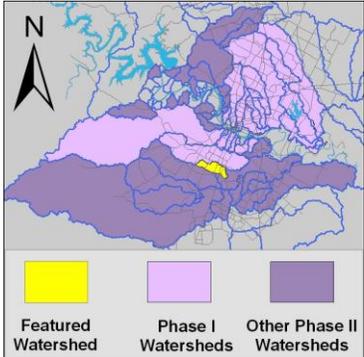


South Boggy Watershed

Summary Sheet

Catchment	Total area	4.8 sq. miles				
	Area in recharge	0				
	Creek length	7 miles				
	Receiving water	Onion Creek				
Demographics	2000 population	16,002				
	2030 projected population	18,721				
	30 year projected % increase	17 %				
Land Use	Impervious cover (2003 estimate)	19.9 %				
	Impervious cover (2013 estimate)	30.5 %				
Overall EII Scores	2001	2004	2007	2010	2012	2014
	66	61	66	71	61	59



Featured Watershed (Yellow)

Phase I Watersheds (Light Purple)

Other Phase II Watersheds (Dark Purple)

Flow Regime* for Sample Sites on South Boggy Creek

Site	Site Name	1999		2001				2004				2007				2010				2011		2012				2014								
		Jan	Jan	Mar	Mar	Jun	Sep	Dec	Mar	May	May	Jun	Oct	Dec	Feb	May	Jun	Sep	Dec	Mar	May	May	Oct	Dec	Mar	Apr	May	Jul	Sep	Jan	Apr	May	Jul	Sep
		WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	WQ	
1080	Loganberry	B	B	B	S	n	B	B																										
1081	W Dittmar	B	B	B	S	n	B	B	B	B	B	B	n	B	B	B	B	n	B	B	B	B	B	B	B	B	n	n	n	B	n	B	B	
227	Bluff Spgs	B	B	B	S	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n	n	n	B	B	n	B	n	
3294	Congress								B	B	B	B	B	B																				

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

Index scores* for South Boggy Creek Sites by Year

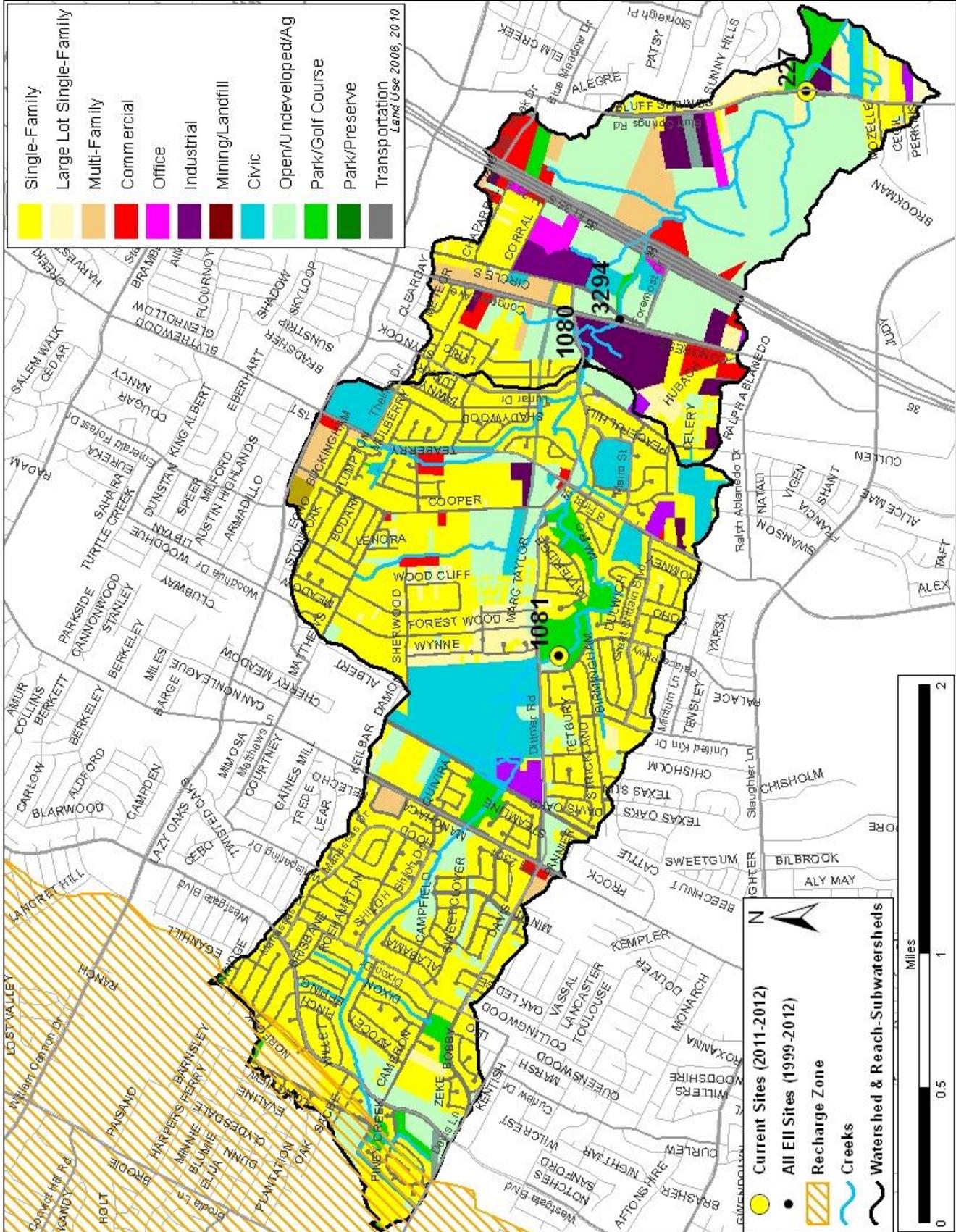
Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	1998	55	73	50	73	63	41	46	36	59
SBG2	1080	South Boggy Creek @ Loganberry Drive	1998	49	73	48	74	68	53	63	43	61
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	1998	52	73	78	76	53	32	46	18	61
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2001	66	92	78	83	56	37	45	25	66
SBG2	1080	South Boggy Creek @ Loganberry Drive	2001	42	92	42	87	73	32	45	18	58
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2001	53	92	88	83	61	39	30	48	66
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2004	73	72	55	77	70	58	53	63	68
SBG1	3294	South Boggy @ Congress Ave	2004	61	72	36	67	61	59	30	87	59
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2004	45	72	38	73	57	48	27	68	56
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2007	63	72	59	77	59	66	68	64	66
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2007	59	72	49	78	58	71	67	74	65
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2010	73	77	57	82	80	70	69	70	73
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2010	67	77	58	88	51	67	68	66	68
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2012	69	71	47	54	68	64	83	44	62
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2012	57	71	40	78	59	49	61	37	59
SBG1	227	South Boggy Creek @ Bluff Springs Road (BO1)	2014	75	65	70	69	65	49	26	71	66
SBG2	1081	South Boggy Creek @ W. Dittmar Rd	2014	55	65	29	73	49	45	27	63	53

* 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

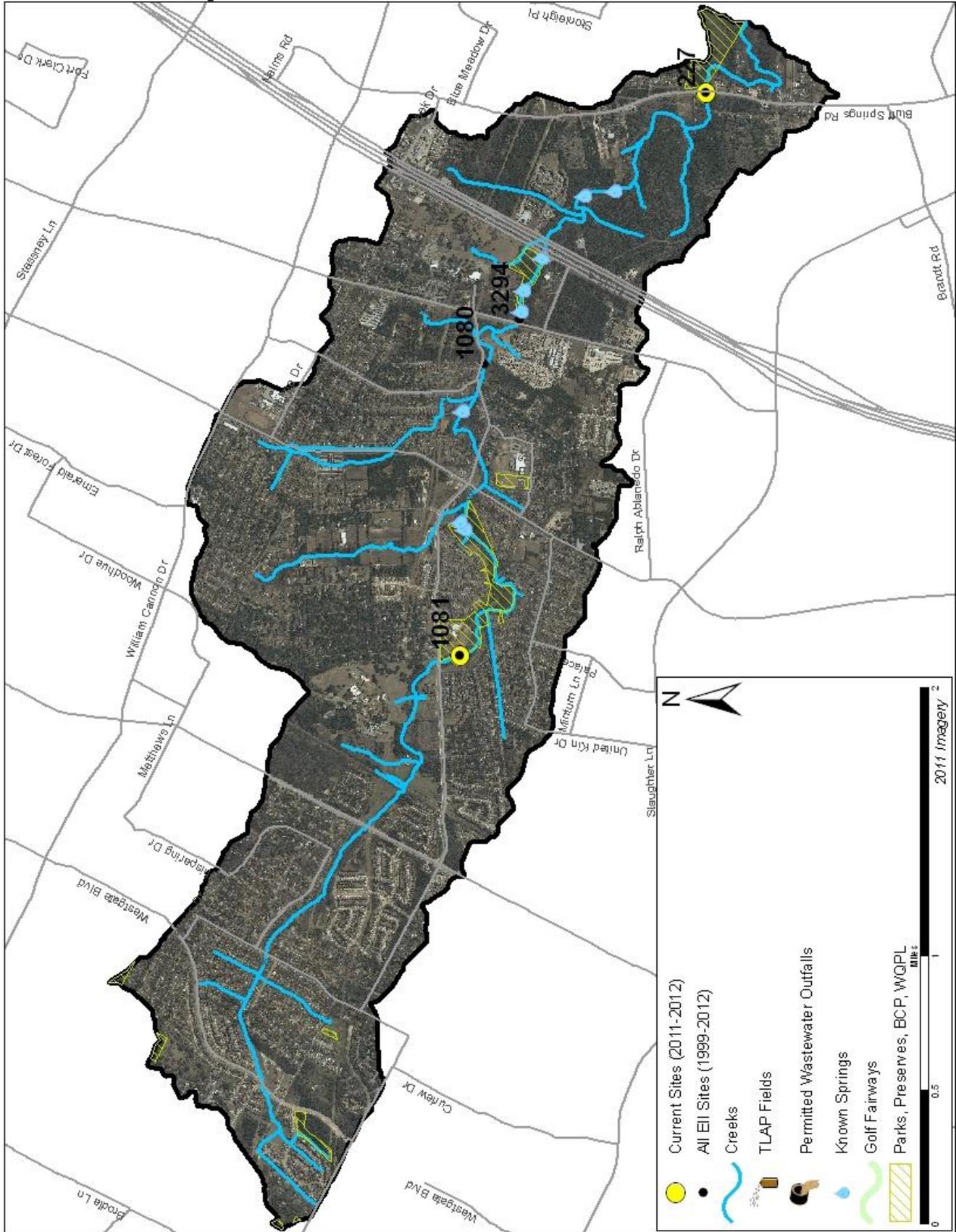
South Boggy Watershed

Land Use Map



South Boggy Watershed

Aerial Map



South Boggy Watershed

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & E. coli for 2014 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
South Boggy @ Bluff Spgs Rd	227	SBG1	01/15/2014		9.1			577		8.26				21.1
South Boggy @ Bluff Spgs Rd	227	SBG1	04/17/2014		15.2			367		7.79		5.1		488.4
South Boggy @ Bluff Spgs Rd	227	SBG1	07/02/2014		26.7			358		7.41		1.6		6.0
Site 227 Mean					17.0			434		7.82		3.4		171.8
South Boggy @ W Dittmar Rd	1081	SBG2	04/17/2014		14.5			675		7.22		4.0		290.9
South Boggy @ W Dittmar Rd	1081	SBG2	07/02/2014		24.5			700		7.42		4.1		1553.1
South Boggy @ W Dittmar Rd	1081	SBG2	09/10/2014		25.2			408		7.64		3.7		613.1
Site 1081 Mean					21.4			594		7.43		3.9		819.0
Watershed Mean					19.2			514		7.62		3.7		495.4

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	

South Boggy Watershed

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2014 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
South Boggy @ Bluff Spgs Rd	227	SBG1	01/15/2014	<J	0.008		0.03	<J	0.004		2.97	1.0	R	
South Boggy @ Bluff Spgs Rd	227	SBG1	04/17/2014		0.056		0.06		0.010	R	3.19	2.3	R	
South Boggy @ Bluff Spgs Rd	227	SBG1	07/02/2014		0.009		0.02		0.023		2.05	0.9		
Site 227 Mean					0.024		0.04		0.013		2.74	1.4		
South Boggy @ W Dittmar Rd	1081	SBG2	04/17/2014		0.077		0.49		0.054	R	<J	2.22	0.5	R
South Boggy @ W Dittmar Rd	1081	SBG2	07/02/2014	<J	0.008	<J	0.01		0.018		3.24	0.9		
South Boggy @ W Dittmar Rd	1081	SBG2	09/10/2014	<J	0.008	<J	0.01		0.019		23.80	16.6	R	
Site 1081 Mean					0.031		0.17		0.030		9.75	6.0		
Watershed Mean					0.028		0.10		0.021		6.25	3.7		

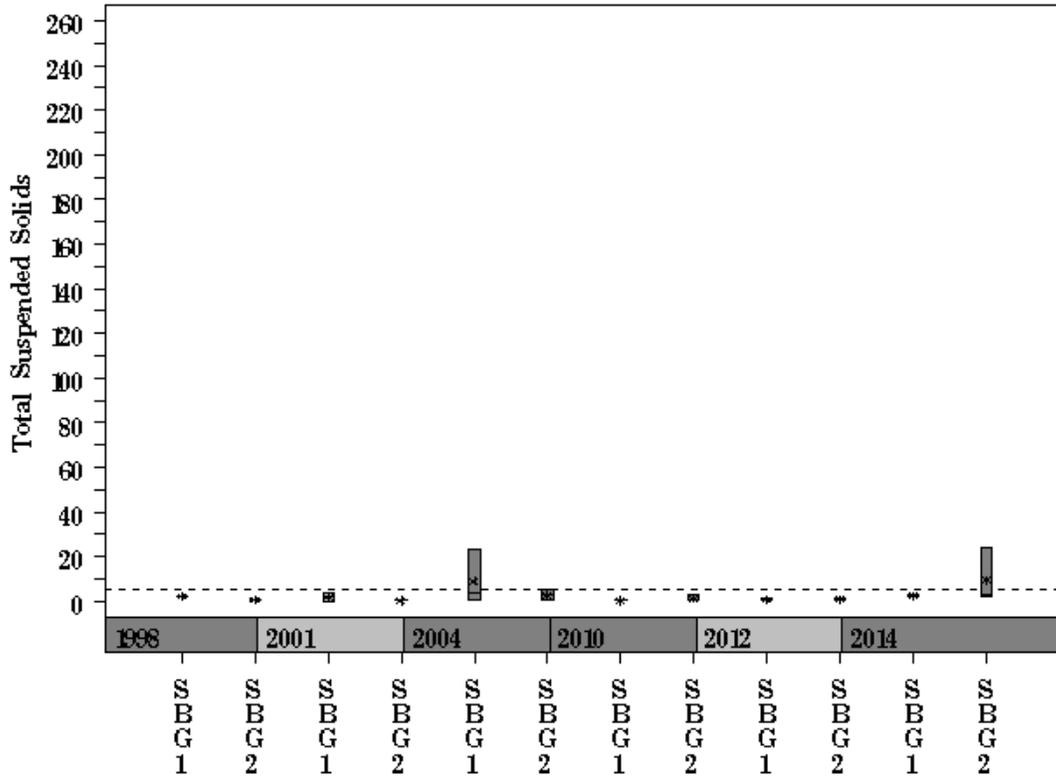
Orange highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

Summary Statistics for all 2013 – 2014 E.I.I. Sites Combined.				
Parameter	2013-2014 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

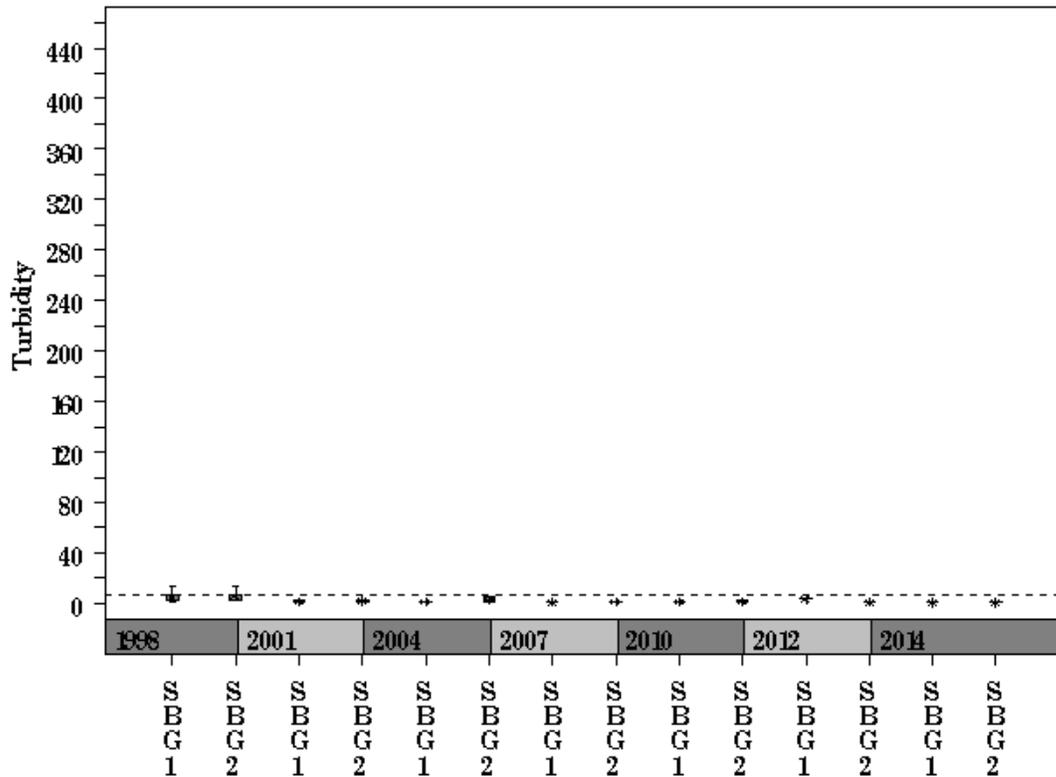
South Boggy Watershed

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

Parameter= TOTAL SUSPENDED SOLIDS Unit= mg/L Watershed= South Boggy



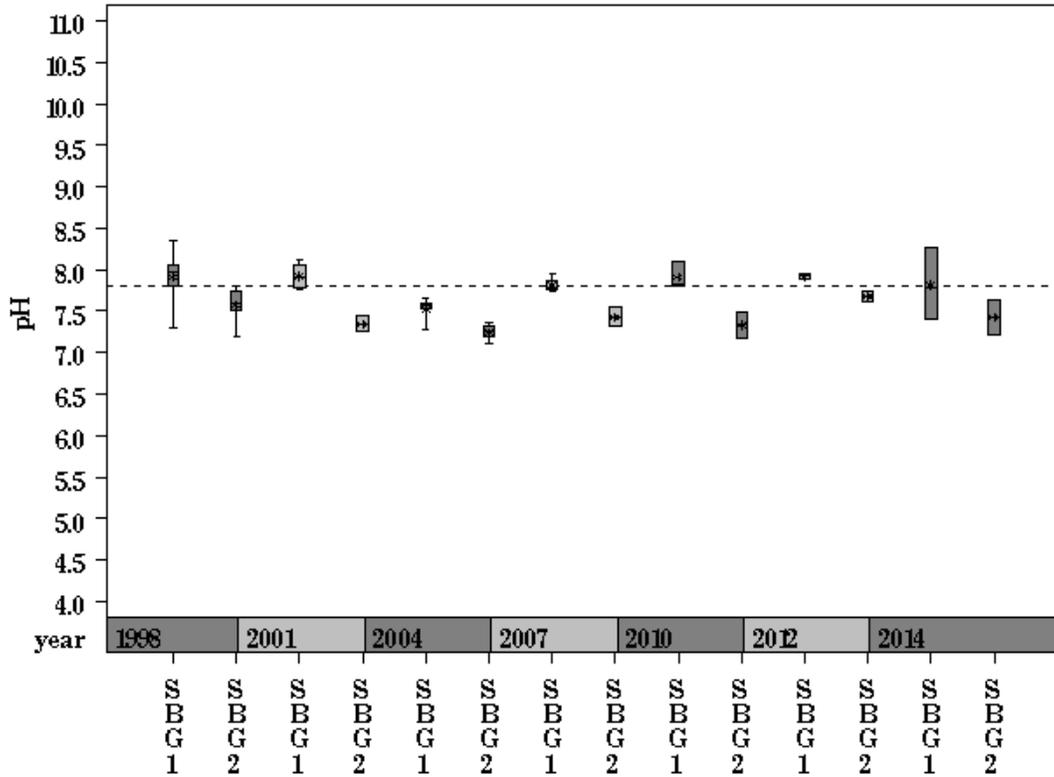
Parameter= TURBIDITY Unit= NTU Watershed= South Boggy



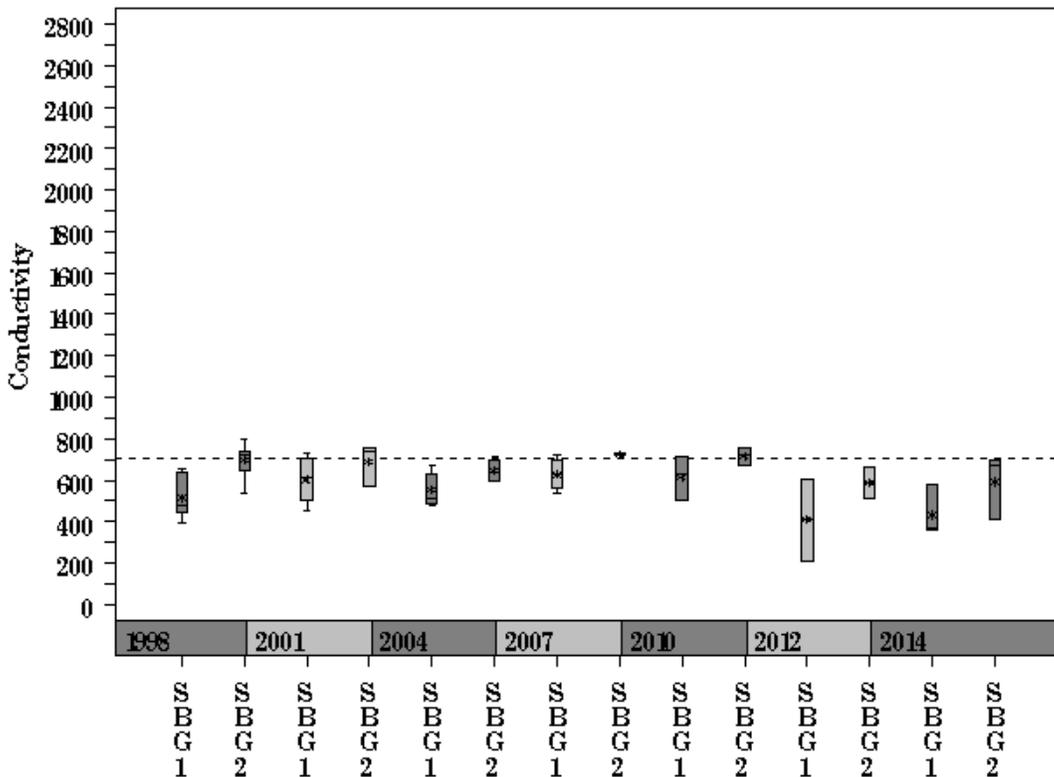
South Boggy Watershed

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

Parameter= PH Unit= Standard units Watershed= South Boggy



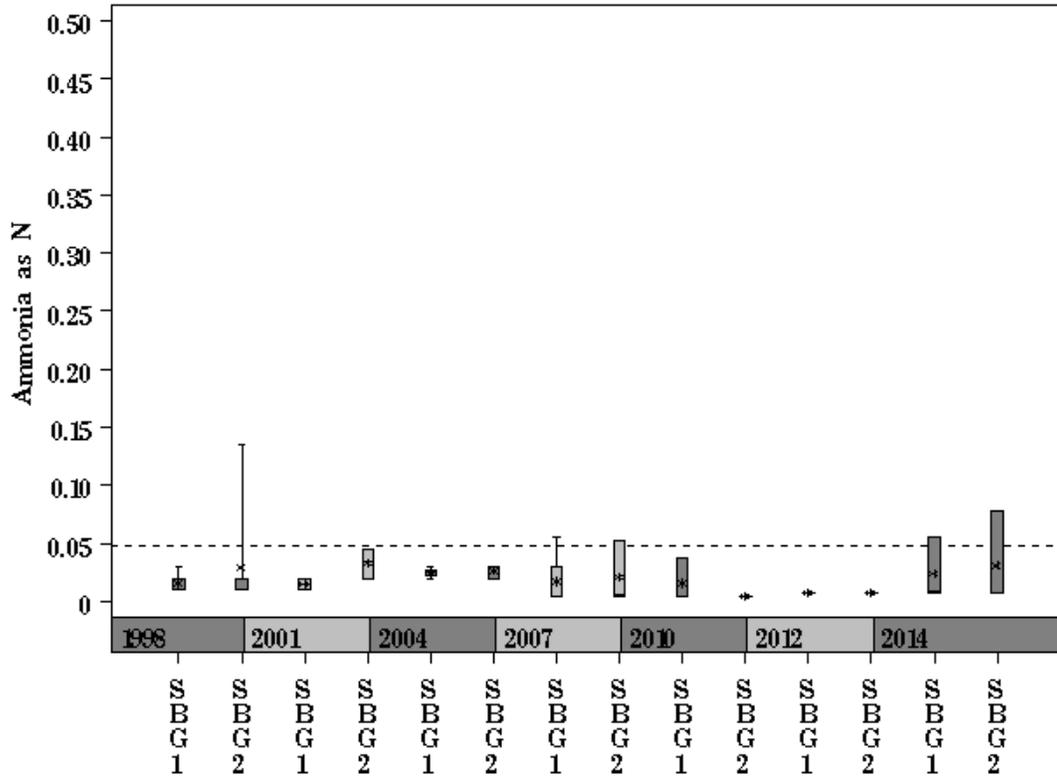
Parameter= CONDUCTIVITY Unit= uS/cm Watershed= South Boggy



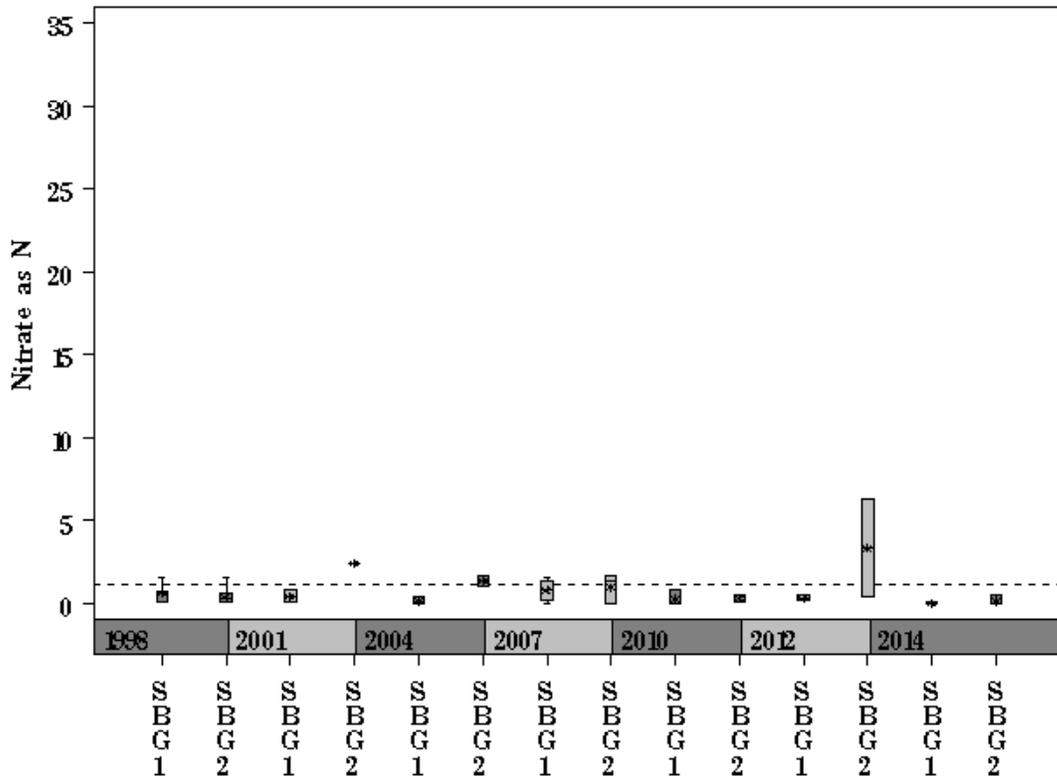
South Boggy Watershed

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

Parameter= AMMONIA AS N Unit= mg/L Watershed= South Boggy



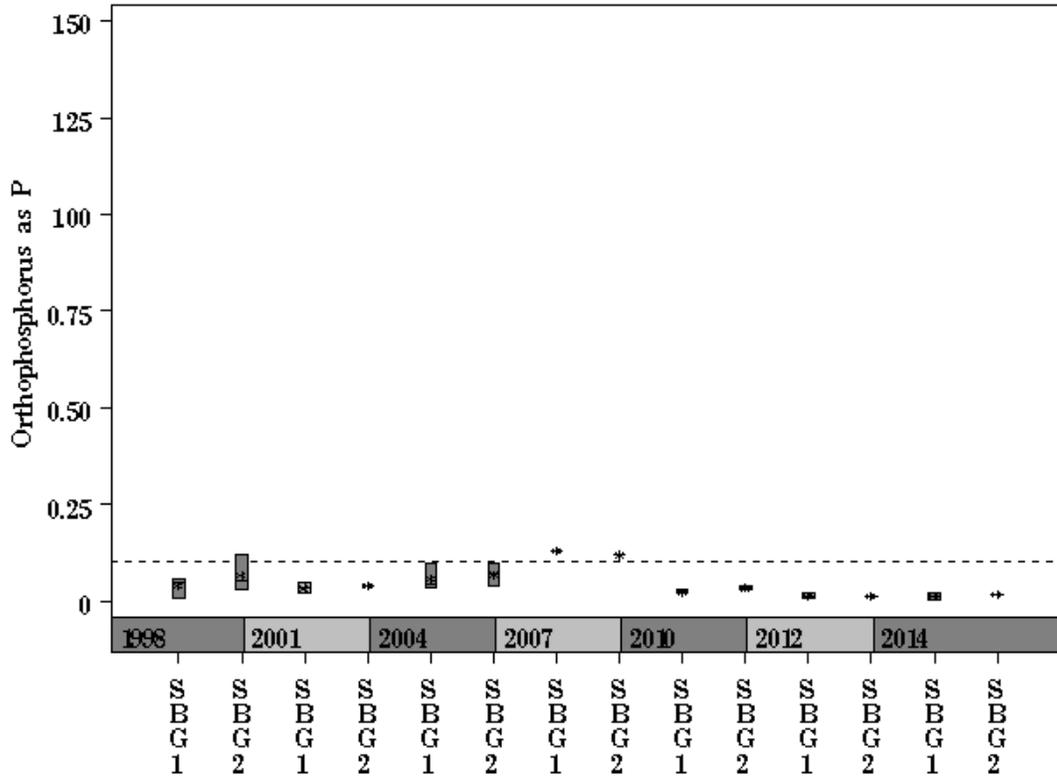
Parameter= NITRATE AS N Unit= mg/L Watershed= South Boggy



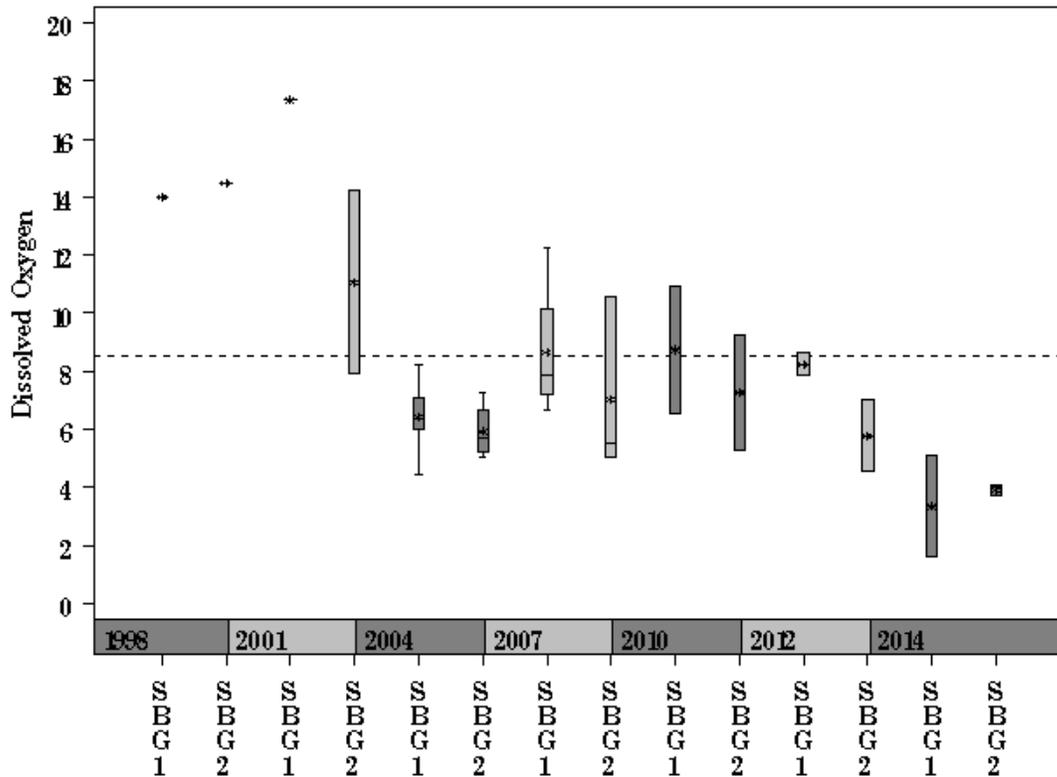
South Boggy Watershed

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

Parameter= ORTHOPHOSPHORUS AS P Unit= mg/L Watershed= South Boggy

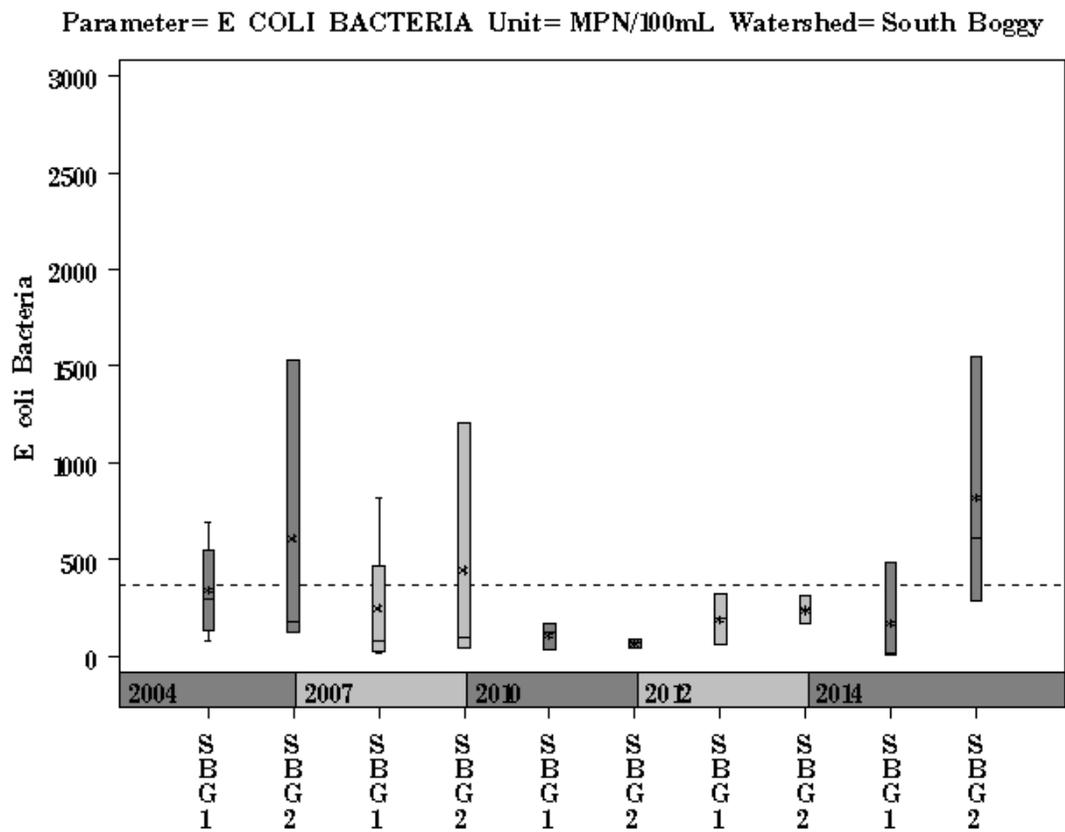


Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= South Boggy



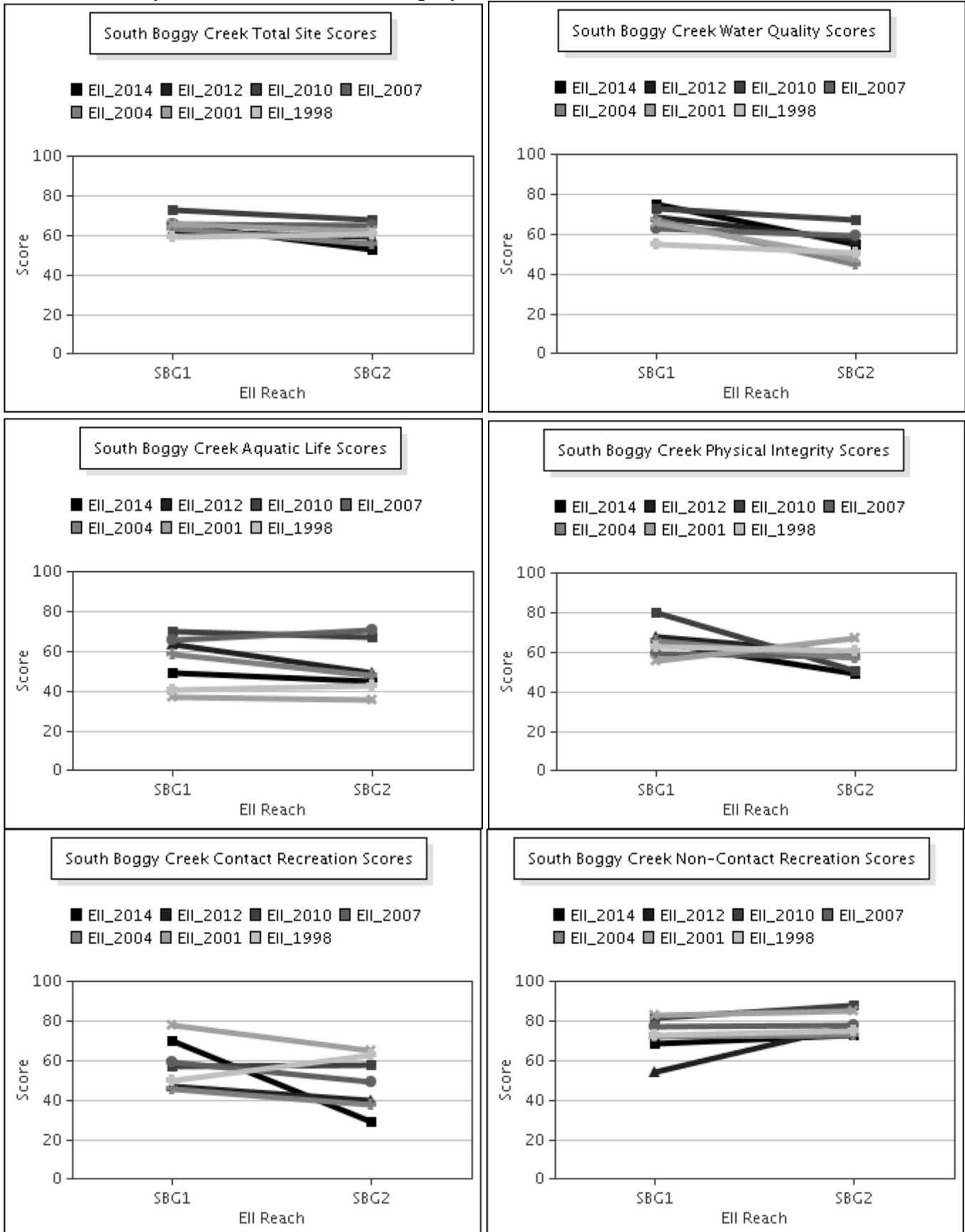
South Boggy Watershed

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



South Boggy Watershed

Score Summary – Reach scores for each sample year



South Boggy Watershed

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

Benthic Macroinvertebrate ID	PTI	FFG	South Boggy @ Bluff Spgs Rd (Site 227)	South Boggy @ W Dittmar Rd (Site 1081)
Copepoda	4	SC	2	3
Ostracoda	4	FC,CG		2
<i>Agabus</i> sp.	5	P		4
<i>Trichocorixa</i> sp.	5	P,CG	5	
Chironomidae	6	P,FC	44	78
Hydracarina	6		5	
<i>Microvelia</i> sp.	6	P		34
<i>Neoporus</i> sp.	6	P	7	
Tanypodinae	6	P	6	
<i>Pisidium</i> sp.	7	FC		1
<i>Anopheles</i> sp.	8	FC		6
Cladocera	8	FC	3	8
<i>Hyalella</i> sp.	8	SH,CG	1	1
Oligochaeta	8	CG	4	2
<i>Tipula</i> sp.	8	SH,CG		1
<i>Physella</i> sp.	9	SC	1	50
<i>Culex</i> sp.	10	FC	1	28

South Boggy Watershed

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

Scoring Metric	South Boggy @ Bluff Spgs Rd (Site 227)	South Boggy @ W Dittmar Rd (Site 1081)
Number of Taxa *	10	12
Hilsenhoff Biotic Index *	6.2	7.3
Number of Ephemeroptera Taxa *	0	0
Percent of Total as Chironomidae *	63	36
Number of EPT Taxa *	0	0
Percent of Total as EPT *	0	0
Percent of Total as Predator *	78	53
Number of Intolerant Taxa *	1	2
Percent Dominance (Top 3 Taxa) *	71	75
EPT / EPT + Chironomidae	0	0
Number of Diptera Taxa	2	4
Number of Non-Insect Taxa	6	6
Number of Organisms	79	217
Percent Dominance (Top 1 Taxa)	56	36
Percent of Total as Collector / Gatherer	13	3
Percent of Total as Dominant Guild (FFG)	78	56
Percent of Total as Elmidae	0	0
Percent of Total as Filterers	68	56
Percent of Total as Grazers (PI & SC)	4	24
Percent of Total as Tolerant Organisms	3	36
Percent of Trichoptera as Hydropsychidae	0	0
Ratio of Intolerant : Tolerant Organisms	0.09	0.04
TCEQ Qualitative Aquatic Life Use Score	19	17
TCEQ Quantitative Aquatic Life Use Score	15	17

* **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%.

South Boggy Watershed

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

Diatom Species Name	PTI	South Boggy @ Bluff Spgs Rd (Site 227)	South Boggy @ W Dittmar Rd (Site 1081)
<i>Amphora inariensis</i>	4	4	
<i>Diploneis oblongella</i>	4	2	2
<i>Platessa hustedtii</i>	4		25
<i>Achnanthes exigua</i>	3		4
<i>Achnantheidium affine</i>	3	48	
<i>Achnantheidium alteragracillimum</i>	3	8	
<i>Achnantheidium minutissimum</i>	3	33	96
<i>Amphora pediculus</i>	3	37	3
<i>Caloneis bacillum</i>	3	4	2
<i>Caloneis ventricosa</i>	3	2	
<i>Denticula kuetzingii</i>	3	8	
<i>Diploneis parma</i>	3	12	16
<i>Encyonema silesiacum</i>	3	6	2
<i>Eunotia bilunaris</i>	3		14
<i>Gomphonema affine</i>	3		6
<i>Gomphonema insigne</i>	3		6
<i>Halamphora montana</i>	3	10	4
<i>Navicula cryptotenella</i>	3	8	1
<i>Navicula kotschy</i>	3	4	
<i>Nitzschia dissipata</i>	3	26	
<i>Nitzschia linearis</i>	3	2	
<i>Placoneis placentula</i>	3	2	
<i>Reimeria sinuata</i>	3	1	
<i>Rhopalodia gibba</i>	3	2	
<i>Tryblionella angustata</i>	3	6	
<i>Achnantheiopsis lanceolata</i>	2	2	11
<i>Fallacia pygmaea</i>	2	4	
<i>Fragilaria capucina</i> var. <i>mesolepta</i>	2	14	
<i>Melosira varians</i>	2	5	
<i>Navicula menisculus</i>	2		1
<i>Navicula recens</i>	2	11	16
<i>Navicula sanctaerucis</i>	2	1	
<i>Navicula symmetrica</i>	2	2	1
<i>Navicula veneta</i>	2	8	2
<i>Nitzschia amphibia</i>	2	12	169
<i>Nitschia filiformis</i>	2	10	5
<i>Nitzschia frustulum</i>	2	2	
<i>Nitzschia microcephala</i>	2	11	
<i>Nitzschia sigma</i>	2		2
<i>Sellaphora laevissima</i>	2	4	
<i>Tryblionella apiculata</i>	2	6	1
<i>Tryblionella calida</i>	2	6	
<i>Gomphonema parvulum</i>	1	18	8
<i>Nitzschia palea</i>	1		4
<i>Achnantheiopsis rostrata</i>			37
<i>Amphora copulata</i>		4	2
<i>Encyonema semilanceolatum</i>			2
<i>Eolimna minima</i>		64	52
<i>Fallacia lenzii</i>		19	
<i>Gomphonema lagenula</i>			2
<i>Kolbesia ploenensis</i>		2	
<i>Navicula antonii</i>		54	
<i>Navicula lanceolata</i>		4	
<i>Navicula phyllepta</i>		4	
<i>Nitzschia angustatula</i>		2	
<i>Sellaphora stroemii</i>			2
<i>Ulnaria ulna</i>		6	2

South Boggy Watershed

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

Scoring Metric	South Boggy @ Bluff Spgs Rd (Site 227)	South Boggy @ W Dittmar Rd (Site 1081)
<i>Cymbella</i> Richness	2	1
Number of organisms	500	500
Number of taxa	45	31
Percent motile taxa	36	40
Percent similarity to reference condition	21	22
Pollution tolerance index	2.62	2.49

* **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.

South Boggy Watershed

Site Photographs



1081_t00-na2-05_18_2004



1081_t00-na1-05_18_2004



1081_ur_06_25_2007



1081_ds_06_25_2007



1081_00-ur-05_18_2010



1081_00-ds-05_18_2010

South Boggy Watershed

Site Photographs



3294_t00-ds-05_18_2004



3294_t00-us-05_18_2004



227_ds_06_29_2007



227_t00-ur-05_18_2004



227_00-ds-05_18_2010



227_00-us-05_18_2010

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