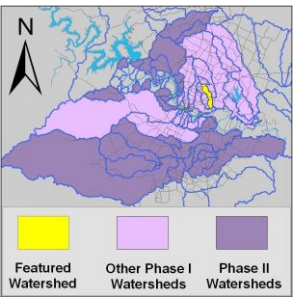


Fort Branch Watershed

Summary Sheet

Catchment	Total area	3 square miles				
	Area in recharge	none				
	Creek length	6 miles				
Demographics	Receiving water	Boggy Creek				
	2000 population	16,796				
	2030 projected population	19,659				
Land Use	30 year projected % increase	17 %				
	Impervious cover (2003 estimate)	38.2 %				
	Impervious cover (2013 estimate)	38.9 %				
Overall EII Scores	2000	2003	2006	2009	2011	2013
	60	55	52	47	43	50



Flow Regime* for Sample Sites on Fort Branch Upstream to Downstream

Site	Site Name	2001		2003					2006					2009					2010			2011					2013					
		Feb WQ	Feb Bio	Feb WQ	Mar WQ	Mar Bio	May WQ	Sep WQ	Dec WQ	Feb WQ	May WQ	Jul Bio	Aug WQ	Nov WQ	Feb WQ	May WQ	Jun Bio	Oct WQ	Dec WQ	Dec WQ	Mar WQ	Jun WQ	Jun Bio	Sep WQ	Jan WQ	Apr WQ	May Bio	Jun WQ	Jun Bio	Jun WQ	Jun Bio	Jun WQ
126	Glencrest	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n	B	B	B	B	n	n	n	B	B	B	B		n		
125	us Manor	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n	n	n	n	n	n	n	B	n	n	n	n	n	n	n	n	
898	Single Shot	B	B	B	B	B	B	B	n	n	n	n	n	n	n	n	n	n	B	n	n	n	n	n	n	n	n	n	n	n		
123	BOG	B	B	B	B	B	B	B	n	n	n	n	n	n	n	n	n	n	B	n	n	n	n	n	n	n	n	n	n	n		
5400	Tura Ln																								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 Fort Branch 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
FOR1	123	Fort Branch Creek @ North Boggy Creek	2000	65	88	86	69	31	37	31	42	63
FOR2	898	Fort Branch Creek @ Single Shot Circle	2000	62	88	71	67	39	32	40	23	60
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2000	59	88	78	67	33	34	29	39	60
FOR4	126	Fort Branch Creek @ Glencrest Drive	2000	45	88	73	72	43	17	31	3	56
FOR1	123	Fort Branch Creek @ North Boggy Creek	2003	68	78	79	74	43	22	19	24	61
FOR2	898	Fort Branch Creek @ Single Shot Circle	2003	49	78	41	60	46	21	25	16	49
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2003	54	78	71	75	41	15	17	12	56
FOR4	126	Fort Branch Creek @ Glencrest Drive	2003	33	78	62	73	44	20	26	14	52
FOR1	123	Fort Branch Creek @ North Boggy Creek	2006		67		35	37				35
FOR2	898	Fort Branch Creek @ Single Shot Circle	2006		67		71	49				47
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2006	75	67	60	75	41	66	62	70	64
FOR4	126	Fort Branch Creek @ Glencrest Drive	2006	44	67	25	89	59	42	39	44	54
FOR1	123	Fort Branch Creek @ North Boggy Creek	2009	79	77	54	12	34				43
FOR2	898	Fort Branch Creek @ Single Shot Circle	2009	71	77	36	28	33				41
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2009		77		63	51				48
FOR4	126	Fort Branch Creek @ Glencrest Drive	2009	65	77	28	55	56	39	27	50	53
FOR1	123	Fort Branch Creek @ North Boggy Creek	2011				25	56				27
FOR2	898	Fort Branch Creek @ Single Shot Circle	2011				55	52	49	49	48	52
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2011				51	45	61	61		52
FOR4	126	Fort Branch Creek @ Glencrest Drive	2011	67		26	60	25				35
FOR1	5400	Fort Branch @ Tura Ln	2013		83		38	58	53	53		58
FOR2	898	Fort Branch Creek @ Single Shot Circle	2013		83		27	54				41
FOR3	125	Fort Branch Creek Upstream of Manor Rd	2013		83		58	56				49
FOR4	126	Fort Branch Creek @ Glencrest Drive	2013	55	83	31	58	62	52	55	49	57

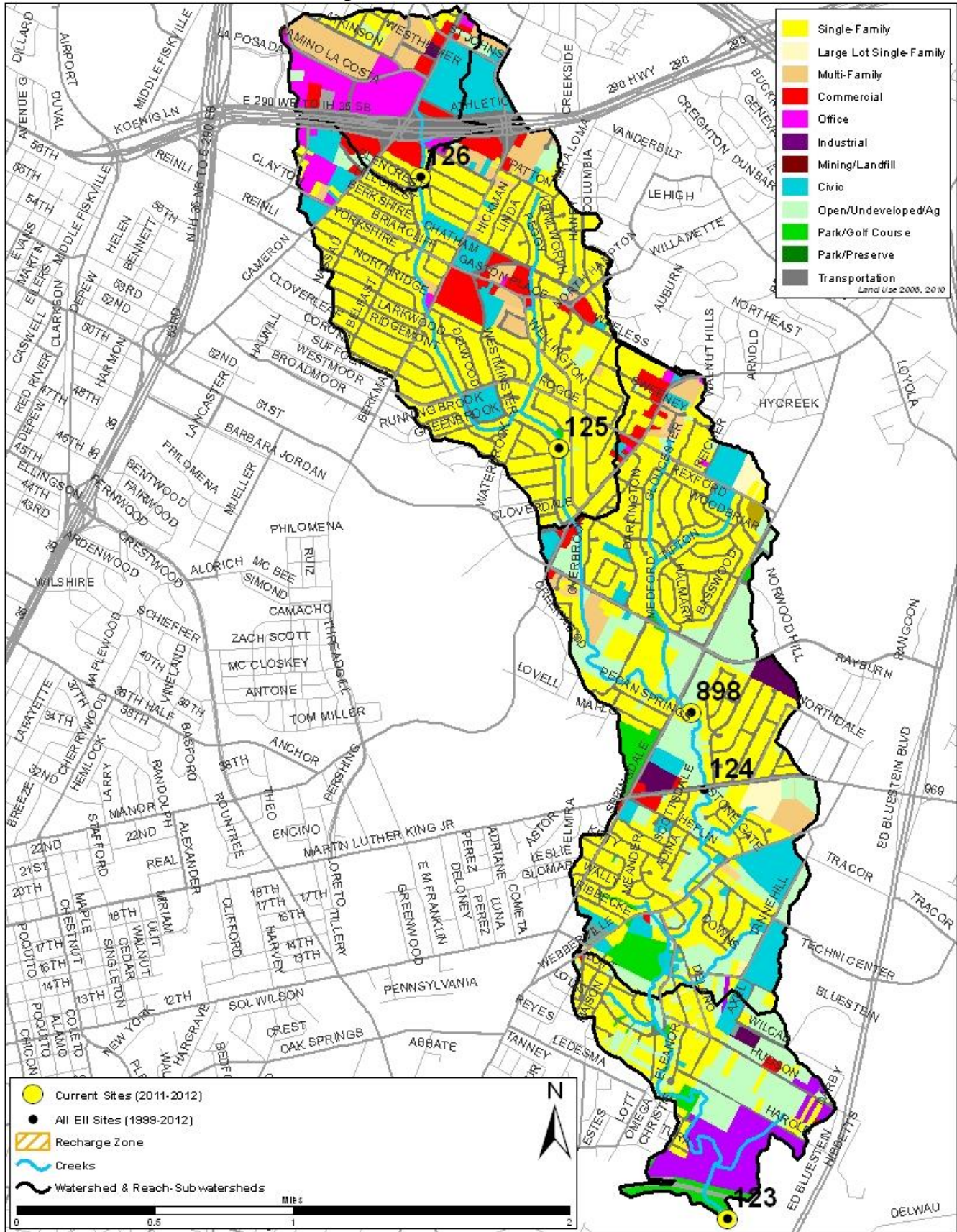
* blank cells indicate parameter was not collected, blank row indicate site was dropped

**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

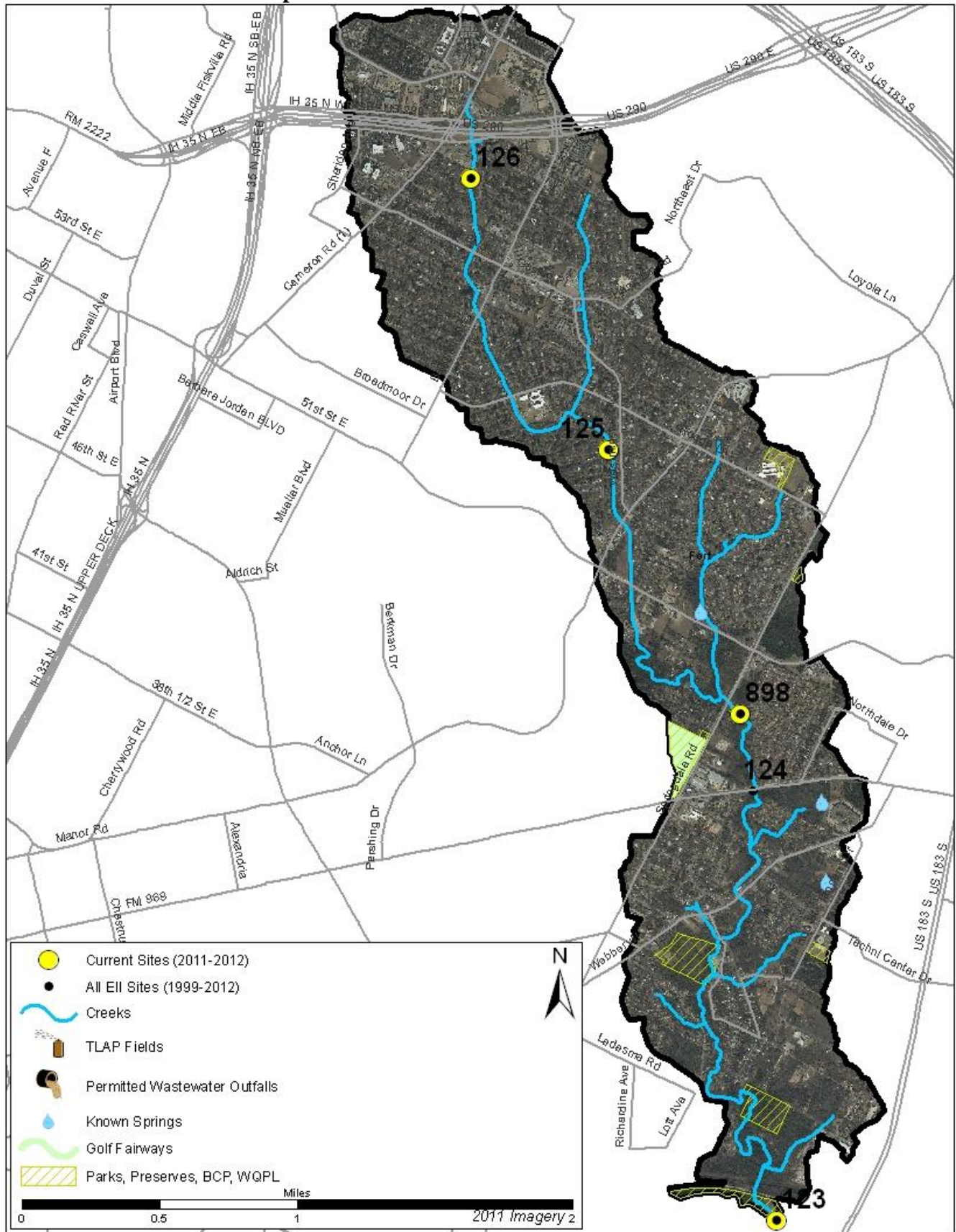
Fort Branch Watershed

Land Use Map



Fort Branch Watershed

Aerial Map



Fort Branch Watershed

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & E. coli for 2013 Sample Sites (Downstream to Upstream)

Qualifiers to the left of value:	>	greater than	Qualifiers to the right of value:	(blank)	Useable
	<	less than		S	Exceeds standard range
	< J	less than detection limit		R	Rejected, failed QC
	J	Estimated			

Site Name	Site #	Reach	Date	Temp.		Cond.		pH		D.O.		E.coli	
				<> Value	flag	<> Value	flag	<> Value	flag	<> Value	flag		
Fort Branch @ Glencrest	126	FOR4	01/22/2013	13.2		725		7.77		10.3		185.0	
Fort Branch @ Glencrest	126	FOR4	04/24/2013	13.7		470		7.61		6.3		721.5	
Fort Branch @ Glencrest	126	FOR4	06/26/2013	25.9		424		7.83		5.9		> 2419.6	
Site 126 Mean				17.6		540		7.74		7.5		1108.7	
Watershed Mean				17.6		540		7.74		7.5		1108.7	

Orange highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

Summary Statistics for all 2013 – 2014 E.I.I. Sites Combined.					
Parameter	2013-2014 Average	2013-2014 Minimum	2013-2014 Maximum	1 Standard Deviation Above	1 Standard Deviation Below
Temperature (C°)	19.6	8.6	34.0	25.8	
Conductivity (uS/cm)	711	107	1783	942	
pH (Standard units)	7.86	6.96	8.97	8.19	7.52
D.O. (mg/l)	8.1	1.2	30.5	11.4	4.8
E.coli. (col/100ml)	435	1	4840	1127	

Fort Branch Watershed

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2013 Sample Sites (Downstream to Upstream)

Qualifiers to the left of value:	>	greater than	Qualifiers to the right of value:	(blank)	Useable
	<	less than		S	Exceeds standard range
	< J	less than detection limit		R	Rejected, failed QC
	J	Estimated			

Site Name	Site #	Reach	Date	NH3-N		NO3/NO2		Ortho-P		T.S.S.		Turb.	
				<> Value	flag	<> Value	flag	<> Value	flag	<> Value	flag		
Fort Branch @ Glencrest	126	FOR4	01/22/2013	<J	0.008	J	0.01		0.016	<J	1.0		1.4
Fort Branch @ Glencrest	126	FOR4	04/24/2013		0.097	R	0.39		0.024		2.3		5.9
Fort Branch @ Glencrest	126	FOR4	06/26/2013		0.049		0.23		0.189		3.1		6.3
Site 126 Mean					0.051		0.21		0.076		2.1		4.6
Watershed Mean					0.051		0.21		0.076		2.1		4.6

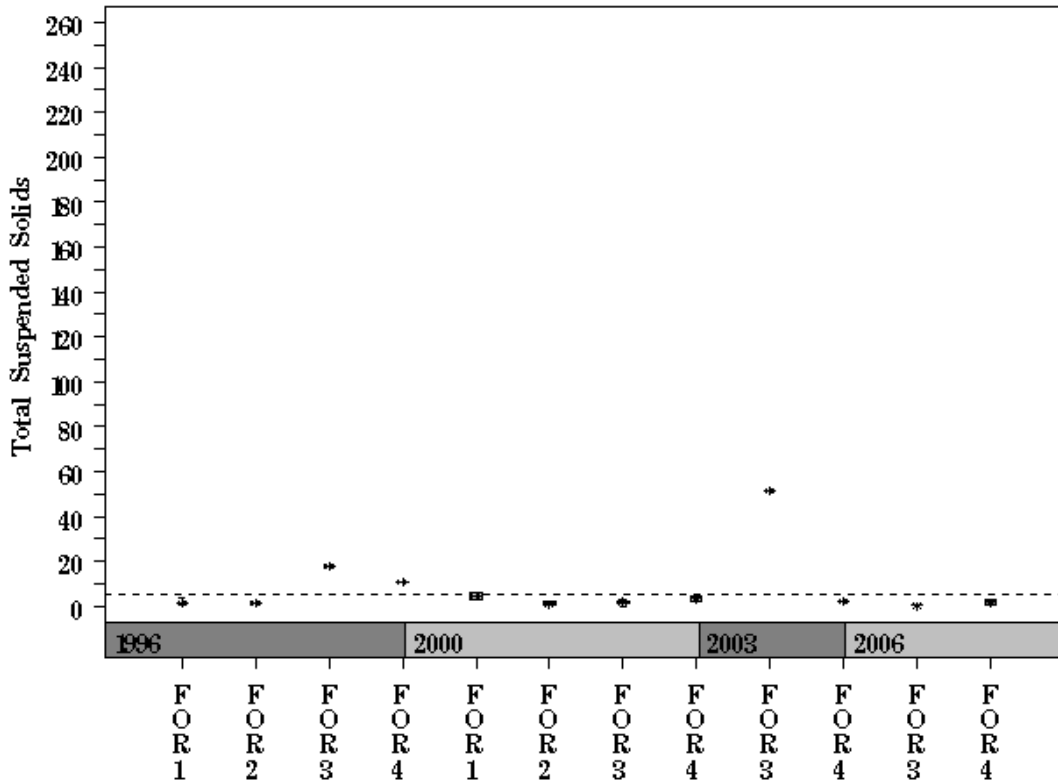
Orange highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

Summary Statistics for all 2013 – 2014 E.I.I. Sites Combined.				
Parameter	2013-2014 Mean	2013-2014 Minimum	2013-2014 Maximum	1 Standard Deviation Above
NH3-M (mg/l)	0.031	0.008	2.250	0.150
NO3-N (mg/l)	1.16	0.01	16.30	4.02
Ortho-P (mg/l)	0.041	0.004	1.360	0.164
TSS (mg/l)	5.6	1.0	70.0	15.3
Turbidity (NTU)	4.5	0.0	97.1	13.2

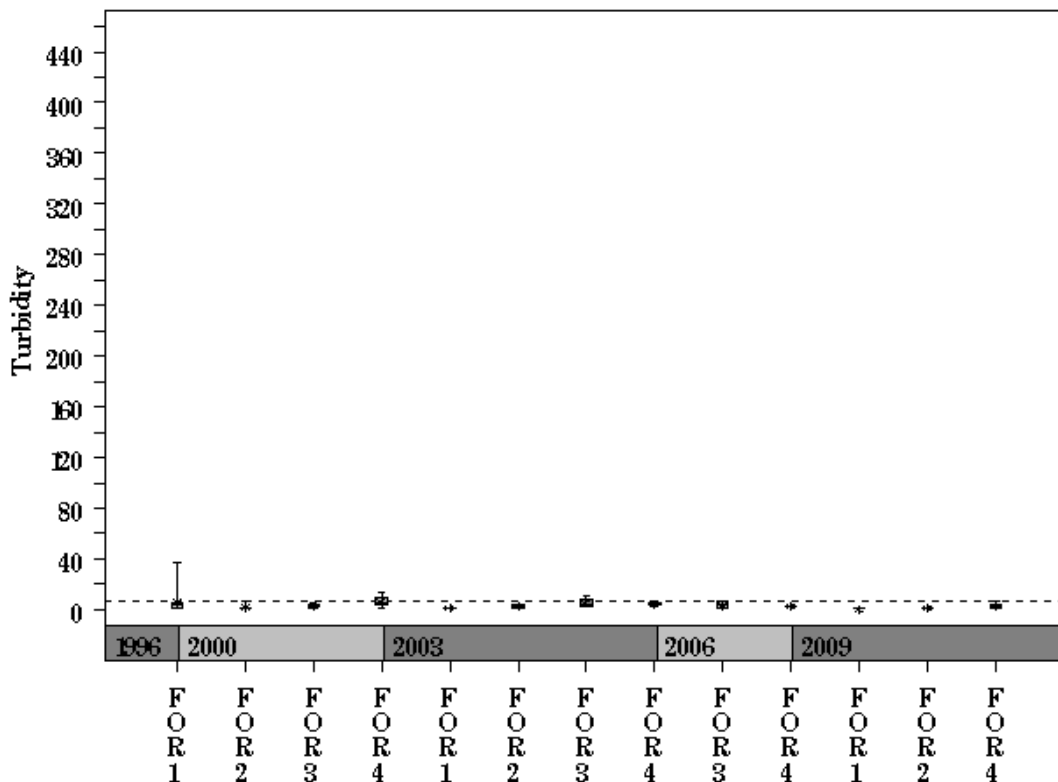
Fort Branch Watershed

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

Parameter= TOTAL SUSPENDED SOLIDS Unit= mg/L Watershed= Fort Branch



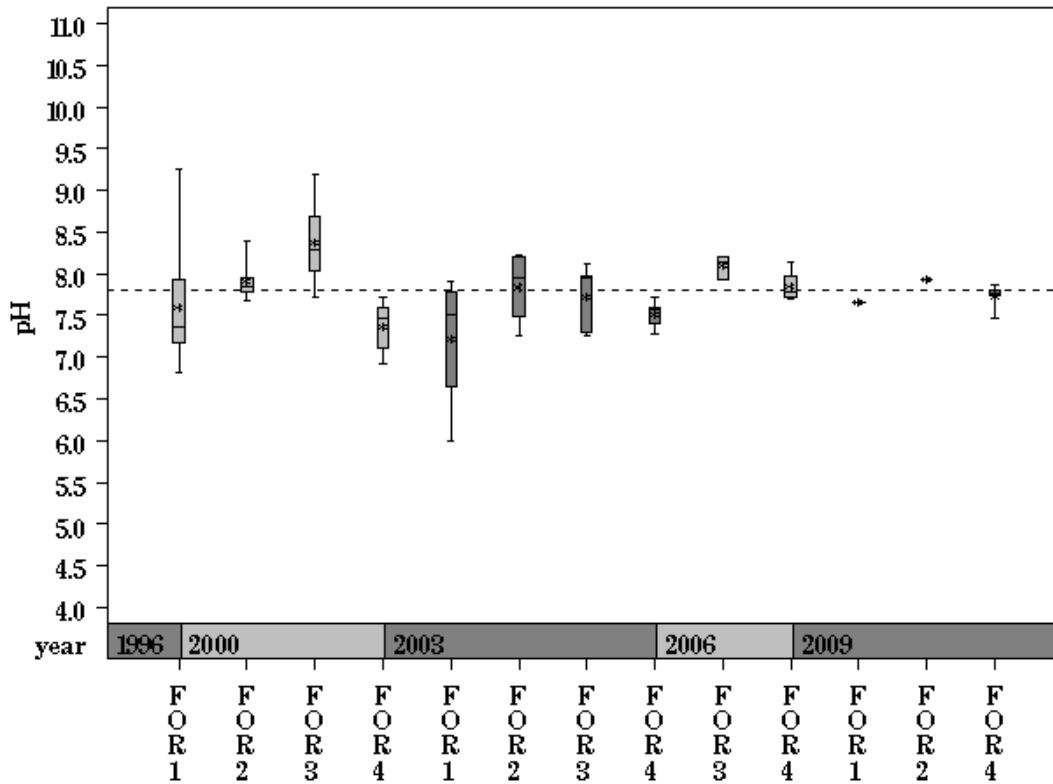
Parameter= TURBIDITY Unit= NTU Watershed= Fort Branch



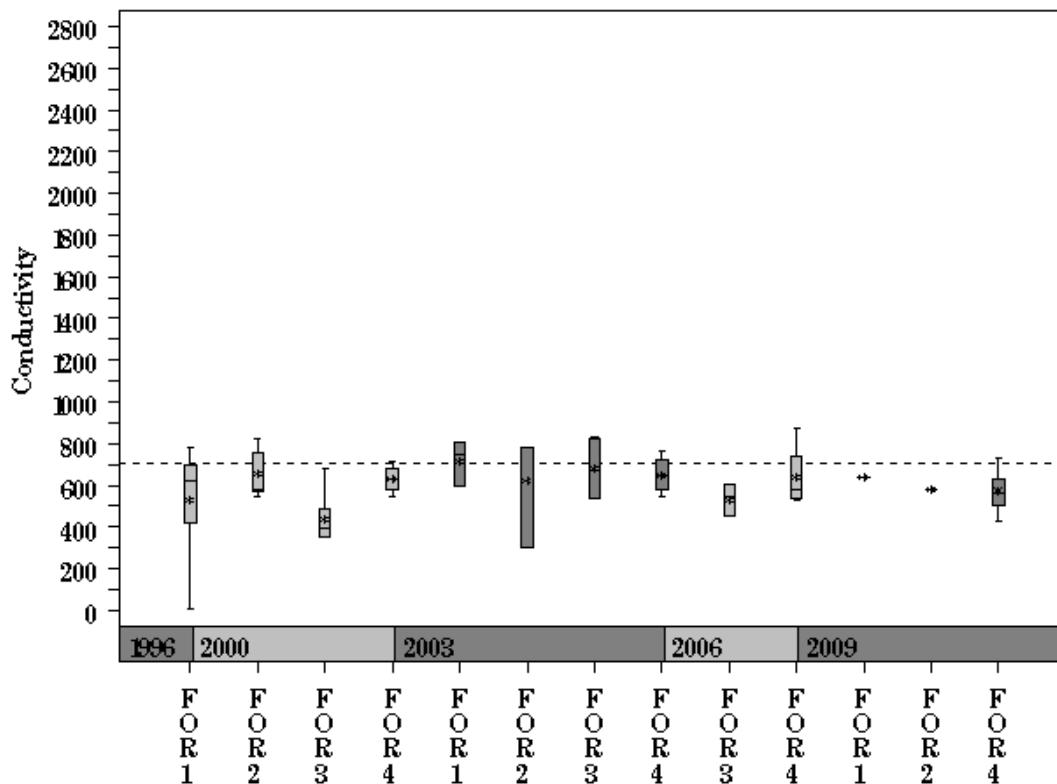
Fort Branch Watershed

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

Parameter= PH Unit= Standard units Watershed= Fort Branch



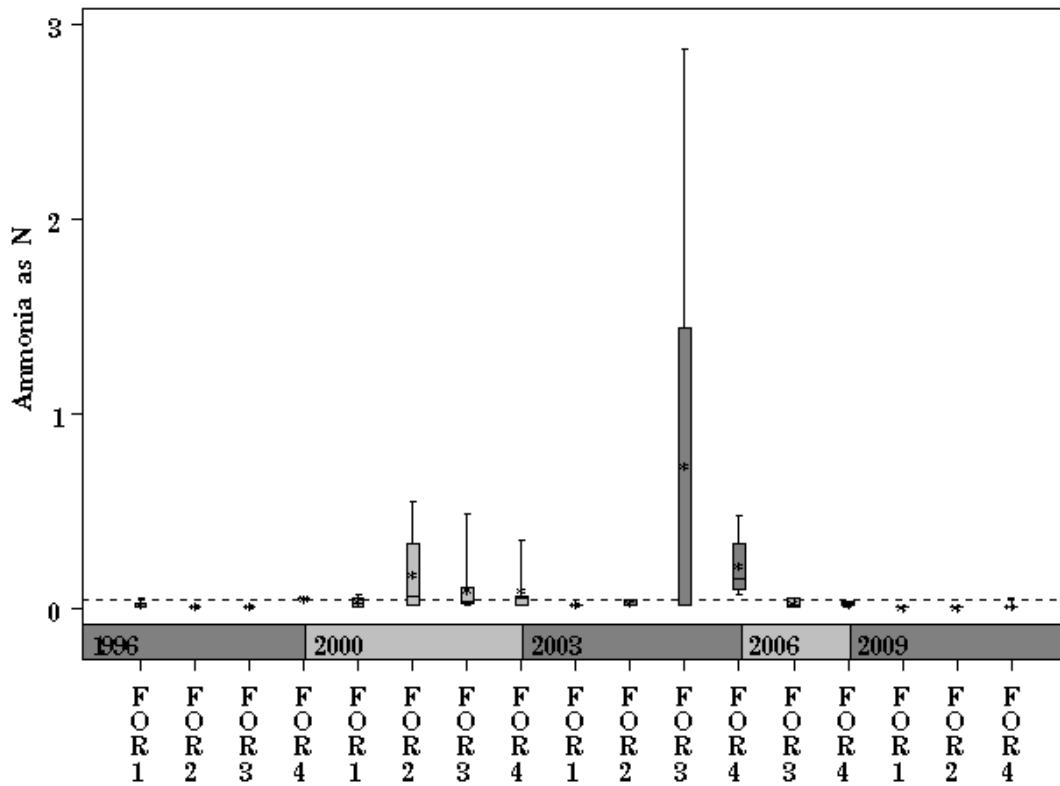
Parameter= CONDUCTIVITY Unit= uS/cm Watershed= Fort Branch



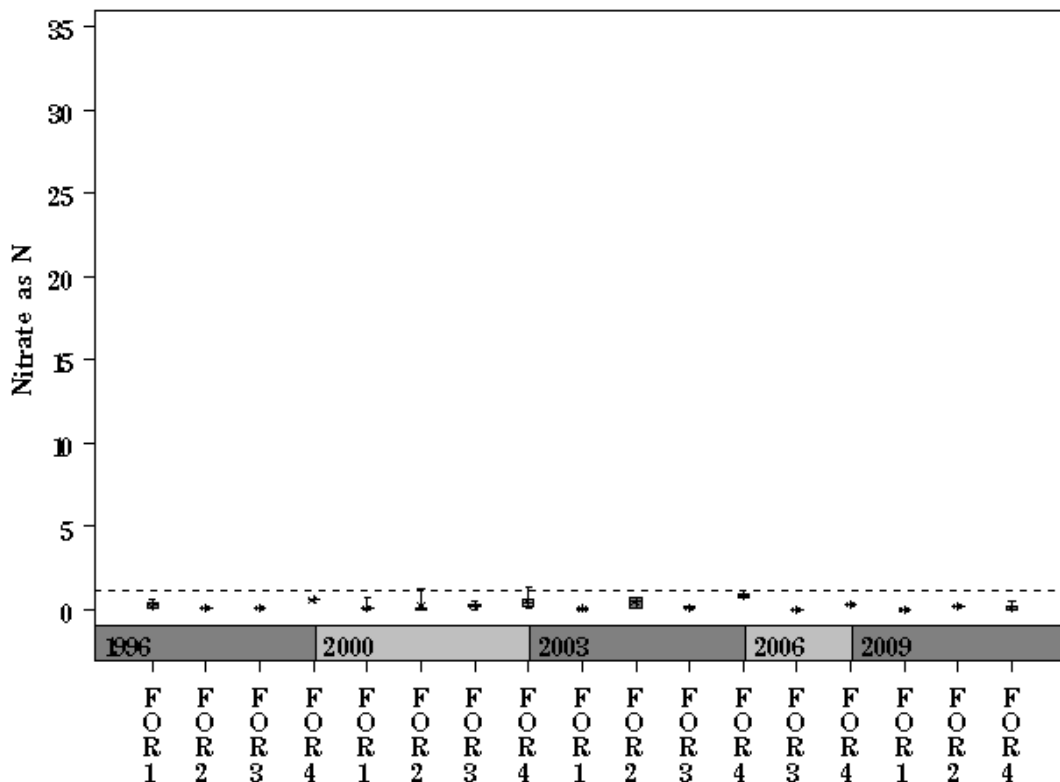
Fort Branch Watershed

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

Parameter= AMMONIA AS N Unit= mg/L Watershed= Fort Branch



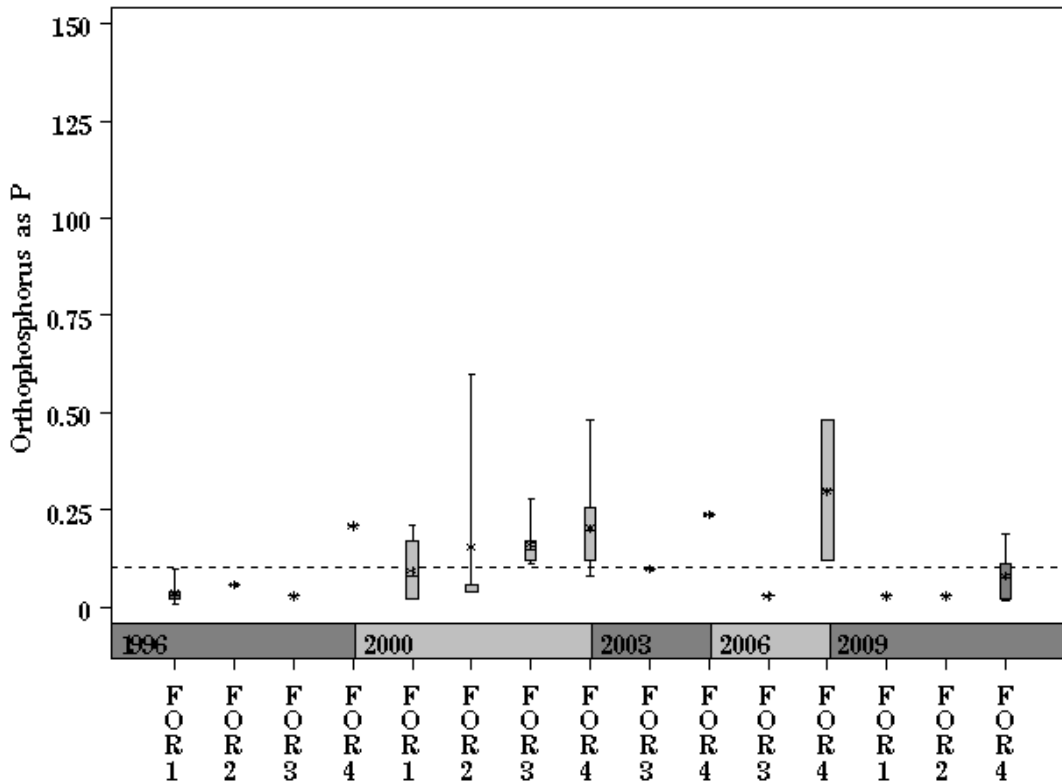
Parameter= NITRATE AS N Unit= mg/L Watershed= Fort Branch



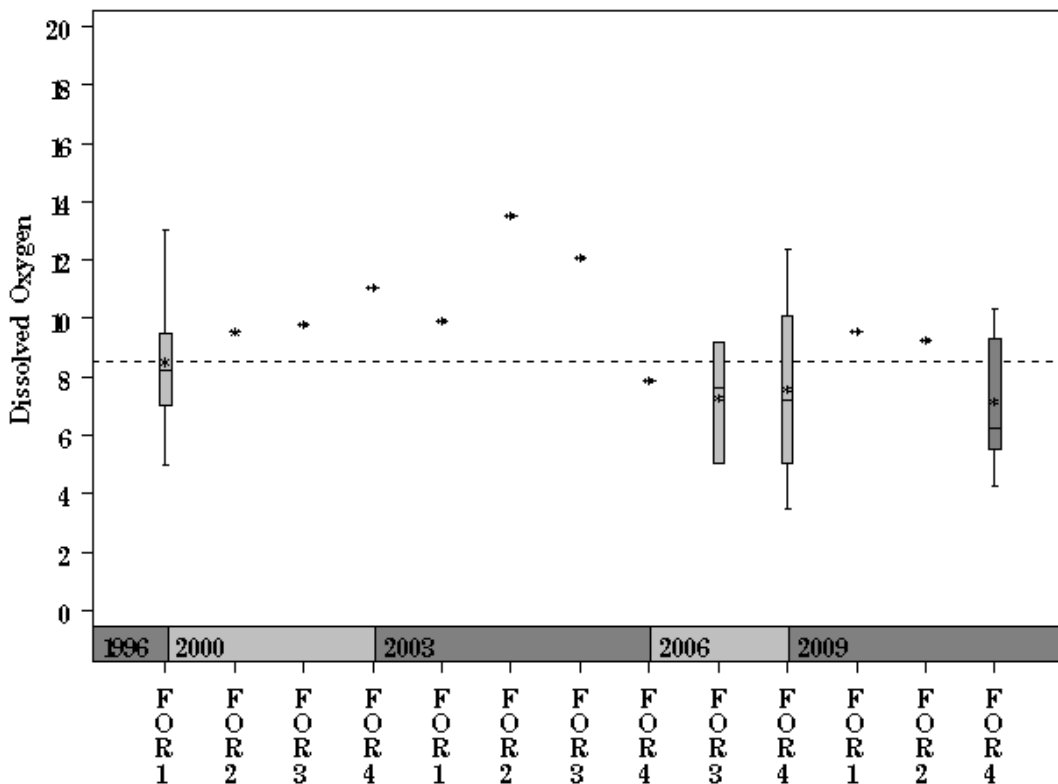
Fort Branch Watershed

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

Parameter= ORTHOPHOSPHORUS AS P Unit= mg/L Watershed= Fort Branch

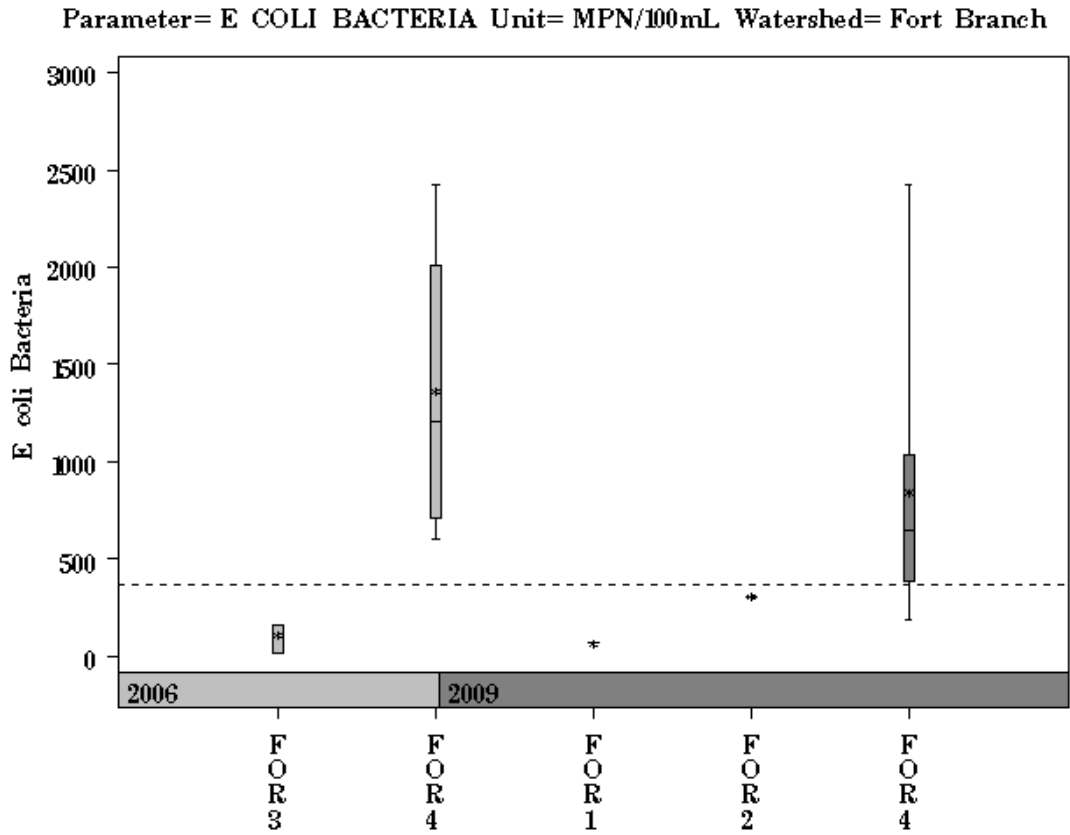


Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Fort Branch



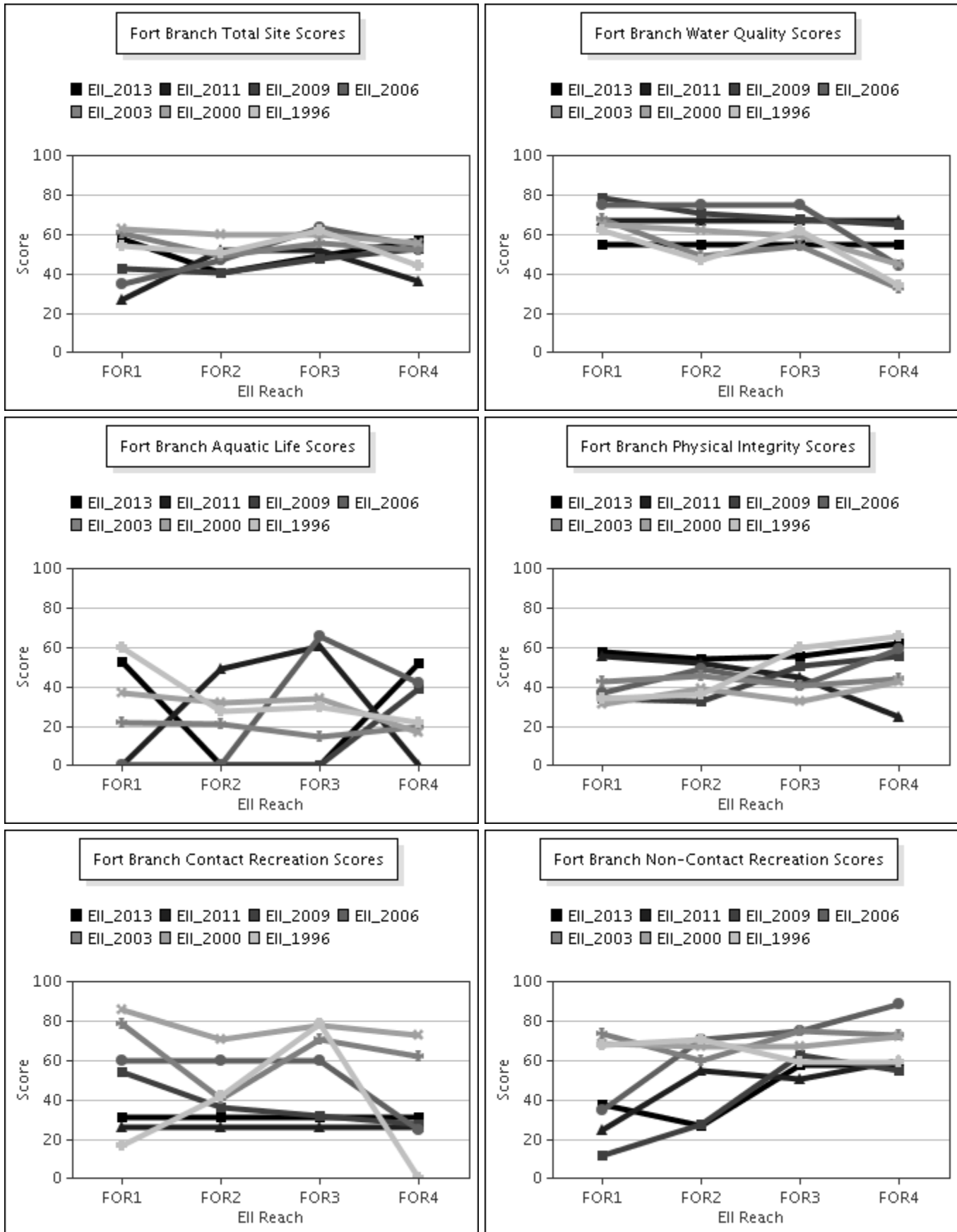
Fort Branch Watershed

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



Fort Branch Watershed

Score Summary – Reach scores for each sample year



Fort Branch Watershed

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2013 Sample Sites (Downstream to Upstream)

Benthic Macroinvertebrate ID	PTI	FFG	Fort Branch @ Tura Ln (Site 5400)	Fort Branch @ Glencrest (Site 126)
<i>Hydroptila</i> sp.	2	SC,PI		1
<i>Callibaetis</i> sp.	4	CG	2	
<i>Fallceon quilleri</i>	4	SC,CG		71
<i>Simulium</i> sp.	4	FC		2
<i>Agabus</i> sp.	5	P		5
<i>Aquarius</i> sp.	5	P	1	
<i>Archilestes</i> sp.	6	P	1	
Chironomidae	6	P,FC	2	38
<i>Enallagma</i> sp.	6	P	1	
<i>Microvelia</i> sp.	6	P	2	
Tanypodinae	6	P		9
<i>Caenis</i> sp.	7	SC,CG	2	
<i>Ferrissia</i> sp.	7	SC		3
<i>Anopheles</i> sp.	8	FC	1	
Cladocera	8	FC	4	
Hirudinea	8	P		1
Oligochaeta	8	CG		16
<i>Physella</i> sp.	9	SC	2	4
<i>Culex</i> sp.	10	FC	10	
Cambaridae		CG	1	

Fort Branch Watershed

Benthic Macroinvertebrates – Metric Summary for 2013 Sample Sites (Downstream to Upstream)

Scoring Metric	Fort Branch @ Tura Ln (Site 5400)	Fort Branch @ Glencrest (Site 126)
Number of Taxa *	12	9
Hilsenhoff Biotic Index *	7.9	5.3
Number of Ephemeroptera Taxa *	2	1
Percent of Total as Chironomidae *	7	31
Number of EPT Taxa *	2	2
Percent of Total as EPT *	14	48
Percent of Total as Predator *	24	35
Number of Intolerant Taxa *	1	3
Percent Dominance (Top 3 Taxa) *	55	83
EPT / EPT + Chironomidae	1	1
Number of Diptera Taxa	3	2
Number of Non-Insect Taxa	3	4
Number of Organisms	29	150
Percent Dominance (Top 1 Taxa)	34	47
Percent of Total as Collector / Gatherer	17	58
Percent of Total as Dominant Guild (FFG)	59	58
Percent of Total as Elmidae	0	0
Percent of Total as Filterers	59	33
Percent of Total as Grazers (PI & SC)	14	53
Percent of Total as Tolerant Organisms	41	3
Percent of Trichoptera as Hydropsychidae	0	0
Ratio of Intolerant : Tolerant Organisms	0.12	1.11
TCEQ Qualitative Aquatic Life Use Score	22	16
TCEQ Quantitative Aquatic Life Use Score	21	27

* **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%.

Fort Branch Watershed

Diatoms – Taxa List & Pollution Tolerance Index for 2013 Sample Sites (Downstream to Upstream)

Diatom Species Name	PTI	Fort Branch @ Glencrest Dr (Site 126)
<i>Amphora libyca</i>	3	8
<i>Caloneis bacillum</i>	3	2
<i>Caloneis ventricosa</i>	3	2
<i>Gomphonema acuminatum</i>	3	75
<i>Gomphonema affine</i>	3	171
<i>Gomphonema clavatum</i>	3	47
<i>Rhoicosphenia abbreviata</i>	3	8
<i>Rhopalodia gibba</i>	3	1
<i>Diadismis confervacea</i>	2	64
<i>Luticola mutica</i>	2	7
<i>Nitzschia amphibia</i>	2	6
<i>Synedra ulna</i>	2	109

Fort Branch Watershed

Diatoms – Metric Summary for 2013 Sample Sites (Downstream to Upstream)

Scoring Metric	Fort Branch @ Glencrest Dr (Site 126)
<i>Cymbella</i> Richness	0
Number of organisms	500
Number of taxa	12
Percent motile taxa	15
Percent similarity to reference condition	7
Pollution tolerance index	2.63

- * **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.

Fort Branch Watershed

Site Photographs



126_t00-us-02_14_2001



126-t00-dr-06-03-2009



125_t00-us-02_15_2001



125_t00-ds-07_10_2006



125-t00-us-06-03-2009



125-t00-ur-06-03-2009

Fort Branch Watershed

Site Photographs



898_t00-ds-02_15_2001



898_t00-ur-03_12_2003



898_t00-us-07_10_2006



898-t00-ds-06-02-2009



123_t00-us1-07_06_2006



123_t00-ds-07_06_2006

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