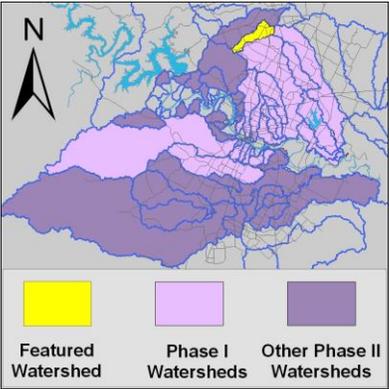


Rattan Creek Watershed

Summary Sheet

Catchment	Total area	7.2 sq. miles					
	Area in recharge	7 sq. miles					
	Creek length	8 miles					
	Receiving water	Lake Creek					
Demographics	2000 population	11,863					
	2030 projected population	33,506					
	30 year projected % increase	182					
Land Use	Impervious cover (2003 estimate)	10.1 %					
	Impervious cover (2013 estimate)	20.6 %					
Overall EII Scores	2001	69	49	54	52	44	59



Flow Regime* for Sample Sites on Rattan Creek

Site	Site Name	1999		2001				2004				2007				2010				2011		2012				2014							
		Jan	Jan	Mar	Mar	Jun	Sep	Dec	Mar	May	Jun	Oct	Dec	Feb	May	Jun	Sep	Dec	Mar	May	May	Oct	Dec	Mar	Apr	May	Jul	Sep	Jan	Apr	Jun	Jul	Sep
		WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ
1009	us Parmer	n	n	B	B	B	B	B	B	B	B	B	B	n	B	n	n	B	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
1097	Shadowbrook	B	B	B	B	B	B	B	n	n	B	B	B	B	B	n	n	n	n	n	n	B	n	n	n	n	n	n	n	n	n	n	n

* B = baseflow n = no flow S = storm flow blue = Samples were taken light blue = Samples were not taken blank = not visited

Index scores* for Rattan Creek Sites by Year

Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
RAT1	1097	Rattan Creek @ Shadowbrook Circle	1998	50	78	84	59	68	56	60	52	66
RAT2	1009	Rattan Creek US of Parmer Lane	1998	75	78	75	62	59				58
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2001	50	90	74	73	63	59	60	58	65
RAT2	1009	Rattan Creek US of Parmer Lane	2001	51	90	84	73	46	69	75	63	67
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2004	56	82	32	71	53				49
RAT2	1009	Rattan Creek US of Parmer Lane	2004	64	82	37	53	50				48
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2007	69	76	74	51	30				50
RAT2	1009	Rattan Creek US of Parmer Lane	2007	49	76	50	62	41	61	61		57
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2010	68		48	47	57				44
RAT2	1009	Rattan Creek US of Parmer Lane	2010	62		50	52	64	67	67		59
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2012					48				16
RAT2	1009	Rattan Creek US of Parmer Lane	2012				65	74	78	63	92	72
RAT1	1097	Rattan Creek @ Shadowbrook Circle	2014		67		61	30	38	34	42	49
RAT2	1009	Rattan Creek US of Parmer Lane	2014		67		84	64	56	56	55	68

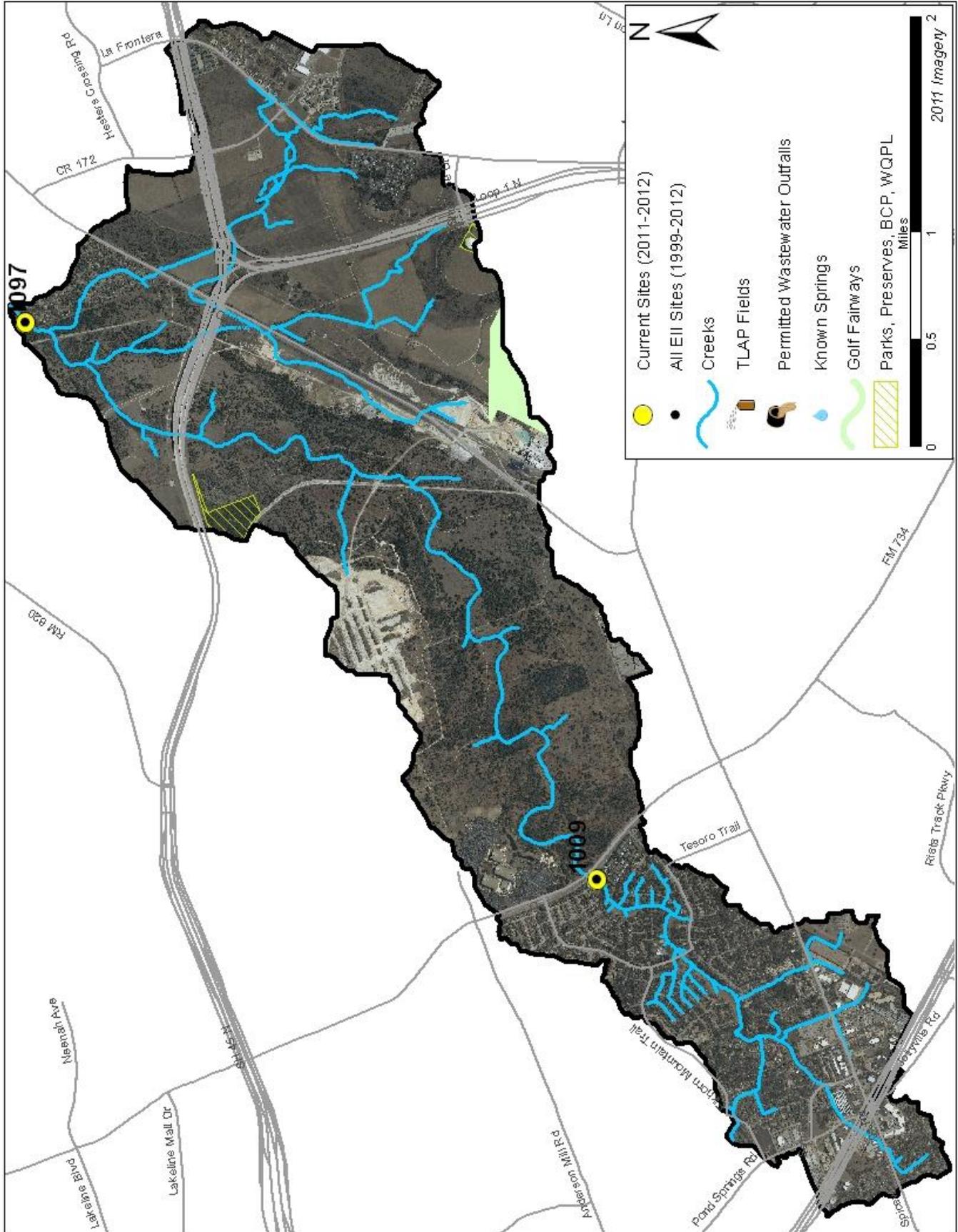
* blank cells indicate parameter was not collected, blank row indicate site was dropped

**sediment samples only collected at the downstream site

100-87.5 Excellent 87.5-75 V. Good 75-62.5 Good 62.5-50 Fair 50-37.5 Marginal 37.5-25 Poor 25-12.5 Bad 12.5-0 V. Bad

Rattan Creek Watershed

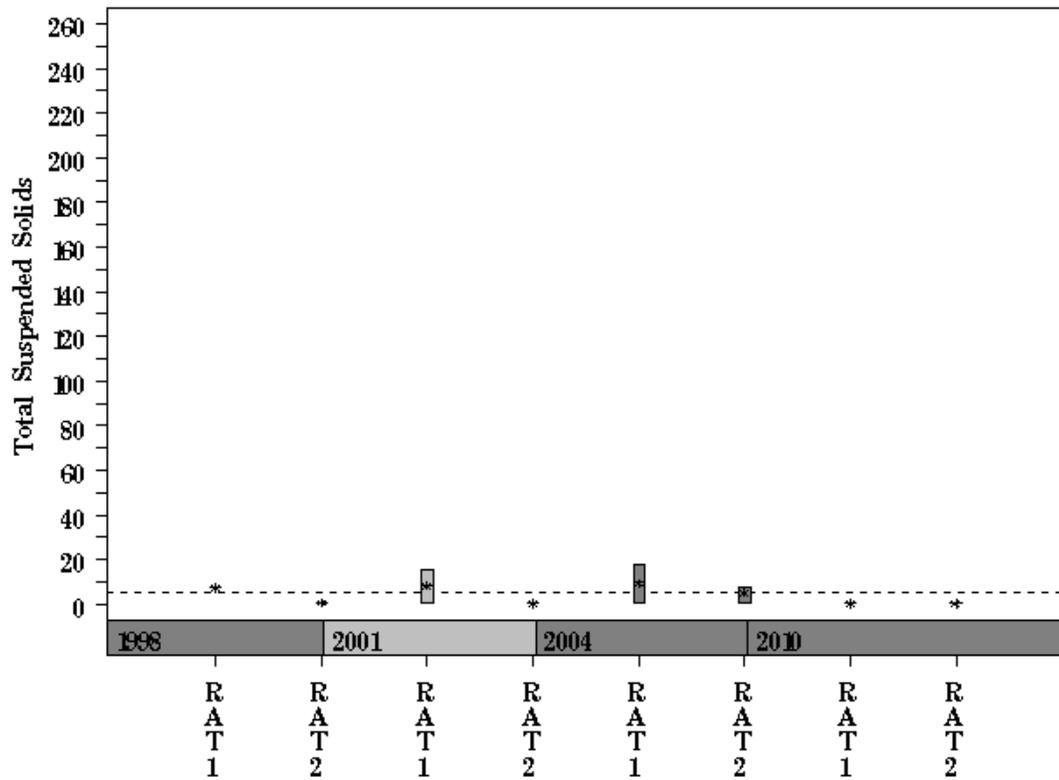
Aerial Map



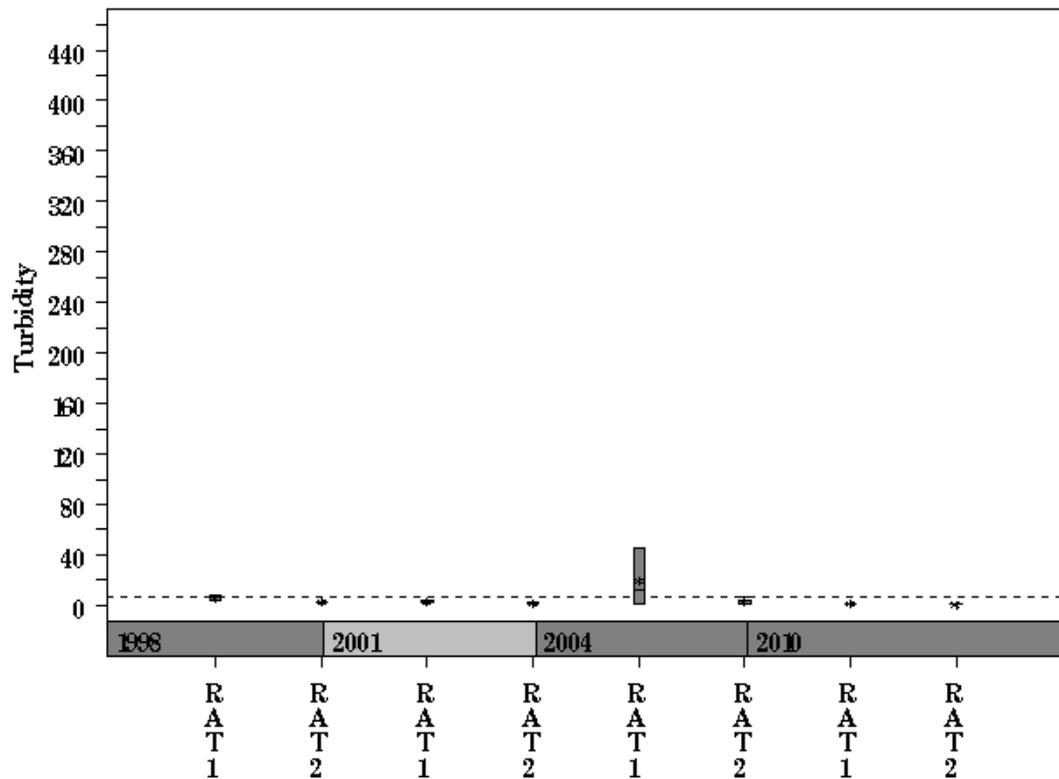
Rattan Creek Watershed

Data Summary Graphs – Total Suspended Solids and Turbidity (Downstream to Upstream by Year)

Parameter= TOTAL SUSPENDED SOLIDS Unit= mg/L Watershed= Rattan

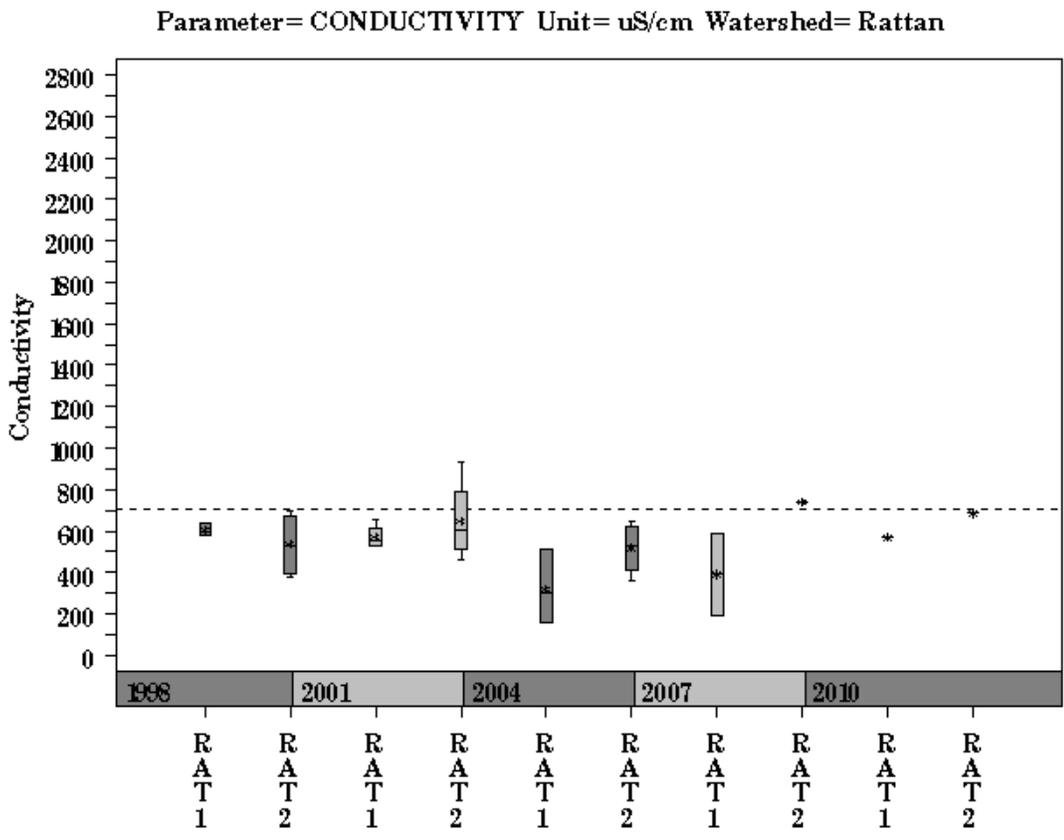
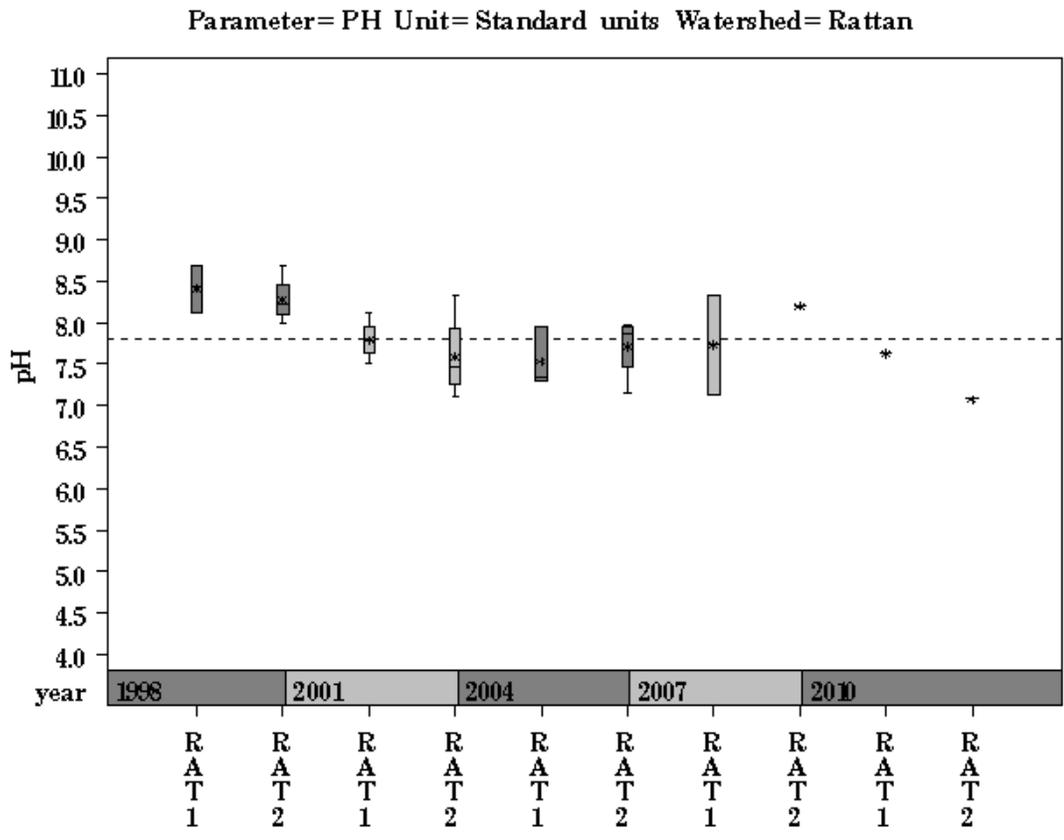


Parameter= TURBIDITY Unit= NTU Watershed= Rattan



Rattan Creek Watershed

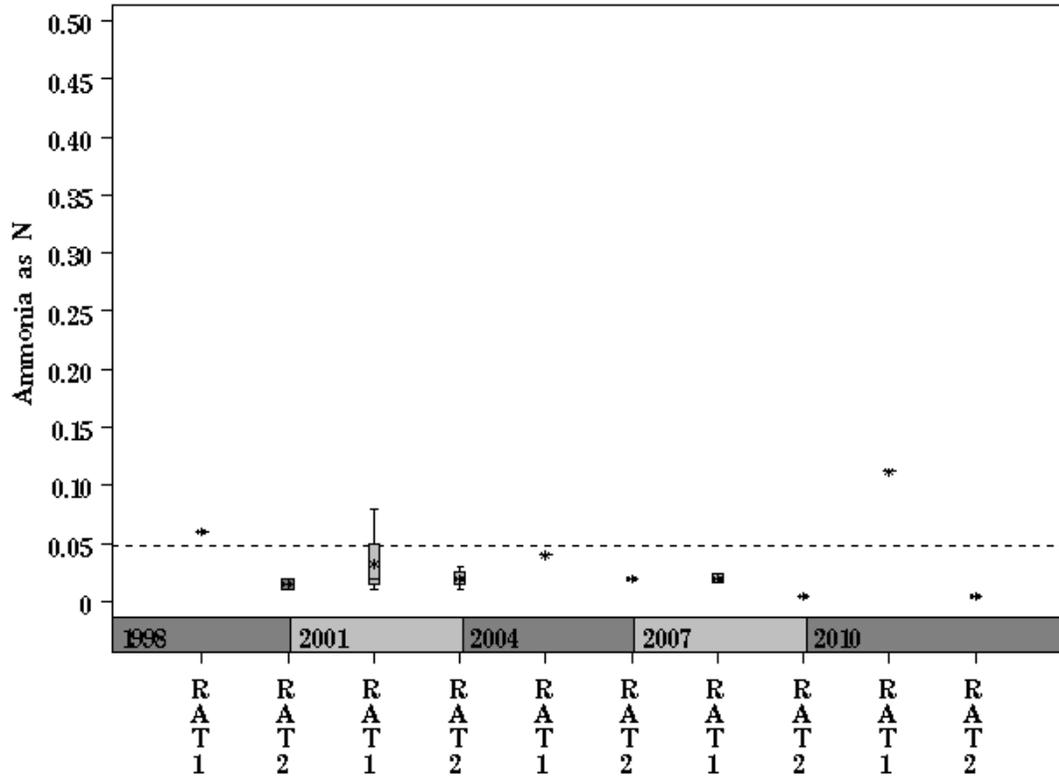
Data Summary Graphs – pH and Conductivity (Downstream to Upstream by Year)



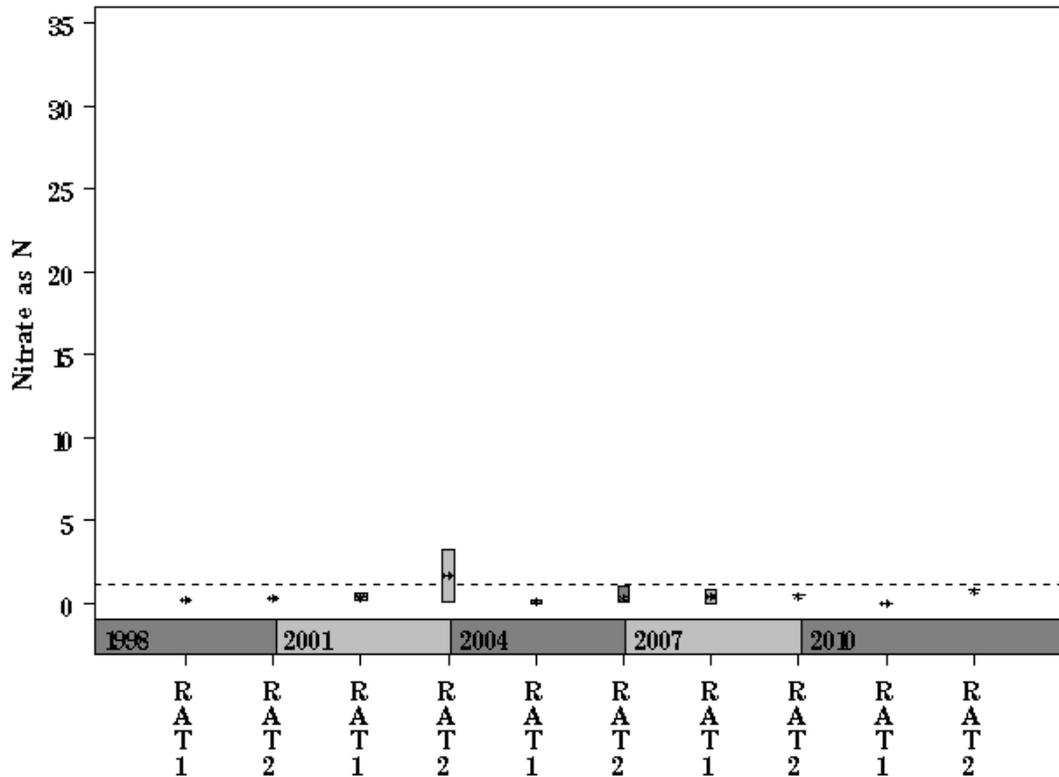
Rattan Creek Watershed

Data Summary Graphs – Ammonia and Nitrate/Nitrite (Downstream to Upstream by Year)

Parameter= AMMONIA AS N Unit= mg/L Watershed= Rattan



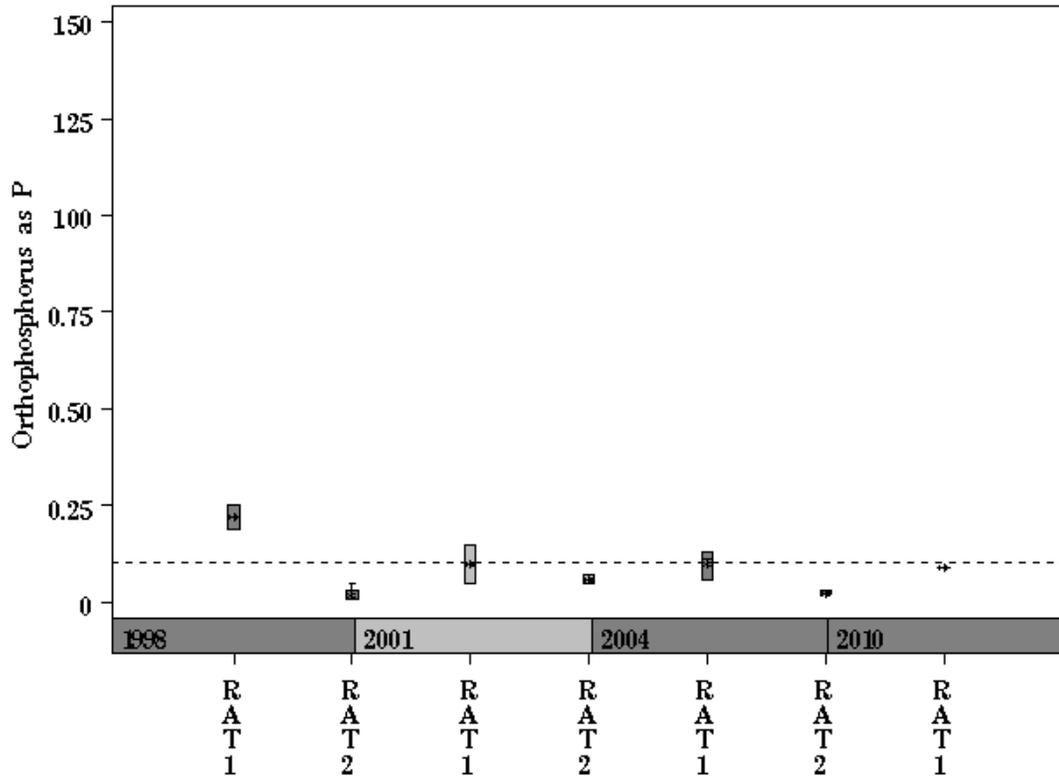
Parameter= NITRATE AS N Unit= mg/L Watershed= Rattan



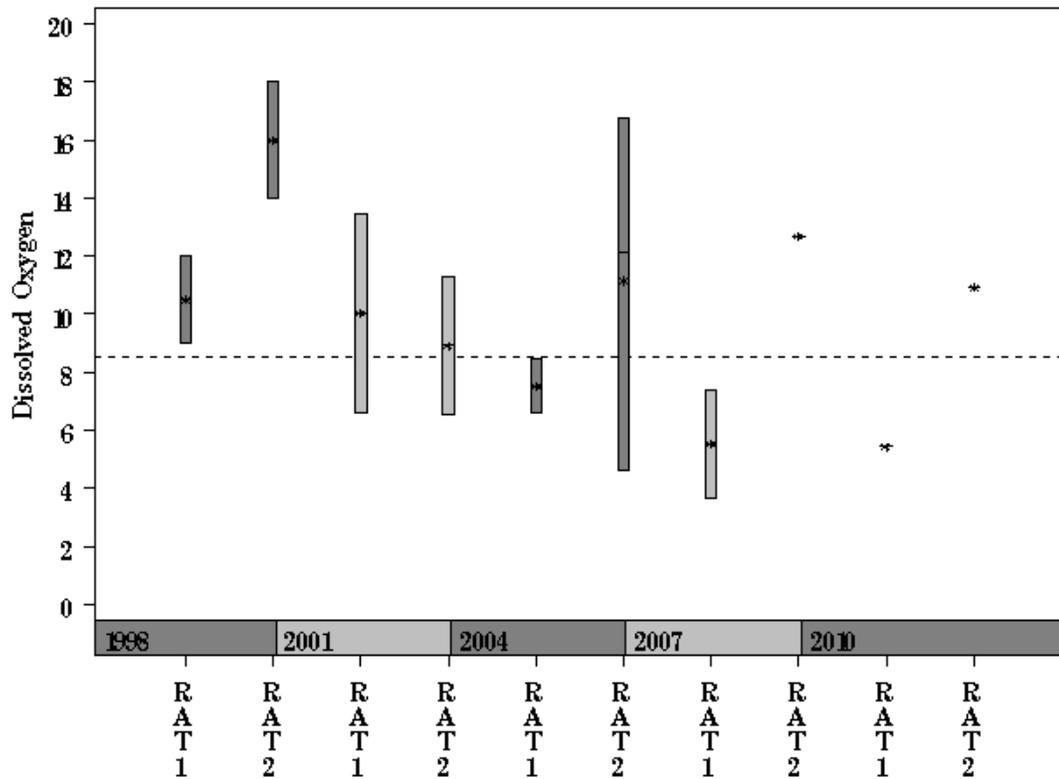
Rattan Creek Watershed

Data Summary Graphs – Orthophosphate and Dissolved Oxygen (Downstream to Upstream by Year)

Parameter= ORTHOPHOSPHORUS AS P Unit= mg/L Watershed= Rattan

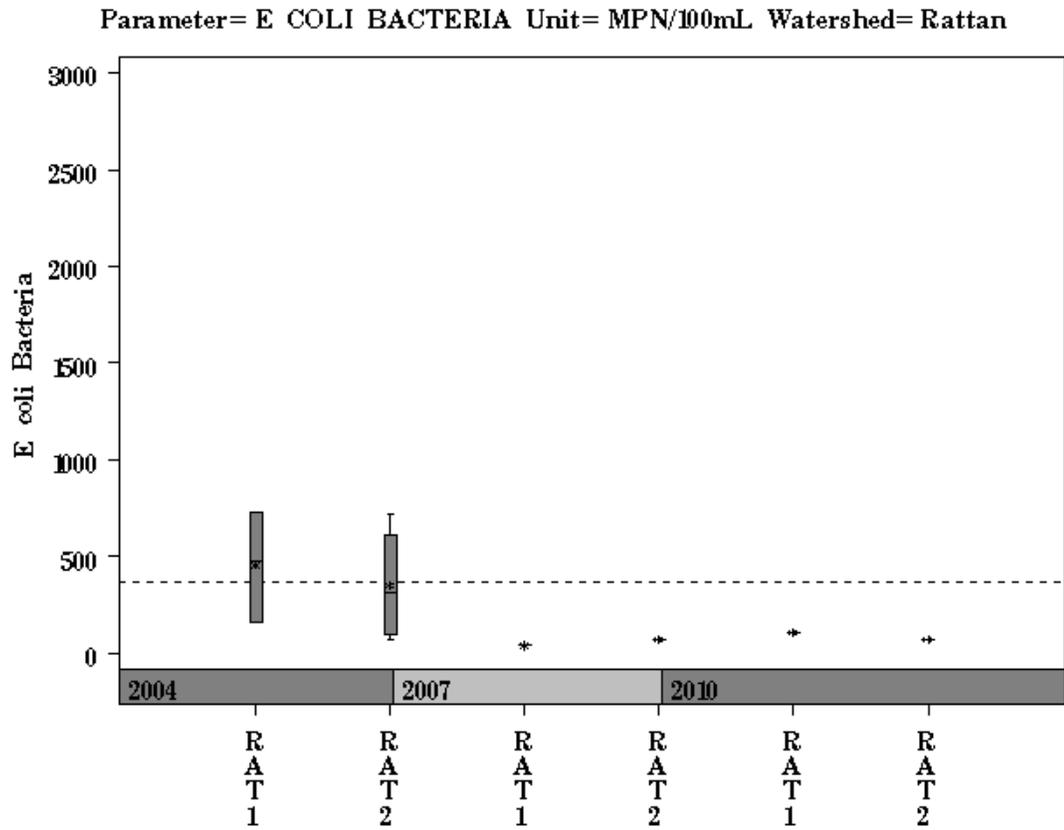


Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Rattan



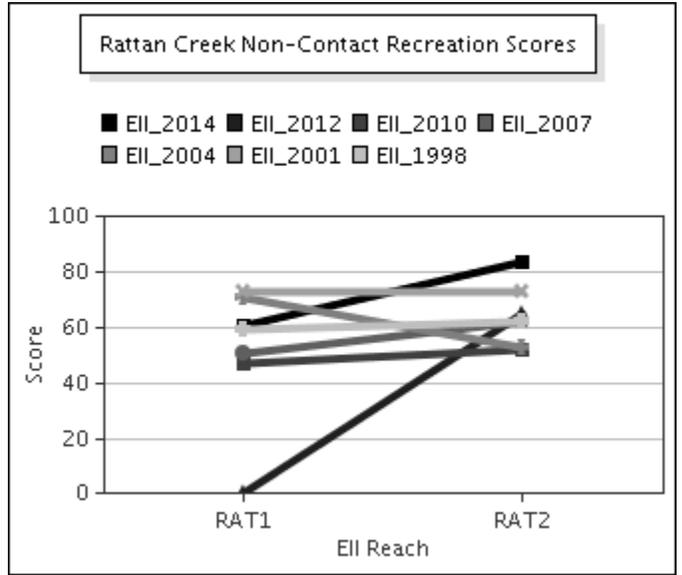
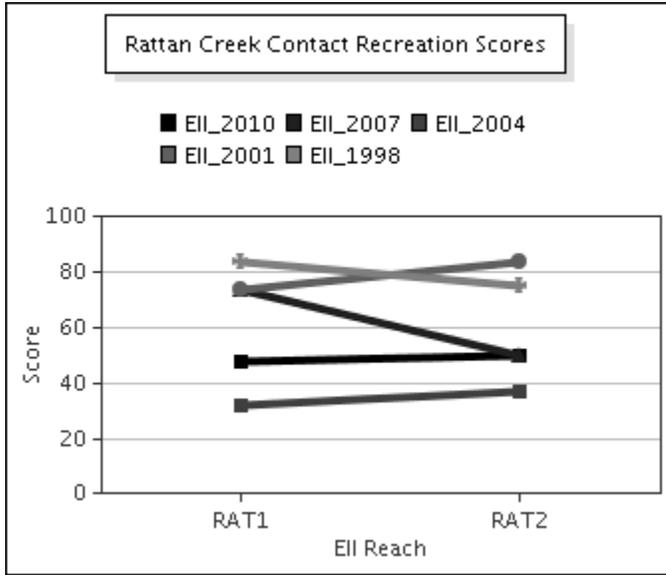
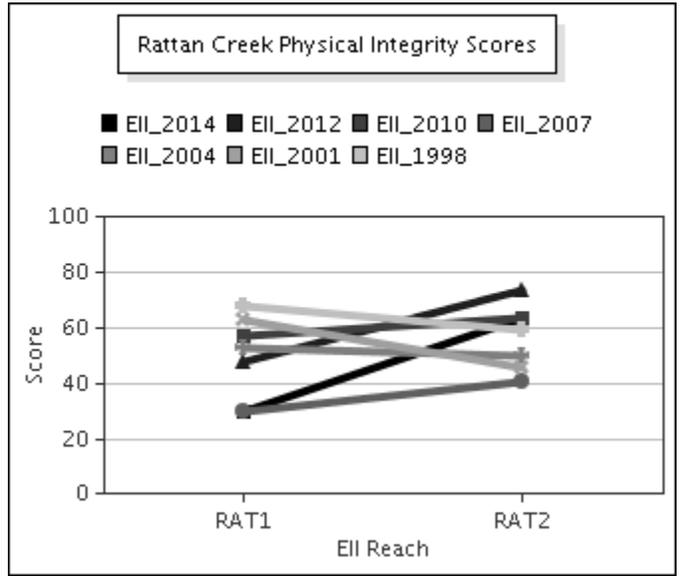
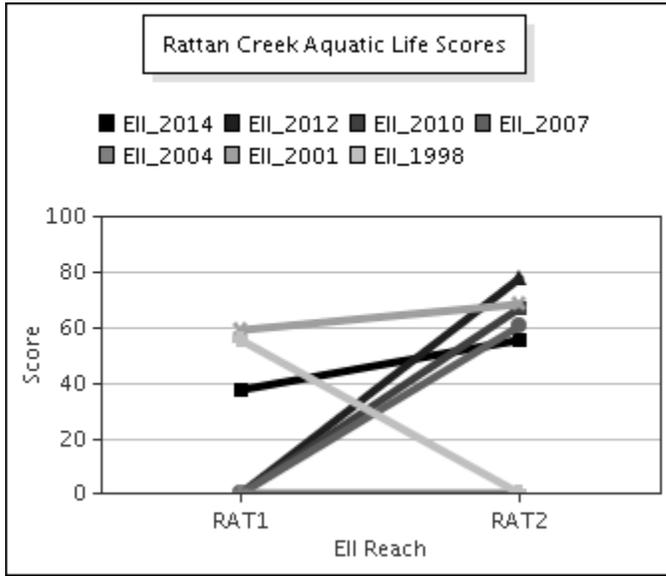
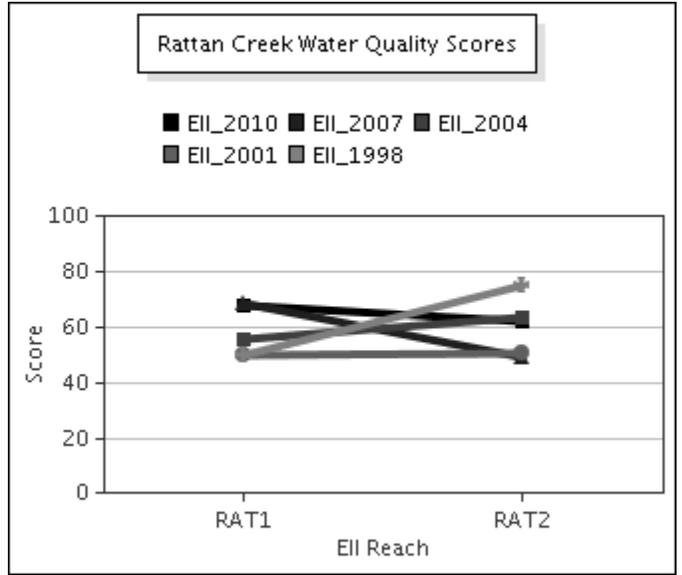
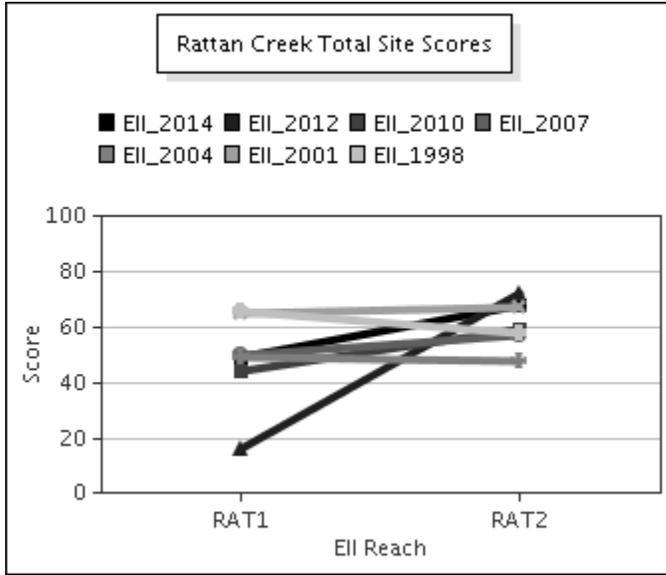
Rattan Creek Watershed

Data Summary Graphs – *E.coli* (Downstream to Upstream by Year)



Rattan Creek Watershed

Score Summary – Reach scores for each sample year



Rattan Creek Watershed

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2014 Sample Sites (Downstream to Upstream)

Benthic Macroinvertebrate ID	PTI	FFG	Rattan @ Shadowbrook Cir (Site 1097)	Rattan us Parmer Ln (Site 1009)
<i>Callibaetis</i> sp.	4	CG		7
Copepoda	4	SC		3
Ostracoda	4	FC,CG	10	1
<i>Buena</i> sp.	5	P	1	1
<i>Eretes</i> sp.	5	P	1	
<i>Neobidessus</i> sp.	5	P		7
<i>Notonecta</i> sp.	5	P	2	
<i>Paracymus</i> sp.	5	CG		2
<i>Sphaerium</i> sp.	5	FC		1
<i>Thermonectus</i> sp.	5	P	2	
<i>Atrichopogon</i> sp.	6	P		1
<i>Cheumatopsyche</i> sp.	6	FC	1	
Chironomidae	6	P,FC	10	5
<i>Fossaria</i> sp.	6	SC	1	46
Hydracarina	6			1
<i>Microvelia</i> sp.	6	P	1	20
<i>Bezzia</i> sp. / <i>Palpomyia</i> sp.	7	P,CG		2
<i>Gyraulus</i> sp.	7	SC		1
<i>Helophorus</i> sp.	7.9	SH		3
<i>Aedes</i> sp.	8			12
Cladocera	8	FC		9
Hirudinea	8	P		2
<i>Hyalella</i> sp.	8	SH,CG		4
Oligochaeta	8	CG	4	7
<i>Psorophora</i> sp.	8	FC		2
<i>Berosus</i> sp.	9	CG		2
Corixidae	9	P,CG	1	
<i>Physella</i> sp.	9	SC		43
<i>Laccophilus</i> sp.	10	P	13	7
<i>Tropisternus</i> sp.	10	P	2	
<i>Micrathyrta hagenii</i>		P		2

Rattan Creek Watershed

Benthic Macroinvertebrates – Metric Summary for 2014 Sample Sites (Downstream to Upstream)

Scoring Metric	Rattan @ Shadowbrook Cir (Site 1097)	Rattan us Parmer Ln (Site 1009)
Number of Taxa *	13	24
Hilsenhoff Biotic Index *	6.9	7.1
Number of Ephemeroptera Taxa *	0	1
Percent of Total as Chironomidae *	20	3
Number of EPT Taxa *	1	1
Percent of Total as EPT *	2	4
Percent of Total as Predator *	67	25
Number of Intolerant Taxa *	1	3
Percent Dominance (Top 3 Taxa) *	67	57
EPT / EPT + Chironomidae	0	1
Number of Diptera Taxa	1	5
Number of Non-Insect Taxa	3	10
Number of Organisms	49	190
Percent Dominance (Top 1 Taxa)	27	24
Percent of Total as Collector / Gatherer	31	13
Percent of Total as Dominant Guild (FFG)	67	49
Percent of Total as Elmidae	0	0
Percent of Total as Filterers	43	9
Percent of Total as Grazers (PI & SC)	2	49
Percent of Total as Tolerant Organisms	33	27
Percent of Trichoptera as Hydropsychidae	100	0
Ratio of Intolerant : Tolerant Organisms	0.48	0.12
TCEQ Qualitative Aquatic Life Use Score	17	29
TCEQ Quantitative Aquatic Life Use Score	21	19

* **EII scoring parameter: Nine metric parameters are used in the calculation of the EII Benthic Subindex score. Other metrics are shown to supplement evaluation.**

1. # of Taxa: Higher diversity (number of taxa) correlates with greater biological integrity. The average number of taxa per site for 2013/2014 samples was 15; the lowest value was 5 and the highest value was 30.
2. Hilsenhoff Biotic Index (HBI): HBI values range from 0 to 10. Low HBI values reflect a higher abundance of taxa that are sensitive to organic (nutrient) pollution, thus a lower level of this type of pollution. The average HBI per site for 2013/2014 samples was 5.4; the lowest value was 3.7 and the highest value was 8.1.
3. # of Ephemeroptera taxa: A higher number of Ephemeroptera (mayfly) taxa correlates with greater biological integrity. The average number of taxa per site for 2013/2014 samples was 2; the lowest value was 0 and the highest value was 7.
4. % of total as Chironomidae: The percentage of the sample represented by the Dipteran family Chironomidae will increase with a decrease in biological integrity. The average percent Chironomidae per site for 2013/2014 samples was 16%; the lowest value was 0% and the highest value was 77%.
5. # of EPT Taxa: A higher number of Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) taxa correlates with greater biological integrity. The average number of EPT taxa per site for 2013/2014 samples was 4; the lowest value was 0 and the highest value was 12.
6. % of total as EPT: The percentage of the sample represented by the insect orders Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) will decrease with a decrease in biological integrity. The average percent EPT taxa per site for 2013/2014 samples was 46%; the lowest value was 0% and the highest value was 89%.
7. % of total as Predator: The percentage of the sample represented by predators is variable with regard to biological integrity. The average percent predator per site for 2013/2014 samples was 31%; the lowest value was 3% and the highest value was 82%.
8. # of Intolerant Taxa: A higher number of pollution intolerant taxa correlates with greater biological integrity. The average number of intolerant taxa per site for 2013/2014 samples was 5; the lowest value was 0 and the highest value was 15.
9. % Dominance (top 3 taxa): The percentage of the sample represented by the three most abundant taxa will increase with a decrease in biological integrity. The average percent of sample dominated by the top three taxa per site for 2013/2014 samples was 72%; the lowest value was 39% and the highest value was 96%.

Rattan Creek Watershed

Diatoms – Taxa List & Pollution Tolerance Index for 2014 Sample Sites (Downstream to Upstream)

Diatom Species Name	PTI	Rattan @ Shadowbrook Cir (Site 1097)	Rattan us Parmer Ln (Site 1009)
<i>Amphora inariensis</i>	4		4
<i>Pinnularia acrosphaeria</i>	4		1
<i>Pinnularia interrupta</i>	4	8	
<i>Aulacoseira granulata</i>	3	5	3
<i>Caloneis bacillum</i>	3	10	3
<i>Cocconeis pediculus</i>	3		4
<i>Denticula kuetzingii</i>	3		4
<i>Encyonema silesiacum</i>	3		2
<i>Gomphonema affine</i>	3	17	39
<i>Gomphonema clavatum</i>	3	23	
<i>Gomphonema truncatum</i>	3	1	
<i>Hantzschia amphioxys</i>	3	1	2
<i>Pinnularia gibba</i>	3	7	2
<i>Pinnularia microstauron</i>	3	3	
<i>Reimeria sinuata</i>	3	2	4
<i>Rhoicosphenia abbreviata</i>	3	2	
<i>Rhopalodia gibba</i>	3		6
<i>Achnantheiopsis lanceolata</i>	2	2	2
<i>Eolimna subminuscula</i>	2		2
<i>Fragilaria vaucheriae</i>	2	1	
<i>Gomphonema angustatum</i>	2	3	
<i>Luticola mutica</i>	2	4	1
<i>Navicula recens</i>	2	7	1
<i>Navicula trivialis</i>	2	2	
<i>Nitzschia amphibia</i>	2	200	229
<i>Sellaphora laevissima</i>	2	170	
<i>Tryblionella apiculata</i>	2		1
<i>Gomphonema parvulum</i>	1	4	31
<i>Amphora copulata</i>			1
<i>Aulacoseira crassipunctata</i>			4
<i>Cocconeis placentula</i> var. <i>euglypta</i>		7	3
<i>Cocconeis placentula</i> var. <i>placentula</i>		3	
<i>Craticula ambigua</i>		5	
<i>Delicata delicatula</i>		1	2
<i>Gomphonema lagenula</i>		1	
<i>Gomphonema mclaughlinii</i>			2
<i>Navicula lanceolata</i>		11	2
<i>Ulnaria ulna</i>			145

Rattan Creek Watershed

Diatoms – Metric Summary for 2014 Sample Sites (Downstream to Upstream)

Scoring Metric	Rattan @ Shadowbrook Cir (Site 1097)	Rattan us Parmer Ln (Site 1009)
<i>Cymbella</i> Richness	1	2
Number of organisms	500	500
Number of taxa	26	26
Percent motile taxa	77	47
Percent similarity to reference condition	8	16
Pollution tolerance index	2.18	2.14

* **EII scoring parameter: Four metric parameters are used in the calculation of the EII Diatom Subindex score: *Cymbella* richness, percent motile taxa, percent similarity to reference condition and pollution tolerance index. Number of taxa is non-scoring, but is shown to supplement evaluation. The number of organisms is typically a sample of 500, but occasionally differs due to sample conditions.**

1. *Cymbella* Richness: The Cymbelloid taxa include species in the genus *Cymbella*, in addition to some species belonging to the genera *Cymbellopsis*, *Cymbopleura*, *Encyonema*, *Encyonemopsis*, *Navicymbula* and *Reimeria*. Their presence highlights the presence of sensitive species, especially with regard to impervious cover, and this value increases with an increase in overall water quality. The average number of Cymbelloid taxa per site for 2013/2014 samples was 3; the lowest value was 0 and the highest value was 7.
2. % Motile Taxa: This is a siltation index showing the relative abundance of genera that are able to move towards the surface if covered by silt. A higher percentage is indicative of a degraded condition caused by increased silt pollution. The average percent motile taxa per site for 2013/2014 samples was 16%; the lowest value was 0% and the highest value was 77%.
3. % similarity to reference condition: This percentage compares a site to reference sites that are selected based on having low percent impervious cover. A higher percentage reflects greater biological integrity. The average percent similarity per site for 2013/2014 samples was 31%; the lowest value was 6% and the highest value was 57%.
4. Pollution Tolerance Index (PTI): This is a total value for a sample, which is a function of the abundance of each taxon (usually species) in a sample and the individual PTI's for each of those taxa. Individual PTI's for each taxon range from 1 (most pollution tolerant) to 4 (most pollution sensitive), thus higher total PTI's for a site reflect greater biological integrity. The average PTI per site for 2013/2014 samples was 2.76; the lowest value was 1.70 and the highest value was 3.45.

Rattan Creek Watershed

Site Photographs



1009_us_06_19_2007



1009_ur_06_19_2007



1009_00-ds-05_24_2010



1009_00-ur-05_24_2010



1009_00-us-05_24_2010



1009_00-us-05_17_2010

Rattan Creek Watershed

Site Photographs



1097_us_06_19_2007



1097_ds_06_19_2007



1097_pool_06_19_2007



1097_ur_06_19_2007



1097_00-us-05_24_2010



1097_00-ds-05_24_2010

This page left intentionally blank