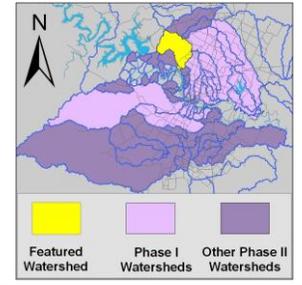


Bull Creek Watershed

Summary Sheet

Catchment	Total area	24.7 sq. miles					
	Area in recharge	16.3 sq. miles					
	Creek length	11 miles					
Demographics	Receiving water	Lake Austin					
	2000 population	43,709					
	2030 projected population	69,716					
Land Use	30 year projected % increase	60 %					
	Impervious cover (2003 estimate)	13.6 %					
Overall EII Scores	Impervious cover (2013 estimate)	20.9 %					
		2001	2004	2007	2010	2012	2014
		76	81	85	82	80	77



Flow Regime* for Sample Sites on Bull Creek

Site	Site Name	2001					2004					2007					2010					2011					2012					2014				
		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	Jun	Jul	Sep			
		WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	Bio	Bio	WQ	WQ			
151	Trib 6 @ BUL	B	B	B	B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
1164	Trib 5 ds Hanks																	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
349	us Trib 7								B	B			B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
920	St Edwards	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n	B	B	B	B	B	B	B			
347	us WBL	B	B			B	B	B	B	B	B	B	B	B	B	B	B																			
350	LOOP360	B	B	B	B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	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

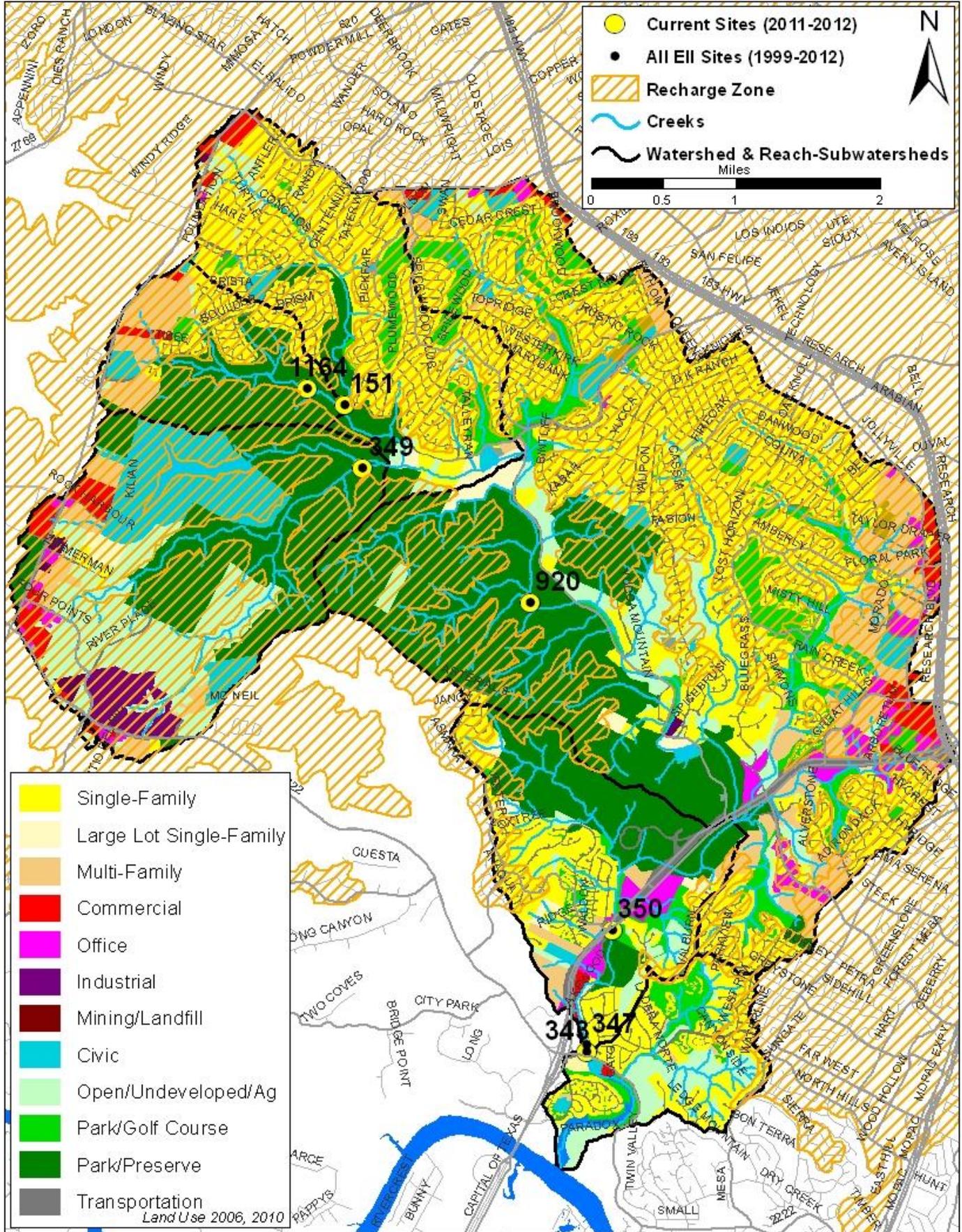
Index scores* for Bull Creek Sites by Year

Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
BUL1	347	Bull Creek US of West Bull Creek	1996	70	88	97	90	79	95	95	95	87
BUL1	350	Bull Creek @ Loop 360 1st Crossing	1996	71	88	97	81	61	92	84	100	82
BUL2	920	Bull Creek @ St. Ed's Park US of dam	1996	63	88	75	93	82	90	91	89	82
BUL5	151	Trib 6 @ Bull Creek (EG)	1996	51	88	87	80	91	76	84	67	79
BUL1	347	Bull Creek US of West Bull Creek	2001	63	65	91	92	88	62	64	59	72
BUL1	350	Bull Creek @ Loop 360 1st Crossing	2001	59	65	87	83	58	87	91	82	70
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2001	60	65	93	81	88	86	88	83	74
BUL5	151	Trib 6 @ Bull Creek (EG)	2001	44	65	92	93	81	83	99	66	73
BUL1	347	Bull Creek US of West Bull Creek	2004	62	84	63	93	88	96	94	97	81
BUL1	350	Bull Creek @ Loop 360 First Crossing	2004	73	84	67	89	80	97	94	100	82
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2004	70	84	72	91	85	95	95	94	83
BUL5	151	Trib 6 @ Bull Creek (EG)	2004	60	84	66	99	87	80	83	77	79
BUL1	347	Bull Creek US of West Bull Creek	2007	69	81	63	91	78	92	84	100	79
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2007	74	81	85	92	90	91	95	86	86
BUL3	349	Bull Creek US of Trib 7 (Franklin)	2007	89	81	93	98	83	98	97	99	90
BUL1	350	Bull Creek @ Loop 360 First Crossing	2010	68	67	71	96	74	93	85	100	78
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2010	73	67	96	97	89	92	84	99	86
BUL3	349	Bull Creek US of Trib 7 (Franklin)	2010	91	67	92	100	93	93	94	92	89
BUL4	1164	Trib 5 DS Hanks Tract Property Line	2010	73	67	87	93	73	82	73	90	79
BUL5	151	Trib 6 @ Bull Creek (EG)	2010	67	67	86	86	87	91	98	83	81
BUL1	350	Bull Creek @ Loop 360 First Crossing	2012	65	73	44	96	85	96	100	92	77
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2012	67	73	69	98	92	96	100	92	83
BUL3	349	Bull Creek US of Trib 7 (Franklin)	2012	81	73	83	94	92	83	78	88	84
BUL4	1164	Trib 5 DS Hanks Tract Property Line	2012	61	73	61	97	92	95	100	89	80
BUL5	151	Trib 6 @ Bull Creek (EG)	2012	55	73	75	80	92	97	100	94	79
BUL1	350	Bull Creek @ Loop 360 First Crossing	2014	68	61	46	85	68	98	98	97	71
BUL2	920	Bull Creek @ St. Ed's Park US of dam	2014	76	61	94	92	83	97	96	98	84
BUL3	349	Bull Creek US of Trib 7 (Franklin)	2014	82	61	76	97	91	98	96	100	84
BUL4	1164	Trib 5 DS Hanks Tract Property Line	2014	61	61	52	87	78	97	96	97	73
BUL5	151	Tributary 6 @ Bull Creek (EG)	2014	60	61	73	68	90	91	100	82	74

* 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

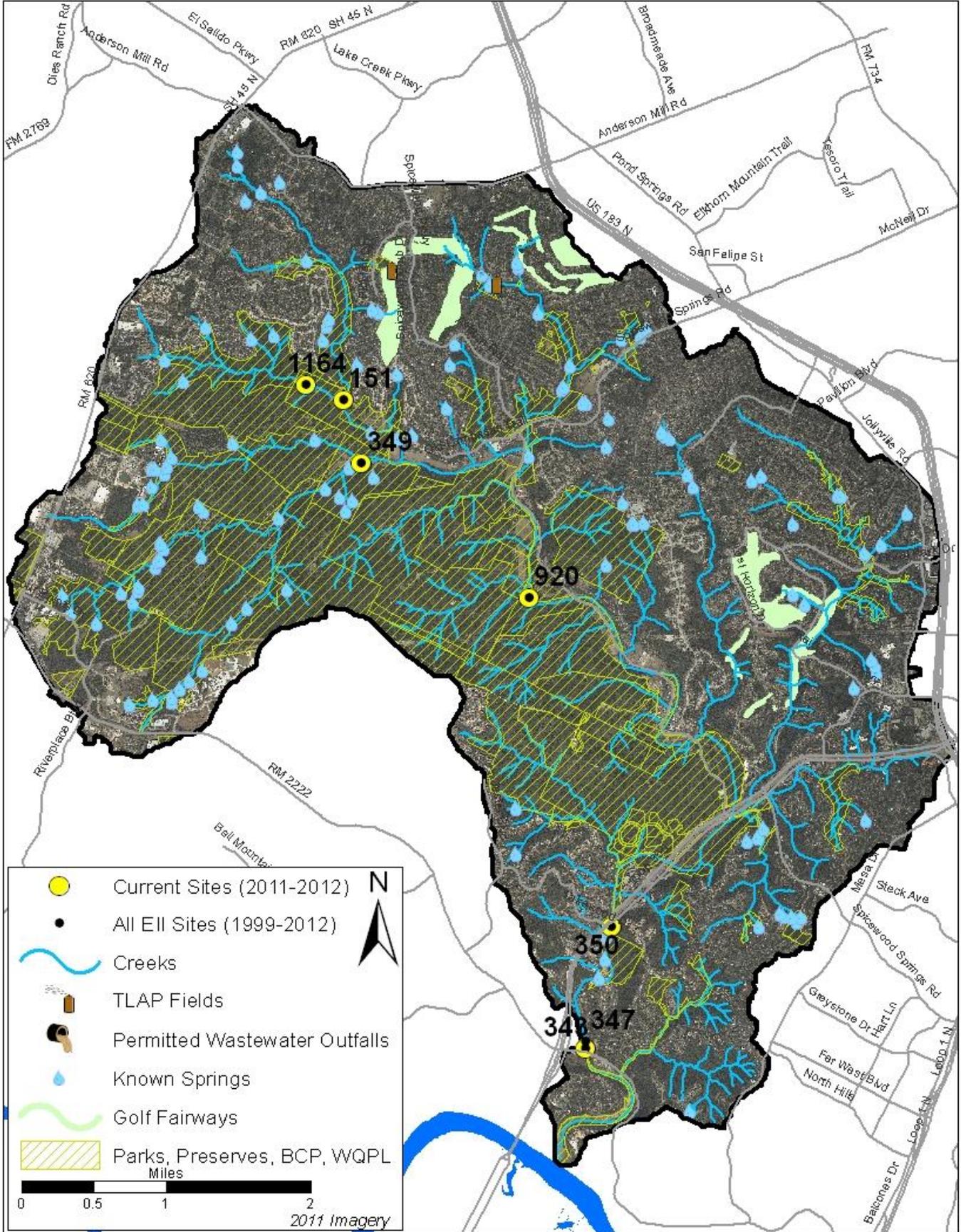
Bull Creek Watershed

Land Use Map



Bull Creek Watershed

Aerial Map



Bull Creek 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	<>
Bull @ Loop 360 1st Crossing	350	BUL1	01/15/2014		12.5		686		8.20		11.8		17.0
Bull @ Loop 360 1st Crossing	350	BUL1	04/17/2014		18.2		672		8.17		10.3		> 4840.0
Bull @ Loop 360 1st Crossing	350	BUL1	06/11/2014		24.0		641		8.13		7.0		
Bull @ Loop 360 1st Crossing	350	BUL1	07/02/2014		30.1		576		8.26		7.2		1990.0
Bull @ Loop 360 1st Crossing	350	BUL1	09/10/2014										172.0
Site 350 Mean					21.2		644		8.19		9.1		1754.8
Bull @ St. Edwards	920	BUL2	01/15/2014		14.4		688		8.17		11.5		3.1
Bull @ St. Edwards	920	BUL2	04/17/2014		17.5		699		8.19		10.3		12.6
Bull @ St. Edwards	920	BUL2	05/06/2014		22.7		671		8.86		6.2		
Bull @ St. Edwards	920	BUL2	07/02/2014		29.8		623		8.04		7.2		13.2
Bull @ St. Edwards	920	BUL2	09/10/2014										12.1
Site 920 Mean					21.1		670		8.32		8.8		10.3
Bull us Trib 7 (Franklin)	349	BUL3	01/15/2014		14.4		557		7.56		7.6		7.4
Bull us Trib 7 (Franklin)	349	BUL3	04/17/2014		16.4		572		7.52		7.4		172.0
Bull us Trib 7 (Franklin)	349	BUL3	05/06/2014		17.0		551		7.48		5.1		
Bull us Trib 7 (Franklin)	349	BUL3	07/02/2014		20.6		575		7.73		5.3		35.5
Bull us Trib 7 (Franklin)	349	BUL3	09/10/2014										21.6
Site 349 Mean					17.1		564		7.57		6.4		59.1
Tributary 5 ds HanksTract	1164	BUL4	01/15/2014		13.0		651		7.53		9.7		17.5
Tributary 5 ds HanksTract	1164	BUL4	04/17/2014		15.6		655		7.28		5.0		260.0
Tributary 5 ds HanksTract	1164	BUL4	05/06/2014		18.3		641		7.46		6.5		
Tributary 5 ds HanksTract	1164	BUL4	07/02/2014		21.6		669		8.17		3.2		387.0
Tributary 5 ds HanksTract	1164	BUL4	09/10/2014										105.0
Site 1164 Mean					17.1		654		7.61		6.1		192.4
Tributary 6 @ Bull Creek	151	BUL5	01/15/2014		13.2		1176		7.84		12.1		13.2
Tributary 6 @ Bull Creek	151	BUL5	04/17/2014		15.8		1196		7.75		8.6		12.2
Tributary 6 @ Bull Creek	151	BUL5	05/06/2014		17.4		1223		7.43		6.7		
Tributary 6 @ Bull Creek	151	BUL5	07/02/2014		22.9		107		7.87		8.3		31.8
Tributary 6 @ Bull Creek	151	BUL5	09/10/2014		23.9		1090		7.95		8.9		> 2420.0
Site 151 Mean					18.7		958		7.77		8.9		619.3
Watershed Mean					19.0		711		7.89		7.9		527.2

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	

Bull Creek 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
Bull @ Loop 360 1st Crossing	350	BUL1	01/15/2014	<J	0.008		0.47	<J	0.004		3.4		0.8	R
Bull @ Loop 360 1st Crossing	350	BUL1	04/17/2014		0.064		0.04	<J	0.004	<J	1.0		1.4	R
Bull @ Loop 360 1st Crossing	350	BUL1	06/11/2014											
Bull @ Loop 360 1st Crossing	350	BUL1	07/02/2014	<J	0.008		0.03	<J	0.004		12.5		0.9	
Bull @ Loop 360 1st Crossing	350	BUL1	09/10/2014	<J	0.008	<J	0.01	<J	0.004	<J	1.0		3.2	R
Site 350 Mean					0.022		0.14		0.004		4.5		1.6	
Bull @ St. Edwards	920	BUL2	01/15/2014	<J	0.008		0.35	<J	0.004	<J	1.0		0.2	R
Bull @ St. Edwards	920	BUL2	04/17/2014		0.076	<J	0.01	<J	0.004	<J	2.1		0.6	R
Bull @ St. Edwards	920	BUL2	05/06/2014											
Bull @ St. Edwards	920	BUL2	07/02/2014	<J	0.008	<J	0.01	<J	0.004		21.1		0.8	
Bull @ St. Edwards	920	BUL2	09/10/2014		0.038	<J	0.01	<J	0.004	<J	1.0		1.6	R
Site 920 Mean					0.033		0.09		0.004		6.3		0.8	
Bull us Trib 7 (Franklin)	349	BUL3	01/15/2014	<J	0.008		0.02	<J	0.004		1.0		0.6	R
Bull us Trib 7 (Franklin)	349	BUL3	04/17/2014	<J	0.008	<J	0.01	<J	0.004		1.4		2.3	R
Bull us Trib 7 (Franklin)	349	BUL3	05/06/2014											
Bull us Trib 7 (Franklin)	349	BUL3	07/02/2014	<J	0.008	<J	0.01	<J	0.004		46.3		0.3	
Bull us Trib 7 (Franklin)	349	BUL3	09/10/2014	<J	0.008	<J	0.01	<J	0.004	<J	1.0		0.9	R
Site 349 Mean					0.008		0.01		0.004		12.4		1.0	
Tributary 5 ds HanksTract	1164	BUL4	01/15/2014	<J	0.008		0.57	<J	0.004	<J	1.5		0.4	R
Tributary 5 ds HanksTract	1164	BUL4	04/17/2014	<J	0.008		0.53	<J	0.004	<J	1.1		0.7	R
Tributary 5 ds HanksTract	1164	BUL4	05/06/2014											
Tributary 5 ds HanksTract	1164	BUL4	07/02/2014		0.016		0.31	<J	0.004		3.9		1.7	
Tributary 5 ds HanksTract	1164	BUL4	09/10/2014		0.024		0.37	<J	0.004		1.4		1.1	R
Site 1164 Mean					0.014		0.44		0.004		2.0		1.0	
Tributary 6 @ Bull Creek	151	BUL5	01/15/2014	<J	0.008		1.34	<J	0.004	<J	1.0		0.5	R
Tributary 6 @ Bull Creek	151	BUL5	04/17/2014	<J	0.008		0.66	<J	0.004		2.1		1.4	R
Tributary 6 @ Bull Creek	151	BUL5	05/06/2014											
Tributary 6 @ Bull Creek	151	BUL5	07/02/2014	<J	0.008		0.46	<J	0.004		1.2		0.4	
Tributary 6 @ Bull Creek	151	BUL5	09/10/2014	<J	0.008		0.44	<J	0.004		10.5		1.0	R
Site 151 Mean					0.008		0.73		0.004		3.7		0.8	
Watershed Mean					0.017		0.28		0.004		5.8		1.0	

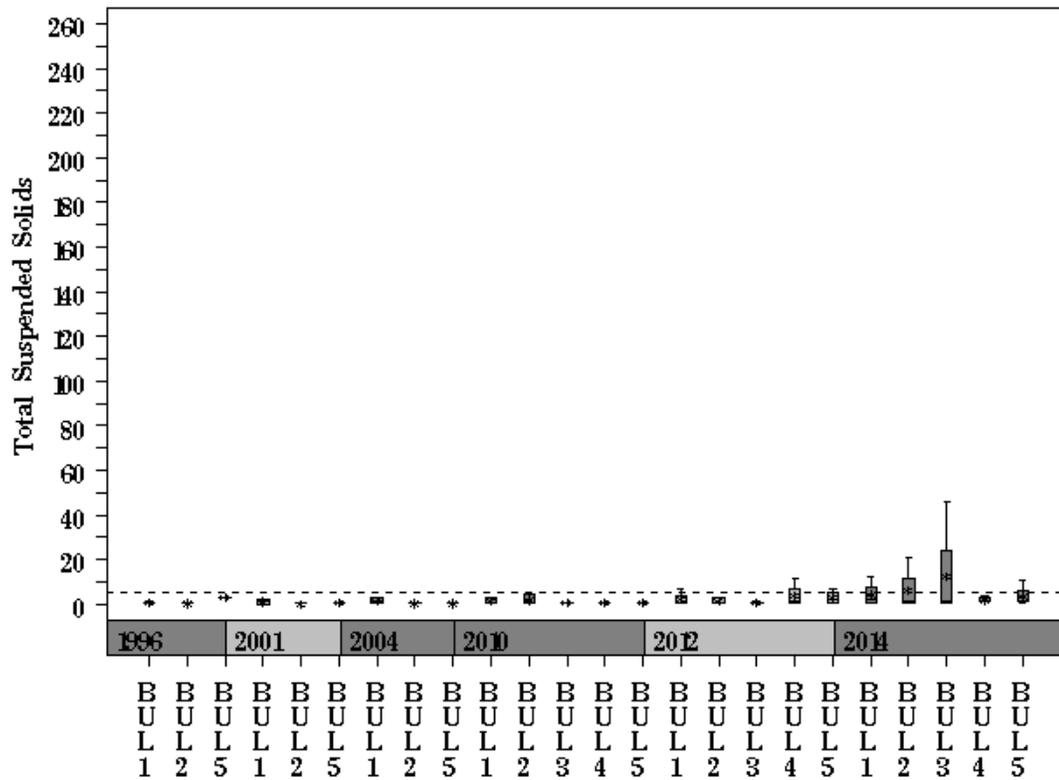
Orange highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

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

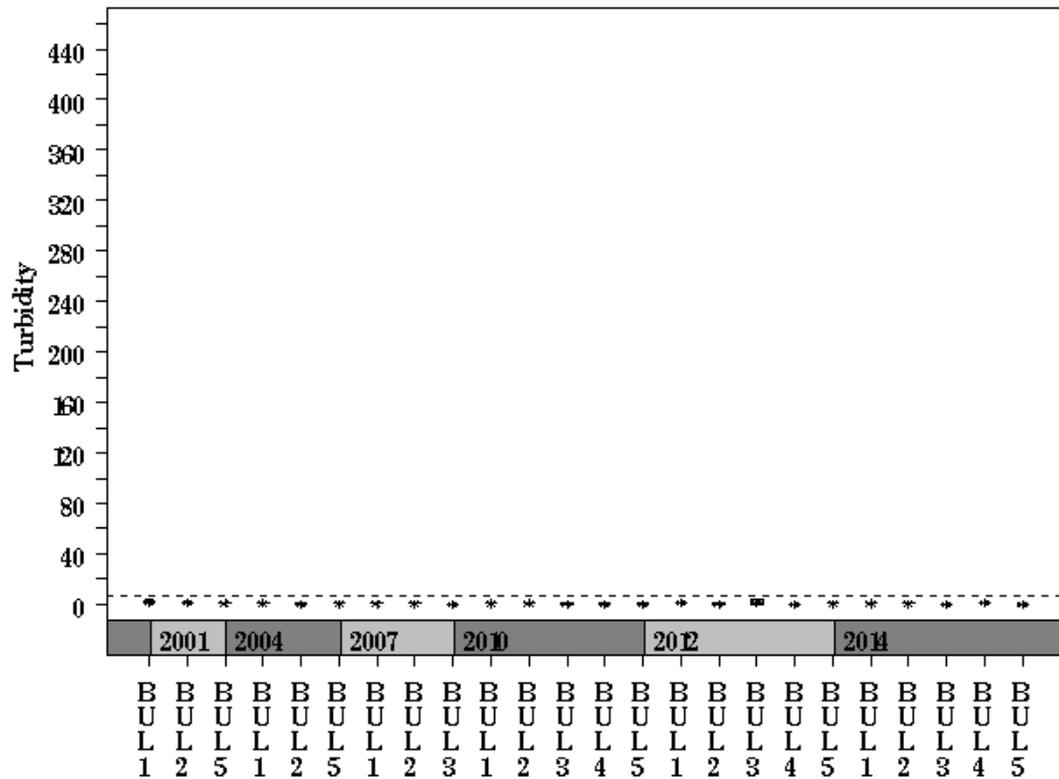
Bull Creek Watershed

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

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



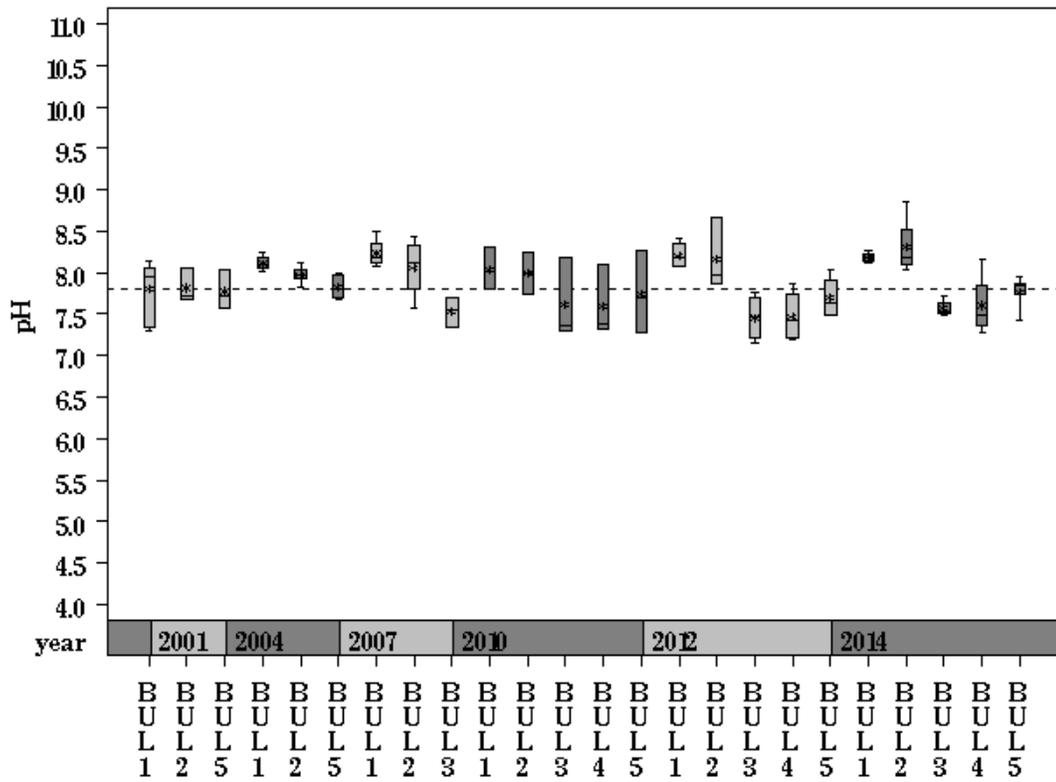
Parameter= TURBIDITY Unit= NTU Watershed= Bull



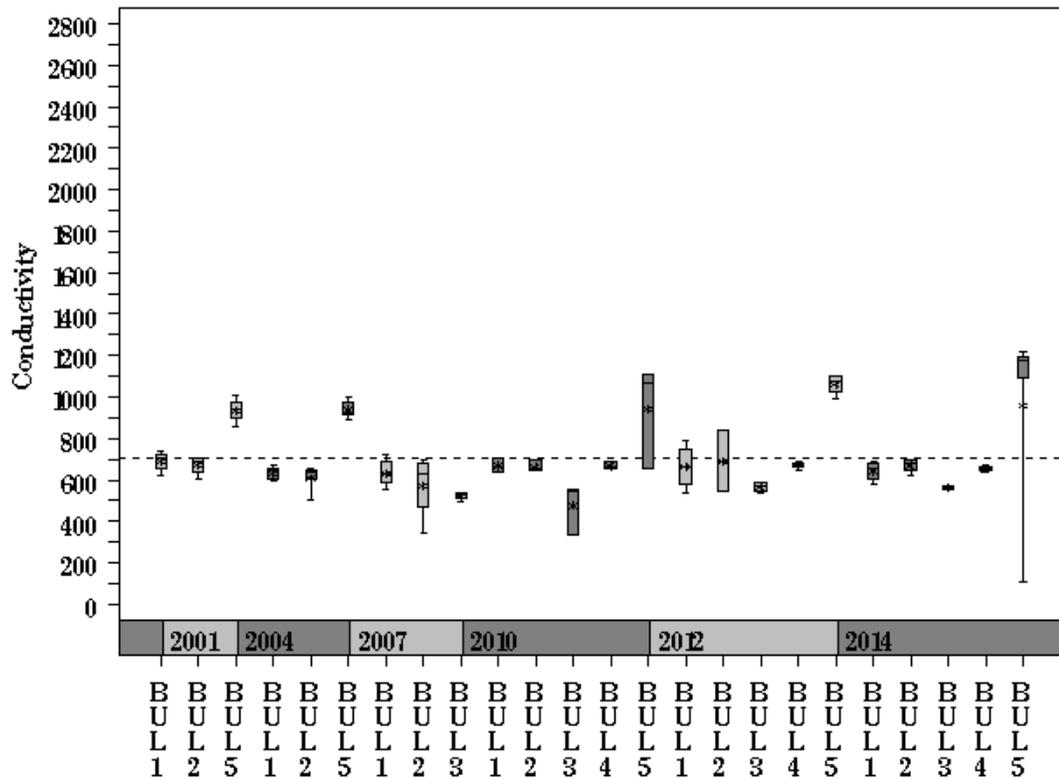
Bull Creek Watershed

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

Parameter= PH Unit= Standard units Watershed= Bull



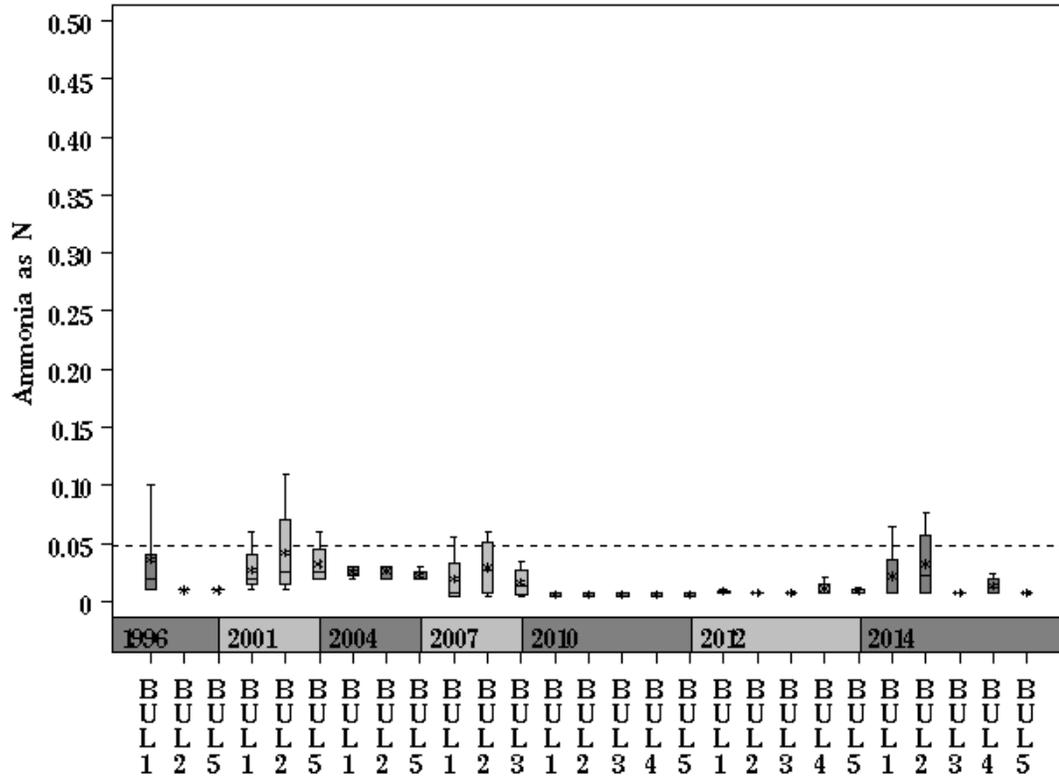
Parameter= CONDUCTIVITY Unit= uS/cm Watershed= Bull



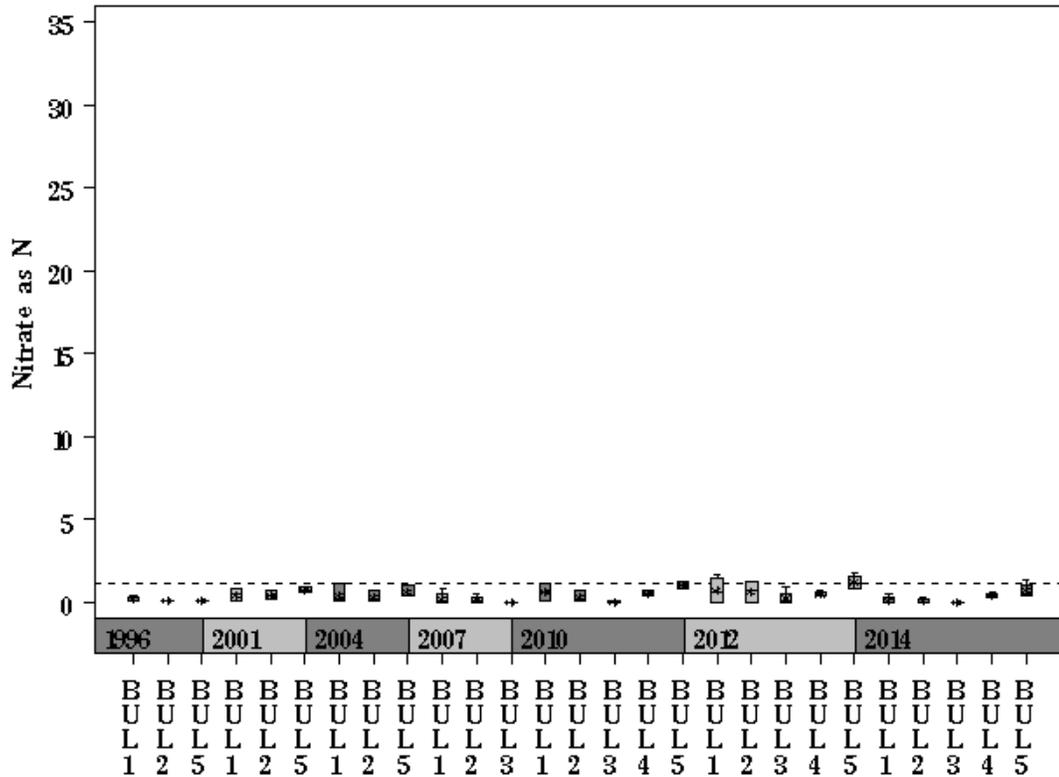
Bull Creek Watershed

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

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



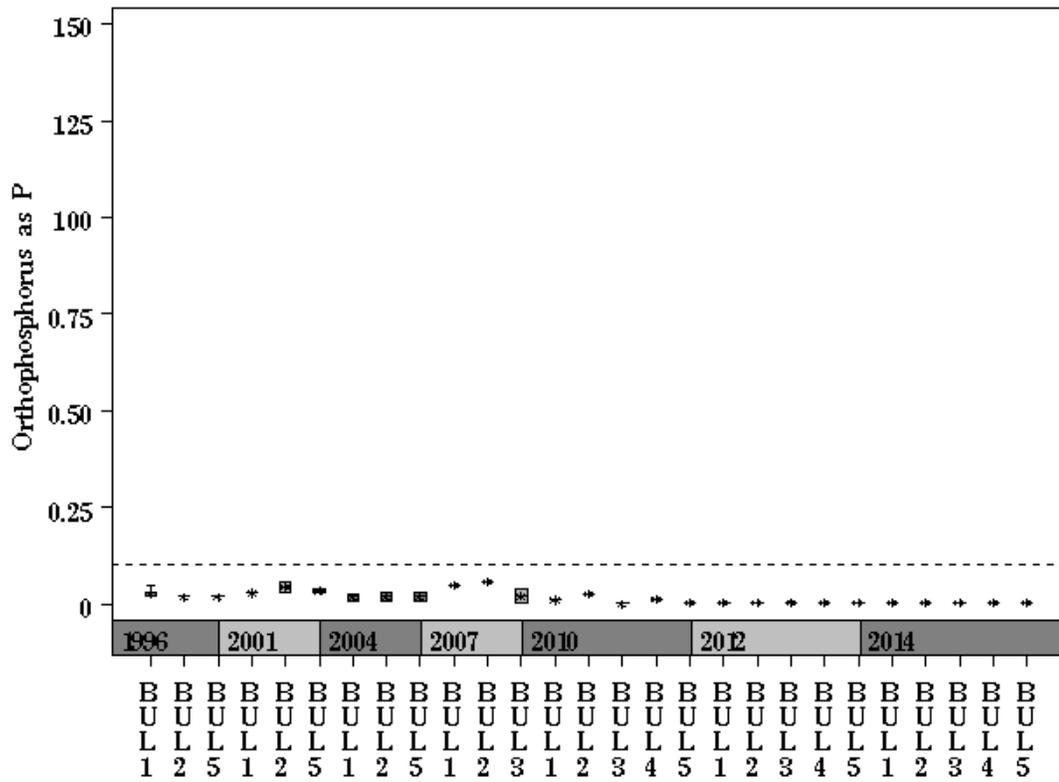
Parameter= NITRATE AS N Unit= mg/L Watershed= Bull



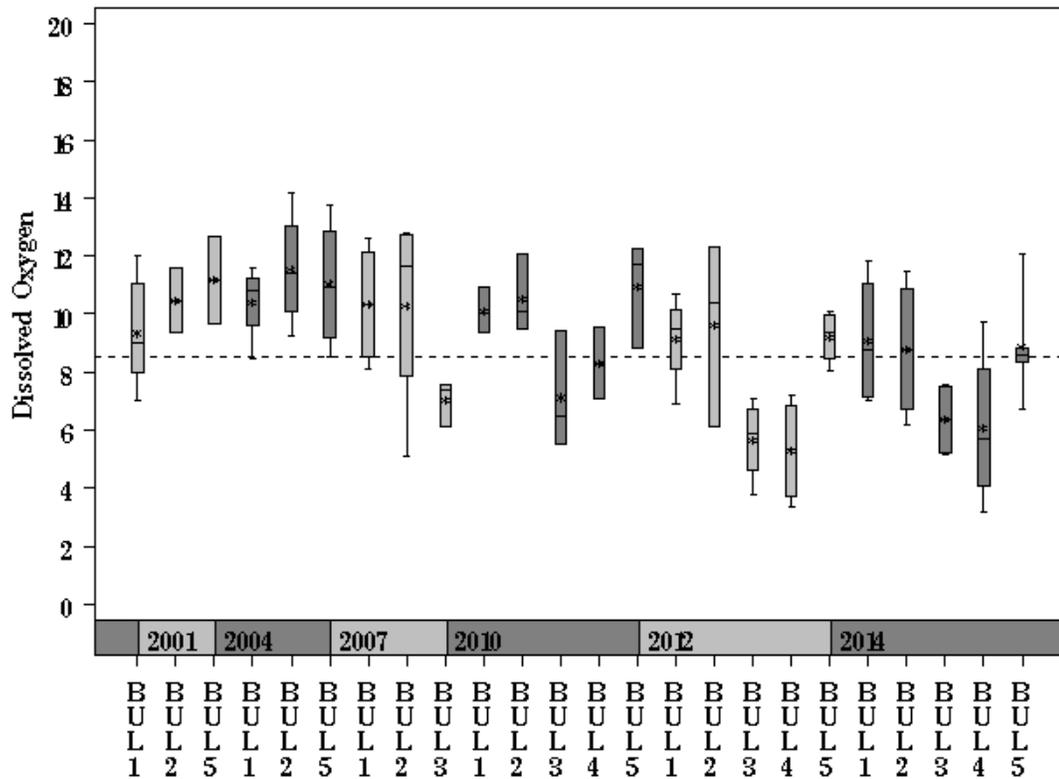
Bull Creek Watershed

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

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

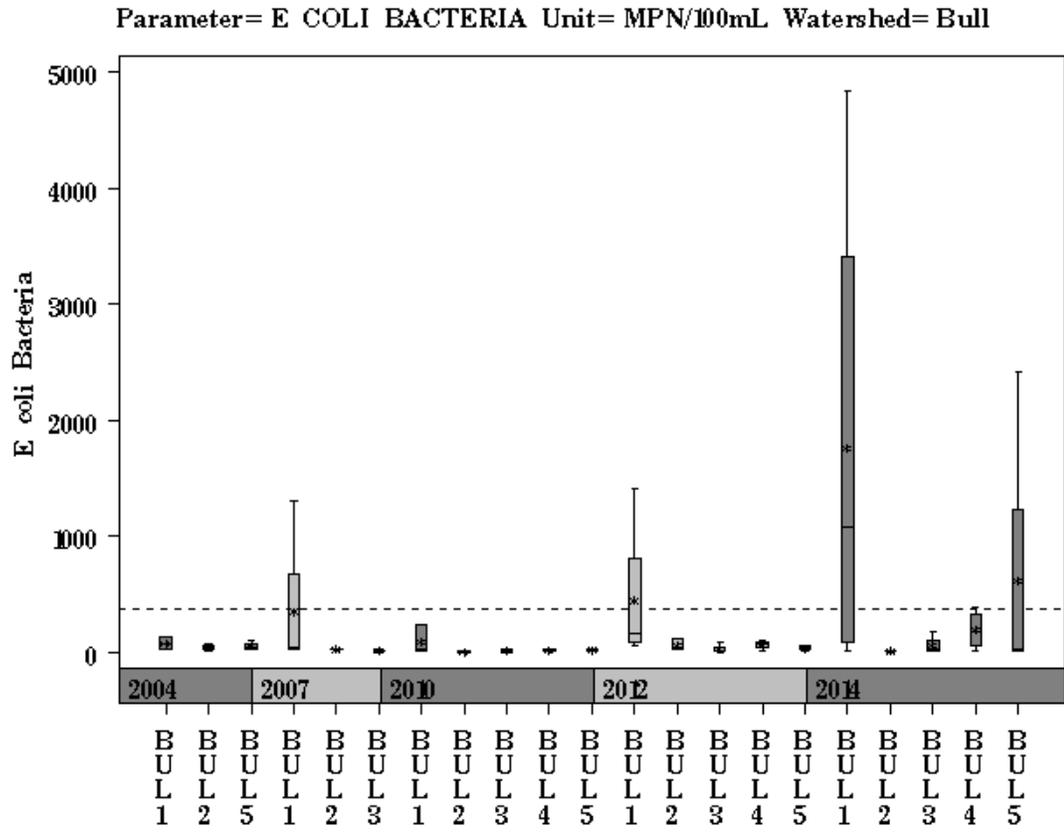


Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Bull



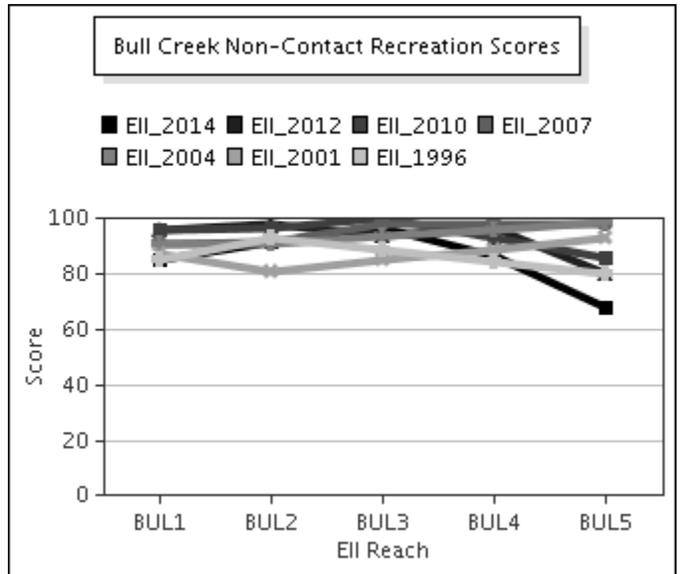
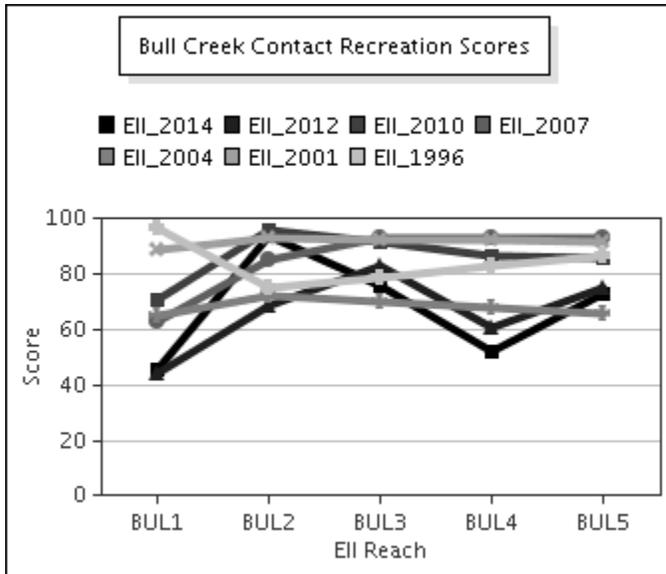
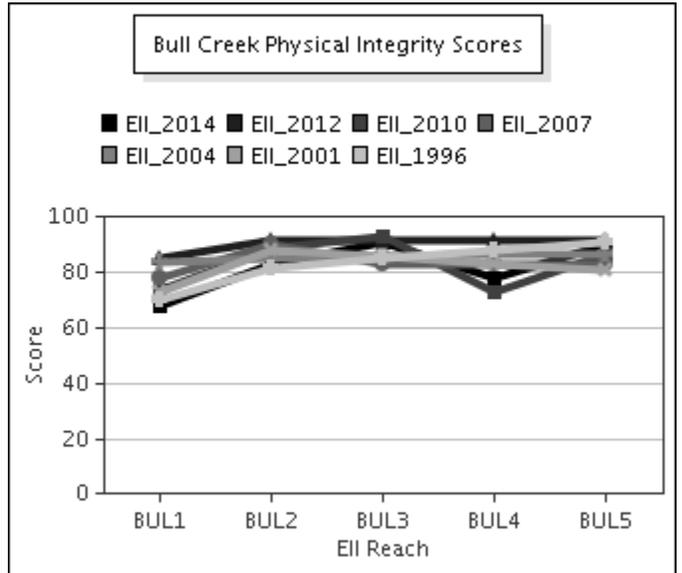
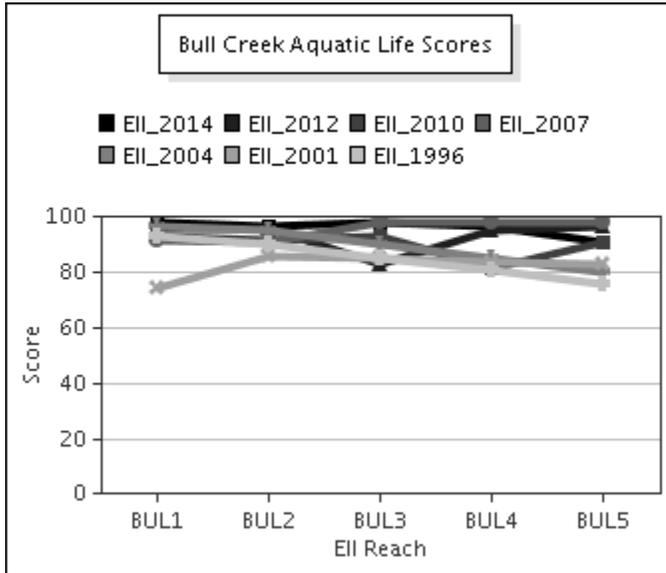
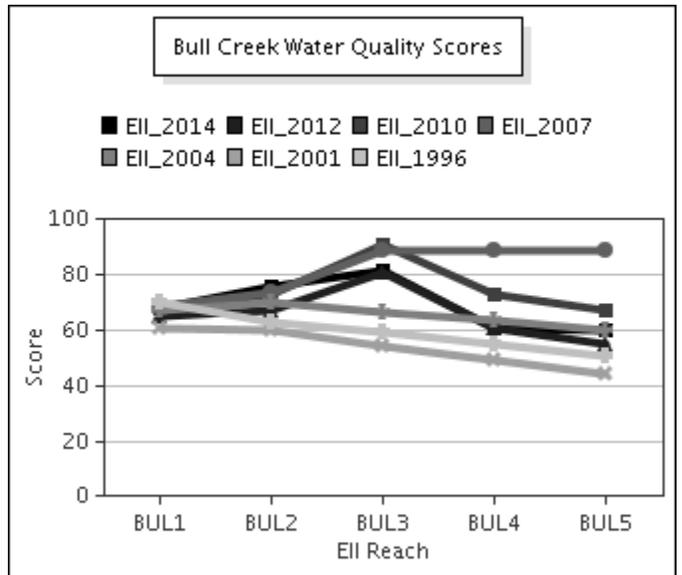
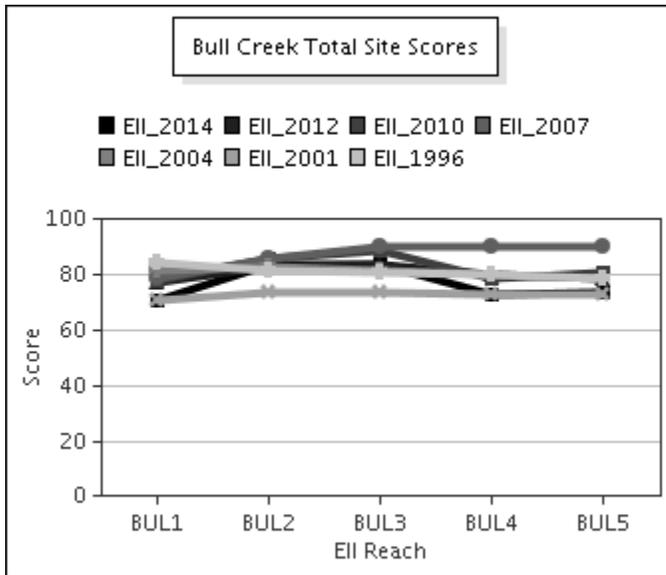
Bull Creek Watershed

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



Bull Creek Watershed

Score Summary – Reach scores for each sample year



Bull Creek Watershed

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

Benthic Macroinvertebrate ID	PTI	FFG	Bull @ Loop 360 1st Crossing (Site 350)	Bull @ St. Edwards (Site 920)	Bull us Trib 7 [Franklin] (Site 349)	Tributary 5 ds Hank Tract (Site 1164)	Tributary 6 @ Bull Creek (Site 151)
<i>Marilia</i> sp.	0	SH					4
<i>Perlesta</i> sp.	0	P		2	4		
<i>Chimarra</i> sp.	2	FC	11	125	2	128	156
<i>Helicopsyche</i> sp.	2	SC	1				3
<i>Hydroptila</i> sp.	2	SC,PI	7	1	15	2	4
<i>Microcyloopus pusillus</i>	2	SC,CG	3	2			2
<i>Phylloicus ornatus</i>	2	SH				1	
<i>Neotrichia</i> sp.	3	SC	1				
<i>Callibaetis</i> sp.	4	CG				1	
<i>Camelobaetidium</i> sp.	4	CG	51				
<i>Fallceon quilleri</i>	4	SC,CG	249	47	176	7	76
<i>Macrelmis</i> sp.	4	SC,CG					2
Ostracoda	4	FC,CG	1	8		1	
<i>Psephenus</i> sp.	4	SC			2		48
<i>Simulium</i> sp.	4	FC	6		10		26
<i>Agabus</i> sp.	5	P				4	
<i>Cincinnatia cincinnatiensis</i>	5	SC	3				
Gerridae	5	P			1	3	
<i>Lutrochus</i> sp.	5	CG		1			
<i>Petrophila</i> sp.	5	SC					3
<i>Tricorythodes</i> sp.	5	CG		1			45
<i>Argia</i> sp.	6	P	4	8	4	22	15
<i>Brechmorhoga mendax</i>	6	P	1				
<i>Cheumatopsyche</i> sp.	6	FC	41	90	40	123	89
Chironomidae	6	P,FC	4	11	87	65	66
Hydracarina	6		2	4	3		4
<i>Limonia</i> sp.	6	SH				2	
<i>Microvelia</i> sp.	6	P		13			
<i>Rhagovelia</i> sp.	6	P		7	9	33	14
<i>Stenonema femoratum</i>	6	SC,CG			18	4	
Tanypodinae	6	P	8	7	23	4	10
<i>Bezzia</i> sp. / <i>Palpomyia</i> sp.	7	P,CG			2		1
<i>Caenis</i> sp.	7	SC,CG			20	1	
<i>Stenelmis</i> sp.	7	SC,CG	4	2			2
<i>Tabanus</i> sp. / <i>Whitneyomyia</i> sp. / <i>Atylotus</i> sp. complex	7	P					3
<i>Caloparyphus</i> sp. / <i>Euparyphus</i> sp.	8	SC,CG		2			5
Hirudinea	8	P	1				
<i>Hyalella</i> sp.	8	SH,CG			6	13	71
Oligochaeta	8	CG			3	4	1
<i>Tipula</i> sp.	8	SH,CG				5	
Cambaridae		CG			1		
<i>Dugesia</i> sp.		P,CG	17	6			35

Bull Creek Watershed

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

Scoring Metric	Bull @ Loop 360 1st Crossing (Site 350)	Bull @ St. Edwards (Site 920)	Bull us Trib 7 (Franklin) (Site 349)	Tributary 5 ds Hank Tract (Site 1164)	Tributary 6 @ Bull Creek (Site 151)
Number of Taxa *	18	17	18	18	23
Hilsenhoff Biotic Index *	4.2	4.1	5.0	4.8	4.7
Number of Ephemeroptera Taxa *	2	2	3	4	2
Percent of Total as Chironomidae *	3	5	26	16	11
Number of EPT Taxa *	7	6	7	8	7
Percent of Total as EPT *	87	79	65	63	55
Percent of Total as Predator *	8	16	31	31	21
Number of Intolerant Taxa *	9	6	6	6	9
Percent Dominance (Top 3 Taxa) *	82	78	71	75	47
EPT / EPT + Chironomidae	1	1	1	1	1
Number of Diptera Taxa	2	2	3	3	5
Number of Non-Insect Taxa	5	3	4	3	4
Number of Organisms	415	337	426	423	685
Percent Dominance (Top 1 Taxa)	60	37	41	30	23
Percent of Total as Collector / Gatherer	78	20	53	9	35
Percent of Total as Dominant Guild (FFG)	78	72	54	76	51
Percent of Total as Elmidae	2	1	0	0	1
Percent of Total as Filterers	17	72	38	76	51
Percent of Total as Grazers (PI & SC)	65	16	54	3	21
Percent of Total as Tolerant Organisms	0	0	0	0	0
Percent of Trichoptera as Hydropsychidae	67	42	70	48	35
Ratio of Intolerant : Tolerant Organisms	5.12	1.29	0.97	0.53	1.31
TCEQ Qualitative Aquatic Life Use Score	33	30	21	26	29
TCEQ Quantitative Aquatic Life Use Score	33	29	27	21	37

* **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%.

Bull Creek Watershed

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

Diatom Species Name	PTI	Bull @ Loop 360 (Site 350)	Bull @ St. Edwards (Site 920)	Bull us Trib 7 (Franklin) (Site 349)	Tributary 5 ds Hanks Tract (Site 1164)	Tributary 6 @ Bull Creek (Site 151)
<i>Amphora inariensis</i>	4					2
<i>Brachysira neoexilis (serians)</i>	4		1	4		
<i>Cymbopleura amphicephala</i>	4				1	
<i>Diploneis oblongella</i>	4			2	8	
<i>Eucoconeis flexella</i>	4		2	15	49	
<i>Eunotia arcus</i>	4		1	18	40	21
<i>Rhopalodia parallela</i>	3.2	2				
<i>Achnanthydium affine</i>	3		2		6	
<i>Achnanthydium alteragracillimum</i>	3	4	8	56	36	4
<i>Achnanthydium minutissimum</i>	3	171	54	79	7	46
<i>Achnanthydium pyrenaicum</i>	3	18	29	87	14	
<i>Amphora pediculus</i>	3	3	2			10
<i>Brachysira vitrea</i>	3			2		
<i>Caloneis bacillum</i>	3		1			2
<i>Cocconeis pediculus</i>	3		18			45
<i>Cymbella laevis</i>	3				2	
<i>Denticula elegans</i>	3		2			
<i>Denticula kuetzingii</i>	3	27	122	14	2	83
<i>Diploneis parma</i>	3			2	31	
<i>Diploneis puella</i>	3					12
<i>Encyonema evergladianum</i>	3	31	39	10	2	
<i>Encyonema silesiacum</i>	3	1			6	
<i>Encyonopsis microcephala</i>	3	69	54	1		
<i>Epithemia turgida</i>	3	2		1	2	
<i>Eunotia bilunaris</i>	3				8	
<i>Fragilaria capucina</i>	3			14	18	
<i>Fragilaria delicatissima</i>	3		18	17	49	
<i>Gomphonema affine</i>	3	1		2		
<i>Gomphonema clavatum</i>	3		2			
<i>Gomphonema intricatum var. vibrio</i>	3			10		
<i>Mastogloia smithii</i>	3	1				
<i>Navicula cryptocephala</i>	3		2			
<i>Navicula cryptotenella</i>	3	2	2	11	3	
<i>Navicula radiosa</i>	3		6	8	10	1
<i>Reimeria sinuata</i>	3					13
<i>Rhopalodia gibba</i>	3		2			
<i>Tabularia fasciculata</i>	3			6		
<i>Tryblionella angustata</i>	3				1	
<i>Diatoma moniliformis</i>	2		8			
<i>Fragilaria radians</i>	2				8	
<i>Fragilaria vaucheriae</i>	2	4				1
<i>Gomphonema angustatum</i>	2			2		1
<i>Navicula recens</i>	2	1	1			
<i>Navicula sanctaerucis</i>	2				2	
<i>Nitzschia amphibia</i>	2	16	11	2	2	8
<i>Sellaphora pupula</i>	2		2			
<i>Gomphonema parvulum</i>	1			4		2
<i>Amphora copulata</i>					2	1
<i>Cocconeis placentula var. euglypta</i>		1			2	215
<i>Cymbella cistula</i>			2	4		
<i>Cymbella excisa</i>		2		2		
<i>Cymbella neoleptoceros</i>		3	4			
<i>Delicata delicatula</i>		94	28	80	8	
<i>Encyonema lapponicum</i>			13	6		
<i>Encyonema semilanceolatum</i>		6	20		10	4
<i>Fragilaria sepes</i>			12		2	2
<i>Gomphonema lagenula</i>						2
<i>Gomphonema mclaughlinii</i>		12		2	2	2
<i>Navicula antonii</i>						1
<i>Sellaphora stroemii</i>		6	8	2		9
<i>Ulnaria acus</i>		3	14	4	2	
<i>Ulnaria ulna</i>		20	10	33	165	13

Bull Creek Watershed

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

Scoring Metric	Bull @ Loop 360 1st Crossing (Site 350)	Bull @ St. Edwards (Site 920)	Bull us Trib 7 (Franklin) (Site 349)	Tributary 5 ds Hank Tract (Site 1164)	Tributary 6 @ Bull Creek (Site 151)
<i>Cymbella</i> Richness	5	3	3	4	1
Number of organisms	500	500	500	500	500
Number of taxa	25	33	31	31	24
Percent motile taxa	4	5	4	4	2
Percent similarity to reference condition	51	52	57	33	44
Pollution tolerance index	2.94	2.95	3.07	3.28	3.04

* **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.

Bull Creek Watershed

Site Photographs



1164_00-ur-05_26_2010



1164_00-ds-05_26_2010



151_00-us-05_26_2010



151_00-ds-05_26_2010



349_00-us-05_26_2010



349_00-ds-05_26_2010

Bull Creek Watershed

Site Photographs



920_00-us-05_26_2010



920_00-ds-05_26_2010



350_00-us-05_26_2010



350_00-ds-05_26_2010



347_us_06_18_2007



347_ds_06_18_2007

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