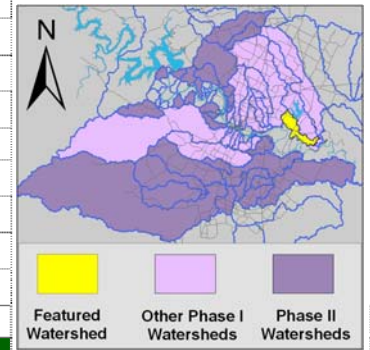


Elm Creek Watershed

Watershed Overview

Catchment	Total area	9 sq. miles						
	Area in recharge	0						
	Creek length	10 miles						
	Receiving water	Gilleland Creek						
Demographics	2000 population	3,136						
	2030 projected population	5,643						
	30 year projected % increase	180 %						
Land Use	Impervious cover (2003 estimate)	7.2 %						
	Impervious cover (2013 estimate)	12.8 %						
Overall EII Scores	1999	2002	2005	2008	2009	2011	2013	2015
	49	65	46	45	62	33	57	62



Flow Regime* for Sample Sites on Elm Creek

Flow Regime - 101 Sample Sites on Elm Creek																																			
Site	2002					2005					2008					2009					2010	2011					2013					2015			
	Feb	Feb	May	Aug	Nov	Mar	Jun	Jun	Sep	Dec	Feb	May	Jun	Sep	Dec	Feb	May	Jun	Oct	Dec	Dec	Mar	Jun	Jun	Sep	Jan	Apr	May	Jun	Sep	Jan	Apr	Jul	Sep	
	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ	
1202	B	B	n	n	B	B	B	n	n	n																									
1203	n																																		
1204	B	B	n	n	B	B	n	n	n	n	B	n	n	n	n	n	n	n	n	B	n	n	n	n	n	n	n	n	n	n	B	B	n	n	
887	n		n																																
3614						B	n	n	n	n	n	B	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	

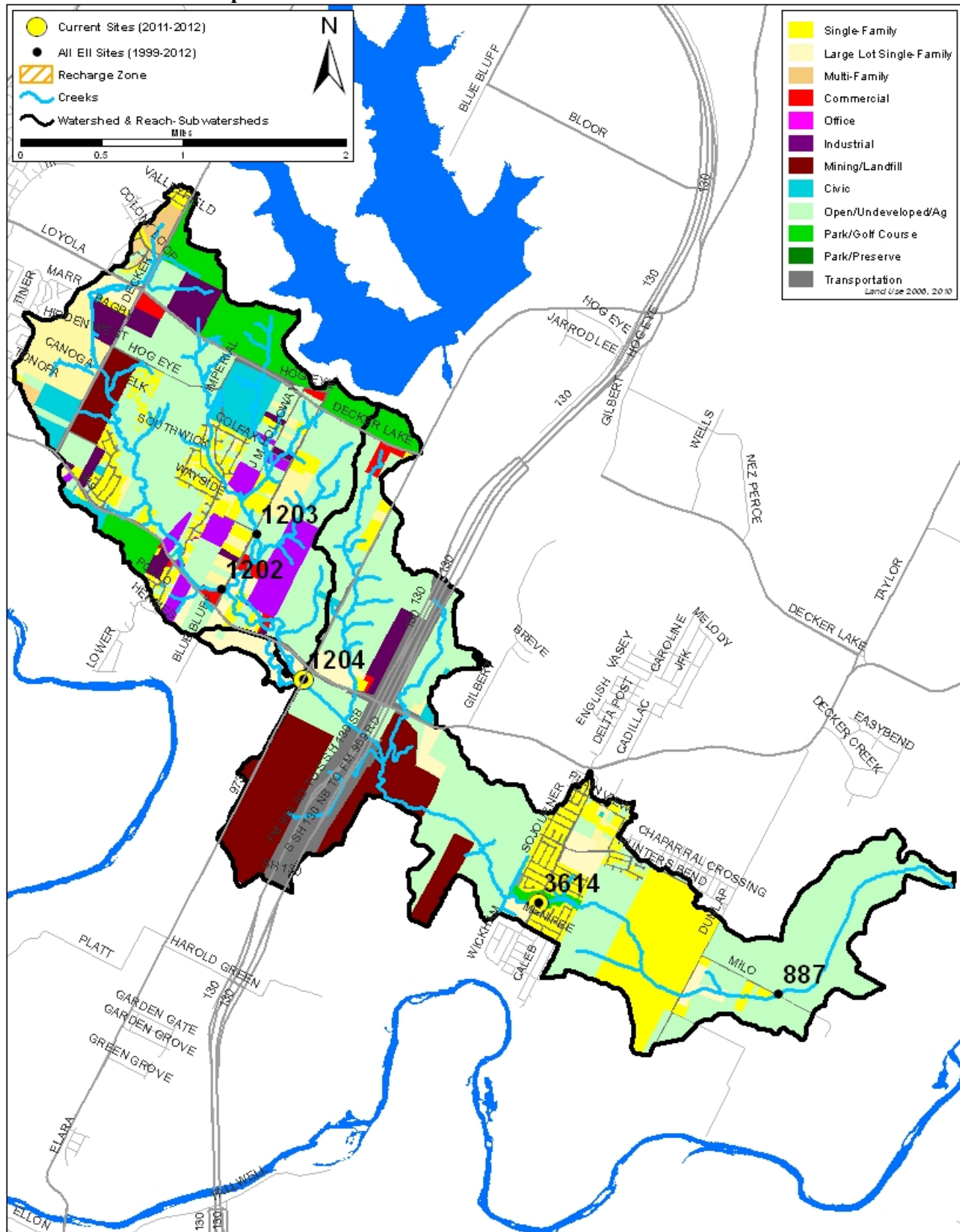
* B = baseflow n = no flow S = storm flow blue = Samples were taken light blue = Samples were not taken blank = not visited

Index scores* for Elm Creek Sites by Year

Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Recreation	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
ELM1	887	Elm Creek @ Milo Road	2002		91		60	44				49
ELM2	1202	West Elm Creek @ Blue Bluff Road	2002	62	91	99	57	58	41	41	40	68
ELM2	1204	Elm Creek @ FM 973	2002	57	91	92	77	51	44	50	37	69
ELM1	3614	Elm Creek @ Austins Colony	2005	46	71		56	50				45
ELM2	1202	West Elm Creek @ Blue Bluff Road	2005	39	71	32	49	56	50		50	50
ELM2	1204	Elm Creek @ FM 973	2005	51	71	47	52	54				46
ELM1	3614	Elm Creek @ Austins Colony	2008	39	67	42	43	37				38
ELM2	1204	Elm Creek @ FM 973	2008	50	67	97	48	47				52
ELM1	3614	Elm Creek @ Austins Colony	2009		66		56	60	68	68		63
ELM2	1204	Elm Creek @ FM 973	2009	69	66	94	47	55				55
ELM1	3614	Elm Creek @ Austins Colony	2011				55	40				32
ELM2	1204	Elm Creek @ FM 973	2011				40	61				34
ELM1	3614	Elm Creek @ Austins Colony	2013		64		64	64	54	54		62
ELM2	1204	Elm Creek @ FM 973	2013		64		45	46	51	51		52
ELM1	3614	Elm Creek @ Austins Colony	2015		62		69	40	66	66		59
ELM2	1204	Elm Creek @ FM 973	2015	65	62	61	63	47	74	89	58	64

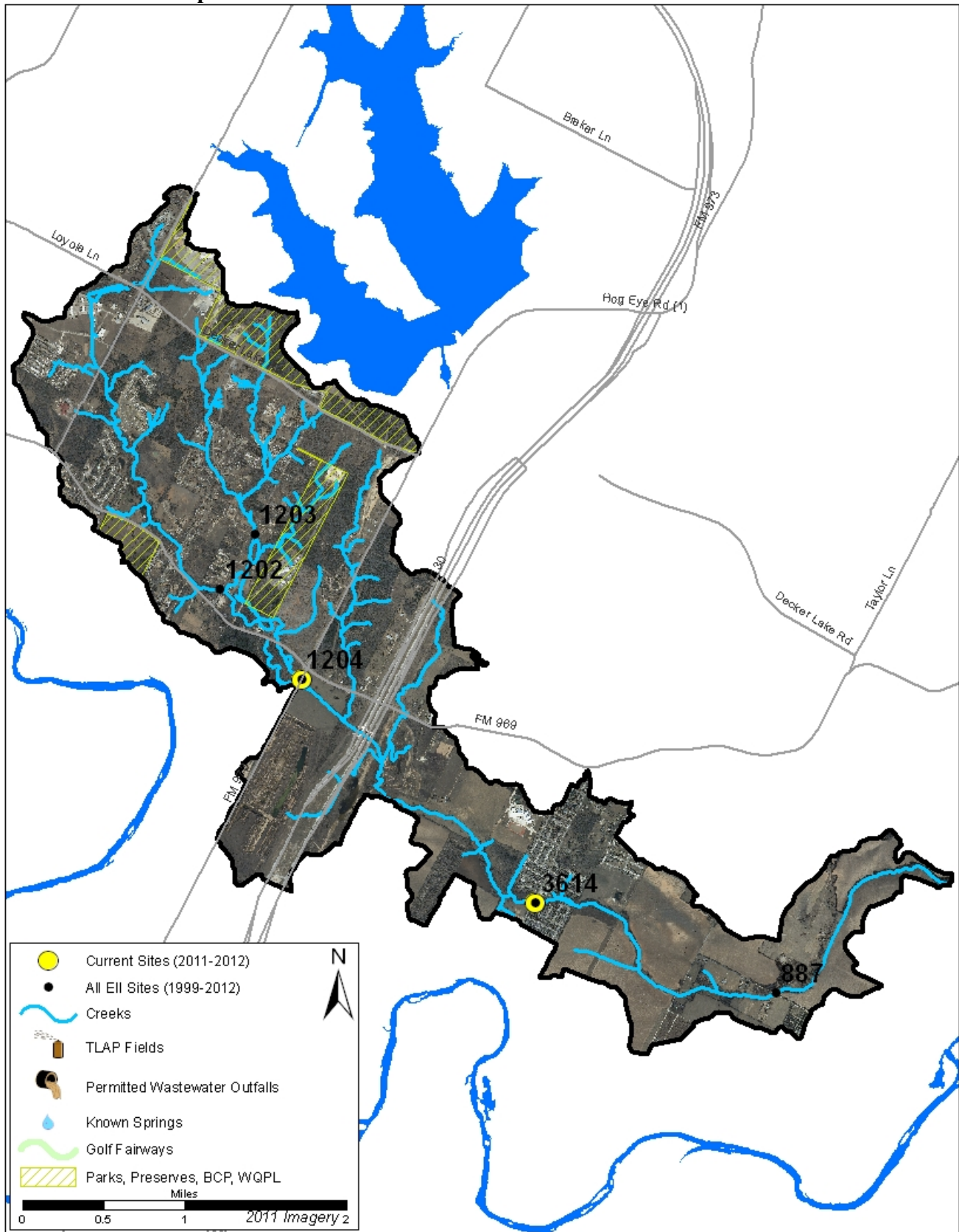
* blank cells indicate parameter was not collected, blank row indicate site was dropped **sediment samples only collected at the downstream site

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



Elm Creek Watershed

Aerial Map



Elm 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
Elm	1204	ELM2	01/14/2015		6.6			601			8.04			10.8			248.1	
Elm	1204	ELM2	04/15/2015		21.7			989			8.12			7.4			29.2	
Elm	1204	ELM2	07/07/2015		28.1			890			7.82			5.5				
ELM2 Mean					18.8			826			7.99			8.1			138.6	
Elm Mean					18.8			826			7.99			8.1			138.6	

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	

Elm 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			

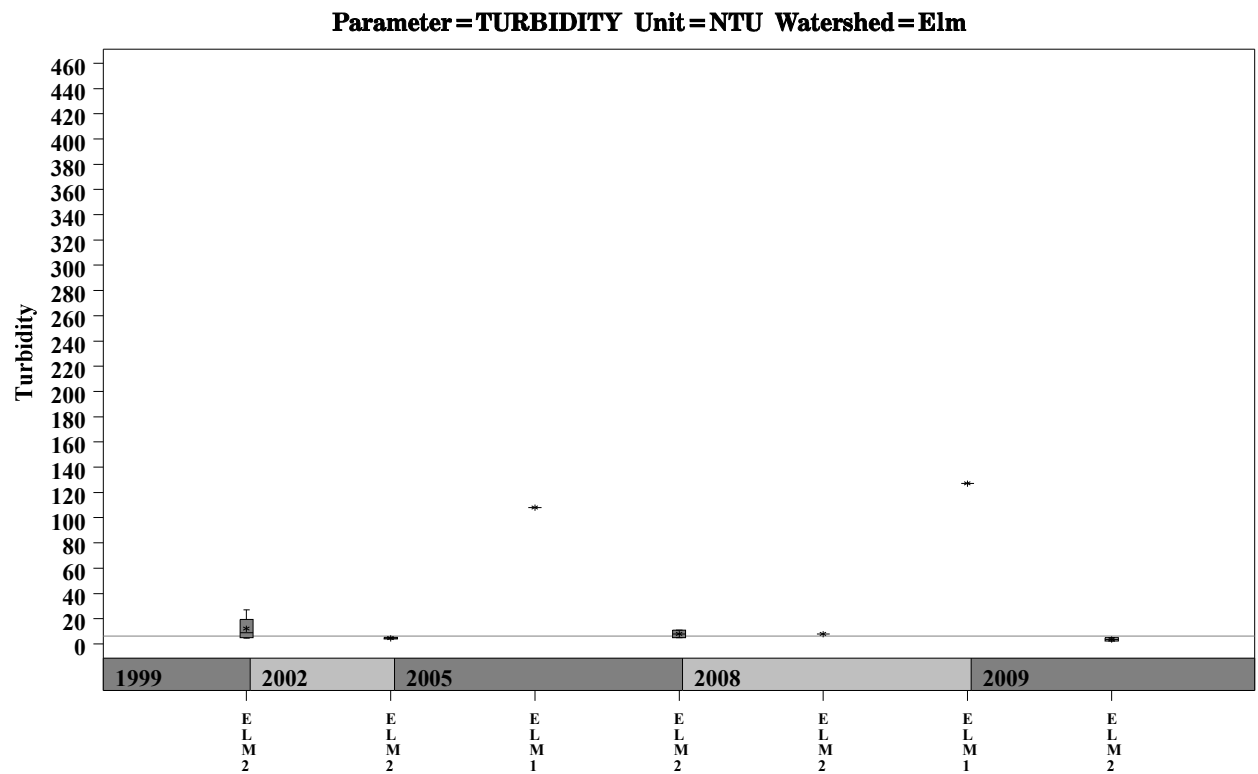
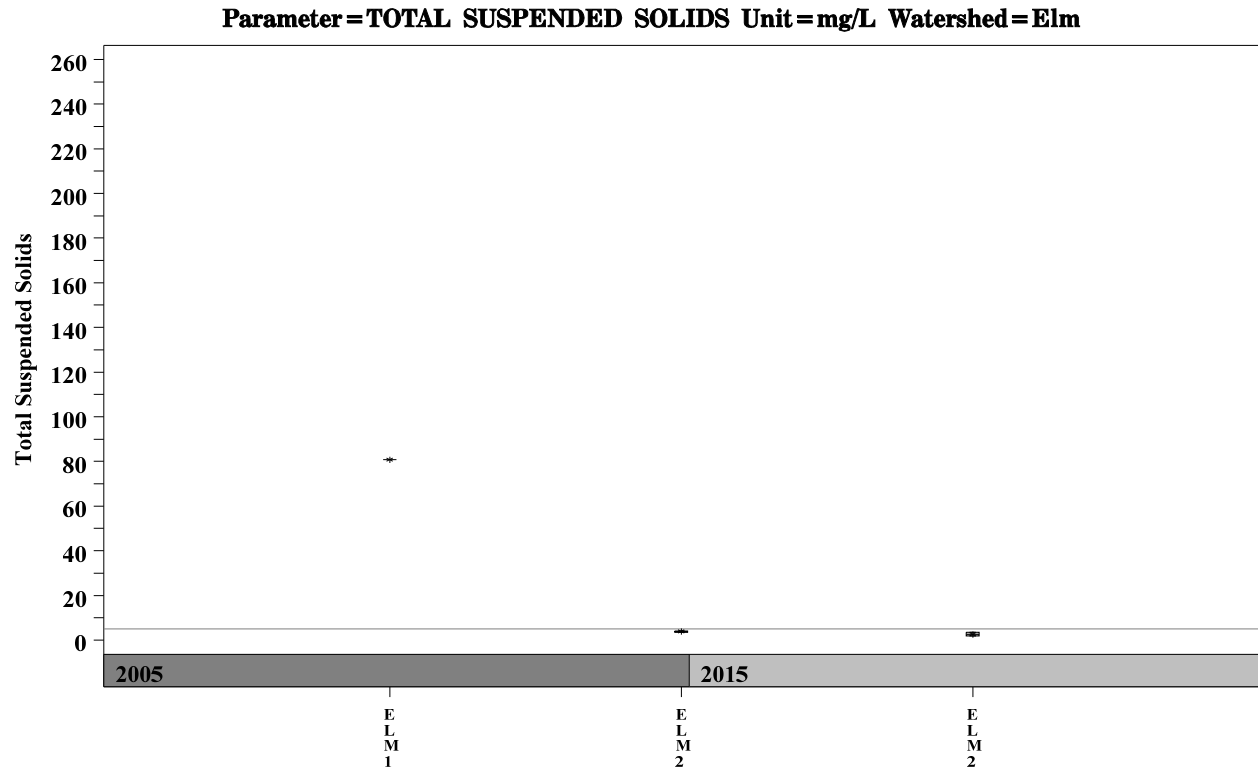
Watershed	Site	EII Reach	Date	NH3-N		NO3/NO2		Ortho-P		T.S.S		Turb.	
				<>	flag	<>	flag	<>	flag	<>	flag	<>	flag
Elm	1204	ELM2	01/14/2015	<J	0.008		0.10		0.026		1.8		4.5
Elm	1204	ELM2	04/15/2015	<J	0.008	<J	0.01		0.018		3.5		4.8
Elm	1204	ELM2	07/07/2015										
ELM2 Mean					0.008		0.05		0.022		2.6		4.7
Elm Mean					0.008		0.05		0.022		2.6		4.7

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

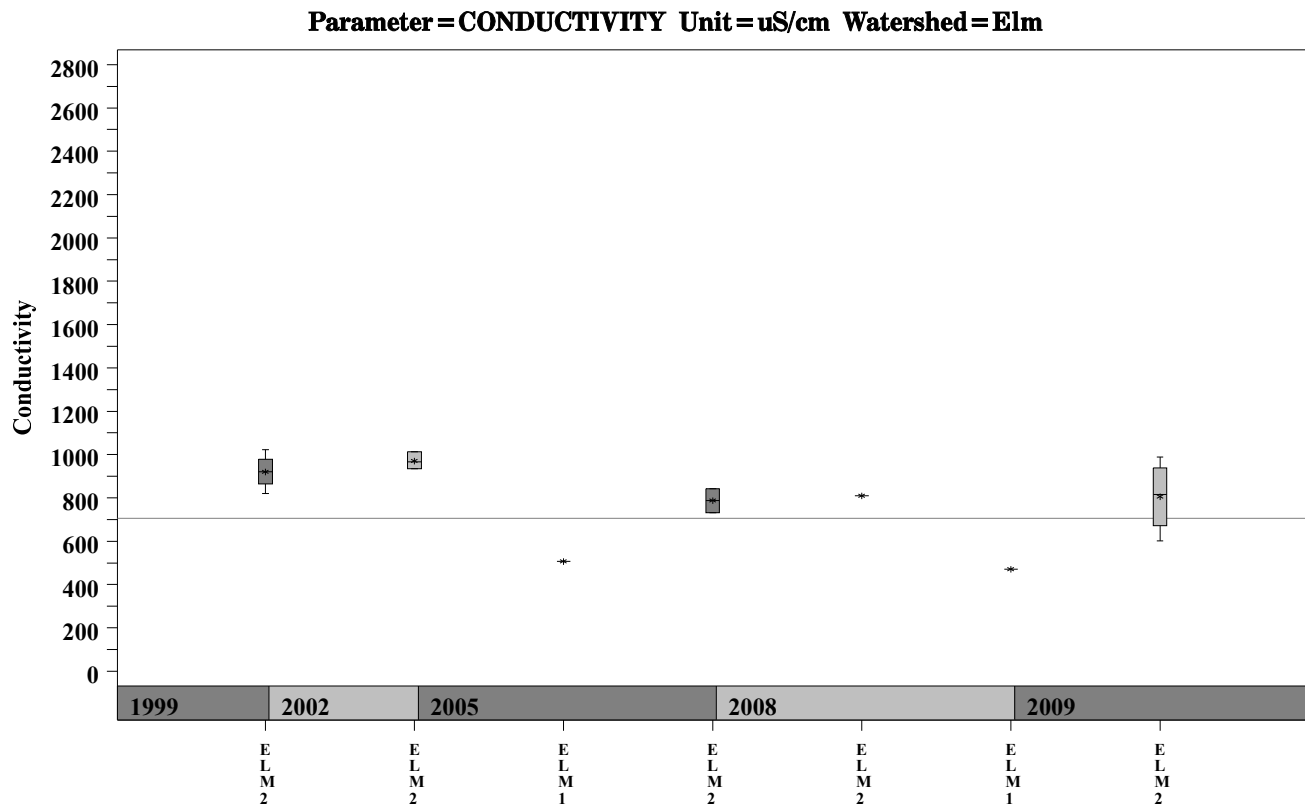
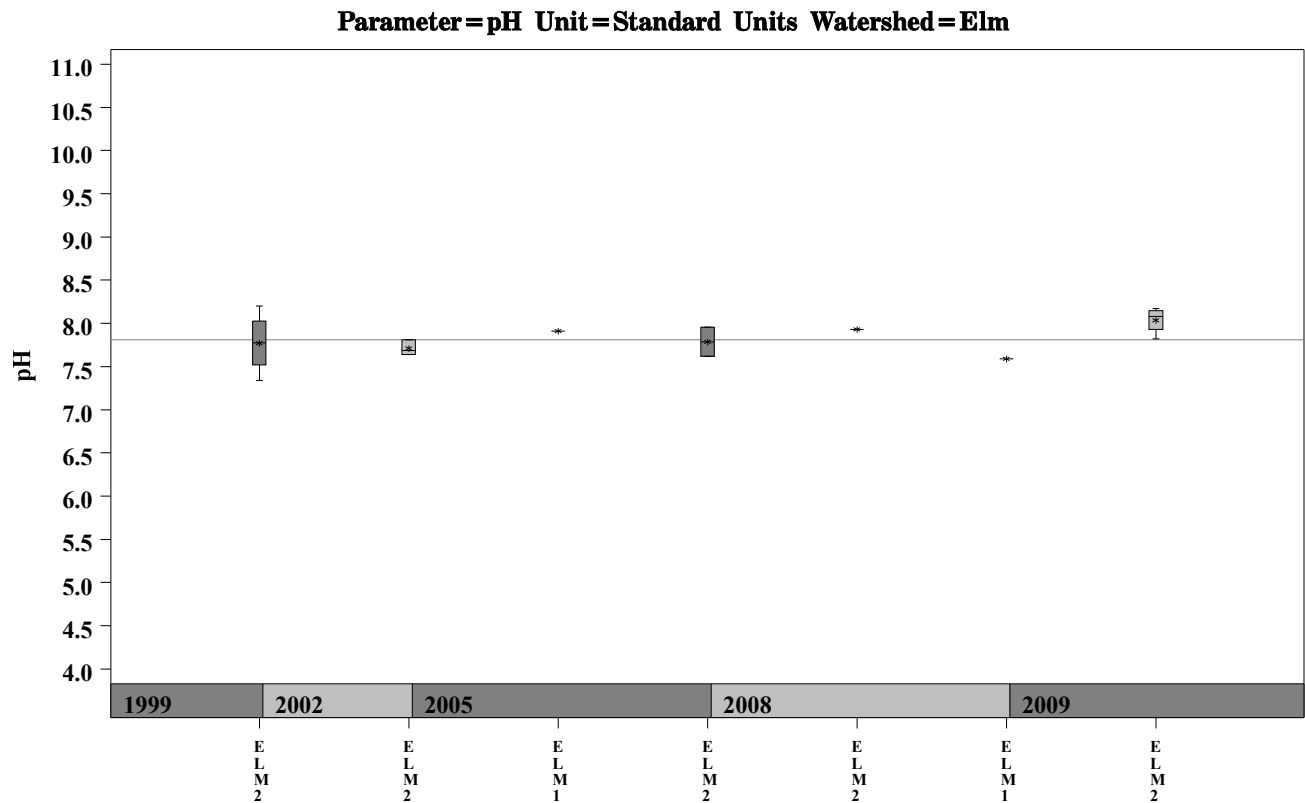
Elm Creek Watershed

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



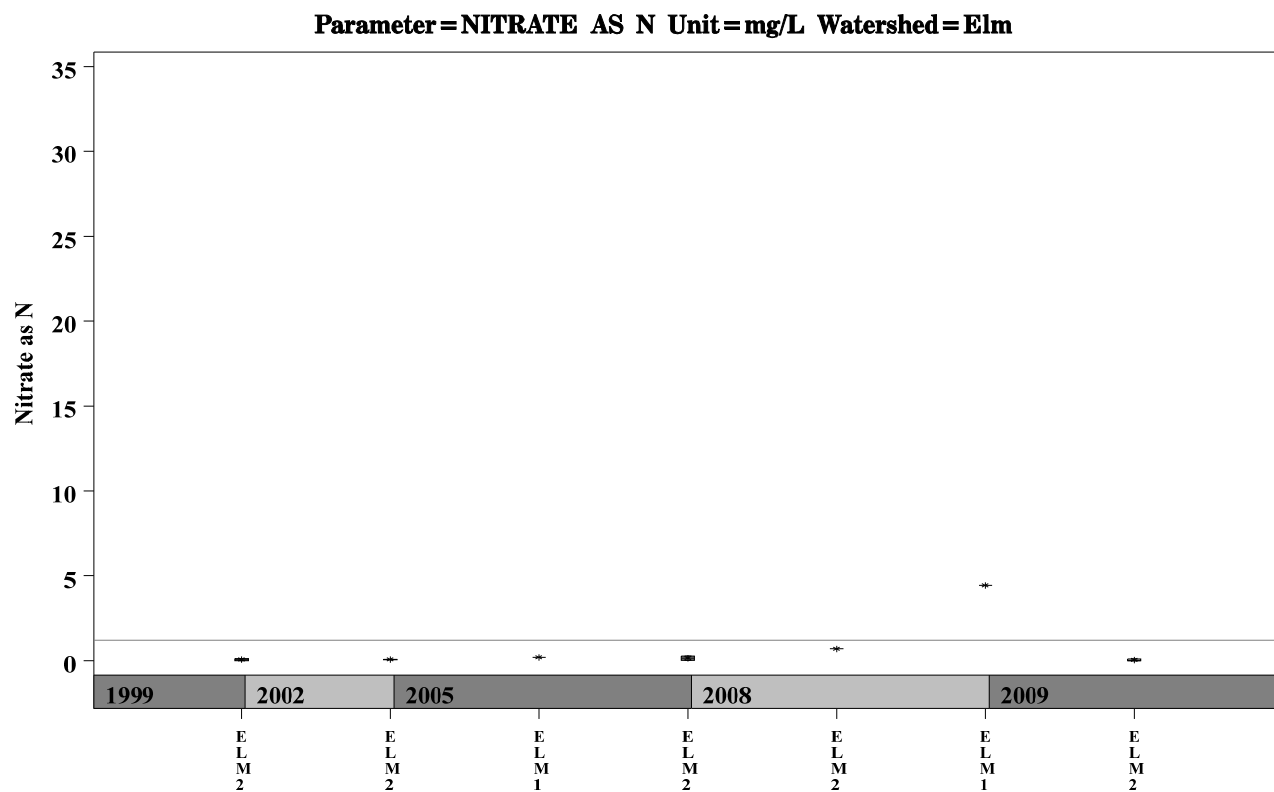
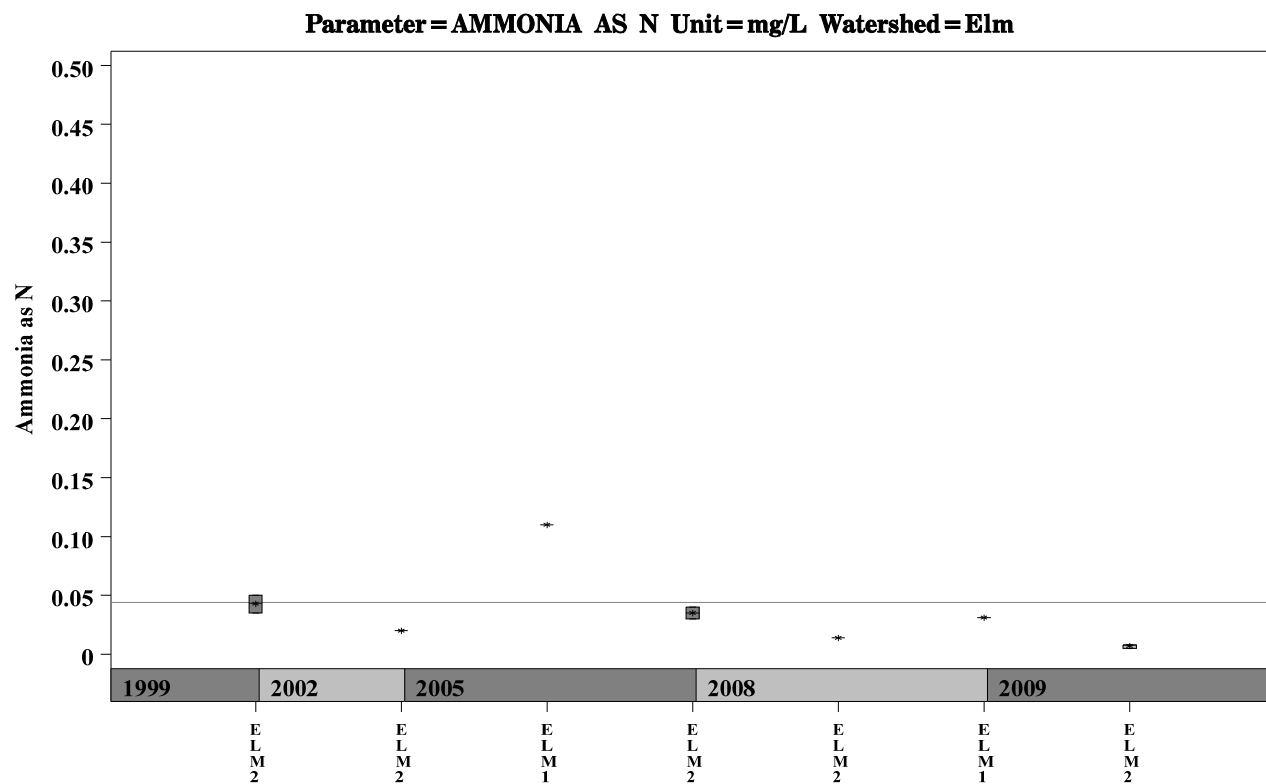
Elm Creek Watershed

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



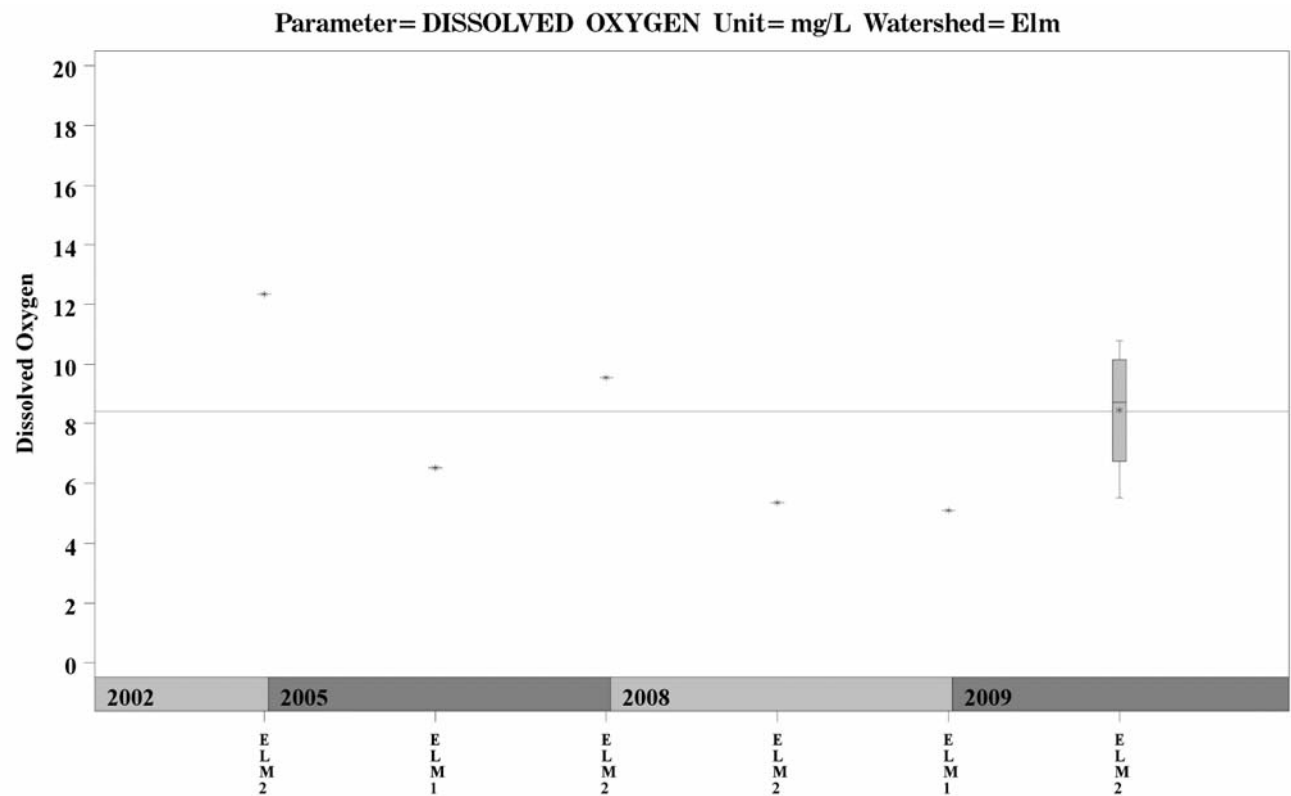
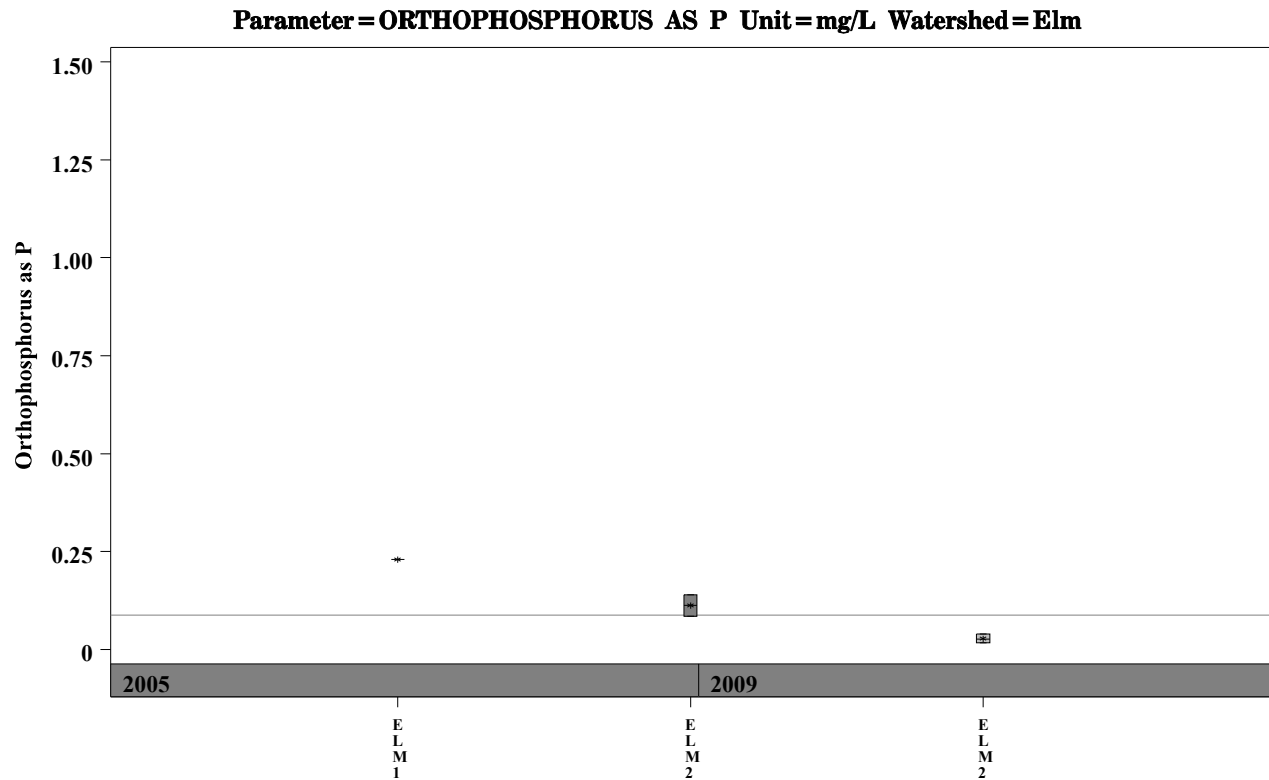
Elm Creek Watershed

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



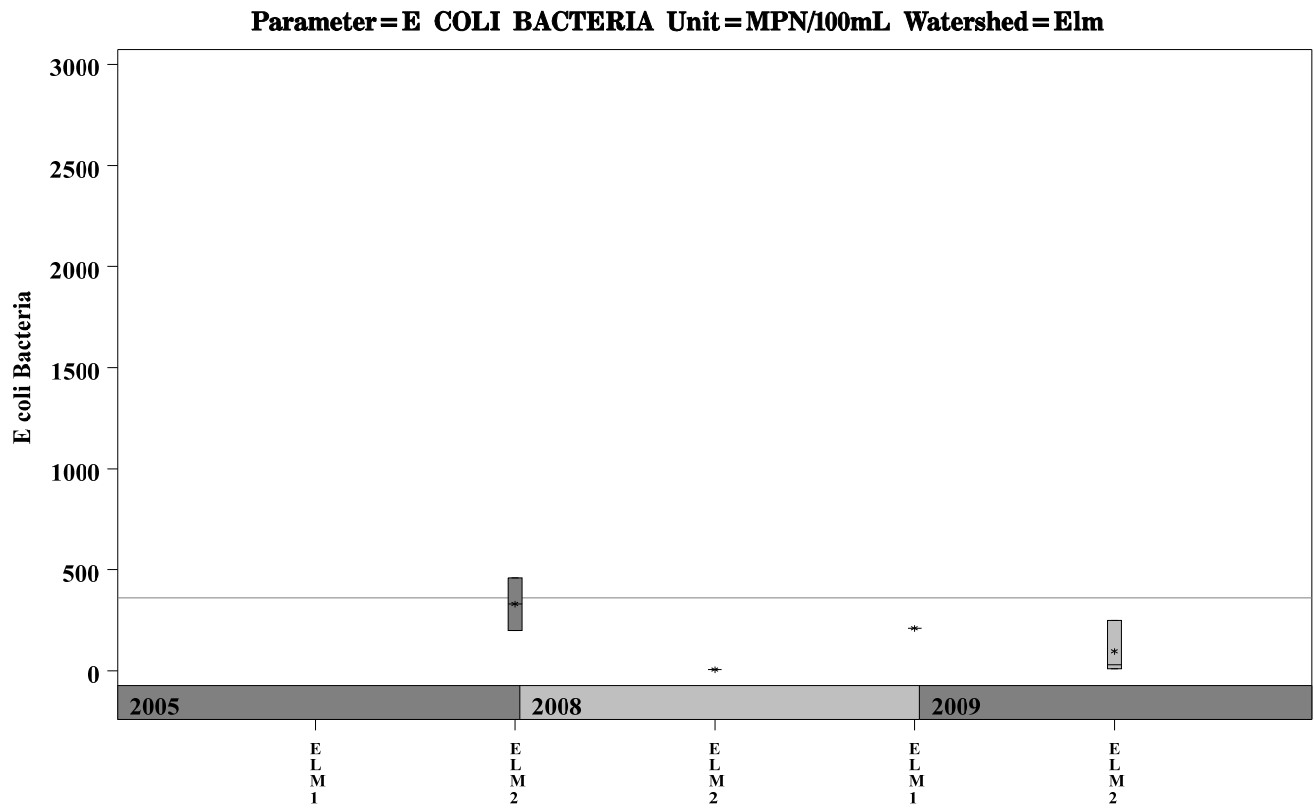
Elm Creek Watershed

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



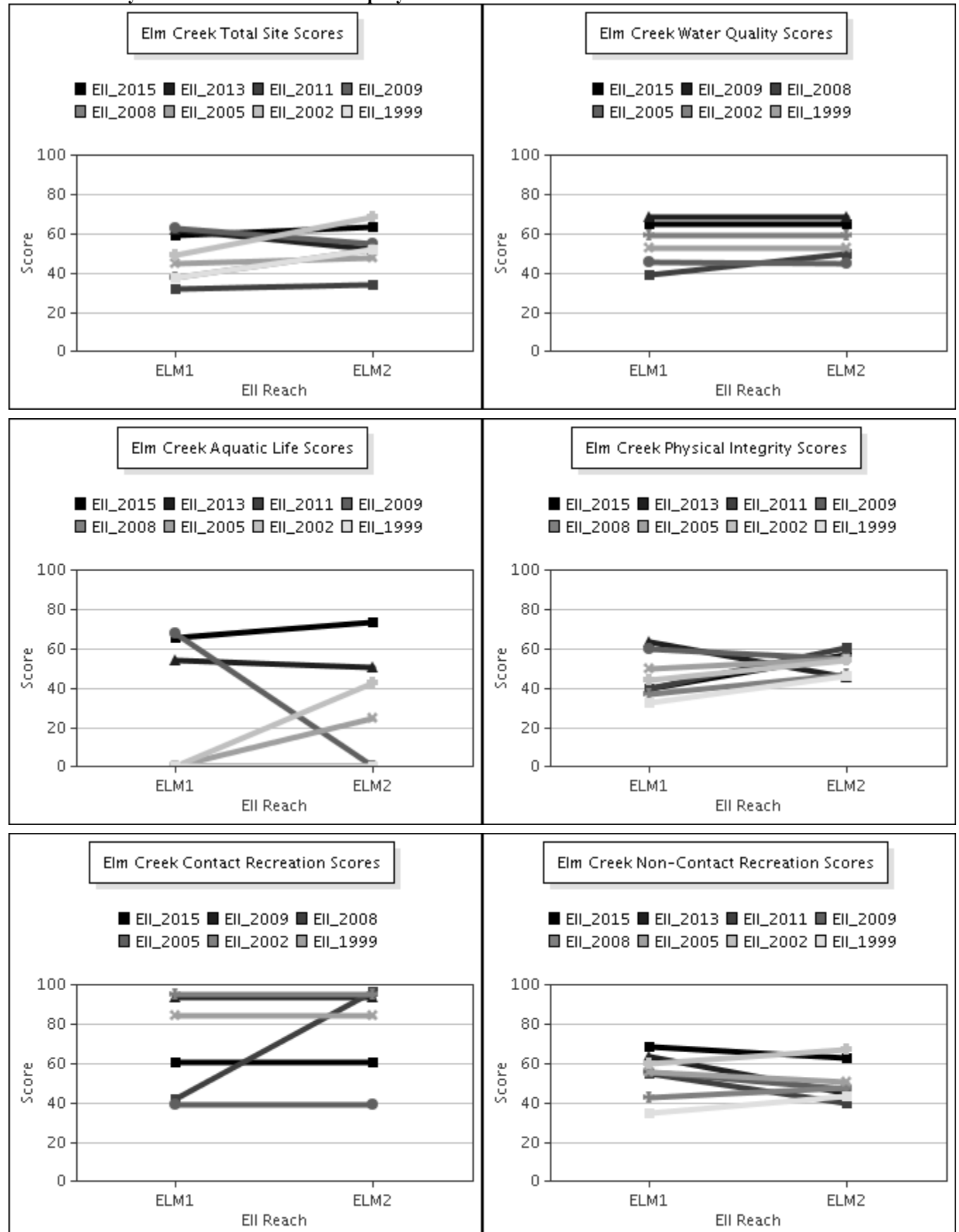
Elm Creek Watershed

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



Elm Creek Watershed

Score Summary – Reach scores for each sample year



Elm Creek Watershed

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

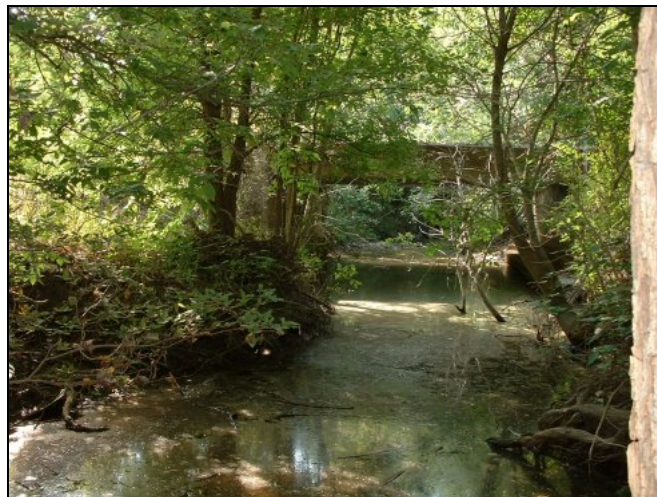
Benthic Macroinvertebrates - Elm Creek			ELM @ FM 973 (1204) 07/07/2015 (WRE)	ELM @ Austins Colony (3614) 07/07/2015 (WRE)
Benthic Macroinvertebrate ID	PTI	FFG		
Chimarra	2	FC	18	
Farrodes Texanus	2	CG,SC	5	
Leptohyphes	2	CG	1	
Callibaetis	4	CG		54
Fallceon	4	CG,SC	52	
Hydrometra	4	P		1
Neochoroterpes	4	CG	3	
Simulium	4	FC	3	
Smicridea	4	FC		1
Anax Junius	5	P		1
Liodessus Obscurellus	5	P		2
Mesovelia	5	P		5
Paracymus	5	CG		5
Rheumatobates	5	P		9
Uvarus	5	P		6
Argia	6	P	10	
Brechmorhoga Mendax	6	P	2	
Cheumatopsyche	6	FC	191	
Chironomidae	6	FC,P	21	7
Enallagma	6	P		17
Hetaerina	6	P	4	
Hydracarina	6		1	8
Rhagovalia	6	P	2	
Sepedon/Sepedomerus	6	P		1
Tanypodinae	6	P	8	2
Bezzia / Palpomyia	7	CG,P		1
Caenis	7	CG,SC		13
Helisoma	7	SC		21
Odontomyia	7	CG		4
Ranatra	7	P		1
Stenelmis	7	CG,SC		1
Helophorus	7.9	SH		1
Anopheles	8	FC		3
Cladocera	8	FC		8
Oligochaeta	8	CG	1	
Peltodytes	8	P,PI,SH		1
Ischnura	9	P		19
Physella	9	SC	1	3
Belostoma	10	P		21
Culex	10	FC		1
Pachydiplax Longipennis	10	P		2
Tropisternus	10	P		1

Elm Creek Watershed

Site Photographs



1202_t00-us-03_27_2002



1202_t00-ds-06_17_2005



3614_t00-us-06_17_2005



3614_t00-ur-06_17_2005



3614_t00-ur-06_18_2008



3614_t00-us-06_03_2009

Elm Creek Watershed

Site Photographs



1204_t00-ds-03_27_2002



1204_t00-ur-03_27_2002



1204_t00-us-06_17_2005



1204_t00-ds-06_17_2005



1204_t0-us06_18_2008



1204_t00-ds-06_03_2009