Central and Southeast Texas Recreational Use Attainability Analyses Project:

San Bernard River Above Tidal (Segment 1302) Comprehensive RUAA
Gum Tree Branch (1302A) Basic RUAA
West Bernard Creek (1302B) Basic RUAA

Results Report

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

Principal Investigator
George Guillen

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

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TCEQ Contact:
Natalie Bell
Total Maximum Daily Load Team
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087
512-239-6941
Natalie.Bell@tceq.texas.gov

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Introduction

Problem Statement

Recreational Use Attainability Analyses (RUAA) are scientific assessments that are used to determine the existing and attainable recreational use for a waterbody, and assess if that use might be different than the presumed recreational use as specified in the Clean Water Act. In August 2010, one Comprehensive and two Basic RUAAs were initiated on three water bodies within the San Bernard River Above Tidal watershed. A Comprehensive RUAA was performed on the San Bernard River Above Tidal (Segment 1302), and a Basic RUAA was completed on Gum Tree Branch (1302A) and West Bernard Creek (1302B). This RUAA Report will provide the TCEQ Water Quality Standards Group with relevant information needed to determine the appropriate attainable recreational use for the three water bodies in question. The completion of these RUAAs consisted of several important interrelated components including 1) reconnaissance and site selection, 2) conducting the basic or comprehensive RUAA, and 3) public outreach. The objectives of each component are listed below.

Objectives

1. Reconnaissance and Site Selection

The primary objective of this phase was to select survey sites that would be accessible to users and most likely characterize recreational uses in the watershed. This was accomplished primarily with the input of local, state, and regional agency staff familiar with the watershed, as well as aerial imagery. Reconnaissance surveys for the San Bernard River Above Tidal were conducted on December 12, 2009 and January 6, 2010. An initial stakeholder meeting occurred on February 2, 2010 at the Albert George Branch Public Library in Needville, Texas, at which

the site selections were discussed. Reconnaissance surveys for Gum Tree Branch were conducted on June 22, 2010 and for West Bernard Creek on June 22-23, 2010.

2. Recreational Use Attainability Analysis

The primary objectives of the San Bernard River Above Tidal Watershed RUAAs was to characterize the recreational use and potential impediments to recreational use for these streams. The RUAA field surveys were conducted during the weekends in April and May of 2011, to collect information on the waterbody and associated uses. Field surveys were conducted at selected sites with the highest probability of detecting recreation use. The objectives for all three water bodies were to document and characterize observed uses, site conditions (hydrology, physical attributes), and weather during the RUAA field surveys. A historical information review and interviews were also conducted for the San Bernard River Above Tidal Comprehensive RUAA. The objective of the historical review and interviews was to supplement the data obtained from the field surveys and increase the probability of detecting and characterizing recreational uses in the segment.

3. Public Participation

The objective of the public participation phase was to solicit as much information on the historical and current recreational uses in the San Bernard River Above Tidal, Gum Tree Branch, and West Bernard Creek from various watershed stakeholders, including agency staff (such as TCEQ, Texas Parks and Wildlife, Clean Rivers Partners, and State Soil and Water Conservation Board), citizens, recreational user groups, and other interested parties. This included sending out email and phone messages to key organizations and staff familiar with the watershed. The stakeholder contact list is provided in Appendix 1. In addition, on February 2, 2009, an initial stakeholder meeting was held to gather information on the watershed, including likely

recreational access points. Finally, a public meeting was advertised via public notice by TCEQ and held at the Albert George Branch Public Library in Needville, TX on June 24, 2011 to present the findings of this study and confirm with the attending public that findings were concurrent with information on potential observed or known recreational uses (Appendix 7).

Study Area

Description of Waterbody

San Bernard River Above Tidal

The San Bernard River Above Tidal (Segment 1302) is located within the Brazos-Colorado Coastal river basin. This classified segment is approximately 107 miles in length. Segment 1302 begins at the saltwater barrier 3.2 km (2.0 miles) upstream of SH 35 in Brazoria County to the headwaters above Bernard/Bostik Rd, southeast of New Ulm in Austin County. This portion of the San Bernard River Above Tidal is predominately undeveloped, with the small communities of East Bernard and Kendleton located in the middle of the watershed. Rice and cotton farming dominate the landscape. The stream is gently sloped and bank access to the water is easy in the upstream portions of the river. The banks become steeper and more difficult to access the water downstream. The San Bernard River Above Tidal is on the Texas 303(d) list for not meeting the state's bacteria criteria associated with primary recreation uses in the lower 50 miles of the segment (TCEQ, 2008).

Gum Tree Branch

Gum Tree Branch is located within the Brazos-Colorado Coastal river basin. Unclassified waterbody 1302A is approximately 15 miles in length. Waterbody 1302A begins at the confluence with West Bernard Creek near Wharton CR 252 to the headwaters approximately

15 miles upstream near RR 102. Gum Tree Branch is intermittent in its upper reaches. Gum Tree Branch is on the Texas 303(d) list for not meeting the state's bacteria criteria associated with primary recreation uses (TCEQ, 2008).

West Bernard Creek

West Bernard Creek is located within the Brazos-Colorado Coastal river basin. Unclassified waterbody 1302B is approximately 40 miles in length. West Bernard Creek begins at the confluence with the San Bernard River Above Tidal downstream of US Highway 59 to the headwaters approximately 40 miles upstream near FM 1093. West Bernard Creek is intermittent in its upper reaches. West Bernard Creek is on the Texas 303(d) list for not meeting the state's bacteria criteria associated with primary recreation uses (TCEQ, 2008).

Watershed Environmental Features and Population Characteristics

The main land use within the watershed is crop production and cattle grazing. Currently, no major metropolitan areas are located in the watershed. Land uses within the watershed are primarily rural and agricultural, with small scattered areas of urbanization (East & Hogan, 2003 & HGAC, 2011) (Figure 1).

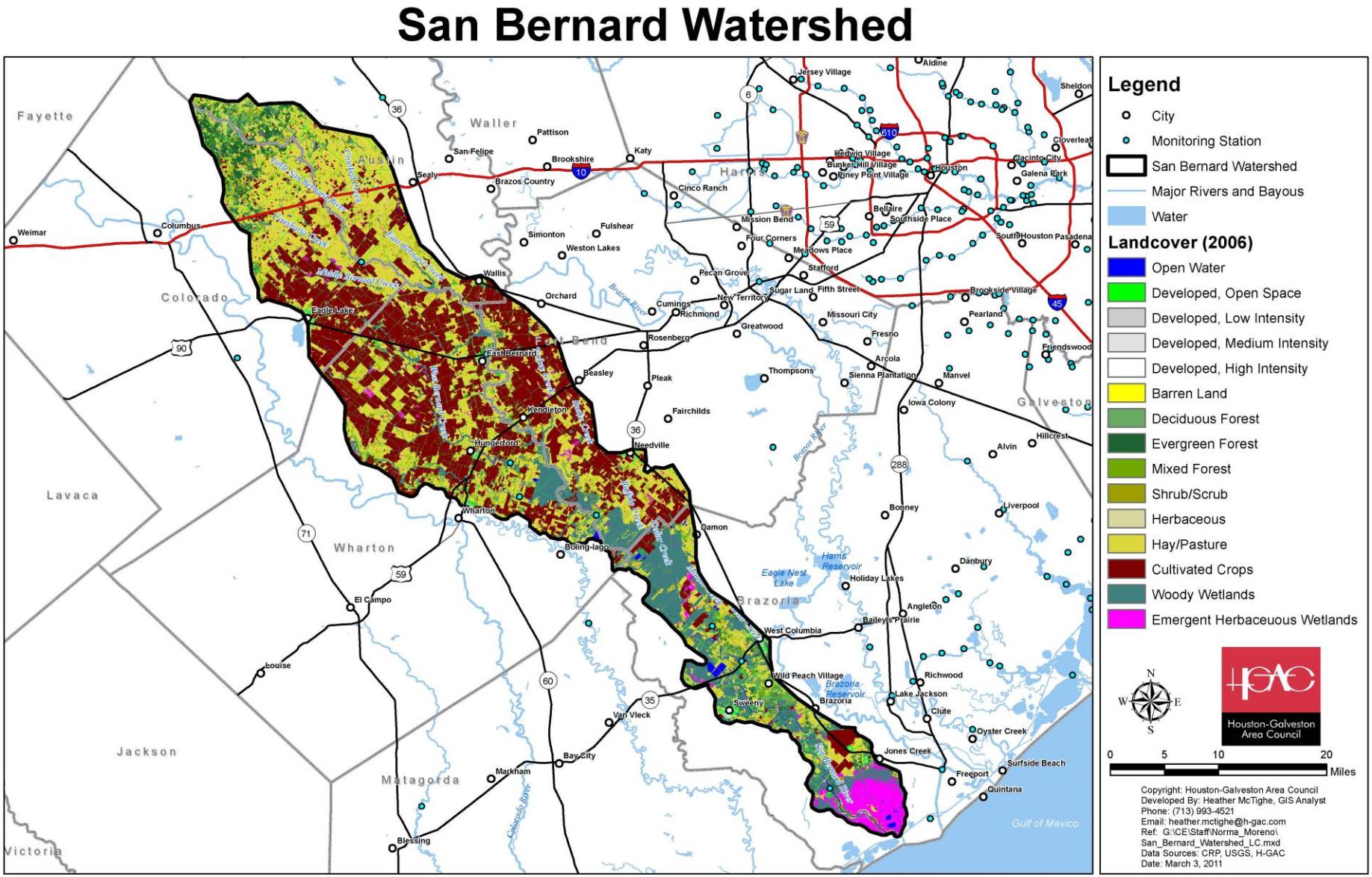

Figure 1. Land use and land cover in the San Bernard River Watershed from the Watershed Protection Plan by the Houston-Galveston Area Council found at: http://www.h-gac.com/community/water/watershed_protection/sanbernard/default.aspx (accessed: 7/14/2011).

Watershed Characterization

The San Bernard River Above Tidal watershed drains just under 900 square miles (TCEQ 2009). The terrain throughout the watershed is characterized by level to undulating plains with a timber belt of hardwoods along the river (HGAC, 2011). The average annual rainfall in the area is between 40" to 54", however, the year that the RUAA field surveys were completed (2011) was a significant drought year at which only 3.7" of rain had been recorded in East Bernard, TX (approximate mid-point of the segment), between January and July 2011 (Wunderground, 2011).

Permitted Discharges (Municipal, Industrial, Storm water)

The San Bernard River Above Tidal watershed is affected by domestic wastewater discharges and by storm water runoff from agricultural, industrial, and urban areas. Under the Texas Pollutant Discharge Elimination System (TPDES), the TCEQ has issued permits to discharge treated wastewater to 13 facilities within the Segment 1302 watershed (Table 1 & Figure 2).

Potential Nonpoint Sources

Potential sources of nonpoint source pollution in the watershed include malfunctioning septic systems, construction site runoff, runoff from streets and yards, and runoff from agricultural lands. For any urban collection and treatment system, sanitary sewer overflows and wastewater treatment facility (WWTF) bypasses are possible sources of bacteria loadings to receiving waters. The San Bernard River Above Tidal watershed can be described as relatively rural with few permitted WWTFs relative to area. This fact suggests that there are potentially a

number of on-site sewage facilities (OSSFs or septic systems) in use in the watershed. OSSFs require routine repairs and maintenance to avoid failures causing potential leaks or overflows. Poorly maintained OSSFs are a potential source of bacteria loadings in the watershed.

Directly adjacent to the San Bernard River Above Tidal, West Bernard Creek, and Gum Tree Branch are agriculture grazing tracts. These tracts potentially provide livestock with direct access to the waterways. During the San Bernard River Above Tidal field surveys, cattle were observed with direct access to the water at field survey site 18, and evidence of animals with direct access to the water was witnessed in the form of tracks and fecal droppings at all field survey sites with the exception of sites 16 and 17. During the Gum Tree Branch field surveys, cattle were observed at site 3, while fecal droppings were observed at site 2. Either cattle or evidence of animals in the form of tracks and fecal droppings were observed at all field survey sites along West Bernard Creek with the exception of sites 5, 8, 10, 11, 12, and 15. Direct contact with agriculture and wildlife grazing is a potential non-point source for the San Bernard River Above Tidal watershed.

Table 1. Permitted outfalls in the San Bernard River Above Tidal Watershed. Outfall number corresponds to Figure 2.

Outfall Number	Permit Number	NPDES number	Permittee	County	Latitude	Longitude
1	12010-001	77470	NEEDVILLE ISD	FORT BEND	29.371911	-95.799396
2	10343-001	27634	CITY OF NEEDVILLE	FORT BEND	29.387744	-95.831896
3	14040-001	117226	STRAIGHTWAY INC	WHARTON	29.399412	-96.093293
4	13240-001	99813	HUNGERFORD MUD 1	WHARTON	29.400245	-96.081347
5	02469-000	86363	LAMBERTI USA INC	WHARTON	29.437188	-96.018013
6	02469-000	86363	LAMBERTI USA, INC	WHARTON	29.437188	-96.018013
7	10996-001	98949	CITY OF KENDLETON	FORT BEND	29.447546	-95.993585
8	03985-000	118940	HUDSON PRODUCTS CORP	FORT BEND	29.475798	-95.958566
9	11450-001	53945	CITY OF BEASLEY	FORT BEND	29.488276	-95.920786
10	14019-001	25852	WHARTON COUNTY WCID NO 2	WHARTON	29.529651	-96.056301
11	12097-001	79120	BERNARD TIMBERS WSC	WHARTON	29.539886	-96.055155
12	02462-000	85936	BAE SYSTEMS TACTICAL VEHICLE SYSTEMS LP	AUSTIN	29.759535	-96.217659
13	13655-001	114880	NEW ULM WSC	AUSTIN	29.885291	-96.47761

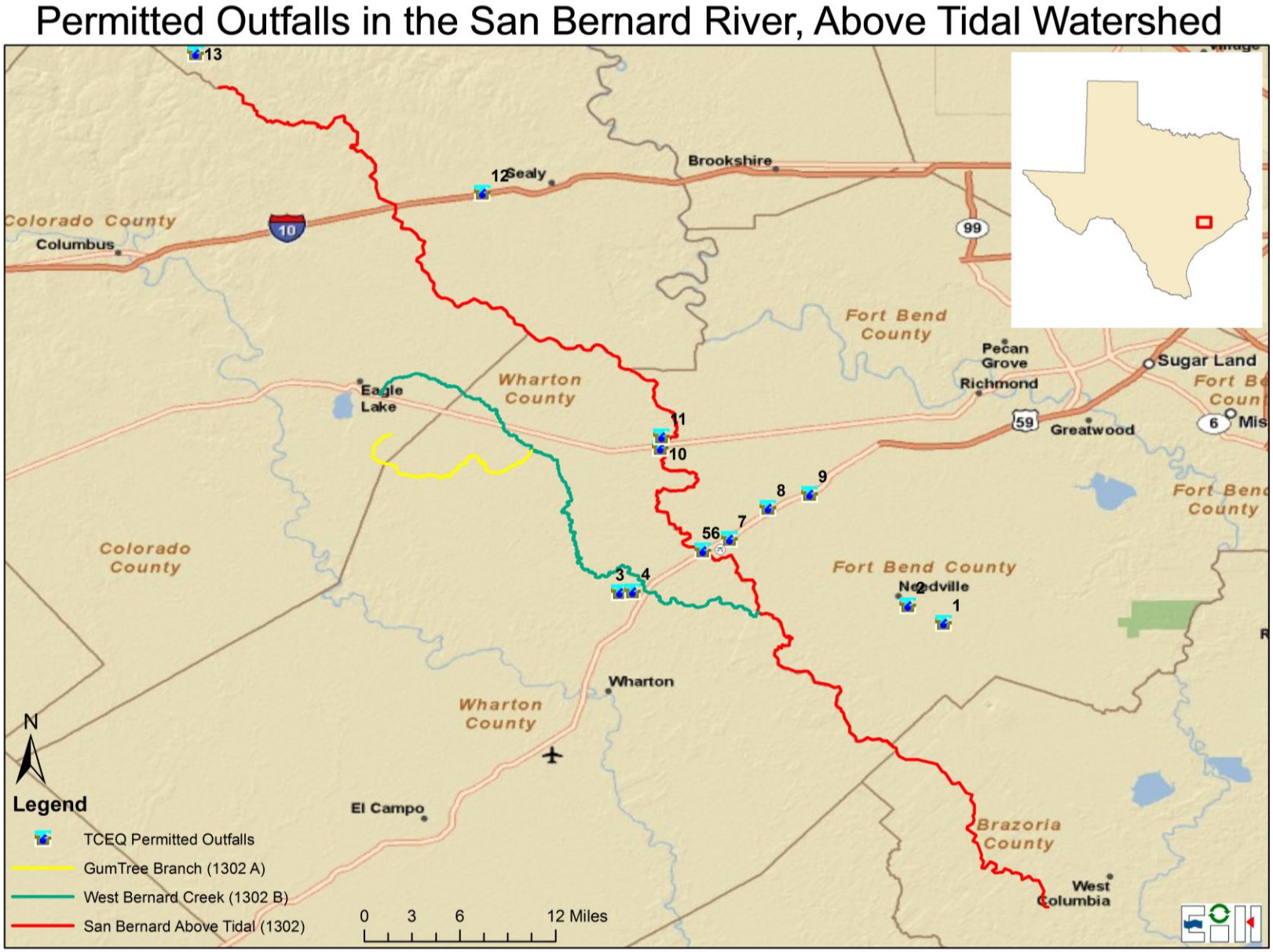

Figure 2. Permitted outfalls in the San Bernard River Above Tidal Watershed for Recreational Use Attainability Analysis Survey. Outfall number corresponds to Table 1.

History of Recreational Use in the San Bernard River Above Tidal Watershed

Historical Summary

Some locals refer to the San Bernard River as the "Singing River" because of reported sounds of the "wail of a violin" from the river. It has been explained that these musical sounds may be caused by escaping gas (Handbook of Texas, 2010). The San Bernard River Above Tidal was dammed on the Wharton-Fort Bend county line in 1929 to form New Gulf Reservoir with a capacity of 2,150 acre-feet. The lake is owned by the Texas Gulf Sulfur Company, and its water is used for municipal supply and irrigation. This dam, while decrepit, still exists just upstream of field survey site B9 (lat: 29.265838, long: -95.877985). Fishing was the most common use documented in our historical review.

Boating

Numerous publicly accessible sites under bridges and roadways provide access to the San Bernard River Above Tidal for small john boats, canoes, and kayaks. A publicly accessible, paved boat launch can be found at Bates Allen Park (Field Survey Site 12). The San Bernard River Above Tidal is a popular paddling destination, and groups, such as the Sierra Club and Friends of the River, participate in coordinated group paddling trips (Figure 3). Also, various on-line forums and personal websites (such as texaskayakfisherman.com and Smug-Mug pages) regularly mention the San Bernard River Above Tidal as a popular paddling destination (Figure 4 & 5). The physical characteristics of the waterbody (such as depth and bank access) are conducive to many forms of boating along the lower portions of the river; however, water control structures and log jams restrict long distance navigation by boat throughout the segment.

Figure 3. One of the photographs submitted by David Heinicke (TPWD) paddling trip organizer of a group paddle on the San Bernard River at Bates Allen Park on April 12, 2010. All photographs are located in Appendix 5.

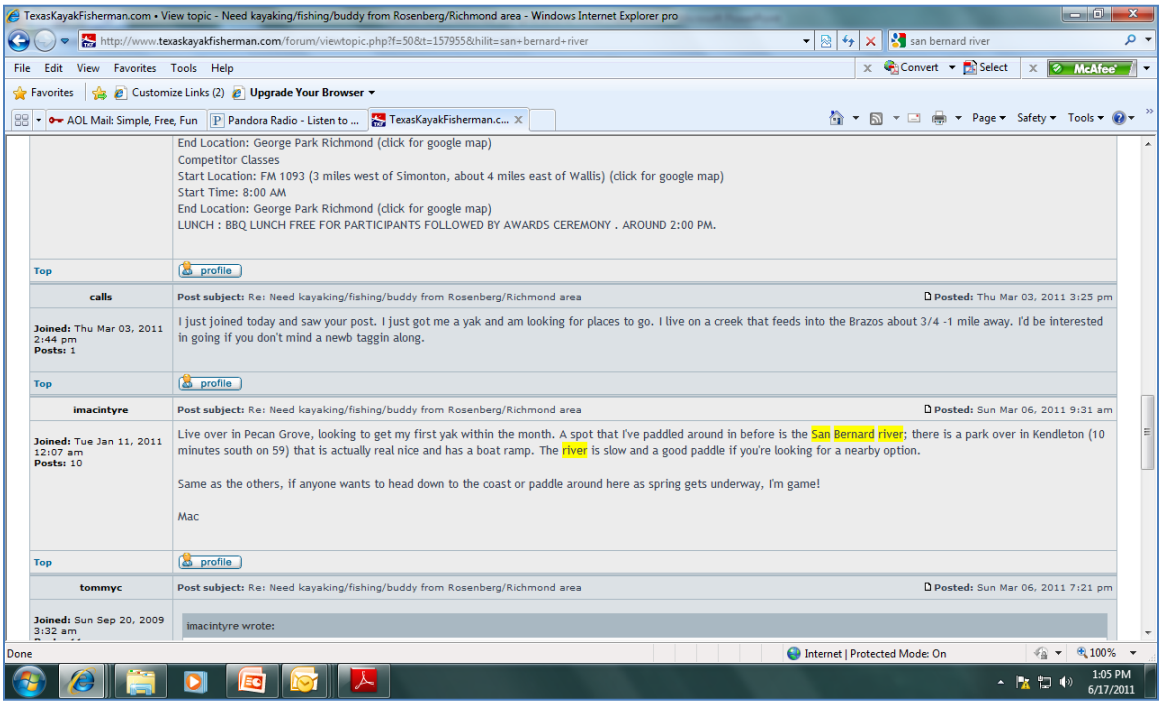

Figure 4. A screen shot of the TexasKayakFisherman.com forum where the San Bernard River as a popular paddling destination is a common topic of discussion. Site accessed on 7/21/2011: http://www.texaskayakfisherman.com/forum/viewtopic.php?f=50&t=157955&p=1600103&hilit=San+Bernard+RIver#p1600103

Figure 5. Smug-Mug user, "TaffyWaffy", posted this photo along with many others in a public album named: San Bernard River at Kendelton. Site accessed on 7/21/2011: http://taffywaffy.smugmug.com/Kayaking/San-Bernard-River-at-Kendelton/13775071_pwv8Q/1/1008258520_Funn8#1008258520_Funn8

Fishing

Like boating, fishing, is a popular form of recreation on the San Bernard River Above Tidal. Documentation of recreational fishing is common on numerous on-line fishing and kayak fishing forums. Fishermen regularly blog about recent trips on the San Bernard River Above Tidal describing what they caught and how far they paddled. Some frequently visited websites are: TexasKayakFisherman.com, FishingTX.com, and Paddling.com. The Friends of the River have photo galleries that document fishing, in particular bow fishing, within Segment 1302 (Figure 6). Large expanses of private property can restrict shoreline public fishing along the San Bernard River Above Tidal. Fishing from private property throughout the segment is apparent through interviews with stakeholders and evidence of fishing paraphernalia found at field survey sites.

Figure 6. Photo from the Friends of the River, San Bernard website (photo album 2009) of a large gar that was caught in San Bernard River Above Tidal at Mound Creek (bottom part of segment). Accessed on 7/21/2011: http://www.sanbernardriver.com/photoalbum.php?gallery=Fish%202009_1

Swimming

Numerous rope swings were documented throughout the above tidal segment. In addition, the physical characteristics of the waterbody, such as bank access, slope, depth, and flow make swimming possible in the middle and lower portions of the river. Swimming and other primary contact recreational uses, such as children wading, are well documented in the interviews for the San Bernard River Above Tidal; however, historical and Internet documentation of swimming was sparse.

Parks

There are three parks directly adjacent to the San Bernard River Above Tidal; two of which are not publicly accessible (Table 2 & Figure 7).

The Attwater Prairie Chicken National Wildlife Refuge is located on the upstream portion of the San Bernard River Above Tidal at field survey site B2. The Refuge property is directly adjacent to the river and provides access along the river through public roads and footpaths, however, there is a refuge fence that lines the river preventing the public from directly accessing the river through Refuge property.

Bates Allen Park, a Fort Bend County Park located in Kendelton, TX, was surveyed at field survey site A12. The park covers over 200 acres directly adjacent to the San Bernard River Above Tidal. Brandt Mannchen with the Houston Sierra Club describes the park as the perfect location for beginning canoers and kayakers because of its width and slow current. He also noted the opportunity to wade, fish, swim, bird, and nature study at the park. The park is a favorite location for organized scouting and canoeing groups, supported by many on-line postings (HASK 2010).

Camp Karankawa is a Bay Area Council Boy Scout camp that is located on the downstream end of the San Bernard River Above Tidal. The Camp offers many amenities to scout campers, including a waterfront area for canoeing and fishing.

Table 2. Parks located directly adjacent to the San Bernard River Above Tidal. Park number corresponds to Figure 7.

Park Number	Access	Park Name	Latitude	Longitude	River Mile
P1	Private	Attwater National Wildlife Refuge	29.70593	-96.27126	78.9
P2	Public	Bates Allen County Park	29.43146	-96.00957	39.5
P3	Private	Camp Karankawa	29.14124	-95.728753	3.25

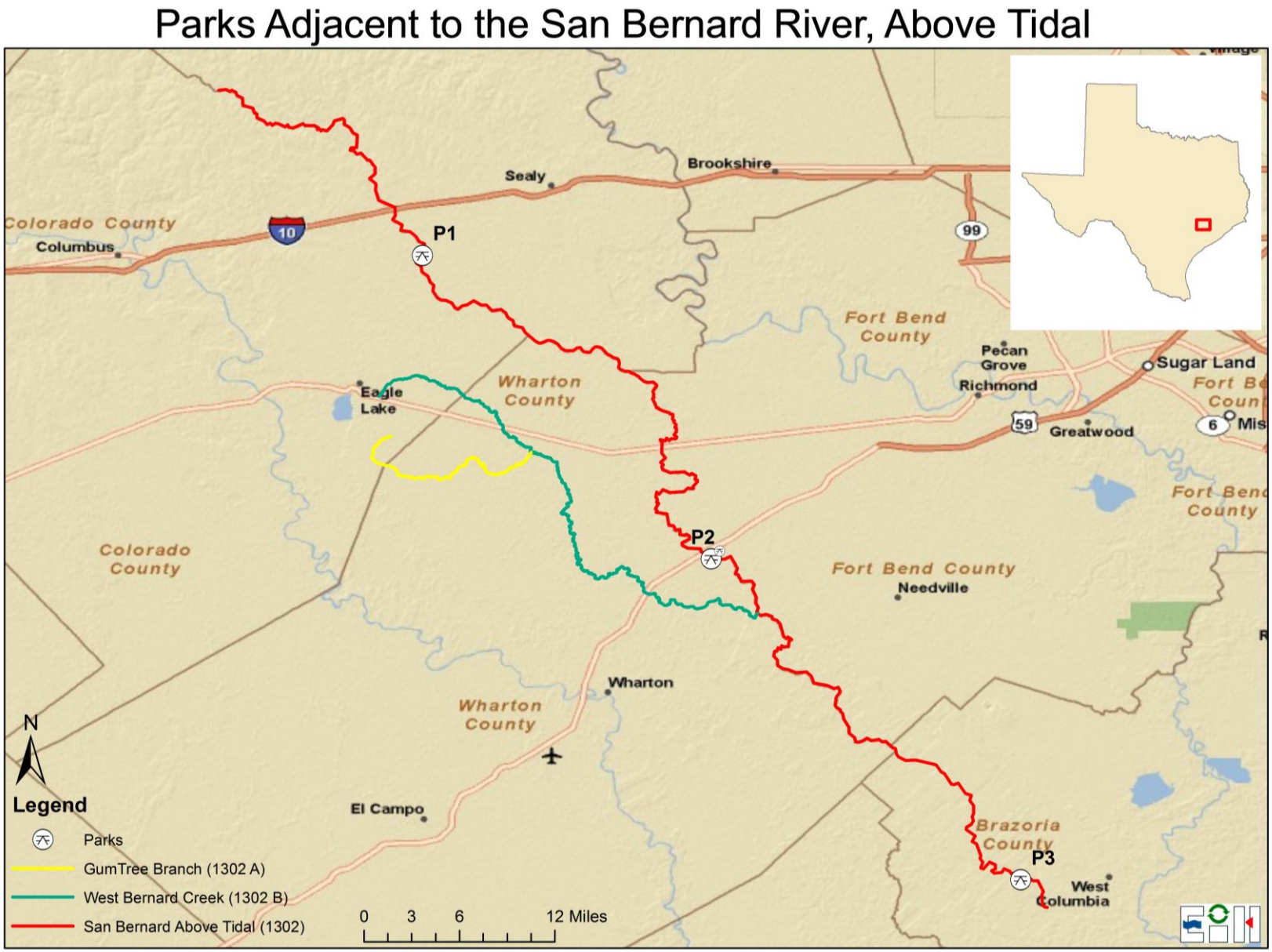

Figure 7. Map of the parks that are directly adjacent to the San Bernard River Above Tidal. Park Number corresponds to Table 2.

Site Reconnaissance Summary

Prospective sites were chosen based on public access and documented uses from the stakeholder response to the request for information e-mail, which is included in Appendix 1. Site suggestions were submitted to TCEQ as part of the Quality Assurance Plan's (QAP) Monitoring Plan, which was approved by TCEQ on January 19, 2011. An amended QAP including the privately owned field survey sites and one public site was approved on July 5, 2011.

Initial reconnaissance surveys for the San Bernard River Above Tidal were conducted on December 21, 2009 and January 6, 2010. A total of 30 prospective sites were visited, and of these, 18 were chosen as field survey sites. An additional nine sites located on private property were added to the site list to improve spatial coverage. Reconnaissance site tables and maps are available in Appendix 9, Quality Assurance Plan and Monitoring Plans (QAP).

Initial reconnaissance surveys for Gum Tree Branch were conducted on June 22, 2010. A total of 12 prospective sites were visited, and of these, three were chosen as field survey sites. Reconnaissance site table and maps are available in Appendix 9, Quality Assurance Plan and Monitoring Plans (QAP).

Initial reconnaissance surveys for West Bernard Creek were conducted on June 22 & 23, 2010. A total of 26 prospective sites were visited, and of these, 17 were chosen as field survey sites. Reconnaissance site table and maps are available in Appendix 9, Quality Assurance Plan and Monitoring Plans (QAP).

Methodologies

RUAA Survey Site Selection and Descriptions

The three streams assessed in this RUAA (San Bernard River Above Tidal, Gum Tree Branch, and West Bernard Creek) flow through predominantly rural areas where the majority of

the land is privately owned. The TCEQ recommends a target density of approximately three survey sites per every five miles of stream (TCEQ, 2009). During our study, survey sites were established in areas where the waterbody is accessible to the public and has the highest potential for recreational use (road crossings, public lands/parks located near the waterbody, and populated areas). These sites were chosen based on public access potential and also providing sufficient spatial coverage throughout each assessment unit. In portions of the waterbody where the recommended three sites per every five miles of stream was not possible, supplementary information was gathered through coordination with local authorities in stakeholder meetings, conducting interviews (Appendix 3), and using topographic maps and aerial photos to document any additional potential access points (reconnaissance sites).

The San Bernard River Above Tidal Field Survey Sites

Due to the lack of public access points along the San Bernard River Above Tidal, a sizeable effort was made to retrieve contact information from the county appraisal districts for all landowners that own property directly adjacent to the river. Mailings describing the study and requesting access permission to the San Bernard River Above Tidal were sent to 256 property owners, and an additional 129 information-only packets (including interview forms) were mailed to stakeholders when phone numbers were not available. A total of 27 field survey sites were surveyed (Table 3 & Figure 9). Nine of the 27 field survey sites were located on private property, of which the University of Houston-Clear Lake secured access in order to provide a more spatially homogeneous scale to the field survey sites.

Extensive interviews were collected to help determine the types and frequency of contact recreation occurring along the privately owned portions of the stream. These interviews resulted in additional background information and confirmation that recreation was most likely to occur

at sites identified in this study. Every effort was made for the interviewees to provide recreational use information about the entire length of the segment, including areas other than the selected sites in this RUAA. Topographic maps were used to provide the needed geographic information about potential recreational opportunities and potential access points along the San Bernard River Above Tidal. The topographic map and aerial imagery review resulted in site selection for the reconnaissance site visits. Figure 8 was taken at field survey site 10, and is a good representation of the general site conditions along the San Bernard River Above Tidal.

Figure 8. Picture of field survey site 10, showing the general representation of the physical conditions seen on the San Bernard River Above Tidal (Segment 1302)

Table 3. Field survey sites for the Comprehensive RUAA Survey on the San Bernard River Above Tidal (Segment 1302) (see Figure 9).

Site #	Site Type	Description	Latitude	Longitude	Approx. River mile
A1	Public	Bostik Rd @ San Bernard River	29.85483	-96.45535	106.0
B1	Private	Dietzmann - Cat Spring @ San Bernard River	29.82687	-96.41480	97.9
A2	Public	Cat Spring @ San Bernard River	29.82363	-96.37872	95.0
A3	Public	FM 949 @ San Bernard River	29.82461	-96.34227	90.0
A4	Public	Sealy Rd. @ San Bernard River	29.77978	-96.31506	86.0
A5	Public	IH10 @ San Bernard River	29.74856	-96.29675	83.0
B2	Private	Attwater NWR @ San Bernard River	29.70593	-96.27126	78.9
A6	Public	FM 3013 @ San Bernard River	29.66065	-96.24348	74.7
A7	Public	FM1093 @ San Bernard River	29.62238	-96.14528	67.0
A8	Public	SH60 @ San Bernard River	29.60199	-96.09032	62.0
B3	Private	Tihacek - East Bernard @ San Bernard River	29.56923	-96.06131	58.2
A9	Public	US90A @ San Bernard River	29.53298	-96.05546	54.0
B4	Private	Smith - East Bernard @ San Bernard River	29.51654	-96.05341	52.4
A10	Public	FM2919 @ San Bernard River	29.49481	-96.02890	49.0
B5	Private	Boettcher - East Bernard @ San Bernard River	29.48586	-96.05835	46.2
A11	Public	US59 @ San Bernard River	29.43766	-96.01547	40.0
A12	Public	Roberts Ln @ San Bernard River	29.43146	-96.00957	39.5
B6	Private	Archer - East Bernard @ San Bernard River	29.41060	-95.97944	36.0
B7	Private	Vallet - Needville @ San Bernard River	29.32611	-95.91935	29.2
A13	Public	Tierra Grande Dr @ San Bernard River	29.34417	-95.94694	29.0
A14	Public	FM442 @ San Bernard River	29.31321	-95.89314	24.0
B8	Private	Henning - Boling @ San Bernard River	29.29210	-95.89062	22.2
B9	Private	Moore - Guy @ San Bernard River	29.26330	-95.84851	15.8
A15	Public	San Bernard Dr @ San Bernard River	29.25121	-95.83698	17.0
A16	Public	FM1301 @ San Bernard River	29.16034	-95.76543	7.4
A17	Public	FM1469 @ San Bernard River	29.15369	-95.76151	6.4
A18	Public	Linnett Rd @ San Bernard River	29.13603	-95.71157	1.7

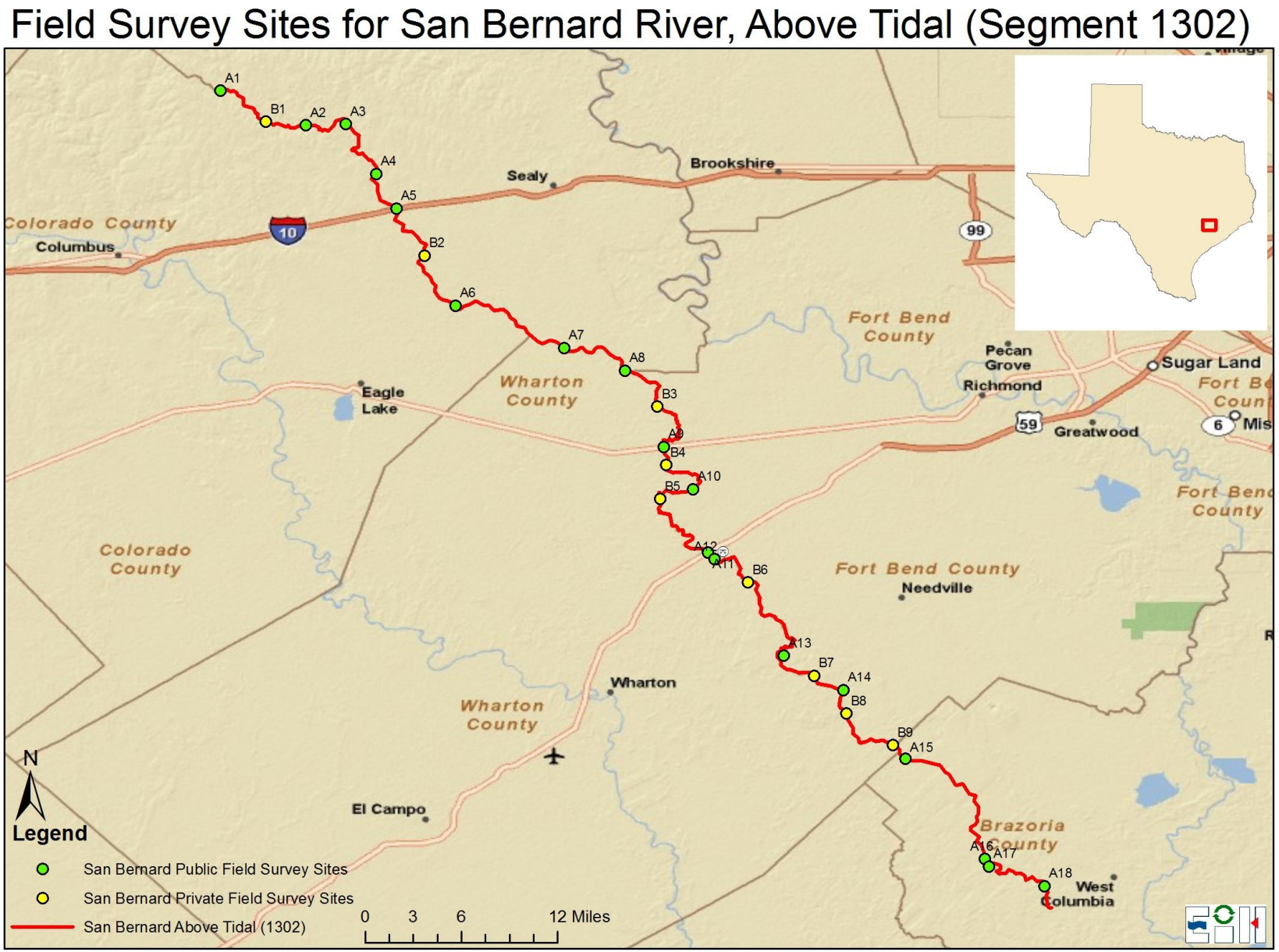

Figure 9. Comprehensive RUAA survey sites on the San Bernard River Above Tidal (Segment 1302) selections based on river mile/assessment units, accessibility, and recreational features (see Table 3).

Gum Tree Branch Field Survey Sites

The University of Houston-Clear Lake retrieved contact information from the county appraisal districts for most landowners that own property directly adjacent to Gum Tree Branch. Mailings describing the study and requesting access permission to Gum Tree Branch were sent to the nine predominant property owners. A total of three field survey sites were surveyed (Table 4 & Figure 11). The University of Houston-Clear Lake was unable to find any landowner interested in participating in the study, so no sites on private property were surveyed in this Basic RUAA.

Interviews were solicited from the nine contacted landowners and during the public meetings in order to gather supplemental information on what kind of recreation may occur along Gum Tree Branch. Two interviews were completed by stakeholders suggesting that Gum Tree Branch is not commonly used for recreation. Every effort was made for the interviewees to provide recreational use information about the entire length of the waterbody, including areas other than the selected sites in this RUAA. Topographic maps were used to provide the needed geographic information about potential recreational opportunities and potential access points along Gum Tree Branch. The topographic map and aerial imagery review resulted in site selection for the reconnaissance site visits. Figure 10 was taken at field survey site 2, and is a good representation of the general site conditions along Gum Tree Branch.

Figure 10. Picture of field survey site 2, showing the general representation of the physical conditions seen on Gum Tree Branch (1302A)

Table 4. Field survey sites for the Basic RUAA Survey on Gum Tree Branch (1302A) (see Figure 11).

Field Survey Site #	Description	Latitude	Longitude	Approx river mile
1	Hunt Rd @ Gum Tree Branch	29.54191	-96.30057	14.3
2	CR271 B @ Gum Tree Branch	29.50469	-96.27316	9.5
3	CR252 @ Gum Tree Branch	29.52269	-96.17594	0.4

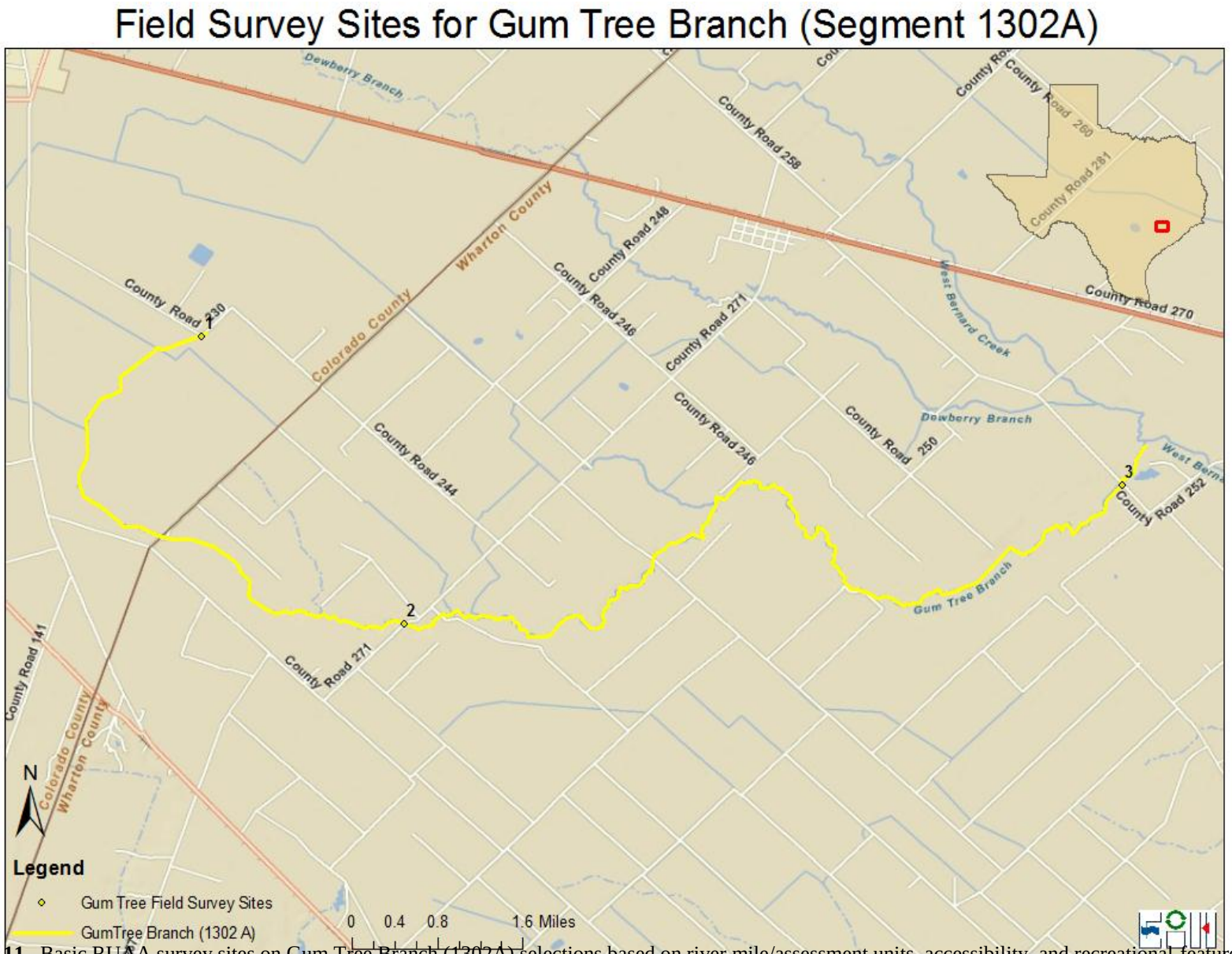

Figure 11. Basic RUAA survey sites on Gum Tree Branch (1302A) selections based on river mile/assessment units, accessibility, and recreational features (see Table 4).

West Bernard Creek Field Survey Sites

In attempts to gain supplemental access to West Bernard Creek, contact information was retrieved from the county appraisal districts for all landowners that own property directly adjacent to West Bernard Creek. Mailings describing the study and requesting access permission to West Bernard Creek were sent to 86 property owners. Unfortunately, none of these property owners were willing to participate in this study by allowing access to the creek through their property. A total of 17 field sites were surveyed (Table 5 & Figure 13).

Interviews were collected from stakeholder mailings, public meetings, and from individuals observed during the field surveys to help determine what kind of recreation occurs along West Bernard Creek. These interviews resulted in additional background information and confirmed that recreation was most likely to occur at the sites identified in this study. Every effort was made for the interviewees to provide recreational use information about the entire length of the waterbody, including areas other than the selected sites in this RUAA. The topographic map and aerial imagery review resulted in site selection for the reconnaissance site visits. Figure 12 was taken at field survey site 8, and is a good representation of the general site conditions along West Bernard Creek.

Figure 12. Picture of field survey site 8, showing the general representation of the physical conditions seen on West Bernard Creek (1302B)

Table 5. Field survey sites for the Basic RUAA Survey on West Bernard Creek (1302B) (see Figure 13).

Field Survey Site #	Description	Latitude	Longitude	Approx. river mile
1	US90 @ West Bernard Creek	29.57760	-96.31158	40.2
2	FM1093 A @ West Bernard Creek	29.59033	-96.30036	39.0
3	Little Public Rd @ West Bernard Creek	29.59525	-96.28263	37.8
4	FM1093 B @ West Bernard Creek	29.59619	-96.27297	37.1
5	Colorado CR211 @ West Bernard Creek	29.57972	-96.23525	34.0
6	CR277 @ West Bernard Creek	29.57347	-96.21929	32.7
7	CR279 @ West Bernard Creek	29.56481	-96.20583	31.3
8	US90 B @ West Bernard Creek	29.55043	-96.19784	30.1
9	CR252 @ West Bernard Creek	29.52527	-96.16406	26.2
10	CR254 @ West Bernard Creek	29.49813	-96.14182	23.3
11	Wharton CR211 A @ West Bernard Creek	29.45521	-96.13750	19.0
12	CR213 @ West Bernard Creek	29.41330	-96.11169	13.8
13	CR215 @ West Bernard Creek	29.42495	-96.09166	11.7
14	SH60 @ West Bernard Creek	29.41519	-96.07856	10.3
15	US183 @ West Bernard Creek	29.40475	-96.07059	9.1
16	CR225 @ West Bernard Creek	29.38650	-96.02272	4.8
17	Boyett Drive @ West Bernard Creek	29.38495	-95.97991	1.4

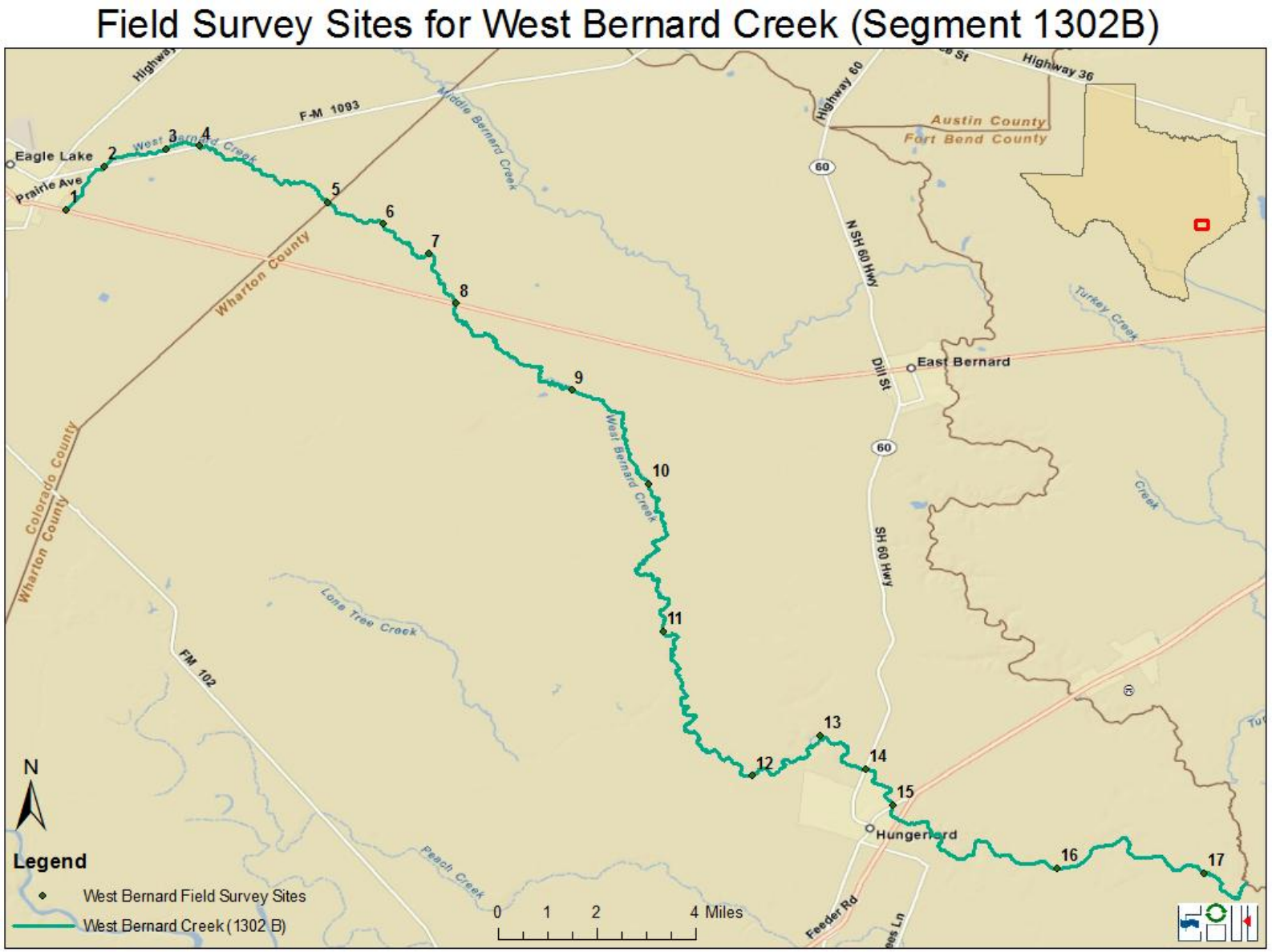

Figure 13. Basic RUAA survey sites on West Bernard Creek (1302B) selections based on river mile/assessment units, accessibility, and recreational features (see Table 5).

Sampling Methods

RUAAs are used to identify and assign attainable uses and criteria to individual water bodies. Applicable uses and associated criteria are defined in the Texas Surface Water Quality Standards (TSWQS). Until recently, Texas had two recreation use categories in the 2000 TSWQS: contact and noncontact recreation. In June 2010, these recreation use categories were expanded to include additional categories: primary contact and secondary contact recreation (1 & 2). Primary contact recreation consists of recreational activities involving a significant risk of ingestion of water including: wading by children, swimming, water skiing, diving, and surfing. Secondary contact recreation 1 is considered water recreation activities not involving a significant risk of water ingestion: including fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity. Secondary contact recreation 2 follows the same definition as secondary contact recreation 1, except that it occurs less frequently due to (1) physical characteristics of the waterbody and/or (2) limited public access.

According to TCEQ agency guidance, a comprehensive RUAA must be conducted on the San Bernard River Above Tidal since it is a classified waterbody (Segment 1302), while a Basic RUAA must first be completed on Gum Tree Branch (1302A) and West Bernard Creek (1302B), as they are both unclassified water bodies. RUAA surveys must be conducted during the normal warm season (air temperature $\geq 70°F$) and periods when people would most likely use the waterbody for contact recreational purposes (weekends, holidays, and summer). RUAA surveys must also be conducted during optimal sampling conditions that are representative of the normal flow conditions of the stream and are not storm-influenced. Throughout the sampling season of 2011, South Central Texas experienced drought conditions, which could have potentially affected the amount and type of recreational uses observed during the field surveys for these

three water bodies. RUAA field surveys for the San Bernard River Above Tidal watershed water bodies were conducted between April 22nd and June 10th, 2011. More specific procedures can be found in *TCEQ's RUAA Procedures Document, May 2009.*

Field Survey Descriptions

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

Due to impediments affecting stream access, complete field survey methods were not possible at some locations on the assessed water bodies. Impediments to stream access, such as steep banks and water depth exceeding 1.5 meters, at times, limited the field survey team's ability to survey the complete 300 meter stretch of stream. In each case where this was a factor, the impediments were documented on the field data sheet and pictures of these conditions were

also taken. Specific impediments causing access constraints for each site can be found in Appendices 2 and 5.

Interviews

Interviews were conducted during field survey visits on both the unclassified and classified segments whenever possible (Appendix 3). In-person interviews were performed with interviewees located in close proximity to the waterbody and, in some cases, adjacent land/homeowners. Interview forms were mailed to a total of 480 landowners in the watershed for all three waterbodies combined. Other stakeholders were interviewed via telephone for the San Bernard River Above Tidal (Appendix 3). The Environmental Institute of Houston's Interview Protocol Guideline is attached as Appendix 4.

Results

The San Bernard River Above Tidal RUAA Results

The 107 miles of the San Bernard River Above Tidal were evaluated using a total of 27 field surveys. Eighteen sites were located on public property and were surveyed twice. Nine sites were located on private property and were surveyed once in order to document the physical parameters relating to recreational use potential, as well as interviews with the landowners. Field survey visits were completed between April 22nd and June 10th, 2011. All field data sheets are attached (Appendix 2).

Physical Evaluation and Flow

During the RUAA surveys, the air temperatures fell within the range of acceptable temperatures for sampling described in the TCEQ procedures manual (Table 6). The average thalweg depth of the San Bernard River Above Tidal was greater than 0.9 meters and the average

width was 14.7 meters. The average Secchi Tube reading taken at the field survey sites was 0.4 meters (Table 6). The average flow for the segment based on measurements taken at accessible sites was 8.5cfs. The stream type recorded throughout the segment was intermittent with perennial pools in the upstream portion of the waterbody, and perennial from site A-9 to the end of the segment. The San Bernard River Above Tidal riparian zone can be categorized generally as forested (Table 7). The dominant substrate observed within the segment was either sand in the upstream or mud/clay in the downstream portions of the watershed.

Surrounding Conditions that Impede Recreation and Channel Obstructions

Impediments to stream recreation and channel obstructions on the San Bernard River Above Tidal were recorded at the field survey site visits and include: steep slopes, log jams, thick vegetation, private property, and fences. The San Bernard River Above Tidal has limited public access due to the large amount of privately owned land surrounding the river. A complete listing of the documented stream recreational use impediments and their locations can be found in Table 9, and Appendix 8.

Recreational Uses

Uses observed from all combined site visits include: kayaking, boating, fishing, standing, walking, and jogging/running (Table 8). A total of ten people were observed carrying out secondary contact recreation activities on the San Bernard River Above Tidal. The dominant secondary contact recreation activity observed was kayaking. Various non-contact activities were recorded, as well as evidence of recreation. Rope swings were found at field survey site numbers A13, A14, A17, and A18. Fishing tackle was found at nine of the field survey sites. Foot paths/prints were documented at 14 of the field survey sites. Remnants of kids' play (toys) were found at field survey site number A17.

Interviews

During the Comprehensive RUAA on the San Bernard River Above Tidal (Segment 1302), a total of 119 individuals agreed to participate in the interview. Of the 119 total, 24 were interviewed in person, 25 by mail, and 70 by phone. A total of 96 out of the 119 interviewed answered yes to the question "Are you familiar with the San Bernard River Above Tidal?" Of those, 49 had personally used the stream for recreation, 68 had observed recreation activities, and 62 had heard about recreation on the San Bernard River Above Tidal. The total number of years that interviewees were familiar with the San Bernard River Above Tidal watershed was over 1,900 man-years.

The types of recreational uses documented by interviews included the following primary contact recreation activities: swimming, wading-children, tubing, and water skiing (Tables 8 & 9). Secondary contact uses documented by interviews included: wading-adults, rafting, boating, kayaking, canoeing, and fishing. Non-contact uses included: trapping, hunting, walking/hiking, and wildlife watching. Figure 14 depicts the approximate locations of observed recreational uses. Appendix 8-A provides an electronic supplement which includes a complete depiction of the observed uses, physical evidence of uses, and responses to interviews that provided data based on personal experiences, witnessed uses, hear-say uses, and impediments.

Table 6. Average physical parameters from the Comprehensive RUAA two field surveys conducted on the San Bernard River Above Tidal (Segment 1302) * = not taken due to sampler error, ** = site dry, *** = Too deep, no flow taken, **** = no water access.

Site #	Site Description	Avg Air Temp (C)	Avg Water Temp (C)	Avg Secchi (m)	Avg Stream Flow (cfs)	Avg Depth (m)	Avg Width (m)
A1	Bostik Rd. @ San Bernard River	32.0	*	0.15	0.00	0.34 (pools)	3.25 (pools)
B1	Dietzman-cat spring @ San Bernard River	29.0	26.0	0.26	0.00	0.36 (pools)	5.8 (pools)
A2	Cat Spring @ San Bernard River	29.1	24.5	0.50	0.00	0.43 (pools)	6.03 (pools)
A3	Fm 949 @ San Bernard River	30.6	27.0	0.71	0.00	0.44 (pools)	3.64 (pools)
A4	Sealy Rd @ San Bernard River	29.7	25.0	1.01	0.00	0.92 (pools)	14.35 (pools)
A5	IH 10 @ San Bernard	30.4	25.5	1.84	0.00	0.30 (pools)	3.71 (pools)
B2	Attwater NWR @ San Bernard River	27.2	****	****	0.00	****	****
A6	FM 3013 @ San Bernard River	28.4	24.8	0.40	0.00	1.02 (pools)	21.59 (pools)
A7	Fm 1093 @ San Bernard River	30.1	**	**	0.00	**	**
A8	SH 60 @ San Bernard River	30.0	28.0	0.54	0.00	0.71 (pools)	12.6 (pools)
B3	Tichacek-East Bernard @ San Bernard River	31.0	**	**	0.00	**	**
A9	US90A @ San Bernard River	28.7	24.0	0.18	6.60	0.81	11.8
B4	Smith-East Bernard @ San Bernard River	32.7	26.0	0.61	7.77	0.59	8.0
A10	FM 2919 @ San Bernard River	32.0	25.0	0.46	5.60	0.80	19.1
B5	Boettcher-East Bernard @ San Bernard River	38.6	26.0	0.33	***	>1.4	12.9
A11	US 59 @ San Bernard River	32.8	25.0	0.24	6.50	>1.25	16.5
A12	Roberts Ln. @ San Bernarard River	26.7	26.4	0.26	***	>1.4	52.0
B6	Archer-East Bernard @ San Bernard River	34.8	31.0	0.30	<1.0	0.42	4.6
B7	Vallet-Needville @ San Bernard River	29.0	27.0	0.14	31.79	0.91	6.1
A13	Tierra brande Dr. @ San Bernard River	28.0	23.0	0.17	***	>1.4	17.3
A14	FM 442 @ San Bernard River	30.7	25.0	0.20	37.16	>1.23	15.4
B8	Henning-Boling @ San Bernard River	36.2	28.0	0.32	8.13	>1.4	17.2
B9	Moore-Guy @ San Bernard River	32.7	28.0	0.31	15.60	1.26	6.1
A15	San Bernard Dr @ San Bernard River	28.9	26.0	0.42	***	>1.21	16.4
A16	FM 1301 @ San Bernard River	30.2	24.0	0.23	51.85	>1.22	17.5
A17	FM 1469 @ San Bernard River	29.6	26.8	0.51	***	>1.4	24.3
A18	Linnett Rd. @ San Bernard River	28.0	27.0	0.28	***	>1.4	36.8
	Total Average	**30.6**	**26.0**	**0.4**	**8.5**	**>0.9**	**14.7**

Table 7. Physical Characteristics of Riparian Zone and Dominant substrate of the field survey sites sampled during the Comprehensive RUAA on the San Bernard River Above Tidal (Segment 1302)

Site #	Site Description	Left Bank Riparian Zone	Right Bank Riparian Zone	Ease of Bank Access to Water	Dominant Primary Substrate
A1	Bostik Rd. @ San Bernard River	Forest	Forest	Easy	Sand/Mud/Clay
B1	Dietzman-cat spring @ San Bernard River	Forest	Forest	Moderately Difficult	Sand
A2	Cat Spring @ San Bernard River	Forest	Forest	Easy/Moderatly Easy	Sand
A3	Fm 949 @ San Bernard River	Forest	Forest	Easy	Sand
A4	Sealy Rd @ San Bernard River	Forest	Forest	Easy	Sand
A5	IH 10 @ San Bernard	Forest	Forest	Easy	Silt/Sand
B2	Attwater NWR @ San Bernard River	Forest	Shrub	Easy	Sand
A6	FM 3013 @ San Bernard River	Shrub	Shrub	Easy/Moderately Easy	Sand
A7	Fm 1093 @ San Bernard River	Forest	Forest	Easy	Sand
A8	SH 60 @ San Bernard River	Forest	Forest	Easy/Moderately Easy	Sand
B3	Tichacek-East Bernard @ San Bernard River	Forest	Forest	Moderately Difficult	Sand
A9	US90A @ San Bernard River	Forest	Forest	Moderately Easy	Sand/Mud/Clay
B4	Smith-East Bernard @ San Bernard River	Forest	Forest	Easy	Sand
A10	FM 2919 @ San Bernard River	Forest	Forest	Moderately Easy	Sand/Mud/Clay
B5	Boettcher-East Bernard @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay
A11	US 59 @ San Bernard River	Forest	Forest	Moderately Easy/Difficult	Silt/Mud/Clay
A12	Roberts Ln. @ San Bernarard River	Forest	Forest	Easy	Sand/Mud/Clay
B6	Archer-East Bernard @ San Bernard River	Forest	Mowed/Maintained	Easy	Mud/Clay
B7	Vallet-Needville @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay
A13	Tierra brande Dr. @ San Bernard River	Forest	Forest	Moderately Easy/Difficult	Mud/Clay
A14	FM 442 @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay
B8	Henning-Boling @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay
B9	Moore-Guy @ San Bernard River	Forest	Forest	Moderately Difficult	Mud/Clay
A15	San Bernard Dr @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay
A16	FM 1301 @ San Bernard River	Forest	Forest	Moderately Easy/Difficult	Mud/Clay
A17	FM 1469 @ San Bernard River	Forest	Forest	Moderately difficult	Sand/Mud/Clay
A18	Linnett Rd. @ San Bernard River	Forest	Forest	Moderately Easy	Mud/Clay

Table 8. Recreational uses observed and interviewed documented by number of observed occurrences for the San Bernard River Above Tidal (Segment 1302) collected during the Comprehensive RUAA.

Types of recreation		Field Survey Observations	Interviews			Total
			Personal Use	Witnessed	Hearsay	
1°	Swimming		17	14	11	**42**
	Wading - Children		6	3	5	**14**
	Tubing		3			**3**
	Water Skiing		2	2	1	**5**
2°	Wading - Adults		8	4	5	**17**
	Rafting		1	1	2	**4**
	Boating	2	6	13	10	**31**
	Kayaking/Canoeing	2	18	25	18	**63**
	Fishing	7	35	51	46	**139**
Non	Hunting		7	7	13	**27**
	Trapping		2	3	2	**7**
	Walking/Hiking	1	3	2		**6**
	Jogging/Running	1	1			**2**
	Fossil Hunting				1	**1**
	Motorcycle/ATV			4		**4**
	Horseback Riding			1		**1**
	Camping		2	1		**3**
	Wildlife Watching		1	2	3	**6**
	Photography			1		**1**
	Standing/Sitting	5	1	1		**7**

Observed Recreational Uses on the San Bernard River, Above Tidal

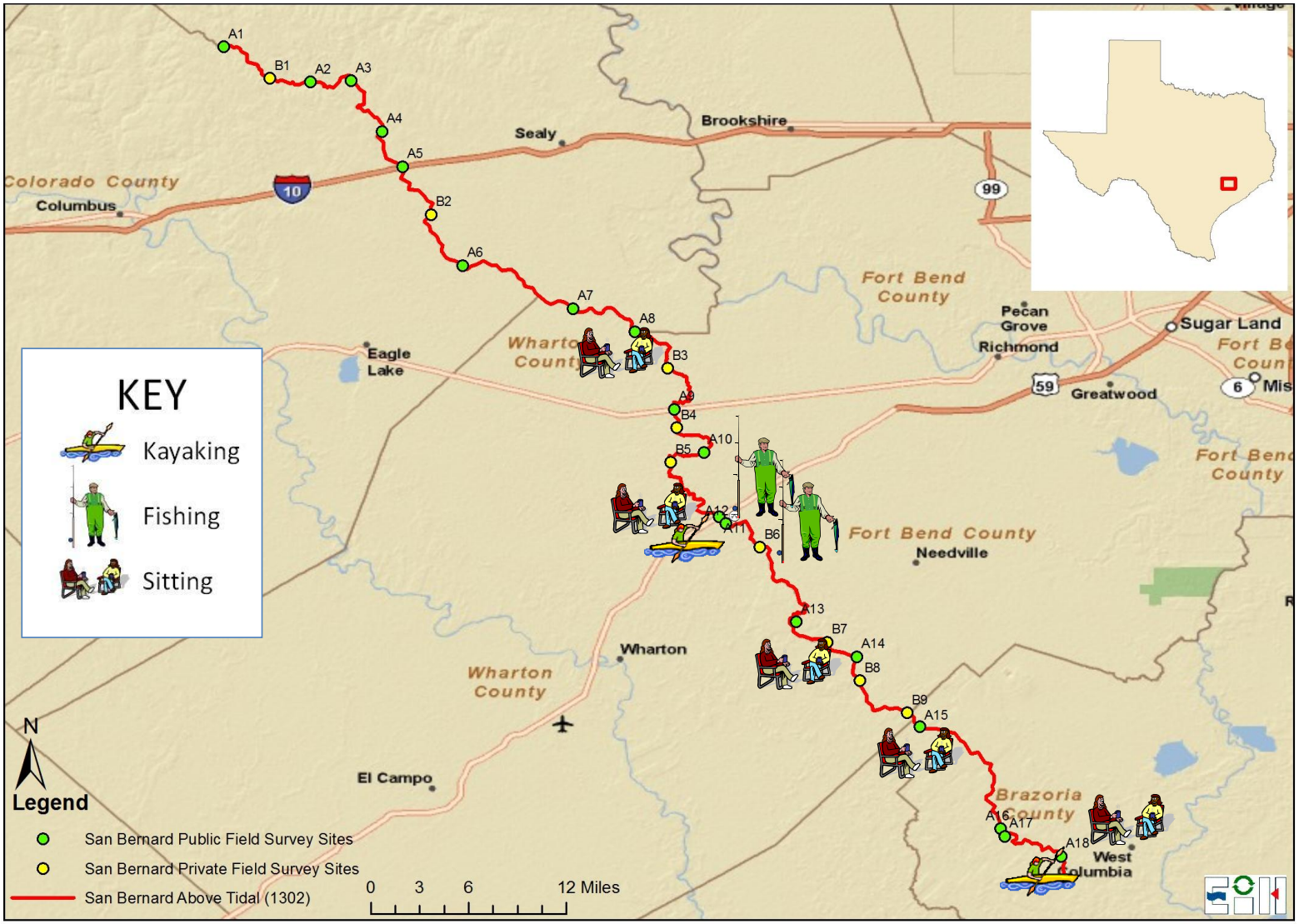

Figure 14. Comprehensive RUAA survey sites on the San Bernard River Above Tidal (Segment 1302) selections based on river mile/assessment units, accessibility, and recreational features. Constructed from field observations. Locations are approximate. See Appendix 8-A for an interactive Google Earth map depicting exact locations of uses, impediments, and evidence.

Table 9. Impediments, evidence of recreational uses, observed recreational uses, and interviewed documented uses by site on the San Bernard River Above Tidal (Segment 1302) for the Comprehensive RUAAs by location. (Table Continued on next page)

Site #	Description	Impediments	Evidence	Observed	Personal Use	Witnessed Use	Hear-say Use
A1	Bostik Rd @ San Bernard River	Fence, Steep slopes, Thick vegetation, Culverts, Private property					
NA	End of Dunlavy Rd (Ellison)				Swimming, Fishing, Wading-Children, Wading-Adults	Fishing	Wading-Children, Wading-Adults, Hunting
B1	Dietzmann - Cat Spring @ San Bernard River	Steep slopes, Thick vegetation, Private property, Fence, Low water crossing	Trails/paths		Swimming, Fishing, Hunting, Wading-Children, Wading-Adults	Fishing, Hunting, Wading-Children	Fishing, Hunting, Trapping, Wading-Children, Wading-Adults
A2	Cat Spring @ San Bernard River	Private property, Steep slopes, Thick vegetation	RV/ATV tracks, Graffiti		Swimming, Tubing, Fishing, Wading-Children, Wading-Adults	Swimming, Tubing, Wading-Children	Swimming, Tubing
A3	FM 949 @ San Bernard River	Fence, Thick vegetation, Private property, Steep slopes	RV/ATV tracks				
A4	Sealy Rd. @ San Bernard River	Debris in channel, Thick vegetation, Low bridge, Private property, Fence			Swimming, Wading-Children	Swimming, Sitting, Wading-Children, Fishing	Swimming, Fishing
A5	IH10 @ San Bernard River	Steep slopes	Chair				
B2	Attwater NWR @ San Bernard River	Fence, Private property				Bird watching, Photography	Wading-Adults
A6	FM 3013 @ San Bernard River	Fence, No trespass sign, Private property, Steep slopes	Foot paths/prints, Graffiti, Fishing tackle, Unimproved parking lot				Kayaking, Canoeing
NA	Kaechele Ranch (Recon #10)					Fishing, ATV riding, Hiking, Wading-Adults	
A7	FM1093 @ San Bernard River	Fence, Private property	Trails/paths, RV/ATV tracks, Fire pit/ring, Shotgun shells				
NA	Parma-Brandt Rd (Turner)					ATV riding, Horseback Riding	
A8	SH60 @ San Bernard River		Trails/paths, RV/ATV tracks, Fire pit/ring, Fishing tackle	Standing	Kayaking, Fishing, Wading-Children, Wading-Adults	Kayaking, Fishing, Canoeing, Wading-Adults, Swimming	Fossil-hunting
NA	End of Wharton CR 268 (Minks)				Fishing, Boating, Camping		
B3	Tihacek - East Bernard @ San Bernard River	Fence, Private property, No trespass sign, Log jam	Trails/paths, Deer stand				
NA	Sycamore Circle (Rives)					Fishing	Fishing
A9	US90A @ San Bernard River	Rip rap, Debris in channel, Log jam	Fire pit/ring, RV/ATV tracks, Graffiti, Foot paths/prints		Swimming, Fishing, Hunting	Fishing, Hunting, Motorcycle riding	Fishing
B4	Smith - East Bernard @ San Bernard River	Steep slopes, Downed trees, Debris in water, Private property	Trails/paths, Foot paths/prints		Fishing, Hunting, Wading-Children, Wading-Adults	Fishing, Hunting, Wading-Children, Wading-Adults	Hunting, Fishing, Wading-Adults, Wading-Children
NA	End of Hargis St (Recon #14)				Fishing	Fishing	Hunting
A10	FM2919 @ San Bernard River	Steep slopes, Thick vegetation, Log jam	Foot paths/prints, Fishing tackle				
B5	Boettcher - East Bernard @ San Bernard River	Private property, Fence, Thick vegetation, Log jam	Foot paths/prints				
NA	County Road 208 (Hlavinka)				Canoeing		

Table 9. Cont. Impediments, evidence of recreational uses, observed recreational uses, and interviewed documented uses by site on the San Bernard River Above Tidal (Segment 1302) for the Comprehensive RUAAs by location.

Site #	Description	Impediments	Evidence	Observed	Personal Use	Witnessed Use	Hear-say Use
A11	US59 @ San Bernard River	Steep slopes, Thick vegetation, Rip rap, Downed trees, Log jam	Unimproved parking lot, Fishing tackle		Fishing, Boating, Kayaking, Canoeing	Fishing, Boating, Kayaking, Canoeing	Fishing, Boating, Kayaking, Canoeing
A12	Roberts Ln @ San Bernard River	No swimming or motorized boats sign	Boat ramp, Playgrounds, Trails/paths, Unimproved parking lot, Paved parking lot, Docks, Park, Foot paths/prints, Fire pit/ring, Fishing tackle	Standing, Fishing, Boating, Kayaking, Jogging/Running	Standing, Fishing, Boating, Kayaking, Canoeing, Jogging/Running, Bird watching, Hiking	Fishing, Boating, Kayaking, Canoeing, Swimming, Bird watching, Hiking	Fishing, Boating, Kayaking, Canoeing, Swimming, Bird watching, Hiking
NA	USFWS Otto Tract				Hiking		
B6	Archer - East Bernard @ San Bernard River	Thick vegetation, Soft sediment Private property, Steep slopes, Debris in water			Swimming, Fishing, Canoeing, Wading-Adults	Fishing, Canoeing	Swimming, Fishing, Wading-Adults, Hunting
B7	Vallet - Needville @ San Bernard River	Steep slopes, Debris in water, Private property, Log jam, No trespass sign	Foot paths/prints				
A13	Tierra Grande Dr @ San Bernard River	Steep slopes, Thick vegetation, Downed trees, Wildlife, Private property	Park, Picnic tables, Rope swing, Foot paths/prints, RV/ATV tracks, Fire pit/ring, Fishing tackle, Deer stand		Swimming, Kayaking, Fishing, Trapping, Canoeing, Hunting,	Fishing Canoeing	Swimming, Kayaking, Fishing, Trapping, Canoeing, Rafting, Boating
A14	FM442 @ San Bernard River	Steep slopes, Debris in water, Log jam, Rip rap, Thick vegetation, Fence, Downed trees	Rope swing, Trails/paths, Unimproved parking lot, RV/ATV tracks, Fire pit/ring, Foot paths/prints		Fishing, Swimming, Tubing, Trapping, Canoeing, Hunting, Wading-Adults	Fishing Swimming, Trapping, Hunting, Kayaking	Fishing, Swimming, Trapping, Hunting, Kayaking
B8	Henning - Boling @ San Bernard River		Foot paths/prints, Raft hanging from tree				
NA	New Gulf Reservoir pump station (Hubenak)				Hiking		
B9	Moore - Guy @ San Bernard River	Private property, Steep slopes, Thick vegetation, Log jam					
A15	San Bernard Dr @ San Bernard River	Downed trees, Soft sediment, Private property, No trespass sign, Steep slopes, Fence, Log jam,	Make-shift boat slide, John boat, Trails/paths, Foot paths/prints, Fishing tackle, Unimproved parking lot, chair	Standing			
A16	FM1301 @ San Bernard River	Steep slopes, Thick vegetation, Downed trees, No trespass sign, Fence, Rip rap, Debris in water, Private property	RV/ATV tracks, Fishing tackle, Trails/paths, Foot paths/prints, John boat		Swimming, Tubing, Fishing, Water skiing, Boating		
A17	FM1469 @ San Bernard River	Private property, Steep slopes, Thick vegetation	Trails/paths, Rope swing, Fire pit/ring, Platform/tree house, Foot path/prints, Children's toys		Fishing, Swimming	Boating, Swimming, Fishing	Fishing, Boating, Swimming
NA	Webb (5mi above saltwater dam)					Fishing	
NA	Camp Karankawa (Recon #28)				Fishing		
A18	Linnett Rd @ San Bernard River	Steep slopes, Fence, Private property, Thick vegetation, No trespass sign, Log jam, Rip rap	Trails/paths, Make-shift boat slide, Rope swing, Foot paths/prints, John boat, Fishing tackle, Fire pit/ring	Kayaking	Kayaking	Fishing, Boating	Swimming
NA	End of Brazoria CR 791 (Recon #30)				Fishing	Boating, Swimming	

Summary

Twenty seven sites were surveyed on the San Bernard River Above Tidal as part of this RUAA to evaluate whether the existing recreational uses of the segment might be different than the current presumed recreational uses. Important data collected in this RUAA included general stream characteristics, observations and evidence of recreational use, and surrounding conditions that promote or impede recreation.

While the San Bernard River Above Tidal had several impediments to recreational use, such as private property, steep slopes, thick vegetation, log jams, debris in water, and rip rap, the RUAA documented a variety of recreation activities. The most common recreation activity was kayaking. This was observed during field surveys, cited by interviewees, and evidence of boating was encountered at several survey sites. Fishing, kayak/canoeing, and swimming were the most commonly reported recreational uses by interviewees. The average thalweg depth in the river was >0.9 meters and the average flow value for all the survey sites on this segment was 8.5cfs. One public and two private recreation areas in the form of maintained parks were found as part of this RUAA. RUAA summary analysis indicates that primary contact, secondary contact (1 & 2), and non-contact recreation activities occur on the San Bernard River Above Tidal (Segment 1302).

Gum Tree Branch RUAA Results

The 15 miles of Gum Tree Branch were evaluated using a total of three field surveys. Field survey visits were completed on May 15th and 21st, 2011. All field data sheets are attached (Appendix 2).

Physical Evaluation and Flow

During the RUAA surveys, the air temperatures fell within the range of acceptable temperatures for sampling described in the TCEQ procedures manual (Table 10). The average thalweg depth of Gum Tree Branch was 0.56 meters and the average width was 6.4 meters. The average Secchi Tube reading taken at the field survey sites was 0.13 meters (Table 10). The average flow for the waterbody based on measurements taken at accessible sites was 10.9cfs. The stream type recorded at site one was intermittent with perennial pool and at site two and three it was perennial. Gum Tree Branch riparian zone was categorized as row crop, shrub dominated corridor, and forested from site 1 to site 3, respectively (Table 11). The dominant substrate throughout the waterbody was generally composed of mud/clay.

Surrounding Conditions that Impede Recreation and Channel Obstructions

Impediments to stream recreation and channel obstructions on Gum Tree Branch were recorded at the field survey site visits and include: debris, private property, steep slopes, fences, culvert, and wildlife. Gum Tree Branch has very limited public access due to the privately owned land surrounding the waterbody. A complete listing of the documented stream recreational use impediments and their locations can be found in Table 12, and Appendix 8-B.

Recreational Uses

Throughout the reconnaissance as well as field survey site visits, no recreational use of Gum Tree Branch was documented. A deer blind, as well as, bullet casings were observed at field survey site 3. Water depth and ease of bank access at all three sites along Gum Tree Branch do not physically restrict the potential for recreational use on this waterbody.

Interviews

During the Basic RUAA on Gum Tree Branch (1302A), a total of two individuals completed an interview form, neither of which reported any recreational use on the waterbody.

There were no recreational uses observed by field staff, and there was no evidence of recreational use observed during the field surveys. Please see Appendix 8, an electronic supplement for the complete depiction of the observed uses, evidence of uses, interviewed uses in the form of personal uses, witnessed use, and hear-say use, and impediments.

Table 10. Average physical parameters from the basic RUAA field surveys conducted on Gum Tree Branch (1302A)

Site #	Site Description	Air Temp (°C)	Water Temp(°C)	Secchi (m)	Average Depth (m)	Average Width (m)	Stream Flow (cfs)
1	Hunt Rd. @ Gum Tree Branch	30.0	26	NA	0.54	2.1	0.00
2	CR 271B @ Gum Tree Branch	23.0	20	0.15	0.63	10.0	11.47
3	CR 252 @ Gum Tree Branch	22.5	20	0.11	0.50	7.0	21.17
	Total Average	**25.2**	**22**	**0.13**	**0.56**	**6.4**	**10.88**

Table 11.Physical Characteristics of Riparian Zone and Dominant Substrate of the field survey sites sampled during the basic RUAA on Gum Tree Branch (1302A)

Site #	Site Description	Stream Type	Left Bank Riparian Zone	Right Bank Riparian Zone	Ease of Bank Access	Dominant Primary Substrate
1	Hunt Rd. @ Gum Tree Branch	Intermittent w/ perennial pools	Row Crops (rice fields)	Row Crops (rice fields)	Easy	Mud/Clay
2	CR 271B @ Gum Tree Branch	Perennial	Shrub-Dominated corrdidor	Shrub-Dominated corrdidor	Easy	Mud/Clay
3	CR 252 @ Gum Tree Branch	Perennial	Forest	Forest	Easy	Mud/Clay

Table 12. Impediments and evidence of recreational uses by site on Gum Tree Branch (1302A) for the basic RUAA by location.

Field Survey Site #	Description	Impediments	Evidence
1	Hunt Rd @ Gum Tree Branch	Wildlife (alligators), Stagnant pooled water, private property, culvert	
2	CR271 B @ Gum Tree Branch	Fence, Steep slopes, Low water bridge, Debris in water, Garbage, Wildlife (snakes)	
3	CR252 @ Gum Tree Branch	Steep slopes, Thick vegetation, Debris in water, Wildlife (snakes), Garbage	Deer blind, Bullet casings

Summary

Three sites were surveyed on Gum Tree Branch as part of this RUAA to evaluate whether the existing and/or attainable recreational uses of the waterbody might be different than the current presumed recreational uses. Important data collected in this RUAA included general stream characteristics, observations and evidence of recreational use, and surrounding conditions that promote or impede recreation.

Gum Tree Branch had several impediments to recreational use such as debris, private property, steep slopes, fences, culvert, and wildlife. There was no active recreational use, nor any evidence of recreational use observed during the field surveys. The thalweg depth on average was 0.56 meters and the average flow value for all the survey sites was 10.88cfs. RUAA summary analysis indicates that with the limited information collected as part of this basic RUAA no recreation activities occur on Gum Tree Branch (1302A).

West Bernard Creek RUAA Results

The 40 miles of West Bernard Creek were evaluated using a total of 17 field surveys. Field survey visits were completed between May 7th and 14th, 2011. All field data sheets are attached (Appendix 2).

Physical Evaluation and Flow

During the RUAA surveys, the air temperatures fell within the range of acceptable temperatures for sampling described in the TCEQ procedures manual (Table 13). The average thalweg depth of West Bernard Creek was 0.7 meters and the average width was 10.2 meters. The average secchi tube reading taken at the field survey sites was 0.2 meters (Table 13). The average flow for the waterbody based on measurements taken at accessible sites was 28.8cfs. The most common stream type recorded throughout the waterbody was either perennial or intermittent with perennial pools recorded at sites 1 and 2. West Bernard Creek riparian zone can be generally categorized as forested (Table 14). The dominant substrate throughout the waterbody was generally composed of mud/clay.

Surrounding Conditions that Impede Recreation and Channel Obstructions

Impediments to stream recreation and channel obstructions on West Bernard Creek were recorded at the field survey site visits and include: steep slopes, fences, thick vegetation, debris in channel, log jams, and wildlife. A complete listing of the documented stream recreational use impediments and their locations can be found in Table 16, and Appendix 8-C.

Recreational Uses

There was only one recreational use observed during the field surveys, which occurred at site 14 and involved a father and son driving up to the site to check their jug lines (Table 15). Various evidence of recreation was recorded on the downstream portion of the waterbody. Fishing tackle was found at five of the field survey sites. Foot paths/prints were documented at three of the field survey sites.

Interviews

During the basic RUAA on West Bernard Creek (1302B), a total of 86 information packets were mailed to landowners with property adjacent to the waterbody. In these information packets, interview forms were included. Interviews were also solicited at field survey sites and at the public meeting. A total of 11 interviews were completed. Of the 11, one interview was completed in person at field survey site 14; while the rest were mailed into UHCL. A total of nine of the 11 interviewed answered yes to the question "Are you familiar with West Bernard Creek?" Of those, six had personally used the stream for recreation, four had observed recreation activities, and four had heard about recreation on West Bernard Creek.

The types of recreational uses documented by interviews included the following primary contact recreation activities: swimming, tubing, and wading-children (Table 15 & 16). Secondary contact uses documented by interviews included: wading-adults, boating, kayaking, and fishing. Non-contact uses included: trapping and hunting. Please see Appendix 8, an electronic supplement for the complete depiction of the observed uses, evidence of uses, interviewed uses in the form of personal uses, witnessed use, and hear-say use, and impediments.

Table 13. Average physical parameters from the basic RUAA field surveys conducted on West Bernard Creek (1302B) * = average width and depth of pools.

Site #	Site Description	Air Temp (°C)	Water Temp (°C)	Secchi (m)	Average Depth (m)	Average Width (m)	Stream Flow (cfs)
1	US90 at West Bernard Creek	29.0	19.5	0.30	0.13	2.2	0.01
2	FM1093A at West Bernard Creek	29.0	21.0	0.15	* 0.14	* 19	0.00
3	Little Public Road at West Bernard Creek	30.5	20.3	0.18	0.23	5.0	0.48
4	FM1093 B at West Bernard Creek	32.0	24.0	0.13	0.26	2.8	1.30
5	Colorado CR211 at West Bernard Creek	33.0	26.0	0.22	0.40	4.2	5.01
6	CR277 at West Bernard Creek	28.0	25.0	0.47	0.30	4.7	5.14
7	CR279 at West Bernard Creek	31.0	23.0	0.32	0.42	4.0	2.64
8	US90B @ West Bernard Creek	29.0	24.0	0.52	0.41	4.5	3.47
9	CR 252 @ West Bernard Creek	29.0	24.0	0.05	0.65	10.0	14.35
10	CR 254 @ West Bernard Creek	33.0	26.0	0.13	0.72	9.5	19.68
11	CR 211A @ West Bernard Creek	32.0	26.0	0.01	0.82	11.0	29.33
12	CR 213 @ West Bernard Creek	31.1	22.0	0.13	>1.4	49.0	36.83
13	CR 215 @ West Bernard Creek	27.8	21.5	0.09	1.07	10.0	36.83
14	SH 60 @ West Bernard Creek	28.3	21.0	0.09	1.04	15.0	113.10
15	US 183 @ West Bernard Creek	25.1	21.5	0.12	1.14	10.0	79.28
16	CR 125 @ West Bernard	22.1	21.5	0.01	1.07	10.0	79.28
17	Boyett Drive @ West Bernard Creek	20.5	21.5	0.07	1.26	11.0	62.17
	Total Average	**28.8**	**22.8**	**0.2**	**0.7**	**10.2**	**28.8**

Table 14. Physical Characteristics of Riparian Zone and Dominant substrate of the field survey sites sampled during the basic RUAA on West Bernard Creek (1302B) ***** = Substrate type not recorded (sampler error), mud/clay likely substrate type from site pictures and survey crew recollection.

Site #	Site Description	Left Bank Riparian Zone	Right Bank Riparian Zone	Ease of Bank Access to Water	Dominant Primary Substrate
1	US90 at West Bernard Creek	Forest	Forest	Moderately easy	Mud/Clay
2	FM1093A at West Bernard Creek	Forest	Forest	Moderately easy	Mud/Clay
3	Little Public Road at West Bernard Creek	Forest	Forest	Easy	Sand
4	FM1093 B at West Bernard Creek	Forest	Forest	Moderately difficult	Mud/Clay
5	Colorado CR211 at West Bernard Creek	Forest	Pasture	Moderately easy	Silt
6	CR277 at West Bernard Creek	Forest	Forest	Moderately difficult	Mud/Clay
7	CR279 at West Bernard Creek	Forest	Forest	Moderately easy	Silt
8	US90B @ West Bernard Creek	Forest	Forest	Moderately easy	Mud/Clay
9	CR 252 @ West Bernard Creek	Forest	Forest	Moderately easy	Mud/Clay
10	CR 254 @ West Bernard Creek	Forest	Forest	Moderately easy	Mud/Clay
11	CR 211A @ West Bernard Creek	Forest	Forest	Moderately difficult	Silt; Mud/Clay
12	CR 213 @ West Bernard Creek	Forest	Forest	Moderately difficult	Mud/Clay
13	CR 215 @ West Bernard Creek	Forest	Forest	Moderately easy	Silt
14	SH 60 @ West Bernard Creek	Forest	Forest	Moderately difficult	Mud/Clay
15	US 183 @ West Bernard Creek	Forest	Forest	Moderately difficult	* Mud/Clay
16	CR 125 @ West Bernard	Forest	Forest	Moderately difficult	Mud/Clay
17	Boyett Drive @ West Bernard Creek	Forest	Forest	Moderately difficult	Mud/Clay

Table 15. Recreational uses observed and interviewed documented by number of observed occurrences for West Bernard Creek (1302B) collected during the basic RUAA.

Types of recreation		Field Survey Observations	Interviews			Total
			Personal Use	Witnessed	Hearsay	
1°	Swimming		3	2	2	**7**
	Tubing		1	1	1	**3**
	Wading - Children		1			**1**
2°	Wading - Adults		4	2	2	**8**
	Boating		1	1	1	**3**
	Kayaking/Canoeing		2	1	1	**4**
	Fishing		6	4	4	**14**
Non	Hunting		3	2	3	**8**
	Trapping		1	1	1	**3**
	Standing/Sitting	1				**1**

Table 16. Impediments, evidence of recreational uses, observed recreational uses, and interviewed documented uses by site on West Bernard Creek (1302B) for the basic RUAA by location.

Field Survey Site #	Description	Impediments	Evidence	Observed	Personal Use	Witnessed Use	Hear-say Use
1	US90 @ West Bernard Creek	Algal film on water surface, Thick vegetation, Fence, Rip rap, Low bridge, Steep slopes					
2	FM1093 A @ West Bernard Creek	Thick vegetation, Low bridge					
3	Little Public Rd @ West Bernard Creek	Steep slopes, Thick vegetation, Debris in channel, Log jam, Low bridge, Wildlife					
4	FM1093 B @ West Bernard Creek	Steep slopes, Thick vegetation, Log jam, Wildlife					
5	Colorado CR211 @ West Bernard Creek	Culvert, Fence, Log jam, Steep slopes, Private property					
6	CR277 @ West Bernard Creek	Private property, Fence, Steep Slope, Thick vegetation, Log jam, Dead goat in water					
7	CR279 @ West Bernard Creek	Fence, Thick vegetation, Debris in channel, Log jam, Utility pipe					
8	US90 B @ West Bernard Creek	Steep slopes, Thick vegetation, Fence, Log jam, Private property, Debris in channel					
9	CR252 @ West Bernard Creek	Thick vegetation, Steep slopes, Debris in channel, Fence, Log jam	Foot paths/prints				
NA	Niedziejko Property				Fishing, Hunting, Wading-Adults		
10	CR254 @ West Bernard Creek	Log jam, Wildlife, Steep slopes	Fire pit/ring, Fishing tackle, Graffiti, Gun Shells, Fishing				
11	Wharton CR211 A @ West Bernard Creek	Thick vegetation, Fence, Private property, Steep slopes	Foot paths/prints, Fire pit/ring, RV/ATV tracks				
12	CR213 @ West Bernard Creek	Fence, Debris in channel, Rip rap, Steep slopes, Wildlife, Private property	Fishing tackle				
13	CR215 @ West Bernard Creek	Steep slopes, Thick vegetation					
14	SH60 @ West Bernard Creek	Steep slopes, Thick vegetation, Debris in channel, Fence, Private property	Fishing tackle	Sitting	Swimming, Tubing, Kayaking, Fishing, Boating, Trapping, Hunting, Wading-Adults	Swimming, Tubing, Kayaking, Fishing, Boating, Trapping, Hunting, Wading-Adults	Swimming, Tubing, Kayaking, Fishing, Boating, Trapping, Hunting, Wading-Adults
15	US183 @ West Bernard Creek	Thick vegetation, Rip rap, Steep slopes, Fence, Channel obstruction, Wildlife, Dead cow in water					
16	CR225 @ West Bernard Creek	Steep slopes, Fence, Private property, No trespass sign, Dead Calf in water	Fishing tackle, Shotgun shell		Swimming, Kayaking, Fishing, Hunting, Wading-Children, Wading-Adults	Swimming, Fishing, Hunting, Wading-Adults	Swimming, Fishing, Hunting, Wading-Adults
17	Boyett Drive @ West Bernard Creek	Steep slopes, Thick vegetation, Rip rap	Camping sites, Fishing tackle, Shotgun shell, Foot paths/prints				

Summary

Seventeen sites were surveyed on West Bernard Creek as part of this RUAA to evaluate whether the existing and/or attainable recreational uses of the waterbody might be different than the current presumed recreational uses. Important data collected in this RUAA included general stream characteristics, observations and evidence of recreational uses, and surrounding conditions that promote or impede recreation.

While West Bernard Creek had several impediments to recreational use such as steep slopes, fences, log jams, and limited public access; the RUAA documented a variety of recreation activities. The most common recreation activity was fishing. This was observed during field surveys, cited by interviewees, and evidence of fishing encountered at several survey sites. Swimming, wading-children and adults, kayaking, hunting, and trapping were also reported by interviewees. Depths in the creek ranged from 0.13 meters to greater than 1.4 meters (unwadeable) and the average flow value for all the survey sites was 28.8cfs. RUAA interview summary analysis indicates that primary contact, secondary contact (1 & 2), and non-contact recreation activities occur on West Bernard Creek (1302B), while only secondary contact were documented during the field surveys.

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RUAA Summary Form

RUAA Summary San Bernard River Above Tidal

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

Name of waterbody: __*San Bernard River Above Tidal*_____
Segment No. or Nearest Downstream Segment No.: ____*1302*_____
Classified?: __*Yes*_____
County: _____*Austin, Colorado, Wharton, Fort Bend, and Brazoria*_____

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

   b. Do secondary contact recreation 1 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   c. Do secondary contact recreation 2 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   d. Do noncontact recreation activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

2. Physical Characteristics of Waterbody
   a. What is the average thalweg depth? __*>0.9*__meters

   b. Are there substantial pools deeper than 1 meter? □ yes □ no

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

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

RUAA Summary Gum Tree Branch

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

Name of waterbody: __*Gum Tree Branch*_____
Segment No. or Nearest Downstream Segment No.: ____*1302A*_____
Classified?: __*No*_____
County: _____*Colorado and Wharton*_____

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

   b. Do secondary contact recreation 1 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   c. Do secondary contact recreation 2 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   d. Do noncontact recreation activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

2. Physical Characteristics of Waterbody
   a. What is the average thalweg depth? __*0.56*__ meters

   b. Are there substantial pools deeper than 1 meter? □ yes □ no NA

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

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

RUAA Summary West Bernard Creek

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

Name of waterbody: __*West Bernard Creek*_____
Segment No. or Nearest Downstream Segment No.: ____*1302B*_____
Classified?: __*No*_____
County: _____*Colorado and Wharton*_____

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

   b. Do secondary contact recreation 1 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   c. Do secondary contact recreation 2 activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

   d. Do noncontact recreation activities occur on the waterbody?
      □ frequently □ seldom □ not observed or reported □ unknown

2. Physical Characteristics of Waterbody
   a. What is the average thalweg depth? __*0.7*__meters

   b. Are there substantial pools deeper than 1 meter? □ yes □ no NA

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

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