

Change in Environmental Integrity Index Values in the Austin, Texas, Area (1996-2002)

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Environmental Integrity Index (EII) data collected from 1996 to 2002 in 46 watersheds throughout the Greater Austin area were analyzed to assess changes over time and to ensure that monitoring goals and Business Plan performance measures were maintained as specified. These values are also in use as part of the city-wide WPDRD Masterplan in prioritizing subwatersheds to address through Capital Improvement Projects, regulations, and/or programs. In general, although by subindex, watershed score, and rank many watersheds indicate degradation or do not meet Masterplan goals, no watersheds were found to have decreased enough to lower narrative score categories, which is the current Business Plan performance measure. This exercise highlights both the variability in the data as well as the value of its large spatial coverage and ability to summarize many aspects of environmental water quality of Austin's streams.

Introduction

Staff at the Environmental Resource Management Division (ERM) of the City of Austin's Watershed Protection and Development Review Department (WPDRD) developed the Environmental Integrity Index (EII) as a comprehensive planning tool not only to identify the location of problems in the physical, biological, and chemical health of Austin watersheds but also to provide a relative ranking of impacted watersheds to better focus projects, programs, and regulations. The EII is composed of 6 sub-indices: water quality, sediment quality, contact recreation, non-contact recreation, habitat quality, and aquatic life. EII values are calculated for each site and year of sampling and then averaged for all sites in a watershed to yield watershed values for each year of sampling.

The EII is adjusted to span a 100-point scale for each sub-index, with a narrative criterion for each designated range of scores (Table 1). The WPDRD Masterplan Objective as stated in the EII Sampling and Analysis Plan for each EII site or watershed is to achieve a desired EII score, or goal (Table 2).

Table 1. EII narrative scores and range of numeric scores.

Narrative Score	EII Score Range	
	Lower	Upper
Excellent	87.6	100.0
Very Good	75.1	87.5
Good	62.6	75.0
Fair	50.1	62.5
Marginal	37.6	50.0
Poor	25.1	37.5
Bad	12.6	25.0
Very Bad	0.0	12.5

Table 2. EII objectives as stated in the EII Sampling and Analysis Plan.

If the current EII score is:	The Goal is:
Excellent	Maintain an "Excellent" Score
Very Good	Maintain a minimum score of "Very Good"
Good	Achieve a score of "Very Good"
< Good	Achieve a score of "Good"

Additionally, the WPDRD Business Plan (2003) states as one water quality protection performance measure that any substantial decrease in EII score, defined as a decrease of more than 12.5 points resulting in a decrease of one narrative score range, requires the creation of an EII action plan for the affected segment or watershed.

The geographic scope of the EII program also provides a unique opportunity for comparing water quality data across the entire City of Austin to relevant Texas Commission on Environmental Quality (TCEQ) screening levels and water quality standards. Identification of frequent exceedance of the screening levels or water quality standards will allow ERM staff to plan new intensive monitoring programs to ensure that problem areas are appropriately identified on future Clean Water Act Section 303(d) state water quality impairment lists published by TCEQ.

This report is a documentation of the results of EII sampling from 1996 to 2002. The objectives of this report are to:

- Present detailed summaries of EII watershed sub-index scores
- Present relative rankings of sub-index and total EII watershed scores
- Assess EII monitoring goals and performance objectives as specified in the EII Sampling Plan and the WPDRD Business Plan
- Evaluate spatial and temporal changes in EII scores
- Compare EII data to relevant TCEQ screening criteria and water quality standards

Methods

EII Data Collection and Analysis

Because the collection and analysis methods used in determining the EII values are well-documented in the current EII Sampling and Analysis Plan, they are not presented in detail here. A general description of subindices used in the EII is provided below.

Contact Recreation (Swimming/Wading) - The suitability of a waterbody for contact recreation use is evaluated using fecal coliform bacteria concentration, which is an indicator of pathogenic activity. Concentration numbers in colonies/100 milliliter are converted to an index score relative to common regulatory criteria for human health protection.

Non-Contact Recreation/Aesthetic - Parameters included in the non-contact recreation field assessment include water surface appearance, litter, odor, clarity, and percent algae cover. Scoring is primarily from visual assessment by trained staff.

Water and Sediment Quality - Water quality subcomponents are calculated from chemical analysis of grab samples from all study sites during baseflow conditions. Water quality is evaluated from ammonia-nitrogen, nitrate-nitrogen, orthophosphate phosphorus, total dissolved solids, total suspended solids, and fecal coliform bacteria levels. Sediment sampling is conducted at one site in each watershed located near the mouth, and samples are analyzed for heavy metals, polycyclic aromatic hydrocarbons, chlordane, total PCB, DDT, DDD, and DDE levels. Scoring is from concentration data compared to local reference conditions for water and aquatic toxicity effects levels published for sediment.

Habitat Quality Index - Parameters used to measure habitat quality include instream cover, embeddedness, velocity/depth regimes, channel alteration, sediment deposition, frequency of riffles, channel flow status, condition of banks, and riparian zone width. Scoring is from field measurements and visual assessment by trained staff.

Aquatic Life Support - Aquatic life support evaluates biological health using the macroinvertebrate community structure and diatom community structure. Previous data collected also scored filamentous algae percent cover, chlorophyll-a, and the presence or absence of fish. Scoring is from biological indices calculated from taxonomic identification.

Generally, watersheds are divided into three groups, known as phases and designated in the City of Austin Masterplan, sampled on a rotating 3-year cycle with quarterly water quality and annual biological data collection events at four sites in each watershed. As the EII has evolved over time, data collection has occurred at differing times (Table 3) and with differing frequency.

Table 3. General schedule of EII data collection over time.

EII Phase	First Year of Sampling	Second Year of Sampling
I	1996	2000
II	1998	2001
III	1999	2002

Index calculation methods have also changed slightly over time. All efforts were made to standardize data analysis for different sample years for all sub-indices. Habitat Quality Index scores were adjusted to account for changing field data collection methods to use a common subset of parameters. Aquatic Life Index scores were calculated using only benthic macroinvertebrate and diatom data, although additional data such as chlorophyll-a and fish presence have been included in the calculation of the aquatic life sub-index scores in the past. During the first phase used in the WPDRD Masterplan (1996) a single sampling event represented the score for a single year due to schedule constraints. However, more frequent water quality samples were collected in following phases and subsequent phase repeats to characterize water chemistry over the year. In the second phase, monthly samples were collected and analysis of this data was used to justify subsequent sampling at the rate of four times per year. In order to make the most accurate assessment, all water quality data were included, and no sampling event was excluded from the analysis.

Sites and watersheds were ranked relative to one another for each index. An “Olympic” ranking system was used to deal with tied values statistically. Thus, tied values receive the same rank, and the next lowest value receives a rank equal to the general formula:

$$\text{Rank} = (\text{Previous Rank}) + (\text{Number of Tied Values at Next Highest Rank}) + 1$$

Comparative analyses were performed using SAS System version 8 with the PROC GLM procedure to run ANOVA in addition to mean comparison testing using Duncan’s multiple range comparison test. Temporal trends were analyzed using linear regression techniques of the SAS System.

Comparison to TCEQ Screening Criteria and Standards

EII water quality data were compared to TCEQ screening criteria and standards in an attempt to locate potential problem areas for future study. Segment-specific criteria were used for the comparison where applicable (Table 4). Methods employed in this comparison differed slightly from those described in the TCEQ procedures manual (TCEQ 2002), as EII collection methodologies do not directly coincide with TCEQ surface water quality monitoring procedures (TCEQ 2002). In addition, Texas Surface Water Quality Standards (TSWQS) numerical criteria are not strictly applicable due to the intermittent flow regime of most of Austin’s streams.

Both total and dissolved orthophosphorus were compared to the dissolved orthophosphorus screening level. Only single sample exceedances were considered for fecal coliform bacteria, as it was not possible to calculate the geometric mean in accordance with the TSWQS. NO₃ values measured for the EII were compared to the screening level for NO₃+NO₂, although TCEQ does accept NO₃ data in screening. Raw TDS results were compared directly to the segment-specific standards, rather than using annual averages. Where conductivity was known but TDS was missing, TDS values were calculated from conductivity using the 0.65 conversion factor specified by TCEQ (2002).

Percent exceedance values were calculated by dividing the number of exceedances over the total number of samples on a parameter basis, for each watershed and for each individual sample site. The number of samples was generally less than the required number (10 samples in 5 years in most cases) for an official TCEQ assessment, resulting in inflated percent exceedance values. However, this datum is still useful as a screening tool for planning future monitoring efforts.

Table 4. TCEQ screening criteria and segment-specific standards used in comparison of EII water quality data listed by receiving watershed.

Watershed	Parameter	Criterion
All watersheds	Ammonia	0.17 mg/L
All watersheds	Nitrate	2.76 mg/L
All watersheds	Orthophosphorus	0.5 mg/L
All watersheds	Fecal Coliform	400 col/100mL
All watersheds	DO	5 mg/L
All watersheds	pH	6.5 – 9.0
Lake Austin, Onion Creek, Town Lake, Barton Creek	Water Temperature	90°F
Brushy Creek	Water Temperature	91°F
Walnut Creek	Water Temperature	95°F
Onion Creek (not over recharge), Walnut Creek, Barton Creek	TDS	500 mg/L
Lake Austin, Town Lake, portions of Onion Creek over recharge zone	TDS	400 mg/L

Results

Summary of EII Data by Watershed

Watershed values for each of the EII sub-indices from first and second round sampling years are presented in Tables 5 through 10); the total watershed EII scores are shown in Table 11). Additionally, the individual components for each sub-index have been calculated, converted to 100-point scales with narrative descriptions to enable more specific problem characterization, and presented along with the total sub-index scores.

Table 5. Non-Contact Recreation Sub-Index Scores.

WATERSHED NAME	DCM CODE	PHASE	YEAR	CLARITY		FLOW		LITTER		ODOR		% ALGAE COVER		SURFACE APPEARANCE		TOTAL NCR	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Barton Creek	BAR	1	2000	89	Excellent	91	Excellent	90	Excellent	90	Excellent	66	Good	83	Very Good	85	Very Good
			1996	87	Very Good	67	Good	93	Excellent	93	Excellent	67	Good	75	Good	81	Very Good
Bear Creek	BER	2	2001	95	Excellent	96	Excellent	89	Excellent	97	Excellent	76	Very Good	91	Excellent	91	Excellent
			1998	95	Excellent	62	Fair	93	Excellent	98	Excellent	86	Very Good	94	Excellent	86	Very Good
Bee Creek	BEE	2	2001	82	Very Good	88	Excellent	88	Excellent	88	Excellent	92	Excellent	93	Excellent	89	Excellent
			1998	93	Excellent	78	Very Good	67	Good	87	Very Good	92	Excellent	77	Very Good	82	Very Good
Blunn Creek	BLU	1	2000	79	Very Good	66	Good	64	Good	81	Very Good	33	Poor	61	Fair	64	Good
			1996	86	Very Good	71	Good	54	Fair	73	Good	86	Very Good	76	Very Good	75	Good
Boggy Creek	BOG	1	2000	75	Good	63	Good	41	Marginal	85	Very Good	64	Good	64	Good	66	Good
			1996	68	Good	46	Marginal	31	Poor	74	Good	78	Very Good	78	Very Good	63	Good
Bull Creek	BUL	1	2001	93	Excellent	90	Excellent	85	Very Good	91	Excellent	84	Very Good	80	Very Good	87	Very Good
		2	1996	91	Excellent	83	Very Good	83	Very Good	91	Excellent	80	Very Good	89	Excellent	86	Very Good
Buttermilk Branch	BMK	1	2000	74	Good	83	Very Good	51	Fair	71	Good	84	Very Good	91	Excellent	76	Very Good
			1996	83	Very Good	46	Marginal	36	Poor	68	Good	43	Marginal	83	Very Good	58	Fair
Carson Creek	CAR	2	2001	70	Good	83	Very Good	43	Marginal	97	Excellent	85	Very Good	67	Good	74	Good
			1998	82	Very Good	72	Good	50	Marginal	87	Very Good	63	Good	88	Excellent	74	Good
Cottonmouth Creek	CTM	3	2002	78	Very Good	63	Good	55	Fair	92	Excellent	58	Fair	57	Fair	67	Good
			1999	55	Fair	18	Bad	85	Very Good	65	Good	75	Good	40	Marginal	58	Fair
Country Club Creek	ECC	1	2000	5	Very Bad	75	Good	35	Poor	80	Very Good	90	Excellent	30	Poor	53	Fair
			1996	.	.	5	Very Bad	25	Bad	70	Good	.	.	33	Poor		
Decker Creek	DKR	3	2002	23	Bad	85	Very Good	28	Poor	93	Excellent	95	Excellent	78	Very Good	67	Good
			1999	50	Marginal	22	Bad	62	Fair	78	Very Good	98	Excellent	85	Very Good	62	Fair
Dry Creek (East)	DRE	3	2002	29	Poor	39	Marginal	37	Poor	76	Very Good	87	Very Good	76	Very Good	57	Fair
			1999	16	Bad	26	Poor	56	Fair	71	Good	81	Very Good	36	Poor	53	Fair
Dry Creek (North)	DRN	2	2001	85	Very Good	78	Very Good	73	Good	80	Very Good	90	Excellent	82	Very Good	82	Very Good
			1998	95	Excellent	67	Good	53	Fair	80	Very Good	53	Fair	78	Very Good	71	Good
Eanes	EAN	2	2001	35	Poor	43	Marginal	65	Good	83	Very Good	88	Excellent	80	Very Good	66	Good
			1998	100	Excellent	43	Marginal	65	Good	100	Excellent	75	Good	90	Excellent	70	Good
East Bouldin Creek	EBO	1	2000	83	Very Good	55	Fair	28	Poor	48	Marginal	49	Marginal	70	Good	55	Fair
			1996	83	Very Good	33	Poor	34	Poor	53	Fair	85	Very Good	53	Fair	50	Marginal
Elm Creek	ELM	3	2002	59	Fair	48	Marginal	73	Good	95	Excellent	61	Fair	50	Marginal	65	Good
			1999	17	Bad	9	Very Bad	50	Marginal	76	Very Good	48	Marginal	40	Marginal	42	Marginal

Table 5. Non-Contact Recreation Sub-Index Scores (cont'd.)

WATERSHED NAME	DCM CODE	PHASE	YEAR	CLARITY		FLOW		LITTER		ODOR		% ALGAE COVER		SURFACE APPEARANCE		TOTAL NCR	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Fort Branch	FOR	1	2000	85	Very Good	73	Good	44	Marginal	90	Excellent	29	Poor	91	Excellent	69	Good
			1996	74	Good	39	Marginal	36	Poor	85	Very Good	65	Good	86	Very Good	64	Good
Gilleland Creek	GIL	3	2002	78	Very Good	88	Excellent	65	Good	83	Very Good	64	Good	75	Good	76	Very Good
			1999	36	Poor	93	Excellent	43	Marginal	83	Very Good	80	Very Good	87	Very Good	70	Good
Harper's Branch	HRP	1	2000	64	Good	58	Fair	35	Poor	76	Very Good	83	Very Good	63	Good	63	Good
			1996	86	Very Good	56	Fair	54	Fair	81	Very Good	89	Excellent	71	Good	72	Good
Harris Branch	HRS	3	2002	67	Good	77	Very Good	25	Bad	47	Marginal	53	Fair	63	Good	55	Fair
			1999	40	Marginal	67	Good	42	Marginal	45	Marginal	88	Excellent	72	Good	59	Fair
Huck's Slough	HUK	2	2001	40	Marginal	30	Poor	85	Very Good	80	Very Good	90	Excellent	55	Fair	63	Good
			1998	.	.	5	Very Bad	80	Very Good	100	Excellent	.	.	.	.	62	Fair
Johnson Creek	JOH	1	2000	90	Excellent	90	Excellent	45	Marginal	100	Excellent	90	Excellent	100	Excellent	77	Very Good
			1996	90	Excellent	20	Bad	70	Good	85	Very Good	85	Very Good	80	Very Good	60	Fair
Lake Austin	LKA	3	2002	95	Excellent	85	Very Good	88	Excellent	89	Excellent	96	Excellent	92	Excellent	91	Excellent
			1999	91	Excellent	89	Excellent	86	Very Good	96	Excellent	93	Excellent	94	Excellent	92	Excellent
Lake Creek	LKC	2	2001	88	Excellent	87	Very Good	72	Good	96	Excellent	41	Marginal	87	Very Good	78	Very Good
			1998	88	Excellent	78	Very Good	88	Excellent	84	Very Good	40	Marginal	64	Good	74	Good
Little Barton Creek	LBA	2	2001	67	Good	90	Excellent	88	Excellent	92	Excellent	98	Excellent	97	Excellent	89	Excellent
			1998	93	Excellent	78	Very Good	93	Excellent	100	Excellent	85	Very Good	90	Excellent	90	Excellent
Little Bear Creek	LBR	2	2001	90	Excellent	90	Excellent	95	Excellent	98	Excellent	50	Marginal	53	Fair	80	Very Good
			1998	80	Very Good	40	Marginal	92	Excellent	88	Excellent	53	Fair	65	Good	70	Good
Little Bee Creek	LBE	2	2001	98	Excellent	65	Good	88	Excellent	95	Excellent	63	Good	98	Excellent	84	Very Good
			1998	100	Excellent	30	Poor	78	Very Good	100	Excellent	50	Marginal	25	Bad	63	Good
Little Walnut Creek	LWA	1	2000	93	Excellent	88	Excellent	46	Marginal	76	Very Good	55	Fair	81	Very Good	73	Good
			1996	75	Good	80	Very Good	36	Poor	73	Good	74	Good	79	Very Good	69	Good
Marble Creek	MAR	3	2002	50	Marginal	53	Fair	45	Marginal	98	Excellent	50	Marginal	50	Marginal	58	Fair
			1999	18	Bad	28	Poor	58	Fair	70	Good	88	Excellent	75	Good	56	Fair
North Fork Dry Creek	NFD	3	2002	33	Poor	48	Marginal	75	Good	93	Excellent	93	Excellent	85	Very Good	71	Good
		2	1999	15	Bad	23	Bad	60	Fair	78	Very Good	80	Very Good	73	Good	55	Fair
Onion Creek	ONI	2	2001	93	Excellent	100	Excellent	87	Very Good	99	Excellent	87	Very Good	98	Excellent	94	Excellent
		2	1998	100	Excellent	90	Excellent	88	Excellent	100	Excellent	95	Excellent	95	Excellent	95	Excellent
		1	1996	80	Very Good	80	Very Good	59	Fair	77	Very Good	60	Fair	69	Good	71	Good

Table 5. Non-Contact Recreation Sub-Index Scores (cont'd.)

WATERSHED NAME	DCM CODE	PHASE	YEAR	CLARITY		FLOW		LITTER		ODOR		% ALGAE COVER		SURFACE APPEARANCE		TOTAL NCR	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Rattan Creek	RAT	2	2001	78	Very Good	73	Good	85	Very Good	95	Excellent	30	Poor	78	Very Good	73	Good
			1998	70	Good	43	Marginal	78	Very Good	90	Excellent	20	Bad	30	Poor	61	Fair
Rinard Creek	RIN	3	2002	62	Fair	47	Marginal	92	Excellent	92	Excellent	73	Good	82	Very Good	74	Good
			1999	37	Poor	32	Poor	78	Very Good	93	Excellent	88	Excellent	82	Very Good	69	Good
Shoal Creek	SHL	1	2000	83	Very Good	63	Good	40	Marginal	78	Very Good	65	Good	74	Good	67	Good
			1996	74	Good	64	Good	63	Good	70	Good	40	Marginal	55	Fair	61	Fair
Slaughter Creek	SLA	2	2001	91	Excellent	86	Very Good	78	Very Good	96	Excellent	73	Good	76	Very Good	83	Very Good
			1998	81	Very Good	70	Good	82	Very Good	87	Very Good	61	Fair	69	Good	75	Good
South Boggy Creek	SBG	2	2001	87	Very Good	92	Excellent	60	Fair	100	Excellent	90	Excellent	78	Very Good	84	Very Good
			1998	75	Good	57	Fair	58	Fair	90	Excellent	77	Very Good	90	Excellent	74	Good
South Fork Dry Creek	SFD	3	2002	50	Marginal	37	Poor	58	Fair	95	Excellent	97	Excellent	92	Excellent	71	Good
			1999	45	Marginal	23	Bad	67	Good	73	Good	25	Bad	60	Fair	49	Marginal
Tannehill Branch	TAN	1	2000	85	Very Good	75	Good	29	Poor	76	Very Good	76	Very Good	83	Very Good	71	Good
			1996	40	Marginal	38	Marginal	31	Poor	73	Good	68	Good	73	Good	54	Fair
Taylor Slough (North)	TYN	2	2001	85	Very Good	78	Very Good	75	Good	60	Fair	65	Good	80	Very Good	74	Good
			1998	78	Very Good	55	Fair	70	Good	63	Good	90	Excellent	65	Good	70	Good
Taylor Slough (South)	TYS	2	2001	75	Good	55	Fair	90	Excellent	90	Excellent	90	Excellent	80	Very Good	80	Very Good
			1998	95	Excellent	75	Good	70	Good	100	Excellent	75	Good	55	Fair	78	Very Good
Waller Creek	WLR	1	2000	66	Good	80	Very Good	55	Fair	76	Very Good	76	Very Good	88	Excellent	74	Good
			1996	65	Good	66	Good	66	Good	90	Excellent	83	Very Good	83	Very Good	76	Very Good
Walnut Creek	WLN	1	2000	75	Good	91	Excellent	79	Very Good	85	Very Good	67	Good	92	Excellent	82	Very Good
			1996	71	Good	81	Very Good	57	Fair	80	Very Good	75	Good	89	Excellent	75	Good
West Bouldin Creek	WBO	1	2000	64	Good	44	Marginal	39	Marginal	45	Marginal	30	Poor	41	Marginal	44	Marginal
			1996	78	Very Good	16	Bad	45	Marginal	90	Excellent	90	Excellent	85	Very Good	59	Fair
West Bull Creek	WBL	2	2001	88	Excellent	85	Very Good	84	Very Good	86	Very Good	86	Very Good	89	Excellent	86	Very Good
			1998	100	Excellent	83	Very Good	68	Good	90	Excellent	83	Very Good	93	Excellent	86	Very Good
West Country Club Creek	WCC	1	2000	60	Fair	83	Very Good	80	Very Good	90	Excellent	65	Good	70	Good	75	Good
			1996	78	Very Good	73	Good	38	Marginal	78	Very Good	88	Excellent	75	Good	72	Good
Williamson Creek	WMS	1	2000	86	Very Good	80	Very Good	69	Good	82	Very Good	38	Marginal	54	Fair	68	Good
			1996	90	Excellent	33	Poor	74	Good	94	Excellent	48	Marginal	70	Good	65	Good

Table 6. Water Quality Sub-Index Watershed Scores.

WATERSHED NAME	DCM CODE	PHASE	YEAR	NH3		Cond/TDS		Fecal Coliform		NO3		OrthoP		TSS		WQ Total	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Barton Creek	BAR	1	2000	82	Very Good	51	Fair	74	Good	66	Good	83	Very Good	98	Excellent	74	Good
			1996	100	Excellent	46	Marginal	79	Very Good	75	Good	70	Good	77	Very Good	72	Good
Bear Creek	BER	2	2001	40	Marginal	57	Fair	62	Fair	57	Fair	69	Good	66	Good	59	Fair
			1998	75	Good	61	Fair	81	Very Good	55	Fair	89	Excellent	90	Excellent	73	Good
Bee Creek	BEE	2	2001	43	Marginal	32	Poor	53	Fair	48	Marginal	55	Fair	87	Very Good	53	Fair
			1998	63	Good	34	Poor	64	Good	55	Fair	58	Fair	87	Very Good	59	Fair
Blunn Creek	BLU	1	2000	45	Marginal	37	Poor	50	Marginal	42	Marginal	50	Marginal	70	Good	49	Marginal
			1996	81	Very Good	24	Bad	63	Good	56	Fair	29	Poor	50	Marginal	50	Marginal
Boggy Creek	BOG	1	2000	51	Fair	56	Fair	56	Fair	54	Fair	41	Marginal	66	Good	56	Fair
			1996	54	Fair	62	Fair	29	Poor	60	Fair	31	Poor	52	Fair	49	Marginal
Bull Creek	BUL	1	2001	52	Fair	41	Marginal	62	Fair	44	Marginal	71	Good	84	Very Good	57	Fair
		2	1996	100	Excellent	12	Bad	63	Good	75	Good	71	Good	85	Very Good	64	Good
Buttermilk Branch	BMK	1	2000	69	Good	51	Fair	54	Fair	60	Fair	57	Fair	78	Very Good	61	Fair
			1996	83	Very Good	49	Marginal	29	Poor	58	Fair	58	Fair	100	Excellent	62	Fair
Carson Creek	CAR	2	2001	48	Marginal	55	Fair	52	Fair	60	Fair	53	Fair	36	Poor	51	Fair
			1998	69	Good	50	Marginal	69	Good	51	Fair	51	Fair	43	Marginal	54	Fair
Cottonmouth Creek	CTM	3	2002	50	Marginal	31	Poor	55	Fair	26	Poor	50	Marginal	60	Fair	44	Marginal
			1999	73	Good	40	Marginal	79	Very Good	54	Fair	62	Fair	37	Poor	55	Fair
Decker Creek	DKR	3	2002	44	Marginal	52	Fair	83	Very Good	89	Excellent	63	Good	31	Poor	62	Fair
			1999	65	Good	35	Poor	56	Fair	84	Very Good	61	Fair	28	Poor	54	Fair
Dry Creek	DRE	3	2002	47	Marginal	43	Marginal	64	Good	90	Excellent	55	Fair	26	Poor	55	Fair
			1999	42	Marginal	43	Marginal	76	Very Good	75	Good	51	Fair	25	Bad	54	Fair
Dry Creek (North)	DRN	2	2001	61	Fair	23	Bad	44	Marginal	23	Bad	56	Fair	94	Excellent	48	Marginal
			1998	67	Good	27	Poor	44	Marginal	40	Marginal	63	Good	75	Good	49	Marginal
Eanes	EAN	2	2001	75	Good	24	Bad	38	Marginal	24	Bad	46	Marginal	95	Excellent	48	Marginal
			1998	84	Very Good	33	Poor	48	Marginal	52	Fair	49	Marginal	57	Fair	51	Fair
East Bouldin Creek	EBO	1	2000	42	Marginal	59	Fair	43	Marginal	49	Marginal	40	Marginal	68	Good	51	Fair
			1996	33	Poor	76	Very Good	29	Poor	46	Marginal	33	Poor	77	Very Good	52	Fair
Elm Creek	ELM	3	2002	50	Marginal	22	Bad	80	Very Good	93	Excellent	57	Fair	53	Fair	60	Fair
			1999	54	Fair	32	Poor	56	Fair	93	Excellent	44	Marginal	30	Poor	52	Fair
Fort Branch	FOR	1	2000	41	Marginal	67	Good	58	Fair	68	Good	32	Poor	56	Fair	58	Fair
			1996	81	Very Good	61	Fair	29	Poor	64	Good	48	Marginal	38	Marginal	51	Fair

Table 6. Water Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	DCM CODE	PHASE	YEAR	NH3		Cond/TDS		Fecal Coliform		NO3		OrthoP		TSS		WQ Total	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Gilleland Creek	GIL	3	2002	45	Marginal	28	Poor	54	Fair	28	Poor	36	Poor	32	Poor	36	Poor
		3	1999	37	Poor	25	Bad	65	Good	24	Bad	26	Poor	33	Poor	36	Poor
Harper's Branch	HRP	1	2000	42	Marginal	28	Poor	42	Marginal	44	Marginal	33	Poor	66	Good	44	Marginal
		1	1996	86	Very Good	23	Bad	35	Poor	26	Poor	27	Poor	88	Excellent	46	Marginal
Harris Branch	HRS	3	2002	43	Marginal	34	Poor	48	Marginal	23	Bad	23	Bad	34	Poor	34	Poor
		3	1999	30	Poor	30	Poor	53	Fair	21	Bad	23	Bad	26	Poor	31	Poor
Huck's Slough	HUK	2	2001	50	Marginal	27	Poor	52	Fair	26	Poor	58	Fair	26	Poor	37	Poor
		2	1998	100	Excellent	24	Bad	89	Excellent	23	Bad	61	Fair	85	Very Good	58	Fair
Johnson Creek	JOH	1	2000	37	Poor	52	Fair	35	Poor	42	Marginal	33	Poor	53	Fair	43	Marginal
		1	1996	32	Poor	11	Very Bad	27	Poor	51	Fair	24	Bad	37	Poor	30	Poor
Lake Austin	LKA	3	2002	50	Marginal	58	Fair	72	Good	67	Good	68	Good	80	Very Good	67	Good
		3	1999	65	Good	62	Fair	79	Very Good	80	Very Good	96	Excellent	79	Very Good	76	Very Good
Lake Creek	LKC	2	2001	47	Marginal	57	Fair	55	Fair	35	Poor	29	Poor	47	Marginal	45	Marginal
		2	1998	70	Good	54	Fair	72	Good	43	Marginal	33	Poor	52	Fair	55	Fair
Little Barton Creek	LBA	2	2001	54	Fair	60	Fair	62	Fair	73	Good	59	Fair	71	Good	64	Good
		2	1998	91	Excellent	71	Good	78	Very Good	71	Good	65	Good	89	Excellent	77	Very Good
Little Bear Creek	LBR	2	2001	42	Marginal	70	Good	53	Fair	65	Good	64	Good	73	Good	63	Good
		2	1998	59	Fair	64	Good	68	Good	51	Fair	44	Marginal	61	Fair	59	Fair
Little Bee Creek	LBE	2	2001	34	Poor	39	Marginal	42	Marginal	28	Poor	44	Marginal	79	Very Good	46	Marginal
		2	1998	93	Excellent	29	Poor	70	Good	24	Bad	43	Marginal	59	Fair	50	Marginal
Little Walnut Creek	LWA	1	2000	61	Fair	68	Good	61	Fair	79	Very Good	60	Fair	65	Good	66	Good
		1	1996	83	Very Good	76	Very Good	28	Poor	58	Fair	79	Very Good	73	Good	63	Good
Marble Creek	MAR	3	2002	49	Marginal	45	Marginal	70	Good	42	Marginal	62	Fair	40	Marginal	51	Fair
		3	1999	58	Fair	41	Marginal	70	Good	66	Good	65	Good	38	Marginal	55	Fair
North Fork Dry Creek	NFD	3	2002	50	Marginal	23	Bad	74	Good	99	Excellent	43	Marginal	33	Poor	53	Fair
		3	1999	65	Good	24	Bad	75	Good	78	Very Good	52	Fair	25	Bad	52	Fair
Onion Creek	ONI	2	2001	40	Marginal	75	Good	53	Fair	64	Good	67	Good	66	Good	63	Good
		2	1998	89	Excellent	78	Very Good	68	Good	78	Very Good	63	Good	87	Very Good	77	Very Good
		1	1996	100	Excellent	66	Good	79	Very Good	63	Good	65	Good	85	Very Good	75	Good
Rattan Creek	RAT	2	2001	58	Fair	63	Good	42	Marginal	72	Good	50	Marginal	77	Very Good	62	Fair
		2	1998	62	Fair	64	Good	64	Good	62	Fair	56	Fair	55	Fair	61	Fair
Rinard Creek	RIN	3	2002	50	Marginal	64	Good	78	Very Good	92	Excellent	61	Fair	35	Poor	65	Good
		3	1999	73	Good	50	Marginal	80	Very Good	91	Excellent	70	Good	29	Poor	65	Good

Table 6. Water Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	DCM CODE	PHASE	YEAR	NH3		Cond/TDS		Fecal Coliform		NO3		OrthoP		TSS		WQ Total	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Shoal Creek	SHL	1	2000	45	Marginal	61	Fair	46	Marginal	53	Fair	59	Fair	69	Good	56	Fair
			1996	81	Very Good	15	Bad	32	Poor	56	Fair	58	Fair	62	Fair	47	Marginal
Slaughter Creek	SLA	2	2001	43	Marginal	51	Fair	58	Fair	66	Good	75	Good	62	Fair	59	Fair
			1998	84	Very Good	50	Marginal	72	Good	69	Good	90	Excellent	80	Very Good	72	Good
South Boggy Creek	SBG	2	2001	51	Fair	51	Fair	39	Marginal	41	Marginal	49	Marginal	72	Good	52	Fair
			1998	81	Very Good	50	Marginal	43	Marginal	50	Marginal	45	Marginal	47	Marginal	51	Fair
South Fork Dry Creek	SFD	3	2002	38	Marginal	53	Fair	58	Fair	74	Good	61	Fair	27	Poor	53	Fair
			1999	60	Fair	41	Marginal	70	Good	73	Good	45	Marginal	23	Bad	52	Fair
Tannehill Branch	TAN	1	2000	53	Fair	68	Good	58	Fair	75	Good	47	Marginal	61	Fair	63	Good
			1996	50	Marginal	59	Fair	33	Poor	61	Fair	42	Marginal	52	Fair	50	Marginal
Taylor Slough (North)	TYN	2	2001	50	Marginal	51	Fair	46	Marginal	53	Fair	43	Marginal	79	Very Good	52	Fair
			1998	83	Very Good	31	Poor	67	Good	43	Marginal	54	Fair	85	Very Good	59	Fair
Taylor Slough (South)	TYS	2	2001	52	Fair	37	Poor	41	Marginal	41	Marginal	33	Poor	77	Very Good	45	Marginal
			1998	36	Poor	34	Poor	32	Poor	29	Poor	29	Poor	74	Good	43	Marginal
Waller Creek	WLR	1	2000	39	Marginal	38	Marginal	49	Marginal	55	Fair	37	Poor	72	Good	50	Marginal
			1996	83	Very Good	36	Poor	25	Bad	52	Fair	27	Poor	84	Very Good	50	Marginal
Walnut Creek	WLN	1	2000	66	Good	60	Fair	73	Good	55	Fair	59	Fair	66	Good	64	Good
			1996	90	Excellent	57	Fair	37	Poor	39	Marginal	25	Bad	68	Good	52	Fair
West Bouldin Creek	WBO	1	2000	56	Fair	61	Fair	64	Good	78	Very Good	56	Fair	81	Very Good	67	Good
			1996	100	Excellent	80	Very Good	47	Marginal	75	Good	67	Good	96	Excellent	76	Very Good
West Bull Creek	WBL	2	2001	51	Fair	59	Fair	58	Fair	69	Good	59	Fair	90	Excellent	66	Good
			1998	80	Very Good	66	Good	55	Fair	67	Good	65	Good	92	Excellent	70	Good
West Country Club Creek	WCC	1	2000	44	Marginal	42	Marginal	52	Fair	77	Very Good	48	Marginal	49	Marginal	53	Fair
			1996	100	Excellent	68	Good	31	Poor	75	Good	33	Poor	100	Excellent	68	Good
Williamson Creek	WMS	1	2000	72	Good	51	Fair	66	Good	76	Very Good	62	Fair	86	Very Good	69	Good
			1996	100	Excellent	66	Good	37	Poor	50	Marginal	54	Fair	100	Excellent	66	Good

Table 7. Sediment Quality sub-index watershed scores.

WATERSHED NAME	YEAR	HERBICIDE/PESTICIDE						METALS								TOTAL PAH		SITE TOTAL		
		DDD	DDE	DDT	Chlordane	PCB	#	Narrative	As	Cd	Cu	Pb	Hg	Zn	#	Narrative	#	Narrative	#	Narrative
Barton Creek	1996	.	.	.	.	.	.	.	93	50	84	88	93	83	82	Very Good	.	.	82	Very Good
	2000	85	78	73	.	90	82	Very Good	46	93	93	90	86	89	83	Very Good	21	Bad	62	Fair
Bear Creek	1996	.	.	.	.	.	.	.	.	.	75	86	.	81	81	Very Good	.	.	81	Very Good
	2001	.	.	.	.	.	.	.	63	90	91	72	89	89	82	Very Good	.	.	82	Very Good
Bee Creek	1998	.	.	.	.	86	86	Very Good	94	44	92	96	92	94	85	Very Good	.	.	85	Very Good
	2001	.	.	.	.	.	.	.	95	96	96	92	89	96	94	Excellent	.	.	94	Excellent
Blunn Creek	1996	.	.	.	.	.	.	.	85	43	80	71	93	81	76	Very Good	29	Poor	52	Fair
	2000	85	78	73	.	90	82	Very Good	76	87	87	75	89	84	83	Very Good	32	Poor	66	Good
Boggy Creek	1996	.	.	.	.	.	.	.	79	49	88	92	93	89	82	Very Good	.	.	82	Very Good
	2000	85	78	73	.	90	82	Very Good	91	99	98	97	90	97	96	Excellent	88	Excellent	88	Excellent
Bull Creek	1996	.	.	.	.	.	.	.	93	66	88	94	93	90	88	Excellent	.	.	88	Excellent
	2000	.	.	.	.	.	.	.	99	96	95	92	89	93	94	Excellent	24	Bad	59	Fair
Buttermilk Branch	1996	73	37	48	.	83	60	Fair	81	88	95	90	100	92	91	Excellent	27	Poor	59	Fair
	2000	.	.	.	.	.	.	.	99	91	94	85	88	87	91	Excellent	.	.	91	Excellent
Carson Creek	2001	.	.	.	.	77	77	Very Good	95	93	97	92	91	94	94	Excellent	.	.	85	Very Good
	1996	75	.	67	.	84	75	Good	92	94	90	81	100	91	91	Excellent	.	.	83	Very Good
Cottonmouth Creek	1999	.	.	.	.	.	.	.	93	41	92	94	91	90	83	Very Good	.	.	83	Very Good
	2002	.	49	.	.	.	49	Marginal	82	50	78	89	93	88	80	Very Good	.	.	64	Good
Country Club Creek	1996	66	38	42	.	65	53	Fair	89	94	85	83	100	89	90	Excellent	40	Marginal	61	Fair
	2000	85	78	73	.	90	82	Very Good	88	95	94	94	91	94	93	Excellent	88	Excellent	87	Very Good
Decker Creek	1996	74	.	.	.	84	79	Very Good	86	94	94	94	100	96	94	Excellent	80	Very Good	84	Very Good
	2002	.	.	.	.	.	.	.	88	91	96	95	93	98	93	Excellent	.	.	93	Excellent
Dry Creek (East)	1999	.	.	.	.	.	.	.	78	84	89	90	88	78	84	Very Good	.	.	84	Very Good
	2002	.	.	.	.	.	.	.	84	71	87	90	93	89	86	Very Good	.	.	86	Very Good
Dry Creek (North)	1998	.	31	.	.	.	31	Poor	90	50	97	91	92	91	85	Very Good	.	.	58	Fair
	2001	.	.	.	.	.	.	.	75	95	96	90	90	93	90	Excellent	.	.	90	Excellent
Eanes	1998	.	.	.	.	46	46	Marginal	90	42	88	79	92	80	78	Very Good	48	Marginal	57	Fair
	2001	.	.	.	.	.	.	.	81	90	91	79	91	89	87	Very Good	49	Marginal	68	Good
East Bouldin Creek	1996	.	30	41	.	.	35	Poor	80	60	89	59	93	88	78	Very Good	.	.	57	Fair
	2000	.	.	.	.	.	.	.	82	92	86	46	90	84	80	Very Good	37	Poor	59	Fair
Elm Creek	1996	.	.	.	.	80	80	Very Good	85	92	84	92	100	90	91	Excellent	.	.	85	Very Good
	2002	.	.	.	.	.	.	.	89	81	92	96	93	95	91	Excellent	.	.	91	Excellent
Fort Branch	1996	76	49	49	.	85	65	Good	92	94	98	96	100	96	96	Excellent	81	Very Good	81	Very Good
	2000	85	78	73	.	90	82	Very Good	91	99	98	97	90	97	95	Excellent	88	Excellent	88	Excellent

Table 7. Sediment Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	YEAR	HERBICIDE/PESTICIDE						METALS								TOTAL PAH		SITE TOTAL	
		DDD	DDE	DDT	Chlordane	PCB	# Narrative	As	Cd	Cu	Pb	Hg	Zn	# Narrative	# Narrative	# Narrative			
Gilleland Creek	1996	75	.	67	.	84	75 Good	82	94	97	97	100	97	94 Excellent	80 Very Good	83 Very Good			
	2002	.	.	.	.	.	.	81	78	89	89	93	90	87 Very Good	.	87 Very Good
Harper's Branch	1996	.	.	36	.	.	36 Poor	93	44	84	48	93	83	74 Good	19 Bad	43 Marginal			
	2000	85	78	73	.	90	82 Very Good	77	91	71	31	89	88	75 Good	8 Very Bad	55 Fair			
Harris Branch	2002	.	.	.	.	.	.	62	77	91	89	93	92	84 Very Good	.	84 Very Good
	1996	72	.	.	.	81	76 Very Good	56	87	89	92	100	92	86 Very Good	.	81 Very Good			
Huck's Slough	1998	.	.	.	.	.	.	48	27	89	89	92	95	73 Good	.	73 Good
	2001	.	.	.	.	.	.	79	96	71	94	90	94	87 Very Good	46 Marginal	67 Good
Johnson Creek	1996	.	16	23	.	.	20 Bad	76	47	81	45	93	79	70 Good	.	45 Marginal			
	2000	.	.	.	.	80	80 Very Good	88	96	94	37	92	91	83 Very Good	.	82 Very Good
Lake Austin-Bear West	1999	.	.	.	.	.	.	93	85	99	99	90	96	94 Excellent	.	94 Excellent
	2002	.	.	.	.	.	.	90	83	95	92	98	96	92 Excellent	.	92 Excellent
Lake Austin-Common Ford	1999	.	.	.	.	.	.	93	84	97	97	92	94	93 Excellent	.	93 Excellent
	2002	.	.	.	.	.	.	93	84	95	94	97	97	93 Excellent	.	93 Excellent
Lake Austin-Cuernavaca	1999	.	.	.	.	.	.	94	87	98	94	90	92	93 Excellent	.	93 Excellent
	2002	.	.	.	.	.	.	92	85	92	93	97	89	91 Excellent	.	91 Excellent
Lake Austin-Panther Hollow	1999	.	.	.	.	.	.	90	.	91	98	92	95	94 Excellent	.	94 Excellent
	2002	.	58	.	.	.	58 Fair	91	85	96	97	99	96	94 Excellent	.	76 Very Good			
Lake Austin-Turkey	1999	.	.	.	.	.	.	81	86	99	97	93	96	92 Excellent	.	92 Excellent
	2002	.	.	.	.	.	.	88	81	96	49	99	94	85 Very Good	.	85 Very Good
Lake Austin-Deer	1999	.	.	.	.	.	.	91	82	94	93	86	92	90 Excellent	.	90 Excellent
	2002	.	.	.	.	.	.	94	88	97	97	99	91	94 Excellent	.	94 Excellent
Lake Creek	1998	.	.	.	.	.	.	50	33	98	98	.	92	74 Good	.	74 Good
	2001	.	.	.	.	.	.	48	93	93	91	90	90	84 Very Good	.	84 Very Good
Little Barton Creek	2000	.	.	.	.	.	.	90	.	96	95	90	97	94 Excellent	.	94 Excellent
	2001	.	.	.	.	.	.	77	94	92	94	88	94	90 Excellent	.	90 Excellent
Little Bear Creek	1998	.	.	.	.	100	100 Excellent	90	22	85	89	.	77	72 Good	.	86 Very Good
	2001	.	.	.	.	.	.	64	82	83	83	87	84	81 Very Good	.	81 Very Good
Little Bee Creek	1998	.	.	.	.	.	.	90	.	93	98	92	91	93 Excellent	.	93 Excellent
	2001	.	.	.	.	79	79 Very Good	90	88	90	36	92	86	80 Very Good	48 Marginal	69 Good
Little Walnut Creek	1996	.	.	.	.	.	.	72	47	91	97	93	90	82 Very Good	.	82 Very Good
	2000	.	.	.	.	.	.	99	93	91	91	88	88	92 Excellent	.	92 Excellent
Marble Creek	1996	.	.	.	.	.	.	.	.	87	.	.	82	84 Very Good	.	84 Very Good
	2002	.	.	.	.	.	.	77	59	86	91	93	90	83 Very Good	.	83 Very Good

Table 7. Sediment Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	YEAR	HERBICIDE/PESTICIDE						METALS						TOTAL PAH		SITE TOTAL			
		DDD	DDE	DDT	Chlordane	PCB	# Narrative	As	Cd	Cu	Pb	Hg	Zn	# Narrative	# Narrative	# Narrative			
North Fork Dry Creek	1999	.	.	.	.	.	. .	92	32	88	85	87	82	77	Very Good	.	.	77	Very Good
	2002	.	.	.	.	.	. .	73	74	86	83	93	89	83	Very Good	.	.	83	Very Good
Onion Creek	1996	82	75	71	.	79	77 Very Good	.	.	.	.	.	50	50	Marginal	.	.	63	Good
	2001	.	.	.	.	.	. .	74	91	93	93	91	89	88	Excellent	.	.	88	Excellent
Rattan Creek	1998	.	.	.	.	.	. .	90	39	81	90	92	77	78	Very Good	.	.	78	Very Good
	2001	.	.	.	.	.	. .	79	94	94	94	90	93	90	Excellent	.	.	90	Excellent
Rinard Creek	1996	72	.	.	.	.	72 Good	.	.	87	.	.	87	87	Very Good	.	.	80	Very Good
	2002	.	.	.	.	.	. .	59	63	89	90	98	88	81	Very Good	.	.	81	Very Good
Shoal Creek	1996	.	.	.	.	.	. .	49	47	88	48	93	87	69	Good	23	Bad	46	Marginal
	2000	.	.	.	.	.	. .	75	92	94	95	89	91	89	Excellent	.	.	89	Excellent
Slaughter Creek	1996	79	.	69	.	.	74 Good	.	.	87	.	.	46	67	Good	.	.	70	Good
	2001	.	.	.	.	.	. .	73	87	92	85	87	90	86	Very Good	.	.	86	Very Good
South Boggy Creek	1998	.	.	.	.	86	86 Very Good	94	40	92	92	92	87	83	Very Good	47	Marginal	72	Good
	2001	.	.	.	.	.	. .	84	91	96	95	91	95	92	Excellent	.	.	92	Excellent
South Fork Dry Creek	1999	.	.	.	.	.	. .	61	27	92	88	90	83	74	Good	.	.	74	Good
	2002	.	.	.	.	.	. .	47	77	92	87	93	93	82	Very Good	.	.	82	Very Good
Tannehill Branch	1996	.	.	.	.	.	. .	85	45	83	92	93	86	81	Very Good	.	.	81	Very Good
	2000	84	78	73	.	90	81 Very Good	95	99	99	99	90	99	97	Excellent	88	Excellent	89	Excellent
Taylor Slough (North)	2001	.	.	.	.	.	. .	46	92	91	42	91	89	75	Good	16	Bad	46	Marginal
	1996	56	39	49	.	84	57 Fair	.	.	93	31	.	84	69	Good	23	Bad	50	Marginal
Taylor Slough (South)	2001	.	.	.	.	.	. .	63	96	96	81	90	92	86	Very Good	38	Marginal	62	Fair
	1996	47	26	47	.	84	51 Fair	.	.	87	.	.	79	83	Very Good	25	Bad	53	Fair
Waller Creek	1996	.	.	.	.	.	. .	92	86	88	80	93	92	88	Excellent	24	Bad	56	Fair
	2000	.	.	.	.	.	. .	83	94	88	43	90	88	81	Very Good	40	Marginal	60	Fair
Walnut Creek	1996	.	.	.	.	.	. .	83	49	92	95	93	91	84	Very Good	.	.	84	Very Good
	2000	.	.	.	.	.	. .	99	95	97	96	90	94	95	Excellent	.	.	95	Excellent
Wells Branch	1996	72	.	.	.	82	77 Very Good	72	81	95	96	100	94	90	Excellent	.	.	83	Very Good
West Bouldin Creek	1996	.	23	39	.	.	31 Poor	50	47	87	84	93	87	75	Good	.	.	53	Fair
	2000	84	78	73	.	90	81 Very Good	38	83	50	77	90	86	71	Good	88	Excellent	80	Very Good
West Bull Creek	1996	86	80	74	.	82	80 Very Good	.	.	87	.	.	91	89	Excellent	.	.	85	Very Good
	2001	.	.	.	.	.	. .	76	96	96	93	90	95	91	Excellent	.	.	91	Excellent
Williamson Creek	1996	.	.	.	.	.	. .	70	49	91	96	93	91	82	Very Good	.	.	82	Very Good
	2000	.	.	.	.	.	. .	99	92	91	89	90	89	92	Excellent	.	.	92	Excellent

Table 8. Habitat Quality Sub-Index Watershed Scores.

WATERSHED NAME	YEAR	Epifaunal Substrate / Avail. Cover		Embedded-ness		Velocity / Depth Regimes		Sediment Deposition		Channel Flow Status		Channel Alteration		Frequency of Riffles		Bank Stability		Vegetative Protection		Riparian Vegetative Zone Width		Total HQI	
		#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Barton Creek	2000	89	Excellent	89	Excellent	90	Excellent	80	Very Good	89	Excellent	88	Excellent	85	Very Good	83	Very Good	83	Very Good	85	Very Good	86	Very Good
	1996	83	Very Good	77	Very Good	.	.	83	Very Good	67	Good	90	Excellent	70	Good	85	Very Good	78	Very Good	58	Fair	77	Very Good
Bear Creek	2001	73	Good	88	Excellent	72	Good	84	Very Good	92	Excellent	85	Very Good	76	Very Good	90	Excellent	86	Very Good	90	Excellent	84	Very Good
	1998	68	Good	87	Very Good	71	Good	77	Very Good	59	Fair	85	Very Good	64	Good	92	Excellent	83	Very Good	72	Good	76	Very Good
Bee Creek	2001	68	Good	60	Fair	78	Very Good	67	Good	82	Very Good	82	Very Good	78	Very Good	77	Very Good	82	Very Good	67	Good	74	Good
	1998	73	Good	70	Good	58	Fair	70	Good	67	Good	75	Good	70	Good	65	Good	75	Good	77	Very Good	70	Good
Blunn Creek	2000	56	Fair	63	Good	64	Good	60	Fair	64	Good	65	Good	69	Good	39	Marginal	48	Marginal	49	Marginal	58	Fair
	1996	63	Good	76	Very Good	.	.	60	Fair	58	Fair	78	Very Good	89	Excellent	61	Fair	71	Good	53	Fair	68	Good
Boggy Creek	2000	19	Bad	36	Poor	25	Bad	41	Marginal	46	Marginal	58	Fair	59	Fair	32	Poor	22	Bad	36	Poor	37	Poor
	1996	36	Poor	55	Fair	.	.	49	Marginal	46	Marginal	53	Fair	29	Poor	40	Marginal	45	Marginal	38	Marginal	43	Marginal
Bull Creek	2001	81	Very Good	86	Very Good	88	Excellent	75	Good	89	Excellent	71	Good	76	Very Good	86	Very Good	73	Good	63	Good	79	Very Good
	1996	65	Good	78	Very Good	.	.	74	Good	80	Very Good	78	Very Good	49	Marginal	85	Very Good	80	Very Good	69	Good	73	Good
Buttermilk Branch	2000	38	Marginal	68	Good	60	Fair	51	Fair	74	Good	44	Marginal	43	Marginal	55	Fair	25	Bad	22	Bad	48	Marginal
	1996	25	Bad	64	Good	.	.	59	Fair	51	Fair	61	Fair	20	Bad	63	Good	36	Poor	20	Bad	44	Marginal
Carson Creek	2001	43	Marginal	70	Good	62	Fair	65	Good	87	Very Good	68	Good	52	Fair	59	Fair	60	Fair	65	Good	63	Good
	1998	42	Marginal	60	Fair	63	Good	48	Marginal	72	Good	55	Fair	57	Fair	60	Fair	45	Marginal	38	Marginal	54	Fair
Cottonmouth Creek	2002	50	Marginal	64	Good	45	Marginal	59	Fair	70	Good	75	Good	41	Marginal	65	Good	55	Fair	44	Marginal	57	Fair
	1999	30	Poor	50	Marginal	15	Bad	28	Poor	18	Bad	58	Fair	60	Fair	58	Fair	48	Marginal	68	Good	43	Marginal
Country Club Creek	2000	35	Poor	55	Fair	25	Bad	55	Fair	80	Very Good	55	Fair	55	Fair	0	Very Bad	30	Poor	30	Poor	42	Marginal
	1996	80	Very Good	15	Bad	.	.	10	Very Bad	20	Bad	65	Good	5	Very Bad	65	Good	40	Marginal	65	Good	41	Marginal
Decker Creek	2002	25	Bad	28	Poor	43	Marginal	75	Good	78	Very Good	55	Fair	13	Bad	85	Very Good	75	Good	75	Good	55	Fair
	1999	38	Marginal	47	Marginal	23	Bad	28	Poor	37	Poor	85	Very Good	52	Fair	73	Good	87	Very Good	83	Very Good	55	Fair
Dry Creek	2002	26	Poor	29	Poor	6	Very Bad	43	Marginal	58	Fair	75	Good	9	Very Bad	52	Fair	30	Poor	39	Marginal	37	Poor
	1999	26	Poor	42	Marginal	20	Bad	43	Marginal	28	Poor	66	Good	38	Marginal	67	Good	55	Fair	61	Fair	45	Marginal
Dry Creek (North)	2001	67	Good	65	Good	75	Good	58	Fair	68	Good	82	Very Good	85	Very Good	77	Very Good	69	Good	54	Fair	70	Good
	1998	62	Fair	52	Fair	43	Marginal	43	Marginal	47	Marginal	73	Good	88	Excellent	67	Good	63	Good	58	Fair	60	Fair
Eanes	2001	43	Marginal	35	Poor	13	Bad	73	Good	38	Marginal	83	Very Good	45	Marginal	80	Very Good	75	Good	68	Good	55	Fair
	1998	63	Good	65	Good	30	Poor	55	Fair	30	Poor	85	Very Good	45	Marginal	75	Good	68	Good	78	Very Good	59	Fair
East Bouldin Creek	2000	43	Marginal	61	Fair	63	Good	48	Marginal	44	Marginal	61	Fair	58	Fair	23	Bad	34	Poor	32	Poor	47	Marginal
	1996	64	Good	75	Good	.	.	56	Fair	49	Marginal	65	Good	59	Fair	59	Fair	51	Fair	21	Bad	55	Fair
Elm Creek	2002	34	Poor	46	Marginal	43	Marginal	53	Fair	41	Marginal	59	Fair	41	Marginal	72	Good	48	Marginal	56	Fair	49	Marginal
	1999	33	Poor	28	Poor	0	Very Bad	31	Poor	0	Very Bad	69	Good	40	Marginal	51	Fair	51	Fair	63	Good	37	Poor

Table 8. Habitat Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	YEAR	Epifaunal Substrate / Avail. Cover	Embedded-ness	Velocity / Depth Regimes	Sediment Deposition	Channel Flow Status	Channel Alteration	Frequency of Riffles	Bank Stability	Vegetative Protection	Riparian Vegetative Zone Width	Total HQI
		# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative
Fort Branch	2000	37 Poor	46 Marginal	50 Marginal	44 Marginal	53 Fair	67 Good	68 Good	73 Good	39 Marginal	40 Marginal	52 Fair
	1996	28 Poor	45 Marginal	.	40 Marginal	48 Marginal	62 Fair	25 Bad	38 Marginal	53 Fair	43 Marginal	42 Marginal
Gilleland Creek	2002	70 Good	64 Good	74 Good	67 Good	82 Very Good	68 Good	54 Fair	49 Marginal	55 Fair	66 Good	65 Good
	1999	52 Fair	66 Good	64 Good	54 Fair	85 Very Good	69 Good	59 Fair	61 Fair	75 Good	60 Fair	65 Good
Harper's Branch	2000	44 Marginal	70 Good	76 Very Good	59 Fair	70 Good	33 Poor	55 Fair	43 Marginal	44 Marginal	28 Poor	52 Fair
	1996	63 Good	57 Fair	.	48 Marginal	52 Fair	54 Fair	72 Good	34 Poor	33 Poor	21 Bad	48 Marginal
Harris Branch	2002	52 Fair	55 Fair	75 Good	42 Marginal	73 Good	73 Good	75 Good	40 Marginal	57 Fair	62 Fair	60 Fair
	1999	33 Poor	42 Marginal	60 Fair	25 Bad	57 Fair	53 Fair	53 Fair	38 Marginal	50 Marginal	55 Fair	47 Marginal
Huck's Slough	2001	10 Very Bad	10 Very Bad	10 Very Bad	10 Very Bad	10 Very Bad	75 Good	0 Very Bad	70 Good	70 Good	20 Bad	29 Poor
	1998	25 Bad	80 Very Good	0 Very Bad	40 Marginal	0 Very Bad	80 Very Good	0 Very Bad	55 Fair	75 Good	75 Good	43 Marginal
Johnson Creek	2000	55 Fair	60 Fair	25 Bad	55 Fair	20 Bad	57 Fair	20 Bad	62 Fair	39 Marginal	25 Bad	42 Marginal
	1996	63 Good	57 Fair	.	28 Poor	45 Marginal	58 Fair	18 Bad	32 Poor	43 Marginal	30 Poor	42 Marginal
Lake Austin	2002	71 Good	73 Good	58 Fair	71 Good	64 Good	79 Very Good	86 Very Good	80 Very Good	87 Very Good	88 Excellent	76 Very Good
	1999	50 Marginal	63 Good	68 Good	83 Very Good	85 Very Good	93 Excellent	73 Good	90 Excellent	78 Very Good	79 Very Good	76 Very Good
Lake Creek	2001	52 Fair	59 Fair	60 Fair	81 Very Good	76 Very Good	86 Very Good	78 Very Good	92 Excellent	84 Very Good	83 Very Good	75 Good
	1998	74 Good	71 Good	58 Fair	72 Good	68 Good	83 Very Good	67 Good	68 Good	81 Very Good	77 Very Good	72 Good
Little Barton Creek	2001	87 Very Good	75 Good	85 Very Good	80 Very Good	93 Excellent	90 Excellent	90 Excellent	70 Good	67 Good	72 Good	81 Very Good
	1998	87 Very Good	72 Good	77 Very Good	80 Very Good	78 Very Good	88 Excellent	75 Good	70 Good	78 Very Good	88 Excellent	79 Very Good
Little Bear Creek	2001	65 Good	88 Excellent	58 Fair	88 Excellent	93 Excellent	80 Very Good	58 Fair	70 Good	70 Good	75 Good	75 Good
	1998	52 Fair	72 Good	45 Marginal	90 Excellent	32 Poor	92 Excellent	37 Poor	85 Very Good	73 Good	88 Excellent	67 Good
Little Bee Creek	2001	18 Bad	65 Good	38 Marginal	75 Good	65 Good	68 Good	50 Marginal	65 Good	50 Marginal	85 Very Good	58 Fair
	1998	53 Fair	58 Fair	15 Bad	50 Marginal	20 Bad	78 Very Good	38 Marginal	55 Fair	55 Fair	50 Marginal	47 Marginal
Little Walnut Creek	2000	43 Marginal	63 Good	60 Fair	48 Marginal	59 Fair	64 Good	56 Fair	49 Marginal	37 Poor	60 Fair	54 Fair
	1996	50 Marginal	73 Good	.	58 Fair	66 Good	69 Good	46 Marginal	50 Marginal	38 Marginal	54 Fair	56 Fair
Marble Creek	2002	43 Marginal	60 Fair	33 Poor	60 Fair	48 Marginal	70 Good	15 Bad	55 Fair	65 Good	75 Good	52 Fair
	1999	15 Bad	50 Marginal	43 Marginal	45 Marginal	25 Bad	53 Fair	43 Marginal	58 Fair	65 Good	73 Good	47 Marginal
North Fork Dry Creek	2002	18 Bad	15 Bad	38 Marginal	28 Poor	45 Marginal	78 Very Good	78 Very Good	75 Good	60 Fair	28 Poor	46 Marginal
	1999	28 Poor	50 Marginal	15 Bad	70 Good	15 Bad	38 Marginal	40 Marginal	45 Marginal	35 Poor	45 Marginal	38 Marginal
Onion Creek	2001	81 Very Good	92 Excellent	87 Very Good	75 Good	96 Excellent	91 Excellent	81 Very Good	76 Very Good	87 Very Good	92 Excellent	86 Very Good
	1998	80 Very Good	88 Excellent	88 Excellent	73 Good	88 Excellent	80 Very Good	83 Very Good	83 Very Good	75 Good	83 Very Good	82 Very Good
	1996	68 Good	73 Good	.	64 Good	71 Good	82 Very Good	66 Good	75 Good	79 Very Good	86 Very Good	74 Good

Table 8. Habitat Quality Sub-Index Watershed Scores (cont'd.)

WATERSHED NAME	YEAR	Epifaunal Substrate / Avail. Cover	Embedded-ness	Velocity / Depth Regimes	Sediment Deposition	Channel Flow Status	Channel Alteration	Frequency of Riffles	Bank Stability	Vegetative Protection	Riparian Vegetative Zone Width	Total HQI
		# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative	# Narrative
Rattan Creek	2001	45 Marginal	63 Good	53 Fair	73 Good	53 Fair	53 Fair	65 Good	90 Excellent	25 Bad	25 Bad	55 Fair
	1998	53 Fair	65 Good	28 Poor	68 Good	40 Marginal	80 Very Good	40 Marginal	80 Very Good	85 Very Good	40 Marginal	58 Fair
Rinard Creek	2002	27 Poor	38 Marginal	32 Poor	37 Poor	52 Fair	85 Very Good	32 Poor	24 Bad	25 Bad	47 Marginal	40 Marginal
	1999	32 Poor	57 Fair	27 Poor	32 Poor	23 Bad	67 Good	27 Poor	45 Marginal	62 Fair	78 Very Good	45 Marginal
Shoal Creek	2000	36 Poor	61 Fair	64 Good	56 Fair	58 Fair	55 Fair	44 Marginal	66 Good	41 Marginal	26 Poor	51 Fair
	1996	54 Fair	66 Good	.	38 Marginal	53 Fair	58 Fair	46 Marginal	67 Good	47 Marginal	24 Bad	50 Marginal
Slaughter Creek	2001	81 Very Good	75 Good	63 Good	81 Very Good	81 Very Good	81 Very Good	79 Very Good	88 Excellent	83 Very Good	81 Very Good	79 Very Good
	1998	71 Good	84 Very Good	77 Very Good	83 Very Good	67 Good	83 Very Good	81 Very Good	81 Very Good	85 Very Good	70 Good	78 Very Good
South Boggy Creek	2001	70 Good	65 Good	60 Fair	65 Good	67 Good	65 Good	53 Fair	64 Good	69 Good	55 Fair	63 Good
	1998	63 Good	63 Good	60 Fair	55 Fair	53 Fair	67 Good	70 Good	72 Good	63 Good	60 Fair	63 Good
South Fork Dry Creek	2002	20 Bad	23 Bad	20 Bad	20 Bad	28 Poor	80 Very Good	18 Bad	22 Bad	20 Bad	45 Marginal	30 Poor
	1999	13 Bad	35 Poor	28 Poor	52 Fair	25 Bad	48 Marginal	37 Poor	62 Fair	60 Fair	42 Marginal	40 Marginal
Tannehill Branch	2000	29 Poor	44 Marginal	56 Fair	58 Fair	51 Fair	60 Fair	53 Fair	39 Marginal	34 Poor	36 Poor	46 Marginal
	1996	18 Bad	30 Poor	.	29 Poor	41 Marginal	50 Marginal	20 Bad	45 Marginal	50 Marginal	35 Poor	35 Poor
Taylor Slough (North)	2001	78 Very Good	75 Good	75 Good	75 Good	73 Good	70 Good	80 Very Good	75 Good	55 Fair	15 Bad	67 Good
	1998	73 Good	68 Good	40 Marginal	63 Good	50 Marginal	50 Marginal	70 Good	40 Marginal	45 Marginal	33 Poor	53 Fair
Taylor Slough (South)	2001	40 Marginal	80 Very Good	60 Fair	45 Marginal	40 Marginal	65 Good	75 Good	80 Very Good	70 Good	75 Good	63 Good
	1998	40 Marginal	75 Good	35 Poor	40 Marginal	40 Marginal	30 Poor	65 Good	60 Fair	40 Marginal	30 Poor	46 Marginal
Waller Creek	2000	68 Good	69 Good	71 Good	66 Good	76 Very Good	54 Fair	74 Good	62 Fair	46 Marginal	26 Poor	61 Fair
	1996	65 Good	71 Good	.	60 Fair	58 Fair	74 Good	46 Marginal	59 Fair	48 Marginal	21 Bad	56 Fair
Walnut Creek	2000	53 Fair	63 Good	68 Good	46 Marginal	84 Very Good	78 Very Good	68 Good	44 Marginal	53 Fair	81 Very Good	64 Good
	1996	56 Fair	60 Fair	.	43 Marginal	78 Very Good	50 Marginal	59 Fair	46 Marginal	43 Marginal	60 Fair	55 Fair
West Bouldin Creek	2000	45 Marginal	58 Fair	50 Marginal	50 Marginal	33 Poor	76 Very Good	48 Marginal	43 Marginal	28 Poor	28 Poor	46 Marginal
	1996	70 Good	71 Good	.	60 Fair	29 Poor	49 Marginal	24 Bad	44 Marginal	45 Marginal	33 Poor	47 Marginal
West Bull Creek	2001	66 Good	59 Fair	68 Good	54 Fair	78 Very Good	71 Good	75 Good	86 Very Good	83 Very Good	64 Good	70 Good
	1998	80 Very Good	75 Good	64 Good	69 Good	71 Good	84 Very Good	90 Excellent	76 Very Good	73 Good	69 Good	75 Good
West Country Club Creek	2000	40 Marginal	38 Marginal	55 Fair	45 Marginal	85 Very Good	60 Fair	60 Fair	60 Fair	50 Marginal	63 Good	56 Fair
	1996	38 Marginal	45 Marginal	.	8 Very Bad	45 Marginal	10 Very Bad	80 Very Good	73 Good	53 Fair	37 Poor	43 Marginal
Williamson Creek	2000	50 Marginal	63 Good	52 Fair	57 Fair	61 Fair	69 Good	53 Fair	80 Very Good	70 Good	64 Good	62 Fair
	1996	55 Fair	67 Good	.	51 Fair	48 Marginal	79 Very Good	23 Bad	65 Good	62 Fair	54 Fair	56 Fair

Table 9. Contact Recreation Watershed Sub-Index Scores.

WATERSHED NAME	DCM CODE	EII PHASE	YEAR	Contact Recreation	
				Numeric	Narrative
Barton Creek	BAR	1	2000	94	Excellent
			1996	96	Excellent
Bear Creek	BER	2	2001	88	Excellent
			1998	96	Excellent
Bee Creek	BEE	2	2001	87	Very Good
			1998	87	Very Good
Blunn Creek	BLU	1	2000	73	Good
			1996	73	Good
Boggy Creek	BOG	1	2000	75	Good
			1996	34	Poor
Bull Creek	BUL	2	2001	90	Excellent
		1	1996	89	Excellent
Buttermilk Branch	BMK	1	2000	78	Very Good
			1996	44	Marginal
Carson Creek	CAR	2	2001	86	Very Good
			1998	89	Excellent
Cottonmouth Creek	CTM	3	2002	79	Very Good
			1999	88	Excellent
Decker Creek	DKR	3	2002	93	Excellent
			1999	84	Very Good
Dry Creek	DRE	3	2002	89	Excellent
			1999	92	Excellent
Dry Creek (North)	DRN	2	2001	79	Very Good
			1998	73	Good
Eanes	EAN	2	2001	74	Good
			1998	76	Very Good
East Bouldin Creek	EBO	1	2000	61	Fair
			1996	51	Fair
Elm Creek	ELM	3	2002	96	Excellent
			1999	84	Very Good
Fort Branch	FOR	1	2000	77	Very Good
			1996	35	Poor
Gilleland Creek	GIL	3	2002	88	Excellent
			1999	89	Excellent
Harper's Branch	HRP	1	2000	65	Good
			1996	45	Marginal
Harris Branch	HRS	3	2002	82	Very Good
			1999	79	Very Good
Huck's Slough	HUK	2	2001	77	Very Good
			1998	98	Excellent
Johnson Creek	JOH	1	2000	70	Good
			1996	44	Marginal
Lake Austin	LKA	3	2002	94	Excellent
			1999	94	Excellent
Lake Creek	LKC	2	2001	87	Very Good
			1998	88	Excellent

Table 9. Contact Recreation Watershed Sub-Index Scores (cont'd.)

WATERSHED NAME	DCM CODE	EII PHASE	YEAR	Contact Recreation	
				Numeric	Narrative
Little Barton Creek	LBA	2	2001	91	Excellent
			1998	95	Excellent
Little Bear Creek	LBR	2	2001	81	Very Good
			1998	87	Very Good
Little Bee Creek	LBE	2	2001	79	Very Good
			1998	92	Excellent
Little Walnut Creek	LWA	1	2000	85	Very Good
			1996	40	Marginal
Marble Creek	MAR	3	2002	90	Excellent
			1999	93	Excellent
North Fork Dry Creek	NFD	3	2002	92	Excellent
			1999	92	Excellent
Onion Creek	ONI	2	2001	87	Very Good
			1998	86	Very Good
		1	1996	96	Excellent
Rattan Creek	RAT	3	2001	79	Very Good
			1998	80	Very Good
Rinard Creek	RIN	3	2002	96	Excellent
			1999	96	Excellent
Shoal Creek	SHL	1	2000	69	Good
			1996	44	Marginal
Slaughter Creek	SLA	2	2001	80	Very Good
			1998	88	Excellent
South Boggy Creek	SBG	2	2001	69	Good
			1998	59	Fair
South Fork Dry Creek	SFD	3	2002	85	Very Good
			1999	84	Very Good
Tannehill Branch	TAN	1	2000	78	Very Good
			1996	53	Fair
Taylor Slough (North)	TYN	2	2001	70	Good
			1998	87	Very Good
Taylor Slough (South)	TYS	2	2001	55	Fair
			1998	64	Good
Waller Creek	WLR	1	2000	64	Good
			1996	36	Poor
Walnut Creek	WLN	1	2000	92	Excellent
			1996	64	Good
West Bouldin Creek	WBO	1	2000	81	Very Good
			1996	87	Very Good
West Bull Creek	WBL	2	2001	91	Excellent
			1998	79	Very Good
West Country Club Creek	WCC	1	2000	73	Good
			1996	65	Good
Williamson Creek	WMS	1	2000	92	Excellent
			1996	69	Good

Table 10. Aquatic Life Sub-Index Watershed Scores.

WATERSHED NAME	DCM CODE	PHASE	YEAR	Benthic		Diatom		Aquatic Life Score	
				#	Narrative	#	Narrative	#	Narrative
Barton Creek	BAR	1	2000	72	Good	94	Excellent	83	Very Good
			1996	77	Very Good	87	Very Good	82	Very Good
Bear Creek	BER	2	2001	71	Good	65	Good	68	Good
			1998	57	Fair	67	Good	63	Good
Bee Creek	BEE	2	2001	52	Fair	82	Very Good	67	Good
			1998	64	Good	86	Very Good	75	Good
Blunn Creek	BLU	1	2000	33	Poor	55	Fair	45	Marginal
			1996	28	Poor	35	Poor	32	Poor
Boggy Creek	BOG	1	2000	31	Poor	17	Bad	24	Bad
			1996	32	Poor	33	Poor	33	Poor
Bull Creek	BUL	2	2001	86	Very Good	73	Good	80	Very Good
		1	1996	89	Excellent	88	Excellent	88	Excellent
Buttermilk Branch	BMK	1	2000	52	Fair	32	Poor	42	Marginal
			1996	19	Bad	36	Poor	28	Poor
Carson Creek	CAR	2	2001	31	Poor	23	Bad	27	Poor
			1998	60	Fair	53	Fair	56	Fair
Cottonmouth Creek	CTM	3	2002	28	Poor	14	Bad	21	Bad
			1999	0	Very Bad	0	Very Bad	0	Very Bad
Country Club Creek	ECC	1	2000	53	Fair	43	Marginal	48	Marginal
			1996	0	Very Bad	0	Very Bad	0	Very Bad
Decker Creek	DKR	3	2002	26	Poor	15	Bad	21	Bad
			1999	25	Bad	28	Poor	26	Poor
Dry Creek (East)	DRE	3	2002	7	Very Bad	4	Very Bad	6	Very Bad
			1999	0	Very Bad	0	Very Bad	0	Very Bad
Dry Creek (North)	DRN	2	2001	32	Poor	57	Fair	45	Marginal
			1998	49	Marginal	66	Good	58	Fair
Eanes	EAN	2	2001	31	Poor	66	Good	49	Marginal
			1998	33	Poor	38	Marginal	35	Poor
East Bouldin Creek	EBO	1	2000	31	Poor	26	Poor	28	Poor
			1996	10	Very Bad	7	Very Bad	8	Very Bad
Elm Creek	ELM	3	2002	30	Poor	26	Poor	28	Poor
			1999	0	Very Bad	0	Very Bad	0	Very Bad
Fort Branch	FOR	1	2000	33	Poor	27	Poor	30	Poor
			1996	31	Poor	39	Marginal	35	Poor
Gilleland Creek	GIL	3	2002	71	Good	59	Fair	65	Good
			1999	67	Good	48	Marginal	57	Fair
Harper's Branch	HRP	1	2000	29	Poor	17	Bad	23	Bad
			1996	25	Bad	23	Bad	24	Bad
Harris Branch	HRS	3	2002	70	Good	32	Poor	51	Fair
			1999	60	Fair	49	Marginal	55	Fair
Huck's Slough	HUK	2	2001	24	Bad	64	Good	44	Marginal
			1998	0	Very Bad	0	Very Bad	0	Very Bad
Johnson Creek	JOH	1	2000	16	Bad	7	Very Bad	11	Very Bad
			1996	9	Very Bad	9	Very Bad	9	Very Bad
Lake Austin	LKA	3	2002	60	Fair	86	Very Good	73	Good
			1999	44	Marginal	64	Good	47	Marginal

Table 10. Aquatic Life Watershed Sub-Index Scores (cont'd.)									
WATERSHED NAME	DCM CODE	PHASE	YEAR	Benthic		Diatom		Aquatic Life Score	
				#	Narrative	#	Narrative	#	Narrative
Lake Creek	LKC	2	2001	72	Good	43	Marginal	58	Fair
			1998	62	Fair	55	Fair	59	Fair
Little Barton Creek	LBA	2	2001	65	Good	77	Very Good	71	Good
			1998	68	Good	90	Excellent	79	Very Good
Little Bear Creek	LBR	2	2001	53	Fair	54	Fair	54	Fair
			1998	40	Marginal	42	Marginal	41	Marginal
Little Bee Creek	LBE	2	2001	37	Poor	60	Fair	49	Marginal
			1998	14	Bad	20	Bad	17	Bad
Little Walnut Creek	LWA	1	2000	67	Good	64	Good	66	Good
			1996	52	Fair	62	Fair	57	Fair
Marble Creek	MAR	3	2002	22	Bad	38	Marginal	30	Poor
			1999	18	Bad	14	Bad	16	Bad
North Fork Dry Creek	NFD	3	2002	18	Bad	30	Poor	24	Bad
			1999	0	Very Bad	0	Very Bad	0	Very Bad
Onion Creek	ONI	2	2001	73	Good	69	Good	70	Good
		2	1998	94	Excellent	88	Excellent	61	Fair
		1	1996	82	Very Good	65	Good	74	Good
Rattan Creek	RAT	2	2001	68	Good	61	Fair	64	Good
			1998	30	Poor	26	Poor	28	Poor
Rinard Creek	RIN	3	2002	45	Marginal	78	Very Good	62	Fair
			1999	24	Bad	13	Bad	19	Bad
Shoal Creek	SHL	1	2000	43	Marginal	45	Marginal	44	Marginal
			1996	46	Marginal	50	Marginal	48	Marginal
Slaughter Creek	SLA	2	2001	53	Fair	67	Good	60	Fair
			1998	68	Good	68	Good	69	Good
South Boggy Creek	SBG	2	2001	40	Marginal	31	Poor	36	Poor
			1998	52	Fair	32	Poor	42	Marginal
South Fork Dry Creek	SFD	3	2002	40	Marginal	28	Poor	34	Poor
			1999	0	Very Bad	0	Very Bad	0	Very Bad
Tannehill Branch	TAN	1	2000	34	Poor	31	Poor	33	Poor
			1996	26	Poor	21	Bad	24	Bad
Taylor Slough (North)	TYN	2	2001	47	Marginal	48	Marginal	48	Marginal
			1998	36	Poor	38	Marginal	37	Poor
Taylor Slough (South)	TYS	2	2001	42	Marginal	32	Poor	37	Poor
			1998	56	Fair	18	Bad	37	Poor
Waller Creek	WLR	1	2000	28	Poor	31	Poor	30	Poor
			1996	23	Bad	16	Bad	20	Bad
Walnut Creek	WLN	1	2000	87	Very Good	64	Good	76	Very Good
			1996	88	Excellent	67	Good	78	Very Good
West Bouldin Creek	WBO	1	2000	20	Bad	22	Bad	21	Bad
			1996	9	Very Bad	6	Very Bad	8	Very Bad
West Bull Creek	WBL	2	2001	74	Good	83	Very Good	79	Very Good
			1998	79	Very Good	88	Excellent	84	Very Good
W. Country Club Creek	WCC	1	2000	37	Poor	28	Poor	33	Poor
			1996	22	Bad	17	Bad	20	Bad
Williamson Creek	WMS	1	2000	56	Fair	51	Fair	54	Fair
			1996	21	Bad	26	Poor	24	Bad

Table 11. Total Watershed EII and Sub-Index Scores by Year of Sampling.

WATERSHED NAME	DCM CODE	PHASE	YEAR	Water Quality		Sediment Quality		Contact Recreation		Non-Contact Recreation		Habitat		Aquatic Life		Total EII	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Barton Creek	BAR	1	2000	74	Good	65	Good	94	Excellent	85	Very Good	60	Fair	83	Very Good	77	Very Good
			1996	72	Good	82	Very Good	96	Excellent	81	Very Good	85	Very Good	82	Very Good	83	Very Good
Bear Creek	BER	2	2001	60	Fair	82	Very Good	88	Excellent	91	Excellent	62	Fair	68	Good	75	Good
			1998	75	Good	81	Very Good	96	Excellent	86	Very Good	79	Very Good	63	Good	80	Very Good
Bee Creek	BEE	2	2001	59	Fair	94	Excellent	87	Very Good	89	Excellent	52	Fair	67	Good	75	Good
			1998	60	Fair	85	Very Good	87	Very Good	82	Very Good	74	Good	75	Good	77	Very Good
Blunn Creek	BLU	1	2000	49	Marginal	69	Good	73	Good	64	Good	39	Marginal	45	Marginal	57	Fair
			1996	50	Marginal	58	Fair	73	Good	75	Good	65	Good	32	Poor	59	Fair
Boggy Creek	BOG	1	2000	56	Fair	88	Excellent	75	Good	66	Good	27	Poor	24	Bad	56	Fair
			1996	49	Marginal	82	Very Good	34	Poor	63	Good	48	Marginal	33	Poor	52	Fair
Bull Creek	BUL	2	2001	55	Fair	65	Good	90	Excellent	89	Excellent	52	Fair	80	Very Good	72	Good
		1	1996	64	Good	88	Excellent	89	Excellent	86	Very Good	78	Very Good	88	Excellent	83	Very Good
Buttermilk Branch	BMK	1	2000	61	Fair	91	Excellent	78	Very Good	76	Very Good	35	Poor	42	Marginal	64	Good
			1996	62	Fair	64	Good	44	Marginal	58	Fair	55	Fair	28	Poor	51	Fair
Carson Creek	CAR	2	2001	56	Fair	85	Very Good	86	Very Good	74	Good	48	Marginal	27	Poor	63	Good
			1998	54	Fair	83	Very Good	89	Excellent	74	Good	53	Fair	56	Fair	68	Good
Cottonmouth Creek	CTM	3	2002	44	Marginal	64	Good	79	Very Good	67	Good	58	Fair	21	Bad	56	Fair
			1999	55	Fair	83	Very Good	88	Excellent	58	Fair	49	Marginal	0	Very Bad	56	Fair
Country Club Creek (East)	ECC	1	2000			87	Very Good			53	Fair	31	Poor	48	Marginal	55	Fair
			1996			63	Good			33	Poor	32	Poor	0	Very Bad	32	Poor
Decker Creek	DKR	3	2002	62	Fair	93	Excellent	93	Excellent	67	Good	56	Fair	21	Bad	65	Good
			1999	53	Fair	84	Very Good	84	Very Good	62	Fair	66	Good	26	Poor	63	Good
Dry Creek (East)	DRE	3	2002	55	Fair	86	Very Good	89	Excellent	57	Fair	37	Poor	6	Very Bad	55	Fair
			1999	55	Fair	84	Very Good	92	Excellent	53	Fair	52	Fair	0	Very Bad	56	Fair
Dry Creek (North)	DRN	2	2001	50	Marginal	90	Excellent	79	Very Good	82	Very Good	48	Marginal	45	Marginal	66	Good
			1998	49	Marginal	60	Fair	73	Good	71	Good	60	Fair	58	Fair	62	Fair
Eanes	EAN	2	2001	51	Fair	73	Good	74	Good	66	Good	45	Marginal	49	Marginal	60	Fair
			1998	51	Fair	58	Fair	76	Very Good	70	Good	68	Good	35	Poor	57	Fair
East Bouldin Creek	EBO	1	2000	52	Fair	62	Fair	61	Fair	55	Fair	43	Marginal	28	Poor	50	Marginal
			1996	52	Fair	57	Fair	51	Fair	50	Marginal	52	Fair	8	Very Bad	44	Marginal
Elm Creek	ELM	3	2002	60	Fair	91	Excellent	96	Excellent	65	Good	51	Fair	28	Poor	65	Good
			1999	53	Fair	85	Very Good	84	Very Good	42	Marginal	43	Marginal	0	Very Bad	49	Marginal

Table 11. Total Watershed Sub-Index Scores by Year of Sampling (cont'd.)

WATERSHED NAME	DCM CODE	PHASE	YEAR	Water Quality		Sediment Quality		Contact Recreation		Non-Contact Recreation		Habitat		Aquatic Life		Total EII	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Fort Branch	FOR	1	2000	58	Fair	88	Excellent	77	Very Good	69	Good	37	Poor	30	Poor	60	Fair
			1996	51	Fair	81	Very Good	35	Poor	64	Good	49	Marginal	35	Poor	53	Fair
Gilleland Creek	GIL	3	2002	36	Poor	87	Very Good	88	Excellent	76	Very Good	65	Good	65	Good	70	Good
			1999	38	Marginal	83	Very Good	89	Excellent	70	Good	68	Good	57	Fair	68	Good
Harper's Branch	HRP	1	2000	44	Marginal	59	Fair	65	Good	63	Good	35	Poor	23	Bad	48	Marginal
			1996	46	Marginal	45	Marginal	45	Marginal	72	Good	39	Marginal	24	Bad	44	Marginal
Harris Branch	HRS	3	2002	34	Poor	84	Very Good	82	Very Good	55	Fair	61	Fair	51	Fair	61	Fair
			1999	32	Poor	81	Very Good	79	Very Good	59	Fair	46	Marginal	55	Fair	59	Fair
Huck's Slough	HUK	2	2001	42	Marginal	68	Good	77	Very Good	63	Good	27	Poor	44	Marginal	54	Fair
			1998	58	Fair	73	Good	98	Excellent	62	Fair	61	Fair	0	Very Bad	59	Fair
Johnson Creek	JOH	1	2000	43	Marginal	82	Very Good	70	Good	77	Very Good	32	Poor	11	Very Bad	53	Fair
			1996	30	Poor	45	Marginal	44	Marginal	60	Fair	40	Marginal	9	Very Bad	37	Poor
Lake Austin	LKA	3	2002	67	Good	89	Excellent	94	Excellent	91	Excellent	76	Very Good	73	Good	82	Very Good
			1999	78	Very Good	93	Excellent	94	Excellent	92	Excellent	81	Very Good	47	Marginal	81	Very Good
Lake Creek	LKC	2	2001	46	Marginal	84	Very Good	87	Very Good	78	Very Good	56	Fair	58	Fair	68	Good
			1998	56	Fair	74	Good	88	Excellent	74	Good	74	Good	59	Fair	71	Good
Little Barton Creek	LBA	2	2001	67	Good	92	Excellent	91	Excellent	89	Excellent	55	Fair	71	Good	78	Very Good
			1998	78	Very Good	95	Excellent	95	Excellent	90	Excellent	81	Very Good	79	Very Good	86	Very Good
Little Bear Creek	LBR	2	2001	58	Fair	81	Very Good	81	Very Good	80	Very Good	57	Fair	54	Fair	69	Good
			1998	61	Fair	86	Very Good	87	Very Good	70	Good	77	Very Good	41	Marginal	69	Good
Little Bee Creek	LBE	2	2001	46	Marginal	70	Good	79	Very Good	84	Very Good	48	Marginal	49	Marginal	63	Good
			1998	50	Marginal	93	Excellent	92	Excellent	63	Good	54	Fair	17	Bad	62	Fair
Little Walnut Creek	LWA	1	2000	67	Good	92	Excellent	85	Very Good	73	Good	38	Marginal	66	Good	70	Good
			1996	63	Good	82	Very Good	40	Marginal	69	Good	61	Fair	57	Fair	62	Fair
Marble Creek	MAR	3	2002	51	Fair	83	Very Good	90	Excellent	58	Fair	53	Fair	30	Poor	61	Fair
			1999	55	Fair	84	Very Good	93	Excellent	56	Fair	54	Fair	16	Bad	60	Fair
North Fork Dry Creek	NFD	3	2002	53	Fair	83	Very Good	92	Excellent	71	Good	47	Marginal	24	Bad	62	Fair
			1999	55	Fair	77	Very Good	92	Excellent	55	Fair	42	Marginal	0	Very Bad	54	Fair
Onion Creek	ONI	2	2001	64	Good	88	Excellent	87	Very Good	94	Excellent	61	Fair	70	Good	77	Very Good
			1998	77	Very Good	63	Good	86	Very Good	95	Excellent	80	Very Good	61	Fair	74	Good
			1996	75	Good	63	Good	96	Excellent	71	Good	70	Good	74	Good	75	Good
Rattan Creek	RAT	2	2001	51	Fair	90	Excellent	79	Very Good	73	Good	39	Marginal	64	Good	66	Good
			1998	63	Good	78	Very Good	80	Very Good	61	Fair	64	Good	28	Poor	62	Fair

Table 11. Total watershed EII and sub-index scores by year of sampling (cont'd)

WATERSHED NAME	DCM CODE	PHASE	YEAR	Water Quality		Sediment Quality		Contact Recreation		Non-Contact Recreation		Habitat		Aquatic Life		Total EII	
				#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative	#	Narrative
Rinard Creek	RIN	3	2002	65	Good	81	Very Good	96	Excellent	74	Good	40	Marginal	62	Fair	70	Good
			1999	65	Good	80	Very Good	96	Excellent	69	Good	53	Fair	19	Bad	63	Good
Shoal Creek	SHL	1	2000	56	Fair	89	Excellent	69	Good	67	Good	37	Poor	44	Marginal	60	Fair
			1996	47	Marginal	51	Fair	44	Marginal	61	Fair	55	Fair	48	Marginal	51	Fair
Slaughter Creek	SLA	2	2001	63	Good	86	Very Good	80	Very Good	83	Very Good	57	Fair	60	Fair	72	Good
			1998	73	Good	70	Good	88	Excellent	75	Good	79	Very Good	69	Good	76	Very Good
South Boggy Creek	SBG	2	2001	54	Fair	92	Excellent	69	Good	84	Very Good	45	Marginal	36	Poor	63	Good
			1998	52	Fair	73	Good	59	Fair	74	Good	61	Fair	42	Marginal	60	Fair
South Fork Dry Creek	SFD	3	2002	53	Fair	82	Very Good	85	Very Good	71	Good	30	Poor	34	Poor	59	Fair
			1999	56	Fair	68	Good	84	Very Good	49	Marginal	49	Marginal	0	Very Bad	51	Fair
Tannehill Branch	TAN	1	2000	63	Good	89	Excellent	78	Very Good	71	Good	32	Poor	33	Poor	61	Fair
			1996	50	Marginal	81	Very Good	53	Fair	54	Fair	41	Marginal	24	Bad	51	Fair
Taylor Slough (North)	TYN	2	2001	59	Fair	49	Marginal	70	Good	74	Good	44	Marginal	48	Marginal	57	Fair
			1998	59	Fair	52	Fair	87	Very Good	70	Good	53	Fair	37	Poor	60	Fair
Taylor Slough (South)	TYS	2	2001	55	Fair	66	Good	55	Fair	80	Very Good	46	Marginal	37	Poor	57	Fair
			1998	43	Marginal	57	Fair	64	Good	78	Very Good	42	Marginal	37	Poor	54	Fair
Waller Creek	WLR	1	2000	51	Fair	63	Good	64	Good	74	Good	40	Marginal	30	Poor	54	Fair
			1996	50	Marginal	62	Fair	36	Poor	76	Very Good	56	Fair	20	Bad	50	Marginal
Walnut Creek	WLN	1	2000	64	Good	95	Excellent	92	Excellent	82	Very Good	45	Marginal	76	Very Good	76	Very Good
			1996	52	Fair	84	Very Good	64	Good	75	Good	47	Marginal	78	Very Good	67	Good
West Bouldin Creek	WBO	1	2000	67	Good	80	Very Good	81	Very Good	44	Marginal	32	Poor	21	Bad	54	Fair
			1996	76	Very Good	53	Fair	87	Very Good	59	Fair	51	Fair	8	Very Bad	45	Marginal
West Bull Creek	WBL	2	2001	67	Good	91	Excellent	91	Excellent	86	Very Good	50	Marginal	79	Very Good	77	Very Good
			1998	72	Good	85	Very Good	79	Very Good	86	Very Good	76	Very Good	84	Very Good	80	Very Good
West Country Club Creek	WCC	1	2000	53	Fair	87	Very Good	73	Good	75	Good	40	Marginal	33	Poor	60	Fair
			1996	68	Good	63	Good	65	Good	72	Good	33	Poor	20	Bad	49	Marginal
Williamson Creek	WMS	1	2000	69	Good	92	Excellent	92	Excellent	68	Good	47	Marginal	54	Fair	70	Good
			1996	66	Good	82	Very Good	69	Good	65	Good	59	Fair	24	Bad	57	Fair

Relative Ranking of EII Sub-index and Total Watershed Scores

Watershed scores for each sub-index as well as the total EII watershed score were ranked relative to each other for first and second round sampling years (Table 12). This comparative analysis not only demonstrates how the environmental quality of each watershed relates to other watersheds within a limited temporal scale (generally equal to the total 3-year EII sampling schedule) but also reveals how each watershed changed from the first round to the second round of sampling relative to the change in other watersheds across the city.

To highlight the sub-indices that changed the most in the relative rankings for each watershed, the top three positive and negative changes in relative rankings were calculated (Table 13). The Huck's Slough watershed degraded (apparently) the most from first round to second round sampling, dropping more ranks than any other watershed in three sub-indices (water, contact recreation, and habitat) and also in total EII watershed score ranking.

All but 2 of the 11 phase III watersheds dropped in relative ranking for the sediment quality sub-index. However, the ranking of total EII watershed scores decreased more in phase II watersheds (a decrease was recorded in 67% of the watersheds) than total EII watershed rankings in phase I (which decreased in 35% of the watersheds) or phase III (which decreased in 45% of the watersheds).

The decreases in the Bull Creek and Barton Creek watershed sediment rankings are of special concern due to the environmentally sensitive nature of both watersheds. The Bull Creek sediment sub-index dropped 36 places, making Bull Creek the most (apparently) degraded watershed in sediment quality rankings from first round to second round sampling years. Although only the fifth worst decrease in overall sediment quality rankings, Barton Creek dropped 24 places in sediment quality from first round to second round sampling.

Whereas Elm Creek yielded the largest apparent improvement in total watershed EII ranking, Buttermilk Branch was one of the most improved watershed in terms of relative rankings, yielding strong positive improvements in two sub-indices (sediment and non-contact recreation) and in its total EII watershed score ranking. The ranking of the benthic macroinvertebrate component of the aquatic life sub-index in the Buttermilk Branch watershed also yielded strong improvement.

Table 12. Relative ranking of watershed sub-index and total EII scores for first round (I) and second round (II) sampling.

WATERSHED NAME	Water Quality		Sediment		Contact Recreation		Non-Contact Recreation		Habitat		Aquatic Life		Benthic Sub-Index		Diatom Sub-Index		Watershed Total	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Barton Creek	8	1	16	40	2	3	8	8	1	6	3	1	6	5	5	1	2	3
Bear Creek	5	15	20	29	2	14	4	2	5	3	9	8	14	7	8	11	5	7
Bee Creek	18	17	6	2	18	16	7	4	10	14	6	9	10	18	6	4	7	7
Blunn Creek	35	37	39	37	30	36	11	38	16	32	26	23	27	29	24	19	25	34
Boggy Creek	39	21	16	16	46	34	29	35	37	45	25	39	24	32	25	41	35	37
Bull Creek	13	24	4	40	12	11	4	4	7	14	1	2	2	2	2	7	2	9
Buttermilk Branch	16	14	32	8	40	30	38	18	24	38	27	27	35	18	23	27	36	21
Carson Creek	27	21	13	24	12	19	14	21	28	18	15	38	12	32	15	39	13	22
Cottonmouth Creek	23	40	13	42	15	26	38	32	34	7	41	42	41	38	41	44	30	37
Country Club (East)			33	19			47	45	47	43	41	21	41	15	41	24	47	39
Decker Creek	28	13	9	3	23	5	31	32	15	10	29	42	29	40	27	43	16	19
Dry Creek (East)	23	24	9	22	9	13	43	42	31	35	41	46	41	46	41	46	30	39
Dry Creek (North)	39	36	38	11	30	26	19	12	21	18	12	23	18	31	10	18	18	17
Eanes	33	32	39	35	29	35	21	35	13	24	23	19	23	32	21	10	28	29
East Bouldin Creek	30	31	41	44	38	44	44	43	31	28	39	36	38	32	39	37	44	45
Elm Creek	28	15	6	8	23	1	46	37	40	16	41	36	41	36	41	37	41	19
Fort Branch	33	19	20	16	45	32	28	30	34	35	23	33	25	29	20	36	34	29
Gilleland Creek	44	44	13	19	12	14	21	18	13	2	13	11	9	7	18	17	13	11
Harper's Branch	42	40	46	45	39	42	17	39	45	38	30	41	29	37	30	41	44	46
Harris Branch	45	45	20	25	27	22	36	43	39	4	16	18	12	9	17	27	25	26
Huck's Slough	20	43	28	38	1	32	31	39	18	45	41	25	41	41	41	12	25	41
Johnson Creek	46	42	46	29	40	38	35	17	44	40	38	45	39	45	38	45	46	44
Lake Austin	1	3	2	13	7	3	2	2	2	1	18	5	20	13	12	2	4	1
Lake Creek	21	38	27	25	15	16	14	16	10	10	11	15	11	5	14	24	11	16
Little Barton Creek	1	3	1	4	6	9	3	4	2	12	4	6	7	12	1	6	1	2
Little Bear Creek	17	19	5	32	18	23	21	14	8	8	20	16	21	15	19	20	12	15
Little Bee Creek	35	38	2	36	9	26	29	9	26	18	36	19	37	26	32	16	18	22
Little Walnut Creek	14	3	16	4	43	20	25	25	18	34	13	10	16	11	13	12	18	11
Marble Creek	23	32	9	27	8	11	40	41	26	13	37	33	36	42	36	26	22	26
North Fork Dry Creek	23	28	26	27	9	6	41	27	41	21	41	39	41	44	41	33	32	25
Onion Creek	5	9	33	16	22	16	19	1	12	4	10	7	4	4	11	8	10	3
Rattan Creek	14	32	25	11	26	26	33	25	17	32	27	12	26	10	28	15	18	17
Rinard Creek	12	8	24	32	2	1	25	21	28	29	35	13	31	21	37	5	16	11

Table 12. Relative ranking of watershed sub-index and total EII scores for first round (I) and second round (II) sampling (cont'd).

WATERSHED NAME	Water Quality		Sediment		Contact Recreation		Non-Contact Recreation		Habitat		Aquatic Life		Benthic Sub-Index		Diatom Sub-Index		Watershed Total	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Shoal Creek	41	21	45	13	40	40	33	32	24	35	17	25	19	22	16	23	36	29
Slaughter Creek	7	11	30	22	15	25	11	11	5	8	8	14	7	15	7	9	8	9
South Boggy Creek	30	27	28	4	36	40	14	9	18	24	19	29	16	24	26	30	22	22
South Fork Dry Creek	21	28	31	29	23	20	45	27	34	44	41	30	41	24	41	34	36	33
Tannehill Branch	35	11	20	13	37	30	42	27	43	40	30	31	28	28	31	30	36	26
Taylor Slough (North)	19	17	44	46	18	38	21	21	28	27	21	21	22	20	21	22	22	34
Taylor Slough (South)	43	24	41	39	34	45	9	14	41	23	21	28	15	23	33	27	32	34
Waller Creek	35	32	37	43	44	43	10	21	23	29	33	33	32	38	35	30	40	41
Walnut Creek	30	9	9	1	34	6	11	12	38	24	5	4	3	1	8	12	15	6
West Bouldin Creek	4	3	43	34	18	23	36	46	33	40	39	42	39	43	40	40	43	41
West Bull Creek	8	3	6	8	27	9	4	7	9	17	2	3	5	3	2	3	5	3
Country Club (West)	10	28	33	19	33	36	17	20	46	29	33	31	33	26	34	34	41	29
Williamson Creek	11	2	16	4	32	6	27	31	22	21	30	16	34	14	28	21	28	11

Table 13. Top three improvements and decreases in watershed relative rankings from first round to second round sampling events by sub-index. Numeric change in ranking is in parentheses.

Index	Top 3 Decreases in Rankings	Top 3 Improvements in Rankings
Water Quality	Huck's Slough (-23) West Country Club Creek (-18) Rattan Creek (-18)	Tannehill Branch (+24) Walnut Creek (+21) Shoal Creek (+20)
Sediment	Bull Creek (-36) Little Bee Creek (-34) Cottonmouth Creek (-29)	Shoal Creek (+32) Dry Creek (North) (+27) Buttermilk Branch (+24) South Boggy Creek (+24)
Contact Recreation	Huck's Slough (-31) Taylor Slough (North) (-20) Little Bee Creek (-17)	Walnut Creek (+28) Williamson Creek (+26) Little Walnut Creek (+23)
Non-Contact Recreation	Blunn Creek (-27) Harper's Branch (-22) Eanes (-14)	Buttermilk Branch (+20) Little Bee Creek (+20) Onion Creek (+18) Johnson Creek (+18)
Habitat	Huck's Slough (-27) Blunn Creek (-16) Little Walnut Creek (-16)	Harris Branch (+35) Cottonmouth Creek (+27) Elm Creek (+24)
Aquatic Life	Carson Creek (-23) Boggy Creek (-14) Decker Creek (-13)	Rinard Creek (+22) Country Club Creek (+20) Little Bee Creek (+17)
Bugs	Carson Creek (-20) Dry Creek (North) (-13) Decker Creek (-11)	Country Club Creek (+26) Williamson Creek (+20) Buttermilk Branch (+17) South Fork Dry Creek (+17)
Diatoms	Carson Creek (-24) Boggy Creek (-16) Fort Branch (-16) Decker Creek (-16)	Rinard Creek (+32) Huck's Slough (+29) Country Club Creek (+17)
Watershed Total	Huck's Slough (-16) Taylor Slough (North) (-12) Dry Creek (East) (-9) Carson Creek (-9) Blunn Creek (-9)	Elm Creek (+22) Williamson Creek (+17) Buttermilk Branch (+15)

Assessment of EII Masterplan Objectives

The Masterplan objectives included in the EII Sampling and Analysis Plan generally require that watersheds either maintain current EII narrative score ratings (for watersheds with “excellent” scores) or improve current EII narrative score to the next highest criterion. For watersheds that score less than “good,” the objective is for future scores to improve to the “good” rating.

Changes in total EII and sub-index narrative scores were assessed for each watershed to determine which sampling locations did not meet the sampling plan objectives from first round to second round sampling years. The potential outcomes of the comparison were that either the watershed met the specified objective, the watershed EII or sub-index score improved but did not meet the objective (e.g., the first round score was less than good, and the second round score improved but did not make a good score), there was no change in score from first round to second, or the narrative score degraded over time.

Comparison of overall total EII and sub-index narrative scores to monitoring objectives showed that for all sub-indices except sediment, non-contact recreation, and contact recreation, more watersheds did not meet objectives (i.e., scores did not improve enough or degraded) than met objectives (Table 14). More than 75% of watersheds studied did not meet the objectives for the total EII watershed score. Fewer than 10% of watersheds studied met monitoring objectives from first round to second round sampling in the aquatic life and water quality sub-indices.

Table 14. Percentages of watersheds meeting monitoring objective goals by sub-index.

Sub-Index	% of Watersheds that Met Goal	% of Watersheds that Did Not Meet Goal
Non-Contact Recreation	52	48
Contact Recreation	62	38
Habitat	15	85
Aquatic Life	9	91
Sediment	58	42
Water Quality	7	93
Total Watershed EII	22	78

Although analysis of success in meeting objectives by EII phase (Table 15) does show variation between phases for several sub-indices, there is little overall difference between phases in the percentage of watersheds achieving monitoring objective goals. On average, only 1 in 3 watersheds in each EII phase met the goal. Of greater interest are the relative numbers of watersheds yielding degrading scores by sampling phase. Excepting the non-contact recreation and habitat sub-index scores, phase II watersheds yielded the highest percentage of watersheds with degrading narrative scores in all other sub-indices. Only phase II watersheds yielded degrading total EII watershed narrative scores. The non-contact recreation score yielded the fewest number of degrading watersheds (only Waller Creek degraded from first round to second round sampling in NCR score) and appears to be one of the more stable sub-indices.

Table 15. Summary of monitoring objective success by EII phase.

Index	EII Phase	# Watersheds Meeting Goal	# Watersheds with No Change in Narrative Score	# Watersheds Improving but not Meeting Goal	# Watersheds with Degrading Narrative Scores
Non-Contact Recreation	1	6	9	3	1
	2	11	5	0	0
	3	7	4	0	0
Contact Recreation	1	12	4	0	0
	2	7	3	0	8
	3	9	2	0	0
Habitat	1	1	8	5	3
	2	6	10	1	1
	3	0	5	4	2
Aquatic Life	1	1	6	9	1
	2	1	6	6	5
	3	2	2	6	1
Sediment	1	12	2	1	1
	2	10	6	0	2
	3	4	6	0	1
Water Quality	1	2	10	3	3
	2	1	9	0	6
	3	0	9	0	2
Total Watershed EII Score	1	4	8	5	0
	2	5	9	0	4
	3	1	10	0	0

To better focus remediation efforts, the watersheds that yielded degrading narrative scores are presented by sub-index and watershed in Table 16. Although eight watersheds in phase II were listed as having a degrading narrative score in contact recreation, most of the degradation was from “Excellent” to “Very Good.”

Both the aquatic life and sediment sub-indices, which are considered more long-term indicators of water quality condition, yielded decreasing narrative scores in the Bull Creek watershed. This correlates with degrading water quality sub-index narrative scores within the Bull Creek watershed and drives the degrading total EII watershed score.

Table 16. Watersheds with degrading narrative scores by phase and sub-index.

Index	Phase		
	I	II	III
Non-Contact Recreation	Waller Creek		
Contact Recreation *		Eanes Creek Huck's Slough Lake Creek Little Bee Creek Onion Creek Slaughter Creek Taylor Slough (North) Taylor Slough (South)*	
Habitat Quality	Blunn Creek Boggy Creek East Bouldin Creek	Huck's Slough	Dry Creek South Fork Dry Creek
Aquatic Life	Boggy Creek	Bull Creek Carson Creek Little Barton Creek Slaughter Creek South Boggy Creek	Decker Creek
Sediment	Barton Creek	Bull Creek Little Bee Creek	Cottonmouth Creek
Water Quality	West Bouldin Creek West Country Club Creek	Bull Creek Bear Creek Eanes Creek Huck's Slough Lake Creek Little Barton Creek Slaughter Creek	Cottonmouth Creek Lake Austin Tribs
Total Watershed EII		Bear Creek Bull Creek Bee Creek Slaughter Creek	

* Most degradations in contact recreation were from excellent to very good.

Comparison to Business Plan Performance Measure

As defined by the 2003 WPDRD Business Plan, a substantial decrease in EII values is a decrease of more than 12.5 points. Change in values from first round to second round sampling years was assessed for 46 watersheds. The change in total EII watershed scores values improved for 33 of the 46 watersheds (or 72%). The average change in score from first round to second round sampling was +3 points. **There were no substantial decreases in total EII watershed score values in any Austin area watershed.** The maximum decrease in total EII watershed score was - 11 points, measured in the Bull Creek watershed. The decrease in Bull was the result of decreasing water quality, sediment, aquatic life (both diatoms and benthic macroinvertebrate components decreased) and habitat quality sub-index scores which could not be offset by the nearly constant contact and non-contact recreation sub-index scores. Although Bull Creek yielded the maximum decrease in total EII watershed score, the only sub-index in Bull Creek yielding a substantial decrease was sediment quality.

However, five substantial increases in total EII watershed score values were present between the first and second sampling years. These increases were observed in the Buttermilk, East Country Club, Elm, Johnson, and Williamson watersheds. The maximum increase of +23 was observed in the East Country Club watershed and is most likely the result of a change in sampling locations to sites with more regular baseflow.

Analysis of change in sub-index scores indicates that Huck’s Slough was also among the most impacted watersheds (Table 17). Huck’s Slough yielded substantial decreases from first round to second round sampling years in water, contact recreation, and habitat quality sub-indices. These decreases could be related to construction impacts resulting from the improvements to the Davis Water Treatment Plant Intake located adjacent to the Huck’s Slough channel.

Table 17. Summary of change in watershed EII sub-indices from first round to second round sampling years; “substantial” is defined according to the 2003 Business Plan Performance Measure as a change (Δ) of more than 12.5 points.

EII Sub-Indices	Watersheds with Substantial Decrease	Average Δ	# Watersheds with Substantial Increase	Maximum Increase
Water	Huck’s Slough (-21) W. Country Club (-15) Bear Creek (-14) Little Barton Creek (-13) Slaughter Creek (-13)	-1.1	2	Johnson Creek (+13) Tannehill Creek (+13)
Sediment	Bull Creek (-23) Little Bee Creek (-23) Cottonmouth Creek (-19) Barton Creek (-17)	+7.7	13	Shoal Creek (+38)
Aquatic Life	Carson Creek (-29) Dry Creek North (-13)	+9	19	East Country Club (+48)
Contact Recreation	Huck’s Slough (-21) Taylor Slough North (-17) Little Bee Creek (-13)	+6.3	21	Little Walnut Creek (+45)
Non-Contact Recreation	West Bouldin Creek (-15)	+6	9	Elm Creek (+23) Onion Creek (+23)
Habitat	Huck’s Slough (-14)	+3.3	29	Taylor Slough South (+17)

Assessment of total EII site scores yielded six (out of 153 sites) with a substantial decrease (≥ 12.5 points) from first round to second round sampling events (Table 18). The largest decrease in total site EII score was observed within the upper reach of Harper’s Branch Creek near Windoak Drive. The Little Barton Creek site (site #77) near the confluence with Barton Creek decreased in all sub-indices, with substantial decreases in the water quality, non-contact recreation, physical integrity, and aquatic life (both benthic macroinvertebrate and diatom components decreased) sub-indices. Similarly, sub-index scores at the Bull Creek site located near the confluence with West Bull Creek decreased for all sub-indices except non-contact recreation, which exhibited little change (+2).

Though making positive improvements in water quality, sediment and contact recreation sub-indices, very large decreases (as much as -79 for aquatic life) in non-contact, physical integrity, and aquatic life sub-indices at the Decker Creek at FM 967 site (#1197) drove the overall substantial decrease in total site EII score. The site on Harper’s Branch Creek in the headwaters near Windoak (site #877) decreased in all sub-indices except sediment, which actually improved

by 14 points due to improving levels of pesticides and PCB's in sediment at the mouth of Harper's Branch.

The Cottonmouth Creek at Colton-Bluff Springs Road (site #1205) was frequently dry and has not maintained sufficient baseflow for aquatic life assessments to be conducted. The observed substantial decrease at the Colton-Bluff Springs Road site was the result of a decrease in the sediment sub-index score (-19) driven by the detection of 4,4'-DDE in sediment at this site in 2002.

Table 18. Sample sites with substantial decrease in total EII site score.

Sample Site #	Site Name	Watershed Name	Δ	EII Phase
77	Little Barton Creek @ Barton Creek	Little Barton Creek	-13	2
347	Bull Creek Above West Bull Creek	Bull Creek	-15	2
877	Harper's Branch @ Windoak Drive	Harper's Branch Creek	-20	1
1197	Decker Creek @ FM 967	Decker Creek	-17	3
1205	Cottonmouth Creek @ Colton-Bluff Springs Road	Cottonmouth Creek	-14	3
1208	Dry Creek (East) @ FM 812	Dry Creek (East)	-16	3

Spatial and Temporal Changes

The change in first round to second round EII watershed scores was evaluated spatially using a graduated color mapping scheme in which the most improved watersheds are dark green and most degraded watersheds are dark red. The green-to-red color spectrum was applied to GIS maps for the total EII watershed score (Figure 1) as well as all sub-indices (Figures 2 through 7).

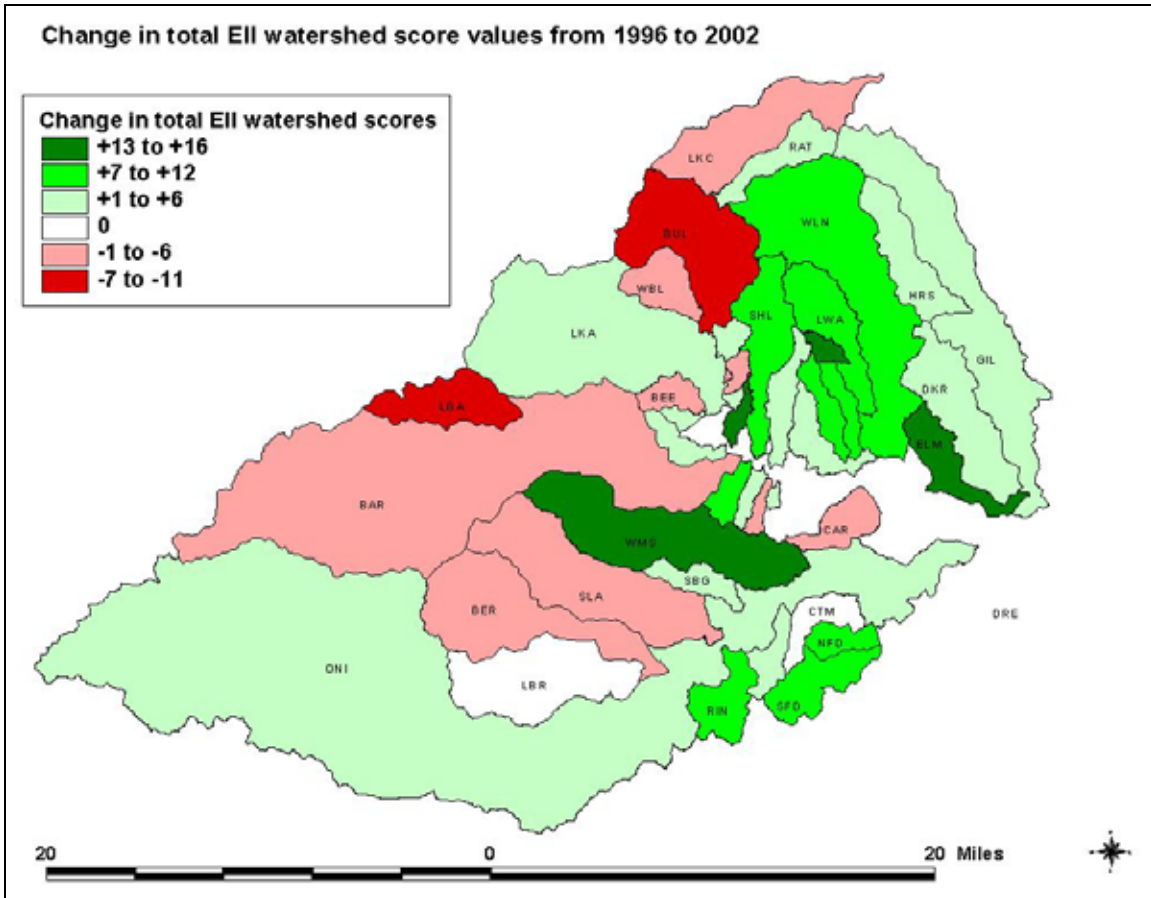


Figure 1. Change in total EII watershed score values from 1996 to 2002.

Total EII watershed scores yielded the most improvement in the north-central watersheds (bounded by Shoal Creek and Walnut Creek). Western watersheds (excluding Onion Creek and the Lake Austin tributaries) generally experienced the most degradation in total EII watershed scores, with Little Barton Creek and Bull Creek yielding the largest decrease from first round to second round sampling years.

The contact recreation sub-index followed a similar pattern with most improving scores concentrated in the north-central watersheds. Habitat and non-contact recreation generally improved in the southern watersheds. Though sediment quality sub-index scores improved in the majority of watersheds across the city, the worst degradation occurred in the Barton, Bull and Cottonmouth watersheds. Though the south-central watersheds (from West Bouldin to Blunn) decreased in water quality and habitat scores, the aquatic life sub-index actually improved.

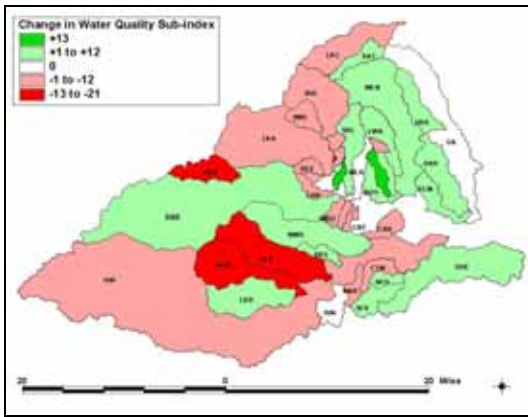


Figure 2. Water quality sub-index scores.

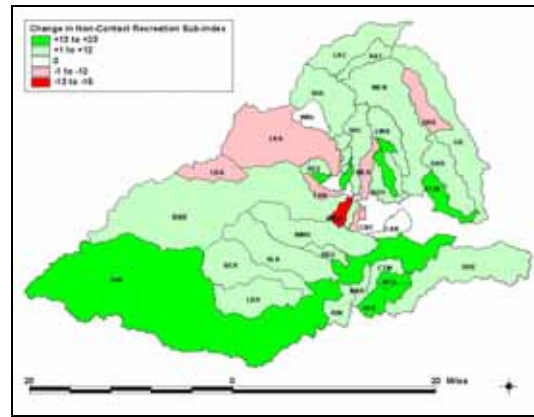


Figure 3. Non-contact recreation sub-index.

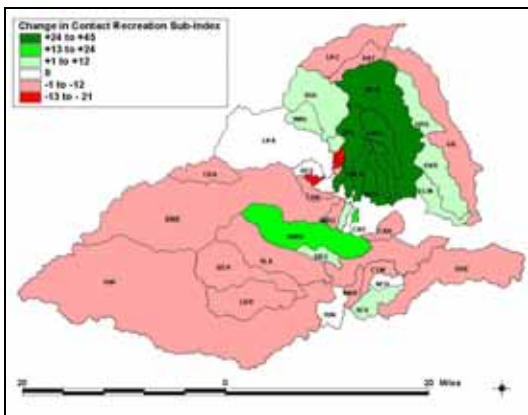


Figure 4. Contact recreation sub-index scores.

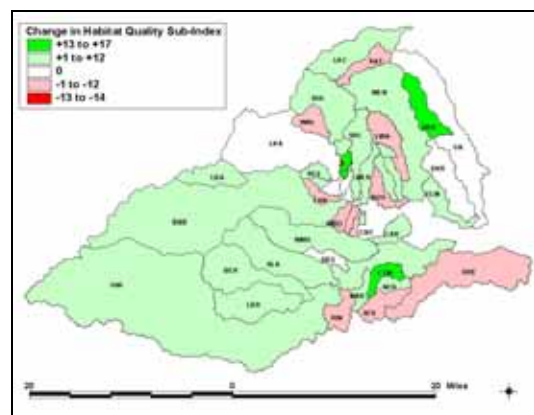


Figure 5. Habitat sub-index scores.

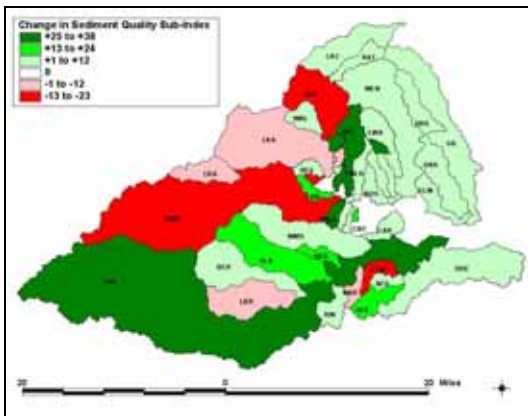


Figure 6. Sediment quality sub-index scores.

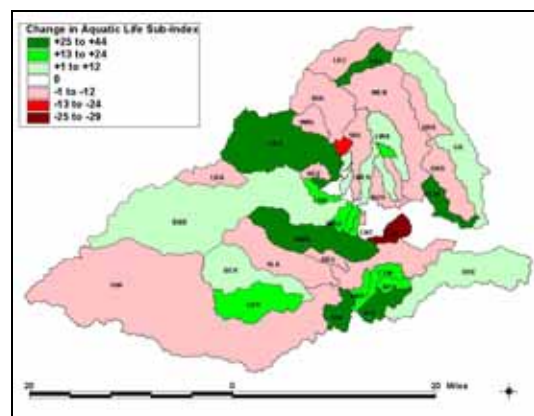


Figure 7. Aquatic life sub-index scores.

ANOVA was used to assess differences in mean watershed scores between first and second round sampling events. For all watersheds grouped together for analysis, the average total EII watershed score was not significantly different between first round and second round sampling events. Similarly, there was no statistically significant difference between first and second round scores for all watersheds in the aquatic life, water quality, or contact recreation sub-index scores.

However, significant city-wide improvement was observed in the sediment and non-contact recreation scores. The average second round sediment sub-index score of 82 was significantly greater than the first round average score of 73 points. The average non-contact recreation sub-index value significantly increased from 68 in the first round to 73 in the second round. Only the habitat (physical integrity) sub-index score significantly decreased from first to second round sampling events, with the average first round score of 59 sliding to 46 during the second round of sampling. However, most watersheds yielded slight improvements in habitat scores, and regression analysis yields conflicting results, most likely due to the highly variable sub-index values over time and the presence of both positive and negative outliers (Figure 8).

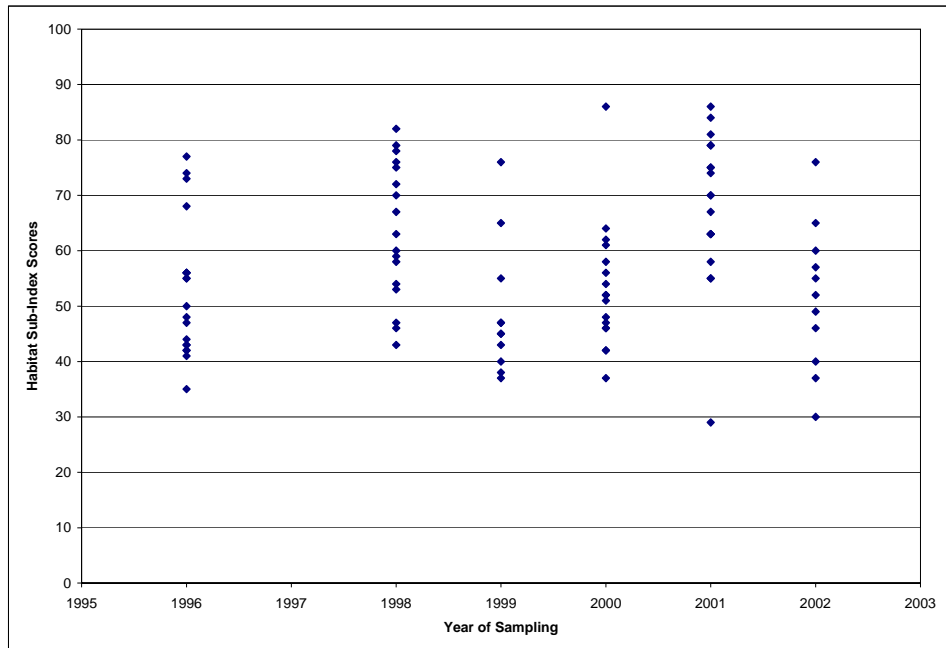


Figure 8. Habitat quality sub-index scores for all watersheds by sampling year.

Regression analysis of habitat sub-index scores city-wide yielded no statistically significant temporal trends, in contrast to ANOVA results that indicated a decline in habitat from first round to second round sampling years. Regression of individual components of the habitat sub-index over time yielded no statistically significant changes over time for any of the parameters except channel flow status, which increased slightly over time ($p = 0.03$, $r^2 = 0.05$).

Regression analyses of non-contact recreation sub-index scores yielded slight, though statistically significant ($p = 0.03$, $r^2 = 0.05$), city-wide increases over time. Analysis of the individual components of the non-contact recreation sub-index indicated no statistically significant change in clarity, percent algae cover, or surface appearance over time. However, the flow parameter ($p = 0.0034$, $r^2 = 0.09$) significantly increased over time and was most likely responsible for city-wide increases in non-contact recreation score. Although the litter parameter also improved over time, the temporal trend was non-significant ($p = 0.08$, $r^2 = 0.03$).

Regression analyses of water quality sub-index scores agree with ANOVA results that there is no statistically significant change over time in water quality sub-index values city-wide. Regression analyses on the EII scores of the individual components of the water quality sub-index also yield no change over time in conductivity, nitrate, and orthophosphorus scores city-wide. Fecal coliform scores, in agreement with general trends observed in the contact recreation sub-index

values, improved over time ($p = 0.01$, $r^2 = 0.08$). However, both ammonia ($p < 0.0001$, $r^2 = 0.41$) and TDS degraded over time city-wide ($p = 0.01$, $r^2 = 0.07$).

City-wide sediment quality sub-index scores are improving over time ($p = 0.0002$, $r^2 = 0.13$) in agreement with ANOVA results. Improvements in sediment scores are most likely driven by the statistically significant temporal improvements in several pesticide and metal components. The parameters 4-4'DDD ($p = 0.002$, $r^2 = 0.40$), 4-4'DDE ($p = 0.005$, $r^2 = 0.35$) and 4-4'DDT ($p = 0.001$, $r^2 = 0.43$) all yielded city-wide statistically significant improving temporal trends. Both cadmium ($p < 0.0001$, $r^2 = 0.17$) and zinc ($p = 0.0005$, $r^2 = 0.12$) also yielded significant improving temporal trends. All other components yielded no statistically significant change over time except mercury, the only parameter in sediment exhibiting degrading temporal trends ($p = 0.002$, $r^2 = 0.10$).

Regression of city-wide aquatic life sub-index scores over time yielded no statistically significant temporal change, and no significant change over time was observed in either benthic macroinvertebrate or diatom components.

Comparison to TCEQ Screening Criteria and Standards

EII water chemistry data were compared to applicable TCEQ screening levels and water quality standards not only to determine if any parameters demonstrate widespread impairment but also to identify which watersheds may be impaired according to TCEQ assessment procedures. City-wide, the most problematic EII water chemistry parameters are TDS, bacteria, and nitrate in terms of percentage exceedance of appropriate TCEQ screening criteria (Table 19). Both pH and water temperature rarely or never exceeded screening levels.

Table 19. Comparison of EII data from all watersheds and sampling years to TCEQ screening criteria, showing that the most problematic EII parameters are TDS, bacteria, and nitrate.

Parameter	# Samples	# Exceeds	% Exceeds
Ammonia as N	513	19	3.70
Dissolved Oxygen	373	12	3.22
Fecal Coliform Bacteria	476	142	29.83
Nitrate as N	547	46	8.41
Orthophosphorus as P (Total)	559	15	2.68
pH	651	9	1.38
TDS/Conductivity	768	321	41.80
Water Temperature	657	0	0.00

The percentage of TDS samples exceeding TCEQ screening levels or water quality standards was greater than or equal to 25% in 29 of the 46 assessed watersheds (Table 20). Bacteria samples exceeded the 25% level in 27 of the 46 watersheds. Nitrate samples exceeded the 25% level in only 6 of the 46 watersheds, and nitrate was the most problematic nutrient parameter city-wide in terms of exceedance of TCEQ screening levels. In 8 of 46 watersheds, 3 or more EII parameters had 25% of all samples exceeding the appropriate TCEQ screening criteria. Those watersheds are Dry Creek (North), East Bouldin Creek, Gilleland Creek, Johnson Creek, Little Bee Creek, Shoal Creek, Taylor Slough North, and Taylor Slough South. Flow effects may be the result of elevated percent exceedances, as several of these watersheds are small in drainage area and frequently dry. Gilleland Creek does receive treated wastewater effluent and has experienced nutrient problems from municipal discharge in the past.

Table 20. Comparison of EII data from specific watersheds for all sampling years to TCEQ screening criteria. Parameters with > 25% of samples exceeding criteria are highlighted in red.

EII Watershed	NH ₃	DO	Fecals	NO ₃	OP	pH	TDS	Temp.
Barton Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bear Creek	0.00	0.00	29.41	0.00	0.00	0.00	39.13	0.00
Bee Creek	16.67	0.00	8.33	0.00	0.00	0.00	100.00	0.00
Blunn Creek	0.00	0.00	71.43	0.00	0.00	23.08	88.24	0.00
Boggy Creek	0.00	8.33	71.43	0.00	0.00	0.00	35.29	0.00
Bull Creek	0.00	0.00	5.00	0.00	0.00	0.00	83.33	0.00
Buttermilk Branch	0.00	0.00	83.33	11.11	0.00	0.00	18.75	0.00
Carson Creek	0.00	0.00	0.00	0.00	0.00	7.69	7.69	0.00
Cottonmouth Creek	0.00	0.00	33.33	0.00	0.00	0.00	71.43	0.00
Country Club Creek	0.00	0.00	0.00	0.00	0.00	0.00	75.00	0.00
Decker Creek	0.00	0.00	16.67	0.00	0.00	0.00	33.33	0.00
Dry Creek (East)	0.00	14.29	18.75	0.00	0.00	0.00	42.86	0.00
Dry Creek (North)	0.00	0.00	50.00	36.36	0.00	0.00	100.00	0.00
Eanes	0.00	0.00	50.00	0.00	0.00	0.00	100.00	0.00
East Bouldin Creek	4.55	0.00	89.47	22.22	0.00	25.00	48.39	0.00
Elm Creek	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
Fort Branch	0.00	18.75	35.00	0.00	3.85	0.00	31.25	0.00
Gilleland Creek	3.85	0.00	7.69	61.54	38.46	0.00	80.00	0.00
Harper's Branch	16.67	0.00	66.67	0.00	0.00	0.00	85.71	0.00
Harris Branch	7.69	0.00	16.67	46.15	15.38	0.00	66.67	0.00
Huck's Slough	0.00	0.00	33.33	0.00	0.00	0.00	100.00	0.00
Johnson Creek	33.33	0.00	100.00	0.00	0.00	0.00	85.71	0.00
Lake Austin	0.00	16.67	4.76	0.00	0.00	0.00	73.33	0.00
Lake Creek	0.00	0.00	5.56	18.18	4.35	0.00	0.00	0.00
Little Barton Creek	0.00	25.00	8.33	0.00	0.00	0.00	0.00	0.00
Little Bear Creek	0.00	0.00	42.86	0.00	0.00	0.00	0.00	0.00
Little Bee Creek	0.00	0.00	50.00	25.00	0.00	0.00	83.33	0.00
Little Walnut Creek	12.50	0.00	62.50	0.00	0.00	0.00	0.00	0.00
Marble Creek	0.00	0.00	33.33	66.67	0.00	0.00	0.00	0.00
North Fork Dry Creek	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
Onion Creek	0.00	5.88	21.21	0.00	0.00	0.00	0.00	0.00
Rattan Creek	0.00	0.00	33.33	12.50	0.00	0.00	0.00	0.00
Rinard Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shoal Creek	31.82	12.50	50.00	3.85	0.00	0.00	62.50	0.00
Slaughter Creek	0.00	0.00	16.67	0.00	0.00	0.00	57.89	0.00
South Boggy Creek	0.00	0.00	40.00	0.00	0.00	0.00	23.08	0.00
South Fork Dry Creek	28.57	0.00	57.14	0.00	0.00	0.00	0.00	0.00
Tannehill Branch	0.00	0.00	71.43	0.00	0.00	0.00	6.25	0.00
Taylor Slough (North)	33.33	0.00	33.33	0.00	0.00	0.00	75.00	0.00
Taylor Slough (South)	0.00	0.00	66.67	50.00	0.00	0.00	80.00	0.00
Waller Creek	0.00	0.00	75.00	0.00	0.00	0.00	70.59	0.00
Walnut Creek	0.00	0.00	45.45	0.00	5.88	0.00	4.00	5.00
West Bouldin Creek	0.00	0.00	50.00	0.00	0.00	9.09	91.67	0.00
West Bull Creek	0.00	0.00	7.14	0.00	0.00	0.00	65.00	0.00
West Country Club Creek	0.00	0.00	100.00	0.00	0.00	0.00	11.11	0.00
Williamson Creek	0.00	6.25	15.38	0.00	0.00	0.00	20.83	0.00

Conclusions

Huck's Slough watershed degraded the most in terms of relative rankings with other watersheds, dropping more ranks than any other watershed in three sub-indices (water, contact recreation, and habitat) and also in total EII watershed score ranking. Ranking of sediment quality sub-index scores fell in nearly all phase III watersheds, although total EII watershed scores declined in more phase II watersheds.

More than 75% of all watersheds studied did not meet the Masterplan-related objectives specified in the EII Sampling and Analysis Plan for the total EII watershed score. Comparison of sub-index score changes to objectives yielded fewer than 10% of all watersheds that met objectives for the aquatic life and water quality sub-indices.

The change in total EII watershed scores values improved for 72% of all, with an average change in total score from first round to second round sampling of +3 points. The only sub-index that yielded a negative average change city-wide from first round to second round scores was the water quality sub-index, which exhibited an average change per watershed of -1.1 points. **There were no substantial decreases (decreases >12.5 points, as defined in the Business Plan) in total EII watershed score values in any watershed.** The maximum decrease in total EII watershed score was -11 points, measured in the Bull Creek watershed. The decrease in Bull Creek was the result of decreasing water quality, sediment, aquatic life, and habitat quality sub-index scores. Analysis of individual site total EII scores yielded six sites with substantially decreasing total EII site score values, in the Little Barton Creek, Harper's Branch, Decker, Cottonmouth, Dry, and Bull Creek watersheds. However, there were 5 substantial increases in total EII watershed score values, observed in the Buttermilk, East Country Club, Elm, Johnson, and Williamson watersheds.

Total EII watershed scores yielded the most improvement in the north-central watersheds (bounded by Shoal Creek and Walnut Creek). Western watersheds (excluding Onion Creek and the Lake Austin tributaries) generally had the most degradation in total EII watershed scores, with Little Barton Creek and Bull Creek yielding the largest decrease from first round to second round sampling years.

EII sediment sub-index scores are improving over time due to decreasing levels of several pesticide and metal contaminants. Mercury in sediment was the only component that appeared to be increasing in concentration city-wide over time. Although no statistically significant city-wide change in water quality sub-index scores was observed over time, both the ammonia and TSS components yielded significantly increasing temporal trends in concentrations for all watersheds combined. Fecal coliform bacteria levels, however, may be improving over time city-wide. The non-contact recreation sub-index, potentially driven by the significantly increasing component flow, was improving over time city-wide. No temporal changes were evident in other sub-indices when all watersheds were assessed as a single unit.

Citywide, the most problematic EII water chemistry parameters are TDS, bacteria, and nitrate in terms of percentage exceedance of appropriate TCEQ screening criteria. Only bacteria and TDS, however, exceeded standards at a level that would cause concern according to TCEQ assessment procedures. Temperature, DO, pH, orthophosphorus, and ammonia rarely exceeded applicable standards or screening levels.