



Contact Recreation Assessment SR-11-14, July 2011 (Updated November 2012)

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Abstract

*Several creek locations in Austin have elevated *E.coli* bacteria levels based on results from routine water quality monitoring. The exposure risk of citizens to fecal-contaminated waters should be considered when prioritizing those water bodies for additional bacteria source investigations, consistent with Texas Commission on Environmental Quality contact recreation standards. Surveys were conducted at twenty-one sites with elevated bacteria levels to assess contact recreation use. Survey sites were ranked to assign priority to locations where the risk of ingestion is likely to be highest.*

Introduction

Analysis in 2009 of *E. coli* indicator bacteria data from 329 sites across greater Austin identified 21 creek locations that had both elevated bacteria levels above current contact recreation standards¹ and some contact recreation potential. The Texas Commission on Environmental Quality (TCEQ) has adopted a new tiered approach to contact recreation use, found in in 30TAC307.4(j) (Table 1).

Table 1. TCEQ Proposed Tiered Recreation Use Categories.

Recreation Use	<i>E. coli</i> geometric mean (col/dL)
Primary Contact	206
Secondary Contact 1	630
Secondary Contact 2	1030
Non-Contact Recreation	2060

¹ Current contact recreation standards state that the geometric mean of *E. coli* should not exceed 126 mpn/100mL (TAC Title 30, Part 1, Chapter 307, Rule §307.7).

TCEQ has developed procedures for assessing the contact recreation use of a unclassified water body with a Recreational Use Attainability Analysis (RUAA). Documentation on the current TCEQ method can be found at http://www.tceq.state.tx.us/assets/public/waterquality/standards/ruaa/Recreational%20UAA%20Procedures_Final_2012.pdf

For this project, we assessed contact recreation potential to prioritize further investigation of sites with elevated indicator bacteria levels within the watersheds of Blunn, Buttermilk, Carson, Deer, Dry, East Bouldin, Elm, Little Walnut, Marble, North Boggy, Shoal, South Boggy, Tannehill, Turkey, Walnut and Wells Branch creeks (Table 2). Assessment methods generally follow the draft TCEQ procedures, although they were customized by City of Austin staff. Some adaptation was necessary since TCEQ RUAA procedures at the time of this report were not well-defined. Several additional watersheds (Bull, Waller, Taylor Slough South, Spicewood, Westlake-Davenport, and Eanes creeks) are already under investigation under other separate study projects and thus were not included here. For the sixteen creeks investigated, sites were ranked by the type of contact recreation observed or reported to occur from staff site visits and anecdotal information from reliable local sources. These sources are acceptable in the TCEQ methodology. In addition, the quantity of various potential recreation uses, the number of site users and the accessibility of each location were documented. Sites where primary contact recreation use is known to occur and mean indicator bacteria levels exceed applicable contact recreation criteria were prioritized for further investigation to determine the source(s) of the fecal contamination.

From the Texas Surface Water Quality Standards 30TAC307.4(j) and the RUAA guidance procedures (TCEQ 2012), primary contact recreation is defined as “recreational activities, such as wading by children, swimming, water skiing, diving, tubing, surfing, and whitewater kayaking, canoeing, and rafting, involving a significant risk of ingestion of water.” Secondary contact recreation 1 is defined as “recreational activities, such as fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity, not involving a significant risk of water ingestion and that commonly occur.” Secondary contact recreation 2 is defined using the same language as secondary contact recreation 1, but with additional language stating, “... occur[s] less frequently than for secondary contact recreation 1 due to (1) physical characteristics of the water body and/or (2) limited public access.” Additionally, for a site to be downgraded from presumed primary to presumed secondary contact recreation, the average thalweg depth must be <0.5 m during baseflow and no substantial pools with a depth > 1 m should occur. Non-contact recreation is defined as “activities, such as ship and barge traffic (obviously not a problem in Austin creeks), birding, and using hike and bike trails near a water body, not involving a significant risk of water ingestion, and where primary and secondary contact recreation should not occur because of unsafe conditions.”

Methods

Site visits at each of 21 locations (Table 2) lasted approximately one hour each, and were conducted under baseflow conditions. Each site encompassed a 300 m reach, which spanned 150 m upstream and downstream of the sample site coordinates. At each site, thalweg depth was recorded in the center of each habitat unit (riffles, runs and pools) encountered while walking the

reach and the maximum depth was recorded from any significant pools (pools with a length > 10 m). The types of contact recreation observed at each site were recorded on a data sheet (Figure 1) and each type of recreation observed was used to produce a score for primary or secondary contact recreation. If reliable information was available that suggested contact recreation occurred at a site, the activity reported was also recorded and included in a separate score for both observed and reported recreation activities. If only non-contact recreation was expected to occur at a site, this was also indicated on the data sheet. Factors that appeared to promote recreation, indications that recreation occurred at a site, characteristics that appeared to discourage site use and conditions that hindered or prohibited access to a site were scored in addition to recreation activities observed. A usage class was given to each site that described the number of people observed during the site visit. At the end of each data sheet, the type of contact recreation was designated and an explanation was given if the recreation category differed from what was observed during the site visit.

Information recorded on the data sheets was used to rank sites so that priority for future bacteria source investigations could be given to sites with the highest contact recreation potential. Sites were ranked first by the type of recreation observed (primary contact, secondary contact 1, secondary contact 2 or non-contact). Within each of those classes, sites were ranked according to the combined scores of recreation activities observed and recreation activities reported to occur (based on interviews). The third ranking category was calculated by adding all promoters or indicators of site use and subtracting all factors that appeared to hinder or prohibit site use. Usage class (number of individuals observed during a site visit) was used as the fourth ranking category. The final ranking category used was based on the number of significant pools present.

Table 2. Sites assessed for contact recreation use.

Site #	Site	State83x	State83y	Geomean
1654	Blunn Creek @ Little Stacy Park	3114230	10063159	330.00
782	Buttermilk Creek @ Providence Ave	3129046	10094262	340.00
1094	Carson Creek @ Shady Spring Subdivision	3138944	10056294	134.70
316	Deer @ Running Deer Trail (AST)	3058538	10109168	213.80
1109	Dry Creek (North) @ FM 2222	3105950	10097042	187.00
1110	Dry Creek (North) @ Highland Pass	3107790	10098276	194.70
1108	Dry Creek (North) @ Mt Bonnel Rd	3103129	10095349	160.20
119	East Bouldin Creek @ Elizabeth St	3110839	10063953	542.50
1338	East Bouldin Creek @ Post Oak	3111184	10066970	458.40
121	East Bouldin Creek Downstream of Alpine Rd	3108425	10056305	150.40
3614	Elm Creek @ Austins Colony	3163198	10060060	209.80
838	Little Walnut Creek @ Golden Meadow Rd	3123733	10111951	1431.80
231	Marble Creek Above Onion Creek (M#1)	3117424	10034668	144.90
837	North Boggy Creek @ Nile Street	3123204	10070615	180.10
116	Shoal Creek @ 24th Street	3110771	10078064	927.80
118	Shoal Creek Downstream of Crosscreek Drive	3115394	10108270	307.90
1081	South Boggy Creek @ W. Dittmar Rd	3095900	10039941	233.30
3858	Tannehill Creek @ Berkman Dr	3127981	10084589	257.80
1221	Turkey Creek @ City Park Rd	3083438	10093539	*
895	Walnut Creek @ Metric Blvd	3127580	10121210	642.90
463	Wells Branch Creek @ Walnut Metro Park	3132456	10119320	129.20

Figure 1a. Contact Recreation Assessment Data Sheet (page 1 of 2)



WPD FIELD DATA SHEET
Project # 531: Contact Recreation Assessment

Entered	P-Lock	F-Lock
Date: _____	_____	_____
By: _____	_____	_____
Ref. No.:		

Site Name: _____ Database No.: _____
 Personnel: _____ Date: _____ Time: _____
 Antecedent Weather: _____ Current Weather: _____
WRE Flow Type: Baseflow (B) / Stormflow (S) / Special Event (E) / No Flow or Dry (N)
TCEO Flow Severity: None (pools only) (1) / Low (2) / Normal (3) / Flood (4) / High (5) / Dry (6)
 Days Since Sign. Rain (> 0.1"): _____ → FEWS Gauge / Rainvieux Website / Other: _____
Sample Type: Grab / Grab Composite / Other: _____ **Medium:** Surface Water / Groundwater / Sediment / Soil / Other: _____

Stream Channel and Substantial Pools Measurements

- Substantial pools - Measure the length of each pool (if > 10 pools only measure 10 pools) and the deepest depth. A substantial pool is considered a pool greater than 10 meters in length for the purposes of a Basic RUAA Survey. If depth measurements were not attainable, explain why.

Pool #	Length (m)	Depth (m)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

- Average depth at the thalweg –Take depth measurements approximately every 30 meters to calculate an average depth at the thalweg (at least 10 measurements needed). If depth and/or width measurements were not attainable, explain why.

Distance (m)	Depth (m)
30	
60	
90	
120	
150	
180	
210	
240	
270	
300	

Figure 1b. Contact Recreation Assessment Data Sheet (page 2 of 2)

Contact Water Recreation Activities Observed:

1. Were water recreation activities that involve a significant risk of ingestion (primary contact recreation) observed at this site? **YES / NO**

2. Check the following boxes of primary contact recreation activities observed at the time of the sampling event at the site. **Total Score:** _____

<input type="checkbox"/> Wading-Children	<input type="checkbox"/> Wading-Adults	<input type="checkbox"/> Swimming	<input type="checkbox"/> Tubing	<input type="checkbox"/> Diving
<input type="checkbox"/> Whitewater-kayaking, canoeing, rafting		<input type="checkbox"/> Other: _____		

3. Were water recreation activities observed at the site, but the nature of the recreation does not involve a significant risk of ingestion (e.g. secondary contact recreation activities)? **YES / NO**

4. Check the following boxes of secondary contact recreation activities observed at the time of the sampling event at the site. **Total Score:** _____

<input type="checkbox"/> Fishing	<input type="checkbox"/> Boating-commercial, recreational	<input type="checkbox"/> Non-whitewater-kayaking, rafting, canoeing
<input type="checkbox"/> Pet contact	<input type="checkbox"/> Biking through water	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Other: _____		

5. Is there sufficient evidence that ONLY non-contact recreation occurs at this site? **YES / NO**
Noncontact recreation applies to water bodies where recreation activities do not involve a significant risk of water ingestion, and where primary and secondary contact recreation uses do not occur because of unsafe conditions, such as barge traffic.

6. Check the following boxes of promoters / indicators of site use. **Total Score:** _____

<input type="checkbox"/> Populated area	<input type="checkbox"/> Rural area	<input type="checkbox"/> Urban/suburban area	<input type="checkbox"/> Residential	<input type="checkbox"/> Power line corridor
<input type="checkbox"/> Roads	<input type="checkbox"/> Pedestrian crossing	<input type="checkbox"/> Street overpass	<input type="checkbox"/> Low water crossing	<input type="checkbox"/> Boating access
<input type="checkbox"/> Fishing tackle	<input type="checkbox"/> Docks/platforms	<input type="checkbox"/> Rope swings	<input type="checkbox"/> Commercial outfitter	<input type="checkbox"/> Parking lot
<input type="checkbox"/> Public property	<input type="checkbox"/> Parks	<input type="checkbox"/> Sports field	<input type="checkbox"/> Golf course	<input type="checkbox"/> Campgrounds
<input type="checkbox"/> Campsites	<input type="checkbox"/> Fire pit/ring	<input type="checkbox"/> Playgrounds	<input type="checkbox"/> Children's toys	<input type="checkbox"/> Remnants of kid's play
<input type="checkbox"/> Nearby school	<input type="checkbox"/> Access stairs	<input type="checkbox"/> Access gates	<input type="checkbox"/> Paved trail	<input type="checkbox"/> Gravel/maintained trails
<input type="checkbox"/> Unmaintained trail	<input type="checkbox"/> RV/ATV tracks	<input type="checkbox"/> Picnic areas/pavilions	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Other: _____		<input type="checkbox"/> Other: _____		

7. Check the following boxes of hindrances of site use. **Total Score:** _____

<input type="checkbox"/> Prohibitive fence	<input type="checkbox"/> Barbed wire	<input type="checkbox"/> Thick vegetation	<input type="checkbox"/> Steep slopes	<input type="checkbox"/> Wildlife
<input type="checkbox"/> Industrial area	<input type="checkbox"/> No trespassing signs	<input type="checkbox"/> No public access	<input type="checkbox"/> Illegal dumpsite	<input type="checkbox"/> Excessive litter
<input type="checkbox"/> Homeless camps	<input type="checkbox"/> Strong odors	<input type="checkbox"/> Other: _____		
<input type="checkbox"/> Other: _____				

8. Indicate the usage class the best describes the number of individuals observed at the site. **Usage Class:** _____
 (1) None (2) 1 - 10 (3) 11 - 20 (4) 20 - 50 (5) > 50

9. Designate which contact recreation category best describes this site: **Primary / Secondary 1 / Secondary 2 / Non-Contact**

10. Explain # 9 using the information recorded above.

Results and Conclusions

Ranked sites are shown in Table 3 (abbreviated version) and Table 4 (with scoring criteria included). Of the 21 sites visited, four sites were designated as supporting primary contact recreation, another four supporting secondary contact recreation 1, and the remainder of sites supporting secondary contact recreation 2. No sites appeared to have dangerous conditions (such as ship and barge traffic in the TCEQ definition – obviously not a problem in our creeks) that would support only non-contact recreation.

Two sites were designated as supporting primary contact recreation even though such activities were not observed during the visit. At Turkey Creek at City Park Road (site # 1221), several park patrons reported that wading children and adults occurred at this location. The designation of primary contact recreation given to North Boggy Creek at Nile Street (site # 837) was based on information supplied by City of Austin staff. The citizen interviewee reported primary contact recreation at Blunn Creek at Little Stacy Park (site # 1654). Primary contact recreation was also reported at Dry Creek at Highland Pass (site # 1110). However, access at this site was generally limited to nearby residents and this site was given a lower priority in the ranking on this basis.

Secondary contact recreation was observed at only one of the four sites given a designation of secondary contact recreation 1. However, the remaining three sites were considered by the observers to have a combination of characteristics and frequency of use that warranted this designation. Both primary and secondary contact recreation were reported at Blunn Creek at Little Stacy Park (site # 1654). While it was not clear whether primary contact recreation actually occurred at that location, the site aesthetics and proximity to a frequently-used park suggested that this designation was appropriate. Secondary contact recreation activities were not observed during the site visit to South Boggy Creek at West Dittmar Road (site # 1081); however, such activities have been observed by COA staff at that location in the past. Due to the remote nature of Marble Creek above Onion Creek (site # 231), no citizen users were present to be interviewed. However, the presence of a large retention pond in the upstream portion of this segment, and the maintenance of this site by PARD staff, suggests that several secondary contact recreation activities, such as fishing, occur at this location. The presence of items, such as fishing tackle, at this location supported this conclusion.

We observed people present at only one of the 13 sites that were given a designation of secondary contact recreation 2. Ranking of sites within this category was primarily based on the scoring metric for promoters or indicators of site use minus hindrances to site use. We also relied on number of significant pools in some cases. As noted above, contact recreation was reported by a resident near Dry Creek at Highland Pass (site # 1110), but site use was not considered to occur frequently due to restricted access at that location. Site information for Carson Creek at Shady Springs (site # 1094) was obtained by interview because access to the entire reach of this site is on private property. The property owner indicated that they not only prohibit site use, but take several steps to discourage unlawful entry. Deer Creek at Running Deer Trail (site # 316)

was considered unusual due to its proximity to Lake Austin. While the area contained within the 300 m reach itself was designated as secondary contact recreation 2, the outfall of the stream at Lake Austin (less than 200 m downstream of the reach) was clearly supporting several types of primary contact recreation. This location may need to be given a higher priority if information collected where Deer Creek flows into Lake Austin is taken into account.

Table 3. Ranked Sites.

Site #	Site Name	Recreation Type	Rank
463	Wells Branch Cr @ Walnut Metro Park	Primary	1
116	Shoal Crk @ 24th St	Primary	2
1221	Turkey Crk @ City Park Rd	Primary	3
837	N. Boggy @ Nile St	Primary	4
1338	E Bouldin @ Post Oak	Secondary 1	5
1654	Blunn Crk @ Little Stacy Park	Secondary 1	6
1081	South Boggy @ W Dittmar Rd	Secondary 1	7
231	Marble Crk above Onion Crk	Secondary 1	8
782	Buttermilk Crk @ Providence Ave	Secondary 2	9
895	Walnut Crk @ Metric Ave	Secondary 2	10
3858	Tannehill Crk @ Berkman Dr	Secondary 2	11
119	E Bouldin @ Elizabeth	Secondary 2	12
838	Little Walnut Crk @ Golden Meadow Rd	Secondary 2	13
3614	Elm Crk @ Austin's Colony	Secondary 2	14
1110	Dry Crk @ Highland Pass	Secondary 2	15
316	Deer Crk @ Running Deer Trail	Secondary 2	16
118	Shoal Crk d/s of Crosscreek Dr	Secondary 2	17
1109	Dry Crk @ FM2222	Secondary 2	18
121	E Bouldin d/s of Alpine	Secondary 2	19
1094	Carson Crk @ Shady Springs	Secondary 2	20
1108	Dry Crk N @ Mt Bonnell Rd	Secondary 2	21

Table 4. Scoring Criteria For Ranked Sites

Site #	Site Name	Recreation Type	Observed Primary Score	Observed Secondary Score	Reported Primary Score	Reported Secondary Score	Promote	Hinder	Promote minus Hinder	Usage Class	# Sig Pools
463	Wells Branch Cr @ Walnut Metro Park	Primary	2	2	2	2	13	1	12	2	3
116	Shoal Crk @ 24th St	Primary	2	1	-	-	13	0	13	4	1
1221	Turkey Crk @ City Park Rd	Primary	0	1	2	1	11	0	11	5	5
837	N. Boggy @ Nile St	Primary	0	0	1	1	11	0	11	2	6
1338	E Bouldin @ Post Oak	Secondary 1	0	2	0	3	6	4	2	2	7
1654	Blunn Crk @ Little Stacy Park	Secondary 1	0	0	1	1	15	1	14	2	6
1081	South Boggy @ W Dittmar Rd	Secondary 1	0	0	-	-	15	2	13	2	0
231	Marble Crk above Onion Crk	Secondary 1	0	0	-	-	12	2	10	1	1
782	Buttermilk Crk @ Providence Ave	Secondary 2	0	0	-	-	15	2	13	2	2
895	Walnut Crk @ Metric Ave	Secondary 2	0	0	-	-	14	3	11	1	2
3858	Tannehill Crk @ Berkman Dr	Secondary 2	0	0	-	-	16	5	11	1	1
119	E Bouldin @ Elizabeth	Secondary 2	0	0	-	-	12	6	6	1	4
838	Little Walnut Crk @ Golden Meadow Rd	Secondary 2	0	0	-	-	9	3	6	1	2
3614	Elm Crk @ Austin's Colony	Secondary 2	0	0	-	-	9	5	4	1	1
1110	Dry Crk @ Highland Pass	Secondary 2	0	0	1	1	7	4	3	1	0
316	Deer Crk @ Running Deer Trail	Secondary 2	0	0	-	-	7	5	2	1	3
118	Shoal Crk d/s of Crosscreek Dr	Secondary 2	0	0	-	-	6	4	2	1	0
1109	Dry Crk @ FM2222	Secondary 2	0	0	-	-	7	6	1	1	2
121	E Bouldin d/s of Alpine	Secondary 2	0	0	-	-	6	5	1	1	0
1094	Carson Crk @ Shady Springs	Secondary 2	-	-	0	0	7	7	0	1	3
1108	Dry Crk N @ Mt Bonnell Rd	Secondary 2	0	0	-	-	5	5	0	1	0

Recommendations

The following recommendations are provided for use of the information from this survey and scoring system:

- Bacteria source investigations should proceed at the sites listed above in the priority order that they have been ranked if mean fecal indicator bacteria levels exceed applicable contact recreation criteria.
- If a significant number of additional sites with elevated bacteria levels are reported in the future, these sites should be assessed and incorporated into this prioritization system.
- Because the information obtained for this report uses language similar to that used by TCEQ to complete RUAA's, this data should be passed on to that agency for future use in full assessments of area creeks.

References

Texas Commission on Environmental Quality (TCEQ). 2009. DRAFT with revisions 2010, Recreational Use-Attainability Analyses (RUAAAs), Procedures for a Comprehensive RUAA and a Basic RUAA Survey. May, 2009.