

Recreational Use Attainability Analysis for Black Cypress Creek (0410A) in the Cypress Creek River Basin

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Chapter 1. Introduction

Problem Statement

Black Cypress Creek (0410A) is an unclassified water body identified for assessment purposes by the Texas Commission on Environmental Quality (TCEQ). Black Cypress Creek is approximately 9 river miles long and is comprised of one assessment unit (AU). The 2022 Texas Integrated Report of Surface Water Quality (TCEQ, 2022a) defines Black Cypress Creek (0410A) as being located from the confluence with Kelly Creek upstream to FM 250 north of the City of Hughes Springs (Figure 1.1). Black Cypress Creek was first listed in 2018 and has continued to be listed as impaired for bacteria on the 2022 Texas 303(d) list. There are no additional impairments for Black Cypress Creek. The Texas Integrated Report of Surface Water Quality (TCEQ, 2022a) includes the Texas 303(d) list of impaired water bodies and is available online dating back to 1992.

Black Cypress Creek (0410A) has a presumed use of primary contact recreation based on the Texas Surface Water Quality Standards (TSWQS) (TCEQ, 2010). Prior to June 2010 only two categories of recreation use, contact and noncontact, existed in Texas. In June 2010, the TCEQ adopted revisions to the TSWQS that expanded the designation of contact recreation into three categories (primary contact recreation, secondary contact recreation 1, and secondary contact recreation 2) based on varying degrees of interaction with the water, while maintaining a fourth category of noncontact recreation. These revisions were codified in the Texas Administrative Code (TAC), Title 30 Chapter 307 and became effective as a state rule on July 22, 2010 (TCEQ, 2010). On February 12, 2014, TCEQ adopted a fourth designation of contact recreation, primary contact recreation 2. As a result of these revisions to the TSWQS, all water bodies listed as impaired based on bacteria for contact recreation are scheduled to undergo a standards review to determine if primary contact recreation is appropriate or if a revision to the use category for recreation should be considered.

Use attainability analyses (UAAs) are studies to evaluate the designated or presumed uses of a water body. To identify and assign attainable uses and criteria to individual water bodies, UAAs evaluate physical, chemical, biological, and economic factors affecting use attainment of a water body (40 Code of Federal Regulations §131.10(g)). A recreational use attainability analysis (RUAA) is a specific type of UAA focused on determining the appropriate recreational use category of a water body, the findings of which are presented within this report for Black Cypress Creek (0410A).

There is one wastewater discharge facility, but no concentrated animal feeding operations are located in the Black Cypress Creek watershed.

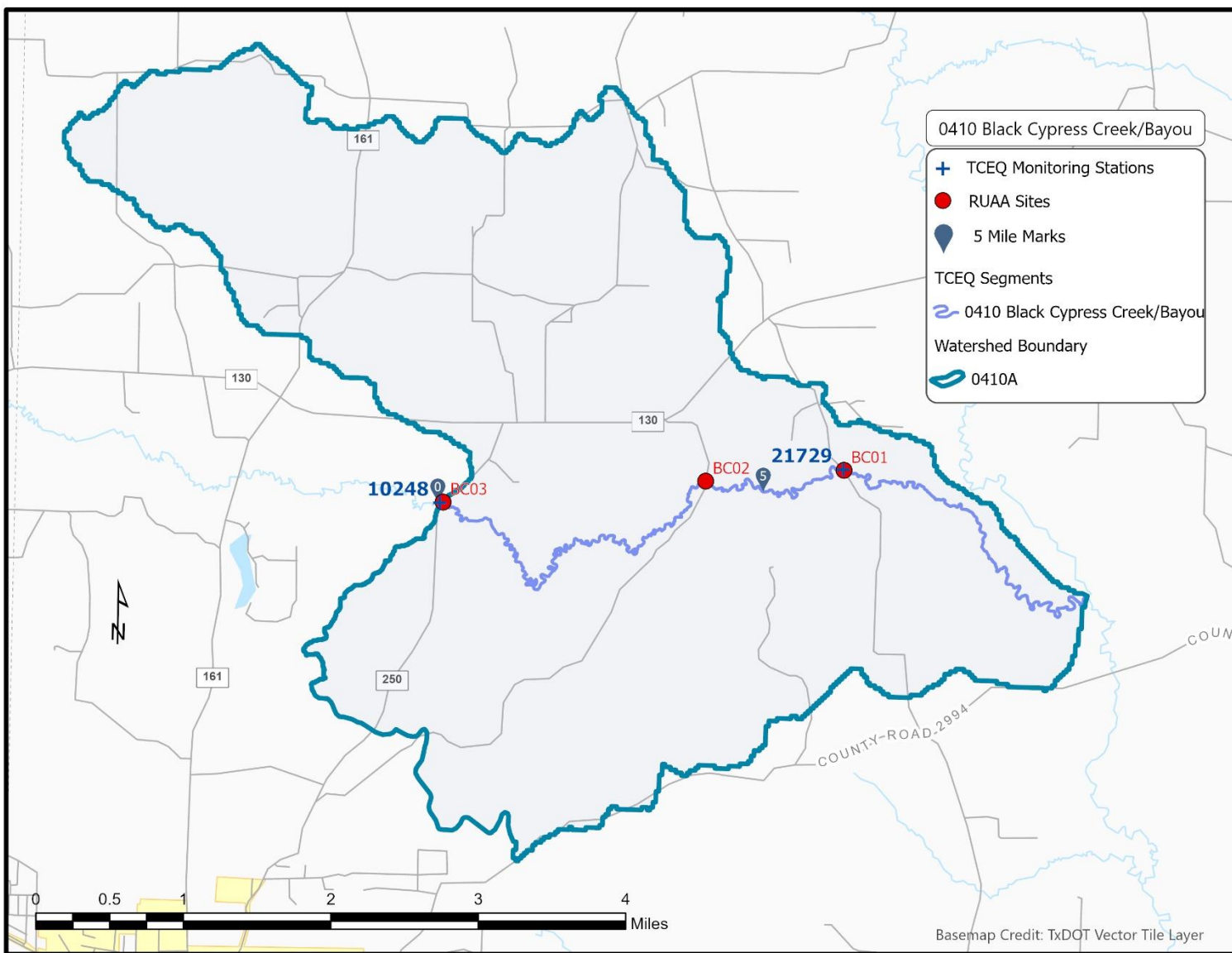


Figure 1.1 Watershed of Black Cypress Creek (0410A)

Objectives

The objective of this report is to present the findings of a Comprehensive RUAA for Black Cypress Creek following the TCEQ March 2014 Procedures for a Comprehensive RUAA and a Basic RUAA Survey (TCEQ, 2014b). An RUAA consists of three parts: field surveys to document water body characteristics and signs of recreation, interviews with stakeholders regarding past and current use of the water body, and a historical review regarding recreational use of the water body. All components of this RUAA were performed by Texas Institute for Applied Environmental Research (TIAER), which is located on the campus of Tarleton State University in Stephenville, Texas. Field surveys and interviews for the RUAA were conducted under a Texas Commission on Environmental Quality (TCEQ) approved Quality Assurance Plan (QAP; TIAER, 2022).

Stakeholder and Agency Involvement

The TCEQ and its collaborating entities maintain an inclusive public participation process. From the inception of this project, the project team sought to ensure that stakeholders were informed and involved. TIAER provided coordination for public participation for this project.

Input from the TCEQ regional staff, United States Geological Survey regional staff, Texas Parks and Wildlife Department (TPWD) regional staff, and other local agencies was solicited as well as input from watershed stakeholders on the need for the RUAA (see Contact Information Form available on the project website noted below).

Meetings with state agencies, river authority representatives, local officials, and stakeholders were held to give an overview of water quality issues within Black Cypress Creek watershed and to obtain comments on proposed survey sites prior to field data collection. Meetings targeted local and state agencies as well as stakeholders in an effort to inform them of the assessment of water quality within Black Cypress Creek and the need for an RUAA.

A public meeting focusing specifically on the RUAA was held at the Northeast Texas Municipal Water District located in Daingerfield, Texas on May 24, 2022. At this meeting input was sought on the proposed sampling sites for the Black Cypress RUAA. Attendees provided information regarding activities that typically occur within the watershed and offered assistance in accessing the stream via privately owned property.

A final public meeting occurred on June 19, 2023 at the Northeast Texas Municipal Water District to inform stakeholders of the findings of both field surveys. The agenda for this meeting including addressing the next steps of the RUAA, inform stakeholders that the draft RUAA report was open for public review and comment, and solicit feedback. The draft report is available via the project website at <https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaascypress/>. Additionally, TIAER was to provide hard copies if desired by individuals. Unfortunately, this meeting yielded no attendees.

In an additional effort to reach stakeholder input, a second final public meeting was held virtually via Zoom on August 3, 2023. Unfortunately, again, no stakeholders attended this meeting.

Watershed stakeholders were invited to attend public meetings through mailed invitations, public announcements (TCEQ website), and individual phone calls. Information on past meetings for this RUAA, presentations, and other information, can be found on the project's website:

<https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaascypress/>

Chapter 2. Study Methodology

The process of developing a list of sites to be surveyed for the RUAA began with a reconnaissance of potential locations along each water body. A combination of Geographic Information System (GIS) data, review of historical information, and meetings, phone conversations with local entities and stakeholders were used to determine sites included in the RUAA field surveys.

Watershed Reconnaissance and Site Selection Strategy

Reconnaissance of each watershed was conducted to collect background information before selecting appropriate sites for each RUAA. To the degree possible, site reconnaissance was coordinated with watershed stakeholders in an effort to increase local landowner interest in water quality issues. The March 2014 RUAA procedures (TCEQ, 2014) recommends selecting three sites per every five miles of stream. Based on this recommendation, the preferred number of sites for Black Cypress Creek was five.

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

- Location of areas along the water body that were accessible to the public and had the highest potential for recreational use, such as road crossings and parks;
- Location of permitted wastewater outfalls and other potential point sources;
- Hydrologic characteristics, such as stream type, streamflow, and hydrologic alterations; and
- Location of city boundaries or other designated population areas.

The site selection process considered locations that were accessible to the public, had the highest potential for recreational use, and that were established TCEQ monitoring stations where historical data may have been collected. The site selection process also considered parks and bridge crossings along the river, as well as access through private lands adjacent to the river.

Survey Methods

Field Survey Data Collection Activities

As specified in the procedures for a Comprehensive RUAA (TCEQ, 2014), two separate field surveys occurred at each selected survey site during the warm season (air temperature greater than or equal to 70°F or 21°C) when human recreational activities were most likely to occur (May - September). Ideally, field surveys were to be conducted when stream flow conditions were normal. Rainfall data 30 days prior to each survey were also documented to provide antecedent conditions.

Data collection activities at each RUAA site for both field surveys included the following:

- Measurement of average depth at thalweg (deepest depth),
- Measurement of depths, lengths, and widths of substantial pools,
- Documentation of observational/anecdotal data required on the RUAA field data sheets,
- Photographs of any signs of recreation and
- Photographs of site conditions including upstream, downstream, left bank, and right bank photos at the 0-m, 150-m, and 300-m transects.

Average Depth at Thalweg and Substantial Pool Depths

Determination of thalweg and substantial pool depths is applicable to contact recreation use determination for intermittent and perennial freshwaters according to TCEQ (2014). The thalweg is defined as the deepest depth of a transect perpendicular to the stream channel. A substantial pool was defined as a pool greater than 1-m (3.28-ft) deep and 10-m (32.8-ft) long for the purposes of the RUAA survey (TCEQ, 2014).

As instructed in the RUAA procedures manual (TCEQ, 2014), a 300-m reach at each site was evaluated to determine average thalweg depth. Eleven transects at 30-m intervals were established along the reach. Transects were labeled upstream to downstream with the 300-m transect at the most upstream point of the survey and the 0-m transect being the most downstream. Thalweg was measured at each of the eleven transects. Where significant pools were encountered along the 300-m reach, depths, widths and lengths were measured and recorded. Depths, lengths and widths are presented in meters as per the RUAA procedures (TCEQ, 2014).

Observational / Anecdotal Data

Anecdotal information was recorded on field data sheets during all surveys using the field data sheets from the TCEQ-approved QAP (TIAER, 2022).

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

- Channel flow status as indicated by flow severity
- Stream type (e.g., ephemeral, intermittent, etc.)
- Riparian zone characteristics (forest, pasture, eroded banks, etc.)
- Stream accessibility
- Substrate type
- Anecdotal information related to observed human contact activities

Photographs

TIAER staff created photographic records of each site during the site surveys. Photographs were intended to clearly depict the characteristics of the channel and any evidence of observed uses or indications of human use, hydrologic modifications, etc. Photographs were taken specifically at the 0-m, 150-m, and 300-m transects (as described in the Field Data Sheets). Any items of interest, e.g., obstructions, were also

photographed. Photographs were used to document evidence of recreational use (e.g., fishing tackle) and actual recreation. Photographs were also used to document a lack of use (e.g., dry creek beds) or impediments to recreational use. In addition, as part of the overall project, photographs were taken to indicate potential bacteria sources to the water body. All photographs were labeled in a manner that indicated the date, site location, orientation to the stream, and photo's subject. Selected photos representative of each RUAA field site are included with the survey results for each water body in this report.

Chapter 3. Study Area

Description of Black Cypress Creek

Black Cypress Creek is located in Cass County in the northeastern portion of Texas. Water body 0410A is within the Cypress Creek River Basin. The small sized watershed is approximately 10,920 acres (roughly 17 square miles) with a population of 446 (USCB, 2020). The watershed is located just northeast of the city of Hughes Springs, Texas (population 1,543) (USCB, 2021).

Climatic Conditions

Annual precipitation for the Black Cypress Creek watershed was based on data obtained from the National Oceanic and Atmospheric Administration's website (NOAA, 2015) for Mount Pleasant, Texas (Station USC00416108). It is important to note that this station is not within the Black Cypress Creek watershed boundaries. However, it is the nearest station with climate data available for both precipitation and temperature. Normal precipitation (1981-2010) for Station USC00416108 averages 48.57 inches per year with a peak rainfall typically occurring in the months of March - June and September - October (Figure 3.1).

Average maximum temperatures for Station USC00416108 rise above 70°F beginning in April and ending in November (Figure 3.1). March through October are the months known as generally suitable for assessing recreational use, but only if temperatures reach above 70°F (TCEQ, 2014b).

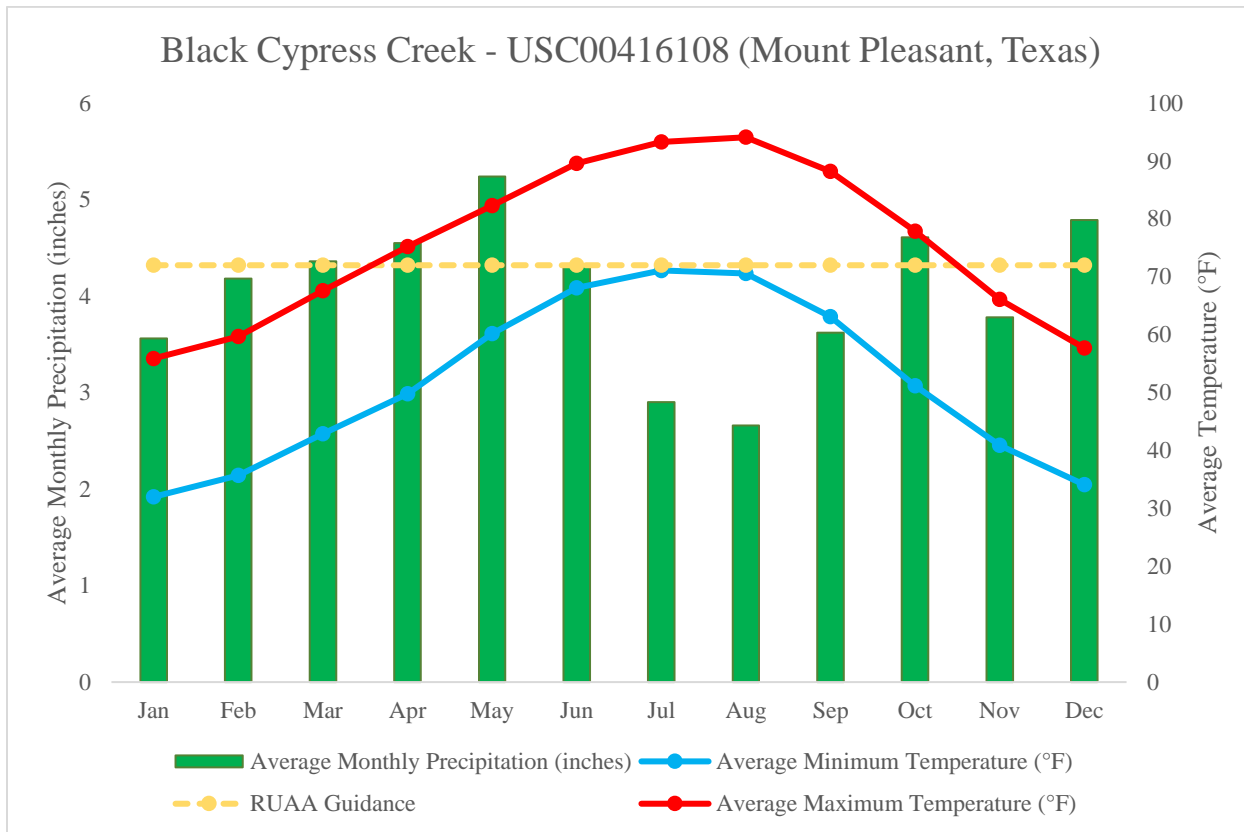


Figure 3.1 Monthly average precipitation for Mount Pleasant, Texas.

Source: NCEI (2023) based on data for 1991-2020.

Land Use and Land Cover

The Black Cypress Creek watershed lies within the Tertiary Uplands ecoregion as defined in the publication Ecoregions of Texas (Griffith et al., 2007). The dominant land cover within the Black Cypress Creek watershed is Pasture/Hay at 26.32% and is present throughout the watershed (Table 3.1 and Figure 3.2). Mixed Forest is the secondary land cover encompassing 19.24% of the Black Cypress Creek watershed.

Table 3.1 Land use/land cover classes within the Black Cypress Creek watershed.

Source: 2011 National Land Cover Database (USGS, 2016).

Class	Area (acres)	Percent (%)
Pasture/Hay	2,883	26.32%
Mixed Forest	2,107	19.24%
Evergreen Forest	2,076	18.95%
Woody Wetlands	1,399	12.77%

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Class	Area (acres)	Percent (%)
Deciduous Forest	1,161	10.60%
Shrub/Scrub	493	4.5%
Developed, Open Space	280	2.56%
Grassland/Herbaceous	209	1.91%
Developed, Low Intensity	177	1.62%
Open Water	60	0.55%
Emergent Herbaceous Wetlands	51	0.47%
Developed, Medium Intensity	34	0.31%
Developed, High Intensity	12	0.11%
Barren Land (Rock/Sand/Clay)	11	0.10%
Cultivated Crops	0	0%
TOTAL	10,955	100%

The land use/land cover for the watershed area was obtained from the National Land Cover Database (NLCD) maintained by the U.S. Geological Survey (USGS, 2019). The land use/land cover categories within the watershed are described as follows from the NLCD legend:

- Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
- Mixed Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
- Evergreen Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
- Woody Wetlands - Areas of forest of shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Deciduous Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

- Shrub/Scrub – Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- Developed, Open Space – Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot, single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- Grassland/Herbaceous – Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
- Developed, Low Intensity – Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
- Open Water – Areas of open water, generally with less than 25% cover of vegetation or soil.
- Emergent Herbaceous Wetlands – Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Developed, Medium Intensity – Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
- Developed High Intensity – Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- Barren Land (Rock/Sand/Clay) – Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
- Cultivated Crops – Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.

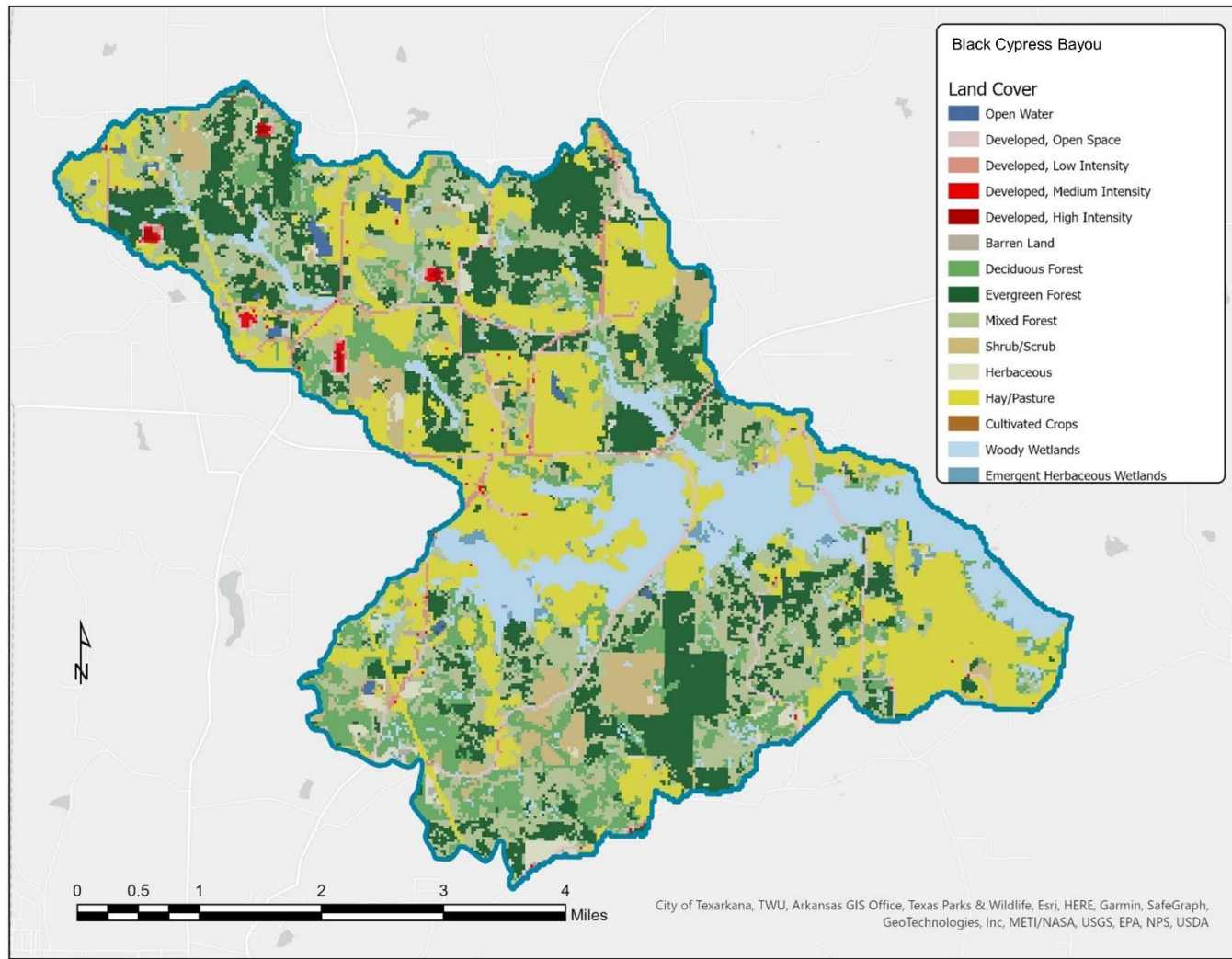


Figure 3.2 Land use and land cover of the Black Cypress Creek watershed.

Source: 2016 National Land Cover Database (USGS, 2017).

Regulated Sources

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

Wastewater Discharge Facilities

There is one municipal wastewater treatment facility (WWTF) within the Black Cypress Creek watershed. Neither WWTF discharges directly into Black Cypress Creek. The City of Hughes Springs WWTF (WQ0010415001) discharges into Hughes Creek; thence to Black Cypress Creek. The allowable permitted average daily flow is 0.75 million gallons per day (MGD).

Regulated Stormwater

The TPDES and the NPDES Municipal Separate Storm Sewer (MS4) Phase I and II rules require municipalities and certain other entities in urban areas to obtain permits for their stormwater systems. Phase I permits are individual permits for large and medium sized communities with populations exceeding 100,000, whereas Phase II permits are for smaller communities that are located within an “Urbanized Area”. An “Urbanized Area” is defined by the U.S. Census Bureau as an area with populations greater than 50,000 and with an overall population density of at least 1,000 people per square mile. Because the population of Hughes Springs does not meet this criterion, the municipality is not required to obtain a stormwater permit.

Concentrated Animal Feeding Operations

There are currently no permitted CAFOs located within the watershed of the Black Cypress Creek watershed.

Potential Unregulated Sources

Unregulated sources are typically nonpoint source in nature, meaning the pollution originates from multiple diffuse locations and is usually carried to surface waters by rainfall runoff, and the sources are not regulated by permit under the TPDES and NPDES. Potential unregulated sources include wildlife (mammals and birds), large exotics, unmanaged feral animals (e.g., feral hogs), on-site sewage facilities (OSSFs), pets, and livestock.

Non-Permitted Agricultural Activities and Domesticated Animals

Activities such as livestock grazing close to water bodies and agricultural use of manure as fertilizer can contribute *E. coli* to nearby water bodies. Livestock statistics were obtained from United States Department of Agriculture (USDA) National Agricultural Statistics Service website (USDA, 2017). While these are county level statistics and thus only a very rough estimate of livestock in the watershed (Table 3.2), these statistics indicate that chickens and cattle and calves (all beef) are the most common livestock found within the watershed.

Table 3.2 Estimated livestock numbers within the Black Cypress Creek watershed based on statistics for Cass County and adjusted for the percent of the county represented by the watershed.

Source: USDA, 2017

100% of the Black Cypress Creek watershed resides in Cass County.

County	Area (Acres)	Chickens	Cattle & Calves (all beef)	All Goats	All Sheep	Horses & Donkeys	Hogs & Pigs
Cass	877,768	2,501,946	14,390	964	153	1,662	211
Proportional Average for the Black Cypress Creek Watershed	15,588	44,432	256	17	3	30	4

Domestic pets are another unregulated source of *E. coli* bacteria, particularly dogs, because storm runoff often carries these wastes into streams (USEPA, 2009). A rough estimate of the dog and cat population can be computed assuming there are 0.614 dogs and 0.457 cats per household (AVMA, 2018). According to the 2020 census there are 187 households within the Black Cypress Creek watershed which indicates that there are potentially 115 dogs and 85 cats residing within the watershed.

Wildlife

E. coli bacteria are common inhabitants of the intestines of all warm-blooded animals, including wildlife such as mammals and birds. Wildlife are naturally attracted to riparian corridors of streams and rivers. With direct access to the stream channel, the deposition of wildlife waste can be a concentrated source of bacteria loading to a water body. Fecal bacteria from wildlife are also deposited onto land surfaces, where it may be washed into nearby streams by rainfall runoff.

Failing On-Site Sewage Facilities

Septic systems or on-site sewage facilities (OSSFs) are often used in rural areas that do not have the ability to connect to a central wastewater collection system. To estimate the number of potential OSSFs in the watershed, 911 address points outside of city boundaries and outside of any area municipal utility districts were used. Results

indicate that 4,498 households in the watershed are outside municipal areas and likely on septic systems.

Historical Information on Recreational Use

A review of historical information was performed regarding recreational water uses for the Black Cypress Creek. 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, and newspapers were searched and contacted in addition to generic internet searches. The following is a summary of the review and searches.

Government Sources

City of Hughes Springs

[City of Hughes Springs Homepage¹](#)

Search retrieved no results

Cass County

[Cass County Homepage²](#)

Search retrieved no results.

Library Sources

City of Hughes Springs Public Library

[City of Hughes Springs Public Library Homepage³](#)

Phone: (903) 639-1332

Searched online catalog. Search retrieved no results.

Social Media Sources

Hughes Springs Facebook

[Hughes Springs Facebook⁴](#)

Explored various posts and events (passed and future). Search retrieved no results.

Internet Searches

Google

[Google.com – Search for Black Cypress Creek⁵](#)

Searched Google by creek name. Search retrieved no results of recreational contact.

Chapter 4. Black Cypress Creek (0410A)

Survey Site Descriptions

Black Cypress Creek is 9 river miles long indicating a goal of 5 sites (3 sites per 5 miles of river) for the RUAA survey. TIAER was able to establish a total of 3 survey sites along Black Cypress Creek (Figure 4.1 and Table 4.1). All 3 sites were located at public road crossings.

All 3 sites allowed for public access. There was no fencing upstream or downstream of the crossings. Access to the stream between road crossings was moderately difficult due to steep banks and dense vegetation. The average distance between survey sites was 1.97 river miles with the largest gap being 4.28 river miles between Site BC01 and BC02. Sites BC01 and BC03 are co-located with TCEQ sampling stations. RUAA surveys were performed June 15, 2022 and September 20, 2022 at all locations. Landowner permission was not required to access sites at any location. A brief description of each site follows.

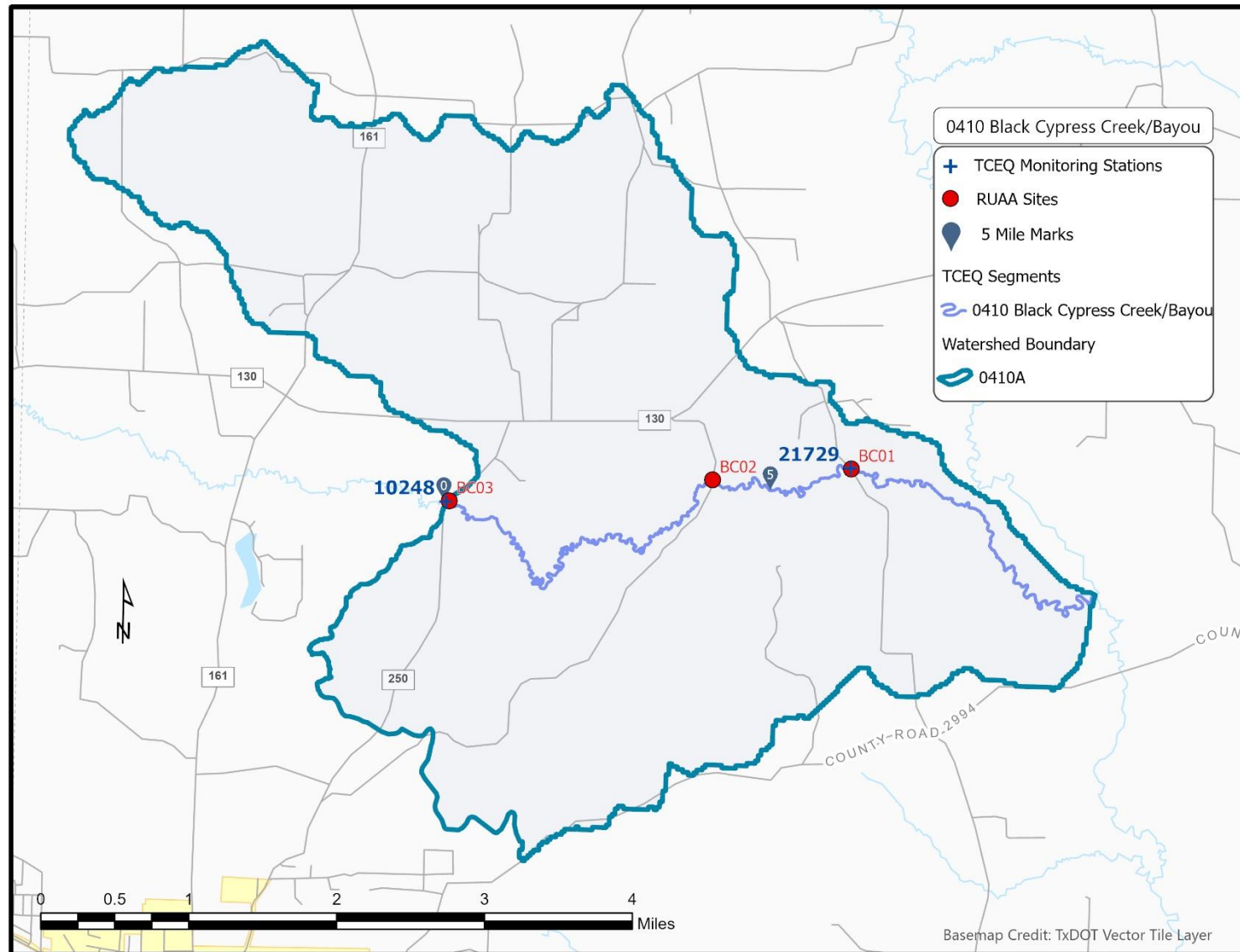


Figure 4.1 Watershed of Black Cypress Creek (0410A)

Table 4.1 Description and location of RUAA field survey sites for Black Cypress Creek, Water Body 0410A

Site ID	TCEQ ID	Site Description	Latitude	Longitude	Access
BC01	21729	BC01 located at FM 2921 in Cass County	33.05312	-94.55632	Public
BC02		BC02 located at FM 2928 in Cass County	33.05185	-94.57247	Public
BC03	10248	BC03 located at FM 250 in Cass County	33.0494	-94.60312	Public

Site BC01 is the most downstream site located on Black Cypress Creek. This site is only publicly accessible from the bridge, thus, access to complete the surveys did not require landowner permission to enter the stream. However, access beyond the bridge was private property. TIAER personnel did not have permission to walk beyond the stream banks. Due to brushy, overgrown banks, the site being located on a heavily trafficked bridge, and private property fencing beyond the bridge crossing, access to this site was moderately dangerous.

Site BC02 is located on Black Cypress Creek about 4.28 miles from site BC01. This site is publicly accessible via the road crossing on FM 2928 in Cass County. Due to very dense vegetation and steep banks, access into the stream was difficult. Landowner permission to access the stream from the road crossing was not required to complete the surveys.

Site BC03 is located on Black Cypress Creek about 1.63 miles from site BC02. This site was publicly accessible via the road crossing on FM250. Due to very dense vegetation and steep banks, access into the stream was difficult. Landowner permission to access the stream from the road crossing was not required to complete the surveys.

Field Survey Results and Discussions

General Description of RUAA Survey Sites and Conditions for Black Cypress Creek 0410A

The Black Cypress Creek RUAA surveys were conducted on June 15 and September 20, 2022 at all 3 sites. The surveys were performed on weekdays, weekends, or holidays at opportune times to observe recreational activities. Air temperatures prior to and during both the first and second surveys were above 21°C (70°F), indicated by the RUAA guidelines as warm enough to promote recreational activities (Tables 4.2 and 4.3). In the 30 days prior to the first survey, 1.01 inches of precipitation fell, while 5.63 inches fell 30 days prior to the second survey. These rainfall events did not cause a hindrance to accessing the stream. The Palmer Drought Severity Index (PDSI) indicated moderate drought (index value: -2.00 to -2.99) conditions for East Texas

during August and severe drought conditions (-3.00 to -3.99) for September (TWDB, 2022).

A summary of the RUAA field survey results is presented in the following tables:

- Table 4.4 describes the stream channel and corridor characteristics at each site.
- Table 4.5 notes the average thalweg depth by site during each survey and the access to the stream, whether public or private, and the ease of bank access.
- Tables 4.6 and 4.7 document the maximum, minimum, and average stream widths at each site for each survey and observed flow conditions.
- Tables 4.8 and 4.9 note stream aesthetics, wildlife observations and tracks, and the presence of garbage by site observed during each survey.

Physical descriptions of each site follow these tables along with selected photos showing notable characteristics of each site. All sites were at public road crossings. Overall thalweg depth averaged 0.37 m for the first survey and 0.35 m for the second survey. Access to the stream was difficult or moderately difficult at all three sites due to steep, densely vegetated banks. The dominant substrate was mud/clay and fine sediment. The majority of the stream corridor was forest with several areas lined with shrubs and pasture. The maximum stream width encountered was 8.5 m at Site BC03 during the first and second surveys. Typical stream widths ranged from 3.0 to 3.5 m at all three sites with the narrowest width of 0.8 m at BC03 during the first survey. Flow conditions appeared normal during both surveys. The water was clear in color at all sites during both surveys except Site BC01, during the first survey, where it appeared to be brown. The water surface at most sites was clear during the first survey, but had foam or scum apparent at Sites BC02 and BC03 during the second survey. Evidence of wildlife was rarely observed at sites, most commonly in the form of raccoon and hog tracks. Trash was rarely observed at most survey sites and when observed was typically plastics, aluminum cans, and bottles. No evidence of recreation was observed at any of the three survey sites.

Table 4.2 Rainfall records with maximum and minimum temperature for Longview, Texas 30 days prior to the first RUAA survey initiated on June 15, 2022

Survey dates are highlighted in gray. Weather Data from Weather Underground; station East Regional Airport Station. (Weather Underground, 2022)

Date	Daily Precipitation (in)	High Temperature (°F)	Low Temperature (°F)
May 14	0	89	71
May 15	0	89	71
May 16	0.08	90	69
May 17	0	90	70
May 18	0	92	71
May 19	0	91	73
May 20	0	93	73

Recreational Use Attainability Analysis for Black Cypress Creek (0410A) in the Cypress Creek River Basin

Date	Daily Precipitation (in)	High Temperature (°F)	Low Temperature (°F)
May 21	0	93	66
May 22	0.36	73	62
May 23	0	70	63
May 24	0.01	80	66
May 25	0.47	77	62
May 26	0	87	57
May 27	0	86	55
May 28	0	89	59
May 29	0	90	67
May 30	0	91	73
May 31	0	92	74
June 1	0	91	73
June 2	0	82	71
June 3	0	86	67
June 4	0	90	69
June 5	0	91	69
June 6	0	93	75
June 7	0	93	72
June 8	0	91	75
June 9	0.03	92	73
June 10	0	94	74
June 11	0.06	97	72
June 12	0	99	77
June 13	0	99	78
June 14	0	98	76
June 15	0	97	77

Table 4.3 Rainfall records with maximum and minimum temperature for Longview, Texas 30 days prior to the second RUAA survey initiated on September 20, 2022

Survey dates are highlighted in gray. Weather Data from Weather Underground; station East Regional Airport Station. (Weather Underground, 2022)

Date	Daily Precipitation (in)	High Temperature (°F)	Low Temperature (°F)
August 20	0	92	73
August 21	0.01	91	73
August 22	1.36	77	73
August 23	3.05	84	74
August 24	0.07	85	73

Recreational Use Attainability Analysis for Black Cypress Creek (0410A) in the Cypress Creek River Basin

Date	Daily Precipitation (in)	High Temperature (°F)	Low Temperature (°F)
August 25	0	86	72
August 26	0.02	91	73
August 27	0	91	75
August 28	0	94	76
August 29	0	89	75
August 30	0.45	87	76
August 31	0	92	73
September 1	0	91	74
September 2	0.19	84	73
September 3	0	91	73
September 4	0	88	72
September 5	0.37	91	70
September 6	0.05	92	72
September 7	0	91	72
September 8	0.06	87	71
September 9	0	87	64
September 10	0	88	63
September 11	0	88	68
September 12	0	83	62
September 13	0	85	57
September 14	0	85	57
September 15	0	86	59
September 16	0	89	62
September 17	0	89	68
September 18	0	92	71
September 19	0	94	72
September 20	0	94	70

Table 4.4 Stream channel and corridor appearance for each site sampled along Black Cypress Creek (0410A)

Site Number	Stream Channel Appearance	Dominant Substrate	Corridor Appearance	Riparian Size	Public Park	Landscape Surroundings
BC01	Natural	Mud/Clay	Forest/Shrub/Pasture	Normal	No	Forest
BC02	Natural	Mud/Clay/Sand	Forest/Pasture	Normal	No	Forest
BC03	Natural	Mud/Clay	Forest	Normal	No	Forest

Table 4.5 Thalweg depth, stream flow type, and site accessibility during the two surveys of Black Cypress Creek (0410A)

Stream flow type represents observed stream characteristics on the date of the survey. Under general access, * indicates that the site was publicly accessible at a road crossing but that further access was limited by fencing of private property. For Bank Access, E = Easy, ME = Moderately Easy, MD = Moderately Difficult, D = Difficult.

Site	Reach Length (m)	# of Transects	# of Recreational Areas at Site	Avg. Site Thalweg Depth (m) for Trip 1	Avg. Site Thalweg Depth (m) for Trip 2	Stream Flow Type Survey 1	Stream Flow Type Survey 2	General Access	Bank Access
BC01	300	11	0	0.37	0.30	Perennial	Perennial	Public*	MD
BC02	300	11	0	0.35	0.39	Perennial	Perennial	Public*	D
BC03	300	11	0	0.38	0.38	Perennial	Perennial	Public*	D

Table 4.6 Description of surveyed stream sites along Black Cypress Creek during the first survey performed on June 15, 2022

Site Number	Maximum Width (m)	Minimum Width (m)	Typical Average Width (m)	Observed Flow
BC01	6.0	1.5	3.5	Normal
BC02	6.0	1.5	3.0	Normal
BC03	8.5	0.8	3.0	Normal

Table 4.7 Description of surveyed stream sites along Black Cypress Creek during the second survey performed on September 20, 2022

Site Number	Maximum Width (m)	Minimum Width (m)	Typical Average Width (m)	Observed Flow
BC01	6.0	1.0	3.0	Normal
BC02	6.5	1.4	3.0	Normal
BC03	8.5	0.9	3.0	Normal

Table 4.8 Stream aesthetics along Black Cypress Creek during the first survey performed June 15, 2022

From Field Data Sheet - Section F: A = absent, R = rare, C = common, Ab = abundant, N = none, NW = no water, SP = slight presence, MP = moderate presence, LP = large presence.

Site	Aquatic Vegetation	Algae Cover	Odor	Color	Bottom Deposit	Water Surface	Reptiles	Water Dependent Birds	Mammals	Evidence of wildlife	Large Garbage in Channel	Small garbage in Channel	Bank Garbage
BC01	A	A	N	Brown	Fine Sediments/Mud/Clay	Clear	N	N	N	Tracks/Fecal Droppings	N	N	R
BC02	A	A	N	Brown	Mud/Clay/Sand	Clear	N	N	N	Tracks/Fecal Droppings	N	R	N
BC03	A	A	N	Brown	Mud/Clay	Clear	N	N	N	Tracks/Fecal Droppings	R	R	R

Table 4.9 Stream aesthetics along Black Cypress Creek during the second survey performed September 20, 2022

From Field Data Sheet - Section F: A = absent, R = rare, C = common, Ab = abundant, N = none, NW = no water, SP = slight presence, MP = moderate presence, LP = large presence. NA indicates not applicable because conditions were dry.

Site	Aquatic Vegetation	Algae Cover	Odor	Color	Bottom Deposit	Water Surface	Reptiles	Water Dependent Birds	Mammals	Evidence of Wildlife	Large Garbage in Channel	Small Garbage in Channel	Bank Garbage
BC01	A	A	N	Clear	Fine Sediments	Clear	N	N	N	Tracks/Fecal Droppings	N	R	N
BC02	A	A	N	Clear	Fine Sediments	Scum	N	N	SP	Tracks/Fecal Droppings	N	R	N
BC03	R	A	N	Scum	Fine Sediments	Scum	SP	N	N	Tracks/Fecal Droppings	N	R	N

Physical Description of BC01

Black Cypress Creek site BC01 was visited on June 15 and September 20, 2022. This site was located at the bridge crossing on FM 2921 in Cass County. Public access to the stream at this site was restricted at the bridge crossing due to fenced private property up to the stream banks. Access beyond the stream banks was prohibited to the general public, including TIAER personnel, due to private property fencing.

The creek at this site passes through a forest riparian zone that led directly up to the creek. Banks were steep and slippery and with thick vegetation. The general appearance of the creek at this location is shown in Figures 4.2 and 4.3.

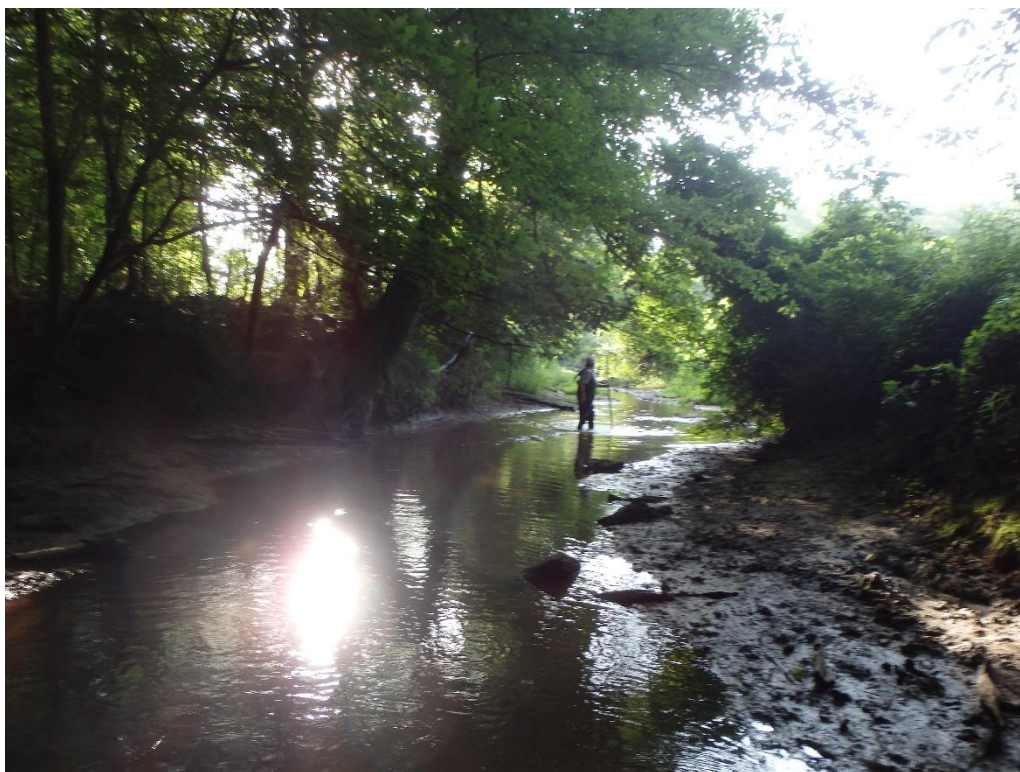


Figure 4.2 Photograph of Black Cypress Creek Site BC01 taken on June 15, 2022. The upstream view of the 150-m transect. TIAER personnel in the photo.

Site BC01 was wadeable with average thalweg ranging from 0.37 m to 0.30 m between surveys. Figure 4.2 illustrates the typical observed width of the creek at this site, approximately 3.5 m. Widths ranged from 1.0 m to 6.0 m during the two surveys (Tables 4.6 and 4.7).

The stream flow type was observed as perennial at the time of both surveys (Table 4.5). Aquatic vegetation and algae cover were absent at this site for each survey. The deepest thalweg depth measured during the first survey at the 240-m transects was 0.78 m and the shallowest was 0.20 m at the 180-m and 300-m transects during the first survey. No pools were observed during either survey at this site.



Figure 4.3 Photograph of Black Cypress Creek Site BC01 taken on September 20, 2022. The downstream view of the 300-m transect

No water dependent birds or reptiles were observed during either survey (Tables 4.8 and 4.9). Bird droppings along with hog and deer tracks were noted during the first survey while raccoon tracks were observed during the second survey. Clam shells were observed during both surveys. No large garbage was present during either survey, but typical household garbage (plastics, glass, cans) were observed in the stream and on the bank.

Physical Description of BC02

Black Cypress Creek at Site BC02 was visited on June 15 and September 20, 2022. This site was located at the FM 2928 bridge crossing in Cass County. Access to this site was difficult because the banks were steep with thick vegetation leading down to the water. The stream at this site was only publicly accessible at the bridge crossing due to fenced private property up to the stream banks.

The riparian zone at Site BC02 was forest with thick vegetation on both the right and left banks (Table 4.4). Banks were vegetated with larger trees and a larger shaded understory (Figures 4.4 and 4.5) throughout this site. The stream was wadeable during both surveys with average thalweg depths ranging from 0.35 m to 0.39 m. The stream was designated as perennial during both surveys (Table 4.5). Channel widths ranged from 6.5 m to 1.4 m throughout the reach during both surveys with a typical observed width of 3.0 m (Tables 4.6 and 4.7).



Figure 4.4 Photograph of Black Cypress Creek Site BC02 taken on June 15, 2022. Photograph shows the downstream view of the 0-m transect.



Figure 4.5 Photograph of Black Cypress Creek at Site BC02 taken on September 20, 2022. Photograph at the 300-m transect facing upstream.

No water dependent birds were observed at this site during either survey (Tables 4.8 and 4.9). Bird droppings were observed in addition to raccoon, deer, and hog tracks. A domestic dog was present during the second survey. No other evidence of wildlife was observed in either survey. Aquatic vegetation and algae were absent during both surveys. No odor was detected, water color was brown during the first survey and clear during the second survey. The surface clear during each survey. Typical garbage such as a trash bag and a glass jar were seen under the bridge during the first survey with no evidence of human recreation or large garbage observed during either survey.

Physical Description of BC03

Black Cypress Creek at Site BC03 was visited on June 15 and September 20, 2022. This site was accessed via a bridge crossing at FM 250 in Cass County. Access to the stream was at the road crossing off a busy highway. The stream at this site was only publicly accessible at the bridge crossing due to fenced private property up to the stream banks. The riparian area was forest with thick vegetation and slippery slopes on both the right and left banks (Table 4.4). Access to the stream was difficult due to the dense forest riparian zones and busy highway.

Site BC03 was wadeable throughout the stream with thalwegs ranging from 0.78 m to 0.11 m between both surveys (Table 4.5). The stream flow type was characterized as perennial for this reach. Average stream width during both surveys was 3.0 m with

maximum and minimum stream widths of 8.5 m and 0.8 m, respectively by survey (Tables 4.6 and 4.7). One substantial pool was observed only during the first survey, measuring 45 meters in length by 8.5 meters in width and >1.2 meters depth.

The stream banks were densely vegetated at BC03. Channel obstructions at this site included log jams and tree branches (as seen in Figure 4.6). Aquatic vegetation was absent during the first survey and rare during the second with algae cover absent during both surveys. The water was brown in color with surface scum observed during the second survey.



Figure 4.6 Photograph of Black Cypress Creek Site BC03 taken on June 15, 2022, the downstream view of the 150-m transect.

The only evidence of wildlife observed were bird droppings and deer, hog, and raccoon tracks during both surveys. Clam shells were observed during the second survey. Tires and a large post with a mailbox were observed during the first survey at the 300-m transect (under the bridge of FM 250). No other large garbage was encountered, but some small garbage, in the channel and along the banks, was observed in the form of plastic bottles observed during both surveys (Tables 4.8 and 4.9). Shotgun shells were observed at the 300-m transect during the second survey.

Observations and Interviews

Activities Observed

During each RUAA survey, field personnel visited sites during times of day and on days when recreational activities were most likely to be observed. All three sites were at public road crossings; however, general public access to the stream beyond the

respective road crossings is unlawful due to fencing marking private property. No form of recreation was directly observed by TIAER staff during either of the two surveys.

Activities Interviewed

A total of three interviews were collected from landowners along Black Cypress Creek.

Two interviews stated they had not personally used, seen others use, or heard of others using the stream for any form of recreation. One interview stated they had been familiar with Black Cypress Creek “all my life”. Another interview stated they had been familiar with the stream for 75 years. One interview indicated they have fished, have seen others fishing, and hear of people fishing in Black Cypress Creek. Of the interviews that stated they had not personally recreated in Black Cypress Creek, one gave the reason as being too shallow with remote access (Table 4.10).

Activities listed in Table 4.10 indicate the number of times personal use, observed use, and/or heard of use was documented from interviews for a given location or in general along the assessment unit. Blank cells in Table 4.10 indicate no interviewed feedback for that location.

Table 4.10 Summary of recreational activities noted in interviews for Black Cypress Creek

Site Name	Number of Interviews	Swimming	Adult Wading	Children Wading	Hunt	Fish	Boat, Canoe, Kayak
BC01							
BC02							
BC03							
General AU	3	0,0,0	0,0,0	0,0,0	0,0,0	1,1,1	0,0,0
Totals	3	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0

Summary

RUAAs were conducted at three sites along Black Cypress Creek on June 15 and September 20, 2022. Temperatures were above 21°C (70°F) during the 30 days prior to each survey (Tables 4.2 and 4.3). Water existed and flowed in Black Cypress Creek during both surveys. Stream flow was considered normal during both surveys based on information provided by local residents. The Palmer Drought Severity Index (PDSI) indicated moderate drought conditions in June 2022 and severe drought conditions in September 2022 (TWDB, 2022).

No recreational activities were observed by TIAER field staff during either survey. Roughly 77% of the watershed through which Black Cypress Creek falls into two types of land use. Pasture/Hay land accounts for the majority at roughly 41%, while mixed forest represent 36% of the watershed. Steep and slippery banks and overgrown banks with thick vegetation were present at all three sites indicating hazardous locations for recreation.

One interview indicated they have fished, have seen others fishing, and hear of people fishing in Black Cypress Creek. No interviews indicated a single occurrence of primary contact recreational activity within the stream. General public access to the stream is limited at all three sites primarily to the right-of-ways immediately surrounding the public bridge crossings or areas immediately up and down stream of culvert crossings. It would be unlawful for the general public, including TIAER personnel, to access the stream beyond the bridge crossings as this land is fenced and privately owned.

Recreational activities observed and reported in interviews are summarized in Figure 4.13. Overall RUAA findings are summarized in the form below.

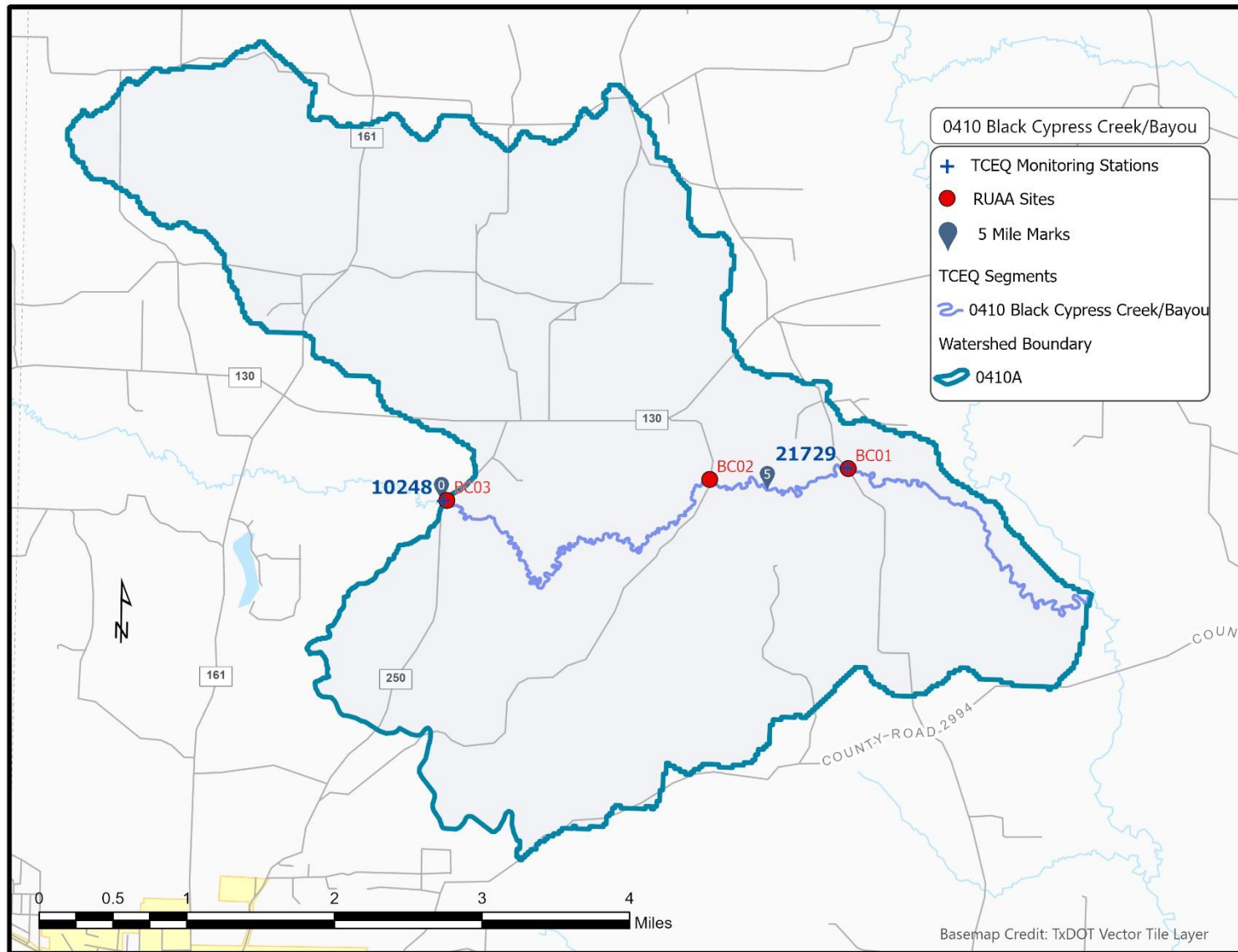


Figure 4.13 Summary of observed and interviewed human activities on Black Cypress Creek

RUAA Summary

(Not part of the Field Data Sheet)

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

Name of water body: Black Cypress Creek

Segment No. of Nearest Downstream Segment No.: 0410A

Classified?: No

Counties: Cass County

1. Observations on Use

- a. Do primary contact recreation activities occur on the water body?
 frequently seldom not observed or reported unknown
- b. Do secondary contact recreation 1 activities occur on the water body?
 frequently seldom not observed or reported unknown
- c. Do secondary contact recreation 2 activities occur on the water body?
 frequently seldom not observed or reported unknown
- d. Do noncontact recreation activities occur on the water body?
 frequently seldom not observed or reported unknown

2. Physical Characteristics of Water Body

- a. What is the average thalweg depth? 0.36 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 of site visits (Based on Palmer Drought Severity Index)

- Mild-Extreme Drought
- Incipient dry spell
- Near Normal
- Incipient wet spell
- Mild-Extreme Wet

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¹ <https://www.hughesspringstxusa.com/>

² <https://www.co.cass.tx.us/>

³ <https://www.hsalibrary.org/>

⁴ <https://www.facebook.com/CityOfHughesSprings/>

⁵ https://www.google.com/search?q=black+cypress+creek&rlz=1C1RXOR_enUS954US954&oq=black+cypress+creek&aqs=chrome..69i57j0i22i30l6j69i60.3488j0j4&sourceid=chrome&ie=UTF-8