Prepared for

H-GAC

Contact Recreation Use Attainability Analysis Pilot Study for Mill Creek Austin County, Texas

PREPARED IN COOPERATION WITH THE HOUSTON-GALVESTON AREA COUNCIL, THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY

Prepared by PBS&J

11196 | SM | 06

AUGUST 2007

PBS&J Project No. 461409.00
Document No. 07H033

FINAL REPORT CONTACT RECREATION USE ATTAINABILITY ANALYSIS PILOT STUDY FOR MILL CREEK, AUSTIN COUNTY, TEXAS HOUSTON-GALVESTON AREA COUNCIL

Prepared for:

Houston-Galveston Area Council
3555 Timmons Lane, Suite 120
Houston, Texas 77027

Prepared by:

PBS&J
1250 Wood Branch Park Drive, Suite 300
Houston, Texas 77079

Prepared in cooperation with the Houston-Galveston Area Council, the Texas Commission on Environmental Quality, and the Environmental Protection Agency

August 2007

Contents

Page

Tables

Figures

Appendices

Acronyms and Abbreviations

ADP	antecedent dry period
ADV	Acoustic Doppler Velocimeter
C	Celsius
cfs	cubic feet per second
CV	Coefficient of Variation
DEM	Digital Elevation Model
DO	dissolved oxygen
E. coli	*Escherichia coli*
EPA	Environmental Protection Agency
FGDC	Federal Geographic Data Committee
FM	Farm-to-Market Road
ft/s	feet/foot per second
GIS	Geographic Information System
gpd	gallons per day
GPS	Global Positioning System
HCFCD	Harris County Flood Control District
HCOEM	Harris County Office of Emergency Management
H-GAC	Houston-Galveston Area Council
HQI	Habitat Quality Index
km	kilometer(s)
LULC	Land Use/Land Cover
mgd	million gallons per day
mg/L	milligram per liter
mL	milliliters
MPN	most probable number
mS/cm	milliSiemens per centimeter
N	number of samples
NH_4-N	ammonia nitrogen
QAPP	Quality Assurance Project Plan
SE	standard error
SH	State Highway
SLOC	site location
SSI	Swimming Suitability Index
SWQM	Surface Water Quality Monitoring
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TKN	total kjeldahl nitrogen

TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
UAA	use attainability analysis
USGS	United States Geological Survey
VSS	volatile suspended solids
WQA	water quality assessment
WWTP	Waste Water Treatment Plant
YSI	Yellow Springs Instruments, Inc.

1.0 INTRODUCTION

1.1 PURPOSE

On May 17, 2007, the Houston Galveston Area Council ("H-GAC") retained PBS&J to provide environmental consulting services to assist with H-GAC's pilot study of contact recreation use attainability analysis ("UAA") methods ("the pilot study"). On May 17, 2007, H-GAC authorized PBS&J to initiate field and office coordination for the pilot study. Field preparation and reconnaissance took place on May 24 and 28 and June 4, 2007. The habitat assessment was conducted from July 9 through 13, 2007. Wet and dry weather sampling took place over nine weeks on June 13, 22, and 28, and on July 11, 24, and 31, 2007. The draft report was delivered to H-GAC on July 27, 2007. This document serves as the final report, which describes the study area, the methods used, the results obtained, and the study recommendations. The pilot study is part of a larger project being conducted by H-GAC to determine what is needed to launch a state-wide plan for conducting UAA's.

1.2 BACKGROUND AND GOALS

The Texas Commission on Environmental Quality ("TCEQ") is responsible for establishing surface water quality standards for all waters in the state, under the authority of Section 303(c) of the Clean Water Act and Section 26.023 of the Texas Water Code. Texas Surface Water Quality Standards are found in Title 30, Chapter 307, of the Texas Administrative Code ("TAC"). The standards establish explicit water quality goals throughout the state. The standards are to maintain the quality of water in the state of Texas consistent with public health and enjoyment, protection of aquatic life, and the operation of existing industries and economic development of the state.

Each standard consists of a designated use, a criterion to protect that use, and an anti-degradation policy. For example, to maintain the contact recreation use in fresh water, 30 TAC §307.7(b)(1)(A)(i) states that "the geometric mean of *Escherichia coli* (*E. coli*) should not exceed 126 per 100 milliliters ["mL"]." In addition, single samples of *E. coli* should not exceed 394 per 100 mL.

Federal regulations allow designated uses to be altered or adjusted if they are found not to be appropriate (existing and attainable) using a process called a UAA. See Part 131.10(g) of Title 40 of the Code of Federal Regulations (40 CFR 131.10(g)). The regulations set forth six criteria for removing a designated use if a UAA can demonstrate that attainment is impossible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use.
2. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of

sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met.

3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.
4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use.
5. Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.
6. Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

When conducting a UAA, generally defined by Environmental Protection Agency ("EPA") as a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act (the so called "fishable/swimmable" uses), one of the six factors must be adequately demonstrated. Demonstration of the UAA factors generally requires some field sampling and observation of the water body of interest. This study was conducted to assist H-GAC and TCEQ with development of protocols to conduct recreational UAA's in the future. This report provides the results of a study conducted to:

- Evaluate methods for watershed reconnaissance for regional or statewide use.
- Evaluate the appropriateness of various methods of characterizing bacteria concentrations in a rural freshwater stream system under various hydrologic influences.
- Evaluate the appropriateness of documenting physical stream conditions for recreational use using habitat assessment techniques.
- Evaluate the appropriateness of documenting current recreational uses via interviews and questionnaires.

1.3 ORGANIZATION OF DOCUMENT

This document is organized into six sections as follows:

- **Section 1 – Introduction:** Section 1.0 provides the background, purpose of the project, and study area details.
- **Section 2 – Study Area:** Section 2.0 provides information about the study area and describes the location of the three sampling locations used in the pilot study.

- **Section 3 – Methods:** Section 3.0 describes the methods applied for the watershed reconnaissance, habitat assessment, wet and dry weather sampling, and recreational suitability in developing a draft UAA protocol.

- **Section 4 – Results:** Section 4.0 discusses the findings of the watershed reconnaissance, habitat assessment, analytical results for wet and dry weather sampling, and the recreational suitability draft UAA protocol.

- **Section 5 – Conclusions:** Section 5.0 discusses recommendations for further consideration with respect to the methods used during the watershed reconnaissance, bacterial density and water quality measurements, habitat assessment, and contact recreation interviews.

- **Section 6 – References:** Section 6.0 provides a comprehensive list of references cited in this report.

2.0 STUDY AREA

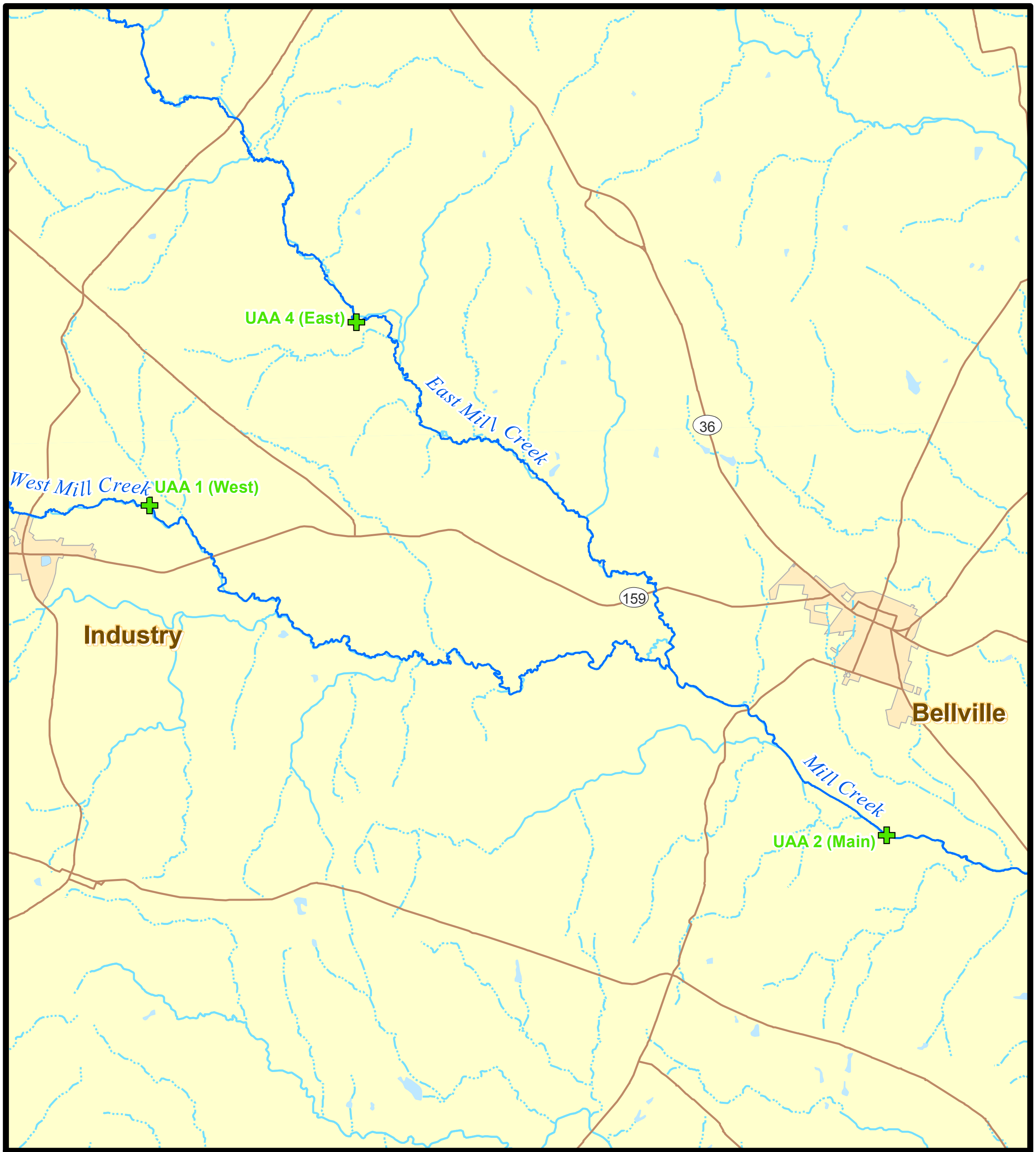
Mill Creek is formed by two branches, the "East Fork," also known as East Fork Mill Creek, and the West Fork in Washington County, Texas. The two branches unite to form Mill Creek in central Austin County, Texas (at 29°56' N, 96°19' W). The main stream flows southeast for 14 miles to its mouth on the Brazos River, on the Austin-Waller county line 2 miles north of Stephen F. Austin State Park (at 29°50' N, 96°07' W) (University of Texas, 2007). The main stem serves a drainage area of 376 square miles (United States Geological Survey ["USGS"] Station 08111700 Mill Creek near Bellville, Texas) and travels through level to moderately sloping terrain surfaced with clay that supports grasslands and post oak forest (University of Texas, 2007). For a more detailed description of the study area see Section 4.1, Watershed Reconnaissance.

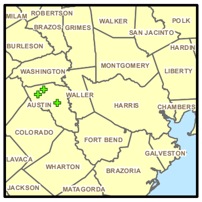
2.1 SAMPLE SITES

Three sites, one each on the East and West Forks and one on the main stem of Mill Creek, within Austin County, were selected for the pilot study as follows:

- UAA1 (West Fork): West Fork of Mill Creek at the Intersection of Industry Road and Bluehole Road, 2.1 miles downstream of Farm-to-Market Road ("FM") 109.
- UAA2 (Main Stem): Mill Creek at FM 2429, 3.2 miles upstream of State Highway ("SH") 36 and 3.3 miles downstream of Mill Creek Road, and 3.6 miles south of the City of Bellville.
- UAA4 (East Fork): East Fork of Mill Creek at Mikeska Road, 3.6 miles north of the intersection of SH 159 and SH 2502.

The selected sites within the study area are illustrated in Figure 2-1 below. One alternate site was selected on the main stem of Mill Creek (UAA3), but was not used because UAA2 had a higher likelihood of observing contact recreation activities.





✚ Sample Locations

— Streams

Streams: NHD
UAA: PBS&J
Base Data: StreetMap USA

0 825 1,650 3,300 4,950 6,600
Meters

N

PBS&J

1250 Wood Branch Park Drive, Ste. 300
Houston, Texas 77079
Phone (281) 493-5100 Fax: (281) 493-1047

Figure 2.1
Mill Creek Study Area

Prepared By: PBS&J/19998	Scale: 1 cm = 1,650 m
Job No.: 461409.00	Date: July 27, 2007

File: N:\ENV\461409_00\projects\mxd\SLOC\Fig2_1.mxd

3.0 METHODS

Prior to commencement of field surveys for the pilot study, TCEQ issued Quality Assurance Project Plan ("QAPP") to H-GAC and PBS&J. The QAPP is dated May 7, 2007, approximately 37 days before the scheduled start of field work. Below is a detailed description of the field work conducted under the QAPP. Any significant deviations from the approved QAPP are noted in this report.

3.1 WATERSHED RECONNAISSANCE

PBS&J staff conducted a field reconnaissance of the Mill Creek watershed. The purpose of the watershed reconnaissance survey was to identify:

- Three sample locations for wet and dry weather sampling and habitat assessment
- Potential sources of bacteria
- Areas of obvious human recreational use
- Impediments to contact recreation

Staff used a combination of field surveys and desktop analysis to gather information about the Mill Creek watershed and input these data into a Geographical Information System ("GIS") format to create a watershed reconnaissance map. The majority of the field reconnaissance was conducted on foot and by vehicle; however, kayaks were used for a small portion of the creek just upstream of the Main Stem site (UAA2). Data used for the desktop analysis was provided by H-GAC and included true color aerial photography from 2005, Digital Elevation Models ("DEM"), Land Use/Land Cover ("LULC") data from 2005, and various ESRI ArcGIS shapefiles such as flowlines, outfalls, cemeteries, airports, county roads, and city boundaries.

The field reconnaissance surveys were documented using a digital camera and global positioning system ("GPS") device. During reconnaissance, the following items were noted for inclusion on the watershed map:

- Point source discharges
- Land use (significant animal populations)
- Illegal dumping areas
- Habitat types (public lands or parks near the water body)

- Signs of human use
- Nearby developed areas

The project team selected three sampling locations and one alternate within the Mill Creek Watershed that were most suitable for conducting the pilot study. Special consideration was given to finding sites that have the highest probability of being utilized for contact recreation. The recommended sites were provided to H-GAC electronically with a location description for review using the TCEQ site location ("SLOC") form.

The watershed reconnaissance maps were created by converting GPS data into a GIS format. Each data point, corresponding identification, and data classification fields were added to generate an inventory of attributes. All ESRI ArcView shapefiles were projected to Texas State Plane, NAD83, South-Central Zone with units in feet, including corresponding Federal Geographic Data Committee ("FGDC") metadata generated for each file. FGDC metadata are used to describe each dataset's accuracy, coordinate information, field names and descriptions, and all other description categories pertinent to the data. The FDGC format was standardized by the federal government and is widely accepted in all GIS data management circles.

3.2 HABITAT ASSESSMENT

3.2.1 Habitat Characterization

A habitat assessment was completed for each site, paying special attention to the surrounding riparian zone using methods and equipment as outlined in the November 2006 *Surface Water Quality Monitoring* ("SWQM") *Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data* (TCEQ, 2006). Stream habitat parameters collected in the field (Part I of SWQM Procedures), along with other resources, were used to formulate the reach habitat descriptors (Part II of SWQM Procedures) listed below and described in the following paragraphs.

- Streambed slope
- Drainage area
- Average stream width and depth
- Instantaneous stream flow
- Maximum pool width and depth
- Number and definition of stream bends
- Habitat type (geomorphic unit) and number of riffles
- Average stream bank erosion potential
- Average stream bank angle
- Ecoregion
- Average tree canopy coverage
- Aesthetics
- Stream Order
- Average width of natural riparian vegetation and percentage of each vegetation type

- Dominant substrate type and percent gravel or larger
- Instream cover
- Land development impact
- Channel flow status

A Habitat Quality Index ("HQI") was calculated and a new parameter termed the Swimming Suitability Index ("SSI"), was developed based on the results from the field survey. During assessment activities, stream flow was measured concurrently with depth measurements using a Flow Tracker Acoustic Doppler Velocimeter ("ADV") and photos were taken at each transect from mid-channel facing upstream and downstream, and facing the left bank and the right bank. The resulting HQI (Part III of the SWQM Procedures) and SSI are addressed in Section 4.2 of this report.

3.2.1.1 Riparian Zone

The riparian zone assessment included the following measurements/assessments:

- Width of the natural vegetation buffer
- Types of riparian vegetation and percent coverage
- Percent tree canopy cover
- Aesthetic quality/land development impact

For each of the three reaches, the width of the natural vegetation buffer on the left and right banks of each transect was visually estimated (high bank height and steepness precluded physical measurement) then the minimum buffer widths for each transect within the reach were averaged.

In the riparian zone along the left and right banks within each reach, the types of riparian vegetation (i.e., trees, shrubs, grasses, cultivated fields, other) and percent coverage of each type were recorded. Subsequently, the percent of each vegetation type for both banks was averaged.

Percent tree canopy cover along each transect was measured using a convex densiometer, then all transect percentages were averaged. Four measurements were taken along each transect; two from mid-channel facing the left, then the right banks; and one each from the water's edge along and facing the left bank and along and facing the right bank.

Aesthetics were described using the SWQM Procedures, using the following categories, which are dependent on land development impacts: (1) Wilderness, (2) Natural Area, (3) Common Setting, and (4) Offensive.

3.2.2 Stream Physical Characteristics

Stream physical characteristic measurements included:

- Habitat type (geomorphic unit)
- Instream cover
- Channel flow
- Substrate characteristics
- Stream depth and width
- Aquatic vegetation
- Bank slope and erosion potential

The habitat type within each transect was identified as riffle, run, glide, or pool. Also, the number of riffles in each reach was recorded. Along each transect, instream physical structures such as logs, tree stumps, and gravel or larger-size substrate that provides shelter for fish and benthic macroinvertebrates were recorded if at a water depth suitable for use by aquatic organisms. Percentage stream cover was visually estimated and each cover type was recorded.

3.2.2.1 Stream Morphology

Channel flow status was determined based on the amount (percentage) of available channel substrate, from bank to bank, covered by water. The number of stream bends and stream bend types (i.e., well defined, moderately defined, poorly defined) within each reach were recorded.

3.2.2.2 Substrate

The dominant substrate type was determined along each transect based on particle size, and percent gravel or larger (>2 millimeters, 0.08 inch) was recorded.

3.2.2.3 Aquatic Vegetation

Any aquatic vegetation observed during the assessment was noted.

3.2.2.4 Stream Depth

Along each transect, average stream width from water's edge to water's edge was measured. Also, the width and depth of the largest pool encountered in each reach were measured.

3.2.2.5 Stream Width

Along each transect, average stream depth from water surface to channel bottom was measured.

3.2.2.6 Bank Slope

The angle of the left and right banks of each transect was measured in degrees with a clinometer. Special measuring guidelines were used, per the SWQM Procedures, for low flow conditions, vertical banks, undercut banks, and irregularly-shaped banks. Concurrently, the percentage of stream bank showing evidence of or potential for erosion was visually estimated for each bank up to the first terrace, then averaged for percent erosion potential across the reach.

3.3 WET AND DRY WEATHER SAMPLING

Wet and dry weather field sampling for the pilot study was conducted in accordance with the most recent version of the TCEQ SWQM manual and the Water Quality Assessment ("WQA") Programs approved QAPP specified for the pilot study. When deviations from the protocols above occurred, it is stated as such in the below detailed sections.

The intent of this pilot study was to evaluate various sampling methods. Ideally, sampling efforts should occur during the index period between March 15 to October 15 so that dry weather samples are taken during base flow conditions. This timeframe reflects the greatest potential for contact recreation to be occurring. In order to obtain the most representative analytical results possible, sampling occurred during the critical period, which in Texas is defined as July 1 through September 30. It is during this period that base flow conditions are **expected** to occur. According to *Contact Recreation Use Attainability Analyses: Draft Protocols for Collection of Field Data* ("Draft Protocols") (H-GAC, 2007), base flow is that portion of a stream's flow contributed by sources of water other than precipitation runoff. It should be noted, however, that collecting samples outside of the index period allows for sampling during low flow conditions during other times of the year. By sampling only in the index period, it is possible that base flow conditions may not occur. This project focused on six sampling events that occurred during June through August 2007.

As described in the Draft Protocols (H-GAC, 2007) and the *Mill Creek Source Identification Study Scope of Work*, wet weather sampling should occur when the site experienced a 10-day antecedent dry period ("ADP") where no measurable rainfall occurred, followed by a storm that resulted in a minimum of 1 inch of rainfall. Sampling should begin as close to the beginning of the runoff as possible. Safety constraints required that wet weather sampling occur only during daylight hours on weekdays and weekends. Rainfall data were noted on a daily basis during the pilot study and more frequently when storm events were forecasted. From this dataset, rainfall data were recorded for 10 days preceding any sampling event. Discharge, gauge height, and precipitation from the USGS station (#0811179) were also recorded daily throughout the study period. Based on weather conditions during the study period, a third sampling category was necessary to describe sample events that occurred after some rain events but that did not meet the qualification of wet weather sampling. "Post-rainfall" sampling was conducted on days following a significant rainfall event but after the creek was allowed to return to somewhat normal flow conditions. Somewhat normal flow conditions were defined to be present at the three sample sites 24 hours after the rain event and when the stream depth at the USGS station downstream of all sample sites was less than 5 feet.

3.3.1 Physical, Hydrological Chemical, and Microbial Characteristics

Data was collected at each of the three sites for physical, hydrological, chemical, and microbial characterization. A summary of the collection techniques used to collect bacteria samples for each sample event are summarized in Table 3-1 below. Basic water quality parameters of dissolved oxygen ("DO"), water temperature, specific conductivity, and pH were collected using either a Yellow Springs Instruments, Inc. ("YSI") Model 600 XLM or Model 6920 V2. A secchi disk was used to measure water clarity in the field. The secchi disk was lowered until it could not be seen, then raised so the black and white fields were barely visible. This depth was noted on the field data sheet. If water clarity was such that the secchi disk reached to the streambed and could still be seen, water clarity was recorded as greater than the water depth. Stream flow was measured by the transect method at each site using a Sontek Doppler Velocimeter or a Marsh McBirney flow meter. Velocity readings were taken at either 11 or 20 evenly-spaced intervals during the first three sample events as there was some disagreement between TCEQ's SWQM protocol and the UAA Draft Protocol. It was then decided that 11 measurements were adequate for streams less than 20 feet across for this study, and therefore 11 measurements were taken at sites UAA1 and UAA4 for Sample Events 4, 5, and 6. Instantaneous water velocity readings were collected at the time and location corresponding to each bacteria grab sample as well.

Table 3-1
Bacteria Sample Methodology for Mill Creek UAA Sample Locations

Sample Event No.	***E. coli*** **Sampling Method: Description**
1	Time Series: 5-minute intervals for one hour
2	Cross Section: 5 equally-spaced samples perpendicular to the flow
3	Longitudinal: 5 equally-spaced samples
4	Vertical: surface, middle, and bottom
5	Time Series: 5-minute intervals for one hour
6	Vertical: surface, middle, and bottom

Water samples were collected for laboratory analysis of:

- Total Suspended Solids ("TSS")
- Volatile Suspended Solids ("VSS")
- Total Phosphorus ("TP")
- Total Nitrogen ("TN")
- Total Kjeldahl Nitrogen ("TKN")
- Ammonia-Nitrogen ("NH4-N")
- Nitrates-Nitrites
- *E. coli*

One duplicate was collected for every 10 samples collected. Bacteria grab samples were collected in a different manner for four of the six sample events as noted in Table 3-1 above.

During Event 1 and Event 5, *E. coli* grab samples were collected according to a time series in which samples were collected every 5 minutes for a total of 60 minutes. During Events 1 and 5, samples were taken from 1 foot below the water's surface. During this period, quality control samples were collected. Sample duplicates were collected from each site. One duplicate was collected for every 10 bacteria samples collected.

For Event 2, bacteria samples were collected perpendicular to stream flow at evenly-spaced intervals along the width of the stream just below the surface of the water. Five samples were collected simultaneously from the left bank, 25 percent, mid-stream, 75 percent, and right bank locations across the stream width. This was completed at the West Fork and East Fork sites by affixing the sample bottles to a piece of metal with holes drilled into it. Holes were to allow water to easily pass through the device without bending and to accommodate placing samples at the location across the stream described above at sites with varying stream widths (Figure 3-1). The stream width at Main Stem site (UAA2) was too wide to use this device, so field team members entered the stream at the locations described above and manually collected samples from 1 foot below the water's surface. During this period, quality control samples were collected. Sample duplicates were collected from each site.

Figure 3-1
Picture Describing Sampling Techniques Used on the East Fork (UAA4) and West Fork (UAA1) Sites During Cross-Section Method for Collecting *E. coli* Samples

During Event 3, bacteria samples were collected longitudinally along the total reach of the stream that was assessed for each site. Samples were taken from 1 foot depth at evenly-spaced intervals. Sample locations were spaced 40 meters (131.2 feet) for the East Fork and West Fork, and 250 meters (820 feet) for the Main Stem site. *E. coli* samples were collected manually from the downstream to upstream by placing field team members at each location on the bank creek. Once the sample downstream was collected, the sampler radioed to the next sampler to collect the next *E. coli* sample. At the Main Stem site (UAA2), kayaks were used because the stream was too deep to wade (Figure 3-2). All other parameters were collected at the downstream location of the reach. During this period, quality control samples were collected. Sample duplicates were collected from each site.

Figure 3-2
Picture Describing Sampling Techniques Used on the Main Stem Site (UAA2) During Longitudinal Method for Collecting *E. coli* Samples

For Event 4 and Event 6, bacteria samples were collected vertically throughout the water column at the centroid of the flow. Sample depths were approximately 1 foot from the bottom, mid-depth, and 1 foot below the surface. During this period, quality control samples were collected. One sample duplicate was collected during this sample event.

3.3.2 Statistical Analysis

3.3.2.1 Methodology Analysis

Boxplots were created to determine if the first grab sample for *E. coli* was different from subsequent samples collected at that sample site for that sample event. The one-sample t-test was performed using the null hypothesis $\mu=0.05$. This test was done to determine if statistical differences existed between the first grab sample and geometric mean of samples collected at a single site during one event (Figure 3-3).

The main purpose of the bacteria analysis was to determine whether a single grab sample is sufficient to capture bacteria concentrations in Mill Creek. Several additional comparisons between *E. coli* concentrations and various stream characteristics (flow, velocity, stream depth, and sample depth) were explored to determine if the limited dataset gathered during the pilot study showed evidence of a relationship or trends. The purpose of the results was to test different methods for collecting bacterial data and to show examples of the type of analysis needed when conducting a contact recreation UAA. The results from the additional comparisons and an explanation of the results are not presented in the results section. These data are located in the Appendix.

SPSS 14.0 (Statistical Package for Social Sciences, Chicago, IL) and Excel (Microsoft, Redmond, WA) were used to compute statistical analyses for the dataset. Descriptive statistics, including number of samples ("N"), median, mean, standard error, standard deviation, coefficient of variation ("CV"), minimum, and maximum were computed for all continuous variables. Geometric mean was computed instead of arithmetic mean for all *E. coli* data.

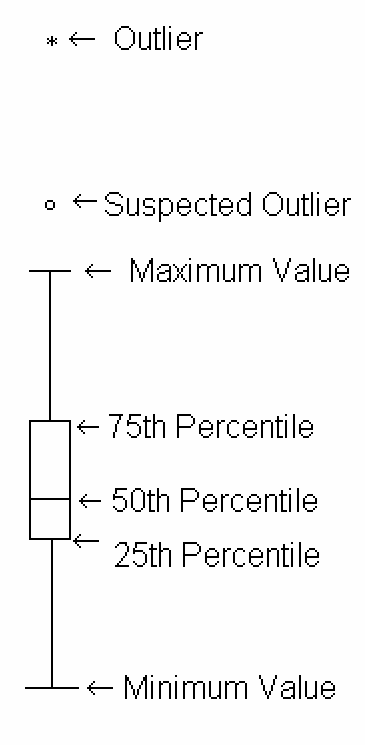


Figure 3-3
Boxplot Diagram

3.4 RECREATIONAL SUITABILITY

In order to determine the stream's suitability for swimming, PBS&J staff surveyed stream reaches, conducted interviews of stream users, and located areas of potential full-body contact recreation. Areas identified with the potential to physically support primary contact recreation activities (e.g., tubing, swimming) were revisited. During field visits, the field teams documented any uses observed and any indications of human use by noting evidence on field data sheets and taking digital photographs. PBS&J staff also conducted a sanitary survey of the area to determine potential sources of bacterial contamination.

PBS&J staff carried interview forms (Data Sheet D) with them during the field reconnaissance survey, the habitat assessment, and during each sampling event for wet and dry weather sampling to interview the public about contact recreation uses. This was to maximize the number of interview forms filled out during the course of the pilot study. To further supplement the contact recreation data collection, PBS&J staff met with local officials and townspeople/landowners in the towns of Bellville, Bleiblerville, and Industry who were knowledgeable about the current and historic uses of the Mill Creek watershed. During these meetings, PBS&J staff left several survey forms with each interviewee to pass out to friends and family who use Mill Creek for primary contact recreation purposes. These interviews were documented on Data Sheet D - Recreational Use Interview, which is included in the Draft Protocols (H-GAC, 2007) and are summarized in the results section.

4.0 RESULTS

4.1 WATERSHED RECONNAISSANCE

The watershed reconnaissance was conducted over three days, including May 24 and 28 and June 4, 2007. PBS&J staff conducted the reconnaissance survey on foot, by vehicle, and using a kayak. The below sections detail the findings from the watershed reconnaissance survey. Site locations, access points, areas of human use, and potential sources of bacteria were recorded during the watershed reconnaissance and are presented on the Watershed Map located in Appendix A. Representative photographs taken during the field survey are located in Appendix B.

Three site locations selected for the pilot study are located on the East and West Forks and one on the Main Stem of Mill Creek, within Austin County:

- UAA1 (West Fork): West Fork of Mill Creek at the Intersection of Industry Road and Bluehole Road, 2.1 miles downstream of FM 109

- UAA2 (Main Stem): Mill Creek at FM 2429, 3.2 miles upstream of SH 36 and 3.3 miles downstream of Mill Creek Road, and 3.6 miles south of the city of Bellville

- UAA4 (East Fork): East Fork of Mill Creek at Mikeska Road, 3.6 miles north of the intersection of SH 159 and SH 2502

4.1.1 Wastewater Discharges

The Mill Creek watershed contains two wastewater treatment plant ("WWTP") outfalls that discharge into various branches of the creek and two commercial outfalls. Two dischargers are municipal permitees and the third is Bellville Tube Co., LP. The City of Bellville WWTP, TCEQ Permit No. 10385-02, is located approximately 1 mile south-southwest of the intersection of SH 36 and SH 159 with FM 1456. The treatment plant serves approximately 4,000 people and discharges 0.045-0.047 million gallons per day ("mgd") or 0.07-0.073 cubic feet per second ("cfs") into Boggy Creek. Boggy Creek enters the main branch of Mill Creek east of SH 36 approximately 3 miles downstream of UAA2. The City of Industry is a municipal permitee that discharges into West Fork Mill Creek. The WWTP, TCEQ Permit No. 13897-001, serves about 200 people and discharges at a rate of 10,000 gallons per day ("gpd"). The discharge point is 2.1 miles west and upstream of UAA1. Two other outfalls are indicated on the TCEQ 2006 data that belong to Bellville Tube Co., LP. This outfall is located north of the intersection of Miller Road at SH 36. The Permit No. is 03716-000. All discharge locations are noted on the watershed reconnaissance map in Appendix A.

Neighborhoods that have developed in Bellville occur around small tributaries of Mill Creek. Today, the majority of the storm sewers in Bellville drain into those tributaries.

4.1.2 Land Use

The land use in the Mill Creek watershed is comprised mainly of rice fields, farmlands, and ranches, though urban land use can be found within the city of Bellville (Table 4-1). Cattle and horse-rearing activities are located in several locations within the watershed. Areas with agricultural uses are noted on the watershed reconnaissance map located in Appendix A. Cemeteries are also included on the reconnaissance maps. Fifty-four cemeteries are spread throughout the watershed and are mapped as potential pollutant point sources due to the possibility for embalming fluids to leach into the soil and/or groundwater.

Table 4-1
Acreages of Land Use Land Cover (LULC)
in the Mill Creek Watershed (LULC data, 2005)

Land Use Land Cover Categories	Acres
High Intensity Developed	94
Medium Intensity Developed	452
Low Intensity Developed	1,355
Open Spaces Developed	1,270
Cultivated Land	4,098
Pasture/Hay	140,354
Grassland	14,086
Deciduous Forest	35,005
Evergreen Forest	11,007
Mixed Forest	4,584
Scrub/Shrub	23,519
Palustrine Forest Wetland	17,322
Palustrine Scrub/Shrub Wetland	64
Palustrine Emergent Wetland	650
Unconsolidated Shore	194
Bare Land	278
Water	1,138

4.1.3 Illegal Dumping

No illegal dumping was found during the watershed reconnaissance survey.

4.1.4 Habitat Types

Mill creek follows a meandering path through interspersed pasture land, blackland prairie, coastal prairie, and hardwood forest floodplain (LULC data, 2005) and provides habitat for a diverse fish community, including spotted gars, minnows, common carp, river carpsuckers, channel catfish, and several sunfish species (Moring, et al, 1998). The surrounding area is known as the Katy Prairie and is one of the country's premier wintering waterfowl regions despite virtually all of the grassland having been converted to rice fields. The rice fields act as artificial wetlands that attract migrant shorebirds, such as the American golden-plover, Hudsonian godwit, pectoral sandpiper, and the buff-breasted sandpiper. The bottomland forest that surrounds much of the creek provides habitat for numerous woodland birds, such as wrens, sparrows, vireos, warblers, and eastern bluebirds. The most ecologically significant segment of Mill Creek is from the confluence with the Brazos River upstream to the point of convergence of the West and East Forks of Mill Creek (TPWD, 1999).

4.1.5 Signs of Human Use (Pre-History and Today)

4.1.5.1 Pre-History

Archeological evidence available suggests that human habitation in the area began as early as 7400 B.C. during the Paleo-Indian Period. The county lies in what appears to have been during late pre-history a zone of cultural transition between inland and coastal aboriginal peoples. During the early historic era, the principal inhabitants were the Tonkawas, a nomadic, flint-working, hunting and gathering people, living in widely-scattered bands, who traveled hundreds of miles in pursuit of buffalo and practiced little if any agriculture (University of Texas, 2007). Today Mill Creek is known for its unique artifacts left by pre-historic inhabitants. Amateur archeologists in Texas are known to search the Mill Creek streambed for arrowheads, stone tools, and pottery.

4.1.5.2 Human Use Today

There are numerous road crossings in the Mill Creek watershed that allow for easy accessibility by the public. Most road crossings with the creek in the upper reaches of the watershed are bordered by private property and contain barbed-wire fencing across the downstream side of the creek from the bridge. Barbed-wire fencing was also encountered along and across reaches at sampling sites. There are also large sand bars located on private property in the lower portions of the watershed that allow for easy access to the creek for some property owners. All access points to the creek are noted on the watershed reconnaissance map in Appendix A.

4.1.6 Nearby Developed Areas

The city of Bellville, with a population of 3,794 people (U.S. Census Bureau, 2000) is located at the intersection of SH 36 and SH 159 and is 3.6 miles north of site UAA2. Other notable communities within the surrounding area of Mill Creek are the cities of Industry and Bleiblerville. Industry, with a population of 304 people (U.S. Census Bureau, 2000) is located at the intersection of SH 159 and FM 109. Industry is 2.7 miles southwest of site UAA1. Bleiblerville, a community of approximately 100 people (University of Texas, 2007) is located at the intersection of SH 159 and FM 2502, 9 miles west of the city of Bellville. Bleiblerville is located 3.6 miles south of UAA4 and 4.7 miles east of UAA1. All major towns in the watershed are labeled on the watershed reconnaissance map in Appendix A.

4.2 HABITAT ASSESSMENT

The HQI (Part III of the SWQM Procedures) values are based upon the values obtained in Part II of the SWQM Procedures and upon field notes. The results of each parameter measured are summarized in Table 4-2. The criteria used in ranking each of the HQI parameters are outlined in the following section.

As defined in the project QAPP, the HQI provides a quantitative measure of a water body's physical conditions suitability for aquatic life—the higher the score, the better the fishing. This parameter is therefore an appropriate metric for determining if a particular water body is suitable or attractive for recreational fishing. It is not, however, suitable for evaluating boating uses or swimming uses. PBS&J altered the building blocks and scoring methods used to determine the HQI in an effort to derive a new metric we called the SSI. Since the SSI was not in use prior to this study, we were restricted to using HQI input measurements.

The SSI scores are based on all but two parameters from the HQI. The two parameters that do not apply to swimming are Channel Sinuosity and Riparian Buffer Vegetation (width). The SSI ranking for the two parameters, Available Instream Cover and Number of Riffles, is inverse to that used to develop the HQI scores. The remaining parameters (i.e., Bottom Substrate Stability, Dimensions of Largest Pool, Channel Flow Status, and Aesthetics of Reach) are equivalent to the HQI scoring methods. The SSI calculation also includes velocity, depth, and turbidity, which are important factors in evaluating swimming suitability. Detailed explanation of the criteria used in ranking each of the SSI parameters is included in the following section. The SSI scores are summarized in Table 4-3. Site maps showing the locations of each transect are located in Appendix D and representative photos taken at each transect are located in Appendix E. Datasheets completed during the habitat assessment are located in Appendix F.

4.2.1.1 Riparian Zone

<u>HQI</u>

Riparian buffer vegetation is important in maintaining stream health through shading, dispersing runoff, and preventing erosion. The amount of riparian buffer vegetation was ranked as extensive (3), wide (2), moderate (1), or narrow (0), based upon the width of the natural buffer.

Aesthetics were ranked as wilderness (3), natural area (2), common setting (1), or offensive (0), based upon the natural beauty, the amount of trees and vegetation, and the amount of development (including water clarity and aesthetic effects resulting from development).

SSI

Riparian buffer vegetation width was not used in ranking the riparian zone for swimming, as it does not affect swimmers. However, the number of large trees or the number of large overhanging limbs may be a parameter to consider in future studies since trees may provide shade for swimmers and/or overhanging limbs for recreational use such as rope swinging.

Aesthetics were ranked in the same manner for the swimming HQI as for the SWQM Procedures HQI, since aesthetics contribute to the recreational user's experience.

4.2.2 Stream Physical Characteristics

HQI

Available in-stream cover is important for fish and benthic organisms. This parameter was ranked as abundant (4), common (3), rare (2), or absent (1), based on the percentage of substrate that provides stable habitat.

In determining habitat type, only those riffles that extended to greater than 50 percent of the channel width and were at least as long as the channel width were counted. However, the total number of riffles within each reach was tallied regardless of size. Ranking consisted of abundant (≥5 riffles), common (2-4 riffles), rare (1 riffle), or absent (no riffles).

SSI

Riffles, which are typically shallow, are important in considering streams for recreational use, such as canoe or kayak activities. In-stream cover in the form of downed trees, woody debris, or thick vegetation can be a hindrance to swimming activities. Therefore, scoring was inverse to that of the aquatic organism HQI with parameter rankings as follows: (4) absent, (3) rare, (2) common, or (1) abundant.

Riffles can also be a hindrance to swimming when caused by submerged debris and thus were scored inversely to that of the aquatic organism HQI rankings. However, riffles have also been considered desirable under certain conditions and can enhance swimming activities when those conditions prevail.

4.2.2.1 Stream Morphology

HQI

In-stream flow affects the amount of potential habitat available to aquatic organisms such as fish; the greater the channel flow, the higher the available habitat, increasing chance of successful fishing. Channel flow was ranked as high (3), moderate (2), low (1), or no flow (0) based on percentage of the channel and/or channel substrate covered by water.

A high degree of sinuosity provides more diverse habitat, protects streams from excessive erosion and flooding, and provides shelter for aquatic organisms. Channel sinuosity was ranked as high (3), moderate (2), low (1), or none (0) based upon the number and type of bends.

SSI

In-stream flow affects the area available for swimming. If flows are too low, then a stream may not be suitable for swimming; if flows are too high the same might be true. Moderate flows are most desirable for swimming. Channel sinuosity, however, does not affect swimmers. This particular watershed is small and had low to moderate flows even during rainy conditions. Only an extreme flooding event would negatively impact swimming; therefore, the numbers assigned to each rank for the swimming HQI are the same as those in the SWQM Procedures, but are based on channel flow only.

4.2.2.2 Substrate

HQI

A somewhat firm foundation is important for swimming activities. Also, substrates containing gravel may provide additional cover for aquatic organisms. Bottom substrate stability was ranked as stable (4), moderately stable (3), moderately unstable (2), or unstable (1) based on percent gravel or larger substrate and dominant substrate type.

SSI

Since stability is important for safe swimming, the same ranking system was used as for the above HQI.

4.2.2.3 Aquatic Vegetation

Aquatic vegetation can provide cover for aquatic organisms. Aquatic vegetation can also hinder swimming activities. The presence or absence of aquatic vegetation was noted during the assessment. No aquatic vegetation was present in any of the reaches assessed.

4.2.2.4 Stream Depth

<u>HQI</u>

Pools provide potential cover for fish. Pool dimensions were ranked as large (4), moderate (3), small (2), or absent (1) based upon percentage of the channel width covered and upon maximum depth.

<u>SSI</u>

Pools also may provide space for swimming, which may result in full head immersion. Therefore, the same ranking system as that above was used for stream depth.

4.2.2.5 Stream Width

Stream width can affect stream shading, temperature, and flow. The stream width at the access point for each reach was 3.9, 5.2, and 28.4 meters the east, west, and main stem sites, respectively. Stream width was not used in formulating the HQI or the SSI.

4.2.2.6 Bank Slope

<u>HQI</u>

Bank stability affects stream use by wildlife and shelter for aquatic organisms. Stability is based upon erosion potential, which is dependent upon soil type, bank slope, and flow rates. Bank stability was ranked as stable (4), moderately stable (3), moderately unstable (2), or unstable (0) based on percentage evidence of erosion and upon average bank angles.

<u>SSI</u>

Bank stability is an important safety concern for stream users and is also important in estimating future impacts to the stream from recreational use. The same ranking system as above was used for this parameter.

4.2.3 Summary of Habitat Assessment

4.2.3.1 West Fork (UAA1)

The West Fork of Mill Creek (UAA1) yielded an HQI of 20 (high) and an SSI of 16 (high). Although the HQI is high, this tributary of Mill Creek may be suitable for recreation only during periods without drought. The reach was assessed during a year of exceptional rainfall and probably contained more water (an average of 0.35 meter [1.14 feet] with individual transect depths ranging from 0.15 to 0.76 meter [0.5 to 2.5 feet]) than during normal rainfall years. Currently, the creek may be suitable for catching minnows, which were seen in the portion near the bridge only; for wading; or for wildlife viewing (several species of birds were noted during the assessment). No signs of recreational use were noted during the assessment. The reach contained only one pool (1.1 meters [3.6 feet] deep and 1.9 meters [6.2 feet] wide), near the bridge, so presumably only a small section of the reach would support fishing or swimming activities. However, wading and wildlife observation would be possible.

4.2.3.2 East Fork (UAA4)

The East Fork of Mill Creek (UAA4) yielded an HQI of 21 (high) and an SSI of 14 (high) (Tables 4-2 and 4-3). This tributary of Mill Creek was considerably colder than the West Fork and the main channel, indicating it is spring-fed and may remain at a relatively stable level year-round. Average depth of this reach was 0.37 meter (1.21 feet) and it contained a few shallow pools, most of which were less than 1 meter deep and covered less than 50 percent of the average stream width (5.8 meters, or 19.0 feet). The largest pool was at the first bend, just west of the bridge; it was 1.1 meters (3.6 feet) deep and 2.0 meters (6.6 feet) wide.

Due to the spring-fed nature of this reach, the presence of a trot line near the largest pool, and the discovery of two turtles during the assessment, it was determined that this reach probably contains fish of suitable size for fishing. Shallowness precludes swimming, but wading and wildlife observation would be possible.

4.2.3.3 Main Stem (UAA2)

Mill Creek (UAA2) yielded an HQI of 12 (limited) and an SSI of 18 (Tables 4-2 and 4-3). According to landowners along the creek, this portion of Mill Creek has been dredged and possibly channelized. All parameters of the HQI were scored at 2 or lower, while the SSI parameter scores were variable. Although the sludgy layer topping the sand substrate and the presence of fishing devices/debris (e.g., trot lines, fishing line) near the bridge may make this reach unsafe for swimming activities, the depth and moderate flows at this site provide good conditions for swimming. Although this reach contains an average of 0 percent cover for aquatic organisms, some under-cut banks do exist that could serve as cover for fish and thus be good for fishing. This reach is also suitable for swimming, tubing, canoeing, and kayaking due to previous channel dredging (average depth over the reach is 1.1 meters [3.6 feet]). Although the average vegetative buffer is less than 5.0 meters (16.5 feet), the bank height of approximately 6.1 meters (20.0 feet) (which was not officially measured for this assessment) prevents viewing of the surrounding pastureland, giving in-stream users a view of only the native vegetation buffer along the banks and therefore the impression of a natural setting.

4.2.3.4 Watershed

Mill Creek provides sufficient habitat for recreation from a watershed perspective. In spite of steep banks, some tributaries to the creek are probably suitable for fishing, wading, and/or wildlife viewing.

The main channel of Mill Creek is sufficiently deep and open for swimming, canoeing and kayaking, and possibly fishing, assuming there is enough cover for fish.

Table 4-2
Habitat Quality Index Scoring Components, Mill Creek Habitat Assessment, Austin County, Texas

Habitat Parameter	UAA1 Scoring Category	Score	UAA4 Scoring Category	Score	UAA2 Scoring Category	Score
Available In-stream Cover (1=absent, 2=rare, 3=common, 4=abundant)	Common	3	Common	3	Absent	1
Bottom Substrate Stability (1=unstable, 2=moderately unstable, 3=moderately stable, 4=stable)	Moderately unstable	2	Moderately unstable	2	Unstable	1
Number of Riffles (1=absent, 2=rare, 3=common, 4=abundant	Common	3	Abundant	4	Absent	1
Dimensions of Largest Pool (1=absent, 2=small, 3=moderate, 4=large)	Large	4	Moderate	3	Small	2
Channel Flow Status (0=no flow, 1=low, 2=moderate, 3=high)	Moderate	2	Moderate	2	Moderate	2
Bank Stability (0=unstable, 1=moderately unstable, 2=moderately stable, 3=stable)	Moderately unstable	1	Moderately unstable	1	Moderately stable	2
Channel Sinuosity (0=none, 1=low, 2=moderate, 3=high)	Moderate	2	High	3	None	0
Riparian Buffer Vegetation (0=narrow, 1=moderate, 2=wide, 3=extensive)	Moderate	1	Moderate	1	Moderate	1
Aesthetics of Reach (0=offensive, 1=common, 2=natural, 3=wilderness)	Natural area	2	Natural area	2	Natural area	2
Habitat Quality Index/Total Score[1]	**High**	**20**	**High**	**21**	**Limited**	**12**

[1] Habitat Quality Index is as follows:
26-31 = Exceptional
20-25 = High
14-19 = Intermediate
≤13 = Limited

Table 4-3
Swimming Suitability Index,
Mill Creek Habitat Assessment, Austin County, Texas

	UAA1		UAA4		UAA2	
Habitat Parameter	**Scoring Category**	**Score**	**Scoring Category**	**Score**	**Scoring Category**	**Score**
Available In-stream Cover (1=abundant, 2=common, 3=rare, 4=absent)	Common	2	Common	2	Absent	4
Bottom Substrate Stability (1=unstable, 2=moderately unstable, 3=moderately stable, 4=stable)	Moderately unstable	2	Moderately unstable	2	Unstable	1
Number of Riffles (1=abundant, 2=common, 3=rare, 4=absent)	Common	2	Abundant	1	Absent	4
Dimensions of Largest Pool (1=absent, 2=small, 3=moderate, 4=large)	Large[4]	4	Moderate	3	Small	2
Channel Flow Status (0=no flow, 1=low, 2=moderate, 3=high)	Moderate	2	Moderate	2	Moderate	2
Bank Stability (0=unstable, 1=moderately unstable, 2=moderately stable, 3=stable)	Moderately unstable	1	Moderately unstable	1	Moderately stable	2
Channel Sinuosity (N/A)[2] (0=none, 1=low, 2=moderate, 3=high)	N/A	-	N/A	-	N/A	-
Riparian Buffer Vegetation (N/A)[3] (0=narrow, 1=moderate, 2=wide, 3=extensive)	N/A	-	N/A	-	N/A	-
Aesthetics of Reach (0=offensive, 1=common, 2=natural, 3=wilderness)	Natural area	3	Natural area	3	Natural area	3
Swim Habitat Quality Index/Total Score[1]	**High**	**16**	**High**	**14**	**High**	**18**

[1] Swim Habitat Quality Index is as follows:
20-25 = Exceptional
14-19 = High
8-13 = Intermediate
≤7 = Limited

[2] Channel sinuosity has no bearing on stream use for swimming.

[3] Width of the riparian buffer vegetation has little effect on swimmers. However, the number of large trees or the number of large overhanging limbs may be a parameter to consider in future studies since trees may provide shade for swimmers and/or overhanging limbs for recreational use such as rope swinging.

[4] This pool was within 30 feet of the bridge; pools were not typical over the remainder of the reach.

4.3 DRY AND WET WEATHER SAMPLING

4.3.1 Sample Dates

A total of six sample events were conducted in 2007 for the pilot study. Event 1 was conducted on June 13 and 14. The West Fork and East Fork sites were revisited on June 14 in order to collect flow readings that could not be taken on June 13. Event 2 was conducted on June 22. Sample Event 3 occurred on June 28 and 29. Sample Event 4 occurred on July 11 and Events 5 and 6 took place on July 24 and July 30, 2007, respectively. Mrs. Jean Wright of the H-GAC accompanied PBS&J staff on June 28 and again on July 24 for Events 3 and 5 in order to conduct field audits.

4.3.2 Field Conditions

Weather conditions during the study period were wetter than normal. Rainfall ranged from 0.35 to 1.93 inches. No sample event occurred during rain events, but all sampling events are considered post-rainfall sampling. Flow conditions at all sample sites were above normal for the entire study period and base flow conditions were not observed. The single highest rainfall event (1.93 inches) occurred two days before Event 2. For the month of June, a total of 8.14 inches of rainfall occurred. Rainfall occurring before Events 1, 3, and 4 was 0.87, 0.35, and 0.54 inch, respectively. These events occurred on June 3 and 26, and July 5.

4.3.3 Physical, Chemical, Hydrological, and Microbial Characteristics

4.3.3.1 Water Quality, Physical, and Hydrological Results

Data were collected at each of the three sample locations for physical, chemical, hydrological, and microbial characterization (Appendix H). Parameters were averaged for all the six sample events. The results of this characterization are summarized in Table 4-4.

Table 4-4
Stream Characteristics

Mean* Water Quality Values for Mill Creek UAA Sites 1, 2, and 4

Sample Site	Flow (cfs)	Drainage Area (acres)	Temp (°C)	DO (mg/L)	Sp. Cond. (mS/cm)	pH	Secchi Depth (meters)	Stream Depth[a] (meters)
West	15.93	53, 058	27.17	6.16	0.43	7.75	0.36	0.2–0.76
Main	95.48	76,150	27.41	6.19	0.46	7.82	0.41	0.4–0.95
East	36.11	169,926	27.22	5.55	0.46	7.72	0.38	0.48–2

* N = 6 for all parameters except specific conductivity and DO where N=5.
a = Range

Except for stream depth and flow, all other properties collected show little spatial and temporal variability. Sampling at each site occurred within a two-hour window of time across all sample events; therefore, variations resulting from time of collection should be negligible.

The average water temperature ranged from 27.17 to 27.22°C, which is normal for local streams for this time of year. Dissolved oxygen ranged from 5.55 to 6.19 milligrams/liter ("mg/L"), which is well within the standards to support quality wildlife. The mean specific conductivity ranged from 0.43 to 0.46 milliSiemens per centimeter ("mS/cm"), which is somewhat indicative of a freshwater stream for this area. It is possible that mixing of waters supplied from the many springs within the drainage basin and recent rainfall has diluted the stream water and lowered the conductivity levels. Specific conductivity ranged from 0.43 to 0.46 mS/cm, having a CV of 0.46, 0.44, and 0.48 for sites West Fork, Main Stem, and East Fork, respectively. Mean pH values ranged from 7.72 to 7.82, which were slightly lower than expected from a creek in this region; however, considerable rainfall had occurred during the study period and may have resulted in reducing pH values from what normally would be 8.0 to 8.3. Overall, pH remained relatively stable both spatially and temporally with a CV <0.02 between sample events and sample sites. Secchi disk readings ranged from 0.36 to 0.41 meter (1.2 to 1.35 feet), indicating a slightly turbid system. This is most likely a result of sediment resuspension caused by recent rainfall events and the muddy and sandy nature of the sediment in this area. These rainfall events contributed to differences in stream morphology as well. Differences in the stream depth and in the rate of flow varied both temporally and spatially. Stream depth varied somewhat between sample events due to several factors, including changes in bottom substrate caused by high flows. During sampling, the field team noticed that rainfall events cause sandbars to change in location and size throughout the study period. The mean flow for each sample location was 15.93, 95.48, and 36.11 cfs with CV's of 1.2, 0.62, and 1.47, respectively, for the West Fork, Main Stem, and East Fork of Mill Creek. The reason for such high variation in flow between sample location and sample event was due to watershed drainage size and rainfall amounts.

At the West Fork of Mill Creek, pH was in a range from 7.58 to 7.89, which is slightly lower than would be expected for the hard-water streams that are found in this area. The slight dip in pH from Sample Event 1 to Sample Event 2 could be a result of recent rainfall in the amount of 1.93 inches that occurred just two days prior to Sample Event 2 (Figure 4-1). It is also likely that the increased rainfall experienced in the recent weeks leading up to the Mill Creek UAA study have diluted the stream, thus causing an overall reduction in pH from what would be expected during this time of year. A similar pattern can be seen with regard to DO, which ranged from 5.94 to 6.35 mg/L. The highest readings occurred during the first sample event and then dropped off with increasing temperature and rate of flow. The CV for DO is 0.41 for site UAA-1 (West Fork), indicating very little temporal variability between sample events. Specific conductivity ranged from 0.32 to 0.52 mS/cm during the study period. Again, these values may be depressed due to dilution effects. The increasing trend over time was expected with the increase in summer air temperatures and solar heating. The flow at the West Fork of Mill Creek varied from sample event to sample event, having a CV of 1.2. This variation represents the greater than normal rainfall this summer. Stream flow ranged from 0.04 to 48.95 cfs with an average flow of 15.93 cfs.

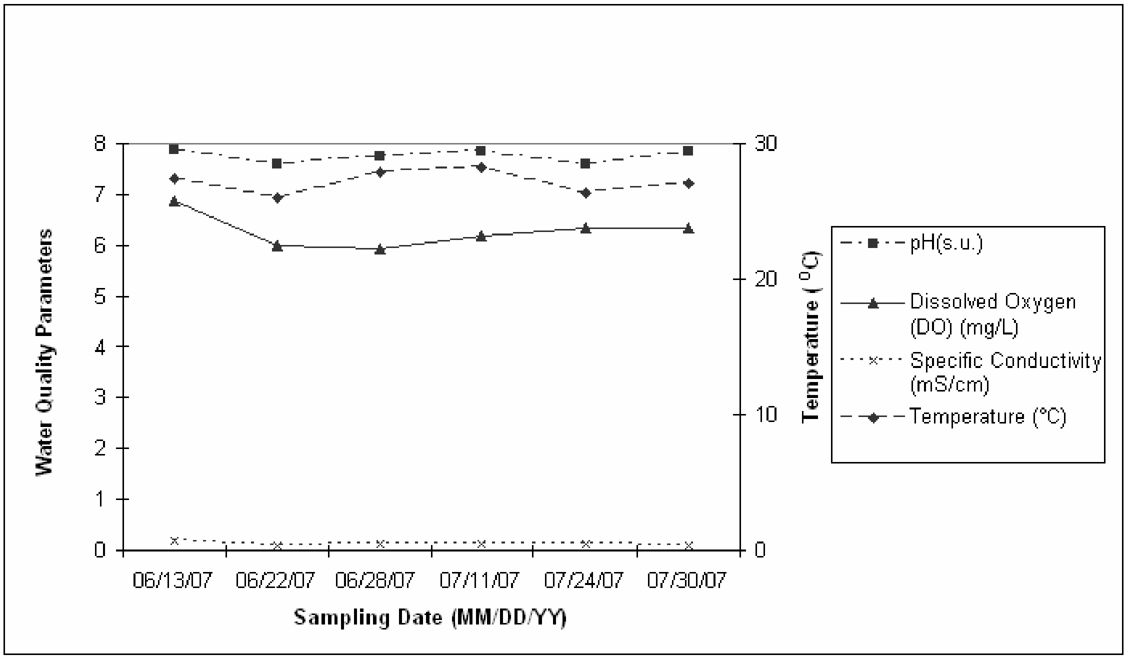


Figure 4-1
Water Quality Parameters Collected During Four Sample Events During June and July at Site UAA-1 (West Fork) on Mill Creek, Austin County

At the main fork of Mill Creek, pH was in a range from 7.74 to 7.88. Again, this is lower than would be expected for streams in this area. A similar pattern can be seen with regard to DO, which ranged from 5.55 to 6.19 mg/L. The highest readings occurred during the first sample event and then dropped off with increasing temperature and rate of flow. The CV for DO is 0.41, indicating moderate temporal variability between sample events. Specific conductivity ranged from 0.32 to 0.53 mS/cm during the study period. Again, these values may be depressed due to dilution effects. Water temperature ranged from 26.12 to 29.54ºC during the study period. The increasing trend over time was expected with the increase in summer air temperatures and solar heating. The flow at the Main Stem of Mill Creek varied from sample event to sample event, having a CV of 0.62. This variation represents the greater than normal rainfall this summer. Stream flow ranged from 22.30 to 164.70 cfs, with an average flow of 95.48 cfs.

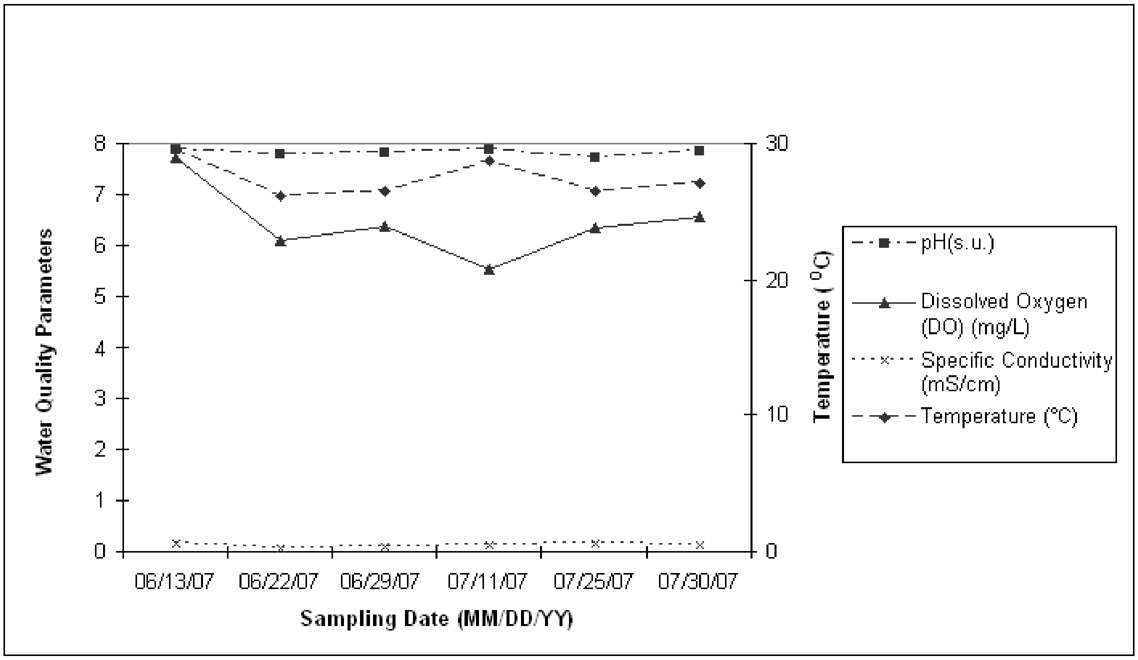


Figure 4-2
Water Quality Parameters Collected During Four Sample Events During June and July at Site UAA-2 (Main Stem) on Mill Creek, Austin County

At the East Fork of Mill Creek, pH was in a range from 7.61 to 7.84. This pattern follows that of the other sample sites and can be seen with regard to DO, which ranged from 5.29 to 5.87 mg/L. The CV for DO is 0.40, indicating moderate temporal variability between sample events. Specific conductivity ranged from 0.32 to 0.73 mS/cm during the study period. Again, these values may be depressed due to dilution effects. Water temperature ranged from 26.48 to 28.26ºC during the study period. The increasing trend over time was expected with the increase in summer air temperatures and solar heating. The flow at the East Fork of Mill Creek also experienced temporal variation from sample event to sample event, having a CV of 1.47. This variation is again attributed to higher than normal rainfall this summer. Stream flow ranged from 2.12 to 143.19 cfs, with an average flow of 36.11 cfs.

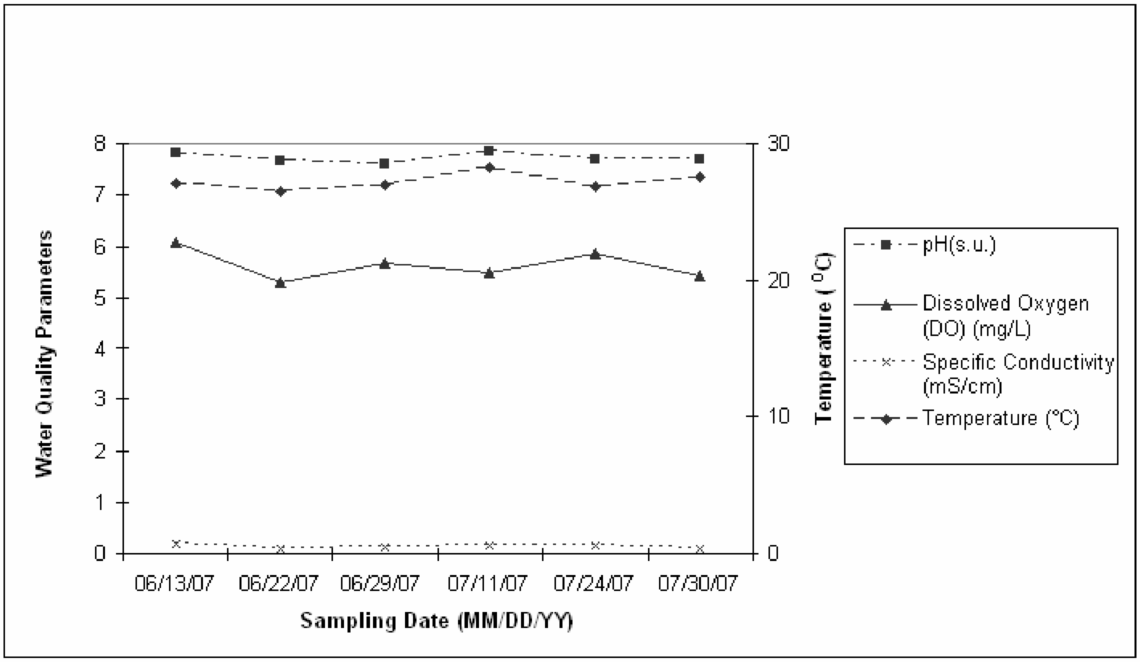


Figure 4-3
Water Quality Parameters Collected During Four Sample Events During June and July at Site UAA-4 (East Fork) on Mill Creek, Austin County

4.3.3.2 Nutrient and Solids Results

TP, TKN, Nitrate-Nitrite, and TN were collected for sample events 4, 5, and 6. Summary statistics for nutrients are located in Appendix I. Mean concentration of samples for TP and TKN collected from the West Fork site are 0.38 and 6 mg/L, respectively. NH_4-N, low level, ranged from 0.02 to 0.14 mg/L. TSS and VSS ranged from 10.40 to 29.30 and 4.00 to 13.30 mg/L, respectively, for this sample location. Nitrate- Nitrite measured from the West Fork ranged from 0.18 to 0.21 mg/L. TKN and Nitrate- Nitrite used to calculate TN which ranged from 4.88 – 7.91 mg/L.

At the Main Stem of Mill Creek, TP and TKN are 0.4 and 6.83 mg/L, respectively. NH_4-N was 0.02 to 0.08 mg/L. TSS and VSS ranged from 17.70 to 108.00 and 6.00 to 20.00, respectively. Nitrate- Nitrite measured from the Main Stem ranged from 0.15 to 0.20 mg/L. TKN and Nitrate- Nitrite used to calculate TN which ranged from 4.15 – 9.40 mg/L.

At the East Fork of Mill Creek, TP and TKN are 0.36 and 6.17 mg/L, respectively. NH_4-N ranged from 0.02 to 0.07 mg/L. TSS and VSS ranged from 13.00 to 96.00 and 4.60 to 24.00, respectively. Nitrate- Nitrite measured from the East Fork ranged from 0.17 to 0.22 mg/L. TKN and Nitrate- Nitrite used to calculate TN which ranged from 5.39 to 8.29 mg/L.

4.3.3.3 Bacteria Results

The purpose of the results detailed below was to test different methods for collecting bacterial data and to determine if taking one grab sample is a sufficient sampling technique. The different types of sampling methodologies were evaluated in order to determine the most efficient way to maximize data collection. The following section details the results of comparing a single grab sample to subsequent samples collected during a single sampling event. Summary statistics for *E. coli* during each sampling event are also addressed (Appendix I). Additional analysis comparing *E. coli* and various stream characteristics is presented in Appendix J.

4.3.4 Evaluation of Bacterial Sampling Methods

Four methods of characterizing bacterial densities were evaluated during this project. Each method required multiple samples to be collected, handled, and analyzed. To evaluate the methods, PBS&J statistically compared the first grab sample obtained at each site using each method against the geometric mean of the remaining samples obtained for each method using a one-sample t-test. This was conducted to determine if the multiple sampling approaches produced statistically different results than the single grab sample. Below are three graphs (Figures 4-4 through 4-6) illustrating the first grab sample, and an adjacent boxplot representing the distribution of the remaining samples collected during the event excluding the grab sample. Based on the p-values from the t-tests, the data suggest that methods of sampling or sampling event do not result in statistically different data. The only statistical difference detected occurred at the East Fork during the time series sampling event.

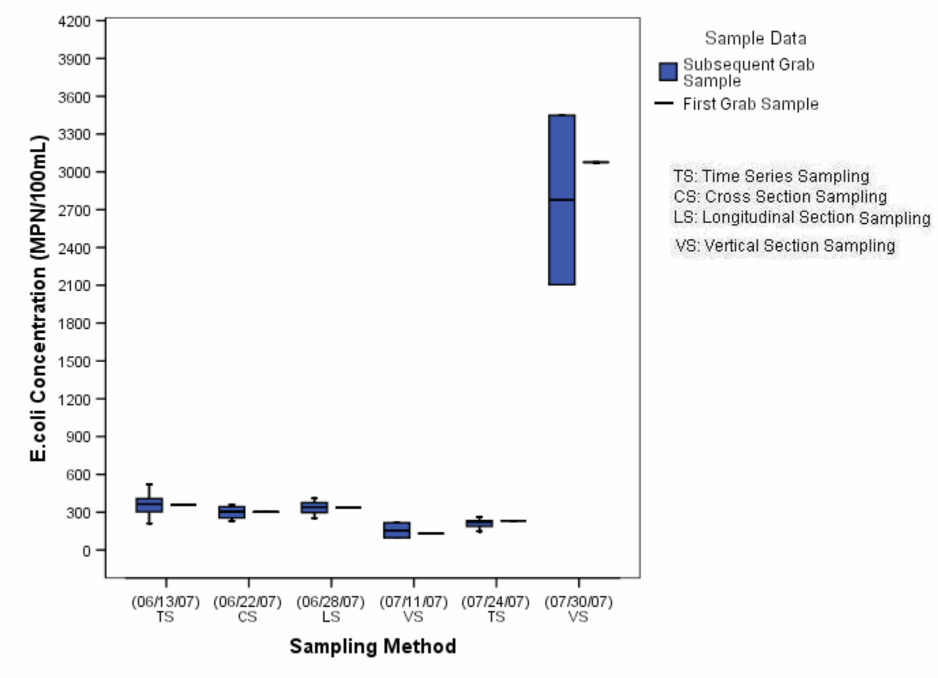


Figure 4-4
Boxplots Comparing the First Grab Sample vs. Entire Sample Set for *E. coli* Concentration Collected from Six Sampling Events at Site UAA-1 (West Fork) During June and July 2007

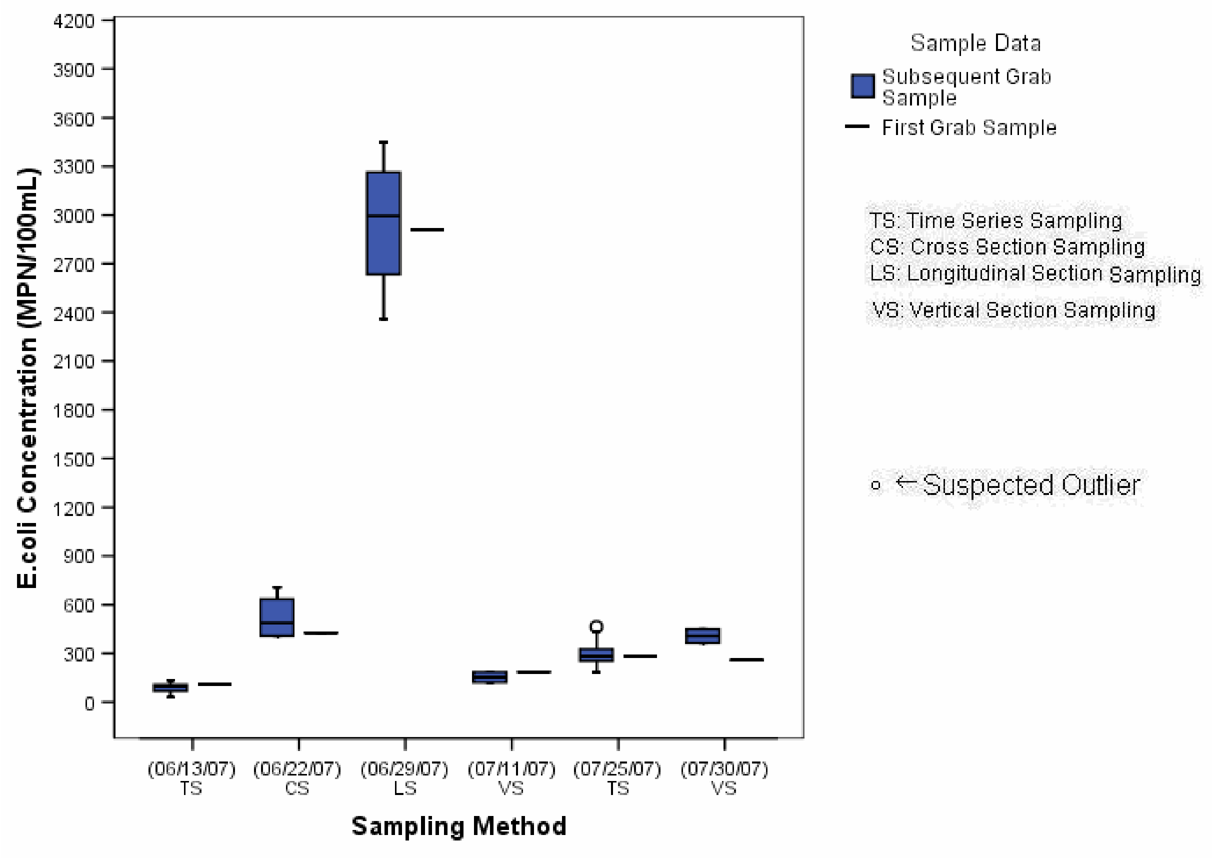


Figure 4-5
Boxplots Comparing the First Grab Sample vs. Entire Sample Set for *E. coli* Concentration Collected from Six Sampling Events at Site UAA-2 (Main Stem) During June and July 2007

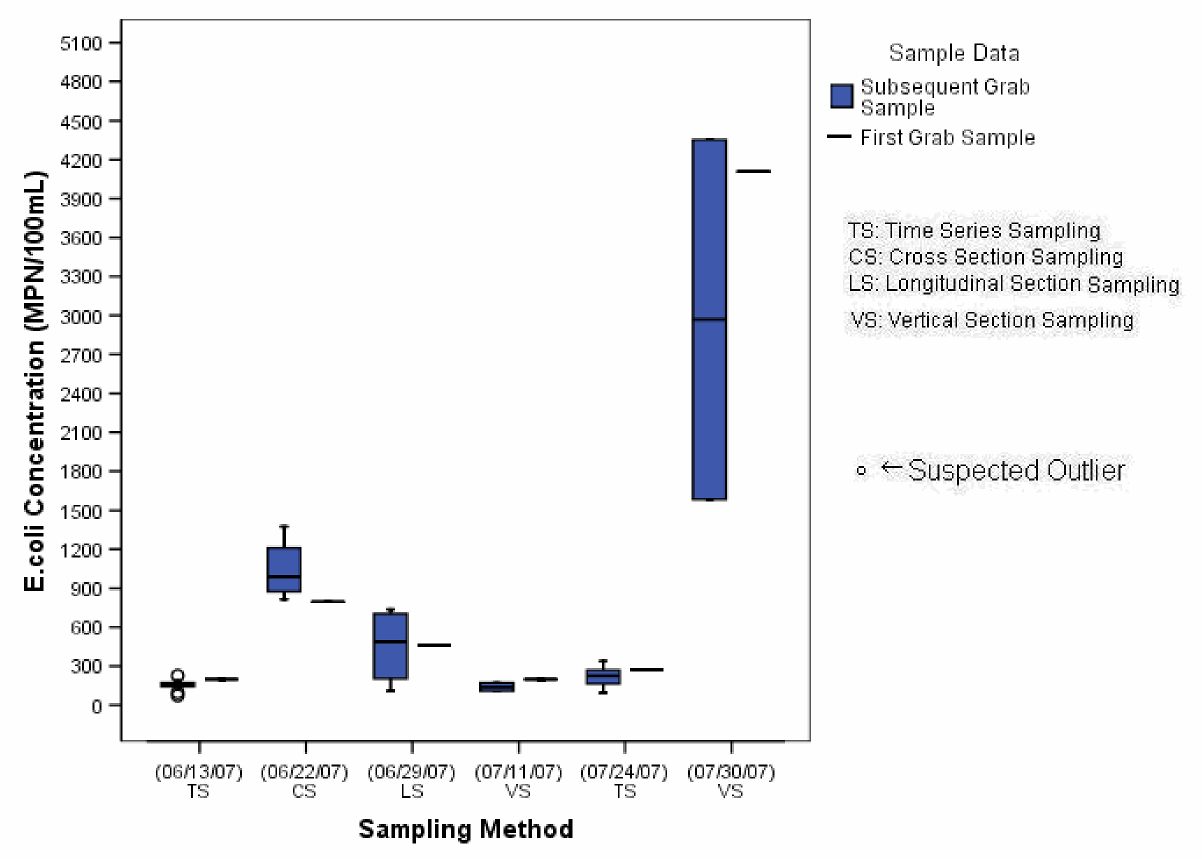


Figure 4-6
Boxplots Comparing the First Grab Sample vs. Entire Sample Set for *E. coli* Concentration Collected from Six Sampling Events at Site UAA-4 (East Fork) During June and July 2007

Time Series (Event 1)

Table 4-5 depicts the descriptive statistics for the times series sampling event conducted on June 13. *E. coli* concentrations for the three sample locations vary somewhat within one sampling event per site. The East Fork site had a CV of 0.73, suggesting there was a difference in *E. coli* concentrations over a one-hour period. The descriptive statistics from the West Fork and Main Stem sites differ from the East Fork site in that the CV's are very low, 0.23 and 0.34, respectively. *E. coli* concentrations did vary between sites, with the West Fork site showing the highest concentrations and the Main Stem showing the lowest. These trends do not remain consistent throughout every sampling event.

Table 4-5
Descriptive Statistics for the Time Series Sampling Method at Three Sampling Locations

Statistic	West Fork (UAA1)	East Fork (UAA4)	Main Stem (UAA2)
Number of Samples	12	12	12
Mean (MPN/100mL)	360	158	92
Minimum (MPN/100mL)	211	74	31
Maximum(MPN/100mL)	520	228	134
Standard Deviation (MPN/100mL)	83	42	32
Standard Error (MPN/100mL)	24	12	9
Coefficient of Variation	0.23	0.26	0.34
Geometric Mean (MPN/100mL)	350	152	86

Cross-Section (Event 2)

Table 4-6 depicts the descriptive statistics for the cross-section sampling event conducted on June 22. *E. coli* concentrations for the three sample locations vary little at each site during each sampling event. CV's ranged from 0.16 to 0.24, suggesting one grab sample may be sufficient for determining bacteria at a given location. *E. coli* did vary between sites, with the West Fork site showing the lowest concentrations and the Main Stem showing the highest. These trends do not remain consistent throughout every sampling event.

Table 4-6
Descriptive Statistics for the Cross-Section Sampling Method at Three Sampling Locations

Statistic	West Fork (UAA1)	East Fork (UAA4)	Main Stem (UAA2)
Number of Samples	5	5	5
Mean (MPN/100mL)	299	993	747
Minimum (MPN/100mL)	231	794	408
Maximum(MPN/100mL)	359	1374	708
Standard Deviation (MPN/100mL)	49	236	132
Standard Error (MPN/100mL)	22	105	59
Coefficient of Variation	0.16	0.24	0.18
Geometric Mean (MPN/100mL)	296	972	490

Although descriptive statistics are computed for all sites, the conditions at the Main Stem site did not allow for depth and flow measurements to be collected across the entire stream. Descriptive statistics are presented in Appendix I. For this reason, the Main Stem site was not included in scatter plots for velocity or depth comparisons and no scatter plot for flow was created.

Longitudinal (Event 3)

Table 4-7 depicts the descriptive statistics for the longitudinal section sampling event conducted on June 28 and 29. *E. coli* concentrations for the three sample locations vary little within one sampling event per site. CV ranged from 0.13 to 0.56, suggesting one grab sample may be sufficient for determining bacteria at a give location. *E. coli* did vary between sites, with the West Fork site showing the lowest concentrations and the Main Stem showing the highest. These trends do not remain consistent throughout every sampling event.

Table 4-7
Descriptive Statistics for the Longitudinal Section Sampling Method at Three Sampling Locations

Statistic	West Fork (UAA1)	East Fork (UAA4)	Main Stem (UAA2)
Number of Samples	4	5	5
Mean (MPN/100mL)	335	457	2940
Minimum (MPN/100mL)	253	109	2359
Maximum(MPN/100mL)	410	738	3448
Standard Deviation (MPN/100mL)	64.25	259	392
Standard Error (MPN/100mL)	32	116	176
Coefficient of Variation	0.19	0.57	0.13
Geometric Mean (MPN/100mL)	330	377	2918

Vertical (Event 4)

Table 4-8 depicts the descriptive statistics for the longitudinal section sampling event conducted on July 11. *E. coli* concentrations for the three sample locations vary little within one sampling event per site. CV ranged from 0.23 to 0.41, suggesting one grab sample may be sufficient for determining bacteria at a given location. *E. coli* did vary between sites, with the West Fork site showing the lowest concentrations and the Main Stem showing the highest. These trends do not remain consistent throughout every sampling event.

Table 4-8
Descriptive Statistics for the Vertical Sampling Method at Three Sampling Locations

Statistic	West Fork (UAA1)	East Fork (UAA4)	Main Stem (UAA2)
Number of Samples	3	3	3
Mean (MPN/100mL)	148	160	165
Minimum (MPN/100mL)	97	109	122
Maximum(MPN/100mL)	216	199	187
Standard Deviation (MPN/100mL)	61	46	38
Standard Error (MPN/100mL)	35	27	22
Coefficient of Variation	0.41	0.29	0.23
Geometric Mean (MPN/100mL)	140	155	162

Time Series(Event 5)

Table 4-9 depicts the descriptive statistics for the times series sampling event conducted on June 13. *E. coli* concentrations for the three sample locations vary somewhat within one sampling event per site.

The East Fork site had a CV of 0.73, suggesting there was a difference in *E. coli* concentrations over a one-hour period. The descriptive statistics from the West Fork and Main Stem sites differ from the East Fork site in that the CV's are very low, 0.23 and 0.34, respectively. *E. coli* concentrations did vary between sites, with the West Fork site showing the highest concentrations and the Main Stem showing the lowest. These trends do not remain consistent throughout every sampling event.

Table 4-9
Descriptive Statistics for the Time Series Sampling Method at Three Sampling Locations

Statistic	**West Fork (UAA1)**	**East Fork (UAA4)**	**Main Stem (UAA2)**
Number of Samples	12	12	12
Mean (MPN/100mL)	213	221	299
Minimum (MPN/100mL)	148	95	185
Maximum(MPN/100mL)	259	336	464
Standard Deviation (MPN/100mL)	34	75	81
Standard Error (MPN/100mL)	10	22	23
Coefficient of Variation	0.16	0.34	0.27
Geometric Mean (MPN/100mL)	210	207	290

Vertical (Event 6)

Table 4-10 depicts the descriptive statistics for the longitudinal section sampling event conducted on July 11. *E. coli* concentrations for the three sample locations vary little within one sampling event per site. CV ranged from 0.23 to 0.41, suggesting one grab sample may be sufficient for determining bacteria at a given location. *E. coli* did vary between sites, with the West Fork site showing the lowest concentrations and the Main Stem showing the highest. These trends do not remain consistent throughout every sampling event.

Table 4-10
Descriptive Statistics for the Vertical Sampling Method at Three Sampling Locations

Statistic	**West Fork (UAA1)**	**East Fork (UAA4)**	**Main Stem (UAA2)**
Number of Samples	3	3	3
Mean (MPN/100mL)	2876	3348	358
Minimum (MPN/100mL)	2105	1585	259
Maximum(MPN/100mL)	3448	4352	450
Standard Deviation (MPN/100mL)	693	1531	96
Standard Error (MPN/100mL)	400	884	55
Coefficient of Variation	0.24	0.46	0.27
Geometric Mean (MPN/100mL)	2816	3048	349

4.4 RECREATIONAL SUITABILITY

4.4.1 Summary of Interviews of Stream Users

During the field reconnaissance survey, field team members interviewed the WWTP operator at the City of Bellville and City of Industry WWTP. In addition to this, they also interviewed a sheriff in Bellville and property owner next to the Mill Creek. Two additional interviews were conducted during the wet and dry weather monitoring and habitat assessment when field team members spoke to two sets of people that arrived at the Main Stem site (UAA2) during sampling. Complete interview forms were not filled out as these observers were eager to move on to business elsewhere; however, team members were able to get some information from users about their contact recreation activities on Mill Creek. One set of users arrived at the stream to determine if "fish were running" and were interested in placing trot lines in the creek. The other person was interested in the field activities occurring. Contact information for these individuals was not obtained but the team members received other data regarding uses. This data were entered on an interview form (Appendix K).

Additionally, scheduled interviews and opportunistic interviews were held with local officials, business owners, and owners of land fronting Mill Creek in all major towns within the watershed. These interviews are summarized below.

4.4.2 Bellville, Texas

On July 16, PBS&J staff attended a meeting with Judge Carolyn Bilski. The judge invited realtor Frank Monk and land owner Gordon Goebel to discuss their knowledge of Mill Creek. Mr. Monk owns the property upstream of the Main Stem site, and Mr. Goebel owns the property downstream of site UAA2. The judge informed us of the proactive manner in which the city has kept the creeks and steams clean by hiring an environmental officer to prevent illegal dumping. Mr. Goebel and Mr. Monk informed us that many people other than land owners enter the creek at the Main Stem site. Mr. Monk says the creek attracts people from all around because it is well-known for containing arrowheads. The creek is used for the most part by land owners and their friends for kayaking and fishing.

A meeting was also held with Mr. Arlie Kendrick, Belleville's wastewater superintendent, on July 16, 2007. He stated that the treated wastewater from the plant feeds into Boggy Creek, which enters Mill Creek downstream of SH 36. The plant services 4,000+ people with TCEQ Permit No. 10385-002.

During a conversation with the proprietor of a barbecue restaurant north of the Main Stem site, he suggested to PBS&J staff that the creek area on Mr. Monk's property "looks really good for a little park area."

4.4.3 Bleiblerville, Texas

PBS&J employees interviewed Matt Macat and a friend in a local store on FM 2502 in Bleiblerville. Mr. Macat, who lives in Bellville, told them that prior to the last two or three years, he and a friend, Mr. Charles Peschel, used to go fishing two to three times a year at a place on Mill Creek called Blue Hole. They used a jonboat to enter the creek and used hook-and-line or trot lines to catch fish. His friend stated that over 50 years ago the creek was the place to go for swimming, fishing, and other recreational activities. Mr. Macat said that his friend Mr. Peschel owns the land next to the Blue Hole. Mr. Macat also stated that Mr. David Jackson, Mr. Byran Balkey, Mr. Mike Aldridge, and Mr. Balchek own creek-front property in the area.

4.4.4 Industry, Texas

In the town of Industry, PBS&J employees were directed to speak with a local lumber yard/hardware store owner, Mr. Everett F. Schmidt. Mr. Schmidt owns property fronting the west fork of Mill Creek. On July 16, 2007, Mr. Schmidt stated that over the past two to three years the creek has dried up, so he stopped using it. The 10 to 15 years prior to that, he would fish a couple of times a year, particularly on Good Friday. He has also observed other people using the creek for fishing and picnicking.

4.4.5 Summary of Contact Recreation Uses

A total of 14 individuals were interviewed during the study period. The primary locations for contact recreation to occur on Mill Creek appear to be downstream of the West Fork site and the stream reach between Mill Creek Road and FM 2429, just upstream of the Main Stem site. The current primary contact recreation uses include fishing, swimming, tubing, and arrowhead hunting. In the past, swimming and fishing occurred at a higher frequency and was more widespread throughout the watershed, but increased sediment loads have contributed to creating a shallower creek so that contact recreation activities only occur in the isolated areas stated above.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FIELD ACTIVITIES

During this pilot study, PBS&J was tasked by H-GAC to conduct a watershed reconnaissance to help identify pollution sources and recreational activities in the watershed, to characterize bacteria concentrations using four different sampling methods, to assess the habitat of the study reaches to help assess each reach's suitability for contact recreation, and to document existing uses via interviews. The intent of the data collection effort was to assess whether these methods were appropriate for regional or state-wide use to conduct recreational UAA's in the future. The following discussion provides an assessment of whether the approaches used in this pilot study are appropriate to implement going forward on a regional and state-wide basis.

5.2 WATERSHED RECONNAISSANCE METHODS

Watershed reconnaissance methods, both field visits and data recording methods, were appropriate and helpful in identifying both pollution sources and recreational activities in the watershed. For example, during reconnaissance work, field staff noted that most of the creek flowed through privately-owned land and that fencing followed property boundaries crossing the creek in multiple locations. This would, of course, limit boating opportunities. While paper datasheets are adequate for recording information, if UAA's are conducted on many water bodies throughout the state, data collection and management would be greatly facilitated if electronic field data collection tools could be employed. Tablet computer technology has advanced so that screen visibility is not a concern, even in direct sunlight. Field computers also are available that are more rugged and waterproof than ever before for field use.

5.3 BACTERIAL DENSITY AND WATER QUALITY MEASUREMENT METHODS

Four methods of characterizing bacterial densities were evaluated during this project. Each method required multiple samples to be collected, handled, and analyzed. To evaluate the methods, PBS&J statistically compared the first grab sample obtained at each site using each method against the geometric mean of the group of samples obtained using each method to determine if the multiple sample approach produced a statistically different result than the single grab sample. There was no statistical difference between the first grab sample and the subsequent samples pooled. Therefore, it appears that collecting a single grab sample is suitable to characterize the bacteria levels for the Mill Creek watershed. A single grab sample is also the most cost-effective approach to attain bacteria results since the other methods required three to five people per site and requires an extended time to collect bacteria samples. It should be noted that the low sample size and small number of sample sites may not allow these findings to be directly extrapolated to other, more complex, watersheds.

During the pilot study, detailed depth and velocity information (flow) was obtained to uncover any correlations among these variables and bacterial densities. Because no significant correlations were observed and because multiple velocity-depth measurements at the same site take a significant amount of additional time, it is recommended that only one set of velocity-depth measurements be required at each bacteria sampling site. The collection of general water quality measurements and, importantly, depth and velocity, should definitely be included in any future UAA protocols. Velocity and depth measurements directly relate to the suitability of recreational activities at the time of sampling. For example, high velocities or low depths might preclude a swimming recreation use.

5.4 HABITAT ASSESSMENT METHODS

Habitat assessment procedures were used during the pilot to help assess whether the water body in question was suitable for contact recreational uses. As defined in the project QAPP, the HQI provides a quantitative measure of a water body's physical condition suitability for aquatic life—the higher the score, the better the fishing. This parameter is therefore an appropriate metric for determining if a particular water body is suitable or attractive for recreational fishing. It is not, however, suitable for evaluating boating uses or swimming uses.

PBS&J altered the building blocks and scoring methods used to determine the HQI in an effort to derive a new metric we called the SSI. This approach was explained in Sections 3.2 and 4.2. Since the SSI was not in use prior to this study, we were restricted to using HQI input measurements. In the future, a more refined SSI could be developed that would consider all factors and field observations needed to evaluate swimming suitability. These factors could include: depth, velocity, temperature, access, vegetation conditions, odor, aesthetics, turbidity, bank and bed conditions, physical hazards, and other factors. A new SSI form could be developed (hard copy or electronic) to help guide the collection and management of the field data necessary to calculate the SSI.

5.5 METHODS TO DOCUMENT RECREATIONAL USES

During the pilot study, questionnaires were used to guide and document face-to-face interviews with recreational users or were provided to subjects to fill out by themselves. Subjects were found when they approached field staff or by scheduling interviews with known land owners. Face-to-face interviews were generally successful; however, a low response rate was seen among subjects receiving the questionnaires for self-completion.

A more robust method of documenting recreational uses has been employed in the Santa Ana River Watershed in San Bernardino, Riverside, and Orange Counties in California (Moore, 2007). In this watershed, stakeholders deployed Internet-enabled video surveillance cameras that took a still photograph every 15 minutes during daylight hours for one year. This generated 63,332 pictures of one water body during a year long study. The frequency allowed stakeholders to assess not only the type of recreational use, but the duration and frequency of the uses. This method of use documentation should be strongly considered for certain Texas water bodies, if stakeholder interest is high and adequate funding is available.

There appear to be two goals for documenting recreational uses in the context of a UAA or a surface water quality criteria adjustment study. First, water quality managers may wish to enroll as many recreational users as possible for epidemiological or risk assessment work. Alternatively, managers may wish to rigorously characterize the existing use of a water body under study. While the data collection for each method may be the same, the site selection methods may differ significantly.

In the first case, when researchers are trying to maximize observations, a biased sampling approach is appropriate. This would mean that subjects should be recruited and interviewed or monitored at sites most suitable for recreational uses. In the second case, when researchers are trying to objectively determine what existing uses are present, a randomized site selection process should be employed. This will allow for any variation in the water body to be addressed in the study design. For example, if an urban stream had concrete bed and banks for 90 percent of its length, and natural conditions with a park for 10 percent of its length, it might be inappropriate to extrapolate conditions and uses occurring at the park for the entire length.

5.6 AMENDMENTS TO DRAFT DATA COLLECTION PROTOCOL

The Contact Recreation UAA Protocol, when finalized, will provide guidance to interested investigators during the performance of UAA studies for waters of the state. The Draft Protocol served as the guidance document for PBS&J during the performance of all project-related activities. Methods, procedures, and datasheets provided in the Draft Protocol were utilized during various stages of the pilot study. The four field data sheets provided as part of the Draft Protocol included:

Data Sheet A – Water Body Information

Data Sheet B – Site Characterization

Datasheet C – Water Quality Data and Depth Measurements

Data Sheet D – Recreational Use Interview

Overall, the draft protocol was generally found to be exhaustive regarding the guidance it provided for activities performed during the pilot study. References made to the TCEQ SWQM were found to be accurate and to the point. Presented below are recommended changes and adjustments to various components of the draft protocol.

Data Sheet A allows the project team to provide stream segment information, define the reach or sub-segment to be studied, and record WWTP information. PBS&J recommends that the SLOC's be used instead of this data sheet since the two documents duplicate each other in terms of the data collected. However, if this data sheet is maintained, a footnote or similar statement should be provided indicating that the data sheet should be utilized only at the beginning of field data collection activities for all stream segments or sites until such time as changes to segments or sites are made.

Data Sheet B is used to record site location data, including WWTP information, field team members, and weather conditions. Additional information provided on this data sheet include GPS location data, Users Observed, Surrounding Conditions, Indications of Human Use, Photos, Stream Morphology, Aquatic Vegetation, and Water Characteristics. PBS&J recommends the following:

- Data Sheet Layout: The stream segment information, weather conditions, location description, and field personnel information should be rearranged in a user-friendly manner.

- Additional Data: Wind Intensity, Recent Significant Rainfall, and Quantity of Rainfall should be added under weather conditions. "None" should be added as a check-box option under Uses Observed and Indications of Human Use. The check-boxes for Surrounding Conditions should be redesigned to allow for the selection of "I" or "P" for each option. The preferred method for collecting substrate data should be provided on the data sheet. Finally, Water Clarity (in the absence of secci measurements) and Debris in Water should be provided as options under Water Characteristics.

- Site Location GPS Data: Non-GPS methods should be provided as options for recording site location data at the access points if GPS data for sub-segments are collected under Data Sheet A.

Data Sheet C facilitates the recording of stream width and length at the access point, field measured parameters, parameters collected for laboratory analysis, bacterial data collection method, and stream depth. PBS&J recommends the following:

- Stream Width, Length, and Depth: These parameters should be lumped together on the Data Sheet. The stream length assessed per field visit should be determined not only on whether the stream is wadeable or not, but also on the holding times for laboratory-collected samples. The stream depth tables should be modified to allow flow velocities to be recorded on the data sheet alongside depths.

- Field Parameters: The required units of measurement for all field-measured parameters should be provided on the data sheet. Data entry fields Sample Time, Sample Depth, and Data Logger should be added under field parameters.

- Parameters Collected for Lab Analysis: Additional data entry fields should be provided to record additional parameters not provided on the data sheet.

- Bacterial Data Collection: The collection method for bacteria should be standardized based on the recommendations from this report

The pilot study also examined the time constraints encountered during field activities. Based on the field activities performed during the study at individual sites, PBS&J determined that the amount of time spent at each site was dependent on the following:

- Number of field team members

- Field conditions (stream accessibility, flow severity, and stream depth)

- Data collection equipment and logistics

- Method of bacteria collection (several time dependent methods were employed)

- Number of stream depth measurement cross-sections and the length of stream assessed

The maximum and minimum number of hours spent at any one site was 2.5 and 1, respectively. It is worthy to note that time management played a key role during the performance of UAA activities on the multiple stream segments or sites.

6.0 REFERENCES

Houston-Galveston Area Council. 2007. Contact Recreation Use Attainability Analyses: Draft Protocols for Collection of Field Data. May 2007.

LULC data. 2005.

Moore, Timothy, et al. 2007. "A Picture is Worth a Thousand Words: Using Wireless Video Cameras to Subcategorize Recreational Use Designations." Proceedings of WEF Specialty Conference: TMDL, 2007. Water Environment Federation, Alexandria, VA., pp. 155-165.

Moring, J., J. Rosendale, S. Ansley, D. Brown. 1998. Fish, Benthic Macroinvertebrate, and Stream Habitat Data from the Houston-Galveston Area Council Service Area, Texas, 1997-1998. United States Geological Survey, Austin, Texas.

Texas Commission on Environmental Quality (TCEQ). 2006. Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data. Document RG-416. Surface Water Quality Monitoring Program, Monitoring Operations Division. November 2006.

Texas Parks and Wildlife Department (TPWD). 1999. Ecologically Significant River and Stream Segments of Region H, Regional Water Planning Area, October 1999.

_______. 2007. Ecological Regions of Texas. Available on the Internet: http://www.tpwd.state.tx.us/huntwild/wild/birding/pif/assist/pif_regions/.

United States Census Bureau, United States Census 2000, http://www.census.gov/census2000/states/tx.html (accessed July 20. 2007).

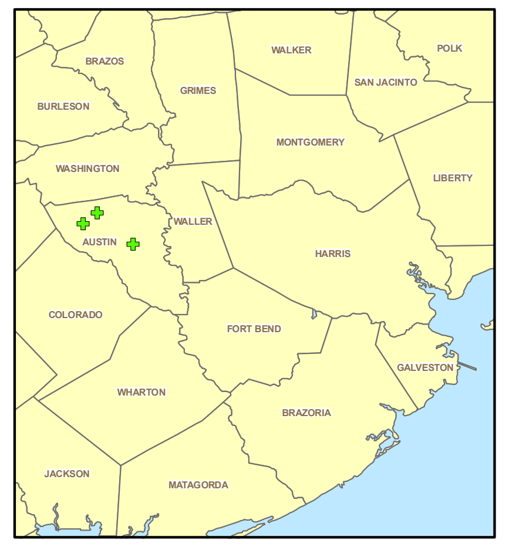
University of Texas. 2007. http://www.tsha.utexas.edu/handbook/online/articles/MM/rbmac.html (accessed July 19, 2007).

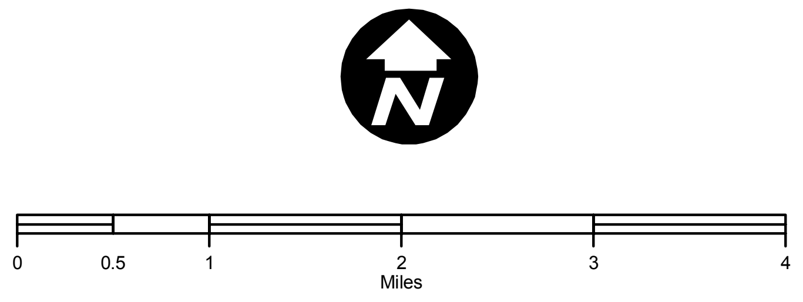
Appendix A

Watershed Reconnaissance

Projection: UTM
Datum: NAD83
Zone: 14 N
Units: Meters

Base Layers: HGAC
Roads: TxDOT
Watershed: PBS&J
Aerial Imagery: NAIP 2005





✢	Cemetary	—	Roads	**Texas Eco Regions - Level III**	
✚	Sample Location	∿	Mill Creek & Tributaries	🟧	East Central Texas Plains
▲	Potential Access Location	▨	Contact Recreation Use Area	🟫	Texas Blackland Prairies
●	Known Fishing Location	▭	Mill Creek Watershed	🟩	Western Gulf Coastal Plain
⛔	Creek Access Blocked by Barbed Wire	▭	County		
WWTP	Waste Water Treatment Plant				

PBS&J

H-GAC

Appendix A
Watershed Reconnaissance Map
Mill Creek Watershed
Austin County, Texas

Prepared By: PBS&J/19998	Scale: 1" = 1 Mile
Job No.: 461409.00	Date: Aug 8, 2007

File: N:\ENV\461409_00\projects\mxd\SLOC\Watershed_Recon_22x34.mxd

Appendix B

Representative Photographs from the Watershed Reconnaissance

Mill Creek Site Reconnaissance Photos
Austin County, Texas

Watershed reconnaissance: Mill Creek at the FM 2429 bridge.

Source of waste water discharge: Town of Industry waste water treatment plant.

Mill Creek Site Reconnaissance Photos
Austin County, Texas

Dry weather conditions: West Fork of Mill Creek, upstream of the bridge on Industry Road at Blue Hole Road.

Wet weather conditions: Same site as above.

Possible source of bacteria: Outfall structure for the City of Bellville; located on Boggy Creek, a tributary to Mill Creek.

Impediment to contact recreation: Fencing across east fork of Mill Creek on Bleiblerville Road.

Evidence of human recreational use: Picnic area next to drainage ditch in town of Bellville.

Land use: Rangeland located near East Fork Mill Creek.

Appendix C

SLOC Forms

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
SWQM STATION LOCATION REQUEST FORM

CHECK ACTION REQUIRED: [X] Add New Station [ ] Change Existing Station

Requestor Name: Marisa Weber

Contact Phone # : (713) 529-4134

Region or Agency Name:

Program Area: [X] SWQM [ ] CRP [ ] TMDL [ ] WQA [ ] Standards [X] Other (please note) UAA ~ Pilot Study

SAMPLING INFORMATION [HG] SWQM Database SOURCE CODE 1 [PB] SWQM Database SOURCE CODE 2 [SS] SWQM Database PROGRAM CODE

NEAREST DOWNSTREAM SEQUENCE #: 11576

NEAREST UPSTREAM SEQUENCE #: 11574

STATION ID (Required when making changes to existing stations)

Temporary ID __ __ __ __ __

SHORT DESCRIPTION

MILL CK AT FM2429 SofBELLVILLE

SHORT DESCRIPTION MUST BE LIMITED TO 30 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

LONG DESCRIPTION

MILL CK AT FM 2429 5.78km S of BELLVILLE 5.13km UPSTREAM of SH 36 5.25km DOWNSTREAM of MILL CREEK ROAD

LONG DESCRIPTION MUST BE LIMITED TO 135 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

USGS GAGE NUMBER

8111700

EPA TYPE:

STREAM	LEVEL 1
AMBNT	LEVEL 2
N/A	LEVEL 3
N/A	LEVEL 4
N/A	LEVEL 5

LOCATION DATA

TCEQ REGION: 12

BASIN: 12

CHECK IF STATION IS <u>ON</u> OR <u>OFF</u> CLASSIFIED TCEQ SEGMENT: IF STATION IS OFF SEGMENT, DESIGNATE NEAREST DOWNSTREAM CLASSIFIED SEGMENT.

SEGMENT: 1202K ON X OFF

TRACS COUNTY CODE: 08

LATITUDE: 29.89679 DECIMAL DEGREES

ECOREGION CODE: 33

LONGITUDE: -96.25499 DECIMAL DEGREES

HOW WAS LAT/LONG DETERMINED ? GPS X TOPO DOQQ X

WAS GPS OPERATOR TCEQ CERTIFIED ? YES X NO

WDM&A STAFF WILL COMPLETE THIS SECTION

STREAM SEQUENCE #: HUC: REACH:

MILE POINT: CHECK IF STATION IS ON OR OFF DESIGNATED EPA REACH: ON OFF

ENTERED IN TRACS BY: **DATE ENTERED:**

Mill Creek at FM 2429 looking upstream

Mill Creek at FM 2429 looking downstream

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
SWQM STATION LOCATION REQUEST FORM

CHECK ACTION REQUIRED: [X] Add New Station [ ] Change Existing Station

Requestor Name: Marisa Weber	Region or Agency Name:	Program Area: [X] SWQM [ ] CRP [ ] TMDL [ ] WQA
Contact Phone # : (713) 529-4134		[ ] Standards [X] Other (please note) UAA ~ Pilot Study

SAMPLING INFORMATION	[HG] SWQM Database SOURCE CODE 1	[PB] SWQM Database SOURCE CODE 2	[SS] SWQM Database PROGRAM CODE

NEAREST DOWNSTREAM SEQUENCE #: 11574 **NEAREST UPSTREAM SEQUENCE #: n/a**

STATION ID (Required when making changes to existing stations) Temporary ID ___ ___ ___ ___ ___

SHORT DESCRIPTION

WEST FORK MILL CK AT INDUSTRYrd

SHORT DESCRIPTION MUST BE LIMITED TO 30 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

LONG DESCRIPTION

WEST FORK MILL CK AT INDUSTRY RD-BLUEHOLE INTERSECTION 3.38km DOWNSTREAM OF SH 109

LONG DESCRIPTION MUST BE LIMITED TO 135 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

USGS GAGE NUMBER

8111700

EPA TYPE:

STREAM	LEVEL 1
AMBNT	LEVEL 2
N/A	LEVEL 3
N/A	LEVEL 4
N/A	LEVEL 5

LOCATION DATA

TCEQ REGION: 12

BASIN: 12

CHECK IF STATION IS <u>ON</u> OR <u>OFF</u> CLASSIFIED TCEQ SEGMENT: IF STATION IS OFF SEGMENT, DESIGNATE NEAREST DOWNSTREAM CLASSIFIED SEGMENT.

SEGMENT: 1202K ON ☐ OFF ☒

TRACS COUNTY CODE: 08

LATITUDE: 29.98388 DECIMAL DEGREES

ECOREGION CODE: 33

LONGITUDE: -96.45336 DECIMAL DEGREES

HOW WAS LAT/LONG DETERMINED ? GPS ☒ TOPO ☐ DOQQ ☒

WAS GPS OPERATOR TCEQ CERTIFIED ? YES ☒ NO ☐

WDM&A STAFF WILL COMPLETE THIS SECTION

STREAM SEQUENCE #: ☐☐☐☐☐ HUC: ☐☐☐☐☐☐☐☐ REACH: ☐☐

MILE POINT: ☐☐☐☐ CHECK IF STATION IS ON OR OFF DESIGNATED EPA REACH:

ON ☐ OFF ☐

ENTERED IN TRACS BY: **DATE ENTERED:**

West Fork Mill Creek at Industry Rd looking upstream 5.24.07

West Fork Mill Creek at Industry Rd looking upstream 5.28.07

West Fork Mill Creek at Industry Rd looking downstream 5.24.07

West Fork Mill Creek at Industry Rd looking downstream 5.28.07

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
SWQM STATION LOCATION REQUEST FORM

CHECK ACTION REQUIRED: [X] Add New Station [ ] Change Existing Station

Requestor Name: Marisa Weber	Region or Agency Name:	Program Area: [X] SWQM [ ] CRP [ ] TMDL [ ] WQA
Contact Phone # : (713) 529-4134		[ ] Standards [X] Other (please note) UAA ~ Pilot Study
SAMPLING INFORMATION	[HG] SWQM Database SOURCE CODE 1	[PB] SWQM Database SOURCE CODE 2
	[SS] SWQM Database PROGRAM CODE	

NEAREST DOWNSTREAM SEQUENCE #: 11574

NEAREST UPSTREAM SEQUENCE #: n/a

☐ **STATION ID** (Required when making changes to existing stations) Temporary ID __ __ __ __ __

SHORT DESCRIPTION

E	A	S	T		F	O	R	K		M	I	L	L		C	K		A	T		M	I	K	E	S	K	A	r	d

SHORT DESCRIPTION MUST BE LIMITED TO 30 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

LONG DESCRIPTION

E	A	S	T		F	O	R	K		M	I	L	L		C	K		A	T		M	I	K	E	S	K	A		R
D		5	.	7	9	k	m		N		o	f		S	H	1	5	9	-	S	H	2	5	0	2		I	N	T
E	R	S	E	C	T	I	O	N																					

LONG DESCRIPTION MUST BE LIMITED TO 135 CHARACTERS, BEGINNING WITH NAME OF WATER BODY.

USGS GAGE NUMBER

8	1	1	1	7	0	0

EPA TYPE:

S	T	R	E	A	M	LEVEL 1
A	M	B	N	T		LEVEL 2
N	/	A				LEVEL 3
N	/	A				LEVEL 4
N	/	A				LEVEL 5

LOCATION DATA

TCEQ REGION: 1 2

BASIN: 1 2

CHECK IF STATION IS <u>ON</u> OR <u>OFF</u> CLASSIFIED TCEQ SEGMENT: IF STATION IS OFF SEGMENT, DESIGNATE NEAREST DOWNSTREAM CLASSIFIED SEGMENT.

SEGMENT: 1 2 0 2K ON ☐ OFF ☒

TRACS COUNTY CODE: 0 8

LATITUDE: 3 0 • 0 2 8 6 8 DECIMAL DEGREES

ECOREGION CODE: 3 3

LONGITUDE: - 9 6 • 4 0 4 4 3 DECIMAL DEGREES

HOW WAS LAT/LONG DETERMINED ? GPS ☒ TOPO ☐ DOQQ ☒

WAS GPS OPERATOR TCEQ CERTIFIED ? YES ☒ NO ☐

WDM&A STAFF WILL COMPLETE THIS SECTION

STREAM SEQUENCE #: ____ HUC: ____ REACH: ____

MILE POINT: ____ CHECK IF STATION IS ON OR OFF DESIGNATED EPA REACH:

ON ☐ OFF ☐

ENTERED IN TRACS BY: **DATE ENTERED:**

East Fork Mill Creek at Mikeska Rd looking upstream

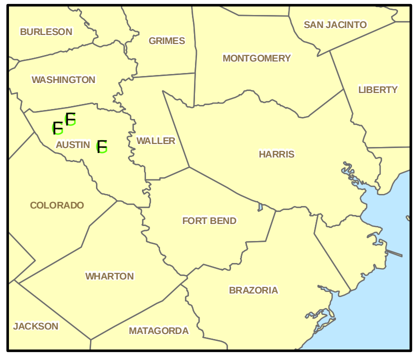
East Fork Mill Creek at Mikeska Rd looking downstream

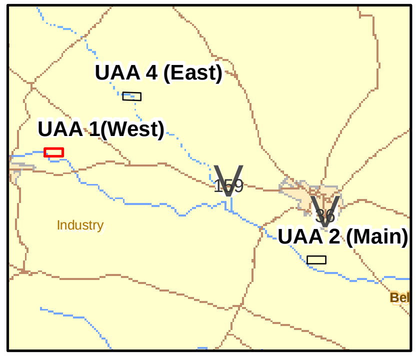
Appendix D

Site Map with Transect Locations

Projection: UTM
Datum: NAD83
Zone: 14 N
Units: Meters

Aerial Imagery: NAIP 2005 (TNRIS)
Streams: NHD
UAA: PBS&J
Transects: PBS&J





Ꝭ **Sample Locations**
? **Habitat Assessment Transects (40m apart)**
— **Streams**

0 18 36 72 108 144
Meters

PBS&J
1250 Wood Branch Park Drive, Ste. 300
Houston, Texas 77079
Phone (281) 493-5100 Fax: (281) 493-1047

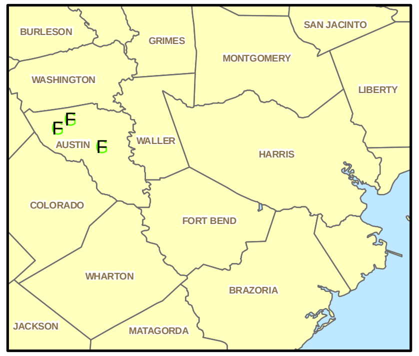
Appendix D
Site Locations with Transect Locations
UAA 1(West)

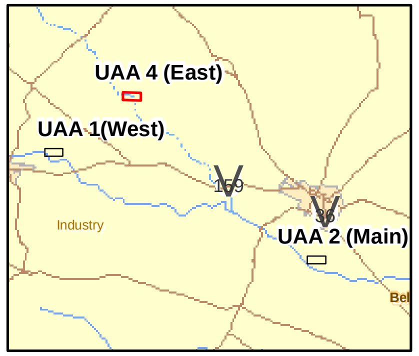
Prepared By: PBS&J/19998	Scale: 1 cm = 36 m
Job No.: 461409.00	Date: Aug 8, 2007

File: N:\ENV\461409_00\projects\mxd\SLOC\Site_Map_11x17.mxd

Projection: UTM
Datum: NAD83
Zone: 14 N
Units: Meters

Aerial Imagery: NAIP 2005 (TNRIS)
Streams: NHD
UAA: PBS&J
Transects: PBS&J





Sample Locations
? Habitat Assessment Transects (40m apart)
Streams

0 18 36 72 108 144
Meters

PBS&J
1250 Wood Branch Park Drive, Ste. 300
Houston, Texas 77079
Phone (281) 493-5100 Fax: (281) 493-1047

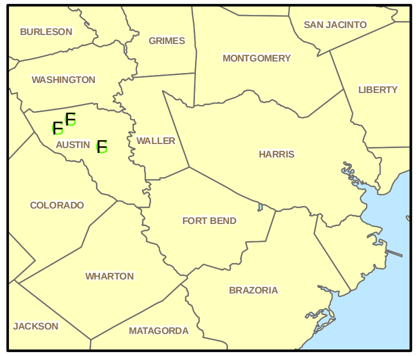
Appendix D
Site Locations with Transect Locations
UAA 4 (East)

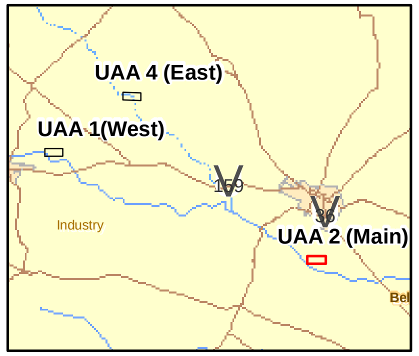
Prepared By: PBS&J/19998	Scale: 1 cm = 36 m
Job No.: 461409.00	Date: Aug 8, 2007

File: N:\ENV\461409_00\projects\mxd\SLOC\Site_Map_11x17.mxd

Projection: UTM
Datum: NAD83
Zone: 14 N
Units: Meters

Aerial Imagery: NAIP 2005 (TNRIS)
Streams: NHD
UAA: PBS&J
Transects: PBS&J





F	**Sample Locations**
?	**Habitat Assessment Transects (200m apart)**
—	**Streams**

0 18 36 72 108 144
Meters

PBS&J
1250 Wood Branch Park Drive, Ste. 300
Houston, Texas 77079
Phone (281) 493-5100 Fax: (281) 493-1047

Appendix D
Site Locations with Transect Locations
UAA 2 (Main)

Prepared By: PBS&J/19998	Scale: 1 cm = 36 m
Job No.: 461409.00	Date: Aug 8, 2007

File: N:\ENV\461409_00\projects\mxd\SLOC\Site_Map_11x17.mxd

Appendix E

Representative Photographs from the Habitat Assessment

UAA1 (West Fork): Transect 1, Facing upstream.

UAA1 (West Fork): Transect 1, facing downstream.

UAA1 (West Fork): Transect 2, Facing upstream.

UAA1 (West Fork): Transect 2, facing downstream.

UAA1 (West Fork): Transect 3, Facing upstream.

UAA1 (West Fork): Transect 3, facing downstream.

UAA1 (West Fork): Transect 4, facing upstream.

UAA1 (West Fork): Transect 4, facing downstream.

UAA1 (West Fork): Transect 5, Facing upstream.

UAA1 (West Fork): Transect 5, facing downstream.

UAA2 (Mill Creek): Transect 1, facing upstream.

UAA2 (Mill Creek): Transect 1, facing downstream.

UAA2 (Mill Creek): Transect 2, Facing upstream.

UAA2 (Mill Creek): Transect 2, facing downstream.

UAA2 (Mill Creek): Transect 3, facing upstream.

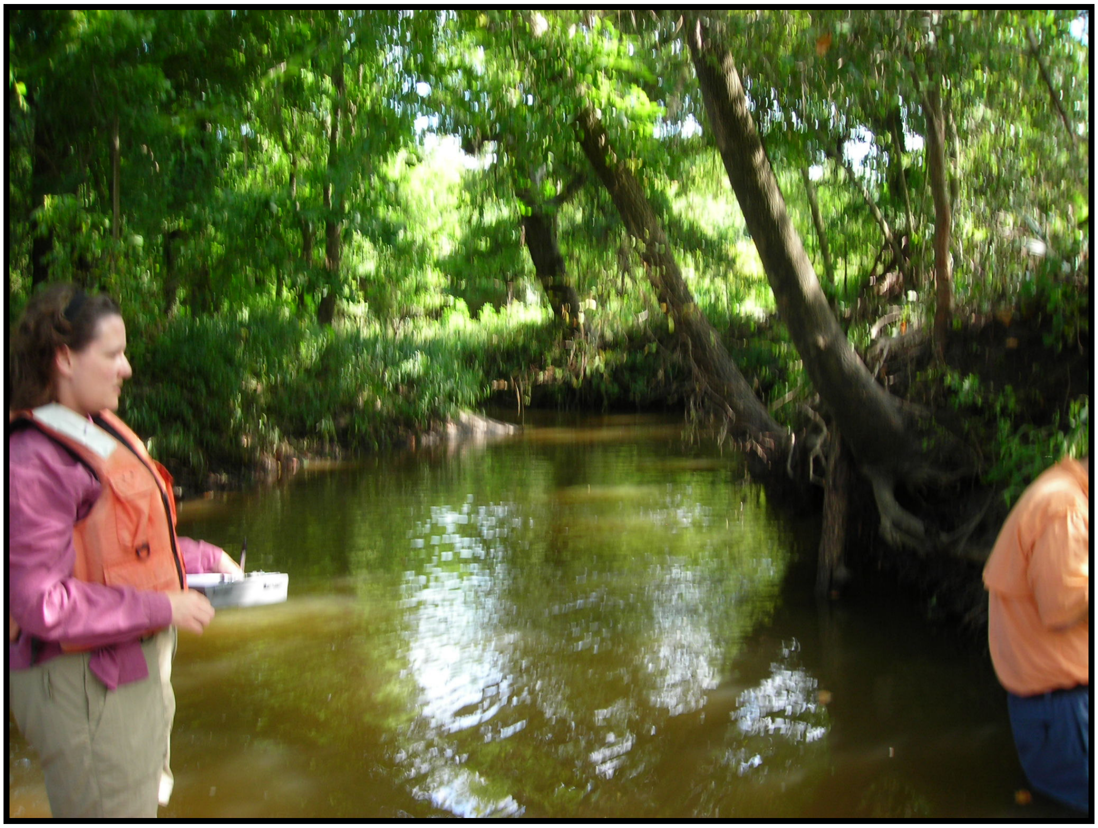
UAA1 (West Fork): Transect 3, facing downstream.

UAA2 (Mill Creek): Transect 4, Facing upstream.

UAA2 (Mill Creek): Transect 4, facing downstream.

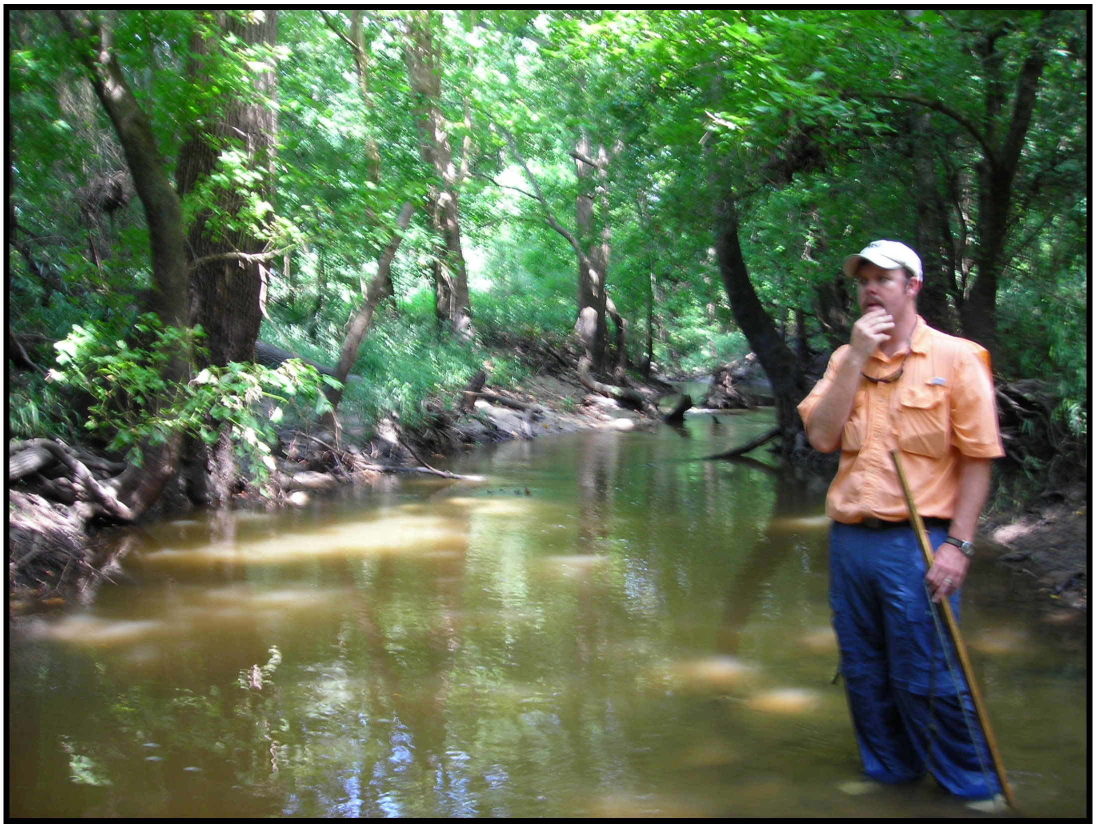
UAA2 (Mill Creek): Transect 5, facing upstream.

UAA2 (Mill Creek): Transect 5, facing downstream.



UAA4 (East Fork): Transect 1, facing upstream.

UAA4 (East Fork): Transect 1, facing downstream.



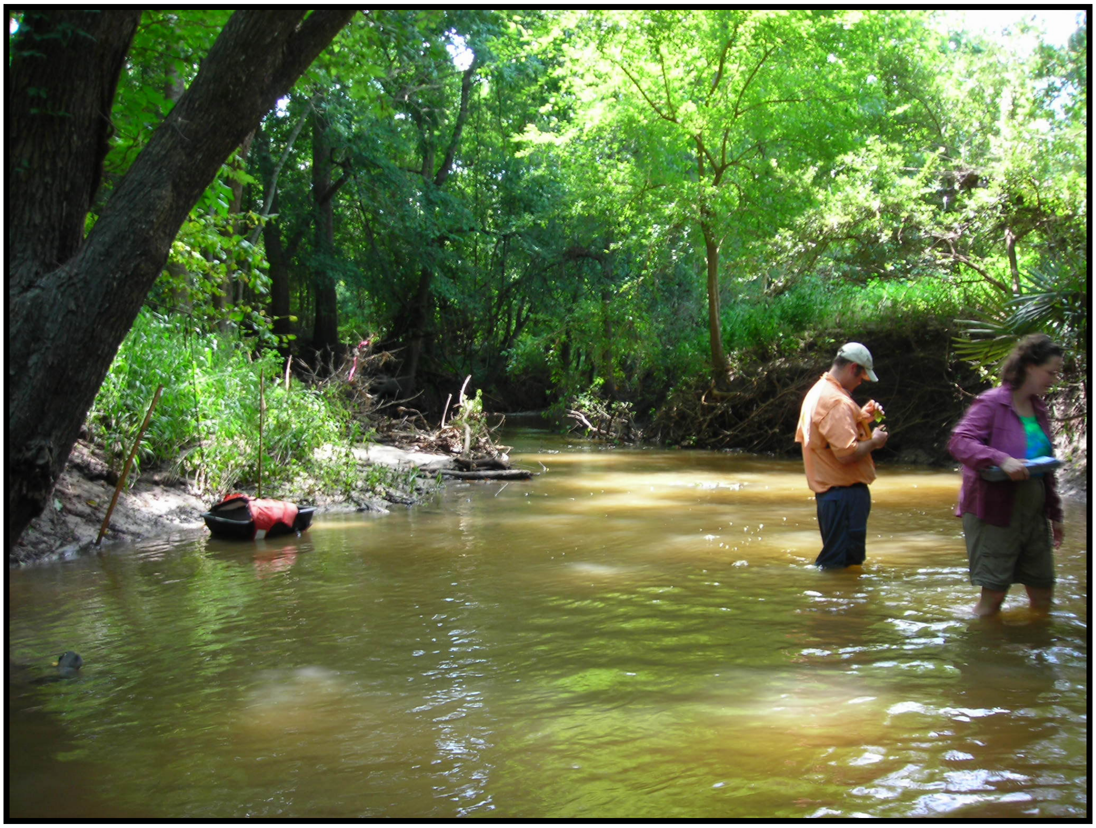
UAA4 (East Fork): Transect 2, facing upstream.

UAA4 (East Fork): Transect 2, facing downstream.

UAA4 (East Fork): Transect 3, facing upstream.

UAA4 (East Fork): Transect 3, facing downstream.

UAA4 (East Fork): Transect 4, facing upstream.



UAA4 (East Fork): Transect 4, facing downstream.

UAA4 (East Fork): Transect 5, facing upstream.

UAA4 (East Fork): Transect 5, facing downstream.

Appendix F

Habitat Assessment Forms

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Data Reporting Form

RTAG#:	REGION: 1 2	EMAIL-ID:	COLLECTOR: G U T I E R R E
STATION ID:	SEGMENT:	SEQUENCE:	DATA SOURCE:

Station Description UAA1-Industry Rd at Blue Hole Rd, Austin County, Texas

Composite - habitat events will be Both

COMPOSITE SAMPLE

COMPOSITE CATEGORY: B T=Time S=Space B=Both

START DATE (MMDDYYYY)	07102007	START TIME (HHMM)	1100	START DEPTH (SHALLOWEST) 00.00 M
END DATE (MMDDYYYY)	07102007	END TIME (HHMM)	0200	END DEPTH (DEEPEST) 00.43 M

M = meters
F = feet

HABITAT DESCRIPTORS

NOTE: All measurements reported in metric units

72052	0.0	Streambed slope over evaluated reach (from USGS map; elevation change in meters/reach length in kilometers multiplied by 1000)	89844	3	Dominant substrate type (1=clay, 2-silt, 3=sand, 4=gravel, 5=cobble, 6=boulder, 7=bedrock, 8=other)
89859	214.7	Approximate drainage area above the most downstream transect from USGS map (km²)	89845	19.0	Average percent of substrate gravel size (> 2mm) or larger (%)
89860	0.2	Length of stream evaluated (km)	84159	36.4	Average percent instream cover (%)
89832	5	Number of lateral transects that were made	89929	5	Number of Stream Cover Types
89861	6.3	Average stream width (m)	89846	54.5	Average percent stream bank erosion potential (%)
89862	0.4	Average stream depth (m)	89847	52.0	Average stream bank angle (degrees)
00061	0.8	Instantaneous stream flow (ft³/sec)	89866	5.2	Average width of natural riparian vegetation (m)
89835	5	Indicate flow measurement method 1=Flow Gage Station, 2= Electronic, 3=Mechanical, 4=Weir/Flume, 5=Doppler	89849	19.5	Average percent trees as riparian vegetation, over reach (%)
			89850	5.5	Average percent shrubs as riparian vegetation, over reach (%)
89848	3	Channel Flow Status 1=no flow, 2=low, 3=moderate, 4=high	89851	70.5	Average percent grasses and forbes as riparian vegetation, over reach (%)
89864	6.3	Maximum pool width at time of study (m)	89852	4.5	Average percent cultivated fields as riparian vegetation, over reach (%)
89865	3.3	Maximum pool depth in study area (m)	89853	0	Average percent other as riparian vegetation, over reach (%)
89839	2	Total number of stream bends	89854	61.8	Average percent tree canopy coverage (%)
89840	1	Number of well defined stream bends	89867	2	Aesthetics (1=wilderness, 2=natural, 3=common, 4=offensive)
89841	1	Number of moderately defined stream bends	84161	2	Stream Order
89842	0	Number of poorly defined stream bends	89961	1	Ecoregion (Texas Ecoregion Code)
89843	2	Total number of riffles	89962	2	Land Development Impact (1=unimpacted, 2=low, 3=moderate, 4=high)

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part I of III

Worksheet #UAA1	**Part I - Stream Physical Characteristics Worksheet**	**Page 1 of 3**

Observers: Gutierrez, Hardin, Marshall | Date: 7/10/2007 | Time: 11:00 am

Weather conditions: Mostly sunny

Stream: West fork Mill Creek | Stream segment no. UAA1

Location of site: Industry Rd @ Blue Hole Rd | Length of reach: 160m

Observed stream uses: None

Stream type (circle one): [✓ **perennial**] or **intermittent w/ perennial pools**

Stream bends: 2	No. well defined 1	No. moderately defined 1	No. poorly defined 0

Aesthetics (circle one): **(1) wilderness** [✓ **(2) natural**] **(3) common** **(4) offensive**

Channel obstructions or modifications: 2 obstructions (downed trees) | No. of riffles 2

Channel flow status (circle one): **high** [✓ **moderate**] **low** **no flow**

Riparian vegetation (%):	**Left Bank**	**Right Bank**
Trees	20	19
Shrubs	10	1
Grasses or forbs	70	71
Cultivated fields	0	9
Other	0	0

Site map:

WQD @ 14:07

Temp	28.68
Sal	0.23
Cond	0.483
DO%/mg/L	82.1/6.33
pH	7.57

Notes

Riparian zone widths	**LB**	**RB**
T1	>20m	>20m
T2	>20m	30 ft then rd
T3	>20m	50ft
T4	>20m	50ft
T5	>20m	50ft

Largest pool – 3.3 ft deep/6.3 ft wide

Wildlife observed -

pileated woodpecker (aural)
barred owl (aural)
hawk (aural)
vulture (visual)

Part I - Stream Physical Characteristics Worksheet (continued)

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg Depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 8.8	
UAA1 T1	13'2"	64	30	0.8 0.15	1.0 0.21	1.2 0.35	1.4 0.72	1.4 0.88	1.4 0.87	1.4 0.86	1.3 0.74	1.4 0.72	1.3 0.39	0.9 0.17	46	20	Total	6

Habitat type (circle one) **Riffle** **[✓ Run]** **Glide** **Pool**	Dominant substrate type Cobble (from bridge construction)	Dominant types riparian vegetation: Left bank: peppervine, morning glory, berry vines Right bank: peppervine	% Gravel or larger 90	CL	1
				CR	2

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m)		Instream cover types: cobble, some vegetation	% Instream cover 80	LB	1
		LB: 50ft	RB: >20m/next to rd			RB	2

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 64.7	
T2	18'5"	45	40	1.0 -0.7	2.0 -0.4	2.25 -0.34	2.5 0.35	2.5 0.21	2.5 0.30	2.4 0.28	2.0 0.26	1.5 0.17	1.0 0.07	0.5 -0.02	75	60	Total	44

Habitat type (Circle One) **Riffle** **Run** **[✓ Glide]** **Pool**	Dominant substrate type Mud & silt Scoured clay w/roots	Dominant types riparian vegetation: Left bank: boxelder Right bank: ash, poison ivy, peppervine	% Gravel or larger 0	CL	11
				CR	10

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m)		Instream cover types: roots, limbs	% Instream cover 15	LB	11
		LB: >20m	RB: 5ft			RB	12

Location of Transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 72.1	
T3	23'6"	40	50	0.8 0.17	1.2 0.31	1.3 0.30	1.4 0.30	1.6 0.34	1.5 0.29	1.3 0.28	1.3 0.26	1.1 0.18	0.9 0.15	0.7 0.12	67.5	50	Total	49

Habitat type (circle one) **Riffle** **Run** **[✓ Glide]** **Pool**	Dominant substrate type Sand	Dominant types riparian vegetation: Left bank: poison ivy, greenbrier Right bank: dogwood, grape vines	% Gravel or larger 0	CL	14
				CR	11

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m)		Instream cover types: roots	% Instream cover 12	LB	12
		LB: >20m	RB: 3ft			RB	12

Worksheet #UAA1

Part I - Stream Physical Characteristics Worksheet (continued)

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg Depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 83.8	
UAA1 T4	24'8"	39	65	1.2 0.85	1.2 0.60	1.0 0.79	1.1 0.74	0.8 0.69	0.7 0.66	0.6 0.70	0.4 0.13	0.0 0.0	0.0 0.0	0.3 0.29	48	75	Total	57

Habitat type (circle one) **Riffle** [✓ **Run**] **Glide** **Pool**	Dominant substrate type Sand		Dominant types riparian vegetation: Left bank: poison ivy, Indian sea-oats, greenbrier Right bank: ash, boxelder, grape vines	% Gravel or larger 5	CL	14
					CR	14
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: >20m RB: 3ft	Instream cover types: roots, woody debris, Chinese-tallow seedlings on sandbar	% Instream cover 45	LB	13
					RB	16

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 79.4	
T5	23'3"	53	90	1.0 0.30	1.3 0.47	0.9 0.59	0.9 0.75	0.8 0.06	0.7 0.06	0.8 0.64	0.7 0.78	0.8 0.48	0.6 0.26	0.4 0.09	43	65	Total	54

Habitat type (Circle One) [✓ **Riffle**] **Run** **Glide** **Pool**	Dominant substrate type Sandy mud		Dominant types riparian vegetation: Left bank: ash, Indian sea-oats Right bank: sycamore	% Gravel or larger 0	CL	14
					CR	13
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: >20m RB: 25ft	Instream cover types: roots, woody debris	% Instream cover 30	LB	12
					RB	15

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%)	
																	Total	

Habitat type (circle one) **Riffle** **Run** **Glide** **Pool**	Dominant substrate type		Dominant types riparian vegetation: Left bank: Right bank:	% Gravel or larger	CL	
					CR	
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: RB:	Instream cover types:	% Instream cover	LB	
					RB	

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part II of III

Part II - Summary of Physical Characteristics of Water Body

Using information from all of the transects and measurements in Part I and other sources, report the following general characteristics or averages for the entire reach:

Stream Name	West fork Mill Creek (UAA1)	**Date**	7/10/2007

Physical Characteristics	**Value**
Stream bed slope over evaluated reach (from USGS map; elevation change in meters/reach length in meters)	0
Approximate drainage area above the transect furthest downstream (from USGS or county highway map in km^2)	214.7
Stream order	2
Length of stream evaluated (in meters or kilometers)	160m
Number of lateral transects made	5
Average stream width (in meters)	6.28
Average stream depth (in meters)	0.35
Instantaneous stream flow (in ft^3/sec)	0.8
Indicate flow measurement method	Doppler
Channel flow status (high, moderate, low, or no flow)	Moderate
Maximum pool width (in meters)	1.9
Maximum pool depth (in meters)	1.1
Total number of stream bends	2
Number of well defined bends	1
Number of moderately defined bends	1
Number of poorly defined bends	0
Total number of riffles	2
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	19.0
Average percent instream cover	36.4
Number of stream cover types	5
Average percent stream bank erosion potential	54.5
Average stream bank slope (in degrees)	52
Average width of natural buffer vegetation (in meters)	5.2
Average riparian vegetation percent composition by: (total to equal 100%)	
Trees	19.5
Shrubs	5.5
Grasses and Forbes	70.5
Cultivated fields	4.5
Other	0
Average percent tree canopy coverage	61.8
Overall aesthetic appraisal of the stream	Natural

Texas Commission on Environmental Quality
Surface Water Quality Monitoring

Habitat Assessment Worksheet B Part III of III

UAA1

Part III - Habitat Quality Index

Habitat Parameter	Scoring Category			
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score 3	4	3	2	1
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate; gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be a mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay or bedrock
Score 2	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥ 5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score 3	4	3	2	1
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is >1 meter	**Moderate** Pool covers approximately 50% or slightly less of the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxiliary pockets
Score 4	4	3	2	1
Channel Flow Status	**High** Water reaches the base of both lower banks; < 5% of channel substrate is exposed	**Moderate** Water fills >75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score 2	3	2	1	0

UAA1

Part III - Habitat Quality Index (continued)

Habitat Parameter	**Scoring Category**			
Bank Stability	**Stable** Little evidence (<10%) of erosion or bank failure; bank angles average <30□	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9□	**Moderately Unstable** Evidence of erosion or bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60□	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60□
Score 1	3	2	1	0
Channel Sinuosity	**High** ≥ 2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) present	**Moderate** 1 well-defined bend or ≥ 3 moderately-defined bends present	**Low** <3 moderately-defined bends or only poorly-defined bends present	**None** Straight channel; may be channelized
Score 2	3	2	1	0
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score 1	3	2	1	0
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Trees and/or native vegetation are common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score 2	3	2	1	0

Total Score 20

HABITAT QUALITY INDEX

26 - 31 **Exceptional**
20 - 25 **High**
14 - 19 **Intermediate**
≤ 13 **Limited**

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Data Reporting Form

RTAG#:		REGION:	1 2	EMAIL-ID: COLLECTOR:	G U T I E R R E
STATION ID:		SEGMENT:	1 2 0 2	SEQUENCE:	
DATA SOURCE:					

Station Description UAA2-FM 2429, Austin County, Texas

Composite - habitat events will be Both

COMPOSITE SAMPLE

B	COMPOSITE CATEGORY:	T=Time	S=Space	B=Both

START DATE (MMDDYYYY)	START TIME (HHMM)	START DEPTH (SHALLOWEST)		
0 7 1 3 2 0 0 7	1 0 3 0	0 0 . 4 0	M	M = meters F = feet
END DATE (MMDDYYYY)	END TIME (HHMM)	END DEPTH (DEEPEST)		
0 7 1 3 2 0 0 7	0 2 3 0	0 2 . 7 4	M	M = meters F = feet

HABITAT DESCRIPTORS

NOTE: All measurements reported in metric units

72052	2.2	Streambed slope over evaluated reach (from USGS map; elevation change in meters/reach length in kilometers multiplied by 1000)	89844	3	Dominant substrate type (1=clay, 2-silt, 3=sand, 4=gravel, 5=cobble, 6=boulder, 7=bedrock, 8=other)
89859	902.2	Approximate drainage area above the most downstream transect from USGS map (km²)	89845	0	Average percent of substrate gravel size (> 2mm) or larger (%)
89860	1	Length of stream evaluated (km)	84159	0	Average percent instream cover (%)
89832	5	Number of lateral transects that were made	89929	2	Number of Stream Cover Types
89861	22.1	Average stream width (m)	89846	11.5	Average percent stream bank erosion potential (%)
89862	1.1	Average stream depth (m)	89847	84	Average stream bank angle (degrees)
00061	0.7	Instantaneous stream flow (ft³/sec)	89866	4.9	Average width of natural riparian vegetation (m)
89835	5	Indicate flow measurement method 1=Flow Gage Station, 2= Electronic, 3=Mechanical, 4=Weir/Flume, 5=Doppler	89849	34	Average percent trees as riparian vegetation, over reach (%)
			89850	12	Average percent shrubs as riparian vegetation, over reach (%)
89848	3	Channel Flow Status 1=no flow, 2=low, 3=moderate, 4=high	89851	45	Average percent grasses and forbes as riparian vegetation, over reach (%)
89864	1.2	Maximum pool width at time of study (m)	89852	0	Average percent cultivated fields as riparian vegetation, over reach (%)
89865	2.7	Maximum pool depth in study area (m)	89853	9	Average percent other as riparian vegetation, over reach (%)
89839	2	Total number of stream bends	89854	73	Average percent tree canopy coverage (%)
89840	0	Number of well defined stream bends	89867	2	Aesthetics (1=wilderness, 2=natural, 3=common, 4=offensive)
89841	0	Number of moderately defined stream bends	84161	4	Stream Order
89842	2	Number of poorly defined stream bends	89961	1	Ecoregion (Texas Ecoregion Code)
89843	0	Total number of riffles	89962	2	Land Development Impact (1=unimpacted, 2=low, 3=moderate, 4=high)

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part I of III

Worksheet #UAA2	**Part I - Stream Physical Characteristics Worksheet**	**Page 1 of 3**

Observers: Gutierrez, Hardin, Marshall | Date: 7/13/2007 | Time: 10:30 am

Weather conditions: Partly cloudy, hot

Stream: Mill Creek | Stream segment no. UAA2

Location of site: FM 2429 | Length of reach: 1 km

Observed stream uses: Fishing (trot line, fishing line), swimming (rope swing)

Stream type (circle one): [✓ **perennial**] or **intermittent w/ perennial pools**

Stream bends: 2	No. well defined 0	No. moderately defined 0	No. poorly defined 2

Aesthetics (circle one): **(1) wilderness** [✓ **(2) natural**] **(3) common** **(4) offensive**

Channel obstructions or modifications: 0 obstructions; dredged channel | No. of riffles 0

Channel flow status (circle one): **high** [✓ **moderate**] **low** **no flow**

Riparian vegetation (%):	**Left Bank**	**Right Bank**
Trees	35	33
Shrubs	14	17
Grasses or forbs	44	45
Cultivated fields	0	0
Other	7	12

Site map:

Notes

Largest pool – 9.0 ft deep/4.0 ft wide

Wildlife observed -
egret (visual)
great blue heron (visual)

Part I - Stream Physical Characteristics Worksheet (continued)

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect **(Unsafe to wade-old trot lines and fishing line in stream)** Thalweg Depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 47.1	
UAA2 T1	74'9"	85	5		4.0 0.07				4.0 0.14				2.2 0.34		85	15	Total	32
	Habitat type (circle one) **Riffle** **Run** [✓ **Glide**] **Pool**		Dominant substrate type Sand		Dominant types riparian vegetation: Left bank: Indian sea-oats, giant ragweed, large elms Right bank: Indian sea-oats, poison ivy, very large elm											% Gravel or larger 0	CL CR	0 2
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m) LB: 35ft	RB: 10ft	Instream cover types: none											% Instream cover 0	LB RB	13 17

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: (estimated with paddle) Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 77.9	
T2	64'2"	75	5		4.0 0.08				5.5 0.10	7.5 N/A		7.0 N/A	9 0.10		85	10	Total	53
	Habitat type (Circle One) **Riffle** **Run** [✓ **Glide**] **Pool**		Dominant substrate type Sand		Dominant types riparian vegetation: Left bank: Indian sea-oats, giant ragweed, elm, 2 large boxelders Right bank: giant ragweed, boxelder saplings											% Gravel or larger 0	CL CR	14 9
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m) LB: >20m	RB: 15ft	Instream cover types: roots											% Instream cover 0	LB RB	16 14

Location of Transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: (covered 90% of the stream width) Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 89.7	
T3	73'0"	90	10	1.3 0.05	1.5 0.15	1.3 0.05	1.4 0.16	1.4 0.18	1.9 0.80	2.2 0.11	2.6 0.07	2.7 0.06	3.0 0.08	3.5 0.10	85	10	Total	61
	Habitat type (circle one) **Riffle** **Run** [✓ **Glide**] **Pool**		Dominant substrate type Sand		Dominant types riparian vegetation: Left bank: Indian sea-oats, large sycamore Right bank: Indian sea-oats, elm, 2 large sycamores, poison ivy											% Gravel or larger 0	CL CR	14 15
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m) LB: 40ft	RB: 20ft	Instream cover types: none											% Instream cover 0	LB RB	16 16

Worksheet #UAA2

Part I - Stream Physical Characteristics Worksheet (continued)

Page 3 of 3

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg Depth: (estimated with paddle) Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 80.9	
UAA2 T4	80'6"	75	5	5.0	5.0	5.0 0.07	4.5	4.5	5.0 0.90	5.5	6.0	6.0 0.14	6.0	5.0	90	5	Total	55
	Habitat type (circle one) **Riffle** **Run** [✓ **Glide**] **Pool**		Dominant substrate type Sand				Dominant types riparian vegetation: Left bank: giant ragweed, Johnson grass Right bank: Indian sea-oats, poison ivy, large sycamore									% Gravel or larger 0	CL	8
																	CR	15
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m)				Instream cover types: Too deep to walk-no visible cover and no gravel									% Instream cover 0	LB	17
			LB: >20m	RB: 15ft													RB	15

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 67.6	
T5	71'0"	90	30	1.6 0.02	1.6 0.05	1.5 0.11	1.7 0.10	1.9 0.15	1.7 0.38	2.0 0.38	2.4 0.48	2.9 0.42	2.9 0.46	3.3 0.45	80	20	Total	46
	Habitat type (Circle One) **Riffle** **Run** [✓ **Glide**] **Pool**		Dominant substrate type Sand				Dominant types riparian vegetation: Left bank: Indian sea-oats, ash, elm, sugarberry Right bank: Indian sea-oats, sycamore, ash									% Gravel or larger 0	CL	7
																	CR	13
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m)				Instream cover types: downed tree									% Instream cover 0	LB	11
			LB: >20m	RB: 20ft													RB	15

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%)	
																	Total	
	Habitat type (circle one) **Riffle** **Run** **Glide** **Pool**		Dominant substrate type				Dominant types riparian vegetation: Left bank: Right bank:									% Gravel or larger	CL	
																	CR	
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**		Width of natural buffer vegetation (m)				Instream cover types:									% Instream cover	LB	
			LB:	RB:													RB	

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part II of III

Part II - Summary of Physical Characteristics of Water Body

Using information from all of the transects and measurements in Part I and other sources, report the following general characteristics or averages for the entire reach:

Stream Name	Mill Creek (UAA2)	**Date**	7/17/2007

Physical Characteristics	**Value**
Stream bed slope over evaluated reach (from USGS map; elevation change in meters/reach length in meters)	2.2%
Approximate drainage area above the transect furthest downstream (from USGS or county highway map in km^2)	902.2
Stream order	4
Length of stream evaluated (in meters or kilometers)	1 km
Number of lateral transects made	5
Average stream width (in meters)	22.1
Average stream depth (in meters)	1.1
Instantaneous stream flow (in ft^3/sec)	0.7
Indicate flow measurement method	Doppler
Channel flow status (high, moderate, low, or no flow)	Moderate
Maximum pool width (in meters)	1.2
Maximum pool depth (in meters)	2.7
Total number of stream bends	2
Number of well defined bends	0
Number of moderately defined bends	0
Number of poorly defined bends	2
Total number of riffles	0
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	0
Average percent instream cover	0
Number of stream cover types	2
Average percent stream bank erosion potential	11.5
Average stream bank slope (in degrees)	84
Average width of natural buffer vegetation (in meters)	4.9
Average riparian vegetation percent composition by: (total to equal 100%)	
Trees	34
Shrubs	12
Grasses and Forbes	45
Cultivated fields	0
Other	9
Average percent tree canopy coverage	73
Overall aesthetic appraisal of the stream	Natural

Texas Commission on Environmental Quality
Surface Water Quality Monitoring

Habitat Assessment Worksheet B Part III of III

UAA2

Part III - Habitat Quality Index

Habitat Parameter	**Scoring Category**			
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score 1	4	3	2	1
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate; gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be a mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay or bedrock
Score 1	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥ 5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score 1	4	3	2	1
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is >1 meter	**Moderate** Pool covers approximately 50% or slightly less of the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxiliary pockets
Score 2	4	3	2	1
Channel Flow Status	**High** Water reaches the base of both lower banks; < 5% of channel substrate is exposed	**Moderate** Water fills >75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score 2	3	2	1	0

Part III - Habitat Quality Index (continued)

Habitat Parameter	**Scoring Category**			
Bank Stability (Note: Although slope average was 84%, the type of soils on the banks are not conducive to erosion, so parameter was ranked as 2 instead of 1)	**Stable** Little evidence (<10%) of erosion or bank failure; bank angles average <30□	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9□	**Moderately Unstable** Evidence of erosion or bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60□	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60□
Score 2	3	2	1	0
Channel Sinuosity	**High** ≥ 2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) present	**Moderate** 1 well-defined bend or ≥ 3 moderately-defined bends present	**Low** <3 moderately-defined bends or only poorly-defined bends present	**None** Straight channel; may be channelized
Score 0	3	2	1	0
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score 1	3	2	1	0
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Trees and/or native vegetation are common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score 2	3	2	1	0

Total Score 12

HABITAT QUALITY INDEX

26 - 31	**Exceptional**
20 - 25	**High**
14 - 19	**Intermediate**
≤ 13	**Limited**

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Data Reporting Form

RTAG#								
REGION	1	2						
EMAIL-ID:								
COLLECTOR	G	U	T	I	E	R	R	E
STATION ID								
SEGMENT								
SEQUENCE								
DATA SOURCE								

Station Description UAA4-Ueckert Rd, Austin County, Texas

Composite - habitat events will be Both

COMPOSITE SAMPLE

B COMPOSITE CATEGORY: T=Time S=Space B=Both

	M	M	D	D	Y	Y	Y	Y
START DATE	0	7	1	2	2	0	0	7
END DATE	0	7	1	2	2	0	0	7

	H	H	M	M
START TIME	1	0	3	0
END TIME	0	1	3	0

START DEPTH (SHALLOWEST)	0	0.	1	2	M
END DEPTH (DEEPEST)	0	0.	8	0	M

M = meters
F = feet

HABITAT DESCRIPTORS

NOTE: All measurements reported in metric units

72052	0.0	Streambed slope over evaluated reach (from USGS map; elevation change in meters/reach length in kilometers multiplied by 1000)	89844	3	Dominant substrate type (1=clay, 2-silt, 3=sand, 4=gravel, 5=cobble, 6=boulder, 7=bedrock, 8=other)
89859	308.2	Approximate drainage area above the most downstream transect from USGS map (km²)	89845	19.0	Average percent of substrate gravel size (> 2mm) or larger (%)
89860	0.2	Length of stream evaluated (km)	84159	42.0	Average percent instream cover (%)
89832	5	Number of lateral transects that were made	89929	4	Number of Stream Cover Types
89861	5.8	Average stream width (m)	89846	41.0	Average percent stream bank erosion potential (%)
89862	0.4	Average stream depth (m)	89847	49.0	Average stream bank angle (degrees)
00061	1.2	Instantaneous stream flow (ft³/sec)	89866	9.7	Average width of natural riparian vegetation (m)
89835	5	Indicate flow measurement method 1=Flow Gage Station, 2= Electronic, 3=Mechanical, 4=Weir/Flume, 5=Doppler	89849	30.0	Average percent trees as riparian vegetation, over reach (%)
			89850	5.5	Average percent shrubs as riparian vegetation, over reach (%)
89848	3	Channel Flow Status 1=no flow, 2=low, 3=moderate, 4=high	89851	55.5	Average percent grasses and forbes as riparian vegetation, over reach (%)
89864	2.0	Maximum pool width at time of study (m)	89852	4.0	Average percent cultivated fields as riparian vegetation, over reach (%)
89865	1.1	Maximum pool depth in study area (m)	89853	5.0	Average percent other as riparian vegetation, over reach (%)
89839	6	Total number of stream bends	89854	71.8	Average percent tree canopy coverage (%)
89840	2	Number of well defined stream bends	89867	2	Aesthetics (1=wilderness, 2=natural, 3=common, 4=offensive)
89841	3	Number of moderately defined stream bends	84161	2	Stream Order
89842	1	Number of poorly defined stream bends	89961	1	Ecoregion (Texas Ecoregion Code)
89843	6	Total number of riffles	89962	2	Land Development Impact (1=unimpacted, 2=low, 3=moderate, 4=high)

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part I of III

Worksheet #UAA4

Part I - Stream Physical Characteristics Worksheet

Page 1 of 3

Observers: Floyd, Gutierrez, Hardin
Date: 7/12/2007
Time: 10:30 am
Weather conditions: Sunny and hot
Stream: East fork Mill Creek
Stream segment no. UAA4
Location of site: Ueckert Rd
Length of reach: 160m
Observed stream uses: One old trot line
Stream type (circle one): [✓ **perennial**] or **intermittent w/ perennial pools**
Stream bends: 6
No. well defined 2
No. moderately defined 3
No. poorly defined 1
Aesthetics (circle one): **(1) wilderness** [✓ **(2) natural**] **(3) common** **(4) offensive**
Channel obstructions or modifications: 1 obstruction (downed tree)
No. of riffles 6
Channel flow status (circle one): **high** [✓ **moderate**] **low** **no flow**

Riparian vegetation (%):	**Left Bank**	**Right Bank**
Trees	35	25
Shrubs	5	6
Grasses or forbs	48	63
Cultivated fields	8	0
Other	4	6

Notes

Largest pool – 3.6 ft deep/6.5 ft wide

Wildlife observed -
downy/hairy woodpecker (aural)
fish crow (aural)
cardinal (visual)
frog (visual)
raccoon (tracks)

Site map:

Part I - Stream Physical Characteristics Worksheet (continued)

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg Depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 67.6	
UAA4 T1	4.3m	60	50	0.6 0.43	0.8 0.53	1.1 0.6	1.3 0.52	2.0 0.56	2.5 0.52	2.6 0.47	2.6 0.50	2.6 0.46	2.4 0.29	2.1 0.11	30	70	Total	46

	Habitat type (circle one) **Riffle** [✓ **Run**] **Glide** **Pool**	Dominant substrate type Sand	Dominant types riparian vegetation: Left bank: Indian sea-oats, elm Right bank: Indian sea-oats	% Gravel or larger 40	CL 11 CR 11
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: 60ft RB: 50ft	Instream cover types: roots	% Instream cover 25	LB 11 RB 13

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 85.3	
T2	6.3m	25	35	1.0 0.46	1.3 0.64	1.0 1.08	0.8 1.01	0.8 0.94	0.7 1.12	0.7 1.15	0.5 0.05	0.5 0.68	0.3 1.07	0.5 0.68	65	50	Total	58

	Habitat type (Circle One) [✓ **Riffle**] **Run** **Glide** **Pool**	Dominant substrate type Sand	Dominant types riparian vegetation: Left bank: Indian sea-oats, sugarberry Right bank: Indian sea-oats, sugarberry	% Gravel or larger 20	CL 14 CR 15
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: >20m RB: 40ft	Instream cover types: woody debris, gravel	% Instream cover 75	LB 14 RB 15

Location of Transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%) 76.5	
T3	6.2m	70	50	0.4 1.44	0.6 1.52	0.5 1.47	1.0 0.68	1.0 0.20	1.6 0.42	2.0 0.27	1.9 0.46	1.8 0.53	1.7 0.67	1.3 0.26	25	35	Total	52

	Habitat type (circle one) [✓ **Riffle**] **Run** **Glide** **Pool**	Dominant substrate type Sand	Dominant types riparian vegetation: Left bank: palmetto, sugarberry Right bank: Indian sea-oats, 2 large sycamores, 2 large ashes	% Gravel or larger 20	CL 13 CR 14
Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**	Algae (circle one) **Abundant** **Common** **Rare** **Absent**	Width of natural buffer vegetation (m) LB: >20m RB: 45ft	Instream cover types: 1 large log, woody debris	% Instream cover 75	LB 13 RB 12

Part I - Stream Physical Characteristics Worksheet (continued)

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg Depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%)	
UAA4 T4	6.5m	45	20	0.9 0.47	0.7 0.63	1.4 0.33	1.6 0.59	1.4 0.62	1.3 0.68	1.3 0.43	1.4 0.36	1.0 0.12	1.4 0.05	0.5 0.09	65	40	58.8	
																	Total	40
																	CL	8
																	CR	8
																	LB	13
																	RB	11

Habitat type (circle one) **Riffle** **Run** [✓ **Glide**] **Pool**

Dominant substrate type: Sand

Dominant types riparian vegetation:
Left bank: Indian sea-oats
Right bank: Indian sea-oats, sugarberry

% Gravel or larger: 10

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**

Algae (circle one) **Abundant** **Common** **Rare** **Absent**

Width of natural buffer vegetation (m): LB: >20m RB: 20ft

Instream cover types: roots, limbs

% Instream cover: 20

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%)	
T5	5.7m	65	40	0.5 0.68	0.8 0.34	0.7 0.73	0.5 0.64	0.8 0.36	1.1 0.52	1.5 0.80	1.7 1.13	1.7 0.99	1.2 0.26	0.7 0.08	40	20	70.6	
																	Total	48
																	CL	14
																	CR	10
																	LB	12
																	RB	12

Habitat type (Circle One) **Riffle** [✓ **Run**] **Glide** **Pool**

Dominant substrate type: Sand

Dominant types riparian vegetation:
Left bank: Indian sea-oats, ash
Right bank Indian sea-oats

% Gravel or larger: 5

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**

Algae (circle one) **Abundant** **Common** **Rare** **Absent**

Width of natural buffer vegetation (m): LB: >20m RB: 5ft

Instream cover types: limbs, roots

% Instream cover: 15

Location of transect	Stream width (m)	Left bank slope (E)	Left bank erosion potential (%)	Stream Depths (~~m~~) (ft) at Points Across Transect Thalweg depth: Flow (ft/s)											Right bank slope (E)	Right bank erosion potential (%)	Tree canopy (%)	
																	Total	
																	CL	
																	CR	
																	LB	
																	RB	

Habitat type (circle one) **Riffle** **Run** **Glide** **Pool**

Dominant substrate type

Dominant types riparian vegetation:
Left bank:
Right bank:

% Gravel or larger

Macrophytes (circle one) **Abundant** **Common** **Rare** **Absent**

Algae (circle one) **Abundant** **Common** **Rare** **Absent**

Width of natural buffer vegetation (m): LB: RB:

Instream cover types:

% Instream cover

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Habitat Assessment Worksheet B Part II of III

Part II - Summary of Physical Characteristics of Water Body

Using information from all of the transects and measurements in Part I and other sources, report the following general characteristics or averages for the entire reach:

Stream Name	East fork Mill Creek (UAA4)	**Date**	7/17/2007

Physical Characteristics	**Value**
Stream bed slope over evaluated reach (from USGS map; elevation change in meters/reach length in meters)	0
Approximate drainage area above the transect furthest downstream (from USGS or county highway map in km^2)	308.2
Stream order	2
Length of stream evaluated (in meters or kilometers)	160m
Number of lateral transects made	5
Average stream width (in meters)	5.8
Average stream depth (in meters)	0.37
Instantaneous stream flow (in ft^3/sec)	1.2
Indicate flow measurement method	Doppler
Channel flow status (high, moderate, low, or no flow)	Moderate
Maximum pool width (in meters)	2.0
Maximum pool depth (in meters)	1.1
Total number of stream bends	6
Number of well defined bends	2
Number of moderately defined bends	3
Number of poorly defined bends	1
Total number of riffles	6
Dominant substrate type	Sand
Average percent of substrate gravel sized or larger	19
Average percent instream cover	42
Number of stream cover types	4
Average percent stream bank erosion potential	41
Average stream bank slope (in degrees)	49
Average width of natural buffer vegetation (in meters)	9.7
Average riparian vegetation percent composition by: (total to equal 100%)	
Trees	30
Shrubs	5
Grasses and Forbes	56
Cultivated fields	4
Other	5
Average percent tree canopy coverage	72
Overall aesthetic appraisal of the stream	Natural

Texas Commission on Environmental Quality
Surface Water Quality Monitoring

Habitat Assessment Worksheet B Part III of III

UAA4

Part III - Habitat Quality Index

Habitat Parameter	**Scoring Category**			
Available Instream Cover	**Abundant** >50% of substrate favorable for colonization and fish cover; good mix of several stable (not new fall or transient) cover types such as snags, cobble, undercut banks, macrophytes	**Common** 30-50% of substrate supports stable habitat; adequate habitat for maintenance of populations; may be limited in the number of different habitat types	**Rare** 10-29.9% of substrate supports stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	**Absent** <10% of substrate supports stable habitat; lack of habitat is obvious; substrate unstable or lacking
Score 3	4	3	2	1
Bottom Substrate Stability	**Stable** >50% gravel or larger substrate; gravel, cobble, boulders; dominant substrate type is gravel or larger	**Moderately Stable** 30-50% gravel or larger substrate; dominant substrate type is mix of gravel with some finer sediments	**Moderately Unstable** 10-29.9% gravel or larger substrate; dominant substrate type is finer than gravel, but may still be a mix of sizes	**Unstable** <10% gravel or larger substrate; substrate is uniform sand, silt, clay or bedrock
Score 2	4	3	2	1
Number of Riffles To be counted, riffles must extend >50% the width of the channel and be at least as long as the channel width	**Abundant** ≥ 5 riffles	**Common** 2-4 riffles	**Rare** 1 riffle	**Absent** No riffles
Score 4	4	3	2	1
Dimensions of Largest Pool	**Large** Pool covers more than 50% of the channel width; maximum depth is >1 meter	**Moderate** Pool covers approximately 50% or slightly less of the channel width; maximum depth is 0.5-1 meter	**Small** Pool covers approximately 25% of the channel width; maximum depth is <0.5 meter	**Absent** No existing pools; only shallow auxiliary pockets
Score 3	4	3	2	1
Channel Flow Status	**High** Water reaches the base of both lower banks; < 5% of channel substrate is exposed	**Moderate** Water fills >75% of the channel; or <25% of channel substrate is exposed	**Low** Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed	**No Flow** Very little water in the channel and mostly present in standing pools; or stream is dry
Score 2	3	2	1	0

UAA4

Part III - Habitat Quality Index (continued)

Habitat Parameter	**Scoring Category**			
Bank Stability	**Stable** Little evidence (<10%) of erosion or bank failure; bank angles average <30□	**Moderately Stable** Some evidence (10-29.9%) of erosion or bank failure; small areas of erosion mostly healed over; bank angles average 30-39.9□	**Moderately Unstable** Evidence of erosion or bank failure is common (30-50%); high potential of erosion during flooding; bank angles average 40-60□	**Unstable** Large and frequent evidence (>50%) of erosion or bank failure; raw areas frequent along steep banks; bank angles average >60□
Score___1___	3	2	1	0
Channel Sinuosity	**High** ≥ 2 well-defined bends with deep outside areas (cut banks) and shallow inside areas (point bars) present	**Moderate** 1 well-defined bend or ≥ 3 moderately-defined bends present	**Low** <3 moderately-defined bends or only poorly-defined bends present	**None** Straight channel; may be channelized
Score___3___	3	2	1	0
Riparian Buffer Vegetation	**Extensive** Width of natural buffer is >20 meters	**Wide** Width of natural buffer is 10.1-20 meters	**Moderate** Width of natural buffer is 5-10 meters	**Narrow** Width of natural buffer is <5 meters
Score___1___	3	2	1	0
Aesthetics of Reach	**Wilderness** Outstanding natural beauty; usually wooded or unpastured area; water clarity is usually exceptional	**Natural Area** Trees and/or native vegetation are common; some development evident (from fields, pastures, dwellings); water clarity may be slightly turbid	**Common Setting** Not offensive; area is developed, but uncluttered such as in an urban park; water clarity may be turbid or discolored	**Offensive** Stream does not enhance the aesthetics of the area; cluttered; highly developed; may be a dumping area; water clarity is usually turbid or discolored
Score___2___	3	2	1	0

Total Score___21___

HABITAT QUALITY INDEX

26 - 31	**Exceptional**
20 - 25	**High**
14 - 19	**Intermediate**
≤ 13	**Limited**

Appendix G

Water Quality Sampling Forms

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name West Fork Mill Creek

Stream Segment Number NO segment ID #

Station ID UAA-1 (Station ID requires submittal of SLOC form)

Date & Time: 6/13/07 14:03

Site Location Description (e.g., road crossing): West fork mill creek @ Industry & Bluehole Rd.

Personnel (Data Collectors): Marica Weber, Pavitra Ramachan, Kofi Sam

Current Weather Conditions: Partly Cloudy

Weather Conditions for Past 10 days: No rain.

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger ______ Permit # ______

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☐ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 29.98388 Y -96.46536

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓ Datum: NAD 27___ or NAD 83 ✓
State Plane ___ Datum: NAD 27___ or NAD 83___ Zone______
UTM ___ Datum: NAD 27___ or NAD 83___ Zone______

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)

Static Mode
Dynamic Mode (Kinematic) ______
Precise Positioning Service ______
Signal Averaging ______
Real Time Differential Processing ______
WAAS- Wide Area Augmentation System

Interpolation

Topographic Map or DRG
Aerial Photograph or DOQQ ✓
Satellite Imagery ______
Interpolation Other ______

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters
EPE ± ______ Feet or ± ______ Meters
PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ___
1:100,000 ___
Other ___
± ______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

- ☐ City/county parks
- ☐ Playgrounds
- ☐ Wildlife
- ☐ Residential
- ☐ Industrial
- ☐ Urban
- ☐ Campgrounds
- ☐ Boating access
- ☐ State parks
- ☐ National forests
- ☐ Nature trails
- ☐ Stairs/walkway
- ☐ No trespass sign
- ☑ Fence
- ☑ Steep slopes
- ☐ Other:

Comments: Wire fence on either side of stream and bridge. Slopes are steep

Indications of Human Use: (attach photos)

- ☑ Roads
- ☐ Rope swings
- ☐ Dock/platform
- ☐ Foot paths/prints
- ☐ RV / ATV Tracks
- ☐ Camping Sites
- ☐ Fire pit/ring
- ☐ Fishing Tackle
- ☐ NPDES Discharge
- ☐ Livestock Watering
- ☐ Other

Comments: Only road traffic.

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
15-1	documentation	16-1	documentation	17-1	documentation
				18-1	"
				19-1	"
				20-1	"

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	0.5	0.75
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	0.5	0.75
POOL					

Substrate (These values should add up to 100%.)

% Cobble	20 % Gravel	60 % Sand	% Silt	20 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) ______________

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). ______________

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: ______________ Date of Survey: 6/13/07
Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** No segment ID# **Station ID** UAA 1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 0.61 meters 23.5' (12')
Total length of reach assessed ~~0.61~~ meters (stream width x 40) *150 m minimum - 500 m maximum*
12.2 mr 8/27/07 per comm w/ JRB

Field Parameters

Air Temp ~~27.39~~ 27.45 JRB 6/14/07 °C
Water Temp 27.39 °C
DO 6.89 mg/l
pH 7.89
Conductivity 0.673 mS/cm
Salinity 0.32 ppt
Secchi Depth 0.21 m
Flow severity 3
Flow (CFS) 0.0395

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

☑ TSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)

Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used

☑ Timed Average — Total time 60 min at 5 min intervals
☐ Cross section — 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal — 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical — Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

***Wadeable Streams* – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.**

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**
0.61	80	5"	8"	6"	3"	4"	2.5"	1.5"						50
		0.127	0.203	0.152	0.076	0.101	0.064	0.038						

Non-wadeable Streams – one transect at access point

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/14/07

Organization: JBS+J Position: Sr Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Main Fork Mill Creek
Stream Segment Number 1202K
Station ID UAA-2 (Station ID requires submittal of SLOC form)

Date & Time: 6/13/07
Site Location Description (e.g., road crossing): Mill Creek @FM 2429
Personnel (Data Collectors): John Branom, Jesse Moya
Current Weather Conditions: Partly Cloudy
Weather Conditions for Past 10 days: No Rain

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger ____ Permit # ____

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 29.89679 Y -96.25499

LOCATION COORDINATES **(Please Indicate coordinate system used for data collection):**

Latitude Longitude ___ Datum: NAD 27 ___ or NAD 83 ✓
State Plane ___ Datum: NAD 27 ___ or NAD 83 ___ Zone ____
UTM ___ Datum: NAD 27 ___ or NAD 83 ___ Zone ____

HORIZONTAL COLLECTION METHOD **(Indicate the method used to determine the locational data.)**

Global Positioning System (GPS)

Static Mode ____
Dynamic Mode (Kinematic) ____
Precise Positioning Service ____
Signal Averaging ____
Real Time Differential Processing ____
WAAS - Wide Area Augmentation System

Interpolation

Topographic Map or DRG ____
Aerial Photograph or DOQQ ✓
Satellite Imagery ____
Interpolation Other ____

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ____ Meters
EPE ± ____ Feet or ± ____ Meters
PDOP ____

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ____ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None. Three people did walk down to the waters edge and evaluate the fishing conditions briefly. They left before we could interview them.

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☑ Steep slopes
☑ Other:

Comments: Banks are steeply sloped and there is concrete riprap lining the banks making them dangerous.

Indications of Human Use: (attach photos)

☑ Roads
☑ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: Rope swing on southern bank upstream of the bridge. There are pull off marks next to the bridge & road where people have pulled off the road & parked.

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
3-1	documentation	5-1	documentation	1-1	documentation
				2-1	
				6-1	
				7-1	

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	28	250	[illegible]	[illegible]
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	28	250	[illegible]	[illegible]
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	75 % Sand	% Silt	25 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) ______________

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant

Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotten egg ☐ fishy ☐ musky

Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black

Bottom Deposit: ☐ sludge ☐ solids ☐ fine sediments ☐ none ☐ other

Water Surface: ☐ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). Log jams in front of bridge

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: ______________ Date of Survey: 6/13/07

Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 1202K **Station ID** UAA2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 28.38 meters
Total length of reach assessed ~~28.38~~ meters (stream width x 40) *150 m minimum - 500 m maximum*
15.2 mi 8/27/07 per comm w/ JRB

Field Parameters

Air Temp 30.12 °C
Water Temp 29.54 °C
DO 7.72 mg/l
pH 7.86
Conductivity 0.567
Salinity 0.15 ppt
Secchi Depth 0.46
Flow severity 2
Flow (CFS) 22.3

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

- ☑ TSS/VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________________

Protocol Used
☑ Timed Average Total time 60 min at 5 min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**
28.38	80	0.76	0.84	0.61	0.23	0.46	0.76	0.76	0.30	0.30	0.24	0.23	0.76	80

Non-wadeable Streams – one transect at access point

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/13/07

Organization: PBS+J Position: Sr Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name East fork Mill Creek
Stream Segment Number NO Segment ID #
Station ID UAA-4 (Station ID requires submittal of SLOC form)

Date & Time: 6/13/07 12:05
Site Location Description (e.g., road crossing): East fork Mill Creek @ Uekert Rd. West
Personnel (Data Collectors): Pavitra Rammohan, Marisa Weber, Kati Sam
Current Weather Conditions: Partly Cloudy
Weather Conditions for Past 10 days: NO rain.

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger____ Permit #____

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 30.02868 Y -96.40443

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	___	Datum: NAD 27___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27___	or NAD 83___	Zone________
UTM	___	Datum: NAD 27___	or NAD 83___	Zone________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	_____
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		

WAAS- Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______Meters
EPE ± ______Feet or ± ______Meters
PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ______Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☑ Fence
☑ Steep slopes
☑ Other:

Comments: Fencing & gaurd rails impede access to stream.

Indications of Human Use: (attach photos)

☐ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
23-1	documentation	24-1	documentation	25-1	documentation
				26-1	"
				27-1	"
				28-1	"

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	20		
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	0 % Gravel	60 % Sand	20 % Silt	20 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) ______________
None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☐ none ☐ oil ☐ acrid ☑ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). ______________

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: ______________ Date of Survey: 6/13/07
Organization: PBSJ Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** No segment ID# **Station ID** UAA 4

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 0.61 meters ~~24ft~~ JRB
Total length of reach assessed 3105 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp 27.62° C
Water Temp 27.07 ° C
DO 6.07 mg/l
pH 7.81
Conductivity 0.734 mS/cm
Salinity 0.36 ppt
Secchi Depth 0.53 m
Flow severity 3
Flow (CFS) 2.12

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP - TKN

0.734 →
mS/cm

→ B4
μS/cm

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________
Protocol Used
☑ Timed Average Total time 60 min at 5 min intervals
☐ Cross section 11 equally spaced samples every ____ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ____ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**
0.61	50	10"	17"	20"	22"	21"	21"	14"					22"	65
		0.254	0.432	0.508	0.559	0.533	0.533	0.356						

Non-wadeable Streams – one transect at access point

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/14/07

Organization: PBSJ Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

2.

(must be completed for each site)

Stream Segment Name West Fork Mill Creek
Stream Segment Number ~~UAA-MC-1~~ no segment ID #
Station ID UAA-1 (Station ID requires submittal of SLOC form)

Date & Time: 6/22/07 (1236)
Site Location Description (e.g., road crossing): West Fork Mill Creek at Industry Rd / BlueHole Rd
Personnel (Data Collectors): Pavitra Rammohan, Kofi Sam, Jesse Moya, Jeremy Marshall
Current Weather Conditions: Cloudy, 32°C (89°F)
Weather Conditions for Past 10 days: wet, rainy

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger________________ Permit #________________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 29.98388 Y -96.46536

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27 ___	or NAD 83 ✓		
State Plane	___	Datum: NAD 27 ___	or NAD 83 ___	Zone	________
UTM	___	Datum: NAD 27 ___	or NAD 83 ___	Zone	________

see Data sheets from Event # I

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	✓
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		

WAAS - Wide ~~Area~~ Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality
FOM ± ______________Meters
EPE ± ________Feet or ± ________Meters
PDOP ______________

Interpolation Data Quality
Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ________Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other
✓ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☑ Other:

Comments: ~~buzzards~~ K.S 04/22/07

Indications of Human Use: (attach photos)

☑ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments:

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
DSC06443	stream run facing downstream	DSC06437	stream run & left bank		

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0m upstream of bridge	4.6	40	—	—
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0m downstream of bridge	4.6	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	20 % Gravel	60 % Sand	% Silt	20 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other light brown/ yellow
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 6/22/07
Organization: PBSRJ Position: Engineer I

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name West Fork Mill Creek **Segment #** ~~UAA-MC-1~~ NO segment ID# JRB 8/6/07 **Station ID** UAA-MC-1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 3.66 meters
Total length of reach assessed ~~3.66~~ 12.2 meters (stream width x 40) *150 m minimum - 500 m maximum*
MW 8/27/07 per comm w/ JRB

Field Parameters

Air Temp 31.6 °C
Water Temp 26.01 °C
DO 5.99 mg/l
pH 7.60
Conductivity 0.321
Salinity 0.15 ppt
Secchi Depth 1ft (upstream)
Flow severity 3-normal
Flow (CFS) 10.19 (calculated)

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS /VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP/ TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________
Protocol Used
☐ Timed Average Total time ____min at ______min intervals
☑ Cross section 5 ~~11~~ equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom
Other 5 samples taken at the same time across stream width at access point.

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
						JRB 8/6/07								

flow velocities @ A/S: @0.2depth 1.00 1.47 0.53
@0.8depth 0.99 1.17 0.47

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
3.66	80	1.16'	1.33'	1'									1.33	50

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/22/07

Organization: PBSJ Position: Engineer II

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name MAin Fork Mill Creek 2

Stream Segment Number ~~UAA-MC-2~~ 1802K

Station ID UAA-2 (Station ID requires submittal of SLOC form)

Date & Time: 06/22/07 (1430)

Site Location Description (e.g., road crossing): Intersection of Mill Creek and FM 2429

Personnel (Data Collectors): Pavitra Rammohan, Kofi Sam, Jesse Moya, Joseny Marshall

Current Weather Conditions: cloudy, 89°F (30°C)

Weather Conditions for Past 10 days: wet, rainy,

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger______ Permit #______

Drought Conditions: (*Use Palmer Drought Severity Index*)

- ☐ Extreme
- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ Incipient Dry Spell
- ☐ Near Normal
- ☐ Incipient Wet Spell
- ☑ Slightly Wet
- ☐ Moderately Wet
- ☐ Very Wet
- ☐ Extremely Wet

See Data Sheets Event #1

Site Location: X 29.89679 Y -96.25499

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27___	or NAD 83___	Zone______
UTM	___	Datum: NAD 27___	or NAD 83___	Zone______

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	____	Topographic Map or DRG	____
Dynamic Mode (Kinematic)	____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	____	Satellite Imagery	____
Signal Averaging	____	Interpolation Other	____
Real Time Differential Processing	____		

WAAS - Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters

EPE ± ______ Feet or ± ______ Meters

PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ____

1:100,000 ____

Other ____

± ______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

- ☐ Swimming
- ☐ Skin diving
- ☐ SCUBA diving
- ☐ Tubing
- ☐ Water skiing
- ☐ Wind surfing
- ☐ Kayaking
- ☐ Boating
- ☐ Canoeing
- ☐ Wading
- ☐ Rafting
- ☐ Hunting
- ☐ Trapping
- ☐ Fishing
- ☑ Other None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☑ Steep slopes
☑ Other:

Comments: Steepslopes + riprap impede safe use.

Indications of Human Use: (attach photos)

☑ Roads
☑ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: Rope swing on south bank 50 meters upstream.

Photos (attach additional sheets if needed)

Upstream Photos

Photo ID#	Photo Purpose
DSC06475	showing stream run and banks

Downstream Photos

Photo ID#	Photo Purpose
DSC06486	stream run

Other Photos

Photo ID#	Photo Purpose

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	6.096	250	—	—
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	6.096	250	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	40 % Sand	30 % Silt	30 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☐ [✓ green/brown] light ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature:
Date of Survey: 06/22/07
Organization: PBSRJ
Position: Engineer II

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 1202K ~~UAA-MC 2~~ JRB **Station ID** UAA-MC-2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 6.096 meters (1/4 of total stream width)
Total length of reach assessed ~~6.096~~ 15.2 meters (stream width x 40) *150 m minimum - 500 m maximum*
mw 8/27/07 per comm. w/ JRB

Field Parameters

Air Temp 31.6 °C
Water Temp 26.12 °C
DO 6.10 mg/l
pH 7.79
Conductivity 0.263
Salinity 0.12 ppt
Secchi Depth 1ft
Flow severity 3 - normal
Flow (CFS) 47.1 cfs (calculated) = 1/4 of total stream width

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

- ☑ TSS / VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)

Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________

Protocol Used

☐ Timed Average Total time ____min at ______min intervals
☑ Cross section 5 ~~11~~ equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom
Other - 5 samples collected at about the same time (2@ left quarter, 2@ right quarter, 1 w/ middle half)

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams* – *5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

One depth/velocity measurement taken at right quarter of stream due to moderate flow conditions
velocity at 0.2depth = 2.09 ft/s at 0.8depth = 1.05 ft/s

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
		2'												

avg velocity 1.57 ft/s

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/22/07

Organization: PBS&J Position: Engineer II

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name East Mill Creek 4

Stream Segment Number ~~UAA-MS-4~~ no segment ID#

Station ID UAA 4 (Station ID requires submittal of SLOC form)

Date & Time: 6/22/07 (1330)

Site Location Description (e.g., road crossing): Intersection of East Mill Creek and Ueckert Rd

Personnel (Data Collectors): Pavitra Rammohan, Kofi Samy, Jesse Moya, Jeremy Marshall

Current Weather Conditions: cloudy 89°F (32°C)

Weather Conditions for Past 10 days: rainy, wet

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger ________ Permit # ________

Drought Conditions: (*Use Palmer Drought Severity Index*)

- ☐ Extreme
- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ Incipient Dry Spell
- ☐ Near Normal
- ☐ Incipient Wet Spell
- ☑ Slightly Wet
- ☐ Moderately Wet
- ☐ Very Wet
- ☐ Extremely Wet

See Event #1 data sheets

Site Location: X 30.02868 Y -96.40443

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27 ___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27 ___	or NAD 83 ___	Zone ____
UTM	___	Datum: NAD 27 ___	or NAD 83 ___	Zone ____

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)

Static Mode ____
Dynamic Mode (Kinematic) ____
Precise Positioning Service ____
Signal Averaging ____
Real Time Differential Processing ____
WAAS - Wide Area Augmentation System

Interpolation

Topographic Map or DRG ____
Aerial Photograph or DOQQ ✓
Satellite Imagery ____
Interpolation Other ____

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters
EPE ± ____ Feet or ± ____ Meters
PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ____ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

- ☐ Swimming
- ☐ Skin diving
- ☐ SCUBA diving
- ☐ Tubing
- ☐ Water skiing
- ☐ Wind surfing
- ☐ Kayaking
- ☐ Boating
- ☐ Canoeing
- ☐ Wading
- ☐ Rafting
- ☐ Hunting
- ☐ Trapping
- ☐ Fishing
- ☐ Other
- ☒ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.)

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☑ Other:

Comments: buzzards, barb wire/fence

Indications of Human Use: (attach photos)

☑ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments:

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
DSC06449	upsteam view	DSC06451	downsteam view	DSC06457	upsteam rght bank
			and banks	DSC06458	upsteam left bank

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4.6	20	—	—
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0 m downstream of bridge	4.6	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	80 % Sand	% Silt	20 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant

Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky

Color: ☐ no color ☑ light green ☐ dark green ☐ tan ☐ red ☐ green/brown ☐ black

Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other

Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Ram
Date of Survey: 6/22/07
Organization: PBS&J
Position: Engineer II

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name East Mill Creek **Segment #** NO segment ID # ~~UAA-MC-4~~ JRB **Station ID** UAA-MC-4

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 4.88 meters
Total length of reach assessed ~~4.88~~ 12.2 meters (stream width x 40) *150 m minimum - 500 m maximum*
mw 8/27/07 per comm w/ JRB

Field Parameters

Air Temp 31.6 °C
Water Temp 26.48 °C
DO 5.29 mg/l
pH 7.66
Conductivity 0.316
Salinity 0.15 ppt
Secchi Depth 1ft
Flow severity 3-normal
Flow (CFS) 22.9 (calculated)

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP- TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________

Protocol Used

☐ Timed Average Total time ____min at ______min intervals
☑ Cross section 5 ~~11~~ equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom
☒ Other 5 samples collected at the same time, evenly spaced across stream width

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams* – *5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

JRB
7/6/07

Measured velocities: 0.2depth 0.52 1.02 1.09
0.8depth 0.5 0.8 1.04

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
4.88	50	1.6'	2.9'	2.2'									2.9'	65

Average velocities 0.51ft/s 0.91ft/s 1.07ft/s

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: - 6/22/07

Organization: PBSRJ Position: Engineer II

Field Data Sheets for Contact Recreation UAA
Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek

Stream Segment Number ~~1 West Fork~~ No segment #

Station ID UAA-1 (Station ID requires submittal of SLOC form)

Date & Time: 06/28/07, 12:45 P.M

Site Location Description (e.g., road crossing): Blue hole @ Industry Dr.

Personnel (Data Collectors): Pavitra Rammohan, Hoji Sam, Justin Dyer, Schlitzkus, Marisa Webe, John Bramon, Jesse Moya

Current Weather Conditions: Cloudy, ~33.3°C

Weather Conditions for Past 10 days: Rainy

Is there a WWTP at the site? ☐ Yes ☒ No

If yes, Name of Discharger________ Permit #________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

see Event # 1 data sheets

Site Location: X 2998788 Y -96.46536

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓	Datum:	NAD 27___	or NAD 83 ✓	
State Plane ___	Datum:	NAD 27___	or NAD 83___	Zone_____
UTM ___	Datum:	NAD 27___	or NAD 83___	Zone_____

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	___	Topographic Map or DRG	___
Dynamic Mode (Kinematic)	___	Aerial Photograph or DOQQ	✓
Precise Positioning Service	___	Satellite Imagery	___
Signal Averaging	___	Interpolation Other	___
Real Time Differential Processing	___		

WAAS-Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters

EPE ± ____ Feet or ± ____ Meters

PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ___ 1:100,000 ___ Other ___

± ____ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other
☒ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☒ Other:

Comments: None

Indications of Human Use: (attach photos)

☑ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos — Photo ID# — Photo Purpose
Downstream Photos — Photo ID# — Photo Purpose
Other Photos — Photo ID# — Photo Purpose

DSC06538-39 Showing the upstreaming downstream of site
DSC06541 – showing upstream of bridge crossing
DSC06542–43 Showing downstream of bridge crossing
DSC06544 – 561 – Showing selection of transects ~~and~~ upstream of bridge crossing and collection of samples)

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4-6	40	—	—
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☐ Yes ☐ No
If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4-6	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	20 [✓ % Gravel]	60 [✓ % Sand]	% Silt	20 [✓ % Mud/Clay]	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Pavitra Rammohan Date of Survey: 06/08/2007
Organization: PBSJ Position: Engineer-II

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** No segment ID# 1 West Fork **Station ID** 1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 3.96 meters
Total length of reach assessed 150 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters
Air Temp 92°F or 33.3°C °C
Water Temp 27.89 °C
DO 5-94 mg/l
pH 7-75
Conductivity 0-483
Salinity 0.23 ppt
Secchi Depth >1.5 ft (hit the bottom of stream)
Flow severity 3
Flow (CFS) 3.76

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP-TKN

120 m
2-30 p.m
13 inches
velocity 0-39

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used
☐ Timed Average Total time ____min at ______min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☑ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

80 m
2-24 P.M
13 inches
velocity
0-26

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
3.96	65	* See reverse side of form.											0.33	85

40 m
depth
23 inches
0-32
velocity

2:20 P.M

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

[illegible]

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/28/07

Organization: PBS&J Position: Sr. Scientist /

160 m
12 inches
0-25
2-32 P.M

Flow Transect

Location	Depth (m)	Flow (f/s)
Left ~~Rt.~~ Bank /28/07 1	0.18	0.15
2	0.15	0.08
3	0.20	0.12
4	0.23	0.15
5	0.25	0.15
6	0.31	0.28
7	0.33	0.30
8	0.33	0.49
9	0.33	0.46
10	0.33	0.53
11	0.28	0.41
12	0.33	0.37
13	0.33	0.56
14	0.33	0.56
15	0.31	0.40
16	0.33	0.35
17	0.31	0.37
18	0.31	0.29
19	0.28	0.18
Rt. ~~Lt.~~ Bank 20 /28/07	0.20	0.03

0 m

Field Data Sheets for Contact Recreation UAA
Data Sheet B - Site Characterization
(must be completed for each site)

Stream Segment Name Mill Creek – Main Stem
Stream Segment Number 1202K
Station ID UAA-2 (Station ID requires submittal of SLOC form)

Date & Time: 06/29/07, 1036
Site Location Description (e.g., road crossing): Intersection of MC & FM2429
Personnel (Data Collectors): Casey Holden and Jeremy Marshall
Current Weather Conditions: Partly cloudy, 29.31°C
Weather Conditions for Past 10 days: Rainy, ~~[illegible]~~

Is their a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger____ Permit #____

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

See datasheets from Event # 1

Site Location: 29.89679 X -96.25499

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓	Datum: NAD 27___ or NAD 83 ✓		
State Plane ___	Datum: NAD 27___ or NAD 83___	Zone___	
UTM ___	Datum: NAD 27___ or NAD 83___	Zone___	

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	___	Topographic Map or DRG	___
Dynamic Mode (Kinematic)	___	Aerial Photograph or DOQQ	✓
Precise Positioning Service	___	Satellite Imagery	___
Signal Averaging	___	Interpolation Other	___
Real Time Differential Processing	___		

WAAS-Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality
FOM ± ___ Meters
EPE ± ___ Feet or ± ___ Meters
PDOP ___

Interpolation Data Quality
Source Map Scale: 1:24,000 ___
1:100,000 ___
Other ___
± ___ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other
☑ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds .
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating accesses
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☑ Other:

Comments: None

Indications of Human Use: (attach photos)

☒ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos Photo ID#	Upstream Photos Photo Purpose	Downstream Photos Photo ID#	Downstream Photos Photo Purpose	Other Photos Photo ID#	Other Photos Photo Purpose
IMG_0816 -0821	Showing upstream				
IMG_0822 -0825	Showing dense vegetation and mostly clay on the banks of bayou.				

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	26	250	—	—
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☐ Yes ☐ No
If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	26	250	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	% Sand	% Silt	100 [✓ % Mud/Clay]	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant

Odor: . ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky

Color: . ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black

Bottom Deposit: ☐ sludge ☐ solids ☐ fine sediments ☑ none ☐ other

Water Surface: ☐ clear ☐ scum ☐ foam ☐ debris ☐ sheen ☑ Ripples

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Pavitra Ramanathan Date of Survey: 06/29/07

Organization: PBS&J Position: Engineer II

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name MILL CREEK **Segment #** 1202K **Station ID** VAA-2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 33 meters
Total length of reach assessed 1000 meters (stream width x 40) ~~150 m minimum - 500 m maximum~~
NON-WADEABLE

Field Parameters

Air Temp	29.31 °C
Water Temp	26.53 °C
DO	6.38 mg/l
pH	7.81
Conductivity	0.386 mS/cm
Salinity	0.15 ppt
Secchi Depth	0.4 m
Flow severity	4 - MODERATE
Flow (~~C~~FS)	1.07

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
- ☑ TSS / VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used
☐ Timed Average Total time ____min at ______min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☑ Longitudinal 5 equally spaced samples every 250 m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

~~Wadeable Streams~~ – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

JKB 8/6/07

✓ ***Non-wadeable Streams*** – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
33	60	*SEE BACK											1.2	85

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 6/~~28~~ 29/07 JKB 7/17/07

Organization: PBS+J Position: SCI II

FLOW @ TRANSECT 1

LOC	DEPTH (m)	FLOW (fps) 60%&80%	20%
Ft BANK			
1	.33	.25	
2	.33	.26	
3	.67	.70	
4	.67	.88	
5	.67	.80	
6	.50	1.03	
7	.33	1.11	
8	.33	1.23	
9	.33	1.13	
10	.33	1.15	
11	.33	1.31	
12	.20	.46	
13	.33	.75	
14	.4	1.12	
15	.67	1.31	
16	.67	1.25	
17	.67	1.06	
18	.80	1.03	.87
19	.80	1.04	1.39
20	1.2	1.14	1.37
21	1.2	1.11	1.37
22	.33	1.21	
23	.33	1.06	
RT BANK			

→ WIDTH = 33 m

OTHER INFO

WATER; ODOR - NONE
COLOR - BRN
CLARITY - POOR
FLOW - MODERATE
SHEEN - NONE
FLOATABLES - LEAVES ONLY
NO DEBRIS

BACT SAMPLES

LOC	DEPTH (m)	FLOW (fps)
3-02-01	.67	1.07
3-02-02	3.0	.39
3-02-03	1.25	.42
3-02-04	2.0	.33
3-02-05	1.0	.53

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek

Stream Segment Number ~~2~~ ~~4 East Fork~~ no segment ID#

Station ID MMC-4 (Station ID requires submittal of SLOC form)

Date & Time: 06/29/07, 11:30am

Site Location Description (e.g., road crossing): Uckert ~~Industry~~ & Blebbville

Personnel (Data Collectors): PR, ~~KS~~, ~~JDS~~, JM, JB

Current Weather Conditions: Cloudy

Weather Conditions for Past 10 days: Cloudy, Rainy (Showers)

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger________ Permit #________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

See Event #1 data Sheets

Site Location: X 30.02868 Y -96.40443

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓ Datum: NAD 27___ or NAD 83 ✓

State Plane ___ Datum: NAD 27___ or NAD 83___ Zone____

UTM ___ Datum: NAD 27___ or NAD 83___ Zone____

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)

Static Mode ____
Dynamic Mode (Kinematic) ____
Precise Positioning Service ____
Signal Averaging ____
Real Time Differential Processing ____
WAAS Wide Area Augmentation System

Interpolation

Topographic Map or DRG ____
Aerial Photograph or DOQQ ✓
Satellite Imagery ____
Interpolation Other ____

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ____ Meters
EPE ± ____ Feet or ± ____ Meters
PDOP ____

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ____ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☑ Other
None.

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☑ Other:

Comments: None

Indications of Human Use: (attach photos)

☑ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
DSC06579-588	Showing ~~upst~~ selection of transects upstream				
DSC06589-596	Showing upstream				
DSC06597	Showing the segment marks				
-DSC06612					

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4.6	20	—	—
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☐ Yes ☐ No
If so, is there an obvious current? ☐ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4.6	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	% Sand	% Silt	% Mud/Clay	% Bedrock
0	0	50	25	25	0

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) Debris at the bottom of Stream. Sediments on the L & R banks

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other Light brown
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). I observed plants/shrubs beneath the water surface, the branches causing eddies. Not certain, if they are, aquatic plants

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Pavitra Ramachan Date of Survey: 06/29/07
Organization: PBS&J Position: Engineer II

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 4 - East Fork No segment ID # **Station ID** 4

Water quality data only needs to be collected at the stream access point.

PR 07/26/07 → (40 ft from Access pt)

Stream Width at Access Point ~~15-0 ft~~ meters

Total length of reach assessed 160 meters (stream width x 40) *150 m minimum - 500 m maximum*

(15/20 = 0.75 ft)

Field Parameters

Air Temp 90 °C
Water Temp 26.99 °C
DO 5.67 mg/l
pH 7.61
Conductivity 0.479
Salinity 0.23 ppt
Secchi Depth 4 ft.
Flow severity 3-Normal
Flow (CFS) 16.01

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

- ☑ TSS/VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)

Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________

Protocol Used

☐ Timed Average Total time ____min at ______min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☑ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Depth of Stream
2.75 ft

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
15 ft	50												0.79	65

(Look at banks & te)

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

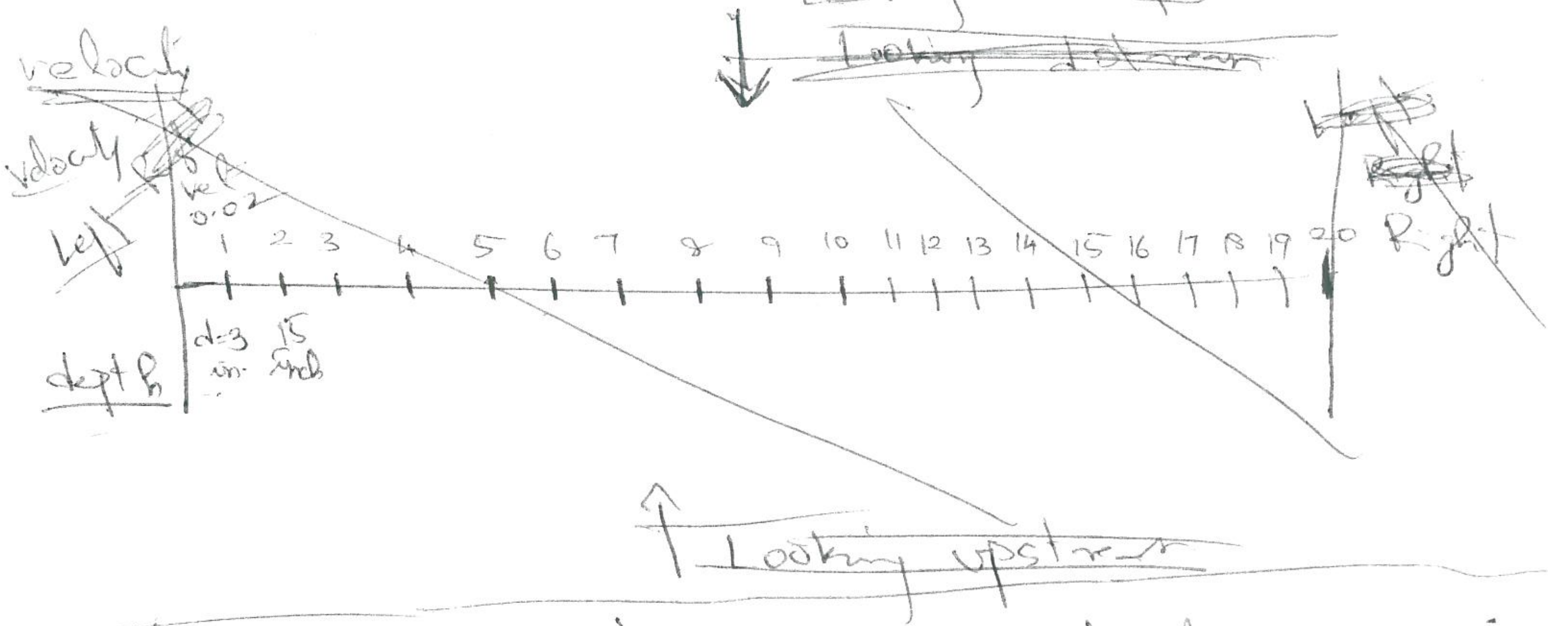
8/6/07

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 06/29/07

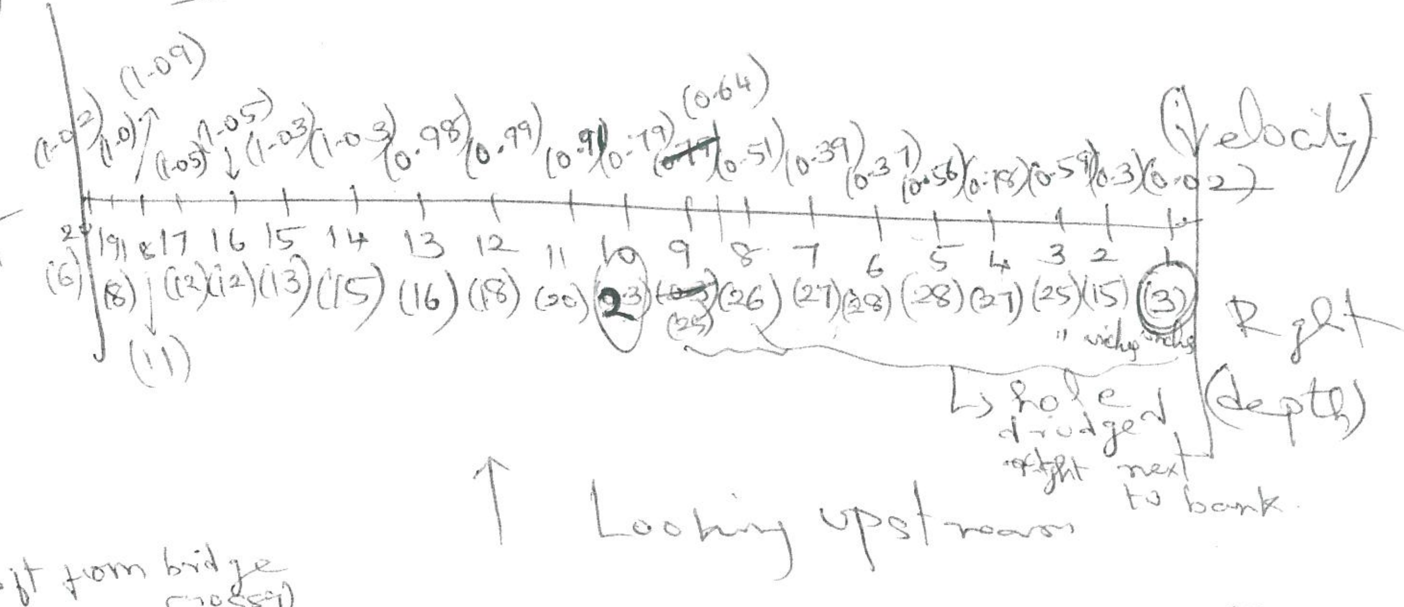
Organization: PBS&J Position: Engineer II

Transect 1st → 40 ft from bridge crossing



Site UAA4

Transect 1st → 40 ft from bridge crossing



(40 ft from bridge crossing)

① 0 m
velocity
0.59
depth
20 inches
1.06 P.M.

② 40 m
vel 0.86
dep 15 inches

③ 80 m
(1.42)
18 inches

④ 120 m
15 inches
(1.12)

⑤ 160 m
(25 inches)

Field Data Sheets for Contact Recreation UAA
Data Sheet B - Site Characterization
(must be completed for each site)

Stream Segment Name West Fork Mill Creek
Stream Segment Number ~~UAA WMC-1~~ NO segment ID # 8/6/07
Station ID UAA1 (Station ID requires submittal of SLOC form)

Date & Time: 7/11/07 14:00
Site Location Description (e.g., road crossing): West Fork Millcreek at Industry
Personnel (Data Collectors): John Branom, Jesse Maya
Current Weather Conditions: Partly Cloudy & Calm 35.30°C
Weather Conditions for Past 10 days: Last significant rainfall was 7/5/07

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger________ Permit #________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

See Event #1 data sheets

Site Location: X 29.98388 Y -96.46536
LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓	Datum: NAD 27___ or NAD 83 ✓		
State Plane ___	Datum: NAD 27___ or NAD 83___	Zone____	
UTM ___	Datum: NAD 27___ or NAD 83___	Zone____	

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	___	Topographic Map or DRG	___
Dynamic Mode (Kinematic)	___	Aerial Photograph or DOQQ	✓
Precise Positioning Service	___	Satellite Imagery	___
Signal Averaging	___	Interpolation Other	___
Real Time Differential Processing	___		

WAAS- Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality	**Interpolation Data Quality**
FOM ± ____ Meters	Source Map Scale: 1:24,000 ___
EPE ± ____ Feet or ± ____ Meters	1:100,000 ___
PDOP ____	Other ___
	± ____ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other
☑ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

- ☐ City/county parks
- ☐ Playgrounds
- ☐ Wildlife
- ☐ Residential
- ☐ Industrial
- ☐ Urban
- ☐ Campgrounds
- ☐ Boating access
- ☐ State parks
- ☐ National forests
- ☐ Nature trails
- ☐ Stairs/walkway
- ☐ No trespass sign
- ☑ Fence
- ☐ Steep slopes
- ☑ Other:

Comments: There is a borbed wire fence just west of the sample point that runs parallel to the stream.

Indications of Human Use: (attach photos)

- ☐ Roads
- ☐ Rope swings
- ☐ Dock/platform
- ☐ Foot paths/prints
- ☐ RV / ATV Tracks
- ☐ Camping Sites
- ☐ Fire pit/ring
- ☐ Fishing Tackle
- ☐ NPDES Discharge
- ☐ Livestock Watering
- ☐ Other

Comments: N/A

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
1	Sample Collection site	1 (4)	View		
1 (1)	Flow + depth measurement	1 (5)	View		
1 (2)	View	1 (6)	View		
1 (3)	View				

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	3.96	40	—	—
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	3.96	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	2 % Gravel	28 % Sand	% Silt	70% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) There are sparce aquatic macrophytes growing in a shallow area which has a high percent gravel content.

Water Characteristics: (Mark all that apply.)
Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotten egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☐ [✓ green/brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). Vegetation growing well along the banks. Debris have been flushed down stream (i.e. logs).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 7/11/07
Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** No segment # West Fork **Station ID** UAA1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 3.96 meters
Total length of reach assessed 150 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp 35.30 °C
Water Temp 28.23 °C
DO 10.18 mg/l
pH 7.84
Conductivity 520 µS/cm
Salinity 0.25 ppt
Secchi Depth 0.46
Flow severity 3
Flow (CFS) 4.06

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

- ☑ TSS/VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: T-Phosphorus TKN

Bacterial Data Collection (attach bacterial results to this form)

Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used

☐ Timed Average — Total time ____min at ______min intervals
☐ Cross section — 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal — 5 equally spaced samples every ________ m (reach length//4)
☑ Vertical — Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
3.96	80	See Reverse Side											0.38	80

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
							[illegible]							

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/11/07

Organization: PBS+J Position: Sr. Scientist

Flow Transect

Left Bank

Loc.	Depth (m)	Velocity (CFS)
1	0.05	0.05
2	0.13	0.02
3	0.20	0.04
4	0.23	0.09
5	0.28	0.14
6	0.30	0.18
7	0.33	0.26
8	0.33	0.38
9	0.36	0.22
10	0.36	0.65
11	0.38	0.66
12	0.38	0.67
13	0.38	0.68
14	0.33	0.55
15	0.36	0.35
16	0.33	0.35
17	0.33	0.19
18	0.30	0.02
19	0.25	0.00
20	0.18	0.00

Rt.
Bank

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek
Stream Segment Number ~~UAA-MC-2~~ 1202K
Station ID UAA 2 (Station ID requires submittal of SLOC form) [illegible] 8/10/07

Date & Time: 7/11/07 11:00
Site Location Description (e.g., road crossing): Mill Creek at FM 2429
Personnel (Data Collectors): John Branom, Jesse Moya
Current Weather Conditions: Partly Cloudy 32.07°C
Weather Conditions for Past 10 days: Last day of rain was 7/5/07

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger ____________ Permit # ____________

See data sheets from Event #1

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 29.89679 Y -96.25499

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓	Datum:	NAD 27___	or NAD 83 ✓	
State Plane ___	Datum:	NAD 27___	or NAD 83___	Zone________
UTM ___	Datum:	NAD 27___	or NAD 83___	Zone________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	_____
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		

WAAS- Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality	**Interpolation Data Quality**
FOM ± _______ Meters	Source Map Scale: 1:24,000 ____
EPE ± _______ Feet or ± _______ Meters	1:100,000 ____
PDOP _______	Other ____
	± _______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☑ Fishing
☑ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) No people were observed, however, 3- ferrol hog carcasses had been dumped at the site. Also, an old trottline was found tied to the shoreline just upstream of the bridge on the Northern banc.

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☐ Steep slopes
☑ Other:

Comments: Eroded banks with concrete rip-rap makes access challenging.

Indications of Human Use: (attach photos)

☐ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☑ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: Found a fishing lure on the bank and some rigging in the water hung up on a tree branch.

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
1(0)-1(2)	obstruction in front of Bridge	1(9)	View		
1(3)	Area Samples Collected	|			
1(4)-1(5)	Hog Remains	|			
1(6)-1(8)	View	1(17)			

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	24	250	—	—
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	30	250	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	30 % Sand	% Silt	70% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). No odor emminated from the water; however, the presence of dead animals on the shore/bank did give the whole area a rancid odor.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 7/11/07
Organization: PBS&J Position: Sr. Scientist.

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 1202K **Station ID** UAA2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 24 meters
Total length of reach assessed 150 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp 32.07 °C
Water Temp 28.76 °C
DO 5.55 mg/l
pH 7.88
Conductivity 492 µS/cm
Salinity 0.23 ppt
Secchi Depth 1.25'
Flow severity 3
Flow (CFS) 56.13

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)

- ☑ TSS / VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: T-Phosphorus TKN

Bacterial Data Collection (attach bacterial results to this form)

Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used

☐ Timed Average	Total time ____min at ______min intervals
☐ Cross section	11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal	5 equally spaced samples every ________ m (reach length//4)
☑ Vertical	Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

6/26/07

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
24	60	* See Reverse Side											0.5m	85

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/11/07

Organization: PBS&J Position: Sr. Scientist

Flow Transect

eft Banc

Loc.	Depth (m)	Velocity (~~C~~FS)
1	0.48	0.58
2	0.48	0.54
3	0.46	0.50
4	0.28	0.54
5	0.51	0.51
6	0.36	0.43
7	0.46	0.47
8	0.51	0.47
9	0.56	0.46
10	0.56	0.49
11	0.56	0.50
12	0.51	0.55
13	0.46	0.58
14	0.43	0.57
15	0.48	0.55
16	0.61	0.47
17	0.66	0.43
18	0.58	0.39
19	0.51	0.36
20	0.46	0.27

Rt.
Banc

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name East Fork Mill Creek
Stream Segment Number ~~UAA-MC-4~~ NO segment ID # 8/6/07
Station ID UAA 4 (Station ID requires submittal of SLOC form)

Date & Time: 7/11/07 15:15
Site Location Description (e.g., road crossing): Mill Creek at Euckert Rd.
Personnel (Data Collectors): John Branan, Jesse Moya
Current Weather Conditions: 2, P.C. 32.45°C
Weather Conditions for Past 10 days: Last significant rainfall 7/5/07 0.54".

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger________ Permit #________

See data sheets Event #1

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 30.02868 Y -96.40443

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27___	or NAD 83___	Zone________
UTM	___	Datum: NAD 27___	or NAD 83___	Zone________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		

WAAS - Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ____________ Meters
EPE ± ________ Feet or ± ________ Meters
PDOP ____________

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ________ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other
☒ None

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) NA

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☑ Fence
☐ Steep slopes
☐ Other:

Comments: Barbedwire fence running parallel to road and stream after 1st bend on the upstream side of the Eickert Rd. Bridge.

Indications of Human Use: (attach photos)

☑ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: NA

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
1-1(2)	Obstruction in Front of Bridge	1(7)	Downstream View		
1(3)	View upstream				
1(4)	Area Samples Collected				

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4.57	20	—	—
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
[✓ RUN]	0	4.57	40	—	—
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	40 % Sand	% Silt	60 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) Vegetation growing well on the banks either side of the stream.

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). A large tree/log is up against the upstream side of the Euckert Rd. Bridge.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 7/14/07
Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name East Fork Mill Creek **Segment #** East Fork (No segment ID#) **Station ID** UAA-4

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 4.57 meters
Total length of reach assessed 150 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp	32.45 ° C
Water Temp	28.26 ° C
DO	5.50 mg/l
pH	7.84
Conductivity	1008 us/cm
Salinity	0.29 ppt
Secchi Depth	0.53 m
Flow severity	3
Flow (CFS)	10.58

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: T-Phosphorus
TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________________
Protocol Used
☐ Timed Average — Total time ____min at ______min intervals
☐ Cross section — 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal — 5 equally spaced samples every ________ m (reach length//4)
☑ Vertical — Samples collected at surface, mid depth, and bottom

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
4.57	50	* See reverse side											0.33	65

~~***Non-wadeable Streams*** – one transect at access point~~

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
					8/6/07									

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/11/07

Organization: PBSJ Position: Sr. Scientist

Flow Transect

Left Bank

Loc.	Depth(m)	Flow(CFS)
1	0.05	0.49
2	0.10	0.56
3	0.15	0.68
4	0.18	0.66
5	0.20	0.75
6	0.25	0.82
7	0.31	0.84
8	0.33	0.74
9	0.33	0.85
10	0.38	0.81
11	0.41	0.78
12	0.46	0.75
13	0.46	0.78
14	0.48	0.76
15	0.46	0.73
16	0.46	0.74
17	0.43	0.63
18	0.36	0.41
19	0.28	0.26
20	0.13	0.00

Rt. Bank

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek West Fork
Stream Segment Number ~~UAA-DE~~-OT ND Segment ID #
[illegible]
Station ID UAA 1 (Station ID requires submittal of SLOC form)

Date & Time: 7/24/07 11:17
Site Location Description (e.g., road crossing): Industry Rd. & Blue hole Rd.
Personnel (Data Collectors): Dyre Schlotzkus, Kofi Sam, John Branam
Current Weather Conditions: 2- Partly Cloudy
Weather Conditions for Past 10 days: rainy; no antecedent dry period

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger ______ Permit # ______

Drought Conditions: (*Use Palmer Drought Severity Index*)

- ☐ Extreme
- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ Incipient Dry Spell
- ☐ Near Normal
- ☐ Incipient Wet Spell
- ☑ Slightly Wet
- ☐ Moderately Wet
- ☐ Very Wet
- ☐ Extremely Wet

See data sheets from event #1

Site Location: X 29.98388 Y -96-46536

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27 ___	or NAD 83 ✓		
State Plane	___	Datum: NAD 27 ___	or NAD 83 ___	Zone	________
UTM	___	Datum: NAD 27 ___	or NAD 83 ___	Zone	________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	______	Topographic Map or DRG	______
Dynamic Mode (Kinematic)	______	Aerial Photograph or DOQQ	✓
Precise Positioning Service	______	Satellite Imagery	______
Signal Averaging	______	Interpolation Other	______
Real Time Differential Processing	______		

WAAS-Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters
EPE ± ______ Feet or ± ______ Meters
PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

- ☐ Swimming
- ☐ Skin diving
- ☐ SCUBA diving
- ☐ Tubing
- ☐ Water skiing
- ☐ Wind surfing
- ☐ Kayaking
- ☐ Boating
- ☐ Canoeing
- ☐ Wading
- ☐ Rafting
- ☐ Hunting
- ☐ Trapping
- ☐ Fishing
- ☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☑ Fence
☑ Steep slopes
☑ Other:

Comments: Three of the four access points of this site are either impeded by fencing of by high/steep sloped banks.

Indications of Human Use: (attach photos)

☐ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos Photo ID#	Upstream Photos Photo Purpose	Downstream Photos Photo ID#	Downstream Photos Photo Purpose	Other Photos Photo ID#	Other Photos Photo Purpose
8-5	documentation	7-5	documentation	1-5	documentation
				3-5	"
				4-5	"
				6-5	"

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	0.43	0.71
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE	0	4.6	40	0.31	0.50
RUN	~~0~~ JRB 7/24/07				
POOL					

Substrate (These values should add up to 100%.)

% Cobble	15 % Gravel	20 % Sand	15 % Silt	50 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) Sparse aquatic macrophytes, both emergent + Submerged.

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant

Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky

Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black

Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other

Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: 7/24/07 Date of Survey: 7/24/07

Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** ~~UAA~~ West Fork No segment ID# JRS 8/6/07 **Station ID** UAA1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 4.5 meters
Total length of reach assessed ~~4.5~~ 12.2 meters (stream width x 40) *150 m minimum - 500 m maximum*
MW 8/27/08 per comm w/ JRB

Field Parameters

Air Temp 26.26 ° C
Water Temp 26.41 ° C
DO 6.35 mg/l
pH 7.58
Conductivity 0.514 mS/cm
Salinity 0.25 ppt
Secchi Depth 0.61
Flow severity 3-normal
Flow (CFS) 28.56

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP - TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used
☑ Timed Average Total time 60 min at 5 min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
4.5	80	0.15	0.31	0.38	0.58	0.61	0.64	0.61	0.61	0.64	0.64	0.70	0.64m	80
		0.01	0.28	0.59	0.87	1.34	1.20	1.44	1.43	1.51	1.52	1.28		
		0.64	0.56											
		0.91	-0.43											

Pt.12 Pt.13

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

JRS 8/6/07

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/24/07

Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek Main Fork

Stream Segment Number ~~UAA-MC-02~~ ~~no segment ID #~~ 1202K

Station ID UAA 2 (Station ID requires submittal of SLOC form) 8/6/07

Date & Time: 7/25/07 11:00

Site Location Description (e.g., road crossing): Mill Creek at FM-2429

Personnel (Data Collectors): John Bravom; Dyre Schlitekus

Current Weather Conditions: 2-Partly Cloudy

Weather Conditions for Past 10 days: Rain; no antecedent dry period.

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger________ Permit #________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

see data sheets from event #1

Site Location: X 29.89679 Y -96.25499

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude ✓	Datum: NAD 27___	or NAD 83 ✓	
State Plane ___	Datum: NAD 27___	or NAD 83___	Zone___
UTM ___	Datum: NAD 27___	or NAD 83___	Zone___

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	___	Topographic Map or DRG	___
Dynamic Mode (Kinematic)	___	Aerial Photograph or DOQQ	✓
Precise Positioning Service	___	Satellite Imagery	___
Signal Averaging	___	Interpolation Other	___
Real Time Differential Processing	___		

WAAS- Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ___ Meters

EPE ± ___ Feet or ± ___ Meters

PDOP ___

Interpolation Data Quality

Source Map Scale: 1:24,000 ___

1:100,000 ___

Other ___

± ___ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.)

None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☑ Steep slopes
☑ Other:

Comments: The banks leading down to the water are steep and very slippery when wet. There is a lot of concrete rip rap with protruding rebar that is dangerous.

Indications of Human Use: (attach photos)

☐ Roads
☑ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: there is a rope swing on the southern bank on the upstream side of the bridge ~50 meters.

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
20-5	documentation	19-5	documentation	16-5	documentation
				18-5	"
				21-5	Obstruction
				22-5	documentation

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	29	29	0.47	0.7
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	29.	29	0.47	0.7
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	95 % Sand	5 % Silt	% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotten egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 7/25/07
Organization: PBSJ Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 1202k Main fork **Station ID** UAA2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 24 meters
Total length of reach assessed ~~24~~ 15.2 meters (stream width x 40) *150 m minimum - 500 m maximum*
mw 8/27/07 per comm w/ JRB

Field Parameters

Air Temp 26.67 °C
Water Temp 26.46 °C
DO 6.34 mg/l
pH 7.73
Conductivity 0.527
Salinity 0.25 ppt
Secchi Depth 19"
Flow severity 5 High
Flow (CFS) 89.48

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP-TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used
☑ Timed Average — Total time 60 min at 5 min intervals
☐ Cross section — 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal — 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical — Samples collected at surface, mid depth, and bottom

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

	Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
dpth		80	.9'	2.3'	3.0'	3.1'	3.4'	3.4'	3.4'	3.4'	3.2'	3.1'	3.1'	2.5'	60
20% or 40% flow			.07	.23	.28	.24	.33	.26	.29	.20	.32	.39	.39		
80% flow			–	–	.36	.36	.41	.37	.38	.39	.40	.45	.46		
dpth			3.0'	3.1'	3.0'	2.8'	2.5'	2.3'	2.0'	2.0'	2.1'			0.6/m	
20 or 40% flow			.47	.40	.48	.53	.60	.65	.68	.71	.57				
80% flow			.48	.52	.54	.52	–	–	–	–	–				

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

8/16/07

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/25/07

Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site) ds 8/16/07

Stream Segment Name Mill Creek ~~UAA MC 04~~ East Fork
Stream Segment Number ~~UAA-MC-04~~ NO segment ID #
Station ID UAAD4 (Station ID requires submittal of SLOC form) ds 8/16/07

Date & Time: 07/24/07 14:11
Site Location Description (e.g., road crossing): Mill Creek @ Uekert Rd. West
Personnel (Data Collectors): Dyre Schlitzkus, Kofi Sam, John Branam
Current Weather Conditions: 3 ~ Partly Cloudy
Weather Conditions for Past 10 days: Rain; no antecedent dry period.

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger ________ Permit # ________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

Site Location: X 30.02868 Y -96.40443
LOCATION COORDINATES (Please Indicate coordinate system used for data collection):
Latitude Longitude ✓ Datum: NAD 27___ or NAD 83___
State Plane ___ Datum: NAD 27___ or NAD 83___ Zone________
UTM ___ Datum: NAD 27___ or NAD 83___ Zone________

see data sheets for event #1

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)

Static Mode ______
Dynamic Mode (Kinematic) ______
Precise Positioning Service ______
Signal Averaging ______
Real Time Differential Processing ______
WAAS-Wide Area Augmentation System

Interpolation

Topographic Map or DRG ______
Aerial Photograph or DOQQ ✓
Satellite Imagery ______
Interpolation Other ______

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ____________ Meters
EPE ± ________ Feet or ± ________ Meters
PDOP ____________

Interpolation Data Quality

Source Map Scale: 1:24,000 ___
1:100,000 ___
Other ___
± ________ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.)
None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☑ Fence
☑ Steep slopes
☑ Other:

Comments: Fencing on both sides of stream as well as steep slopes and gaurd rails impede access.

Indications of Human Use: (attach photos)

☐ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
15-5	documentation			10-5	documentation
~~14-5~~	~~"~~			11-5	"
				13-5	"
				14-5	"

jkb 7/24/07

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	0.5	1.0
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	40	0.5	1.0
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	90 % Sand	10 % Silt	% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) None

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/brown ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form).

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: Date of Survey: 7/24/07
Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** ~~UAA4~~ No segment ID# JRS 8/6/07 **Station ID** East Fork

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 15 meters
Total length of reach assessed 150 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters		**Parameters Collected for Lab Analysis** (attach lab analyzed data to this form)
Air Temp	26.07 ° C	☑ TSS/VSS
Water Temp	26.91 ° C	☑ Ammonia-N
DO	5.87 mg/l	☐ Nitrate-Nitrogen
pH	7.69	☐ BOD
Conductivity	0.556	☐ CBOD
Salinity	0.27 ppt	☐ Other: TP, TKN
Secchi Depth	1' 7"	
Flow severity	~~High~~ ~~5~~ 3-Normal JRS 7/26/07	
Flow (CFS)	21.84	

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:

Protocol Used
☑ Timed Average Total time 60 min at 5 min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☐ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

	Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**
	4.6	45°	.7'	1'	1.2'	0.49m	0.55m	0.64m	0.74m	0.76m	0.91m	1.07m	1.07m	1.07m	70°
velocity			0.35	0.77	0.91	0.84	0.87	0.86	0.89	0.87	0.72	0.72	0.84		
"			0.21m	0.31m	0.37m						0.41	0.81	0.54		
												0.91m	0.09m		
velocity												0.25	0.3		
"												0.42			

~~Non-wadeable Streams~~ ~~– one transect at access point~~ JRS 8/6/07

Stream Width (m)	**Left Bank Slope**	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	**Thalweg Depth**	**Right Bank Slope**

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/26/07

Organization: RBS+J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek

Stream Segment Number ~~UAA 1~~ JKB No segment ID

Station ID ~~UAA-MC-06-1~~ (Station ID requires submittal of SLOC form)
West Fork JKB 7/30/07

Date & Time: 7/30/07 13:35

Site Location Description (e.g., road crossing): Industry Rd and Blue hole Rd.

Personnel (Data Collectors): John Branom & Kofi Sam

Current Weather Conditions: 2- Partly cloudy

Weather Conditions for Past 10 days: Rain. No Antecedent dry period.

Is there a WWTP at the site? ☐ Yes ☑ No

If yes, Name of Discharger ______ Permit # ______

Drought Conditions: (*Use Palmer Drought Severity Index*)

- ☐ Extreme
- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ Incipient Dry Spell
- ☐ Near Normal
- ☐ Incipient Wet Spell
- ☑ Slightly Wet
- ☐ Moderately Wet
- ☐ Very Wet
- ☐ Extremely Wet

See Data Sheets from Event # 1

Site Location: X 29.98388 Y -96.46536

LOCATION COORDINATES **(Please Indicate coordinate system used for data collection):**

Latitude Longitude	✓	Datum: NAD 27 ___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27 ___	or NAD 83 ___	Zone ___
UTM	___	Datum: NAD 27 ___	or NAD 83 ___	Zone ___

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	___	Topographic Map or DRG	___
Dynamic Mode (Kinematic)	___	Aerial Photograph or DOQQ	✓
Precise Positioning Service	___	Satellite Imagery	___
Signal Averaging	___	Interpolation Other	___
Real Time Differential Processing	___		

WAAS-Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______ Meters

EPE ± ______ Feet or ± ______ Meters

PDOP ______

Interpolation Data Quality

Source Map Scale: 1:24,000 ___

1:100,000 ___

Other ___

± ______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

- ☐ Swimming
- ☐ Skin diving
- ☐ SCUBA diving
- ☐ Tubing
- ☐ Water skiing
- ☐ Wind surfing
- ☐ Kayaking
- ☐ Boating
- ☐ Canoeing
- ☐ Wading
- ☐ Rafting
- ☐ Hunting
- ☐ Trapping
- ☐ Fishing
- ☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) N/A

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

- ☐ City/county parks
- ☐ Playgrounds
- ☐ Wildlife
- ☐ Residential
- ☐ Industrial
- ☐ Urban
- ☐ Campgrounds
- ☐ Boating access
- ☐ State parks
- ☐ National forests
- ☐ Nature trails
- ☐ Stairs/walkway
- ☐ No trespass sign
- ☑ Fence
- ☑ Steep slopes
- ☐ Other:

Comments: There are fences on either side of the bridge and steep slopes on 3 of the 4 access points at the bridge.

Indications of Human Use: (attach photos)

- ☐ Roads
- ☐ Rope swings
- ☐ Dock/platform
- ☐ Foot paths/prints
- ☐ RV / ATV Tracks
- ☐ Camping Sites
- ☐ Fire pit/ring
- ☐ Fishing Tackle
- ☐ NPDES Discharge
- ☐ Livestock Watering
- ☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos Photo ID#	Photo Purpose	Downstream Photos Photo ID#	Photo Purpose	Other Photos Photo ID#	Photo Purpose
33-6	documentation	34-6	documentation	29-6	documentation
				30-6	"
				31-6	"
				32-6	"

Stream Morphology

Upstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	15	0.5	1.0
POOL					

Downstream View's Physical Dimensions:

Is there any water present at this view? ☑ Yes ☐ No

If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	4.6	15	0.5	1.0
POOL					

Substrate (These values should add up to 100%.)

% Cobble	20 % Gravel	20 % Sand	10 % Silt	50% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) There are sparse emergent and submerged vegetation exists at this site.

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). __________

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature: __________ Date of Survey: 7/30/07
Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** ~~West Fork~~ No segment ID# **Station ID** UAA-MC-1

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 5.18 meters
Total length of reach assessed 17 ~~150~~ JBS 7/30/07 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp 28.91 ° C
Water Temp 27.09 ° C
DO 6.34 mg/l
pH 7.85
Conductivity 0.336 mS/cm
Salinity 0.16 ~~ppt~~ SU.
Secchi Depth 0.15 m
Flow severity 3-Normal
Flow (CFS) 48.95

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS/VSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP, TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________________
Protocol Used
☐ Timed Average Total time ____min at ______min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☑ Vertical Samples collected at surface, mid depth, and bottom

Upstream of bridge

1C 1B 1A

depth Vel
2.50ft 1.21ft/s
1.32 ft/s
1.45ft/s

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

	Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
depth(ft)	17ft	60	0.6	1.9	2.4ft	2.5	2.5	2.3	2.3	2.2	1.9	1.4	0.9	0.56	80
vel	~~0.58m~~		0.05	0.64	1.55	1.79	1.75	1.83	1.84	1.71	1.43	1.48	0.86		

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
						JBS 8/6/07								

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/30/07

Organization: PBS&J Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek ~~West~~ East Main Fork KB 7/30/07
Stream Segment Number ~~UAA~~ Seg 1202K 7/30/07
Station ID UAA-MC-2 (Station ID requires submittal of SLOC form)

Date & Time: 7/30/07 & 11:00
Site Location Description (e.g., road crossing): Mill Creek @ FM
Personnel (Data Collectors): John Branon & Kofi Sam
Current Weather Conditions: 2-Partly Cloudy
Weather Conditions for Past 10 days: Rain. No antecedent dry period.

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger________ Permit #________

Drought Conditions: (*Use Palmer Drought Severity Index*)

☐ Extreme
☐ Severe
☐ Moderate
☐ Mild
☐ Incipient Dry Spell
☐ Near Normal
☐ Incipient Wet Spell
☑ Slightly Wet
☐ Moderately Wet
☐ Very Wet
☐ Extremely Wet

see data sheets from Event #1

Site Location: X 29.89679 Y -96.25499

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27___	or NAD 83___	Zone________
UTM	___	Datum: NAD 27___	or NAD 83___	Zone________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	_____
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		

WAAS-Wide Area Augmentation System

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ______________Meters
EPE ± ________Feet or ± ________Meters
PDOP ______________

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± ________Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

☐ Swimming
☐ Skin diving
☐ SCUBA diving
☐ Tubing
☐ Water skiing
☐ Wind surfing
☐ Kayaking
☐ Boating
☐ Canoeing
☐ Wading
☐ Rafting
☐ Hunting
☐ Trapping
☐ Fishing
☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.)

NA

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☐ Fence
☑ Steep slopes
☑ Other:

Comments: Concrete rip-rap along bank is dangerous to walk on and Iron rebar protrudes in places.

Indications of Human Use: (attach photos)

☐ Roads
☑ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☑ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: Found a utility knife and (2) plastic baits and an empty worm container. There is a rope swing on the southern bank upstream of the bridge ~ 50 meters.

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
28-6	documentation	27-6	documentation	23-6	documentation
				24-6	"
				25-6	"
				26-6	"

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	95ft.29m	250	1.0	2.0
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	95ft.29m	250	1.0	2.0
POOL					

Substrate (These values should add up to 100%.)

% Cobble	% Gravel	90 % Sand	5 % Silt	5 % Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site) NA

Water Characteristics: (Mark all that apply.)

Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant

Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky

Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black

Bottom Deposit: ☐ sludge ☐ solids ☑ fine sediments ☐ none ☐ other

Water Surface: ☐ clear ☐ scum ☐ foam ☑ debris ☐ sheen

Comments: (Please attach any additional comments to this form). Large log jam on up-stream side of bridge. Floating leaves and twigs.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature:
Date of Survey: 7/30/07
Organization: PBS&J
Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** 1202K Main Fork **Station ID** UAA2

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 28.96 meters
Total length of reach assessed ~~1000~~ 29 meters (stream width x 40) *150 m minimum - 500 m maximum*
7/30/07

Field Parameters

Air Temp	27.22 °C
Water Temp	27.07 °C
DO	6.56 mg/l
pH	7.85
Conductivity	0.481 mS/cm
Salinity	0.23 ppt
Secchi Depth	0.40 m
Flow severity	3-Normal
Flow (CFS)	164.7

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
- ☑ TSS/VSS
- ☑ Ammonia-N
- ☐ Nitrate-Nitrogen
- ☐ BOD
- ☐ CBOD
- ☑ Other: TP, TKN

samples collected downstream of bridge (safety issues) right bank

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:________

Protocol Used
- ☐ Timed Average — Total time ____min at ______min intervals
- ☐ Cross section — 11 equally spaced samples every ________ m (stream width/12)
- ☐ Longitudinal — 5 equally spaced samples every ________ m (reach length//4)
- ☑ Vertical — Samples collected at surface, mid depth, and bottom

2ft depth at sample collect pt.

2C 2B 2A

flow = 0.87 ft/s (2A)
vel. 0.93 ft/s (2B)
0.83 ft/s (2C)

Stream Depth
For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams – 5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
						8/6/07								

Non-wadeable upstream of bridge measurements taken downstream
See back of sheet

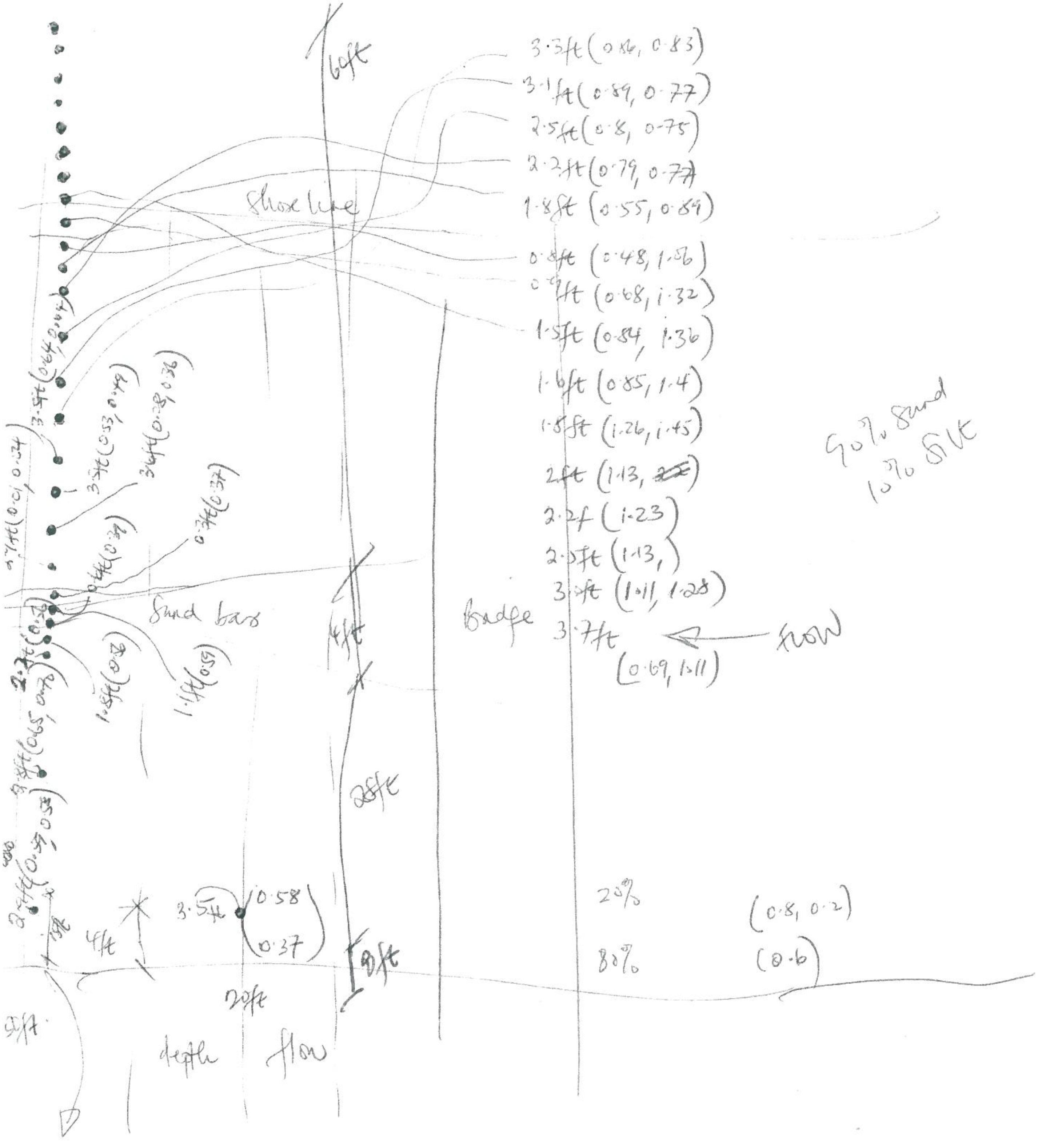
Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
100	75													85

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/30/07

Organization: PBS&J Position: Sr. Scientist


6ft
3.3ft (0.86, 0.83)
3.1ft (0.89, 0.77)
2.5ft (0.8, 0.75)
2.2ft (0.79, 0.77)
1.8ft (0.55, 0.89)
Shore line
0.8ft (0.48, 1.56)
0.9ft (0.68, 1.32)
1.5ft (0.84, 1.36)
1.6ft (0.85, 1.4)
1.8ft (1.26, 1.45)
2ft (1.13, ~~2.2~~)
2.2f (1.23)
2.5ft (1.13,)
3.0ft (1.11, 1.28)
3.7ft (0.69, 1.11)
flow
90% sand
10% silt
Bridge
4ft
2ft
0ft
3.5ft (0.64, 0.64)
0.7ft (0.01, 0.24)
3.5ft (0.53, 0.49)
3.6ft (0.28, 0.36)
0.3ft (0.37)
0.4ft (0.34)
Sand bar
2.3ft (0.2)
1.8ft (0.8)
1.1ft (0.59)
3ft (0.65, 0.72)
2.2ft (0.59, 0.53)
3ft
4ft
3.5ft
0.58
0.37
20%
80%
(0.8, 0.2)
(0.6)
20ft
5ft
depth
flow

measure @ 3ft

Field Data Sheets for Contact Recreation UAA

Data Sheet B - Site Characterization

(must be completed for each site)

Stream Segment Name Mill Creek East Bank
Stream Segment Number ~~UAA MC~~ NO segment ID #
Station ID UAA 1 (Station ID requires submittal of SLOC form)

Date & Time: 7/30/07 14:38
Site Location Description (e.g., road crossing): Uekert Rd. W.
Personnel (Data Collectors): John Branan; Kofi Sam
Current Weather Conditions: 2 - Partly Cloudy
Weather Conditions for Past 10 days: Rain. No antecedent dry period.

Is there a WWTP at the site? ☐ Yes ☑ No
If yes, Name of Discharger________________ Permit #________________

Drought Conditions: (*Use Palmer Drought Severity Index*)

- ☐ Extreme
- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ Incipient Dry Spell
- ☐ Near Normal
- ☐ Incipient Wet Spell
- ☑ Slightly Wet
- ☐ Moderately Wet
- ☐ Very Wet
- ☐ Extremely Wet

see data sheets from Event #1

Site Location: X 30.02869 Y -96.40443

LOCATION COORDINATES (Please Indicate coordinate system used for data collection):

Latitude Longitude	✓	Datum: NAD 27___	or NAD 83 ✓	
State Plane	___	Datum: NAD 27___	or NAD 83___	Zone________
UTM	___	Datum: NAD 27___	or NAD 83___	Zone________

HORIZONTAL COLLECTION METHOD (Indicate the method used to determine the locational data.)

Global Positioning System (GPS)		**Interpolation**	
Static Mode	_____	Topographic Map or DRG	_____
Dynamic Mode (Kinematic)	_____	Aerial Photograph or DOQQ	✓
Precise Positioning Service	_____	Satellite Imagery	_____
Signal Averaging	_____	Interpolation Other	_____
Real Time Differential Processing	_____		
WAAS - Wide Area Augmentation System			

HORIZONTAL ACCURACY ESTIMATE

GPS Data Quality

FOM ± ____________ Meters
EPE ± _______ Feet or ± _______ Meters
PDOP ____________

Interpolation Data Quality

Source Map Scale: 1:24,000 ____
1:100,000 ____
Other ____
± _______ Feet or ± 1 Meters

Uses Observed: (Uses actually observed at time of site visit.)

- ☐ Swimming
- ☐ Skin diving
- ☐ SCUBA diving
- ☐ Tubing
- ☐ Water skiing
- ☐ Wind surfing
- ☐ Kayaking
- ☐ Boating
- ☐ Canoeing
- ☐ Wading
- ☐ Rafting
- ☐ Hunting
- ☐ Trapping
- ☐ Fishing
- ☐ Other

Describe: (Include number of individuals recreating, photo-documentation of evidence of recreational uses, etc. Use Data Sheet D-Recreational Use Interview when conducting interviews.) None

Surrounding Conditions: (Mark all that promote or impede recreational uses. Attach photos of evidence or unusual items of interest.)

☐ City/county parks
☐ Playgrounds
☐ Wildlife
☐ Residential
☐ Industrial
☐ Urban
☐ Campgrounds
☐ Boating access
☐ State parks
☐ National forests
☐ Nature trails
☐ Stairs/walkway
☐ No trespass sign
☑ Fence
☑ Steep slopes
☑ Other:

Comments: At this site there is little stream access and has guard rails and fencing which impeds recreational use. During this site visit the water level and flow were too high for contact recreation.

Indications of Human Use: (attach photos)

☐ Roads
☐ Rope swings
☐ Dock/platform
☐ Foot paths/prints
☐ RV / ATV Tracks
☐ Camping Sites
☐ Fire pit/ring
☐ Fishing Tackle
☐ NPDES Discharge
☐ Livestock Watering
☐ Other

Comments: None

Photos (attach additional sheets if needed)

Upstream Photos		Downstream Photos		Other Photos	
Photo ID#	Photo Purpose	Photo ID#	Photo Purpose	Photo ID#	Photo Purpose
38-6	documentation	39-6	documentation	35-6	documentation
				36-6	"
				37-6	"
				40-6	"

Stream Morphology

Upstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	16.15	40m	1.5	2.2
POOL					

Downstream View's Physical Dimensions:
Is there any water present at this view? ☑ Yes ☐ No
If so, is there an obvious current? ☑ Yes ☐ No

Select one of the following channel features:

Channel Feature	Distance from access (m)	Width (m)	Length (m)	Median Depth (m)	Max. Depth (m)
RIFFLE					
RUN	0	16.0	50m	1.5	2.0
POOL					

Substrate (These values should add up to 100%.) NA could not determine. See comments

% Cobble	% Gravel	% Sand	% Silt	% Mud/Clay	% Bedrock

Aquatic Vegetation (Note amount of vegetation or algal growth at the assessment site)
NA

Water Characteristics: (Mark all that apply.)
Algae Cover: ☑ absent ☐ rare ☐ common ☐ abundant ☐ dominant
Odor: ☑ none ☐ oil ☐ acrid ☐ sewage ☐ rotton egg ☐ fishy ☐ musky
Color: ☐ no color ☐ light green ☐ dark green ☐ tan ☐ red ☑ green/[✓ brown] ☐ black
Bottom Deposit: ☐ sludge ☐ solids ☐ fine sediments ☐ none ☑ other
Water Surface: ☑ clear ☐ scum ☐ foam ☐ debris ☐ sheen

Comments: (Please attach any additional comments to this form). Flow too high to access from the bank or stream.

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Investigator's Signature:
Date of Survey: 7/30/07
Organization: [illegible]
Position: Sr. Scientist

Field Data Sheets for Contact Recreation UAA
Data Sheet C - Water Quality Data and Depth Measurements

Stream Name Mill Creek **Segment #** East Fork (No segment ID#) **Station ID** UAA-MC-04

Water quality data only needs to be collected at the stream access point.

Stream Width at Access Point 16.15 meters
Total length of reach assessed 9.10 meters (stream width x 40) *150 m minimum - 500 m maximum*

Field Parameters

Air Temp 28.08° C
Water Temp 27.59° C
DO 5.42 mg/l
pH 7.69
Conductivity 0.331 mS/cm
Salinity 0.16 ppt
Secchi Depth 0.15m
Flow severity 5-High
Flow (CFS) 143.19

Parameters Collected for Lab Analysis
(attach lab analyzed data to this form)
☑ TSS
☑ Ammonia-N
☐ Nitrate-Nitrogen
☐ BOD
☐ CBOD
☑ Other: TP; TKN

Bacterial Data Collection (attach bacterial results to this form)
Bacteria ☑ *E. Coli* ☐ Enterococcus ☐ Other:____________

Protocol Used
☐ Timed Average Total time ____min at ______min intervals
☐ Cross section 11 equally spaced samples every ________ m (stream width/12)
☐ Longitudinal 5 equally spaced samples every ________ m (reach length//4)
☑ Vertical Samples collected at surface, mid depth, and bottom

Stream Depth

For purposes of transect measurement, left and right bank orientation is determined by the investigator facing downstream.

Wadeable Streams* – *5 equally spaced transects Starting at lower end or reach and ending at upper end of reach.

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope
16.15	90	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	90
		0.50	0.92	1.13	1.25	1.53	1.68	1.59	0.95	0.93	0.75	0.64		~~90~~ 7/30/07

Non-wadeable Streams – one transect at access point

Stream Width (m)	Left Bank Slope	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Thalweg Depth	Right Bank Slope

8/6/07

Please verify that you have completed all sections, checked all applicable boxes and that everything is complete.

Signed: Date: 7/30/07

Organization: PBS&J Position: Sr Scientist

Appendix H

PBS&J Field Data Sheets

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAAMC-01-1
Segment: ~~1202K~~ MW 6/13/07 no segment No.
Station ID: UAA 1
Location: West Fork Mill Creek @ Bluehdle/Industry Rd.
Date: 6/13/07
Names: Marisa Weber
Kofi Sam
Pavitra Rammahan
Time: 1403
Present Weather: 2
Wind Intensity: 1
Days since last significant rainfall (Days): 10
Signature:
Quantity of Rain (in.): 0.87

Site Characteristics

Physical Characteristics

Stream Width (m): 0.61
Stream Depth (m): 0.2
Substrate: Sand/Gravel composite
Flow (cfs): 0.0395
Data Source for Flow: Computed by transect method

Observational Data

Water Odor: 6 - None
Sheen: None
Water Color: 1 - brownish
Floatables: leaves
Water Clarity: 2 - Secchi
Deposits: Sand
Water Surface: 1 - calm
Debris in Water: Log jamb
Flow Description: Glide
Shoreline: eroded; rip rap
Flow Severity: 3 - Normal
Other observational data:
Flow method: computed by transect method using Marsh/McBirney Flow ate
Biological Activity: None
Instream Activity: None

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 27.39
Sample Depth (m): 0.2
Sp. Conductivity (μS/cm): 0.673
Data Logger: YSI 600XLM
Dissolved Oxygen (mg/L): 6.89
Secchi Depth (m): 0.21
pH (s.u.): 7.89
Sample Time: 1540
Additional Comments: Salinity 0.32SSU

Photo Log

Pic No.	Description
13	View of Bridge at Mill Creek and Industry Rd. facing North.
14	View of Bridge at Mill Creek and Industry Rd. facing South
15	View of Mill Creek facing West.
16	View of Mill Creek facing East.
17	View of Northeast banc of Mill Creek
18	View of Southeast banc of Mill Creek
19	View of Northwest banc of Mill Creek
20	View of Southwest banc of Mill Creek

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAA2
Segment: 1202K
Station ID: UAA-MC-2
Location: Mill Creek @ FM 2429
Date: 6/13/07
Names: John Branum
Jesse Moya
Time: 11:58
Present Weather: Partly Cloudy - 2
Wind Intensity: Calm-1
Days since last significant rainfall (Days): 10
Signature:
Quantity of Rain (in.): 0.87

Site Characteristics

Physical Characteristics
Stream Width (m): ~~[illegible]~~ 28.38
Stream Depth (m): 2.5Ft 0.76m
Substrate: Sand
Flow (cfs): 22.3
Data Source for Flow: Calculated by transect method using Marsh/McBirney Flowmate

Observational Data
Water Odor: 1 - none
Sheen: None
Water Color: 3 - greenish
Floatables: Leaves
Water Clarity: 2 - secchi
Deposits: None
Water Surface: 1 - calm
Debris in Water: Log jam
Flow Description: moderate
Shoreline: Sand/Concrete Rip rap
Flow Severity: 2 - low
Other observational data:
Flow methods - Transect w/marsh mcBirney flowmate
Sample Depth 1 Ft.
Biological Activities - Fish, Golden shiner, Gar
Instream Activities - 3 people walked along bank

Water Quality Parameters Recorded (Discrete Sampling)
Temperature (ºC): 29.54
Sample Depth (m): 1 Ft. = 0.3 m
Sp. Conductivity (μS/cm): 0.567
Data Logger: YSI 600 XLM
Dissolved Oxygen (mg/L): 7.72
Secchi Depth (m): 1.5Ft. = 0.46M
pH (s.u.): 7.86
Sample Time: 12:45
Additional Comments: Salinity - 0.15

Photo Log

Pic No.	Description
1	View of Southwest Banc of Road FM 2429
2	View of creek Facing South from West side of Bridge
3	View of creek facing west
5	View of Creek facing East.
6	View of Southeast Banc.
7	View of Northeast Banc
8	View of FM 2429 Facing North
9	

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAAMC- 01-4
Segment: No Segment ID#
Station ID: Mill Creek UAAA
Location: East Fork Mill Creek @ Ueckert Rd.

Date: June 13, 2007
Names: Pavitra Rammohan
Marisa Weber
Kofi Sam
Time: 12:05
Present Weather: 2; Partly Cloudy
Wind Intensity: 1; Calm
Days since last significant rainfall (Days): 10
Signature:
Quantity of Rain (in.): 0, 87

Site Characteristics

Physical Characteristics

Stream Width (m): 3.048
Stream Depth (m): 0.53
Substrate: Sand/Gravel Composite
Flow (cfs): 2.12
Data Source for Flow: Computed by transect method

Observational Data

Water Odor: 1; sewage
Sheen: None
Water Color: 1 - Brownish
Floatables: None
Water Clarity: 2 - secchi
Deposits: None
Water Surface: 1 - calm
Debris in Water: None
Flow Description: Glide
Shoreline: Sand bar
Flow Severity: 3 - normal
Turbidity: 2
Other observational data: Flow was calculated by transect method using a Marsh-McBirney Flowmate.
Biological activity included: Cattle Egrets, fish, aquatic insects.
Instream Activities: None

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 27.07
Sample Depth (m): 0.2
Sp. Conductivity (μS/cm): 0.734
Data Logger: YSI 600 XLM
Dissolved Oxygen (mg/L): 6.07
Secchi Depth (m): 0.53
pH (s.u.): 7.81
Sample Time: 1620
Additional Comments: Salinity - 0.36 S.S.U.

Photo Log

Pic No.	Description
~~13~~ 21	View of Bridge @ Mill Creek and Ueckert Rd facing North
22	View of Bridge @ Mill Creek and Uecker Rd. facing South
23	View of East fork Mill Creek facing west.
24	View of East Fork Mill Creek facing East.
25	View of North west banc mill Creek.
26	View of Southwest banc mill Creek
27	View of Northeast banc mill Creek
28	View of Southeast banc mill Creek.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Station ID: VAA-MC-1
Segment: No segment ID# West Fork Mill Creek
Location: West Fork MC at Industry Rd / Blue Hole Rd.
Date: 06/22/07 6
Time: 12.35 P.M
Present Weather: Cloudy 32°C (89°F)
Wind Intensity: 1-Calm
Days since last significant rainfall (Days): 2
Quantity of Rain (in.): 1.93
Names: Pavitra Rammohan, Kofi Sam, Jesse Moya, Jeremy Marshall
Signature: Pavitra Rammohan

Site Characteristics

Physical Characteristics

Stream Width (m): 8.66
Stream Depth (m): 0.35
Substrate: Gravel, Sand, Mud/clay.
Flow (cfs): 10.19
Data Source for Flow: Calculated based on instantaneous depth & velocity measurement

Observational Data

Water Odor: 6-None
Water Color: light brown yellow
Water Clarity: 1-N/A - Secchi Depth is Available
Water Surface: 1-Clear
Flow Description: Run
Flow Severity: 3 - Normal
Sheen: None
Floatables: None
Deposits: Fine Sediments
Debris in Water: None
Shoreline: ~~[illegible]~~ Clay/vegetation
Other observational data:

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 26.01
Sp. Conductivity (µS/cm): ~~0.321~~ 321
Dissolved Oxygen (mg/L): 5.99
pH (s.u.): 7.60
Sample Depth (m): 0.35
Data Logger: YSI 600 XLM
Secchi Depth (m): 0.3 (upstream)
Sample Time: 1235
Additional Comments:

Photo Log

Pic No.	Description
DSC06443	Stream Run facing downstream
DSC06437	Stream Run @ left Bank.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Segment: 1202K Main Stem Mill creek
Station ID: UAA-MC-2
Location: Intersection of MC & FM2429
Date: 06/20/07 ~~(1430)~~
Names: Pavithra Rammohan, Kofi Sam, Jesse Moy, Jeremy Marshall
Time: 1430
Present Weather: Cloudy, 89°F (32°C)
Wind Intensity: 1, Calm
Days since last significant rainfall (Days): 2
Signature: Pavitra Rammohan
Quantity of Rain (in.): 1.93 in

Site Characteristics

Physical Characteristics

Stream Width (m): ~~6.096~~ Not Measured due to inaccessibility to entire stretch of stream
Stream Depth (m): Not Measured
Substrate: Sand, Silt, and Mud/Clay
Flow (cfs): N.A.
Data Source for Flow: Unable to Calculate due to inadequate measurements

Observational Data

Water Odor: None
Sheen: None
Water Color: Light Brown
Floatables: None
Water Clarity: NA - Secchi depth is Available
Deposits: Fine Sediments
Water Surface: Clear calm
Debris in Water: None
Flow Description: Moderate Flow.
Shoreline: ~~None~~ clay/riprap Eroded
Flow Severity: 3 - Normal
Other observational data: Could not access the entire stream segment due to inaccessibility caused by moderate flow for taking instantaneous depth & velocity measurements

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 26.12
Sample Depth (m): Not measured
Sp. Conductivity (µS/cm): 263
Data Logger: YSI 600 XLM
Dissolved Oxygen (mg/L): 6.10
Secchi Depth (m): 0.3
pH (s.u.): 7.79
Sample Time: 1448
Additional Comments: 5 Samples collected at about the same time (2 @ Left quarter, 2 @ Right quarter and 1 in middle half)

Photo Log

Pic No.	Description
DSC06475	Showing downstream run and banks
DSC06486	Stream Run.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Station ID: UAA-MC-4
Segment: No segment ID # East Mill Creek.
Location: Intersection of East MC & Beckert Rd
Date: 06/22/07
Time: 1330
Names: Partha Rammohan, Koj Sam, Jesse Moya, Jeremy Marshall
Present Weather: Cloudy, 89°F (32°C)
o Wind Intensity: 1 - Calm
Days since last significant rainfall (Days): 2
Signature: Partha Rammohan
Quantity of Rain (in.): 1.93

Site Characteristics

Physical Characteristics

Stream Width (m): 4.88
o Stream Depth (m): 0.48
Substrate: Sand, mud & clay
Flow (cfs): 22.9
Data Source for Flow: Calculated based on instantaneous depth & velocity measurement

Observational Data

Water Odor: 6- None
Sheen: None
Water Color: 3- Light green
Floatables: None
o Water Clarity: 4 NA secchi depth is available
Deposits: Fine sediments
Water Surface: 1- Clear calm
Debris in Water: None
Flow Description: Run/Glide
Shoreline: ~~None~~ san/clay
Flow Severity: 3 - Normal
Other observational data:
Bizard, barb wire/fence

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (°C): 26.48
● Sample Depth (m): 0.48
Sp. Conductivity (μS/cm): 316
Data Logger: YSI 600 XLM
Dissolved Oxygen (mg/L): 5.29
Secchi Depth (m): 0.3
pH (s.u.): 7.66
● Sample Time: 1355
Additional Comments:

Photo Log

Pic No.	Description
DSC06449	Upstream View
DSC06451	Downstream view & banks
DSC06457	Upstream Right Bank
DSC06458	Upstream Left Bank.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: 03-02
Station ID: 02
Segment: Main Stem 1202K
Location: Mill Creek
Date: 6.29.07
Names: KCH J. Marshall
Time: 10:36
Present Weather: ~~Ac cand~~, 29-31°C, Partly cloudy
Wind Intensity: SSE @ 5-10MPH

South-South East

Days since last significant rainfall (Days): 0
Signature:
Quantity of Rain (in.): 0.41

33/12 =

Site Characteristics

Physical Characteristics

Stream Width (m): 33
Stream Depth (m): .4
Substrate: Sand
Flow (cfs): 144.8
Data Source for Flow: ~~MMB~~ Calculated based on instantaneous depth and velocity measurements

Observational Data

Water Odor: 6 None
Sheen: None
Water Color: 1- BROwn.
Floatables: Only leaves
Water Clarity: Poor - secchi
Deposits: ABODEADFHW DEBRIS
Water Surface: 2 Ripple
Debris in Water: None
Flow Description: Moderate ~~Hig~~
Shoreline: ~~None~~ riprap
Flow Severity: 3 - Normal 7 ~~Flood~~ges
Other observational data:

Water Quality Parameters Recorded (Discrete Sampling)

Discrete

Temperature (ºC): 26.53
Sample Depth (m): 0.4
Sp. Conductivity (μS/cm): 0.386
Data Logger: YSI 6290
Dissolved Oxygen (mg/L): 6.38 (79.69)
Secchi Depth (m): 0.25
pH (s.u.): 7.81
Sample Time: 10:45
Additional Comments: Extent of Sate Flow Rate

Photo Log

Pic No.	Description
IMG_0816 -0821	Showing upstream of bridge crossing with Joel collecting samples
IMG_0822 -0825	showing dense vegetation and marshy clay on the banks of bayou

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: MC-1
Station ID: Site 1
Segment: No segment ID #
Location: Bluehole and Industry Rd.
Date: 06/28/07
Time: 12:40
Present Weather: 1-clear, 92°F
Wind Intensity: 1-Calm
Days since last significant rainfall (Days): 2
Quantity of Rain (in.): 0.35
Names: John Branom, J. Meya, J. Schlitettos, P. Rammohan, M. Weber
Signature:

Site Characteristics

Physical Characteristics

Stream Width (m): 13ft or 3.96m
Stream Depth (m): 1.5ft or 0.46m
Substrate: Clay/Sand/Gravel
Flow (cfs): 3.76
Data Source for Flow: Calculated

Observational Data

Water Odor: 6 None
Water Color: 1- brownish
Water Clarity: NA secchi
Water Surface: 1-Calm
Flow Description: run/Glide
Flow Severity: 3-normal
Sheen: None
Floatables: Leaves
Deposits: Sand
Debris in Water: Branches
Shoreline: eroded clay/vegetation
Other observational data: Plants and branches in the stream that obstruct flow. We took flow measurements upstream of these at ~ 5 meters from the bridge

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 27.89
Sp. Conductivity (µS/cm): 483
Dissolved Oxygen (mg/L): 5.94
pH (s.u.): 7.75
Sample Depth (m): 0.46
Data Logger: YSI 600XLm
Secchi Depth (m): > 0.46
Sample Time: 13:00
Additional Comments: Salinity - 0.23

Photo Log

Pic No.	Description
DSC06538-39	→ Showing the upstream & dstream of site
DSC06541	→ showing upstream of bridge crossing
DSC06542-43	→ Showing dstream of bridge crossing
DSC06544-561	Showing selection of transects upstream of bridge crossing and collection of samples.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Segment: ~~West~~ East, No segment ID # form of MC
Station ID: UAA - 4
Location: Intersection of East fork MC & Tucker Rd
Date: 06/29/07
Names: TM, JB, PR
Time: 1130
Present Weather: Cloudy
Wind Intensity: 1 - Calm
Days since last significant rainfall (Days): 0
Signature:
Quantity of Rain (in.): 0.41

Site Characteristics

Physical Characteristics

Stream Width (m): 4.5
Stream Depth (m): 0.825
Substrate: Sand, Silt, Mud/Clay, ~~Se~~ Sediments on the Left & Right banks
Flow (cfs): 16.01
Data Source for Flow: Calculated from instantaneous measurements of depth & velocity.

Observational Data

Water Odor: None
Sheen: None
Water Color: Light Brown
Floatables: None
Water Clarity: NA
Deposits: Sediments on Left & Right banks
Water Surface: Clear
Debris in Water: Debris at bottom
Flow Description: Run
Shoreline: ~~None~~ Sand Clay & stream
Flow Severity: 3 - Normal
Other observational data:
Observed plants/shrubs beneath the water surface, the branches causing eddies.

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 26.99
Sample Depth (m): 0.5
Sp. Conductivity (μS/cm): 479
Data Logger: YSI 600 XLM
Dissolved Oxygen (mg/L): 5.67
Secchi Depth (m): 0.3
pH (s.u.): 7.61
Sample Time: ~~130~~ 1306
Additional Comments:

Photo Log

Pic No.	Description
DSC06579 -DSC06588	Showing the process of marking/selecting the transects moving upstream
DSC06589 -DSC06596	Showing upstream flow & Sediments on left & right bank
DSC06597 -DSC06612	Showing field crew taking measurements & collecting samples at Transect-1 (west of the bridge crossing due to eddies caused by aquatic plants).

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Station ID: UAA-1
Segment: NO Segment ID#
Location: West Fork Mill Creek at Industry
Date: 7/11/07
Time: 14:00
Names: John Branam
Jesse Moya
Present Weather: 2, P.C.
Wind Intensity: 1, Calm
Days since last significant rainfall (Days): 6
Signature:
Quantity of Rain (in.): 0.54

Site Characteristics

Physical Characteristics
Stream Width (m): 3.9
Stream Depth (m): 0.76
Substrate: Clay/sand
Flow (cfs): 4.66
Data Source for Flow: Calculated

Observational Data
Water Odor: 6, None
Water Color: 1, brownish
Water Clarity: NA
Water Surface: 1, Calm
Flow Description: Run
Flow Severity: 3, Normal
Sheen: None
Floatables: None
Deposits: Sand
Debris in Water: None
Shoreline: eroded clay/vegetation
Other observational data: Debris that were previously on the bank have been washed downstream.

Water Quality Parameters Recorded (Discrete Sampling)
Temperature (ºC): 28.23
Sp. Conductivity (µS/cm): 520
Dissolved Oxygen (mg/L): 6.18
pH (s.u.): 7.84
Sample Depth (m): ~~0.76~~ 0.3 [illegible] 7/11/07
Data Logger: YSI 6920 V2
Secchi Depth (m): 0.46
Sample Time: 14:00
Additional Comments:

Photo Log

Pic No.	Description
1	Upstream sample collection Area
1 (1)	Upstream Flow + depth measurements collected
1 (2)	Upstream
1 (3)	Upstream
1 (4)	Downstream
1 (5)	Downstream
1 (6)	Downstream

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: JGB 7/11/07
Segment: 1202K
Station ID: UAA002
Location: Mill Creek at FM 2429
Date: 7/11/07
Names: John Branan
Time: 11:15
Jesse Moya
Present Weather: P.C. 2
Wind Intensity: 2, slight
Days since last significant rainfall (Days): 6
Signature:
Quantity of Rain (in.): 0.54

Site Characteristics

Physical Characteristics

Stream Width (m): 24
Stream Depth (m): 0.95
Substrate: Clay/Sand
Flow (cfs): 56.13
Data Source for Flow: Calculated

Observational Data

Water Odor: 6, None
Sheen: None
Water Color: 1, Brown
Floatables: leaves/twigs
Water Clarity: Secchi
Deposits: Sand
Water Surface: 1-Calm
Debris in Water: logs
Flow Description: run/Glide
Shoreline: eroded/rip rap
Flow Severity: 3-Normal
Other observational data: Three ferral hog carcasses were dumped at the site. Two carcasses were on the southwest banc and one was on a log jam at the bridge on the upstream side.

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 28.76
Sample Depth (m): ~~0.95~~ 0.3 JGB 7/11/07
Sp. Conductivity (μS/cm): 492
Data Logger: YSI 6920 V2
Dissolved Oxygen (mg/L): 5.55
Secchi Depth (m): 0.41
pH (s.u.): 7.88
Sample Time: 11:15
Additional Comments:

Photo Log

Pic No.	Description
1(0)-1(2)	Obstruction upstream side of bridge
1(3)	Area samples collected + Flow measurements taken
1(4)-1(5)	Debris with hog Remains on wood.
1(6)-1(8)	Upstream south side of creek next to bridge
1(9)-1(17)	Downstream different pictures
1(8)	upstream view

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID:
Station ID: UAA-4
Segment: No segment ID# East Fork Mill Creek
Location: Mill Creek and Eckert. Rd.
Date: 7/11/07
Time: 15:15
Names: John Branom
Jesse Moya
Present Weather: 2 P.C.
Wind Intensity: 1, Calm 32.45
Days since last significant rainfall (Days): 6
Quantity of Rain (in.): 0.54
Signature:

Site Characteristics

Physical Characteristics

Stream Width (m): 4.57
Stream Depth (m): 0.48
Substrate: Clay/Sand
Flow (cfs): 10.58
Data Source for Flow: Calculated

Observational Data

Water Odor: 6, None
Water Color: 1, Brownish
Water Clarity: 2, good
Water Surface: 1, calm
Flow Description: Run
Flow Severity: 3 normal
Sheen: None
Floatables: None
Deposits: Sand
Debris in Water: None
Shoreline: eroded sand/clay
Other observational data: Large tree in creek perpendicular to stream-flow at the bridge on the upstream side.

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 28.26
Sp. Conductivity (µS/cm): 608
Dissolved Oxygen (mg/L): 5.50
pH (s.u.): 7.84
Sample Depth (m): 0.48
Data Logger: YSI 6920 V2
Secchi Depth (m): 0.33
Sample Time: 15:15
Additional Comments:

Photo Log

Pic No.	Description
1	Upstream northside of creek next to bridge
1 (1)	Upstream middle of creek next to bridge (obstruction)
1 (2)	Upstream southside of creek next to bridge
1 (3)	Upstream
1 (4)	Upstream Sample collection + Flow measuring area
1 (5)	Downstream Southside of creek (next to bridge)
1 (6)	Downstream Northside of creek (next to bridge)
1 (7)	Down stream

2.54 cm
.3048 = 1'

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAAI-5
Station ID: UAAI-5
Segment: No segment ID # West Fork Mill Creek
Location: Mill Creek at Industry & Blue hole
Date: 07-24-07
Time: 11:17
Names: Kofi Sam
John Branom
Dyer Schitzky
Present Weather: 2 partly Cloudy
Wind Intensity: 1calm, Variable
Days since last significant rainfall (Days): 4
Quantity of Rain (in.): ~~0.20~~ 0.37 8/7/07
Signature: Dyer S

Site Characteristics

Physical Characteristics

Stream Width (m): 15' = 4.572
Stream Depth (m): 2'4" = 28" = .7112 m
Substrate: silt w/ gravel
Flow (cfs): 28.56
Data Source for Flow: Calculated using Sontek handheld flowmeter.

Observational Data

Water Odor: 6-none
Water Color: 1-greenish brown
Water Clarity: secchi
Water Surface: 1-calm
Flow Description: Run/Glide
Flow Severity: 3-normal
Sheen: None
Floatables: Leaves
Deposits: sand
Debris in Water: twigs
Shoreline: eroded clay/vegetation
Other observational data:

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 26.41
Sp. Conductivity (μS/cm): 514.0
Dissolved Oxygen (mg/L): 6.35
pH (s.u.): 7.58
Sample Depth (m): 0.31
Data Logger: YSI 600XLM
Secchi Depth (m): 0.61
Sample Time: 11:17
Additional Comments:

Photo Log

Pic No.	Description
1-5	View of Northeast bank, down-stream side of bridge.
3-5	View of Northwest bank, upstream side of bridge.
4-5	View of Southwest bank, upstream side of bridge.
6-5	View of Southeast bank, downstream side of bridge.
7-5	View of Mill Creek facing downstream.
8-5	View of Mill Creek facing upstream.

1	2	3	4	5	6	7	8	9	10	11	12
1.06	1.04	0.99	0.99	1.01	0.94	0.91	1.02	0.95	0.99	0.88	0.92
12:30	12:35	12:40	12:45	12:50	12:55	13:00	13:05	13:10	13:15	13:20	13:25
A	B	C	D	Dup E	F	G	H	I	J	K	L

depth 1.7

Bacteria / Flow
collection

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAA2-5
Station ID: UAA2
Segment: MainFork 1202K
Location: Main Fork Mill Creek FM-2429
Date: 7/25/07
Time: 11:00 am
Names: John Branon
Dyer Schlisky
Present Weather: 2 - PC.
Wind Intensity: 1 - Calm
Days since last significant rainfall (Days): 3
Quantity of Rain (in.): ~~0.20~~ 0.37
[illegible] 9/7/07
Signature:

Site Characteristics

Physical Characteristics

Stream Width (m): 77' 24m
Stream Depth (m): 0.76m
Substrate: Sand/Silt/Clay
Flow (cfs): 89.48
Data Source for Flow: Calculated using Sontek handheld flowmeter.

Observational Data

Water Odor: 6 - None
Water Color: 1 - Brown
Water Clarity: N/A Secchi
Water Surface: 1 - Calm
Flow Description: Run/Glide
Flow Severity: 3 - Normal
Sheen: None
Floatables: Leaves
Deposits: Sand/silt
Debris in Water: Log jam at bridge
Shoreline: Eroded clay/riprap
Other observational data: Large log jam at upstream side of Bridge.

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): [illegible] 26.46
Sp. Conductivity (µS/cm): 0.527
Dissolved Oxygen (mg/L): 6.34
pH (s.u.): 7.73
Additional Comments: Sal 0.25, Air Temp 26.67
Sample Depth (m): ~~0.3~~ JMB 0.31
Data Logger: YSI 600XLM
Secchi Depth (m): 1'7" = 19"
Sample Time: 11:15

Photo Log

Pic No.	Description
16-5	View of Southwest bank, upstream side of bridge.
18-5	View of Southeast bank, downstream side of bridge.
19-5	View of Mill Creek facing down stream
20-5	View of Mill Creek facing upstream.
21-5	View of log jamb on upstream side of bridge.
22-5	View of Northwest bank, upstream of bridge.

A	.70	12:30
B	.70	5
C	.72	40
D	.72	5
E	.70	50
F	.72	5
G	.71	13:00
H	.70	5
I	.71	10
J	.72	5
K	.68	20
L	.71	5
Dup	.70	12:50
M	/	13:27
N	/	13:27

3

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAA-MC-05-
Station ID: Mill Creek
Segment: East Fork; NO segment ID#
Location: Uekert Rd. West
Date: 07.24-07
Time: 14:11
Present Weather: 3-Cloudy, Calm
Wind Intensity: 1-Calm
Days since last significant rainfall (Days): 4
Quantity of Rain (in.): ~~0.20~~ 0.37
JHB 9/7/07
Names: Kofi Sam
John Branon
Dyer Schlitzer
Signature:

Site Characteristics

Physical Characteristics
Stream Width (m): 15' 4.6m
Stream Depth (m): 0.75
Substrate: Sand, Silt, Clay
Flow (cfs): 21.84
Data Source for Flow: Calculated from Sontek handheld flowmeter.

Observational Data
Water Odor: 6-None
Water Color: Brown-1
Water Clarity: Secchi
Water Surface: 1-Calm
Flow Description: Run
Flow Severity: 3-normal
Sheen: None
Floatables: Leaves
Deposits: Sand
Debris in Water: limbs, logs
Shoreline: muddy, eroded.
Other observational data: Large log jam at upstream side of bridge.

Water Quality Parameters Recorded (Discrete Sampling)
Temperature (ºC): 26.91
Sp. Conductivity (μS/cm): 556.0
Dissolved Oxygen (mg/L): 5.87
pH (s.u.): 7.69
Sample Depth (m): 0.31
Data Logger: YSI 600XLM
Secchi Depth (m): 0.50
Sample Time: 14:11
Additional Comments:

Photo Log

Pic No.	Description
10-5	View of southwest bank, upstream side of bridge.
11-5	View of southeast bank, downstream side of bridge
13-5	View of northeast bank, downstream side of bridge.
14-5	View of northwest bank, upstream side of bridge.
15-5	View of Mill Creek facing upstream.

E. Coli

1 A	14 30	0.95
2 B	14 35	0.83
3 C	'' 40	1.03
4 D	'' 45	0.99
5 E	'' 50	0.95
6 F	'' 55	1.02
7 G	15:00	0.98
8 H	'' 05	1.01
9 I	'' 10	1.02
10 J	'' 15	0.86
11 K	'' 20	0.92
12 L	'' 25	0.84

Flow

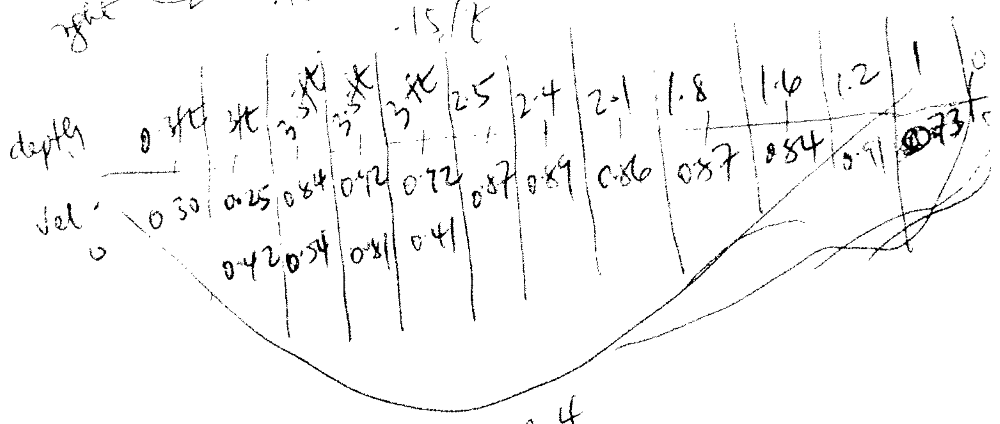
x0.8 → 0.2
x0.2 → 0.8

Flow UAA4
facing upstream

UAA 4,

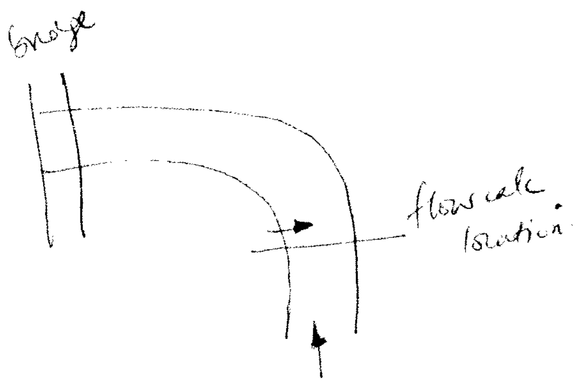
right → left

.15/ft

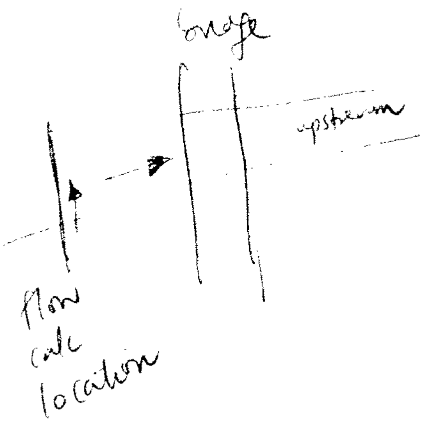


depth		0.3ft	3ft	3.5ft	3.5ft	3ft	2.5	2.4	2.1	1.8	1.6	1.2	1	0
vel	0	0.30	0.25 0.42	0.84 0.54	0.72 0.81	0.72 0.41	0.87	0.89	0.86	0.87	0.84	0.91	0.73	

UAA 4



UAA 1.



PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAA-MC-06-1
Station ID: UAA-MC-1
Segment: NO Segment ID
Location: Mill Creek @ Industry & Blue Hole
Date: 7/30/07
Time: 13-35
Names: K. Gan / J. Brown
Present Weather: 2-Partly Cloudy
Wind Intensity: 1- Calm
Days since last significant rainfall (Days): 1
Quantity of Rain (in.): 0.20
Signature:

Site Characteristics

Physical Characteristics

Stream Width (m): 5.18
Stream Depth (m): 0.58
Substrate: Sand 20% Silt 10% 50% Clay Gravel 20%
Flow (cfs): 48.95
Data Source for Flow: Calculated SonTek handheld flowtracker.

Observational Data

Water Odor: 6-None
Water Color: 1-Brownish
Water Clarity: Secchi
Water Surface: 2-Ripples
Flow Description: Run
Flow Severity: 3-Normal
Sheen: none
Floatables: Leaves
Deposits: Sand/Silt
Debris in Water: None
Shoreline: eroded - clay/vegetation
Other observational data:

Water Quality Parameters Recorded (Discrete Sampling)

Temperature (ºC): 27.09
Sp. Conductivity (µS/cm): 0336.0
Dissolved Oxygen (mg/L): 6.34
pH (s.u.): 7.85
Additional Comments: (Readings taken 20ft upstream of bridge.)
Sample Depth (m): ~~1ft~~ 0.31m
Data Logger: YSI 6290 V2
Secchi Depth (m): 6in 0.15m
Sample Time: 13:45
Salinity: 0.16 su

Photo Log

Pic No.	Description
29-6	View of southwest bank, upstream of bridge.
30-6	View of south east bank, downstream of bridge.
31-6	View from bridge facing upstream.
32-6	View from bridge facing downstream.
33-6	View of northwest bank, upstream side of bridge.
34-6	View of northeast bank, downstream side of bridge

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: UAA-MC-06-2
Station ID: UAA-MC-2
Segment: Main Fork Mill Creek 1202K
Location: Mill Creek @ FM
Date: 7/30/07
Time: 11:00
Names: Kofi Fam / John Branom
Present Weather: 2-Cloudy (Partly)
Wind Intensity: 1- Calm
Days since last significant rainfall (Days): 1
Quantity of Rain (in.): 0.20
Signature:

Site Characteristics

Physical Characteristics
Stream Width (m): 29.0 95ft
Stream Depth (m): 0.67
Substrate: Sand/silt
Flow (cfs): 164.7
Data Source for Flow: Sontek Hand held flow Tracker / ~~Calculated~~ KS 7/30/07

Observational Data
Water Odor: 6 - None
Water Color: 1 - Brown
Water Clarity: Secchi
Water Surface: 1 - Calm
Flow Description: ~~3 - Normal~~ KS 7/30/07 Run
Flow Severity: 3 - Normal
Sheen: None
Floatables: leaves
Deposits: Sand
Debris in Water: unprocessed wood
Shoreline: eroded clay/riprap
Other observational data: Log jams has grown larger and water is deeper up stream of jams. Recent Fishing activities noted by bait containers, 2 plastic baits and a utility knife left behind

Water Quality Parameters Recorded (Discrete Sampling) 11:15
Temperature (ºC): 27.07
Sp. Conductivity (µS/cm): ~~[illegible]~~ 481.0
Dissolved Oxygen (mg/L): 6.56
pH (s.u.): 7.85
Sample Depth (m): 1ft 0.31m
Data Logger: YSI 6920V2
Secchi Depth (m): 1ft 4in 0.40m
Sample Time: 11:15
Salinity: 0.23
Additional Comments: (Readings taken 20ft. upstream from bridge.)

Photo Log

Pic No.	Description
23-6	View of southwest bank, upstream side of bridge.
24-6	View of southeast bank, downstream side of bridge.
25-6	View of Northwest bank, upstream side of bridge.
26-6	View of Northeast bank, downstream side of bridge.
27-6	View from bridge facing downstream.
28-6	View from bridge facing upstream.

PBS&J

Mill Creek Contact Recreation Pilot Study
Field Data Sheet

Sample ID: 4AA-MC-06-4
Segment: No segment ID#
Station ID: 4AA-MC-4
Location: East Fork Mill Creek @ Eleckert
Date: 7/30/07
Time: 1438
Names: K. Sam / J. Bonnom
Present Weather: 2-Partly Cloudy
Wind Intensity: 1-Calm
Days since last significant rainfall (Days): 1
Quantity of Rain (in.): 0.20
Signature:

Site Characteristics

Physical Characteristics 07/30/07
Stream Width (m): 16.15
Stream Depth (m): 2.0
Substrate: Clay / Sand / Silt
Flow (cfs): 143.19
Data Source for Flow: Calculated Sontek handheld flow tracker

Observational Data
Water Odor: 6-none
Water Color: 1-Brownish
Water Clarity: secchi
Water Surface: 2-Ripples
Flow Description: Run
Flow Severity: 5-High
Sheen: None
Floatables: leaves, twigs, logs
Deposits: NA
Debris in Water: NA
Shoreline: Submerged
Other observational data: Flow at this site was too high to sample from the water and thus all sampling was from bridge.

Water Quality Parameters Recorded (Discrete Sampling)
Temperature (ºC): 27.57
Sp. Conductivity (µS/cm): ~~0.~~331.0
Dissolved Oxygen (mg/L): 5.42
pH (s.u.): 7.69
Additional Comments:
Sample Depth (m): 0.31
Data Logger: YSI 6920 V2
Secchi Depth (m): 0.6 in 0.15 M
Sample Time: 1438
Sal 0.16

Photo Log

Pic No.	Description
35-6	View of Eleckert Rd. W. facing south across mill creek bridge.
36-6	View of Southwest bank, upstream side of bridge.
37-6	View of southeast bank, downstream side of bridge.
38-6	View of Mill Creek facing upstream.
39-6	View of Mill Creek facing down stream.
40-6	View of Northeast bank, downstream side of bridge.

Appendix I

Summary Statistics

Analytical Results Summary
Mill Creek Use Attainability Pilot Study
HGAC

Sample Event: **06/13/07** Sample ID:UAA-MC-01 Project Number: 461409.00	**UAA1** **GRAB**	**UAA2** **GRAB**	**UAA4** **GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	10.40	17.7	13	mg/L
Total Volatile Suspended Solids (VSS)	4.00	6.00	4.60	mg/L
Flow	0.04	22.3	2.12	cfs
Temperature	27.39	29.54	27.07	ºC
Specific Conductivity	0.673**	0.567**	0.734**	mS/cm
Dissolved Oxygen (DO)	6.89**	7.72**	6.07**	mg/L
pH	7.89	7.86	7.81	s.u.
water clarity (secchi depth)	0.21	0.46	0.53	meters
Ammonia - low level	<0.02	<0.02	<0.02	mg/L
Phosphate*	(--)	(--)	(--)	mg/L
TKN*	(--)	(--)	(--)	mg/L
Escherichia coli (Time Series)	VALUE			UNIT
1	359	109	199	MPN/100 mL
2	389	98	185	MPN/100 mL
3	211	134	74	MPN/100 mL
4	288	109	161	MPN/100 mL
5	364	52	146	MPN/100 mL
6	265	108	160	MPN/100 mL
7	520	108	161	MPN/100 mL
8	441	86	228	MPN/100 mL
9	426	131	142	MPN/100 mL
10	318	63	187	MPN/100 mL
11	364	74	156	MPN/100 mL
12	369	31	98	MPN/100 mL
Duplicate	364	41	171	MPN/100 mL

* No analysis for these paramters were completed because hold times expired before these variables were added.

** These data were not used in statisitcal analysis because post-calibration did not meet TCEQ satndards.

Analytical Results Summary
Mill Creek Use Attainability Pilot Study
HGAC

Sample Event: **06/22/07** Sample ID:UAA-MC-02 Project Number: 461409.00	**UAA1** **GRAB**	**UAA2** **GRAB**	**UAA4** **GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	29.3	41	30.6	mg/L
Volatile Suspended Solids (VSS)	13.3	7.70	7.00	mg/L
Flow	10.19	47.1*	22.9	cfs
Temperature	26.01	26.12	26.48	ºC
Specific Conductivity	0.321	0.263	0.316	mS/cm
Dissolved Oxygen (DO)	5.99	6.10	5.29	mg/L
pH	7.60	7.79	7.66	s.u.
water clarity (secchi depth)	0.3	0.3	0.3	meters
Ammonia - low level	0.14	<0.02	<0.02	mg/L
Escherichia coli (Cross Section Sampling)	VALUE			UNIT
1	301	426	794	MPN/100 mL
2	328	561	816	MPN/100 mL
3	278	408	933	MPN/100 mL
4	231	708	1046	MPN/100 mL
5	359	408	1374	MPN/100 mL
Duplicate	354	563	836	MPN/100 mL

* Flow calculated at 1/4th of stream segment

Analytical Results Summary
Mill Creek Use Attainability Pilot Study
HGAC

	UAA1	UAA2	UAA4	
Sample Event: **06/28/07(UAA-1) & 06/29/07 (UAA-2 & UAA-4)** Sample ID:UAA-MC-03 Project Number: 461409.00	**GRAB**	**GRAB**	**GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	18.5[2]	31.7	37.3	mg/L
Volatile Suspended Solids (VSS)	7.5	8.30	10.7	mg/L
Total Suspended Solids (TSS) Duplicate	12.7	36.3	39.3	mg/L
Volatile Suspended Solids (VSS) Duplicate	6.0	9.30	10.7	mg/L
Flow	3.76	144.8	16.01	cfs
Temperature	27.89	26.53	26.99	ºC
Specific Conductivity	0.483	0.386	0.479	mS/cm
Dissolved Oxygen (DO)	5.94	6.38	5.67	mg/L
pH	7.75	7.81	7.61	s.u.
water clarity (secchi depth)	>0.45[1]	0.4	0.3	meters
Ammonia - low level	<0.02[2]	<0.02	<0.02	mg/L
Ammonia - low level Duplicate	<0.02[2]	<0.02	<0.02	mg/L
Escherichia coli (Longitudinal Sampling)		VALUE		UNIT
1	3132	2909	464	MPN/100 mL
2	335	2909	669	MPN/100 mL
3	253	3448	738	MPN/100 mL
4	341	2359	303	MPN/100 mL
5	410	3076	109	MPN/100 mL
Duplicate	313	2187	816	MPN/100 mL

1 - The depth of the stream is 0.45 meter

2 - The values were kept out of the analysis for the samples were not collected in an appropriate manner that satisfied sampling requirements.

Analytical Results Summary

Mill Creek Use Attainability Pilot Study

HGAC

Sample Event: **07/11/07** Sample ID:UAA-MC-04 Project Number: 461409.00	**UAA1**	**UAA2**	**UAA4**	
	GRAB	**GRAB**	**GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	12.3	34.3	25.3	mg/L
Volatile Suspended Solids (VSS)	4.70	9.00	6.00	mg/L
Flow	4.06	56.13	10.58	cfs
Temperature	28.23	28.76	28.26	ºC
Specific Conductivity	0.520	0.492	0.608	mS/cm
Dissolved Oxygen (DO)	6.18	5.55	5.50	mg/L
pH	7.84	7.88	7.84	s.u.
water clarity (secchi depth)	0.46	0.4	0.53	meters
Ammonia - low level	<0.02	0.02	0.04	mg/L
Phosphate	0.68	0.8	0.55	mg/L
TKN	7.70	9.20	8.00	mg/L
Escherichia coli (Vertical Sampling)	VALUE			UNIT
1	131	187	199	MPN/100 mL
2	216	187	109	MPN/100 mL
3	97	122	173	MPN/100 mL
Duplicate		201		MPN/100 mL

Analytical Results Summary
Mill Creek Use Attainability Pilot Study
HGAC

Sample Event: **07/24/07(UAA-1 & UAA-4) and 07/25/07 (UAA-2)** Sample ID:UAA-MC-05 Project Number: 461409.00	**UAA1** **GRAB**	**UAA2** **GRAB**	**UAA4** **GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	24.8	33.3	20.0	mg/L
Total Volatile Suspended Solids (VSS)	6.8	20.0	6.0	mg/L
Flow	28.56	89.48	21.84	cfs
Temperature	26.41	26.46	26.91	ºC
Specific Conductivity	0.514	0.527	0.556	mS/cm
Dissolved Oxygen (DO)	6.35	6.34	5.87	mg/L
pH	7.58	7.73	7.69	s.u.
water clarity (secchi depth)	0.61	0.48	0.48	meters
Ammonia - low level	0.071	0.079	0.073	mg/L
Phosphate	0.18	0.15	0.19	mg/L
TKN	5.60	4.00	5.20	mg/L
Escherichia coli (Time Series)	VALUE			UNIT
1	233	285	275	MPN/100 mL
2	226	432	226	MPN/100 mL
3	253	464	336	MPN/100 mL
4	191	336	173	MPN/100 mL
5	183	318	109	MPN/100 mL
6	173	216	156	MPN/100 mL
7	238	185	269	MPN/100 mL
8	201	292	250	MPN/100 mL
9	226	262	201	MPN/100 mL
10	259	243	272	MPN/100 mL
11	223	275	95	MPN/100 mL
12	148	282	288	MPN/100 mL
Duplicate	256	213	269	MPN/100 mL

Analytical Results Summary
Mill Creek Use Attainability Pilot Study
HGAC

	UAA1	UAA2	UAA4	
Sample Event: **07/30/07** Sample ID:UAA-MC-06 Project Number: 461409.00	**GRAB**	**GRAB**	**GRAB**	
PARAMETER NAME	VALUE	VALUE	VALUE	UNIT
Total Suspended Solids (TSS)	28.0	108.0	96.0	mg/L
Volatile Suspended Solids (VSS)	9.5	10.0	24.0	mg/L
Flow	48.95	164.7	143.19	cfs
Temperature	27.09	27.07	27.59	ºC
Specific Conductivity	0.336	0.481	0.331	mS/cm
Dissolved Oxygen (DO)	6.34	6.56	5.42	mg/L
pH	7.85	7.85	7.69	s.u.
water clarity (secchi depth)	0.15	0.4	0.15	meters
Ammonia - low level	0.068	0.077	0.072	mg/L
Phosphate	0.29	0.24	0.35	mg/L
TKN	4.70	7.30	5.30	mg/L
Escherichia coli (Vertical Sampling)	VALUE			UNIT
1	3076	450	4106	MPN/100 mL
2	3448	364	1585	MPN/100 mL
3	2105	259	4352	MPN/100 mL
Duplicate			3873	MPN/100 mL

Summary Statistics for Water Quality, Water Chemistry Stream Characteristics

Parameters	Statistics	UAA-1	UAA-2	UAA-4
TSS (mg/L)	N	6	6	6
	Mean	20.55	44.33	37.03
	Minimum	10.40	17.70	13.00
	Maximum	29.30	108.00	96.00
	Std.Deviation	8.07	32.11	30.08
	Std.Error	3.29	13.11	12.28
	Coefficient of Variation	0.39	0.72	0.81
TVSS (mg/L)	N	6	6	6
	Mean	7.63	10.17	9.72
	Minimum	4.00	6.00	4.60
	Maximum	13.30	20.00	24.00
	Std.Deviation	3.41	5.00	7.30
	Std.Error	1.39	2.04	2.98
	Coefficient of Variation	0.45	0.49	0.75
Flow (cfs)	N	6	6	6
	Mean	15.93	95.48	36.11
	Minimum	0.04	22.30	2.12
	Maximum	48.95	164.70	143.19
	Std.Deviation	19.10	59.51	53.02
	Std.Error	7.80	24.29	21.65
	Coefficient of Variation	1.20	0.62	1.47
Temperature (°C)	N	6	6	6
	Mean	27.17	27.41	27.22
	Minimum	26.01	26.12	26.48
	Maximum	28.23	29.54	28.26
	Std.Deviation	0.85	1.40	0.62
	Std.Error	0.35	0.57	0.25
	Coefficient of Variation	0.03	0.05	0.02
Sp. Conductivity (mS/cm)	N	6	6	6
	Mean	0.47	0.48	0.50
	Minimum	0.32	0.32	0.32
	Maximum	0.67	0.57	0.73
	Std.Deviation	0.13	0.09	0.16
	Std.Error	0.05	0.04	0.07
	Coefficient of Variation	0.28	0.18	0.32
Dissolved Oxygen (DO) (mg/L)	N	6	6	6
	Mean	6.28	6.44	5.64
	Minimum	5.94	5.55	5.29
	Maximum	6.89	7.72	6.07
	Std.Deviation	0.34	0.72	0.29
	Std.Error	0.14	0.29	0.12
	Coefficient of Variation	0.05	0.11	0.05
pH(s.u.)	N	6	6	6
	Mean	7.75	7.82	7.72
	Minimum	7.58	7.73	7.61
	Maximum	7.89	7.88	7.84
	Std.Deviation	0.13	0.06	0.09
	Std.Error	0.05	0.02	0.04
	Coefficient of Variation	0.02	0.01	0.01
Water Clarity (Secchi depth) (meters)	N	6	6	6
	Mean	0.36	0.41	0.38
	Minimum	0.15	0.30	0.15
	Maximum	0.61	0.48	0.53
	Std.Deviation	0.17	0.06	0.16
	Std.Error	0.07	0.03	0.06
	Coefficient of Variation	0.48	0.15	0.41
Ammonia - Low level (mg/L)	N	5	6	6
	Mean	0.06	0.04	0.04
	Minimum	0.02	0.02	0.02
	Maximum	0.14	0.08	0.07
	Std.Deviation	0.05	0.03	0.03
	Std.Error	0.02	0.01	0.01
	Coefficient of Variation	0.77	0.76	0.63
*Phosphate (mg/L)	N	3	3	3
	Mean	0.38	0.40	0.36
	Minimum	0.18	0.15	0.19
	Maximum	0.68	0.80	0.55
	Std.Deviation	0.26	0.35	0.18
	Std.Error	0.15	0.20	0.10
	Coefficient of Variation	0.69	0.89	0.50
*TKN (mg/L)	N	3	3	3
	Mean	6.00	6.83	6.17
	Minimum	4.70	4.00	5.20
	Maximum	7.70	9.20	8.00
	Std.Deviation	1.54	2.63	1.59
	Std.Error	0.89	1.52	0.92
	Coefficient of Variation	0.26	0.39	0.26

* - The samples were tested for these pollutants for the sample event 4,5, and 6 only at all the 3 sites.

Appendix J

Additional Bacteria Analysis and Results

APPENDIX J

Time Series (Event 1)

For the time series datasets, normality and Levene's homogeneity of variance tests were computed to determine whether the data were normally distributed and variances were equal. If tests of normality and homogeneity of variances failed, the tests were conducted again on the natural-log transformation of the data. Probability plots were constructed for the datasets to illustrate that the resulting data was normally distributed. Box-whisker plots (boxplots) were used in this study to visually compare differences in *E. coli* concentrations between sites within Event 1 when the data set represented a single grab sample, a time series every 5 minutes, every 10 minutes, and every 15 minutes. Specifically, boxplots were used to compare the variation in *E. coli* concentrations during these time series. For all boxplots, the line through the middle denotes the median of the data range, the box itself represents the 25th through 75th percentiles, and the "whiskers" extend from the 5th to the 95th percentiles (Figure J-1). Points that extend beyond the length of the whiskers are indicated with an asterisk as an outlier in the dataset. Open circles represent suspected outliers (Figure J-1). Additionally, a scatter plot was created to explore the relationship between *E. coli* concentrations and normalized flow using the geometric mean of *E. coli* concentration at each site. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainages area size in acres.

The purpose of Figure J-1 is to compare the differences between a single grab sample and 5-minute, 10-minute, and 15-minute interval samples over a one-hour time period. The graph illustrates that during this sampling event, *E. coli* concentrations do not vary between the first grab sample and samples taken at 5-minute, 10-minute, and 15-minute intervals at any given sample location.

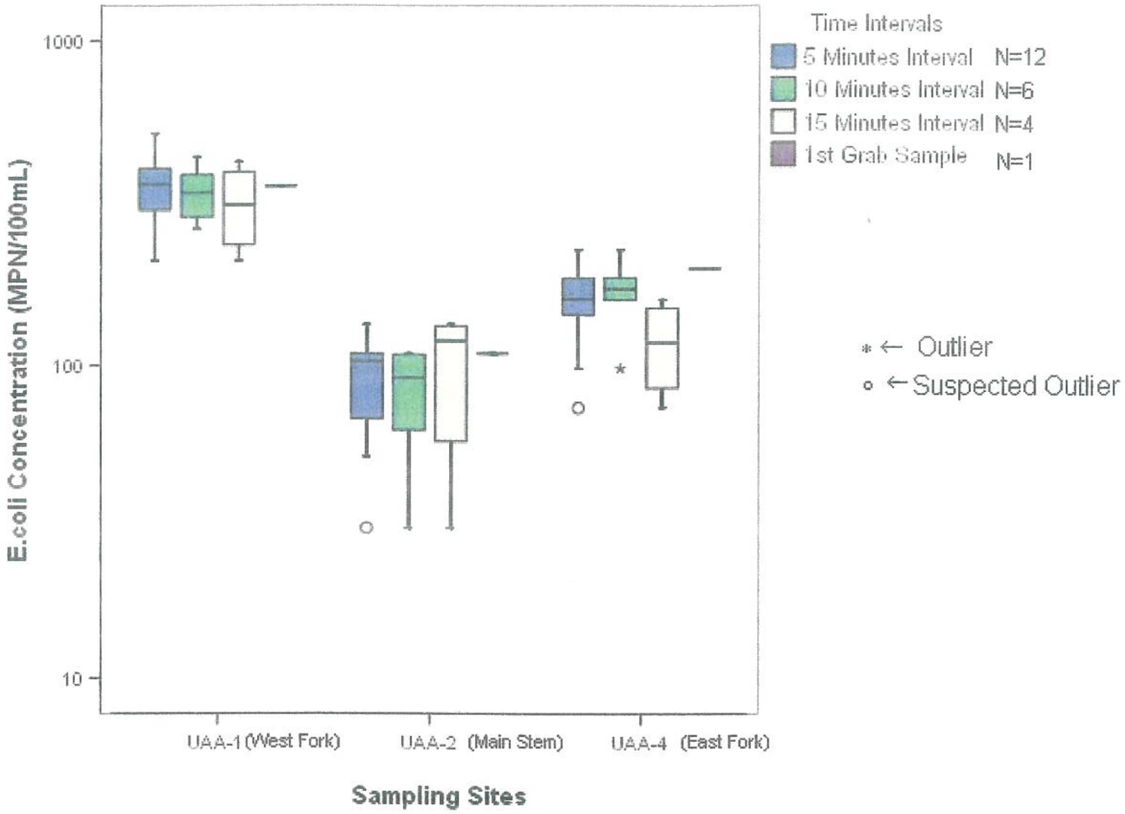


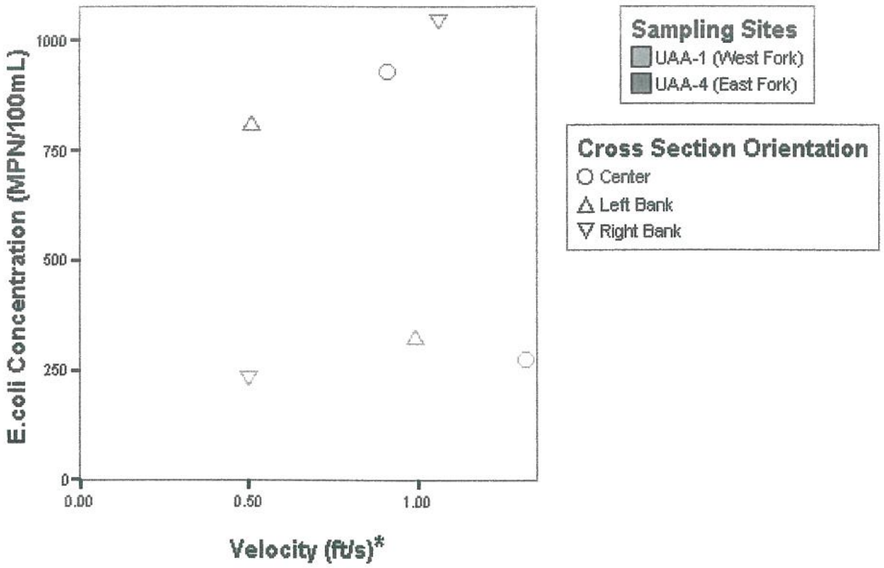
Figure J-1
Boxplot showing *E. coli* Concentrations Obtained from Time Series Sampling during Sampling Events 1 on June 13 2007

Regression analysis were performed on the bacteria data obtained from Event 1 to understand the correlation between field measurements such as instantaneous depth, velocity, stream flow, and bacteria concentration. Since the dataset was limited in size, the data points from Sample Events 1 and 5 were combined in order to increase the robustness of the results obtained from the regression analysis. This is a valid method because both of the sampling events (1 and 5) were performed using the Time Series Sampling method. The results obtained from the regression analysis performed on the combined dataset are discussed under Section 1.1.17.

Cross-Section (Event 2)

Scatter plots were created to explore the relationships between *E. coli* concentrations and instantaneous velocity (velocity) (foot/feet per second ["ft/s"]), and water depth (feet) for the cross-section sampling method. Comparisons between *E. coli* and instantaneous velocity (velocity) and *E. coli* and water depth are graphically represented only in locations where *E. coli*, depth, and velocity were measured at the same location. *E. coli* samples were collected at five equally-spaced positions across the width of each site; however, flow and depth data were only measured at points located 25 percent, 50 percent, and 75 percent of the stream width. Velocity and depth were not compared at the Main Stem site because conditions only allowed field team members to safely enter and collect velocity and depth measurements from a small portion of the flow (approximately ¼ the stream width). Flow was also not analyzed for this sampling event for the same reason.

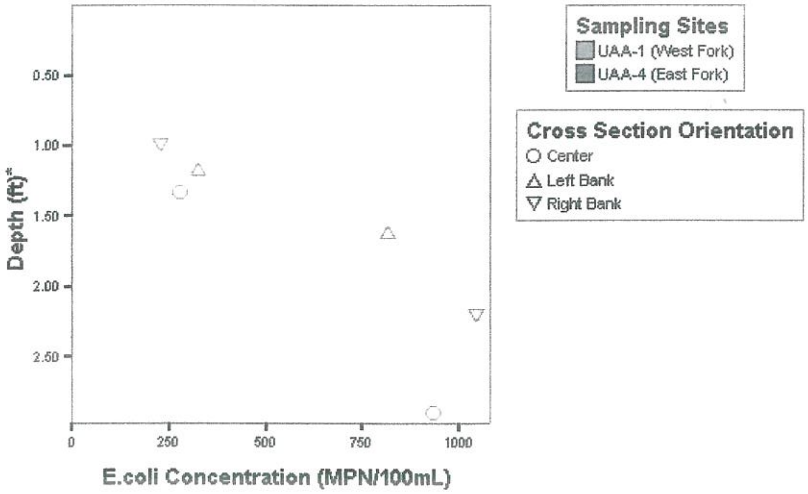
Figure J-2 shows the relationship between velocity and *E. coli* concentration. Based on the small number of samples collected during the pilot study the data suggest *E. coli* concentrations were higher at the East Fork site in comparison with the West Fork site. No trends were detected in the scatter plot below according to the sample location; however, such a limited dataset is not robust enough to determine whether samples taken over a longer time period would show a different trend. Additionally, there is no trend suggesting there is a relationship between velocity and *E. coli* concentration using the cross-section sampling technique. This dataset is not robust enough to determine whether more sets of samples taken would indicate a different trend.



* Instantaneous Velocity measurements for Site UAA-2 were not taken due to inaccessibility to the entire cross-section of the stream.

Figure J-2
EC Concentrations Obtained from Cross-Section Sampling vs. Instantaneous Velocity measured on June 22, 2007

Figure J-3 is a scatter plot showing the relationship between *E. coli* concentration and stream depth. This graph suggests that *E. coli* samples collected from areas with deeper depths resulted in higher *E. coli* concentrations than samples collected from shallower depths. In general, *E. coli* concentrations were much higher at the East Fork site than the West Fork site. This is the opposite trend detected during the time series sampling event; however, weather conditions also differed at these two sampling events. This might be the reason for the observed differences. This dataset is not robust enough to determine whether more sets of samples taken would indicate different trends.



* Instantaneous Depth measurements for Site UAA-2 were not taken due to inaccessibility to the entire stretch of the Cross section of the stream.

Figure J-3
***E. coli* Concentrations Obtained from Cross-Section Sampling vs. Instantaneous Depth Measured on June 22, 2007**

Longitudinal Sections (Event 3)

Scatter plots were created to explore the relationships between *E. coli* concentrations and velocity (ft/s), water depth (feet), and normalized flow longitudinally along each stream reach. *E. coli* samples were collected at five positions across the length of the stream reach at each site and velocity, and water depth data were also measured. Regression analysis was computed for *E. coli* vs. velocity, and *E. coli* vs. water depth comparisons and resulting equation and R-squared value are shown in the results section. For flow comparisons, the geometric mean of *E. coli* concentrations for each site was computed and compared with normalized flow. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainage area size in acres.

Figure J-4 is a graph comparing the geometric mean *E. coli* concentration with normalized flows at each site during the longitudinal sampling event. Based on the limited data set, it appears that higher *E. coli* concentrations occur under high flow conditions once flow is normalized per unit area of watershed upstream. This is the opposite trend that was observed during the time series sampling event; however, field conditions were significantly different between Sampling Events 1 and 3, and this could be the reason an opposite trend was observed. This dataset is not robust enough to determine whether more sets of samples taken would indicate different trends.

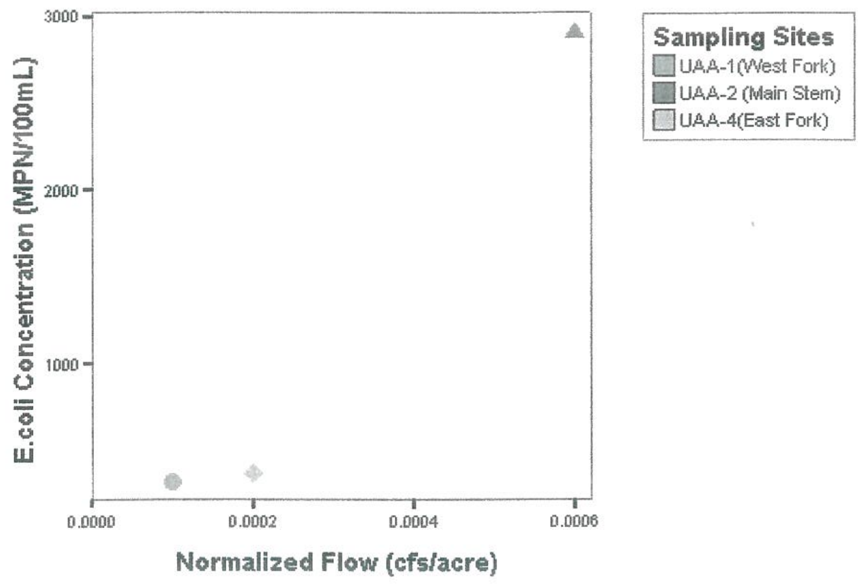
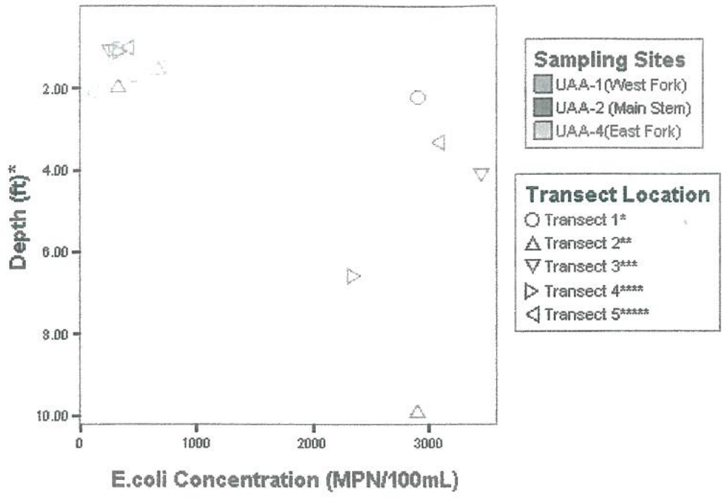


Figure J-4
Geomean *E. coli* Concentrations Obtained from Longitudinal Section Sampling vs. Normalized Flow on June 28-29, 2007

Figure J-5 is a graph comparing the *E. coli* concentration with stream depth at each site during the longitudinal sampling event. The scatter plot below suggests that *E. coli* samples collected from areas with deeper depths resulted in higher *E. coli* concentrations than samples collected from shallower depths. In general, *E. coli* concentrations were much higher at the Main Stem site compared to the East and West Fork sites. This is similar to the trend detected during the cross-section sampling event; however, weather conditions also differed at these two sampling events, so this should be taken into account when making comparisons of similarities and difference between sample events. No trends were shown based on the location along the stream reach where the sample was collected and the *E. coli* concentration; however, this dataset is not robust enough to determine whether samples taken over a longer time period would show different trends.

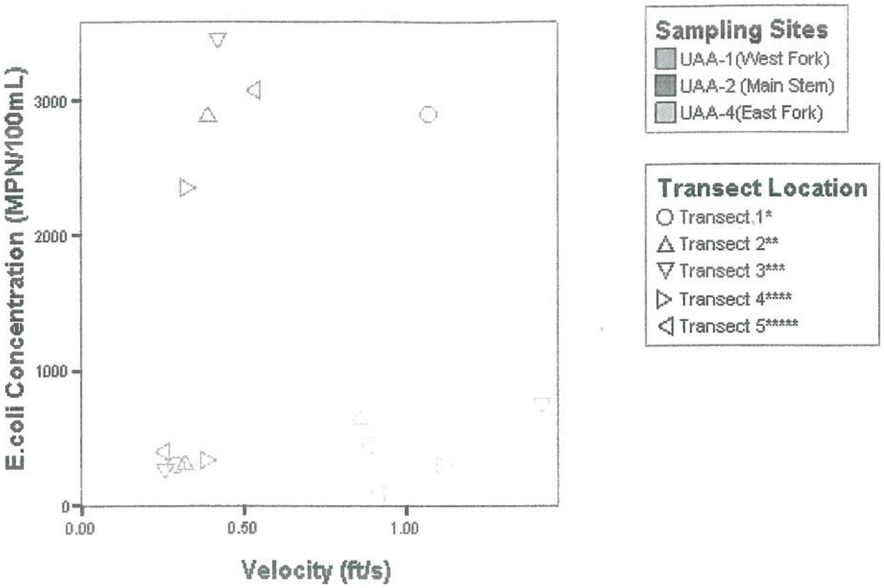


For UAA-1 (West Fork):
* At the bridge crossing
** 40m upstream from the bridge crossing
*** 80m upstream from the bridge crossing
**** 120m upstream from the bridge crossing
***** 160m upstream from the bridge crossing
For UAA-4 (East Fork):
* 9 m upstream from the bridge crossing
** 49m upstream from the bridge crossing
*** 89m upstream from the bridge crossing
**** 129m upstream from the bridge crossing
***** 169m upstream from the bridge crossing
For UAA-2 (Main Stem):
* At the bridge crossing
** 250m upstream from the bridge crossing
*** 500m upstream from the bridge crossing
**** 750m upstream from the bridge crossing
***** 1000m upstream from the bridge crossing

Note: For UAA-4 (East Fork): Transect 1 was located 40ft (12.2 m) upstream of the bridge crossing in order to avoid eddy currents caused by vegetation at the bridge crossing. Add 30ft (9.12m) to the other transect location distances.

Figure J-5
E. coli **Concentrations Obtained from Longitudinal Section Sampling vs. Instantaneous Depth Measured on June 28-29, 2007**

Figure J-6 shows the relationship between *E. coli* concentration and velocity. The scatter plot below suggests that there are no trends in *E. coli* samples collected from areas with higher velocities than lower velocities. In general, *E. coli* concentration was much higher at the Main Stem site compared to the East and West Fork sites. This is similar to the trend detected during the cross-section and longitudinal sampling events; however, weather conditions also differed at these two sampling events, so this should be taken into account when making comparisons of similarities and differences between sample events. No trends were shown based on the location along the stream reach where the sample was collected and *E. coli* concentration; however, this dataset is not robust enough to determine whether more sets of samples taken would indicate different trends.



For UAA-1 (West Fork):
* At the bridge crossing
** 40m upstream from the bridge crossing
*** 80m upstream from the bridge crossing
**** 120m upstream from the bridge crossing
***** 160m upstream from the bridge crossing
For UAA-4 (East Fork):
* 9 m upstream of the bridge crossing
** 49m upstream from the bridge crossing
*** 89m upstream from the bridge crossing
**** 129m upstream from the bridge crossing
***** 169m upstream from the bridge crossing
For UAA-2 (Main Stem):
* At the bridge crossing
** 250m upstream from the bridge crossing
*** 500m upstream from the bridge crossing
**** 750m upstream from the bridge crossing
***** 1000m upstream from the bridge crossing

Figure J-6
***E. coli* Concentrations Obtained from Longitudinal Section Sampling vs. Instantaneous Velocity Measured on June 28-29, 2007**

The relationship between habitat type and *E. coli* concentration was considered, but all *E. coli* samples were collected in water over 1.5 feet deep, and the only habitats that occurred in these areas were runs and glides; therefore, it was determined that this analysis would not be meaningful.

Vertical Profile (Event 4)

Scatter plots were created to explore the relationships between *E. coli* concentrations and velocity (ft/s), depth from which the sample was taken (sample depth), and normalized flow for *E. coli* samples collected at surface, middle, and bottom locations in the water column at each site. Comparisons between *E. coli* and velocity and *E. coli* and sample depth are graphically represented only in locations where *E. coli*, sample depth, and velocity were measured at the same location. Regression analysis was computed for

E. coli vs. velocity, and *E. coli* vs. sample depth comparisons and the resulting equation and R-squared value are shown in the results section. For flow comparisons, the geometric mean of *E. coli* concentrations for each site was computed and compared with normalized flow. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainage area size in acres.

Regression analyses were performed on the bacteria data obtained from Event 4 to understand the individual correlation between field measurements such as instantaneous depth, velocity, stream flow, and bacteria concentration. Since the dataset was limited in size, the data points from Sample Events 4 and 6 were combined in order to increase the robustness of the results obtained from the regression analysis. This is a valid method because both of the sampling events (4 and 6) were performed using the Vertical Section Sampling method. The results obtained from the regression analysis performed on the combined dataset are discussed under Section 1.1.1.8.

Time Series (Event 5)

For the time series bacteria dataset collected from Sampling Event 5, normality and Levene's homogeneity of variance tests were performed to determine whether the data were normally distributed and variances were equal. Upon failure of the data to satisfy the tests of normality and homogeneity of variances, the tests were conducted on the natural-log transformation of the data. However, the tests of normality and homogeneity of variances failed even upon transformation of data. Box-whisker plots (boxplots) were used in this study to visually compare differences in *E. coli* concentrations between sites within Event 5 when the data set represented a single grab sample, a time series every 5 minutes, every 10 minutes, and every 15 minutes. Specifically, boxplots were used to compare the variation in *E. coli* concentrations during these time series. For all boxplots, the line through the middle denotes the median of the data range, the box itself represents the 25th through 75th percentiles, and the "whiskers" extend from the 5th to the 95th percentiles (Figure J-1). Points that extend beyond the length of the whiskers are indicated with an asterisk as an outlier in the dataset. Open circles represent suspected outliers (Figure J-1). Additionally, a scatter plot was created to explore the relationship between *E. coli* concentrations and normalized flow using the geometric mean of *E. coli* concentration at each site. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainages area size in acres.

Regression analysis were performed on the bacteria data obtained from Event 1 to understand the individual correlation between field measurements such as instantaneous depth, velocity, stream flow, and bacteria concentration. Since the dataset was limited in size, the data points from Sample Events 1 and 5 were combined in order to increase the robustness of the results obtained from the regression analysis. This is a valid method because both of the sampling events (1 and 5) were performed using the Time Series Sampling method. The results obtained from the regression analysis performed on the combined dataset are discussed under Section 1.1.1.7.

The purpose of Figure J-7 is to compare the differences between a single grab sample and 5-minute, 10-minute and 15-minute interval samples over a one-hour time period. The graph illustrates that during this sampling event, *E. coli* concentrations do not vary between the first grab sample and samples taken at 5-minute, 10-minute, and 15-minute intervals at any given sample location.

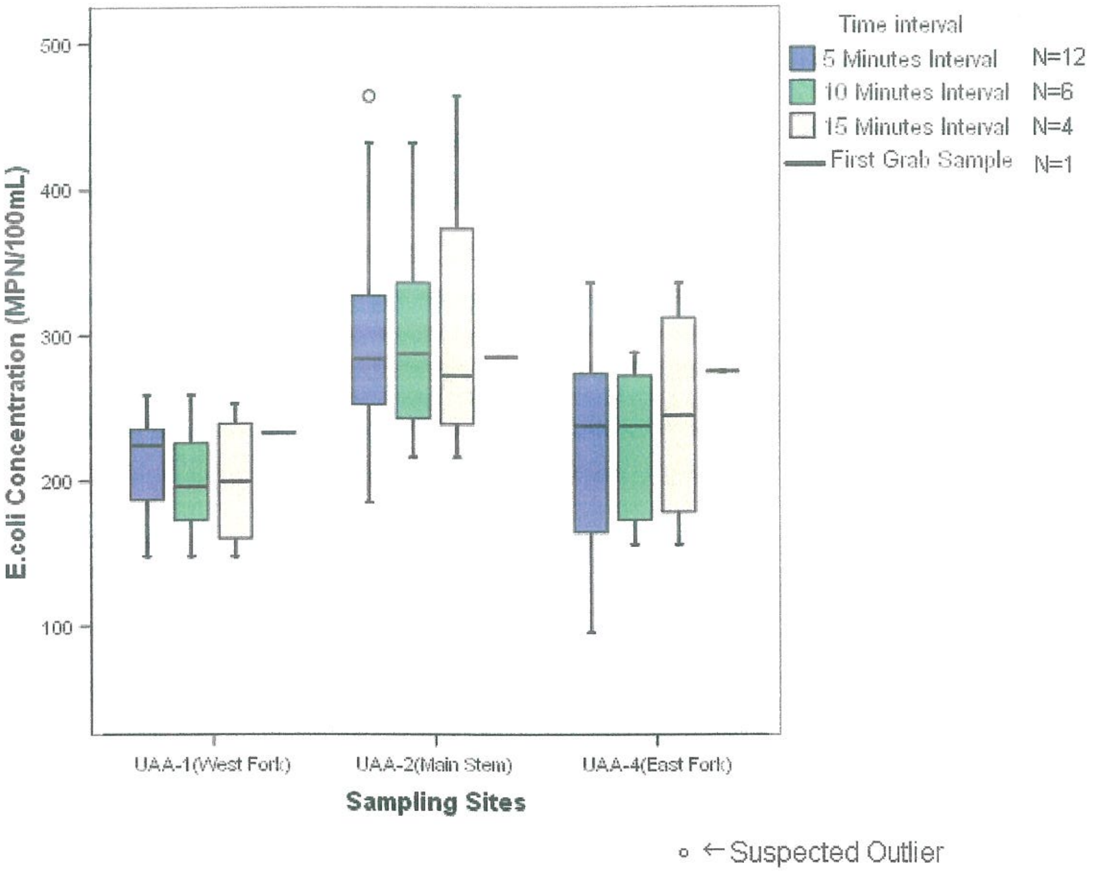


Figure J-7
Boxplot showing *E. coli* Concentrations Obtained from Time Series Sampling on July 24-25, 2007

Regression analyses were performed on the bacteria data obtained from Event 5 to understand the individual correlation between field measurements such as instantaneous depth, velocity, stream flow, and bacteria concentration. Since the dataset was limited in size, the data points from Sample Events 1 and 5 were combined in order to increase the robustness of the results obtained from the regression analysis. This is a valid method because both of the sampling events (1 and 5) were performed using the Time Series Sampling method. The results obtained from the regression analysis performed on the combined dataset are discussed under Section 1.1.1.7.

Vertical Profile (Event 6)

Scatter plots were created to explore the relationships between *E. coli* concentrations and velocity (ft/s), depth from which the sample was taken (sample depth), and normalized flow for *E. coli* samples collected at surface, middle, and bottom locations in the water column at each site. Comparisons between *E. coli* and velocity and *E. coli* and sample depth are graphically represented only in locations where *E. coli*, sample depth and velocity were measured at the same location. Regression analysis was computed for *E. coli* vs. velocity, and *E. coli* vs. sample depth comparisons and the resulting equation and R-squared value are shown in the results section. For flow comparisons, the geometric mean of *E. coli* concentrations for each site was computed and compared with normalized flow. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainage area size in acres.

Regression analyses were performed on the bacteria data obtained from Event 6 to understand the individual correlation between field measurements such as instantaneous depth, velocity, stream flow, and bacteria concentration. Since the dataset was limited in size, the data points from sample Event 4 and 6 were combined in order to increase the robustness of the results obtained from the regression analysis. This is a valid method because both of the sampling events (4 and 6) were performed using the Vertical Section Sampling method. The results obtained from the regression analysis performed on the combined dataset are discussed under Section 1.1.1.8.

Comparison of Bacteria Data Obtained from Sampling Events 1 and 5 Using Time Series Sampling Method

The bacteria data for 5-minute, 10-minute, and 15-minute interval samples over a one-hour time period for sample Events 1 and 5 were combined in order to increase the robustness of the boxplots and compared with the single grab sample obtained from sample Event 1. Figure J-8 illustrates that during this sampling event, *E. coli* concentrations do not vary between the first grab sample and samples taken at 5-minute, 10-minute, and 15-minute intervals at any given sample location.

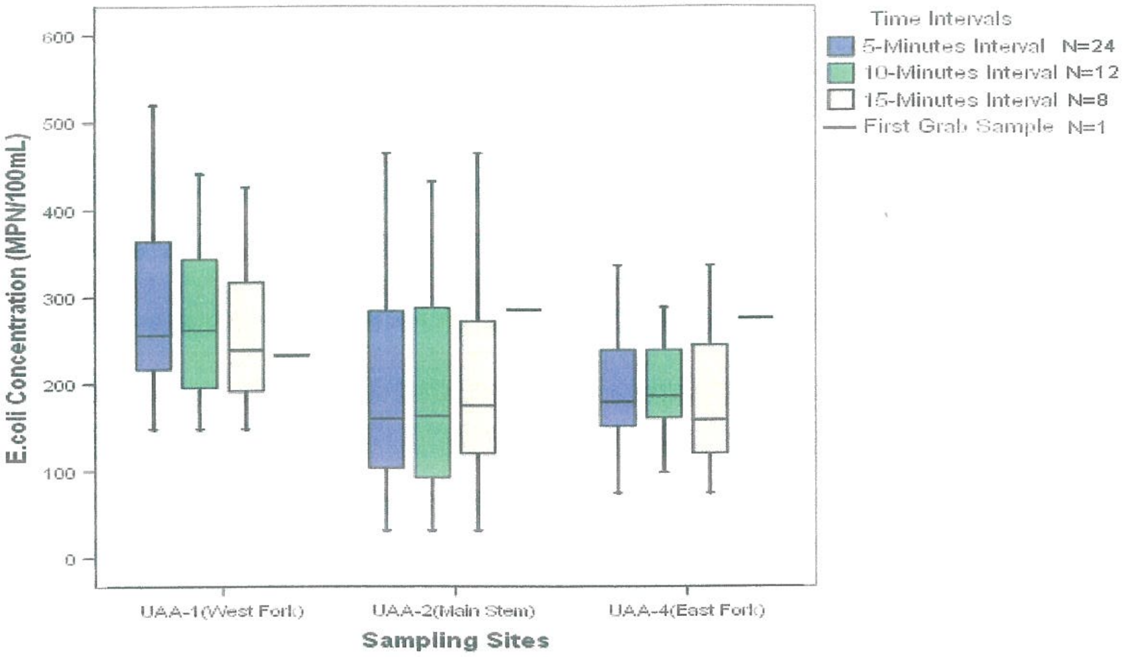
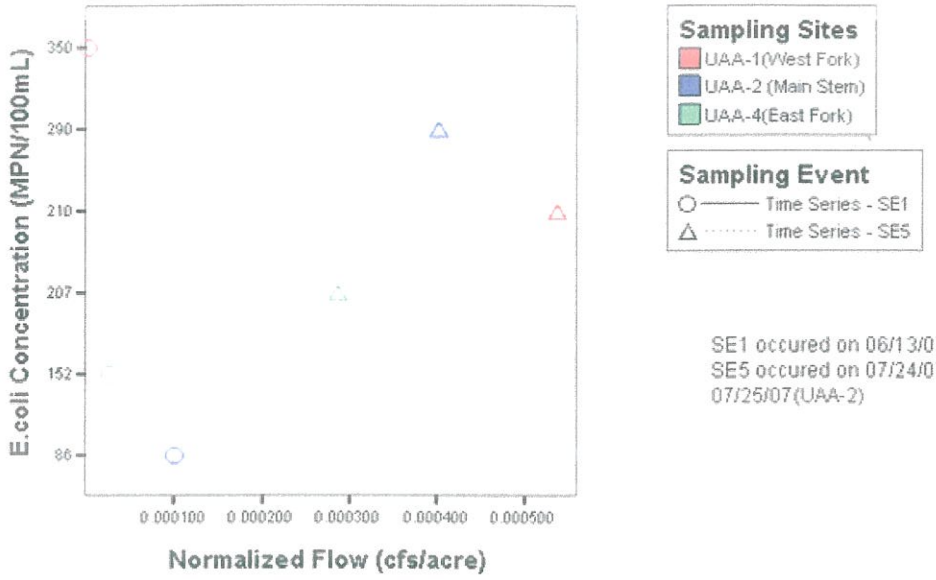


Figure J-8
Boxplot showing *E. coli* Concentrations Obtained from Time Series Sampling During Sampling Events 1 and 5 on June 13 and July 24-25, 2007

Figure J-9 illustrates the relationship between flow and *E. coli* concentration. Flow was measured on the subsequent day at two of the three sampling locations for Sampling Event 1. The sampling activity at sites UAA-1(West Fork) and UAA-4 (East Fork) was performed on July 24 and 25, 2007, respectively, for Sampling Event 5.

Based on the results from the regression analysis on the combined data from sample Events 1 and 5, it appears that higher *E. coli* concentrations occur under higher flow conditions. Flows indicated in the graph are normalized per unit area of watershed upstream of each site. These results are consistent with expectations and the results obtained from other sample event,s which were conducted based on different methods of sampling.



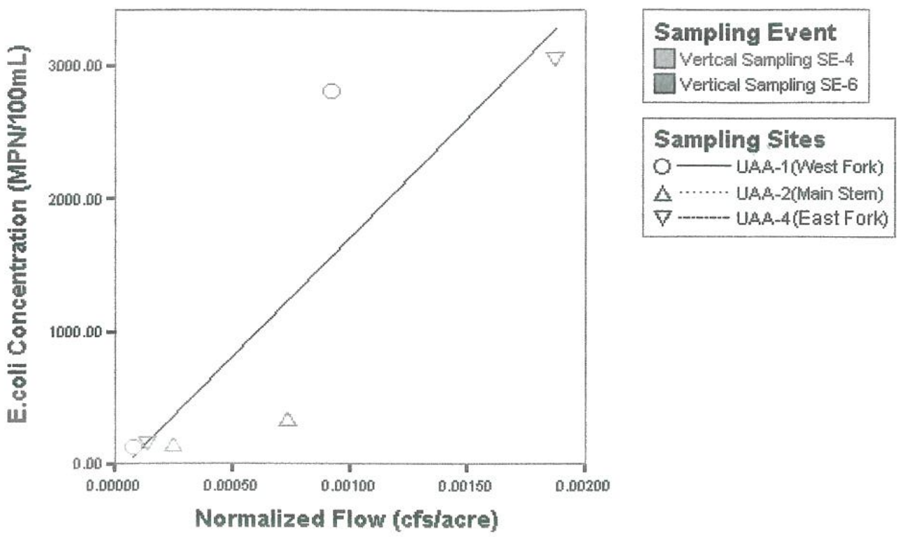
SE1 occured on 06/13/07
SE5 occured on 07/24/07 (UAA1 and 4) -
07/25/07(UAA-2)

* Flow measurements for Site UAA-1 and UAA-4 were taken the following day due to velocimeter malfunction.

Figure J-9
Geomean *E. coli* Concentrations Obtained from Time Series Sampling vs. Normalized Flow During Sampling Events 1 and 5 on June 13 and June 24-25, 2007

Comparison of Bacteria Data Obtained from Sampling Events 4 and 6 Using Vertical Section Sampling Method

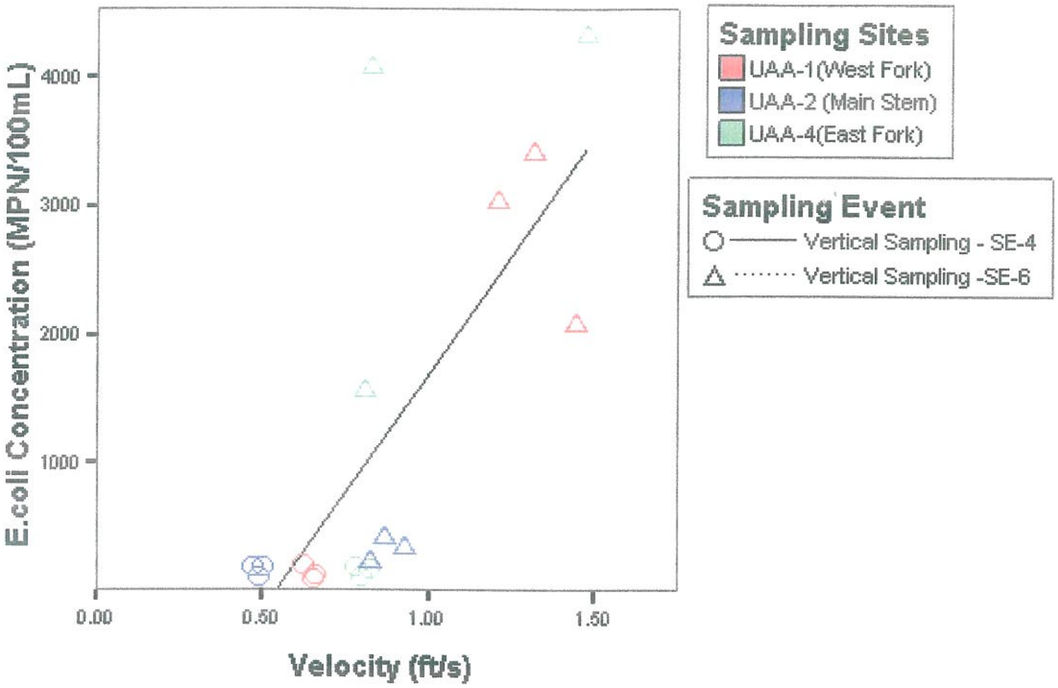
Figure J-10 is a graph comparing the geometric mean *E. coli* concentration with normalized flows at each site during the Sampling Events 4 and 6 using the vertical section sampling method. Based on the results from the regression analysis on the combined data from sample Events 1 and 5, it appears that higher *E. coli* concentrations occur under higher flow conditions. Flows indicated in the graph are normalized per unit area of watershed upstream of each site. These results are consistent with expectations and the results obtained from other sample events, which were conducted based on different methods of sampling.



Linear Regression:
E. coli Concentration (MPN/100mL) = (-86.40) + 1793611.03 * Normalized Flow (cfs/acre)
R-Square = 0.75

Figure J-10
Geomean *E. coli* Concentrations Obtained from Vertical Section Sampling vs. Normalized Flow from Sampling Events Conducted on July 11 and July 24-25 2007

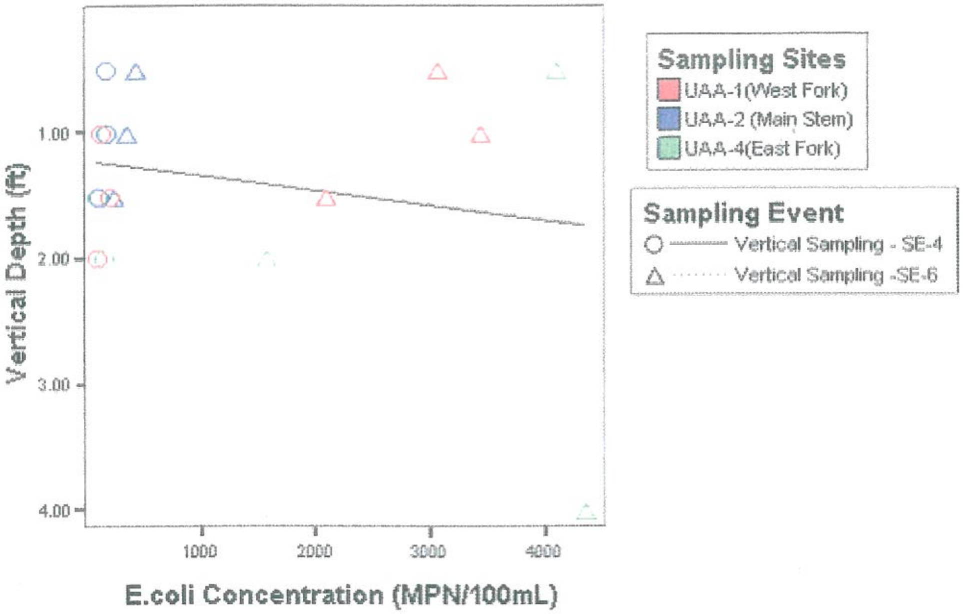
Figure J-11 shows the relationship between *E. coli* concentration and velocity. The scatter plot below suggests that higher *E. coli* concentrations occur under areas with higher velocities than lower velocities. Velocity was highest at the East Fork site and lowest at the Main Stem site, and the *E. coli* concentrations are found to be the highest at the East Fork site and lowest at the Main Stem site.



Linear Regression:
E. coli Concentration (MPN/100mL) = (-1996.49) + 3679.31 * Velocity (ft/s)
R-Square = 0.56

Figure 11
***E. coli* Concentrations Obtained from Vertical Section Sampling vs. Velocity Measured at the Three Vertical Locations During Sampling Events Conducted on July 11 and July 24-25 2007**

Figure J-12 is a graph comparing *E. coli* concentration with sample depths measured during Sampling Events 4 and 6 using the vertical section sampling method. No inference could be drawn from the scatter plot showing *E. coli* samples collected from areas with varying vertical depths from the surface of the stream. This could be attributed to limited data points and was found insufficient to determine a correlation trend.

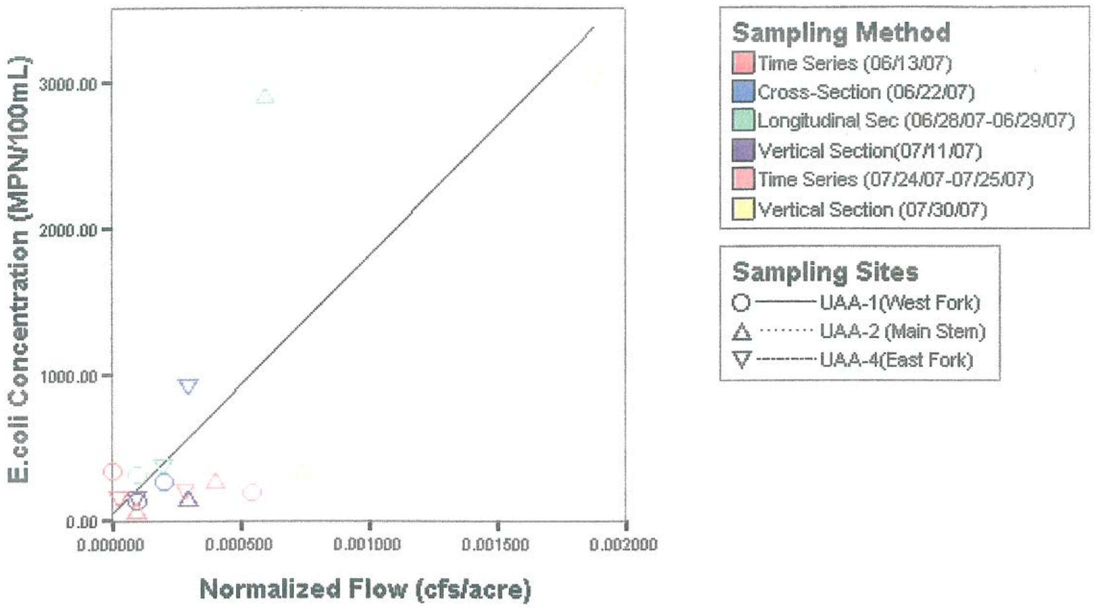


Linear Regression:
E. coli Concentration (MPN/100mL) = (1.22) + 0.00 * Vertical Depth (feet)
R-Square = 0.05

Figure J-12
EC Concentrations Obtained from Vertical Section Sampling vs. Vertical Depth from Sampling Events Conducted on July 11 and July 30, 2007

Rainfall and Pooled Flow Analysis

Figure J-13 is a graph comparing the geometric mean *E. coli* concentration with normalized flows at each site during all the sampling events using different sampling methods in June and July 2007. Based on the results from the regression analysis, it appears that higher *E. coli* concentrations occur under higher flow conditions. Flows indicated in the graph are normalized per unit area of watershed upstream of each site. These results are consistent with expectations and the results obtained from the individual sample events, which were conducted based on different methods of sampling.

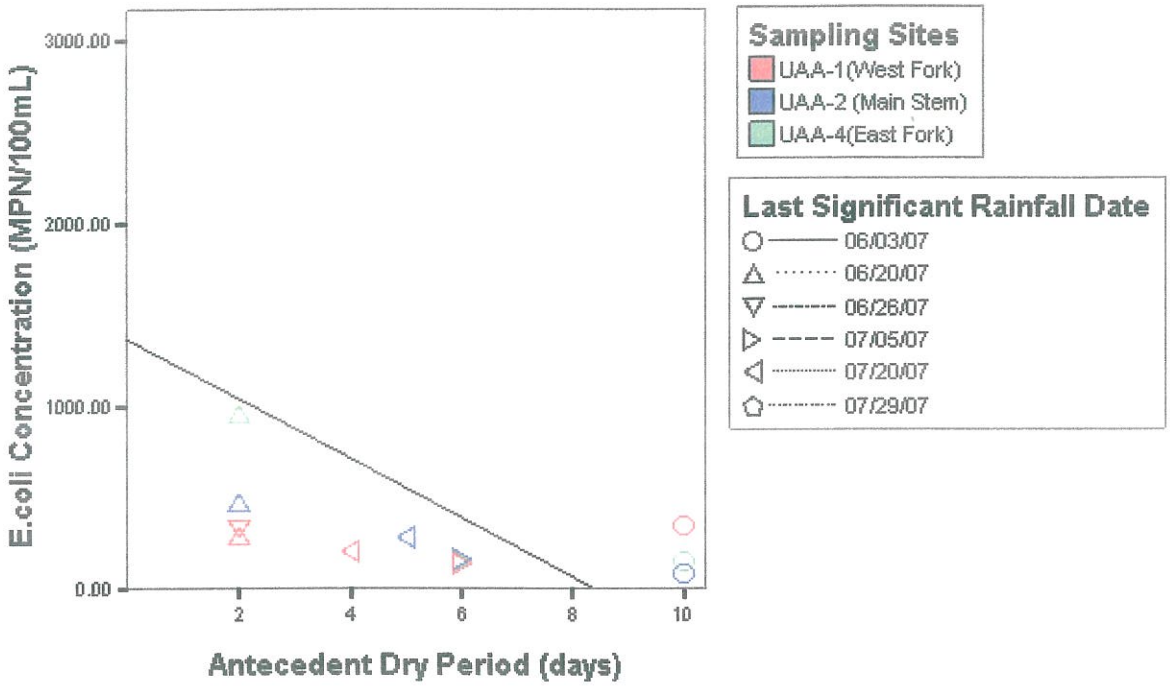


Linear Regression:
E. coli Concentration (MPN/100mL) = 43.77 + 1772986.77 * Normalized Flow (cfs/acre)
R-Square = 0.6

Figure J-13
Geomean EC Concentrations Obtained during Six Sampling Events vs. Normalized Flow during June and July 2007

Overall, higher normalized flows were correlated with high *E. coli* concentrations when all sample events and sample locations were pooled. The strength of this relationship is moderately high based on the R-squared value calculated from a regression analysis; however, it appears that one sample with abnormally high *E. coli* concentrations is driving this relationship. Also, methods for collecting these samples were conducted differently during each sampling event and yielded varying sample sizes. It should be noted that each point on the graph represents a different sample size. Red shapes represent N=12, green and blue shapes represent N=5, purple and yellow shapes represent N=3.

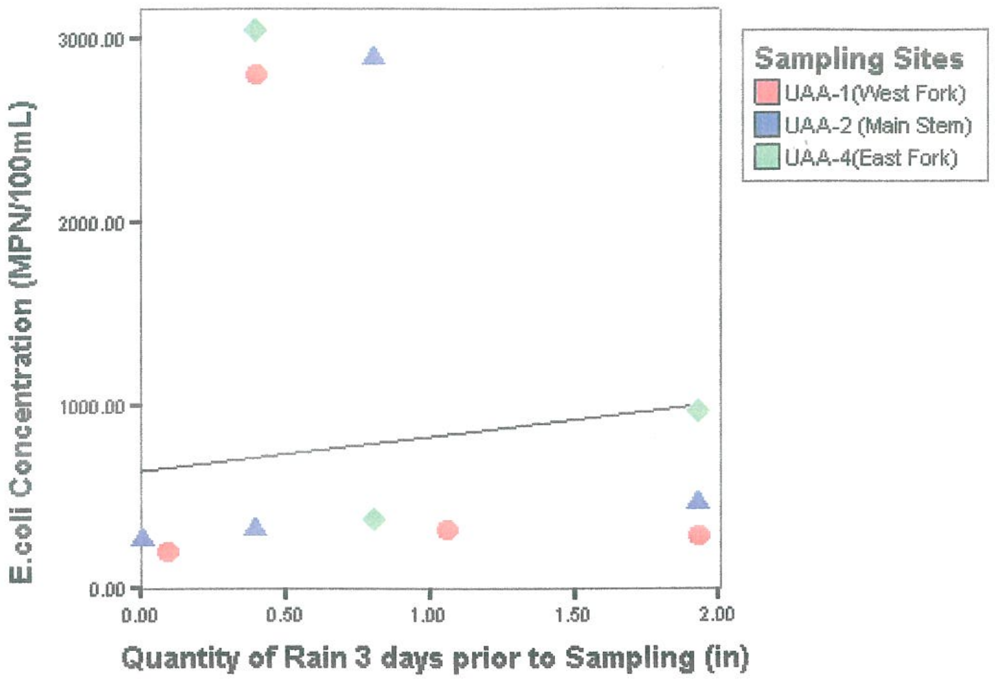
Figure J-14 is a scatter plot representing a regression analysis comparing *E. coli* concentration to the duration of the ADP prior to sampling. The data suggest that higher *E. coli* concentration occur during shorter ADP's. The strength of this relationship is moderate (R-squared value = 0.32). Also, methods for collecting these samples were conducted differently during each sampling event and yielded varying sample sizes.



Linear Regression: *E. coli* Concentration = 1365.40 + (-162.79) * ADP; R-Square = 0.32

Figure J-14
Scatter Plot Showing Geomean *E. coli* Concentrations vs. Antecedent Dry Period (ADP) for Sample Events Conducted During June and July on Mill Creek, Austin County

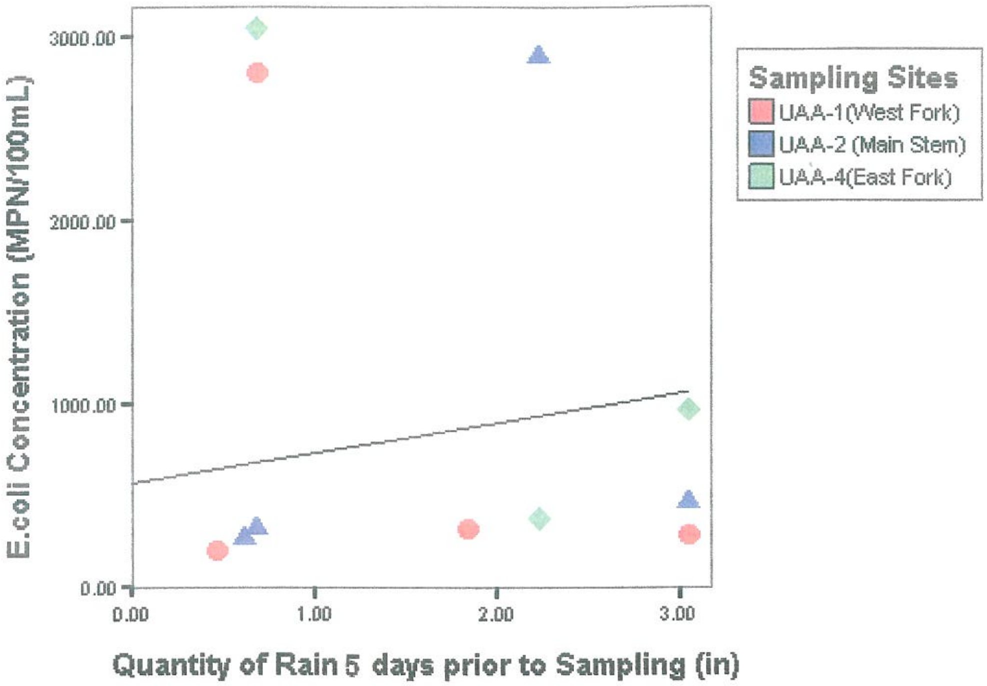
Figure J-15 represents the resulting scatter plot from the regression analysis conducted on cumulative rainfall three days prior to sampling. Overall, higher *E. coli* concentrations are observed when more rainfall occurs three days prior to the sample date. The strength of this relationship is very low based on the R-squared value calculated from a regression analysis; however, it appears one sample with abnormally high *E. coli* concentrations may be affecting this relationship. Also, methods used to collect these samples were different during each sampling event and yielded varying sample sizes.



Linear Regression: *E. coli* Concentration = 639.22 + 186.50 * Quantity of Rain accumulated three days prior; R-Square = 0.02

Figure J-15
Scatter Plot Showing Geomean *E. coli* Concentrations vs. Quantity of Rainfall Accumulated Three Days Prior to the Sampling Event Conducted During June and July on Mill Creek, Austin County

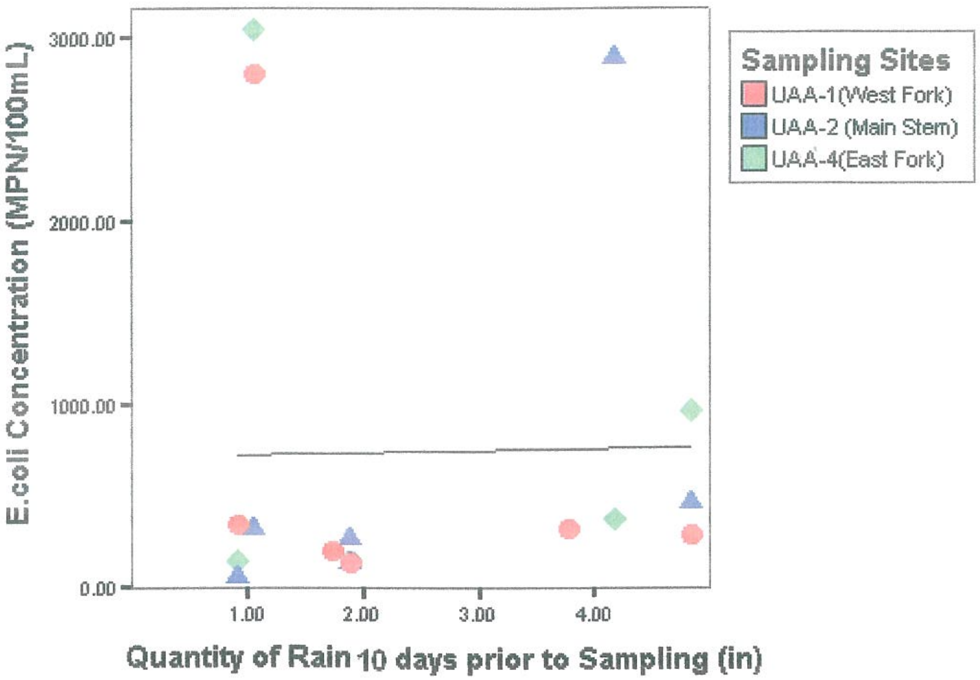
Figure J-16 represents the resulting scatter plot from the regression analysis conducted on cumulative rainfall five days prior to sampling. Again, higher *E. coli* concentrations are observed when more rainfall occurs five days prior to the sample date. The strength of this relationship is very low based on the R-squared value calculated from a regression analysis; however, it appears that one sample with abnormally high *E. coli* concentrations may be affecting this relationship. Also, methods used to collect these samples were different during each sampling event and yielded varying sample sizes.



Linear Regression: *E. coli* Concentration = 568.48+ 163.37 * Quantity of Rain accumulated five days prior; R-Square = 0.03

Figure J-16
Scatter Plot Showing Geomean *E. coli* Concentrations vs. Quantity of Rainfall Accumulated Five Days Prior to the Sampling Event Conducted During June and July on Mill Creek, Austin County

Figure J-17 represents the resulting scatter plot from the regression analysis conducted on cumulative rainfall 10 days prior to sampling. Again, higher *E. coli* concentrations are observed when more rainfall occurs 10 days prior to the sample date. The strength of this relationship is very low based on the R-squared value calculated from a regression analysis; however, it appears that one sample with abnormally high *E. coli* concentrations may be affecting this relationship. Also, methods used to collect these samples were different during each sampling event and yielded varying sample sizes.



Linear Regression: *E. coli* Concentration = 713.96 + 11.33 * Quantity of Rain accumulated 10 days prior; R-Square = 0.00

Figure J-17
Scatter Plot Showing Geomean *E. coli* Concentrations vs. Quantity of Rainfall Accumulated 10 Days Prior to the Sampling Event conducted During June and July on Mill Creek, Austin County.

Rainfall Analysis (All Events)

Regression analysis was computed for *E. coli* vs. cumulative rainfall for three, five, and ten days prior to each sampling event. Additional regression analysis was conducted to compare *E. coli* vs. the ADP experienced prior to each sampling event. All comparisons resulted in a regression equation and R-squared value, which are shown in the results section. Although the sample size for each sampling event differed, a regression analysis was conducted on all flow data together to evaluate the possible correlation of the pooled data. This was conducted by comparing the geometric mean of *E. coli* concentration for each sample event at each site to normalized flow. Normalized flow for each site was computed by dividing the flow measured during the sampling event at that site by its respective drainage size in acres. The resulting equation and R-squared value are shown in the results section.

Appendix K

Contact Recreation interview Forms

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name East Fork Mill Creek **Segment #** UAA4

I. Introduction

Date & Time (include AM or PM): 7-16-07 ~~7/13/07~~ MB 3:00 pm

Interviewed: ☑ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) Met this man at the general Store. He knew First hand about the stream

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____.
"

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☑ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Matt Macat
Current mailing address: 11169 HWY 159 W Bellville
Daytime phone number: (979) 357-2335

E-mail address (optional):

2.a.) Do you live in this area? ☑ Yes ☐ No
If yes, how many years? 30

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years? N/A

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☑ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall today

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☑ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used.

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Fish, jon boat

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

N/A

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

N/A

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? About 3yrs ago. 2-3 times per year in the fall.

4.d.) Where, exactly? Describe specific location and mark on the map. Blue hole

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☑ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

N/A

4.b.) Where, exactly? Describe specific location and mark on the map.

NA

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

2-3 Times/yr in fall

4.d.) Where, exactly? Describe specific location and mark on the map. Blue hole

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☑ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? Swimming

Primary Contact Recreation

☑ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

50 years ago

4.b.) Where, exactly? Describe specific location and mark on the map

Blue hole

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Same

4.d.) Where, exactly? Describe specific location and mark on the map.

Same

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? [✓ Yes] No

If yes, that person's contact info (name, address, phone, directions?)

Charles Peschel 979-557-2875.

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee:

2.) From the Interviewer:

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? Yes [✓ No]

If yes, how (check all that apply)

☐ Workshop? (if so, enter date):

☐ On-line training seminar?

☐ Followed Interview Instruction Sheets?

☐ Other

Interviewer Information:

Printed Name: John Branom & Jesse Moya

Employer (where applicable): PBS&J

Interviewer's phone #: 281-493-5100 E-mail: jrbranom@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #** Main Fork

I. Introduction

Date & Time (include AM or PM): 6/13/07 11:00 am

Interviewed: In person By phone By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) Walked down to edge of stream.

Interviewer introduction to Interviewee: "My name is ________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
Yes No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: NA
Current mailing address: ____
Daytime phone number: (___) ____

E-mail address (optional): ____

2.a.) Do you live in this area? Yes No
If yes, how many years? ____

2.b.) If you don't live nearby, are you still familiar with this stream? Yes No
If yes, how many years? ____

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) Yes No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently Yes No If so, when was the last rainfall ____

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
[✓ Yes] No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ____

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Fishing

Primary Contact Recreation

Swimming Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? NA

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol). NA

Secondary Contact Recreation

[✓ Fishing] Wading Boating Trapping Other: ____________

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Every once in awhile.

4.d.) Where, exactly? Describe specific location and mark on the map. Mill Creek @ FM 2429,

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

Yes [✓ No]

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

Swimming Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

NA

4.b.) Where, exactly? Describe specific location and mark on the map.

NA

Secondary Contact Recreation

Fishing Wading Boating Trapping Other: ______________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

NA

4.d.) Where, exactly? Describe specific location and mark on the map.

NA

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

Yes [✓ No]

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ______________

Primary Contact Recreation

Swimming Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

NA

4.b.) Where, exactly? Describe specific location and mark on the map

NA

Secondary Contact Recreation

Fishing Wading Boating Trapping Other: ______________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

NA

4.d.) Where, exactly? Describe specific location and mark on the map.

NA

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? Yes [✓ No]

If yes, that person's contact info (name, address, phone, directions?)

NA

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: A man and his two sons walked down to the waters edge to see if conditions were good for fishing and to see if we were fishing.

2.) From the Interviewer: These people did not stay long or provide any additional information. /

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? Yes [✓ No]

If yes, how (check all that apply)

Workshop? (if so, enter date): ____

On-line training seminar? ____

Followed Interview Instruction Sheets? ____

Other ____

Interviewer Information:

Printed Name: John Branom

Employer (where applicable): PBS&J

Interviewer's phone #: 281-529-4131 E-mail: jrbranom@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #** N/A

I. Introduction

Date & Time (include AM or PM): June 4, 2007 1pm

Interviewed: [✓ In person] By phone By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) Local Resident of Belleville

Interviewer introduction to Interviewee: "My name is ________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
[✓ Yes] No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Arlie Kendrick
Current mailing address: 30 S. Holland Bellville TX 77418
Daytime phone number: 979) 865-3136

E-mail address (optional): N/A

2.a.) Do you live in this area? [✓ Yes] No
If yes, how many years? 40 + years

2.b.) If you don't live nearby, are you still familiar with this stream? Yes No N/A
If yes, how many years? ________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] No If so, when was the last rainfall May 28

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
Yes [✓ No]
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. Usually go to Brazos River or Lake Summerville

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? ________

Primary Contact Recreation

Swimming Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Secondary Contact Recreation

Fishing Wading Boating Trapping Other: ______

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☒ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☒ Swimming ☒ Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Kids use during the summer especially.

4.b.) Where, exactly? Describe specific location and mark on the map. No answer ask Joe Graabal

Secondary Contact Recreation

[✓ Fishing] Wading Boating Trapping Other: __________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Summer and any time are fishing

4.d.) Where, exactly? Describe specific location and mark on the map. Directed to Joe Goebel

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

[✓ Yes] No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? Swimming, tubing fishing (trot-lines)

Primary Contact Recreation

Swimming Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Summer but any time

4.b.) Where, exactly? Describe specific location and mark on the map Directed to Joe Goebel

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] [✓ Boating] Trapping Other: __________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? any time water is high enough creek dries up in upper reaches during some summers

4.d.) Where, exactly? Describe specific location and mark on the map. Joe Goebel

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? [✓ Yes] No

If yes, that person's contact info (name, address, phone, directions?)

Joe Goebel

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee:

2.) From the Interviewer:

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? [✓ Yes] No

If yes, how (check all that apply)

Workshop? (if so, enter date):

On-line training seminar?

Followed Interview Instruction Sheets?

[✓ Other] Draft Protocol May 07

Interviewer Information:

Printed Name: Marisa Weber, Casey Hardin

Employer (where applicable): PBSJ

Interviewer's phone #: 281 493 5100 E-mail: mnweber@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek West Fork **Segment #** UAA1

I. Introduction

Date & Time (include AM or PM): 7-16-07 400 PM

Interviewed: ☒ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)
House next to stream

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☑ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Everett Fred ~~Schmidt~~ Schmidt [illegible]
Current mailing address: 2010 Blue hole Rd
Daytime phone number: (979) 357-4760

E-mail address (optional): ________________

2.a.) Do you live in this area? ☒ Yes ☐ No
If yes, how many years? >20

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years? __________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☒ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall today

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☒ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. Stopped using Creek about 2-3 years ago

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Fishing

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

JM 7/16/07

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ~~Good Friday every year fishing. Fished a couple time a year~~

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol). ~~Blue hole Area~~ JM 7/16/07

Secondary Contact Recreation

☒ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ______

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Fished a Couple times a year. Especially on Good Friday

4.d.) Where, exactly? Describe specific location and mark on the map. Blue Hole Area

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☒ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

Fishing ☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

NA

4.b.) Where, exactly? Describe specific location and mark on the map.

NA

[illegible] 7/16/07

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? A couple of years ago - on Good Friday

4.d.) Where, exactly? Describe specific location and mark on the map. Blue hole area

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☑ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? Fishing

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? N/A

4.b.) Where, exactly? Describe specific location and mark on the map N/A

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Couple of years ago would go fishing w/ family & church members on Good Friday

4.d.) Where, exactly? Describe specific location and mark on the map. Blue hole

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? Yes [✓ No]

If yes, that person's contact info (name, address, phone, directions?)

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: NA

2.) From the Interviewer: NA

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☑ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date):

☐ On-line training seminar?

☐ Followed Interview Instruction Sheets?

☐ Other

Interviewer Information:

Printed Name: John Branom & Jesse Moya

Employer (where applicable): PBS&J

Interviewer's phone #: 261-529-5100 E-mail: jrbranom@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name West Fork Mill Creek **Segment #** unnamed

I. Introduction

Date & Time (include AM or PM): June 4, 3pm

Interviewed: In person By phone By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) WWTP Operator for City of Industry

Interviewer introduction to Interviewee: "My name is ________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
Yes No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Wes
Current mailing address: WWTP Operator in City of Industry
Daytime phone number: ( ) ———

E-mail address (optional): n/a

2.a.) Do you live in this area? [✓ Yes] No
If yes, how many years? ~40yrs

2.b.) If you don't live nearby, are you still familiar with this stream? Yes No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] No If so, when was the last rainfall May 28

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
[✓ Yes] ~~[✓ No]~~ mu 7/23/07
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used.

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Used to swim and fish but not anymore

Primary Contact Recreation

[✓ Swimming] Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? During raining years in the summer mostly used it growing up but not any more

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol). Used to fish @ Blue hole with a jon boat. Used to swim all the time

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] [✓ Boating] Trapping Other: ____________

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?
See above

4.d.) Where, exactly? Describe specific location and mark on the map.
See above

III. Witnessed Use

1.) Have you observed others using this stream for recreation?
[✓ Yes] No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

[✓ Swimming] Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?
See above
Used to take kids swimming in the summer when rain allowed enough flow

4.b.) Where, exactly? Describe specific location and mark on the map.
See above
Blue hole was mentioned for fishing but no specific location for swimming

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] [✓ Boating] Trapping Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________
See above

4.d.) Where, exactly? Describe specific location and mark on the map. ____________
See above

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

Yes No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ____________

Primary Contact Recreation

[✓ Swimming] [✓ Tubing] Snorkeling/Skin Diving Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________
when flow allows, especially during summer

4.b.) Where, exactly? Describe specific location and mark on the map ____________
I've heard of kids tubing but not sure where, must be down stream.

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] [✓ Boating] Trapping Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________
when flow allows

4.d.) Where, exactly? Describe specific location and mark on the map. ____________

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? [✓ Yes] No

If yes, that person's contact info (name, address, phone, directions?) Mr. Marek

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee:

2.) From the Interviewer:

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? [✓ Yes] No

If yes, how (check all that apply)

Workshop? (if so, enter date):

On-line training seminar?

Followed Interview Instruction Sheets?

[✓ Other] Draft protocol

Interviewer Information:

Printed Name: Marisa Weber & Casey Hardin

Employer (where applicable): PBSJ

Interviewer's phone #: 281 493 5100 E-mail: mrweber@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek (West fork) **Segment #** unnamed

I. Introduction

Date & Time (include AM or PM): June 4, 2007 4pm

Interviewed: In person By phone By mail

(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) Driving by an access point on West fork Mill Creek RD

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)

[✓ Yes] No If yes, list contact information for the interviewee below:

(Do not collect name or contact information if interviewee is a minor)

Legal name: Mr. Marek
Current mailing address: near intersection of west fork Mill Creek & Pilcik Rd
Daytime phone number: (___) N/A

E-mail address (optional): N/A

2.a.) Do you live in this area? [✓ Yes] No
If yes, how many years? ~60 yrs

2.b.) If you don't live nearby, are you still familiar with this stream? Yes No
If yes, how many years?__________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] No If so, when was the last rainfall May 28

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
[✓ Yes] No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used.

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Used to fish @ Blue hole, swim all over but now the creek is silted in.

Primary Contact Recreation

[✓ Swimming] Tubing Snorkeling Skin Diving Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? During wet years in the upper reach

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol). all over the upper reaches in the good ole days but not as much now. Creek is silted in

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] Boating Trapping Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? during wet years

4.d.) Where, exactly? Describe specific location and mark on the map. all over, especially Bluehole but not used so much these days.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

[✓ Yes] No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

[✓ Swimming] Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? any time flows allowed

4.b.) Where, exactly? Describe specific location and mark on the map. all over upper reaches but especially @ Hwy 109 & West Mill Creek

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] [✓ Boating] Trapping Other: ______

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? Only when flows allow. Creek dries up during some summer during other flooding so bad you can't use most roads near West Mill Creek

4.d.) Where, exactly? Describe specific location and mark on the map. At Bluehole mostly

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

[✓ Yes] No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? fishing, wade fishing, swimming

Primary Contact Recreation

[✓ Swimming] Tubing Snorkeling/Skin Diving Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? See above info

4.b.) Where, exactly? Describe specific location and mark on the map See above info

Secondary Contact Recreation

[✓ Fishing] [✓ Wading] Boating Trapping Other: ______

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? See above info

4.d.) Where, exactly? Describe specific location and mark on the map. See above info

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? Yes [✓ No]

If yes, that person's contact info (name, address, phone, directions?)

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: Creek is too silty used to be deeper
this needs to be fixed

2.) From the Interviewer: Very informative about the area
Lived here is whole life

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? [✓ Yes] No

If yes, how (check all that apply)

Workshop? (if so, enter date):

On-line training seminar?

Followed Interview Instruction Sheets?

✓ Other Draft Protocols May 2007

Interviewer Information:

Printed Name: Marisa Weber

Employer (where applicable): PBS J

Interviewer's phone #: 281 493-5109 E-mail: mrweber@pbsj.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #**

I. Introduction

Date & Time (include AM or PM): ____ - ____

Interviewed: ☐ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) Has used the stream for boating

Interviewer introduction to Interviewee: "My name is ____, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☒ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Leigh Ann Schultz
Current mailing address: PO Box 1048 Bellville, TX 77418
Daytime phone number: (975) 865-3127

E-mail address (optional): lschultz@bellvilleabstract.com

2.a.) Do you live in this area? ☒ Yes ☐ No
If yes, how many years? 2

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years? ____

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☒ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall ____

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☒ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ____

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Boating

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Secondary Contact Recreation

☐ Fishing ☐ Wading ☒ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Spring and Summer

4.d.) Where, exactly? Describe specific location and mark on the map.

Mill Creek Road to Highway 36

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☒ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map.

Secondary Contact Recreation

☒ Fishing ☐ Wading ☒ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Sp. All year

4.d.) Where, exactly? Describe specific location and mark on the map.

Gamme Grass bridge

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☒ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ____________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.b.) Where, exactly? Describe specific location and mark on the map ____________

Secondary Contact Recreation

☒ Fishing ☒ Wading ☒ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

All year

4.d.) Where, exactly? Describe specific location and mark on the map.

Gamme Grass bridge

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No

If yes, that person's contact info (name, address, phone, directions?)____________________

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ____________________

2.) From the Interviewer: ____________________

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ____________________

On-line training seminar? ____________________

☐ Followed Interview Instruction Sheets?______

☐ Other____________________

Interviewer Information:

Printed Name:____________________

Employer (where applicable):____________________

Interviewer's phone #:____________________ E-mail: ____________________

Signature: ____________________

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name MILL CREEK **Segment #**__________

I. Introduction

Date & Time (include AM or PM): MAY 24, 2007 PM

Interviewed: [✓ In person] By phone By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) CONTACT MET @ SKALAK Rd BRIDGE - W FORK ; ON HIS WAY FISHING ~ POND. PROPERTY OWNER - LEFT BANK & UPSTREAM OF BRIDGE.

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
[✓ Yes] No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: ROB ABBOTT
Current mailing address:____________________
Daytime phone number: (281) 404 2682

E-mail address (optional):____________________

2.a.) Do you live in this area? Yes [✓ No]
If yes, how many years? 2nd HOME >12 yrs

2.b.) If you don't live nearby, are you still familiar with this stream? [✓ Yes] No
If yes, how many years?__________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] No If so, when was the last rainfall 2 DAYS PRIOR

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
Yes [✓ No]
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. POOR FISHING IN THAT SPECIFIC W FORK REACH; BETTER FISHING ON LOCAL PONDS. STREAM TOO SMALL FOR CANOE USE @ LOCATION.

2.b.) Proceed to "III. Witnessed Use?"

3.) How do you use the stream? HIS PROPERTY LINE - SOME CATTLE.

N/A

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Secondary Contact Recreation — @ OTHER LOCATION

☒ Fishing ☐ Wading ☒ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? HE USES THE STREAM BELOW THE CONFLUENCE OF E + W FORKS A FEW TIMES A YR.

4.d.) Where, exactly? Describe specific location and mark on the map. DOWNSTREAM OF MILL CREEK Rd BRIDGE.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☒ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☒ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? SUMMER, KIDS PLAYING

4.b.) Where, exactly? Describe specific location and mark on the map. D/S OF MILL CREEK Rd. BRIDGE.

Secondary Contact Recreation

[✓ Fishing] Wading Boating Trapping Other: ______________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SPRING, SUMMER - D/S OF MILLCREEK RD BRIDGE.

4.d.) Where, exactly? Describe specific location and mark on the map.

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

[✓ Yes] No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? FISHING TUBING

Primary Contact Recreation

[✓ Swimming] [✓ Tubing] Snorkeling/Skin Diving Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SPRING SUMMER

4.b.) Where, exactly? Describe specific location and mark on the map.

D/S OF MILL CREEK rd.

Secondary Contact Recreation

[✓ Fishing] Wading [✓ Boating] Trapping Other: ______________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SAME AS ABOVE

4.d.) Where, exactly? Describe specific location and mark on the map.

SAME AS ABOVE

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? Yes No

If yes, that person's contact info (name, address, phone, directions?) SAID TO PHONE HIM. HE KNOW A LOT OF LOCAL LANDOWNERS

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewer: Thanks - glad to see you are wearing a PBSJ t-shirt.

2.) From the Interviewee: You BET call me. I was the Environmental GUY @ CONOCO PHILLIPS until I recently retired.

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? [✓ Yes] No

If yes, how (check all that apply)

Workshop? (if so, enter date): __________

On-line training seminar? __________

✓ Followed Interview Instruction Sheets? ______

Other __________

Interviewer Information:

Printed Name: K CASEY HARDIN

Employer (where applicable): PBS+J

Interviewer's phone #: 713 303 5267 E-mail: KCHARDIN@PBSJ.com

Signature:

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #**

I. Introduction

Date & Time (include AM or PM): May 27, 2007 PM

Interviewed: [✓ In person] By phone By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) HE IS A DEPUTY WITH SHERIFFS DPt.

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____.
"

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
[✓ Yes] No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: DEPUTY BRANDON JACKSON
Current mailing address:
Daytime phone number: (979) 865 8905 X 3111

E-mail address (optional):

2.a.) Do you live in this area? Yes No D/N Ask
If yes, how many years?

2.b.) If you don't live nearby, are you still familiar with this stream? [✓ Yes] No
If yes, how many years?

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] No If so, when was the last rainfall TODAY

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
Yes [✓ No]
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. OTHER PLACES TO GO.

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream?

N/A

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☒ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☒ Swimming ☒ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SUMMER → KIDS OUTTA SCHOOL

4.b.) Where, exactly? Describe specific location and mark on the map.

DOWNSTREAM OF MiwCreek Rd.

Secondary Contact Recreation

☒ Fishing ☐ Wading ☒ Boating ☐ Trapping ☐ Other: ______________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SPRING SUMMER & FALL

4.d.) Where, exactly? Describe specific location and mark on the map.

AGAIN - D/S OF Mill Cr. Rd.

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☒ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? FISHIN' & TUBIN'

Primary Contact Recreation

☒ Swimming ☒ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SAME AS ABOVE

4.b.) Where, exactly? Describe specific location and mark on the map

SAME AS ABOVE

Secondary Contact Recreation

☒ Fishing ☐ Wading ☒ Boating ☐ Trapping ☐ Other: ______________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

SAME AS ABOVE

4.d.) Where, exactly? Describe specific location and mark on the map.

SAME AS ABOVE

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No D/N ASK

If yes, that person's contact info (name, address, phone, directions?)

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: HAVE FUN

2.) From the Interviewer: Thanx

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☒ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date):

☐ On-line training seminar?

☒ Followed Interview Instruction Sheets?

☐ Other

Interviewer Information:

Printed Name: K CASEY HARDIN

Employer (where applicable): PBS+J

Interviewer's phone #: 713 303 5267 E-mail: KCHARDIN@PBSJ.com

Signature:

8.7.07

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #**________

I. Introduction

Date & Time (include AM or PM): ________________

Interviewed: ☐ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)__________

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☐ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Chad Swearingen
Current mailing address: 3907 Quail Circle Sealy 77474
Daytime phone number: (____)____________

E-mail address (optional):________________

2.a.) Do you live in this area? [✓ Yes] ☐ No
If yes, how many years?________

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently [✓ Yes] ☐ No If so, when was the last rainfall________

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
[✓ Yes] ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? ________________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

haven't used in years – used as a teenager

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Industry & Hwy 36

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Fishing Boating Swimming

4.d.) Where, exactly? Describe specific location and mark on the map.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

[✓ Yes] ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Fishing Boating

4.b.) Where, exactly? Describe specific location and mark on the map.

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ______________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ______________

4.d.) Where, exactly? Describe specific location and mark on the map. ______________

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☐ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ______________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ______________

4.b.) Where, exactly? Describe specific location and mark on the map ______________

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ______________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ______________

4.d.) Where, exactly? Describe specific location and mark on the map. ______________

~~V. Others to Contact~~

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No

If yes, that person's contact info (name, address, phone, directions?) ____________________

____

____

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ____________________

____

____

____

____

2.) From the Interviewer: ____________________

____

____

____

____

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ____________________

☐ On-line training seminar? ____________________

☐ Followed Interview Instruction Sheets?______

☐ Other____

Interviewer Information:

Printed Name:____

Employer (where applicable):____

Interviewer's phone #:____________________E-mail: ____________________

Signature: ____

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek - Austin Co. **Segment #**________

I. Introduction

Date & Time (include AM or PM): ____________________

Interviewed: ☐ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)____________

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☐ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Frank Monk
Current mailing address: 12168 Schaffner Rd Sealy Tx 77474
Daytime phone number: (979) 865-3558

E-mail address (optional): jfrankmonk@yahoo.com

2.a.) Do you live in this area? [✓ Yes] ☐ No
If yes, how many years? 27 yrs

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) [✓ Yes] ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☐ Yes ☐ No If so, when was the last rainfall______

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
[✓ Yes] ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ____________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? swimming fishing canoeing kayaking; have shot duck in season

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

throughout year; pretty in Spring & Fall

better when there is a little rise

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

primarily above FM2429

between Old Mill Creek Rd & FM2429

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

see 4.a.

4.d.) Where, exactly? Describe specific location and mark on the map.

see 4.b.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

[✓ Yes] ☐ No

If yes, proceed to #2.

If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

[✓ Swimming] ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

periodically during year

4.b.) Where, exactly? Describe specific location and mark on the map.

FM2429 bridge & Old Mill creek Rd. Bridge

Secondary Contact Recreation

[✓ Fishing] ☐ Wading [✓ Boating] ☐ Trapping Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

periodically throughout year; better after rise

4.d.) Where, exactly? Describe specific location and mark on the map.

near FM 2429 & old Mill Creek Rd Bridge

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

[✓ Yes] ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? finding artifacts

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No

If yes, that person's contact info (name, address, phone, directions?) __________

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: Some using the Creek leave trash & a mess [illegible]

2.) From the Interviewer: __________

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): __________

☐ On-line training seminar? __________

☐ Followed Interview Instruction Sheets? ______

☐ Other __________

Interviewer Information:

Printed Name: __________

Employer (where applicable): __________

Interviewer's phone #: __________ E-mail: __________

Signature: __________

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #**________

I. Introduction

Date & Time (include AM or PM): ________________

Interviewed: ☐ In person ☐ By phone ☑ By mail

(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)________

Interviewer introduction to Interviewee: "My name is ________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☑ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: W. Tommy Monk
Current mailing address: P.O. 322 Bellville, TX 77418
Daytime phone number: (979) 877-4338

E-mail address (optional): WTMonk@Gmail.com

2.a.) Do you live in this area? ☑ Yes ☐ No
If yes, how many years? 15

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☑ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall______

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☑ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Fishing, Canoe, hunting

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4-8 times a year Spring & fall
from 1982 to present

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Gamma Grass

Secondary Contact Recreation

☑ Fishing ☐ Wading ☑ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

from 1982 to present

4.d.) Where, exactly? Describe specific location and mark on the map.

Gamma Grass, Mill Creek Rd, Hwy 36

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☑ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map.

Secondary Contact Recreation

☑ Fishing ☐ Wading ☑ Boating ☐ Trapping ☐ Other: ______

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

fishing all during year

4.d.) Where, exactly? Describe specific location and mark on the map.

Gamma Gross Rd. fishing
swimming on Mill creek Rd

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☑ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? Looking for Arrow Heads

Primary Contact Recreation

☑ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ______

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? [✓ Yes] No

If yes, that person's contact info (name, address, phone, directions?) 865-5782

Marcus Pottenberger @ Bellville Meat Market

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ______________________

2.) From the Interviewer: ______________________

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ____________

☐ On-line training seminar? ____________

☐ Followed Interview Instruction Sheets? ______

☐ Other ______________________

Interviewer Information:

Printed Name: ______________________

Employer (where applicable): ______________________

Interviewer's phone #: ____________ E-mail: ____________

Signature: ______________________

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name M,ll Creek **Segment #**________

I. Introduction

Date & Time (include AM or PM): ________________

Interviewed: ☐ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)________________

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☑ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Rebecca Larson
Current mailing address: 117 Wld Phlox
Daytime phone number: (979) 865-5358

E-mail address (optional): Bla21524 @ aol .com

2.a.) Do you live in this area? ☑ Yes ☐ No
If yes, how many years? 12 yrs

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☑ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall 7/26/07

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☑ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? Canoeing

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? 5 times all times of year

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol). Mill Creek Bridge to Twin Bridges to Brazos River

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ________

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☑ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

fishing

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? all times

4.b.) Where, exactly? Describe specific location and mark on the map. Bridge of 2429

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☐ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? swimming

Primary Contact Recreation

☑ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? summer

4.b.) Where, exactly? Describe specific location and mark on the map Neds Fishing camp in 1800's around Hill Creek Bridge

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.d.) Where, exactly? Describe specific location and mark on the map.

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No

If yes, that person's contact info (name, address, phone, directions?) ____________

____

____

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ____________

____

2.) From the Interviewer: ____________

____

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ____________

☐ On-line training seminar? ____________

☐ Followed Interview Instruction Sheets?______

☐ Other____________

Interviewer Information:

Printed Name:____________

Employer (where applicable):____________

Interviewer's phone #:____________E-mail: ____________

Signature: ____________

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name MILL CREEK **Segment #**________

I. Introduction

Date & Time (include AM or PM): 7/20/07 3:15 PM

Interviewed: ☑ In person ☐ By phone ☐ By mail

(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.) AUSTIN COUNTY RESIDENT

Interviewer introduction to Interviewee: "My name is _________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☑ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Tray Moses
Current mailing address: 685 OLD HWY 36 BELLVILLE 77418
Daytime phone number: (979) 865-3149

E-mail address (optional):________________

2.a.) Do you live in this area? ☑ Yes ☐ No
If yes, how many years?________

2.b.) If you don't live nearby, are you still familiar with this stream? ☑ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☑ Yes ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☑ Yes ☐ No If so, when was the last rainfall______

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☑ Yes ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? RECREATIONAL FISHING

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other:

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ONCE OR TWICE PER YEAR - SPRING - FALL

4.d.) Where, exactly? Describe specific location and mark on the map. 2429 @ BRIDGE THEN NORTH ON WATERWAY

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☑ Yes ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

4.b.) Where, exactly? Describe specific location and mark on the map.

Secondary Contact Recreation

☑ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? MONTHLY

4.d.) Where, exactly? Describe specific location and mark on the map. SAME LOCATION

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☐ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ____________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.b.) Where, exactly? Describe specific location and mark on the map ____________

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.d.) Where, exactly? Describe specific location and mark on the map. ____________

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? Yes [✓ No]

If yes, that person's contact info (name, address, phone, directions?) ______

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ______

2.) From the Interviewer: ______

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ______

☐ On-line training seminar? ______

☐ Followed Interview Instruction Sheets? ______

☐ Other ______

Interviewer Information:

Printed Name: Tray Moses

Employer (where applicable): ______

Interviewer's phone #: 979-865 E-mail: ______

Signature: ______

Field Data Sheet for Recreational Use Stream Survey

Data Sheet D—Recreational Use Interview

Stream Name Mill Creek **Segment #**________

I. Introduction

Date & Time (include AM or PM): ____________________

Interviewed: ☐ In person ☐ By phone ☐ By mail
(NOTE: If you are an Interviewee filling out this form to mail back to the TCEQ, proceed to Question #1.)

Interviewee selected because (e.g., house next to stream; standing by stream, etc.)__________

Interviewer introduction to Interviewee: "My name is ________, I work for __(name of your employer)____, and I am collecting information on how people use __(name of the stream)____."

ASK:

1.) Are you willing to respond to a survey about this stream? (It will just take a few minutes.)
☐ Yes ☐ No If yes, list contact information for the interviewee below:
(Do not collect name or contact information if interviewee is a minor)

Legal name: Mark Bolten, Jr
Current mailing address: 3103 Sagebrush Ln Sealy 77474
Daytime phone number: (____)____________

E-mail address (optional):____________________

2.a.) Do you live in this area? ☐ [✓ Yes] ☐ No
If yes, how many years?________

2.b.) If you don't live nearby, are you still familiar with this stream? ☐ Yes ☐ No
If yes, how many years?________

If no, thank the individual for taking the time to talk to you and conclude the interview.

3.) Are you familiar with this particular stretch of the stream? (show them the map, pointing out local landmarks such as roads, bridges, property lines) ☐ [✓ Yes] ☐ No
If yes, proceed to "II. Personal Use?"
If no, proceed to Section V.

4.) Do you know if it has rained here recently ☐ [✓ Yes] ☐ No If so, when was the last rainfall______

II. Personal Use

1.) Have you or your family personally used the stream for recreation?
☐ [✓ Yes] ☐ No
If yes, proceed to #3.
If no, proceed to #2.

2.a.) List reasons stream not used. ____________________

2.b.) Proceed to "III. Witnessed Use?".

3.) How do you use the stream? ____________________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee (or family) used the stream for primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

not used since a teenager

4.b.) Where, exactly? Describe specific location and mark on the map (See map requirements in the protocol).

Old Mill Creek to Hwy 36

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ______

If Interviewee (or family) used the stream for secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Fishing Boating Swimming

4.d.) Where, exactly? Describe specific location and mark on the map.

III. Witnessed Use

1.) Have you observed others using this stream for recreation?

☐ [✓ Yes] ☐ No

If yes, proceed to #2.
If no, proceed to, "IV. Anecdotal Use".

2.) What kinds of uses have you witnessed?

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee witnessed primary contact recreation uses, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)?

Fishing, Boating

4.b.) Where, exactly? Describe specific location and mark on the map.

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee witnessed secondary contact recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.d.) Where, exactly? Describe specific location and mark on the map. ____________

IV. Anecdotal Use

1.) Have you heard about anyone using this stream for recreation – not seen or done yourself, but just heard about it?

☐ Yes ☐ No

If yes, proceed to #2.
If no, thank the individual for taking the time to talk to you and conclude the interview.

2.) What kind of uses have you heard about? ____________

Primary Contact Recreation

☐ Swimming ☐ Tubing ☐ Snorkeling/Skin Diving ☐ Water Skiing

If Interviewee has heard about primary contact recreation, ask:

4.a.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.b.) Where, exactly? Describe specific location and mark on the map ____________

Secondary Contact Recreation

☐ Fishing ☐ Wading ☐ Boating ☐ Trapping ☐ Other: ____________

If Interviewee (or family) used the stream for secondary contact Recreation, ask:

4.c.) When (e.g., year(s)?; season?; only after a rain?) and how often (times/year)? ____________

4.d.) Where, exactly? Describe specific location and mark on the map. ____________

V. Others to Contact

Can you recommend someone else we could contact that knows the stream? ☐ Yes ☐ No

If yes, that person's contact info (name, address, phone, directions?) ____________

If no, thank the individual for taking the time to talk to you and conclude the interview.

VI. Additional Comments

1.) From the Interviewee: ____________

2.) From the Interviewer: ____________

VII. Data Collectors Information

Has interviewer been trained by TCEQ or designee to conduct UAA Interviews? ☐ Yes ☐ No

If yes, how (check all that apply)

☐ Workshop? (if so, enter date): ____________

☐ On-line training seminar? ____________

☐ Followed Interview Instruction Sheets? ______

☐ Other ____________

Interviewer Information:

Printed Name: ____________

Employer (where applicable): ____________

Interviewer's phone #: ____________ E-mail: ____________

Signature: ____________

PBS&J

11196 | SM | 06