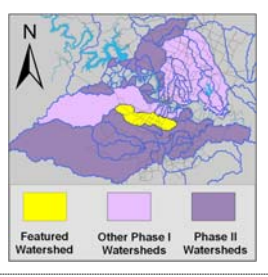


Williamson Creek Watershed

Watershed Overview

Catchment	Total area	30 square miles						
	Area in recharge	8 square miles						
	Creek length	19 miles						
Demographics	Receiving water	Onion Creek						
	2000 population	92,922						
	2030 projected population	129,514						
Land Use	30 year projected % increase	39 %						
	Impervious cover (2003 estimate)	17.9 %						
	Impervious cover (2013 estimate)	34.1 %						
Overall EII Scores	2000	2003	2006	2009	2011	2013	2015	
	70	69	67	62	55	70	68	



Flow Regime* for Sample Sites on Williamson 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	Jun	Oct	Dec	Dec	Dec	Mar	Jun	Jun	Sep	Jan	Apr	Jun	Jun	Sep	Jan	Apr	Jul	Sep
	WQ	Bio	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	
300	B	B																																
490	B	B	B	B	B	n	n	n	n	B	n	n	n	n	n	n	n	B	B	n	n	n	n	n	B	B	n	B	n	B	B	B	n	
344	B	B																																
491	B	B	B	B	B	n	B	n	n	n	B	n	B	n	B	n	B	B	n	n	n	n	n	n	B	B	n	B	B	B	B	B	B	
223	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	B	
492	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 Williamson 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
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	1996	61	82	90	66	55	66	54	77	70
WMS1	492	Williamson Creek @ Pleasant Valley (W2)	1996	71	82	47	86	48	77	73	81	69
WMS2	344	Williamson Creek DS Joe Tanner (USGS)	1996		82		53	73				52
WMS2	491	Williamson Creek @ IH35 (EII)	1996		82		60	45				47
WMS3	300	Williamson Creek @ Mowinkle Dr (MOW)	1996		82		63	66				53
WMS3	490	Williamson Creek @ Hwy 71 (EII)	1996		82		60	64				52
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2000	69	92	95	84	47	50	44	55	73
WMS1	492	Williamson Creek @ Pleasant Valley (W2)	2000	75	92	88	73	46	51	75	77	71
WMS2	344	Williamson Creek DS Joe Tanner (USGS)	2000	64	92	94	53	60	62	85	39	71
WMS2	491	Williamson Creek @ IH35 (EII)	2000	76	92	88	73	43	42	29	55	69
WMS3	300	Williamson Creek @ Mowinkle Dr (MOW)	2000	68	92	93	88	49	62	65	59	75
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2000	62	92	96	38	35	54	40	68	63
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2003	60	80	89	88	69	33	20	46	70
WMS1	492	Williamson Creek @ Pleasant Valley (W2)	2003	63	80	84	70	57	46	42	49	67
WMS2	491	Williamson Creek @ IH35 (EII)	2003	66	80	99	65	61	35	28	44	68
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2003	61	80	85	69	76	56	46	66	71
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2006	66	76	53	85	76	77	74	80	72
WMS2	491	Williamson Creek @ IH35 (EII)	2006	86	76	80	63	57	43	33	53	68
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2006	67	76	76	71	43	25	25		60
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2009	67	79	43	82	69	79	64	94	70
WMS2	491	Williamson Creek @ IH35 (EII)	2009	77	79	46	58	55	58	58		62
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2009	64	79	48	35	65	23	23		53
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2011	60	82	62	50	61	75	70	79	65
WMS2	491	Williamson Creek @ IH35 (EII)	2011		82		47	53				46
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2011		82		35	55				43
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2013	58	83	52	84	59	86	81	91	70
WMS2	491	Williamson Creek @ IH35 (EII)	2013	74	83	62	73	66	72	59	85	72
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2013	60	83	59	82	62	58	41	75	67
WMS1	223	Williamson Creek @ McKinney Falls (Will1)	2015	58	76	52	82	62	69	83	55	67
WMS2	491	Williamson Creek @ IH35 (EII)	2015	58	76	61	73	66	77	94	59	69
WMS3	490	Williamson Creek @ Hwy 71 (EII)	2015	57	76	42	80	60	87	94	80	67

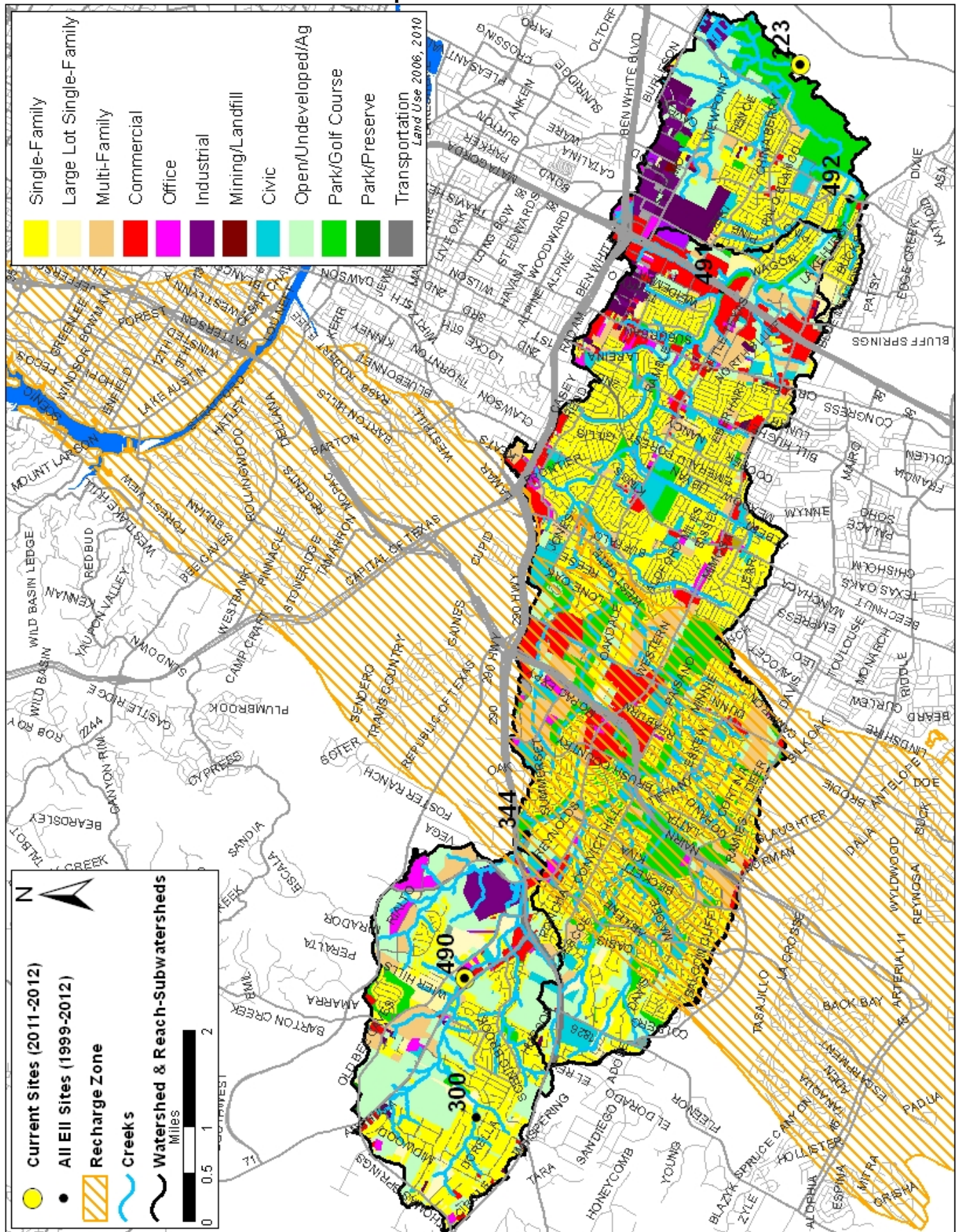
* blank cells indicate parameter was not collected, blank row indicate site was dropped

**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

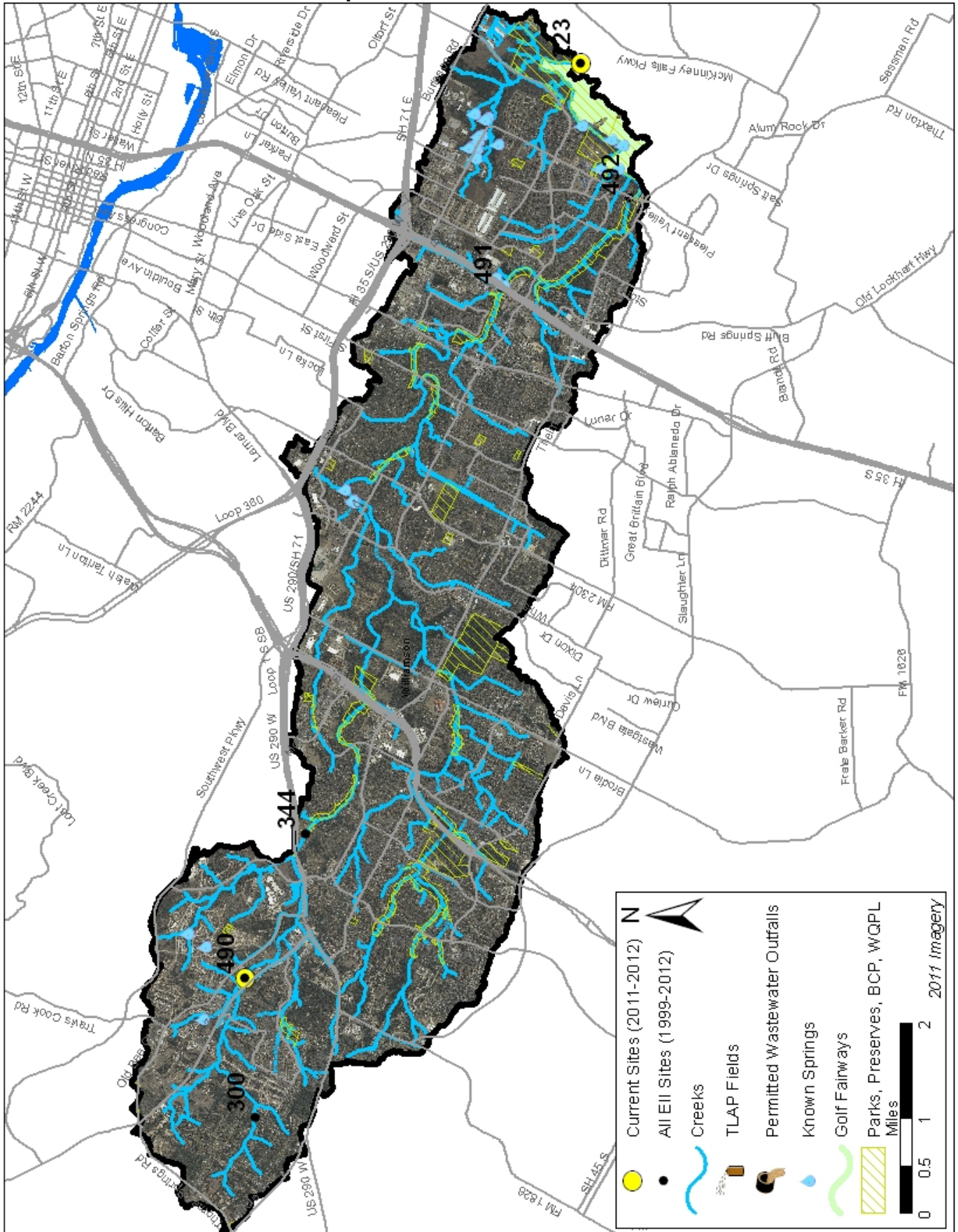
Williamson Creek Watershed

Land Use Map



Williamson Creek Watershed

Aerial Map



Williamson 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
Williamson	223	WMS1	01/14/2015	9.2	678	8.16	16.2	222.4
Williamson	223	WMS1	04/15/2015	24.9	679	8.20	18.7	113.0
Williamson	223	WMS1	07/09/2015	28.8	692	7.83	9.7	
Williamson	223	WMS1	07/14/2015	29.7	709	7.89	12.4	45.2
Williamson	223	WMS1	09/09/2015	27.9	792	8.03	16.1	131.7
WMS1 Mean				24.1	710	8.02	14.6	128.1
Williamson	491	WMS2	01/14/2015	9.8	550	7.90	10.8	21.1
Williamson	491	WMS2	04/15/2015	24.3	605	7.77	10.2	61.3
Williamson	491	WMS2	07/09/2015	28.1	572	8.04	10.6	
Williamson	491	WMS2	07/14/2015	27.0	615	7.89	8.8	75.9
Williamson	491	WMS2	09/09/2015	25.9	630	7.92	8.8	79.8
WMS2 Mean				23.0	594	7.90	9.8	59.5
Williamson	490	WMS3	01/14/2015	9.95	874	7.76	9.8	129.5
Williamson	490	WMS3	04/15/2015	18.2	842	7.54	6.2	101.7
Williamson	490	WMS3	07/08/2015	24.3	803	7.52	6.1	
Williamson	490	WMS3	07/14/2015	24.5	819	7.38	5.1	387.3
WMS3 Mean				19.2	834	7.55	6.8	206.2
Williamson Mean				22.3	704	7.84	10.7	124.4

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	

Williamson 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
Williamson	223	WMS1	01/14/2015	<J 0.008	1.28	<J 0.004	1.1	3.5 R
Williamson	223	WMS1	04/15/2015	<J 0.008	0.44	<J 0.004	1.1	2.6
Williamson	223	WMS1	07/09/2015					
Williamson	223	WMS1	07/14/2015	<J 0.008	0.92	<J 0.004	1.2	1.9 R
Williamson	223	WMS1	09/09/2015	<J 0.008	0.44	<J 0.004	4.2	3.9 R
WMS1 Mean				0.008	0.77	0.004	1.9	3.0
Williamson	491	WMS2	01/14/2015	<J 0.008	0.66	0.016	<J 1.0	5.4 R
Williamson	491	WMS2	04/15/2015	<J 0.008	0.70	0.013	10.6	1.9
Williamson	491	WMS2	07/09/2015					
Williamson	491	WMS2	07/14/2015	0.021	1.42	0.013 R	5.0	1.4 R
Williamson	491	WMS2	09/09/2015	<J 0.008	1.20	<J 0.004	1.6	1.4 R
WMS2 Mean				0.011	1.00	0.012	4.6	2.5
Williamson	490	WMS3	01/14/2015	<J 0.008	0.35	<J 0.004	1.3	2.3 R
Williamson	490	WMS3	04/15/2015	<J 0.008	0.17	<J 0.004	1.4	3.2
Williamson	490	WMS3	07/08/2015					
Williamson	490	WMS3	07/14/2015	0.024	0.12	<J 0.004	2.1	3.1 R
WMS3 Mean				0.013	0.21	0.004	1.6	2.9
Williamson Mean				0.010	0.70	0.007	2.8	2.8

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

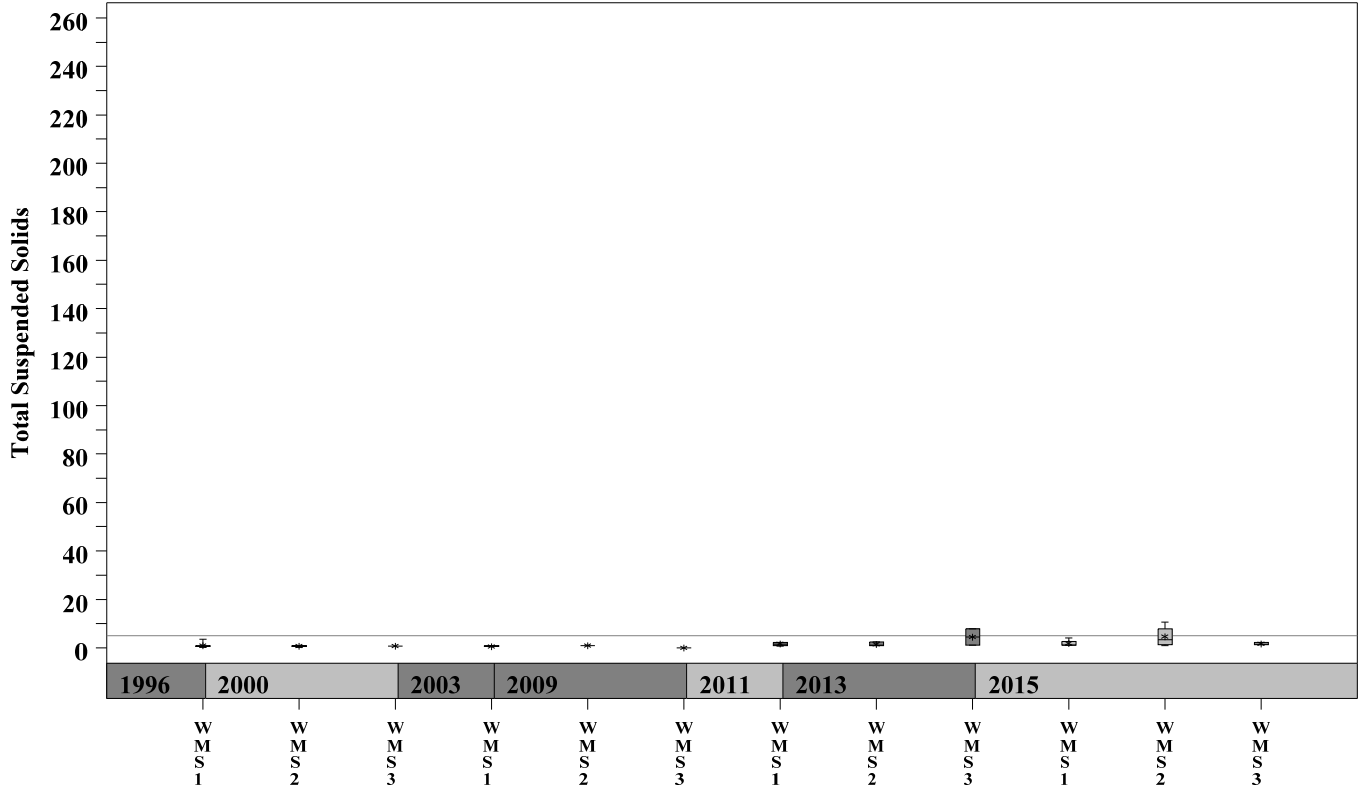
Summary Statistics for all 2015-2016 E.I.I. Sites Combined

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

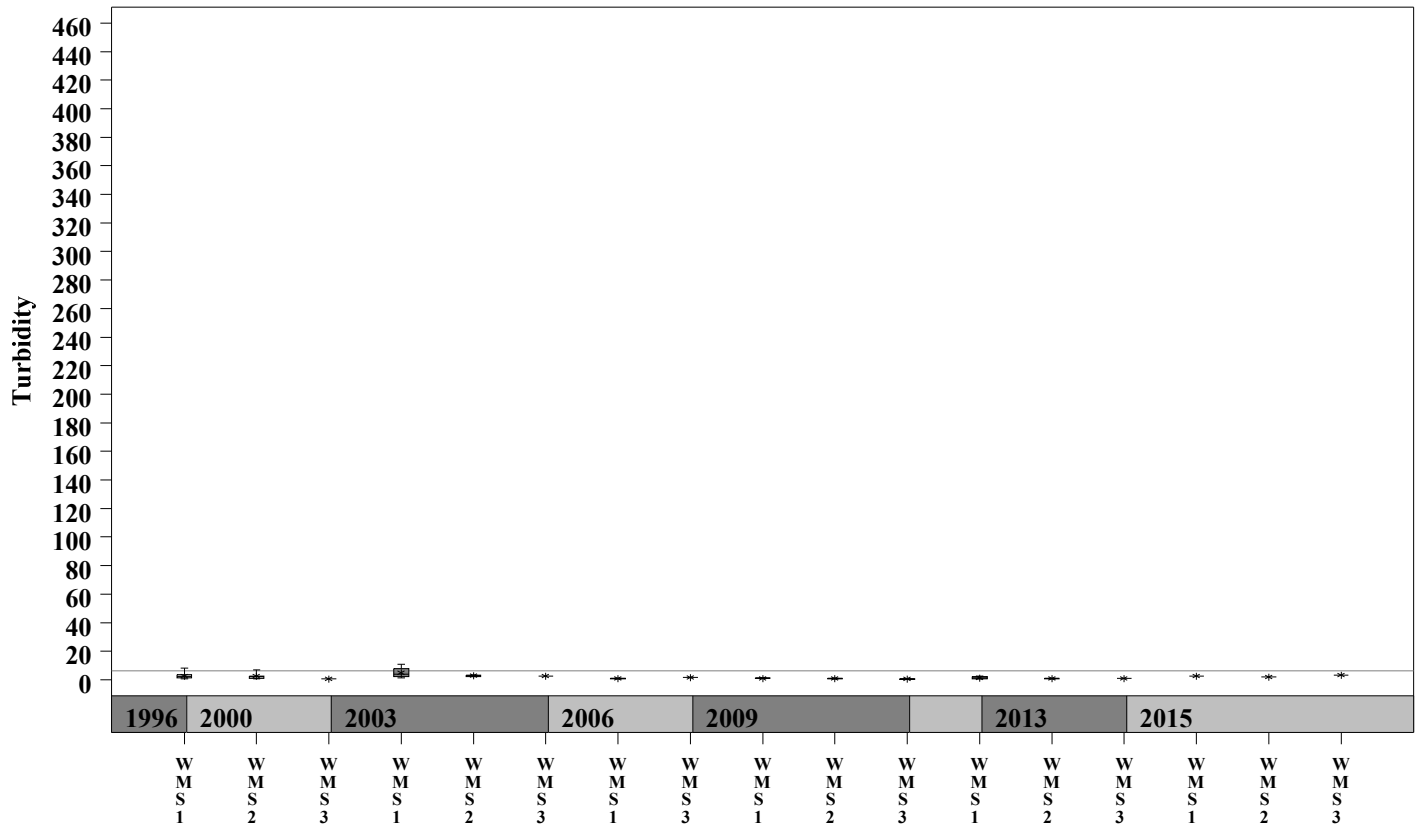
Williamson Creek Watershed

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

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



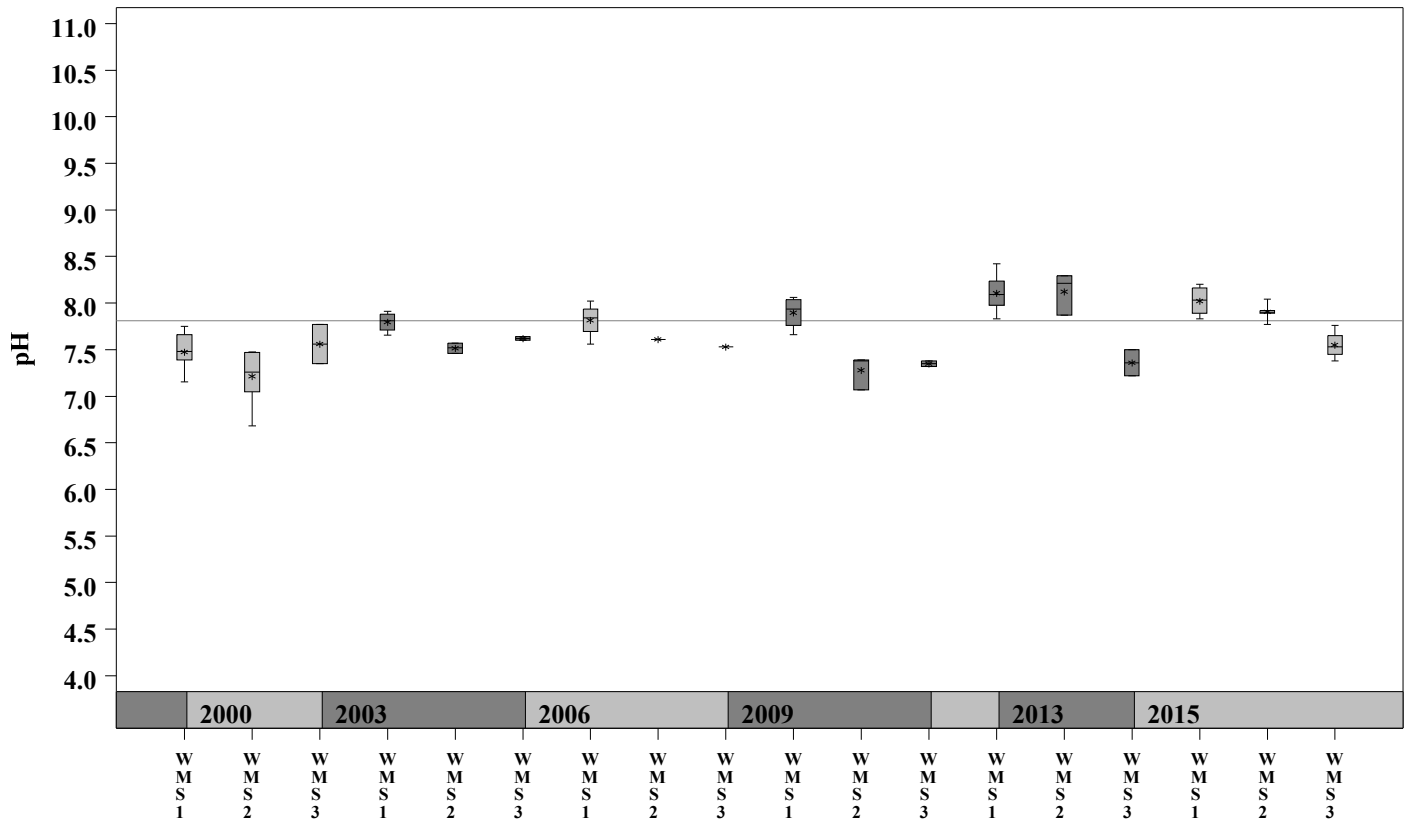
Parameter = TURBIDITY Unit = NTU Watershed = Williamson



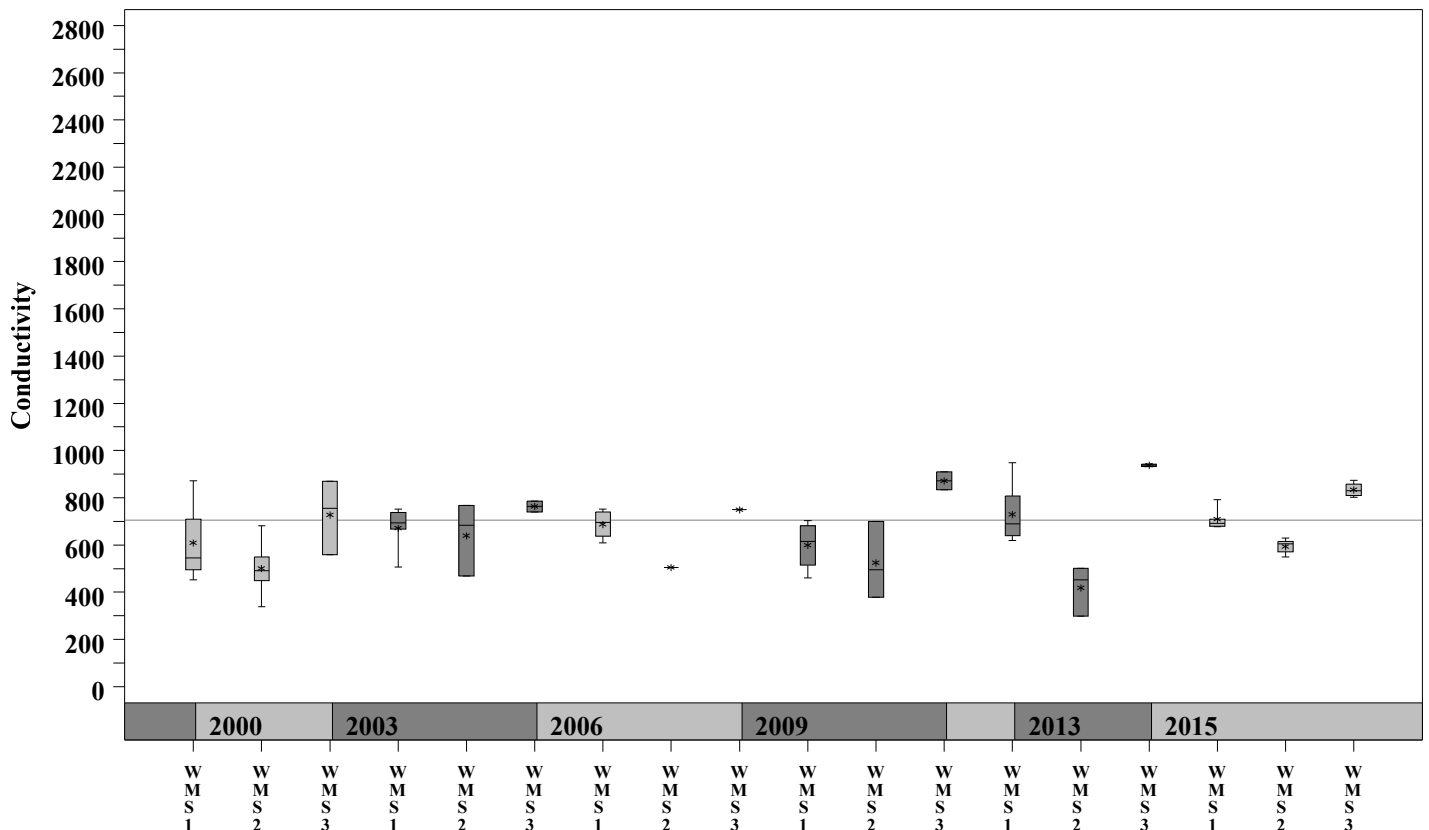
Williamson Creek Watershed

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

Parameter = pH Unit = Standard Units Watershed = Williamson



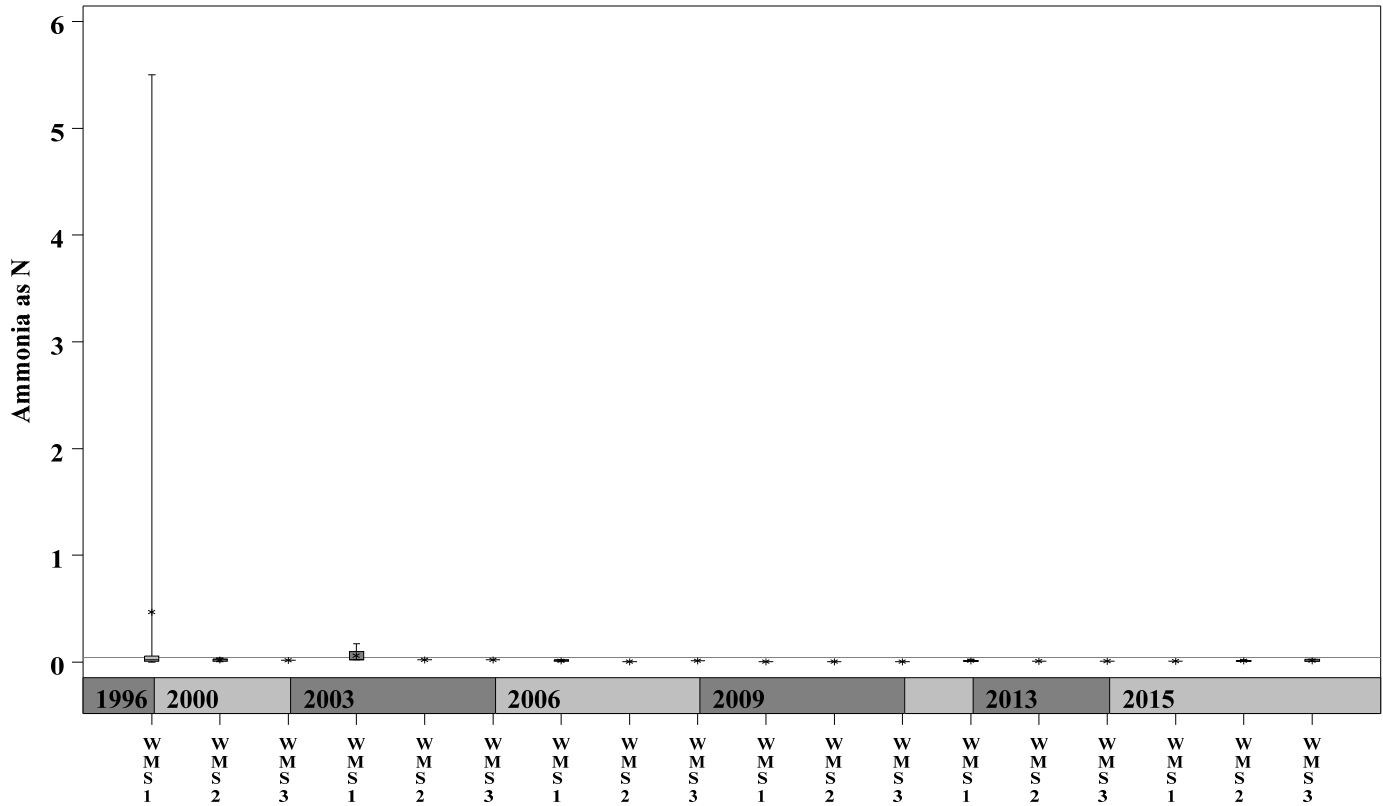
Parameter = CONDUCTIVITY Unit = uS/cm Watershed = Williamson



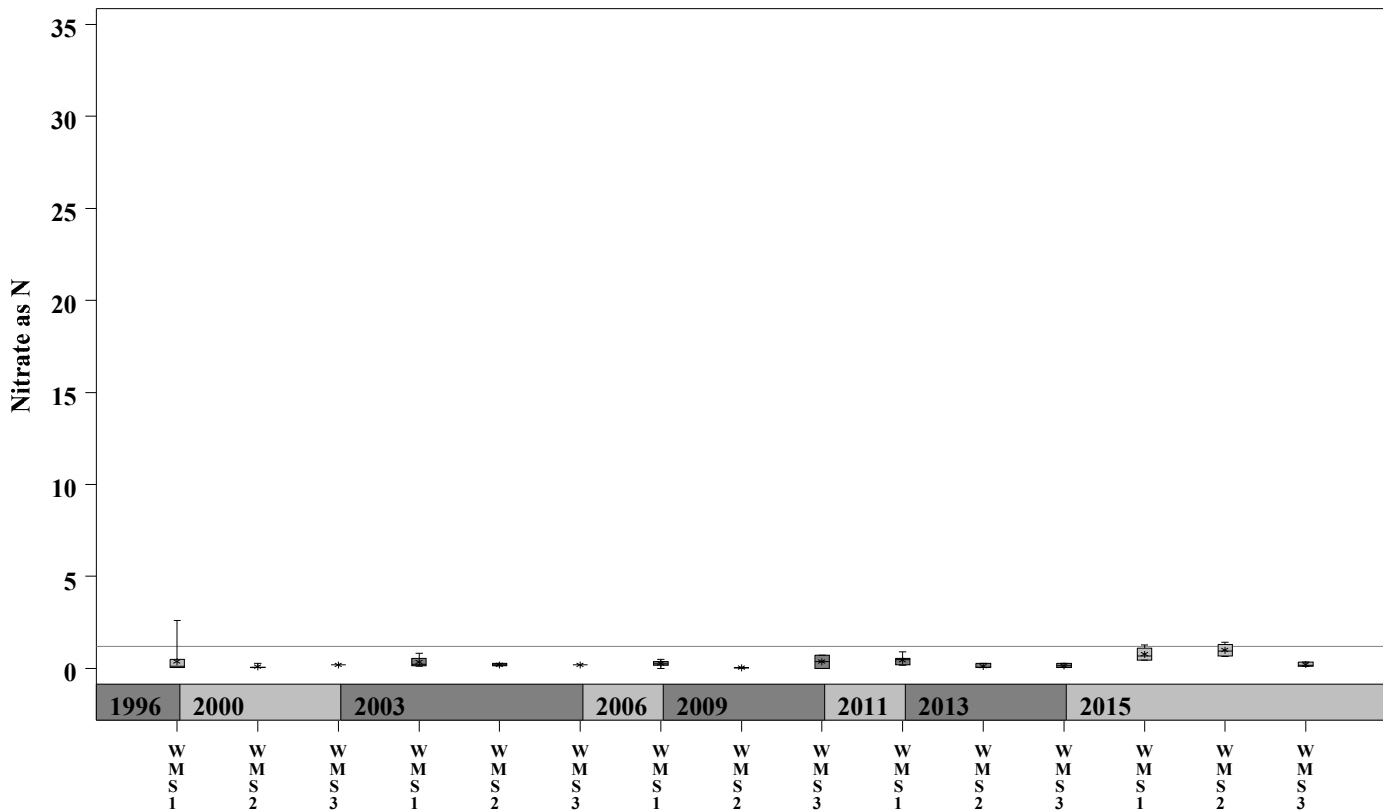
Williamson Creek Watershed

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

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



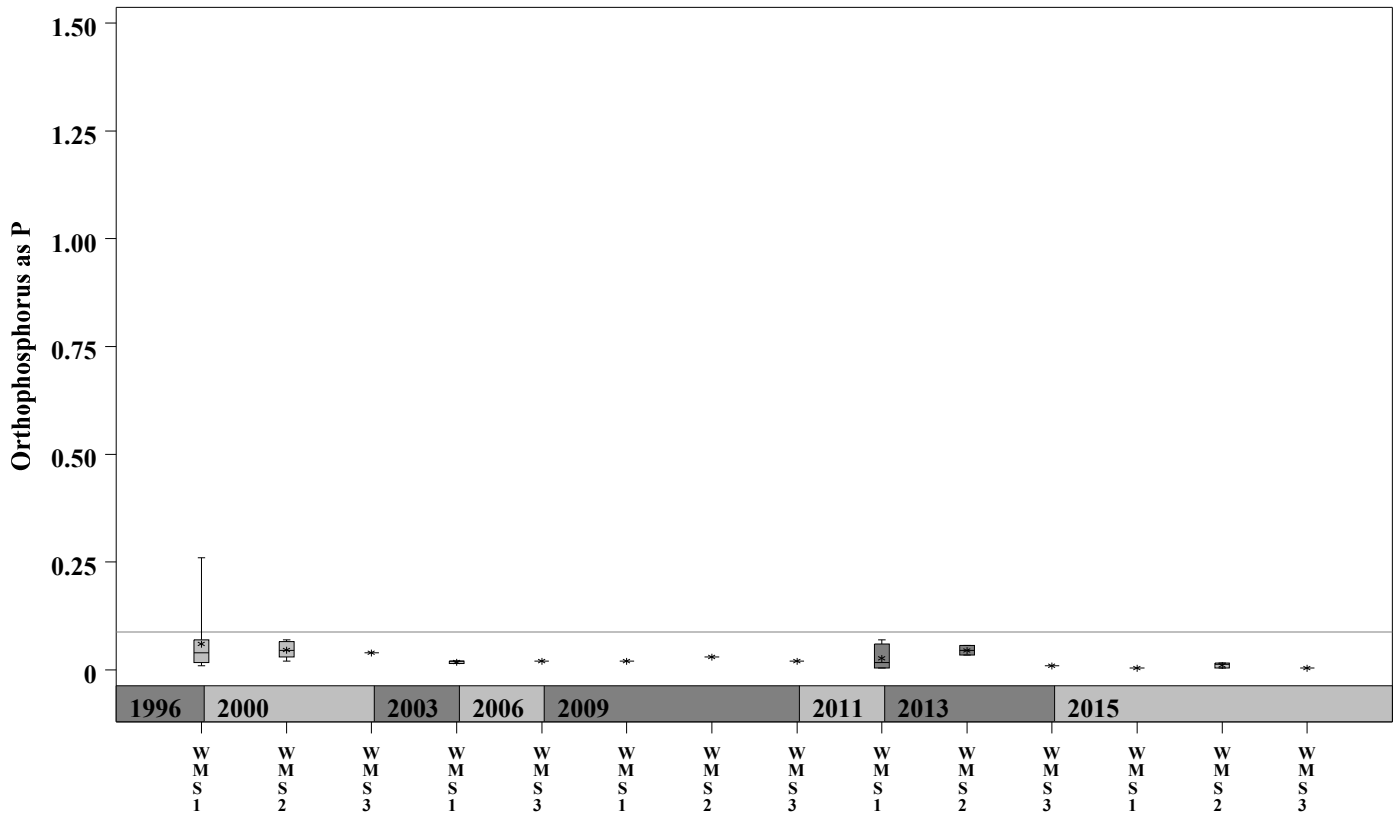
Parameter = NITRATE AS N Unit = mg/L Watershed = Williamson



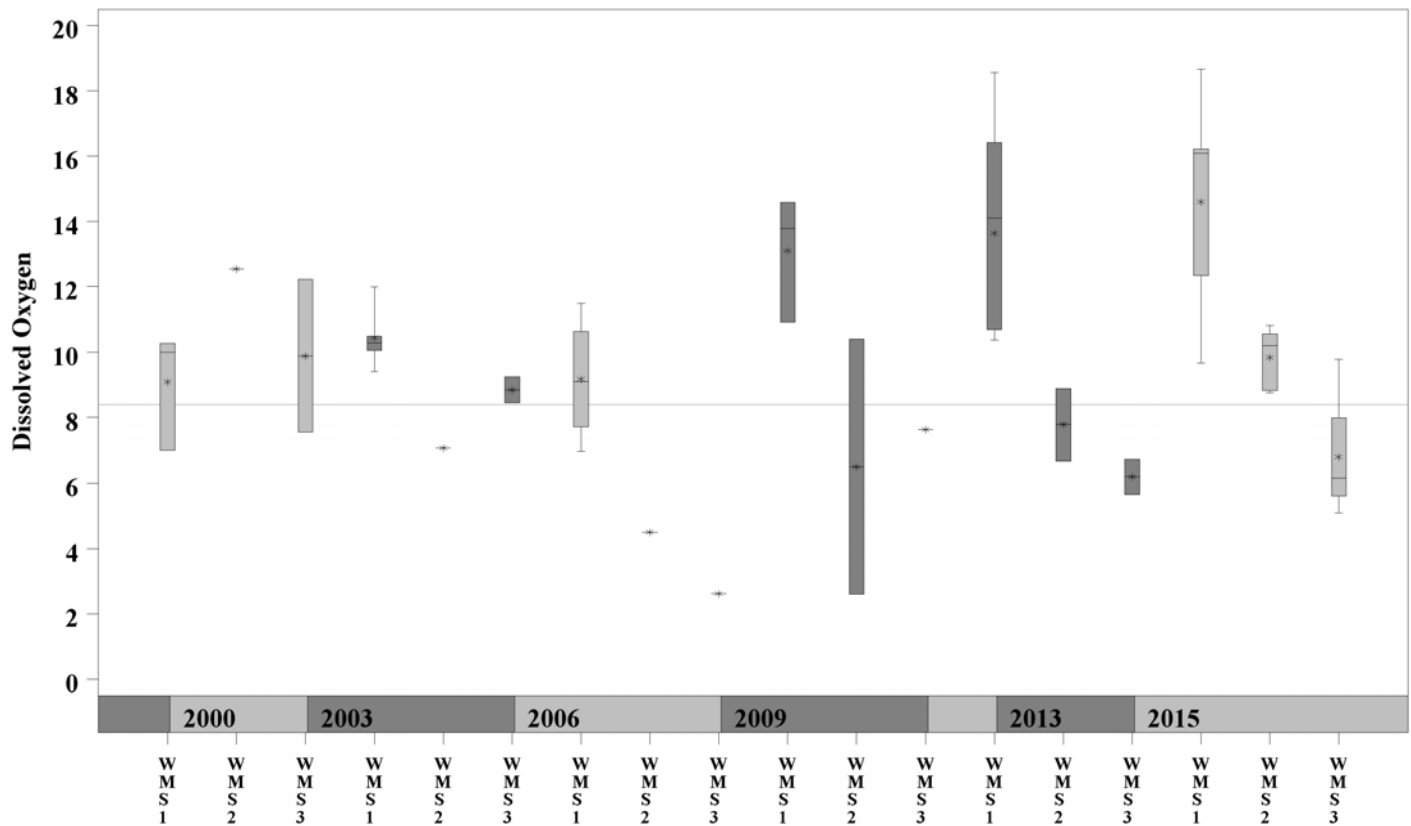
Williamson Creek Watershed

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

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



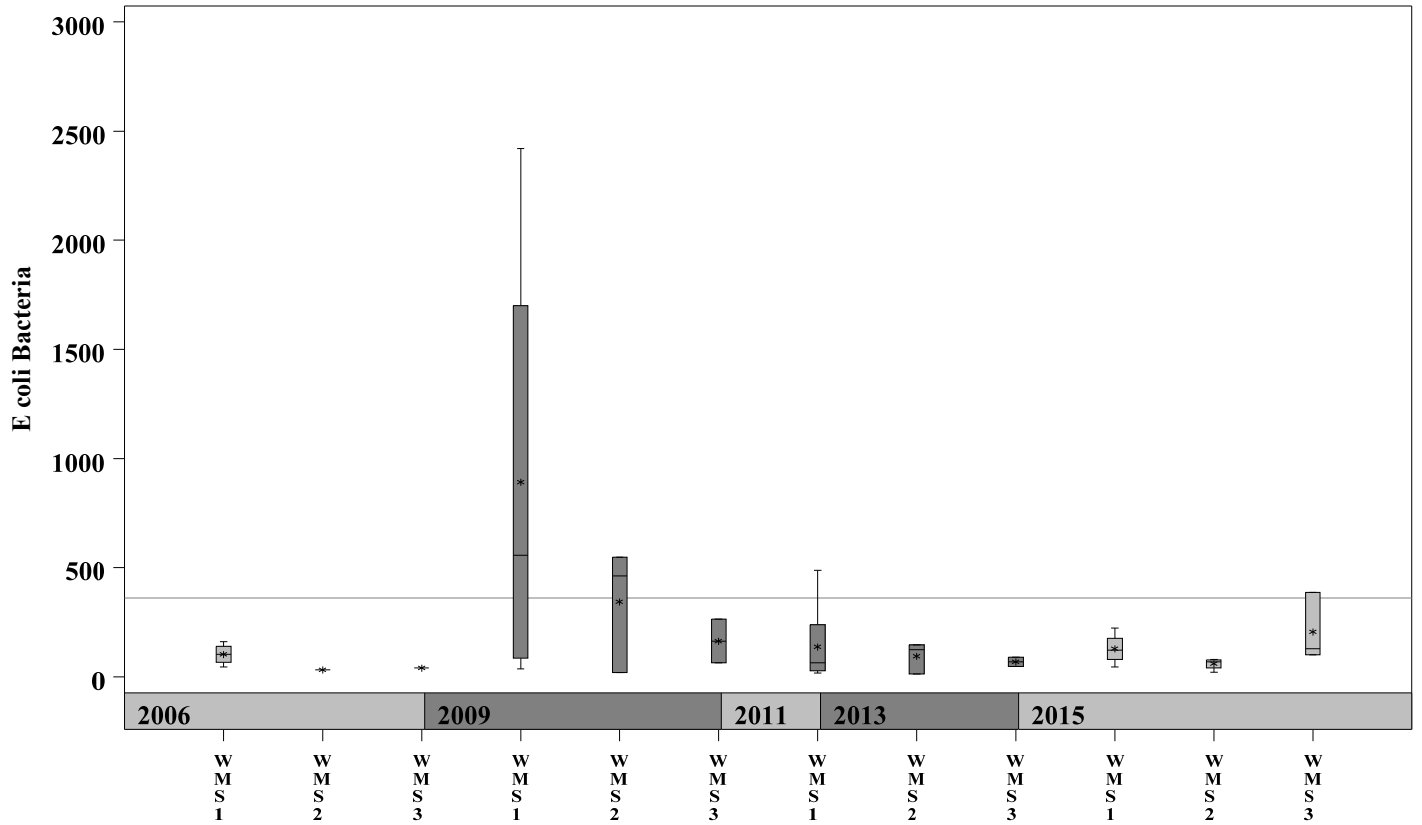
Parameter = DISSOLVED OXYGEN Unit = mg/L Watershed = Williamson



Williamson Creek Watershed

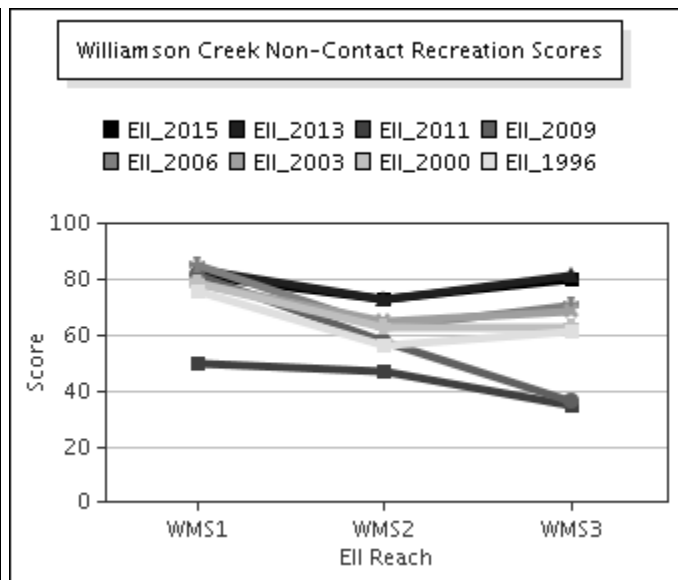
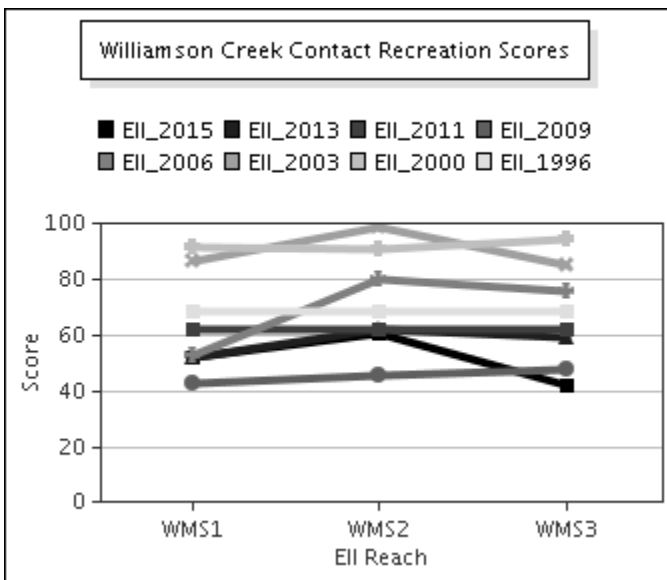
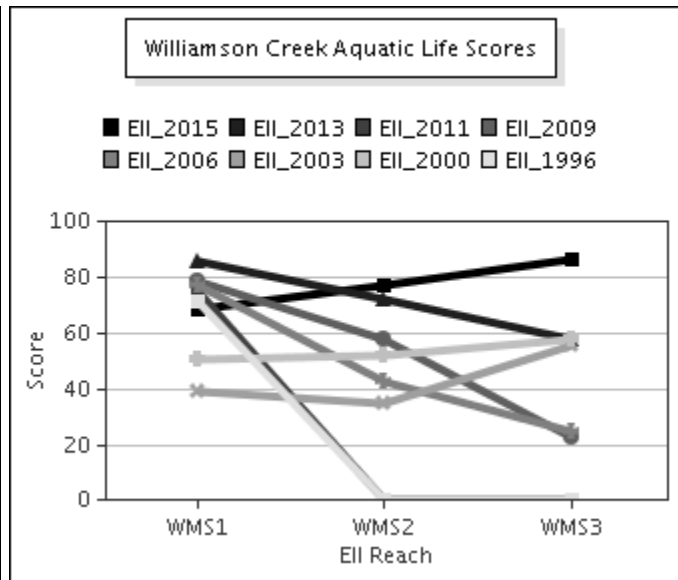
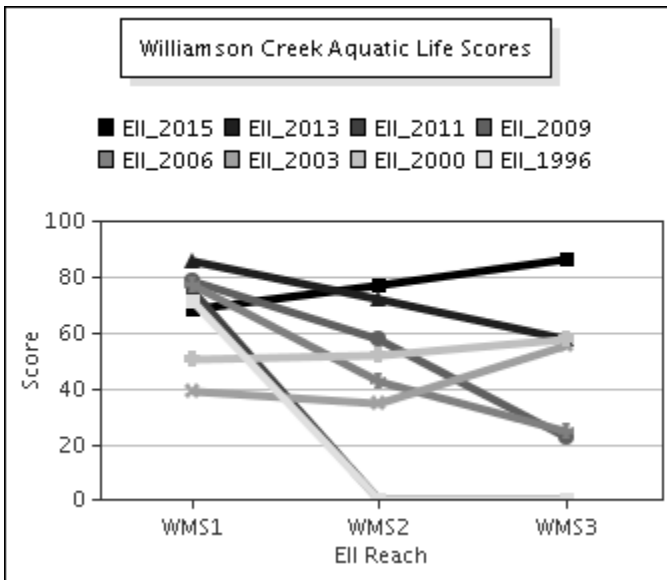
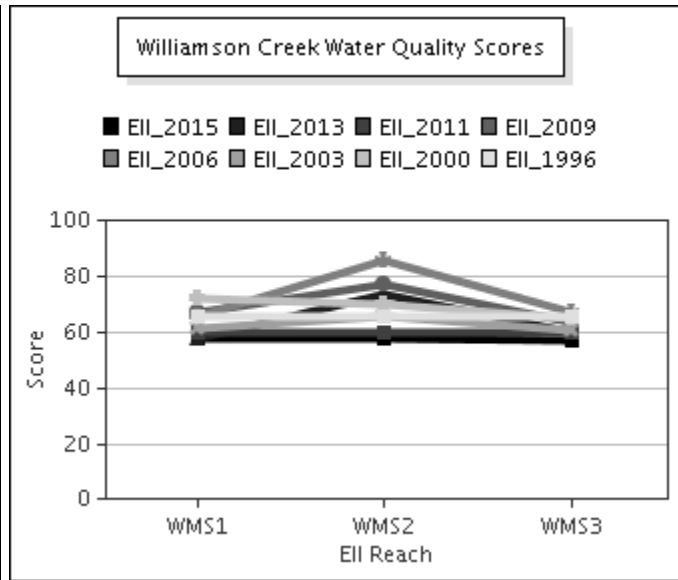
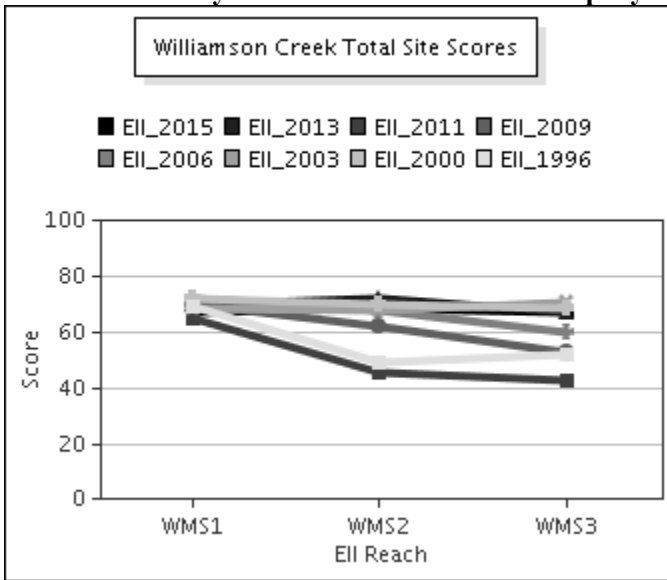
Data Summary Graphs – *E.coli* (Downstream to Upstream by Year)

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



Williamson Creek Watershed

Score Summary – Reach scores for each sample year



Williamson Creek Watershed

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

Benthic Macroinvertebrates - Williamson Creek			WMS @ Hwy71 (490) 07/08/2015 (WRE)	WMS @ IH35 (491) 07/09/2015 (WRE)	WMS @ Mckinney Falls (223) 07/09/2015 (WRE)
Benthic Macroinvertebrate ID	PTI	FFG			
Chimarra	2	FC	41	58	64
Farrodes Texanus	2	CG,SC		1	
Hydroptila	2	PI,SC	2		
Microcylloepus Pusillus	2	CG,SC		3	3
Gammarus	3	CG,SH	4		
Baetodes	4	SC	4		
Camelobaetidius	4	CG	18		6
Dolichopodidae	4	P			1
Fallceon	4	CG,SC	251	11	221
Neochoroterpes	4	CG		2	1
Simulium	4	FC	11	4	44
Smicridea	4	FC		4	
Tricorythodes	5	CG			1
Argia	6	P	5	12	6
Brechmorhoga Mendax	6	P	1		2
Cheumatopsyche	6	FC	52	22	52
Chironomidae	6	FC,P	17	33	260
Enallagma	6	P		2	
Hetaerina	6	P		2	
Hydracarina	6		2		4
Microvelia	6	P	1		
Rhagovelia	6	P		1	1
Tanypodinae	6	P	5	2	2
Caenis	7	CG,SC		1	
Ferrissia	7	SC		1	
Stenelmis	7	CG,SC		33	3
Hirudinea	8	P		2	1
Hyaella	8	CG,SH		1	
Oligochaeta	8	CG	2		
Physella	9	SC		1	
Dugesia		CG,P	4	8	2
Staphylinidae		P			1

Williamson Creek Watershed

Site Photographs



490_t00-us-06_02_2009



490_t00-ds-06_02_2009



300_t00-us-12_07_2000



300_t00-ds-02_15_2001



491_t00-ds-03_12_2003



491_t00-ds-06_02_2009

Williamson Creek Watershed

Site Photographs



344_t00-us-02_14_2001



344_t00-ds-12_07_2000



492_t00-us-03_12_2003



492_t00-ds-03_12_2003



223_t00-ur-02_14_2001



223_t00-ds-05_29_2009