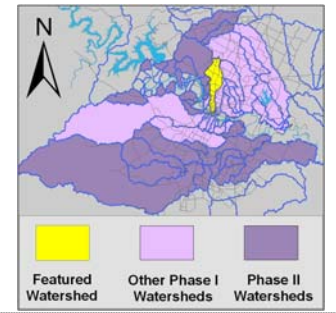


Shoal Creek Watershed

Watershed Overview

Catchment	Total area	13 square miles					
	Area in recharge	3 square miles					
	Creek length	11 miles					
	Receiving water	Town Lake					
Demographics	2000 population	59,011					
	2030 projected population	78,759					
	30 year projected % increase	33 %					
Land Use	Impervious cover (2003 estimate)	47.3 %					
	Impervious cover (2013 estimate)	53.3 %					
Overall EII Scores	2000	2003	2006	2009	2011	2013	2015
	60	54	55	63	57	59	63



Flow Regime* for Sample Sites on Shoal Creek Upstream to Downstream

Site	2001		2003					2006					2009					2010	2011				2013					2015					
	Feb	Feb	Feb	Mar	Mar	May	Sep	Dec	Feb	May	Jul	Aug	Nov	Feb	May	May	Oct	Dec	Dec	Mar	Jun	Jun	Sep	Jan	Apr	May	Jun	Jun	Sep	Jan	Apr	Jul	Sep
	WQ	Bio	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	
118	B	B	B	B	B	B	B	n	B	B	B	n	B	B	B	B	B	B	n	B	n	n	n	B	B	B	B		B	B	B	B	n
117	B	B	B	B	B	B	B	B	B	B	B	n	B	B	B	B	B	B	B	B	n	n	n	B	B	B	B		B	B	B	B	n
116	B	B	B	B	B	B	B	B	B	B	B	n	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		B	B	B	B	B
122	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	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 Shoal Creek Sites by Year

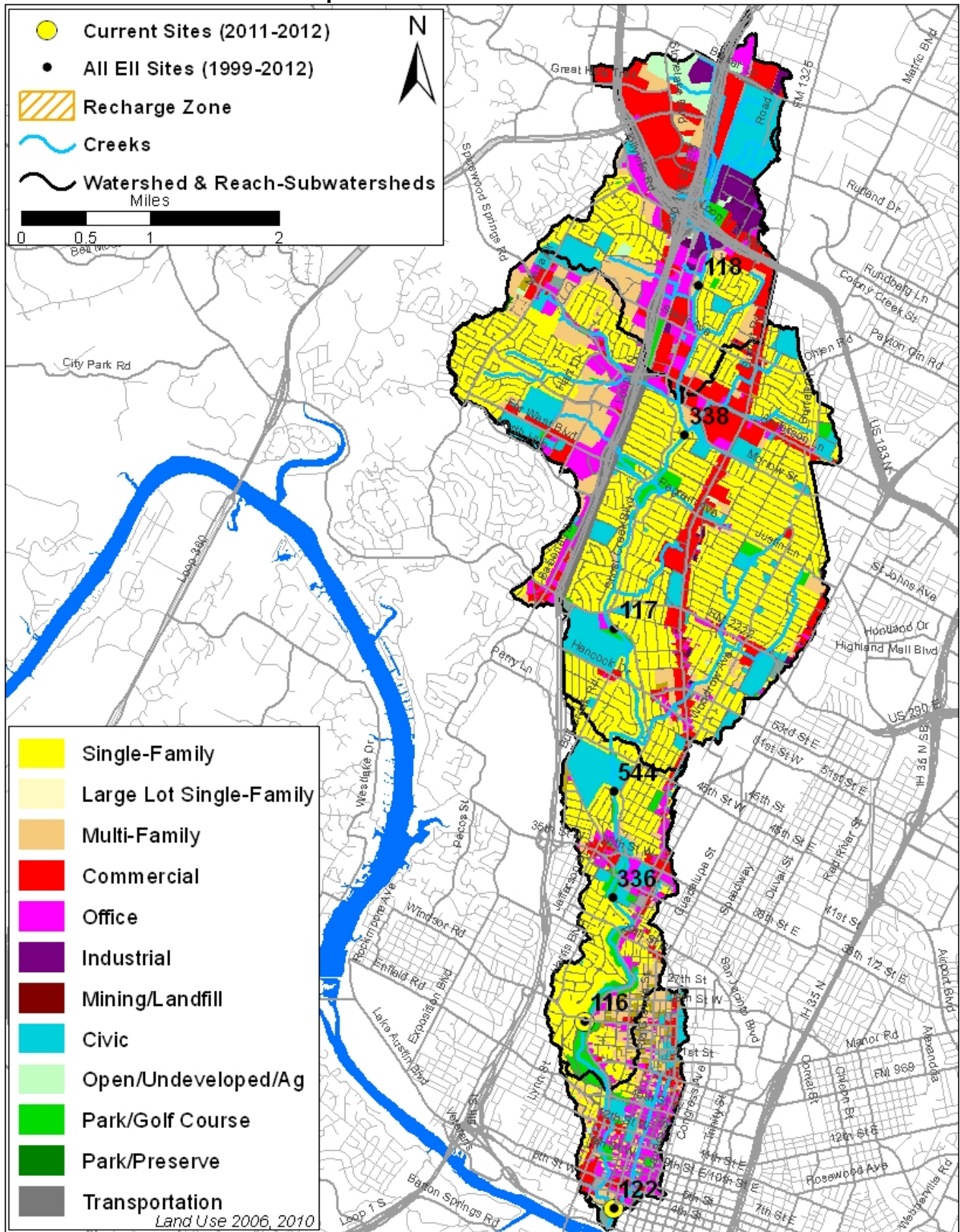
Reach	Site	Site Name	Year	Water Quality	Sediment*	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
SHL1	122	Shoal Creek Upstream of 1st St.	1996	27	51	14	37	58	35	30	39	37
SHL2	116	Shoal Creek @ 24th Street	1996	41	51	45	68	51	52	52	51	51
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	1996	56	51	93	79	60	54	69	38	66
SHL4	118	Shoal Creek DS of Crosscreek Drive	1996	63	51	24	59	50	51	32	70	50
SHL1	122	Shoal Creek Upstream of 1st St.	2000	44	89	63	64	33	37	31	42	55
SHL2	116	Shoal Creek @ 24th Street	2000	53	89	74	63	28	38	40	36	57
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2000	62	89	65	77	45	39	40	37	63
SHL4	118	Shoal Creek DS of Crosscreek Drive	2000	64	89	75	63	42	62	60	64	66
SHL1	122	Shoal Creek Upstream of 1st St.	2003	32	68	60	34	35	45	34	56	46
SHL2	116	Shoal Creek @ 24th Street	2003	51	68	41	66	32	36	29	43	49
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2003	62	68	62	65	65	36	32	40	60
SHL4	118	Shoal Creek DS of Crosscreek Drive	2003	68	68	67	68	54	37	41	32	60
SHL1	122	Shoal Creek Upstream of 1st St.	2006	34	59	30	59	46	38	30	45	44
SHL2	116	Shoal Creek @ 24th Street	2006	48	59	24	79	47	64	62	66	54
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2006	67	59	49	72	57	59	58	60	61
SHL4	118	Shoal Creek DS of Crosscreek Drive	2006	70	59	59	53	58	56	53	59	59
SHL1	122	Shoal Creek Upstream of 1st St.	2009	48	60	25	79	57	79	83	75	58
SHL2	116	Shoal Creek @ 24th Street	2009	64	60	28	84	59	94	91	97	65
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2009	69	60	37	78	72	79	90	68	66
SHL4	118	Shoal Creek DS of Crosscreek Drive	2009	76	60	36	83	49	74	65	82	63
SHL1	122	Shoal Creek Upstream of 1st St.	2011	36	70	25	55	54	53	46	60	49
SHL2	116	Shoal Creek @ 24th Street	2011	62	70	48	80	50	62	61	63	62
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2011	79	70	62	76	63	64	60	67	69
SHL4	118	Shoal Creek DS of Crosscreek Drive	2011	85	70	25	42	60				47
SHL1	122	Shoal Creek Upstream of 1st St.	2013	36	62	25	56	41	82	80	84	50
SHL2	116	Shoal Creek @ 24th Street	2013	60	62	31	83	47	81	80	82	61
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2013	74	62	48	63	58	83	84	81	65
SHL4	118	Shoal Creek DS of Crosscreek Drive	2013	71	62	28	83	56	62	66	57	60
SHL1	122	Shoal Creek Upstream of 1st St.	2015	37	60	25	77	60	79	83	75	56
SHL2	116	Shoal Creek @ 24th Street	2015	57	60	65	72	51	79	87	71	64
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	2015	60	60	40	81	70	84	90	78	66
SHL4	118	Shoal Creek DS of Crosscreek Drive	2015	70	60	38	81	65	79	78	79	66

* blank cells indicate parameter was not collected, blank columns 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

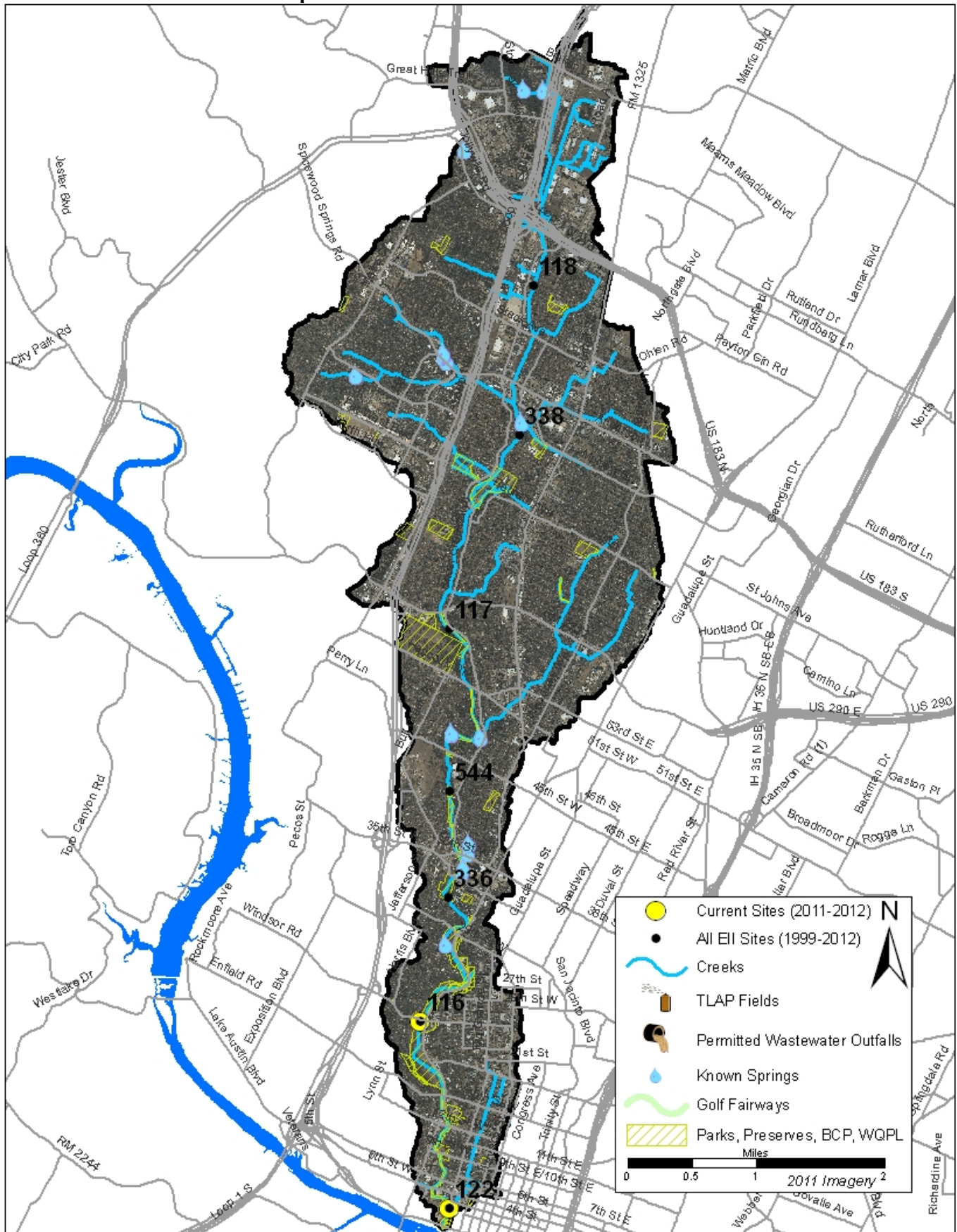
Shoal Creek Watershed

Land Use Map



Shoal Creek Watershed

Aerial Map



Shoal Creek Watershed

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & *E. coli* for 2015 Sample Sites (Downstream to Upstream)

Qualifiers to the left of the value	>	Greater than	Qualifiers to the right of the value	(blank)	Useable
	<	Less than		S	Exceeds standard range
	<J	Less than detected limit		R	Rejected, failed QC
	J	Estimated			

Watershed	Site	EII Reach	Date	<>	Temp.	flag	<>	Cond.	flag	<>	pH	flag	<>	D.O.	flag	<>	E. Coli	flag
Shoal	122	SHL1	01/14/2015		9.9			687			7.93			10.6		>	2419.6	
Shoal	122	SHL1	04/15/2015		20.5			842			7.86			7.2		>	2419.6	
Shoal	122	SHL1	07/10/2015		25.9			839			7.84			5.6				
Shoal	122	SHL1	07/14/2015		26.9			873			7.98			6.7	R		1203.3	
Shoal	122	SHL1	09/09/2015		26.8			812			7.70			4.8			727.0	
SHL1 Mean					22.0			810			7.86			7.0			1692.4	
Shoal	116	SHL2	01/14/2015		8.3			741			7.97			12.3			365.4	
Shoal	116	SHL2	04/15/2015		24.9			952			8.31			18.0			32.8	
Shoal	116	SHL2	07/10/2015		28.0			934			8.09			10.8				
Shoal	116	SHL2	07/14/2015		31.3			921			8.15			10.6	R		63.6	
Shoal	116	SHL2	09/09/2015		28.7			921			7.89			9.0			14.5	
SHL2 Mean					24.2			894			8.08			12.1			119.1	
Shoal	117	SHL3	01/14/2015		6.6			387			7.88			10.4	R		86.7	
Shoal	117	SHL3	04/15/2015		17.9			759			7.62			5.8			153.9	
Shoal	117	SHL3	07/10/2015		28.1			593			8.09			10.4				
Shoal	117	SHL3	07/14/2015		26.0			666			7.86			6.9			648.8	
SHL3 Mean					19.7			601			7.86			8.4			296.5	
Shoal	118	SHL4	01/14/2015		6.5			421			7.89			11.4	R		344.8	
Shoal	118	SHL4	04/15/2015		17.7			561			7.52			5.3			107.1	
Shoal	118	SHL4	07/10/2015		27.2			523			7.97			10.8				
Shoal	118	SHL4	07/14/2015		25.0			593			9.14			4.8			387.0	
SHL4 Mean					19.1			524			8.13			8.1			279.6	
Shoal Mean					21.5			724			7.98			9.0			641.0	

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

Summary Statistics for all 2015-2016 E.I.I. Sites Combined					
Parameter	2015-2016 Average	2015-2016 Minimum	2015-2016 Maximum	1 Standard Deviation Above	1 Standard Deviation Below
Temperature (C°)	20.7	5.8	34.2	27.5	
Conductivity (uS/cm)	722	160	3549	955	
pH (Standard units)	7.86	5.85	10.25	8.24	7.47
D.O. (mg/l)	7.9	0.1	18.7	10.4	5.5
<i>E. Coli</i> (col/100ml)	316.1	1.0	2420.0	883.7	

Shoal Creek Watershed

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2015 Sample Sites (Downstream to Upstream)

Qualifiers to the left of the value	>	Greater than	Qualifiers to the right of the value	(blank)	Useable
	<	Less than		S	Exceeds standard range
	<J	Less than detected limit		R	Rejected, failed QC
	J	Estimated			

Watershed	Site	EII Reach	Date	NH3-N	NO3/NO2	Ortho-P	T.S.S	Turb.
				<> flag	<> flag	<> flag	<> flag	<> flag
Shoal	122	SHL1	01/14/2015	<J 0.008	1.40	0.023	1.3	4.2 R
Shoal	122	SHL1	04/15/2015	0.081	1.59	0.064	6.8	2.0
Shoal	122	SHL1	07/10/2015					
Shoal	122	SHL1	07/14/2015	0.029	2.42	0.041	1.3	3.4 R
Shoal	122	SHL1	09/09/2015	0.039	2.50	0.130	<J 1.0	1.9 R
SHL1 Mean				0.039	1.98	0.064	2.6	2.8
Shoal	116	SHL2	01/14/2015	<J 0.008	1.00	<J 0.004	3.5	12.1 R
Shoal	116	SHL2	04/15/2015	<J 0.008	0.11	<J 0.004	1.4	4.4
Shoal	116	SHL2	07/10/2015					
Shoal	116	SHL2	07/14/2015	0.032	0.54	<J 0.004	10.2	2.2 R
Shoal	116	SHL2	09/09/2015	<J 0.008	0.04	<J 0.004	2.5	1.7 R
SHL2 Mean				0.014	0.42	0.004	4.4	5.1
Shoal	117	SHL3	01/14/2015	<J 0.008	0.53	<J 0.004	3.0	5.3 R
Shoal	117	SHL3	04/15/2015	<J 0.008	0.29	<J 0.004	<J 1.1	1.6
Shoal	117	SHL3	07/10/2015					
Shoal	117	SHL3	07/14/2015	<J 0.008	0.95	<J 0.004	<J 1.0	2.7 R
SHL3 Mean				0.008	0.59	0.004	1.7	3.2
Shoal	118	SHL4	01/14/2015	<J 0.008	0.35	<J 0.004	4.2	2.7 R
Shoal	118	SHL4	04/15/2015	<J 0.008	0.09	<J 0.004	<J 1.1	0.9
Shoal	118	SHL4	07/10/2015					
Shoal	118	SHL4	07/14/2015	<J 0.008	0.03	<J 0.004	<J 1.0	1.1 R
SHL4 Mean				0.008	0.16	0.004	2.1	1.6
Shoal Mean				0.018	0.84	0.021	2.8	3.3

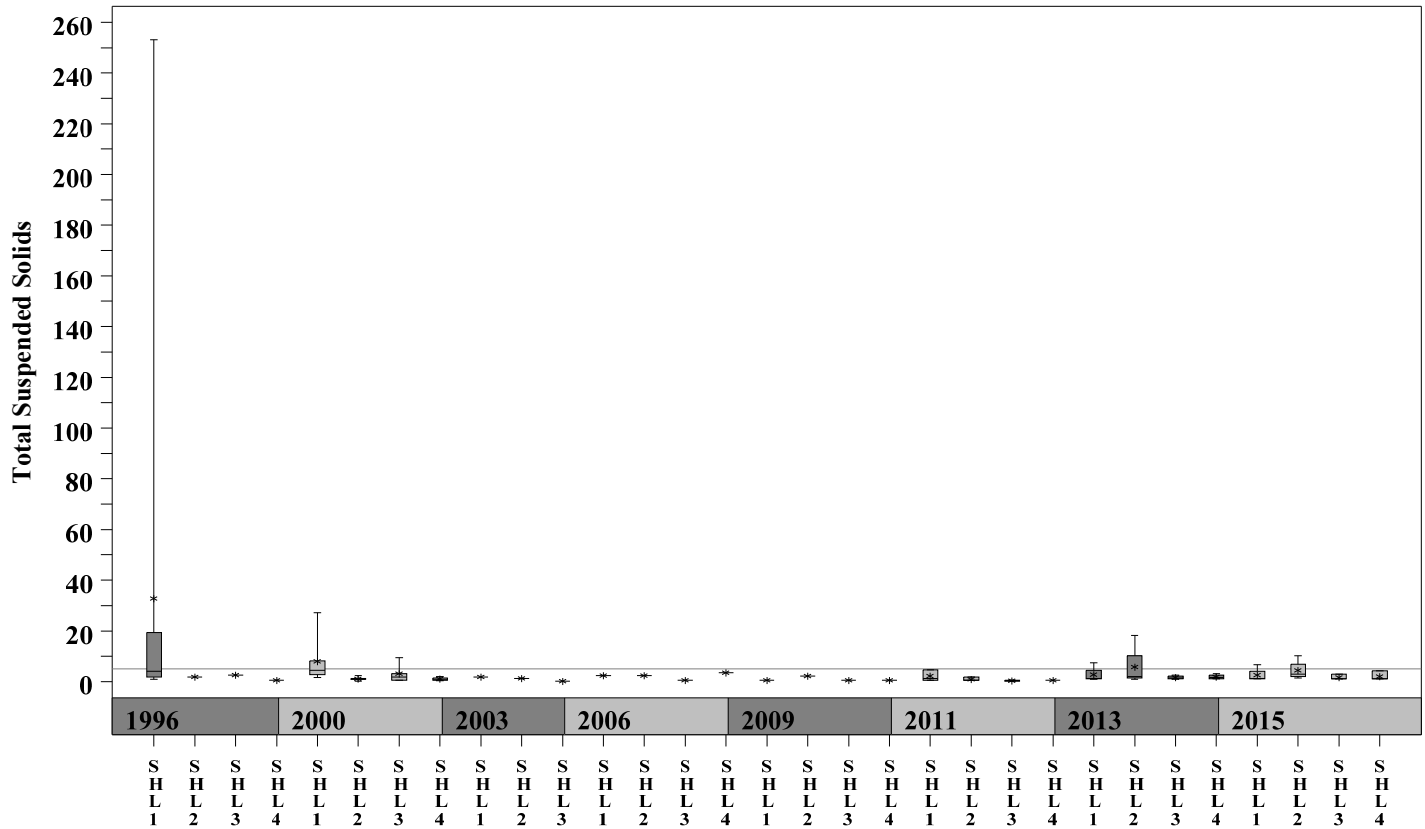
Gray highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

Summary Statistics for all 2015-2016 E.I.I. Sites Combined				
Parameter	2015-2016 Average	2015-2016 Minimum	2015-2016 Maximum	1 Standard Deviation Above
NH3-N (mg/l)	0.018	0.008	0.881	0.085
NO3-N (mg/l)	1.14	0.01	12.0	3.16
Ortho-P (mg/l)	0.016	0.004	0.661	0.08
T.S.S. (mg/l)	3.7	1.0	58.2	9.7
Turbidity (NTU)	4.4	0.2	98.6	11.7

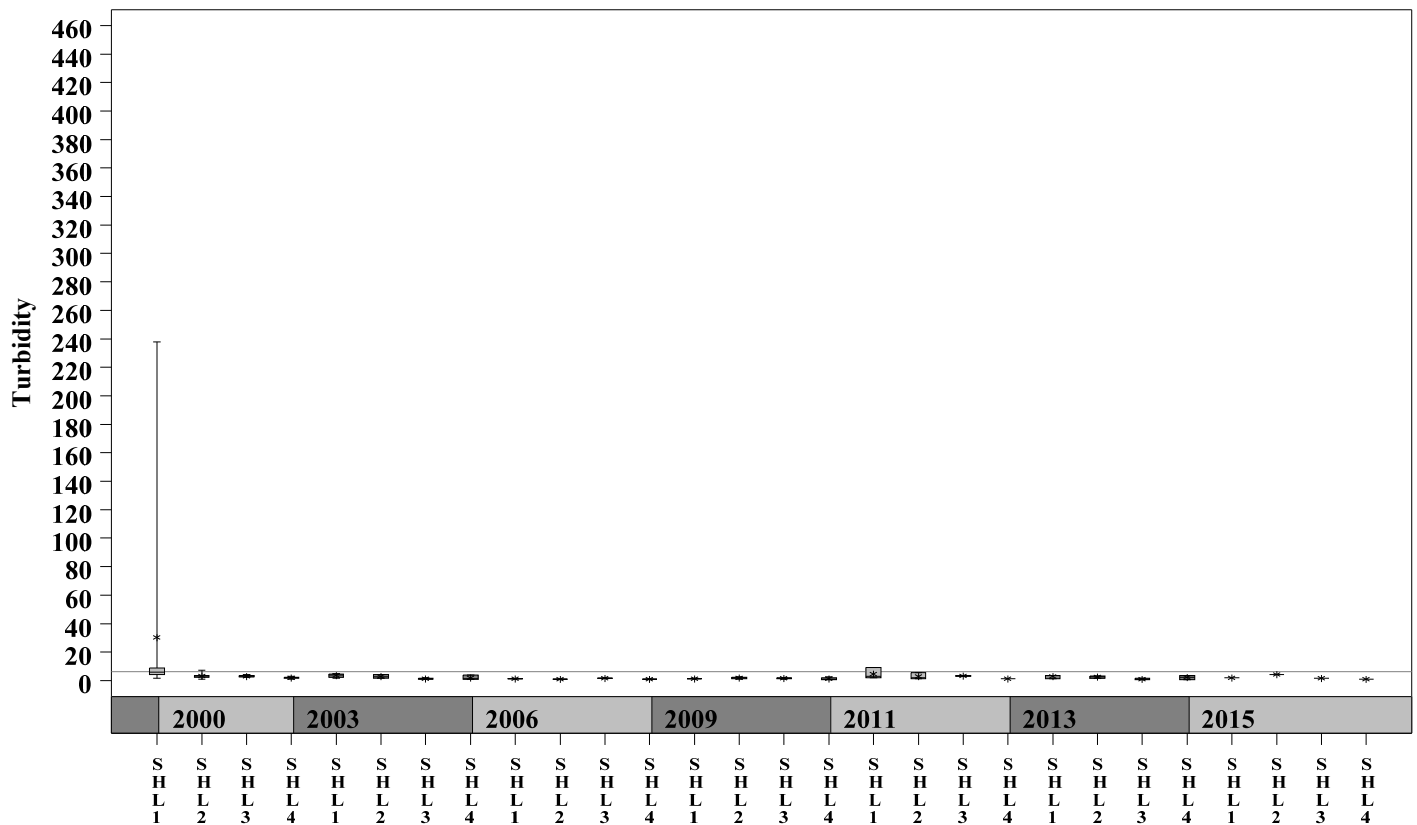
Shoal Creek Watershed

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

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



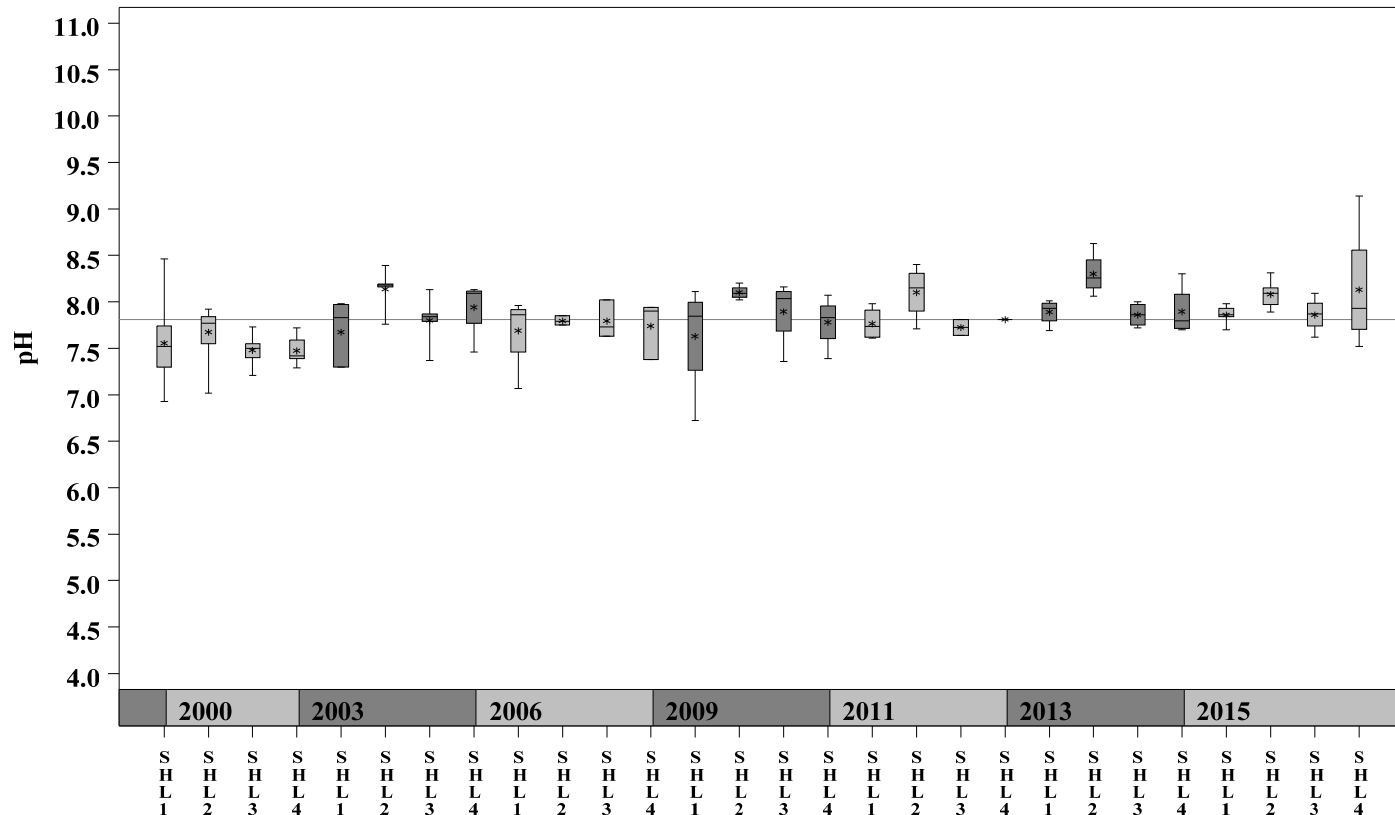
Parameter = TURBIDITY Unit = NTU Watershed = Shoal



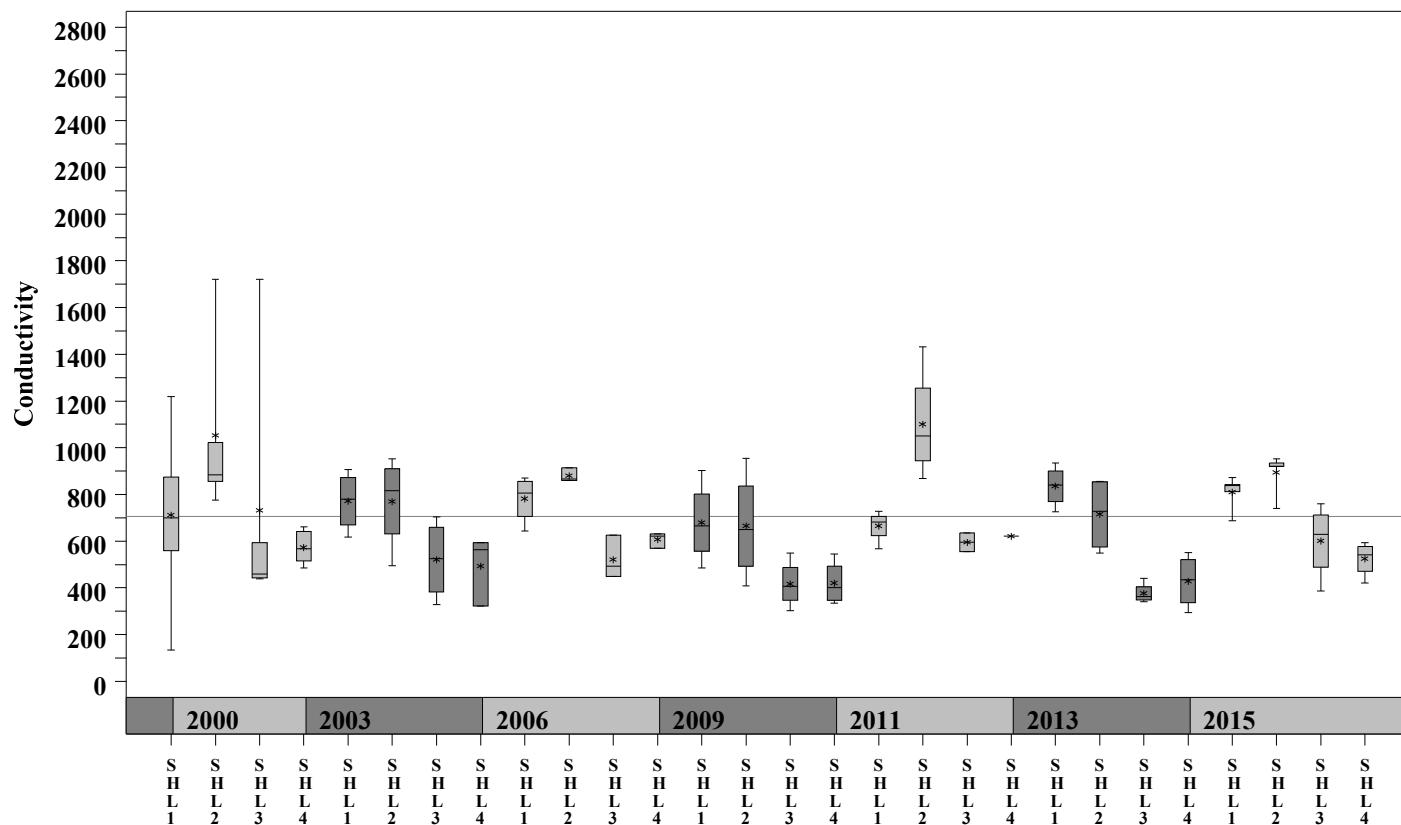
Shoal Creek Watershed

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

Parameter = pH Unit = Standard Units Watershed = Shoal



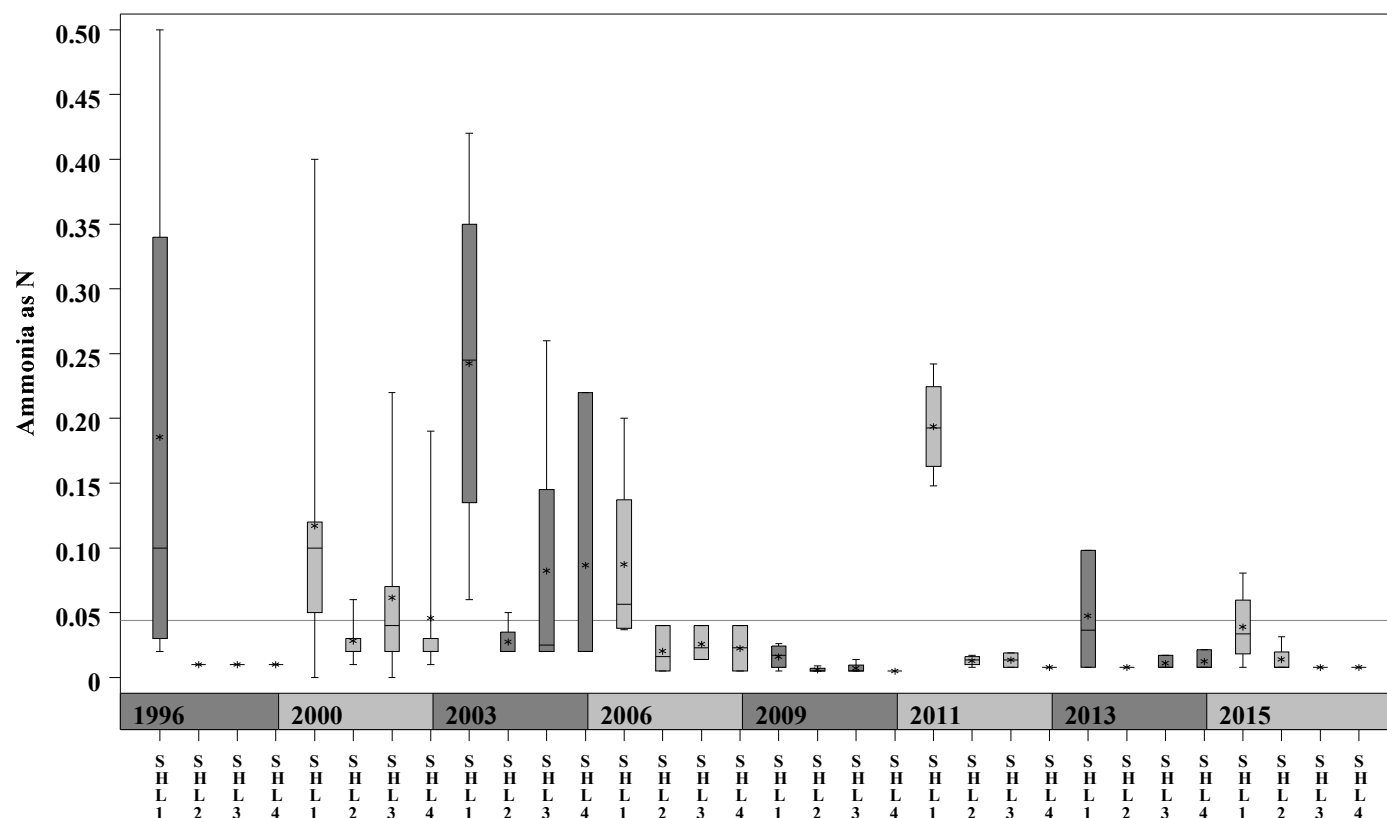
Parameter = CONDUCTIVITY Unit = uS/cm Watershed = Shoal



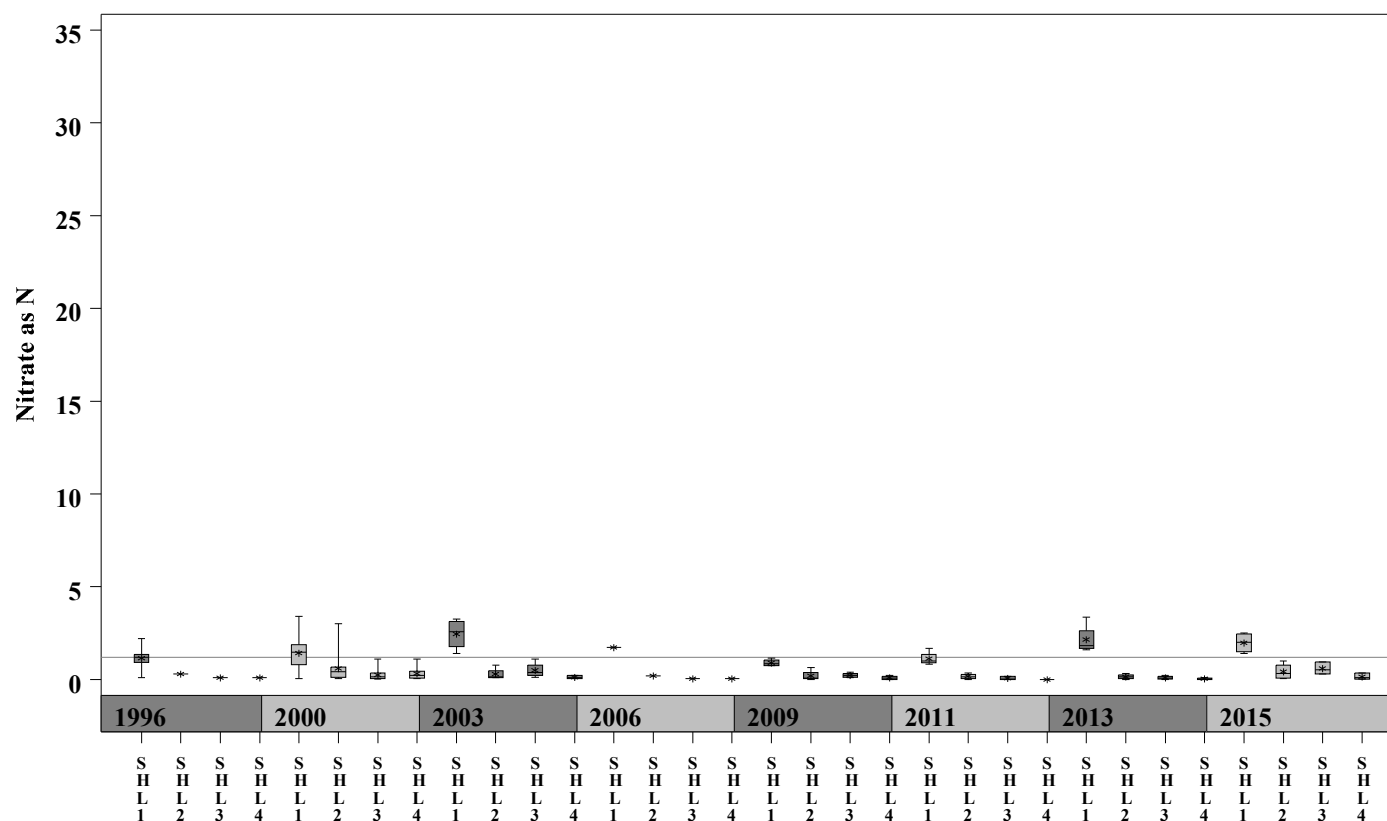
Shoal Creek Watershed

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

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



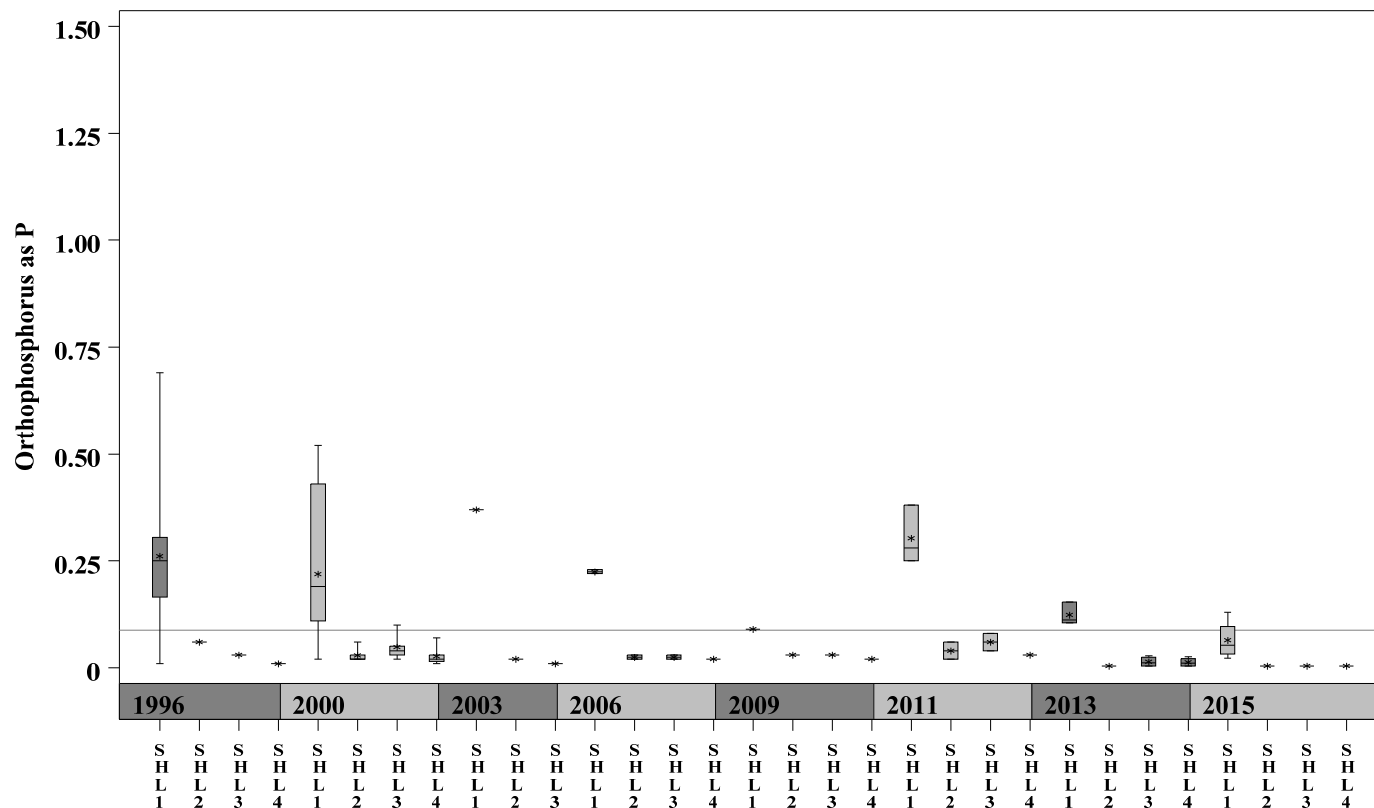
Parameter = NITRATE AS N Unit = mg/L Watershed = Shoal



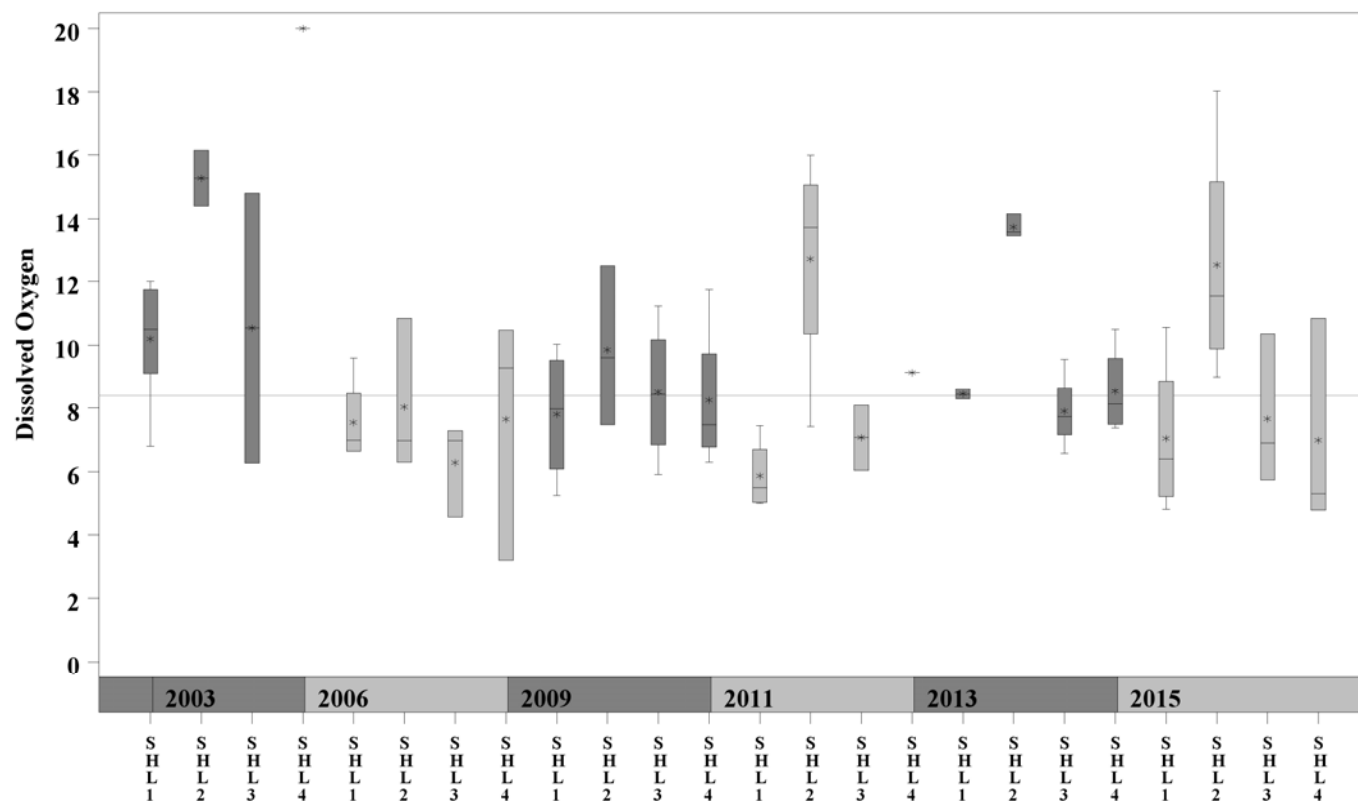
Shoal Creek Watershed

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

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



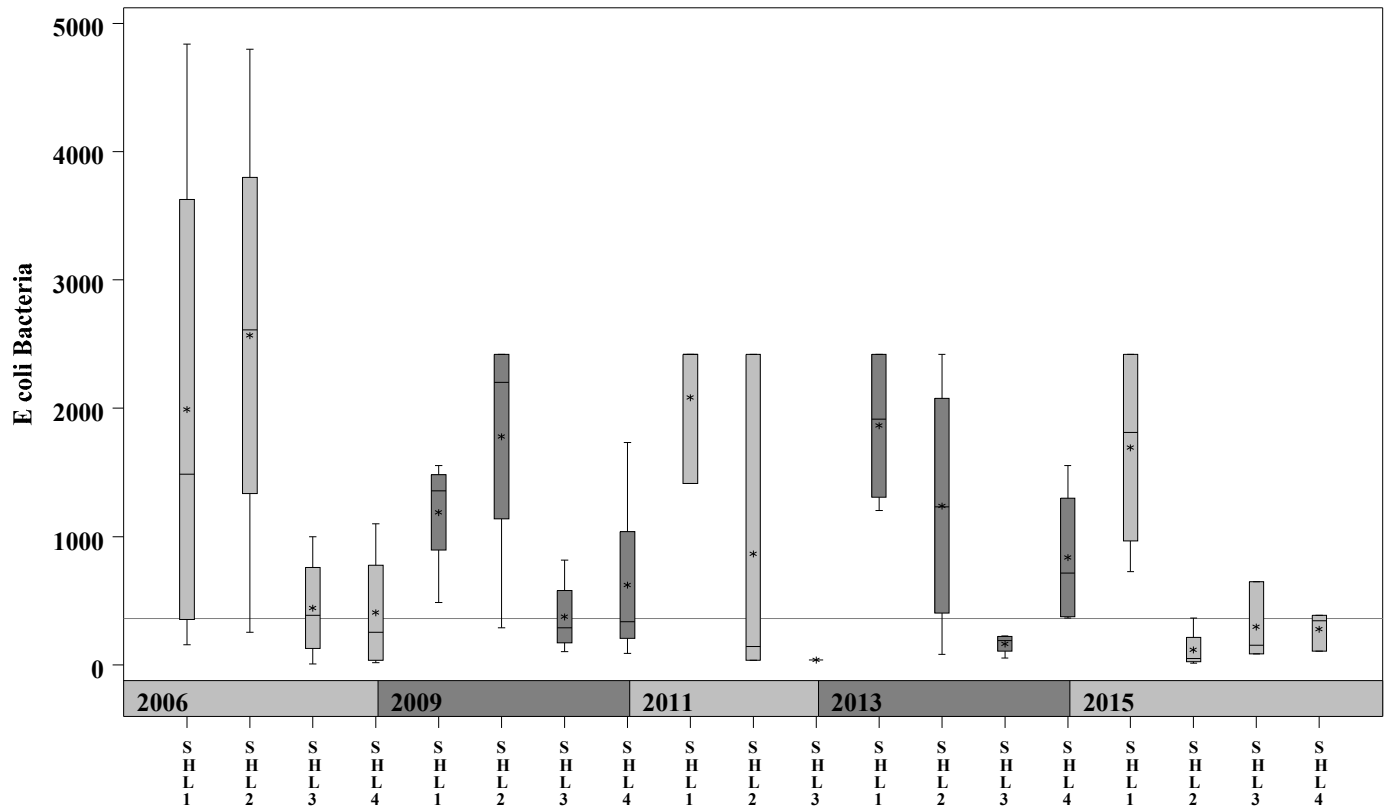
Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Shoal



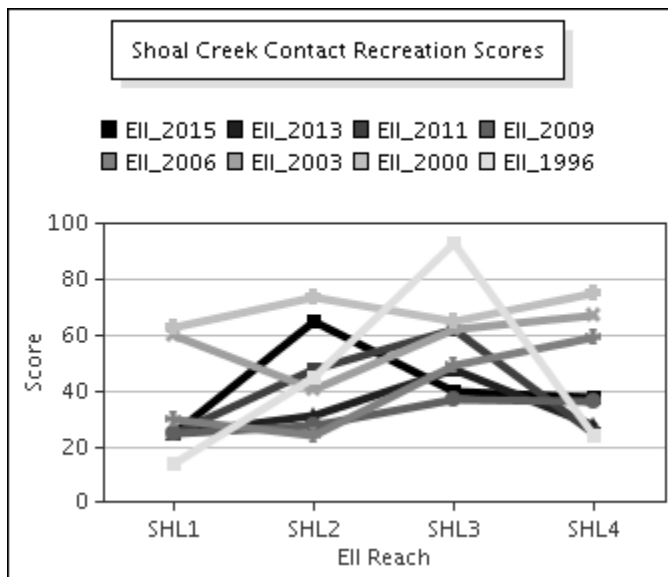
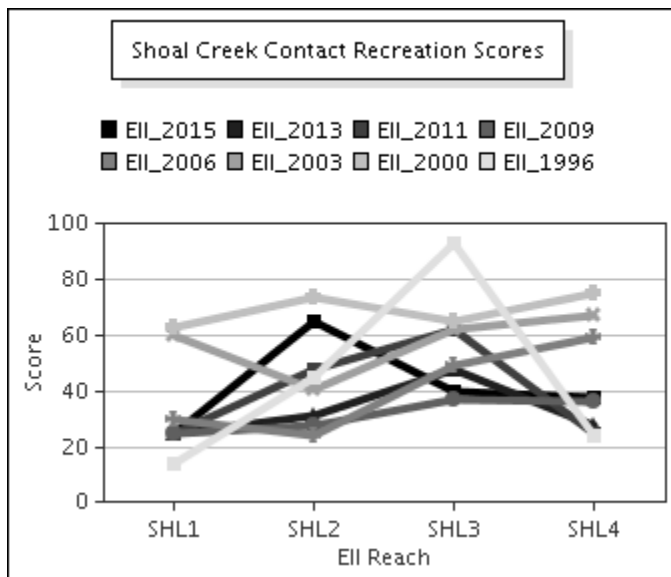
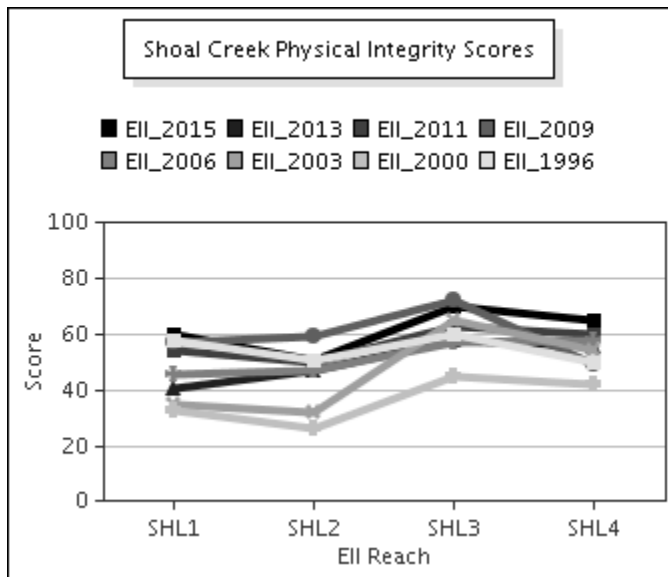
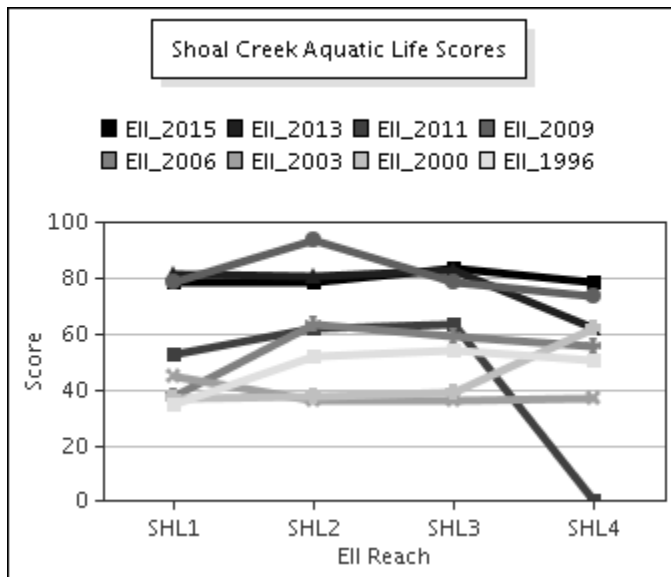
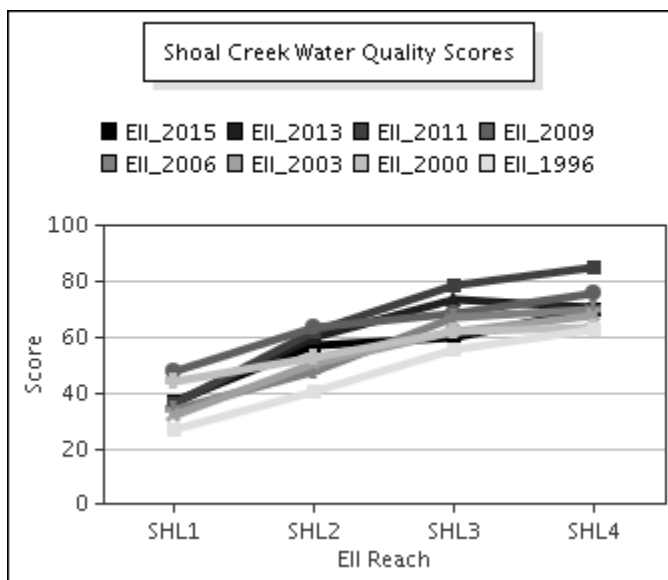
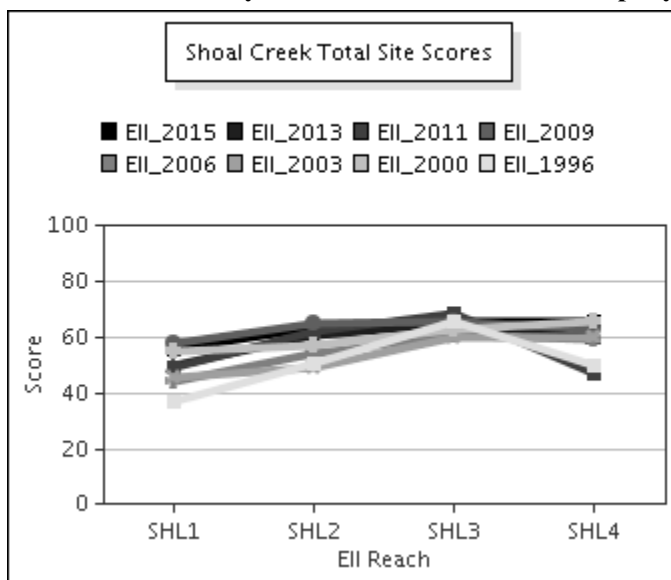
Shoal Creek Watershed

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

Parameter = E COLI BACTERIA Unit = MPN/100mL Watershed = Shoal



Score Summary – Reach scores for each sample year



Shoal Creek Watershed

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2015 Sample Sites (Downstream to Upstream)

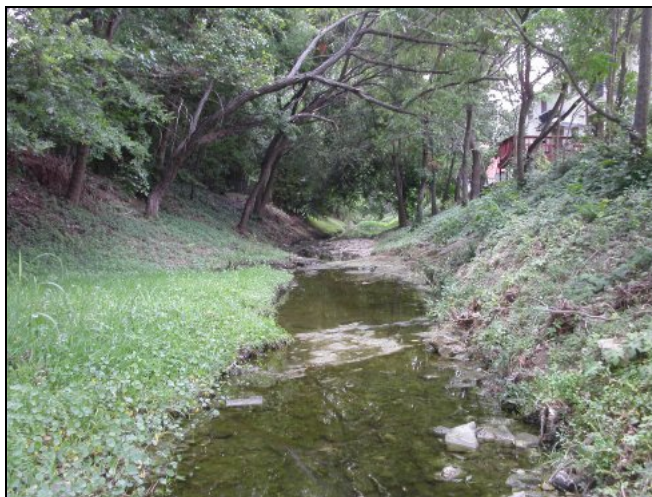
Benthic Macroinvertebrates - Shoal Creek			SHL @ Crosscreek (118) 07/08/2015 (WRE)	SHL @ Shl Edge Ct (117) 07/08/2015 (WRE)	SHL @ 24th (116) 07/10/2015 (WRE)	SHL us 1st (122) 07/10/2015 (WRE)
Benthic Macroinvertebrate ID	PTI	FFG				
Chimarra	2	FC	7	76	23	2
Hydroptila	2	PI,SC				1
Camelobaetidius	4	CG	3	30	18	3
Fallceon	4	CG,SC	44	83	158	119
Neochoroterpes	4	CG	7		2	
Ostracoda	4	CG,FC				1
Simulium	4	FC	1	11		3
Petrophila (Moth)	5	SC	1	2		
Argia	6	P	26	38		7
Brechmorhoga Mendax	6	P	7		1	
Cheumatopsyche	6	FC	4	71	26	2
Chironomidae	6	FC,P	17	32	10	3
Hetaerina	6	P		2		
Rhagovelia	6	P	3			
Tanypodinae	6	P	9		9	1
Caenis	7	CG,SC		1	12	
Stenelmis	7	CG,SC	2	1		
Hirudinea	8	P		2		
Hyaella	8	CG,SH	2	10	1	2
Oligochaeta	8	CG		1		1
Physella	9	SC			2	
Belostoma	10	P	1			
Dugesia		CG,P	64	1	5	

Shoal Creek Watershed

Site Photographs



118_t00-us-07_07_2006



118_t00-ds-07_07_2006



117_t00-ds-02_12_2001



117_t00-us-07_07_2006



117-t00-us-05-28-2009



117-t00-ds-05-28-2009

Shoal Creek Watershed

Site Photographs



116_t00-ds-02_12_2001



116_t00-ds-03_11_2003



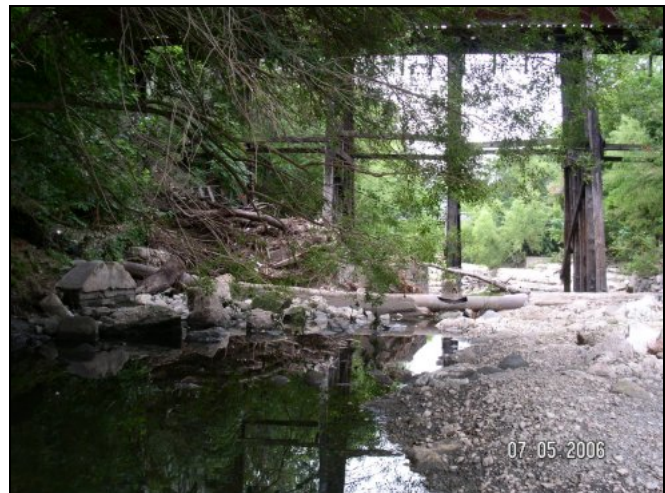
116_t00-us1-07_07_2006



116-t00-us-05-28-2009



122_t00-us-07_05_2006



122_t00-ds-07_05_2006