs.) [\[Return to Text\]](#)



Photogroup 13-11 West Irving Creek Site WI102 showing stream at 0-m transect (upper left), 150-m transect (upper right, middle left), 300-m transect (middle right), and Tim Markwood Park (bottom). [\[Return to Text\]](#)

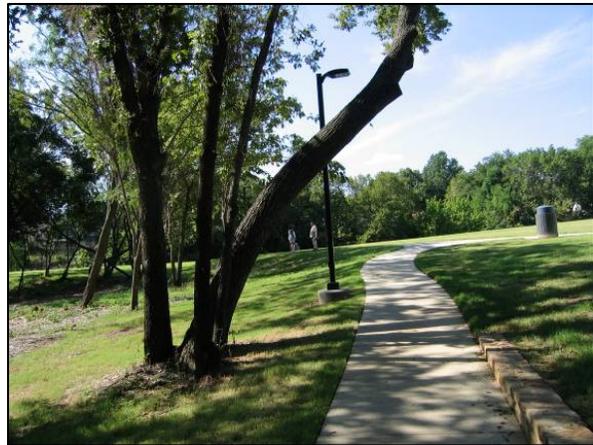


Photogroup 13-12 West Irving Creek Site WI102 showing proximity of residence to stream (residence in upper left corner of right photograph). (Individual photographed is TIAER staff.) [\[Return to Text\]](#)



Photogroup 13-13 West Irving Creek Site WI102 showing sticks placed in mud by human activity [\[Return to Text\]](#)

[Remainder of page intentionally left blank]



Photogroup 13-14 West Irving Creek showing activities observed in parks associated with Sites WI101 and WI102 [Return to Text](#)

CHAPTER 14 REFERENCES

- NAIP (National Agricultural Imagery Program). 2005. Digital Ortho-quarter-quadrangle maps 2-m resolution. Downloaded from Texas Natural Resource Information System. <www.tnris.state.tx.us/datadownload/download.jsp> Accessed August 2010.
- NCTCOG (North Central Texas Council of Governments) 2007. GIS Data Clearinghouse Parks and Schools Layer. <www.dfwmaps.com/clearinghouse.dfwmaps/k>. Accessed August 2010.
- NCTCOG (North Central Texas Council of Governments) 2009. GIS Data Clearinghouse Land Use Maps. <www.dfwmaps.com/clearinghouse/metadata.asp>. Accessed March 15, 2010
- NWS (National Weather Service). 2009a. <www.srh.noaa.gov/fwd/?n=dnarrative>. Accessed November 5, 2009.
- NWS (National Weather Service). 2009b. <<http://lwf.ncdc.noaa.gov/oa/climate/stationlocator.html>>. Accessed November 17, 2009.
- TCEQ (Texas Commission on Environmental Quality). 2007. Draft 2006 Texas 303(d) List (June 27, 2007). <www.tceq.state.tx.us/assets/public/compliance/monops/water/06twqi/2006_303d.pdf> Accessed 31 August 2010.
- TCEQ (Texas Commission on Environmental Quality). 2008a. Surface Water Quality Monitoring Procedures Manual, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue. RG-415. Austin, Texas.
- TCEQ (Texas Commission on Environmental Quality). 2008b. Texas Water Quality Inventory and 303(d) <www.tceq.state.tx.us/compliance/monitoring/water/quality/data/08twqi/twqi08.html>. Accessed 19 July 2010.
- TCEQ (Texas Commission on Environmental Quality). 2009. Recreational Use-Attainability Analyses (RUAAs) - Procedures for a Comprehensive RUAA and a Basic RUAA Survey. May 2009. <www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stakeholders/recUAAsproceduresMay2009.pdf> Accessed 19 July 2010
- TCEQ (Texas Commission on Environmental Quality). 2010a. Draft 2010 Texas 303(d) List (February 5, 2010). <www.tceq.state.tx.us/assets/public/compliance/monops/water/10twqi/2010_303d.pdf> Accessed 19 July 2010.
- TCEQ (Texas Commission on Environmental Quality). 2010b. Texas Surface Water Quality Standards. §307.1-307.10. Adopted by the Commission: June 30, 2010; Effective July 22, 2000 as the state rule. Austin, Texas.

TCEQ (Texas Commission on Environmental Quality). 2010c. Draft 2010 Texas Water Quality Inventory Water Bodies Evaluated (February 5, 2010). <www.tceq.state.tx.us/assets/public/compliance/monops/water/10twqi/2010_303d.pdf> Accessed 19 July 2010.