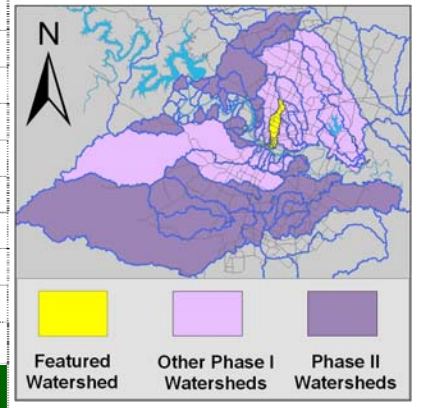


Waller Creek Watershed

Watershed Overview

Catchment	Total area	6 square miles					
	Area in recharge	none					
	Creek length	7 miles					
Demographics	Receiving water	Town Lake					
	2000 population	32,076					
	2030 projected population	42,264					
Land Use	30 year projected % increase	32 %					
	Impervious cover (2003 estimate)	50.0 %					
	Impervious cover (2013 estimate)	58.0 %					
Overall EII Scores	2000	2003	2006	2009	2011	2013	2015
	54	58	54	56	51	46	60



Flow Regime* for Sample Sites on Waller 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	Mar	Jun	Jun	Sep	Jan	Apr	May	Jun	Jun	Sep	Jan	Apr	Jul
	WO	Bio	WO	WO	Bio	WO	WO	WO	WO	Bio	WO	WO	WO	WO	WO	Bio	Bio	WO	WO	WO	WO	WO	Bio	WO	WO	WO	Bio	WO	Bio	WO	WO	WO	WO
780	B	B	B	B	B	B	B	B	B	B	n	B	B	n		B	B	B	B	B	n	n	n	B	B	n	n		B	B	B	B	B
781	B		B	B	B	B	B																										
624	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
38	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 Waller 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	
WLR1	38	Waller Creek DS of Cesar Chavez	1996	53	62	18	67	44	20	20	19	41
WLR2	624	Waller Creek Upstream of 23rd Street	1996	47	62	53	77	49	18	22	13	51
WLR3	780	Waller Creek @ 51st Street	1996	65	62	43	84	65	21	27	14	57
WLR3	781	Waller Creek @ Shipe Park	1996	55	62	30	74	66	19	21	16	51
WLR1	38	Waller Creek DS of Cesar Chavez	2000	41	63	63	59	27	28	22	34	47
WLR2	624	Waller Creek Upstream of 23rd Street	2000	40	63	49	80	49	35	31	38	53
WLR3	780	Waller Creek @ 51st Street	2000	68	63	69	71	45	29	38	20	58
WLR3	781	Waller Creek @ Shipe Park	2000	53	63	74	84	39	26	20	31	57
WLR1	38	Waller Creek DS of Cesar Chavez	2003	44	76	51	53	43	24	34	14	49
WLR2	624	Waller Creek Upstream of 23rd Street	2003	49	76	63	82	63	37	45	29	62
WLR3	780	Waller Creek @ 51st Street	2003	54	76	57	69	63	30	39	21	58
WLR3	781	Waller Creek @ Shipe Park	2003	58	76	69	80	60	36	34	37	63
WLR1	38	Waller Creek DS of Cesar Chavez	2006	38	61	26	68	48	45	30	59	48
WLR2	624	Waller Creek Upstream of 23rd Street	2006	41	61	33	87	68	37	45	29	55
WLR3	780	Waller Creek @ 51st Street	2006	59	61	32	90	64	44	49	39	58
WLR1	38	Waller Creek DS of Cesar Chavez	2009	49	62	29	62	44	78	73	83	54
WLR2	624	Waller Creek Upstream of 23rd Street	2009	54	62	25	81	76	79	86	71	63
WLR3	780	Waller Creek @ 51st Street	2009	57	62	25	58	59	49	24	74	52
WLR1	38	Waller Creek DS of Cesar Chavez	2011	57	69	36	56	48	53	41	65	53
WLR2	624	Waller Creek Upstream of 23rd Street	2011	48	69	30	68	67	51	53	49	56
WLR3	780	Waller Creek @ 51st Street	2011	64	69	25	34	40	41	42	39	46
WLR1	38	Waller Creek DS of Cesar Chavez	2013	45	41	32	58	49	57	57	57	47
WLR2	624	Waller Creek Upstream of 23rd Street	2013	39	41	25	82	61	75	72	78	54
WLR3	780	Waller Creek @ 51st Street	2013	59	41	25	52	53				38
WLR1	38	Waller Creek DS of Cesar Chavez	2015	42	67	42	80	70	69	75	63	62
WLR2	624	Waller Creek Upstream of 23rd Street	2015	37	67	25	88	72	75	78	72	61
WLR3	780	Waller Creek @ 51st Street	2015	48	67	25	78	52	65	59	70	56

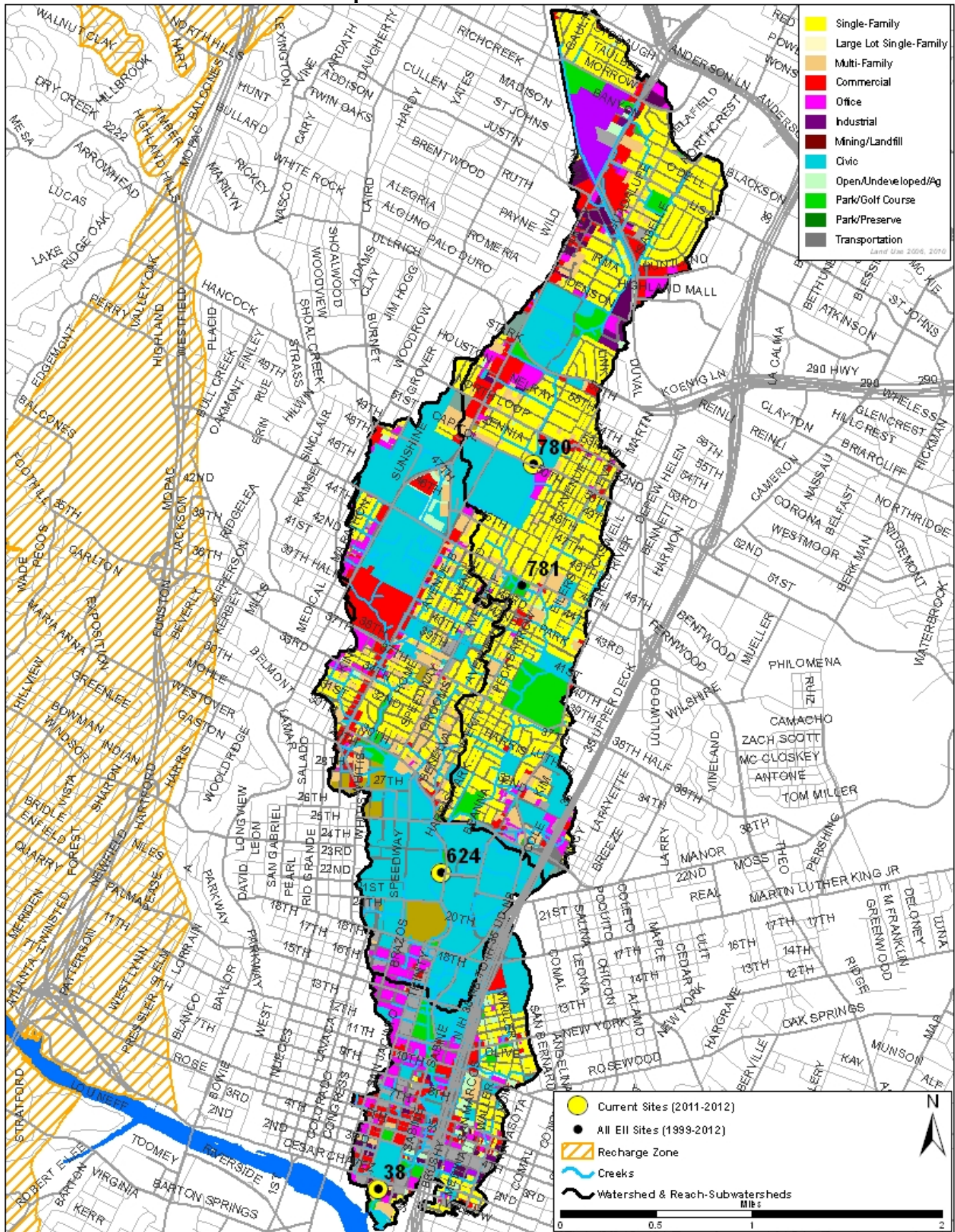
* blank cells indicate parameter was not collected, blank row indicate site was dropped

**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

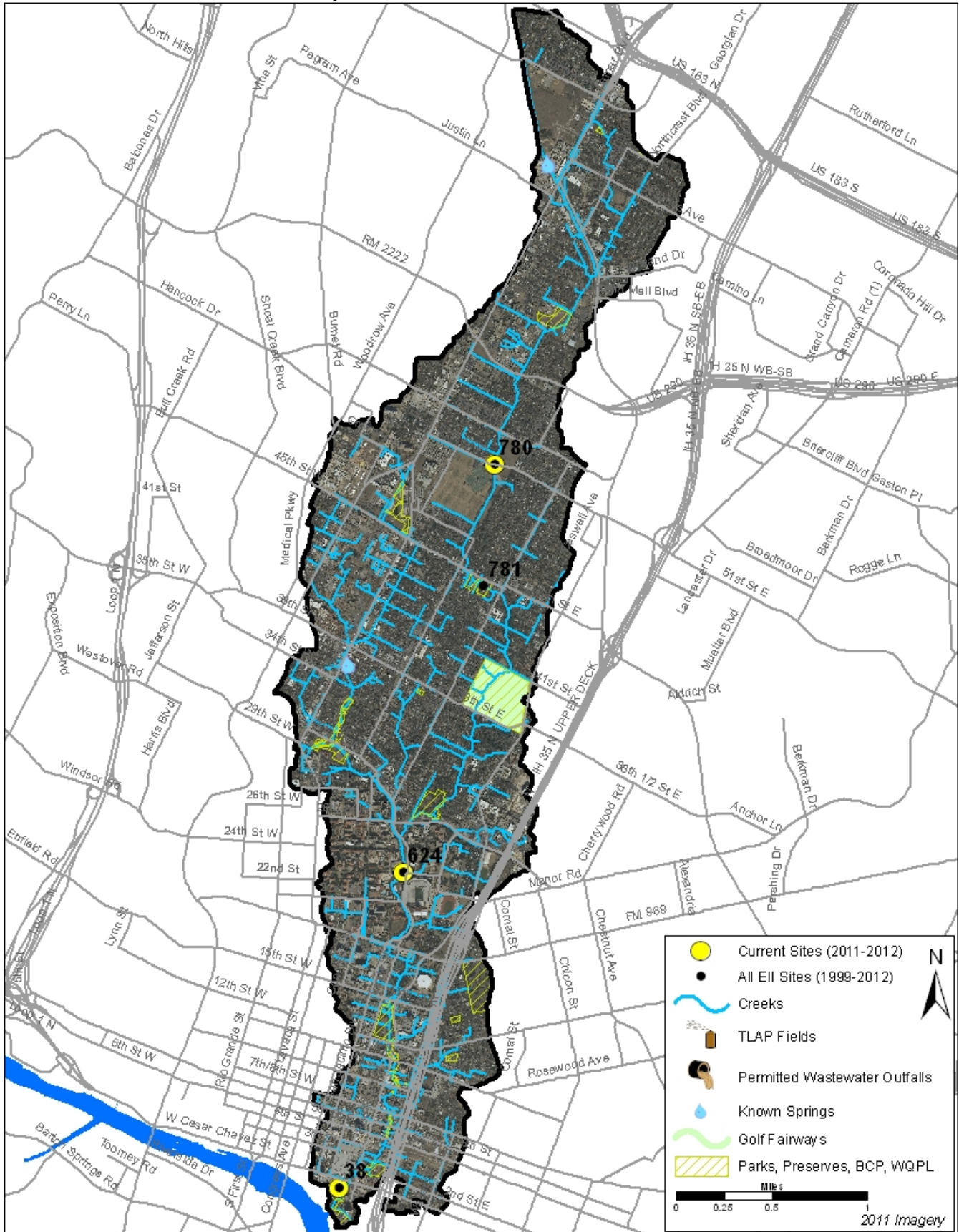
Waller Creek Watershed

Land Use Map



Waller Creek Watershed

Aerial Map



Waller 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. <small>flag</small>	Cond. <small>flag</small>	pH <small>flag</small>	D.O. <small>flag</small>	E. Coli <small>flag</small>
Waller	38	WLR1	01/14/2015	8.2	514	8.02	10.8	13.5
Waller	38	WLR1	04/15/2015	20.6	834	7.99	7.8	649.0
Waller	38	WLR1	07/09/2015	28.0	570	8.24		
Waller	38	WLR1	07/14/2015	28.0	688	8.22	8.0	1050.0
Waller	38	WLR1	09/09/2015	27.9	593	8.03	6.4	1200.0
WLR1 Mean				22.5	640	8.10	8.3	728.1
Waller	624	WLR2	01/14/2015	8.6	926	7.80	11.0	1299.7
Waller	624	WLR2	04/15/2015	20.2	1060	7.82	9.5	1200.0
Waller	624	WLR2	07/09/2015	26.2	1010	7.83	8.1	
Waller	624	WLR2	07/14/2015	26.3	1214	7.75	6.4	1200.0
Waller	624	WLR2	09/09/2015	26.8	1038	7.54	3.7	1370.0
WLR2 Mean				21.6	1050	7.75	7.7	1267.4
Waller	780	WLR3	01/14/2015	6.5	725	8.12	8.4	1046.2
Waller	780	WLR3	04/15/2015	19.4	763	7.86	6.0	548.0
Waller	780	WLR3	07/09/2015	26.0	750	7.78	5.0	
Waller	780	WLR3	07/14/2015	26.1	758	7.84	5.1	> 2420.0
Waller	780	WLR3	09/09/2015	26.4	523	7.44	2.1	1986.3
WLR3 Mean				20.9	704	7.81	5.3	1500.1
Waller Mean				21.7	798	7.88	7.0	1165.2

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	

Waller 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	
Waller	38	WLR1	01/14/2015		0.225		0.84		0.045		43.7		98.6	R
Waller	38	WLR1	04/15/2015		0.104		0.69		0.080		3.5		5.4	
Waller	38	WLR1	07/09/2015											
Waller	38	WLR1	07/14/2015		0.029		0.86	<J	0.004		3.3		3.9	R
Waller	38	WLR1	09/09/2015		0.048		0.62	<J	0.004		2.8		2.6	R
WLR1 Mean					0.101		0.75		0.033		13.3		27.6	
Waller	624	WLR2	01/14/2015	<J	0.008		1.79		0.036	R	1.5		2.0	R
Waller	624	WLR2	04/15/2015		0.060		1.14		0.030		4.2		3.1	
Waller	624	WLR2	07/09/2015											
Waller	624	WLR2	07/14/2015	<J	0.008		2.82		0.045		1.2		1.6	R
Waller	624	WLR2	09/09/2015		0.087		0.88		0.076	<J	1.0		1.7	R
WLR2 Mean					0.040		1.66		0.047		2.0		2.1	
Waller	780	WLR3	01/14/2015	<J	0.008		2.37		0.132	<J	1.0		3.0	R
Waller	780	WLR3	04/15/2015		0.764		0.10		0.324		1.2		2.4	
Waller	780	WLR3	07/09/2015											
Waller	780	WLR3	07/14/2015		0.881		0.46		0.162	<J	2.2		2.5	R
Waller	780	WLR3	09/09/2015	<J	0.008	<J	0.01		0.268		1.4		5.1	R
WLR3 Mean					0.415		0.74		0.222		1.4		3.3	
Waller Mean					0.186		1.05		0.100		5.6		11.0	

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

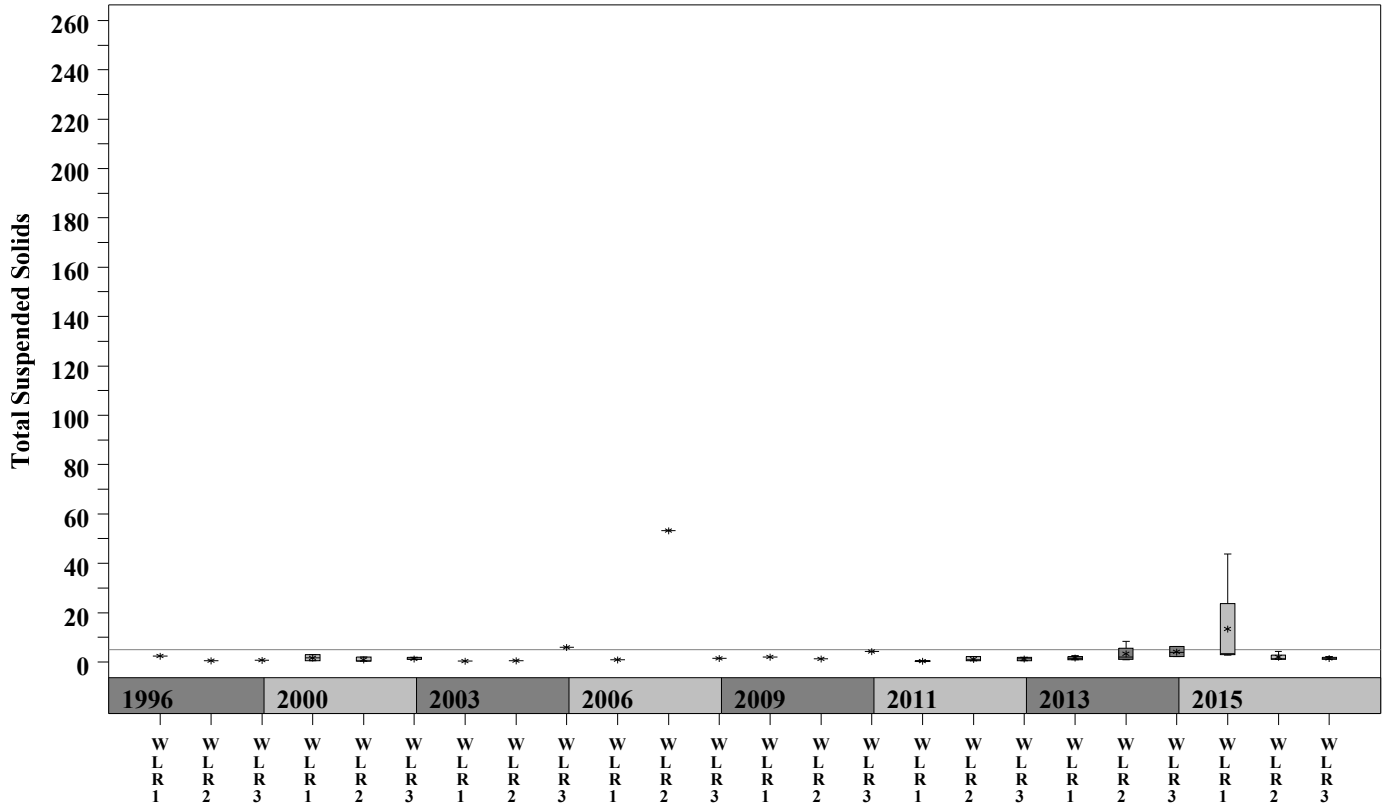
Summary Statistics for all 2015-2016 E.I.I. Sites Combined

Parameter	2015-2016 Average	2015-2016 Minimum	2015-2016 Maximum	1 Standard Deviation Above
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

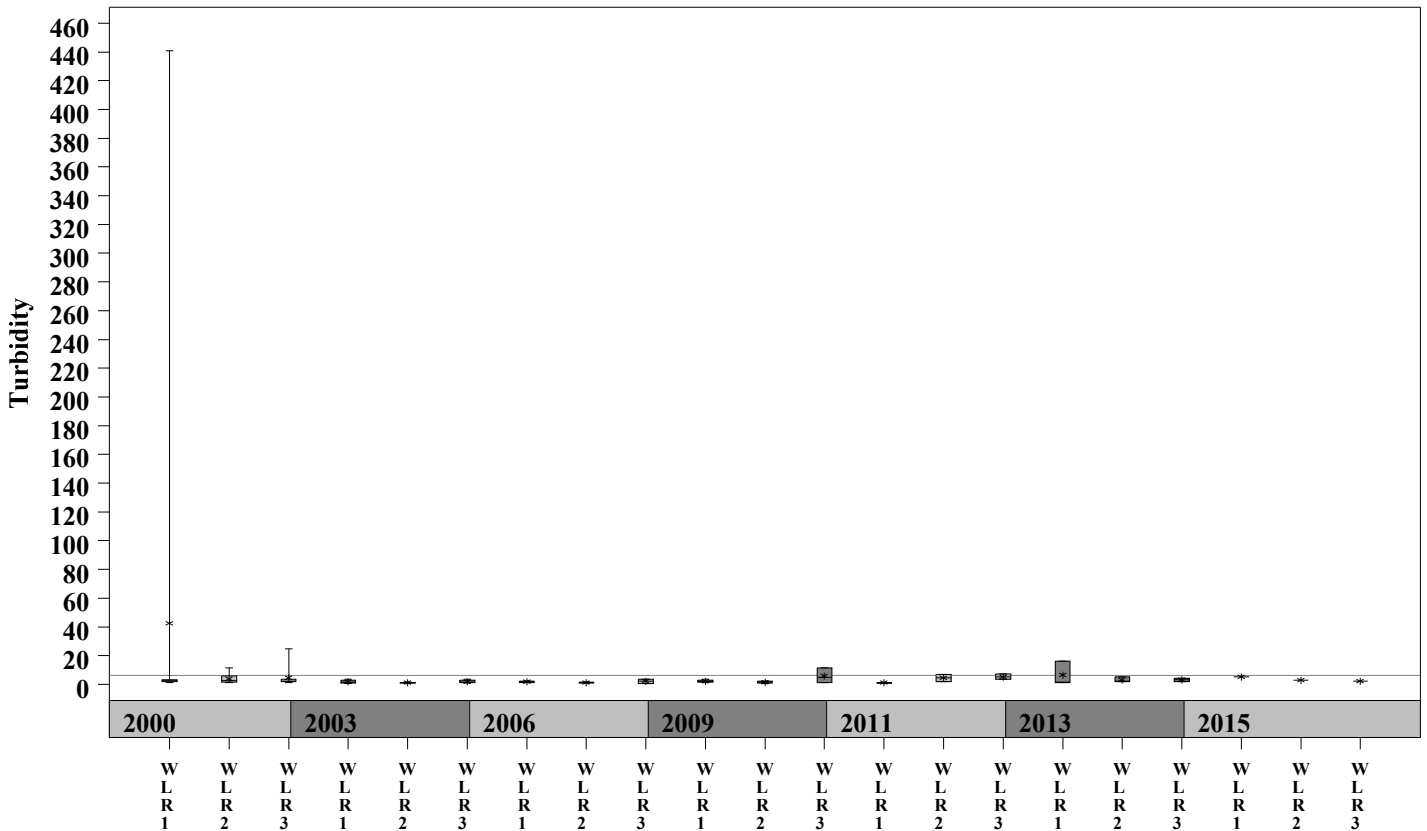
Waller Creek Watershed

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

Parameter = **TOTAL SUSPENDED SOLIDS** Unit = **mg/L** Watershed = **Waller**



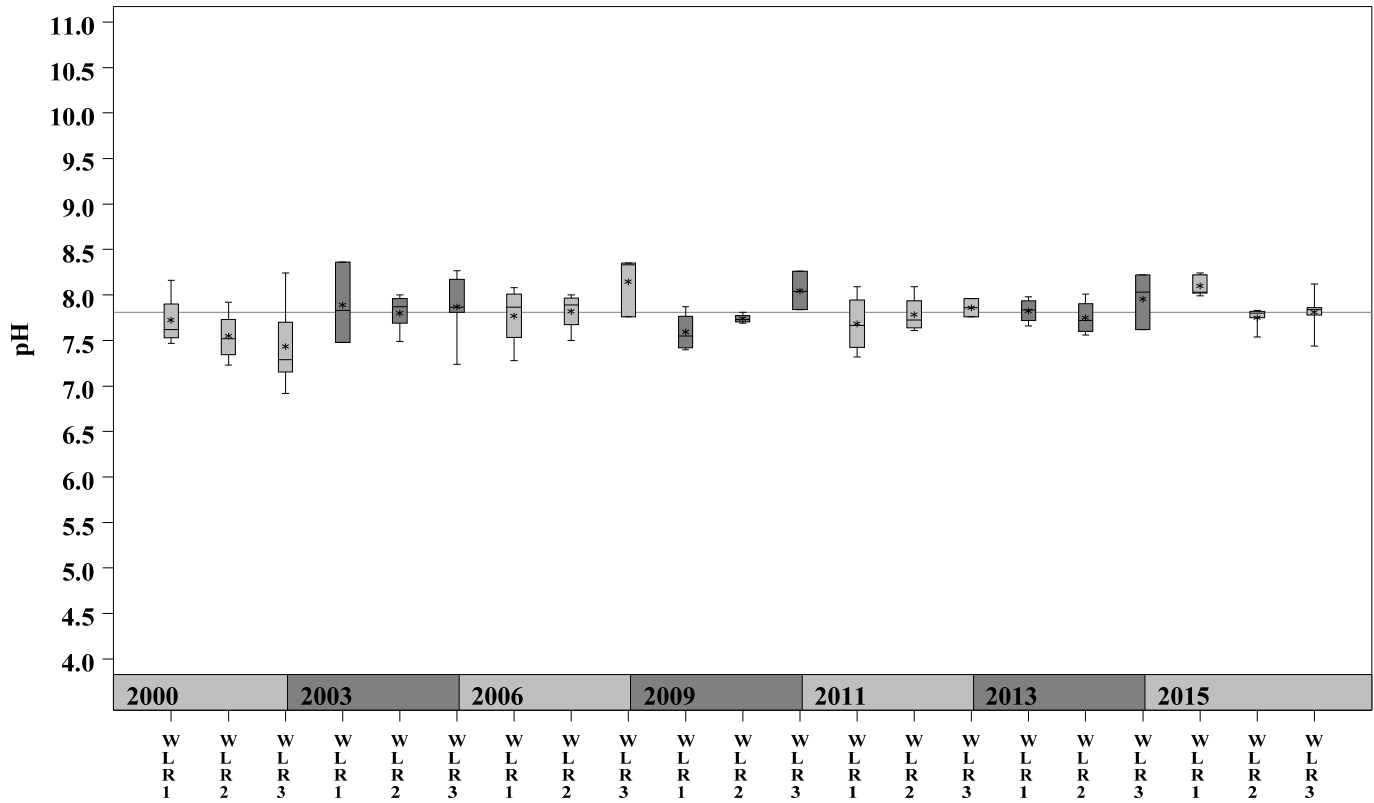
Parameter = **TURBIDITY** Unit = **NTU** Watershed = **Waller**



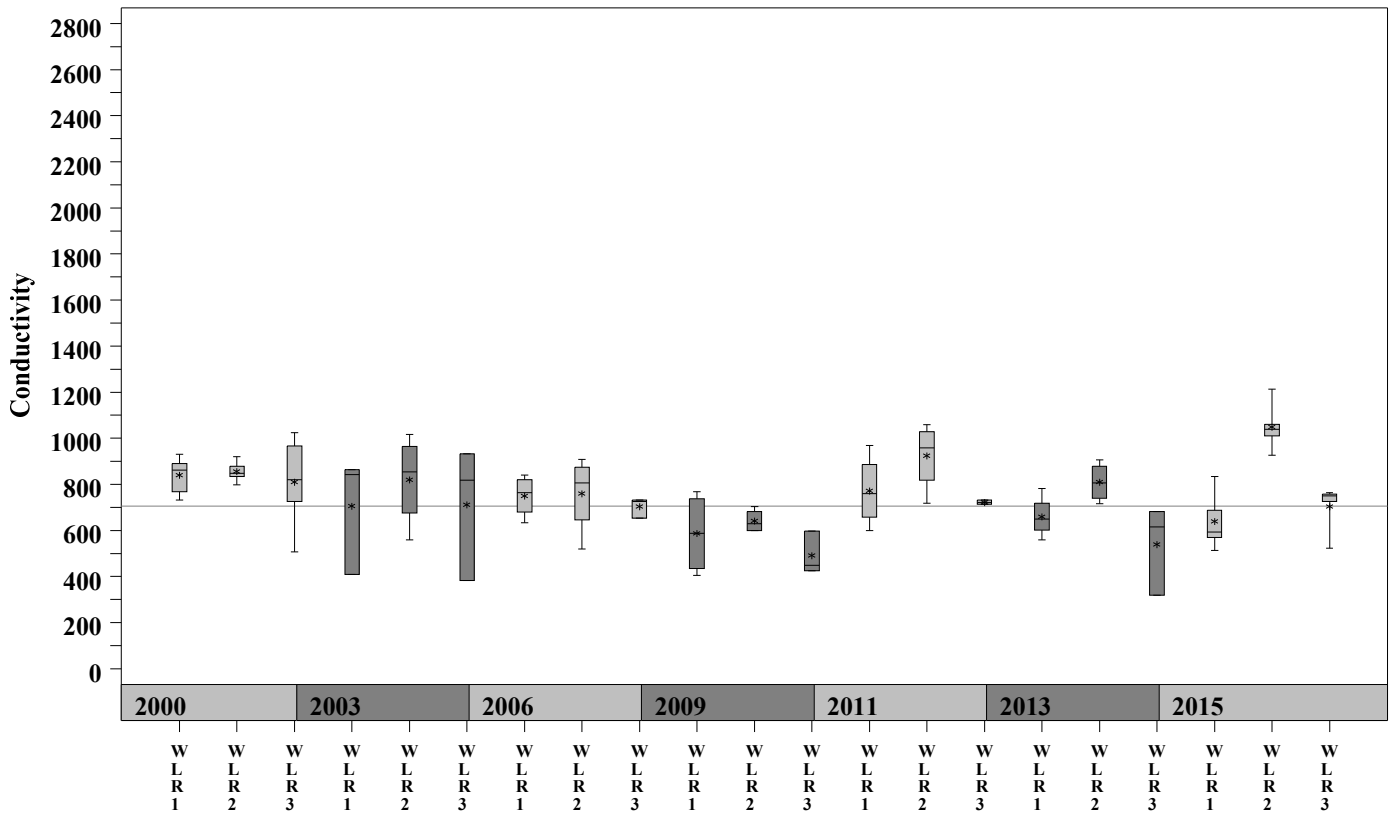
Waller Creek Watershed

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

Parameter = pH Unit = Standard Units Watershed = Waller



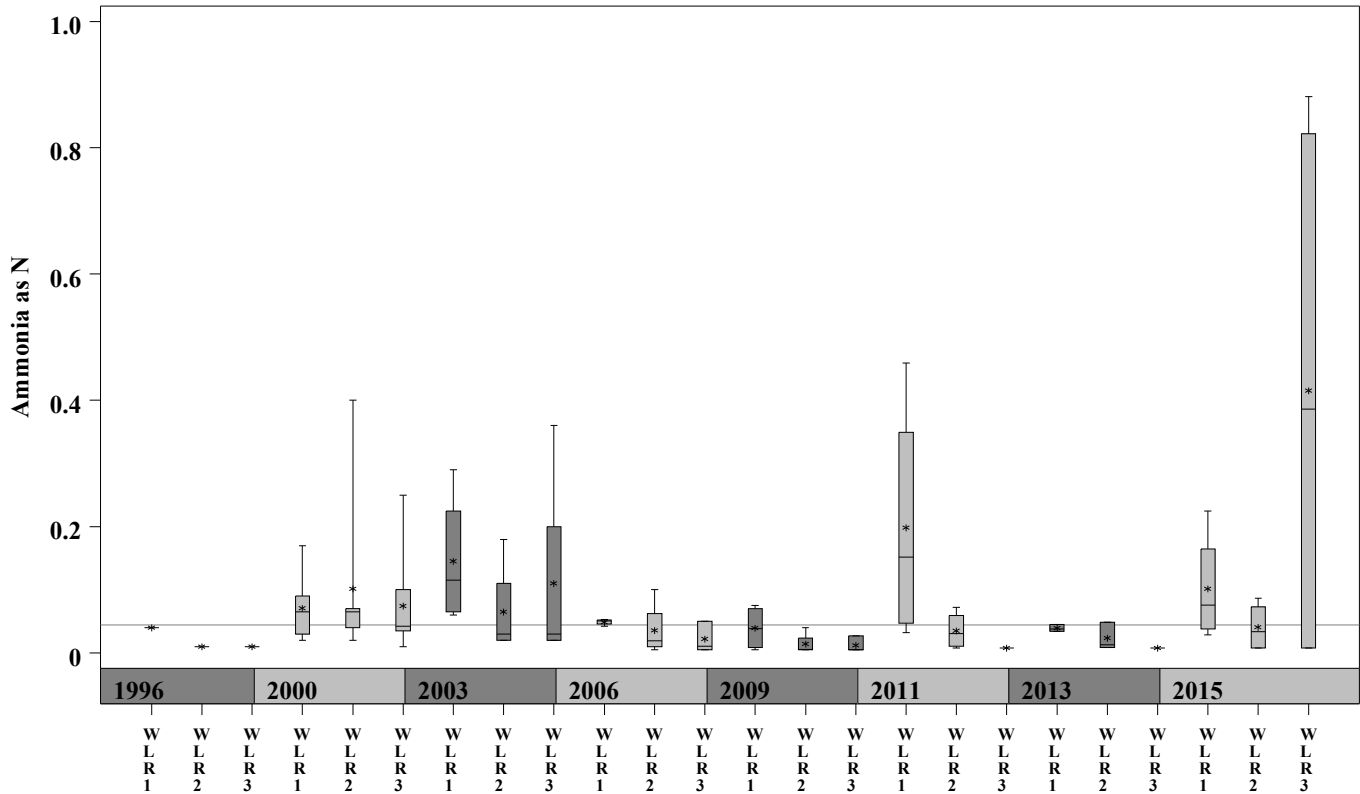
Parameter = CONDUCTIVITY Unit = uS/cm Watershed = Waller



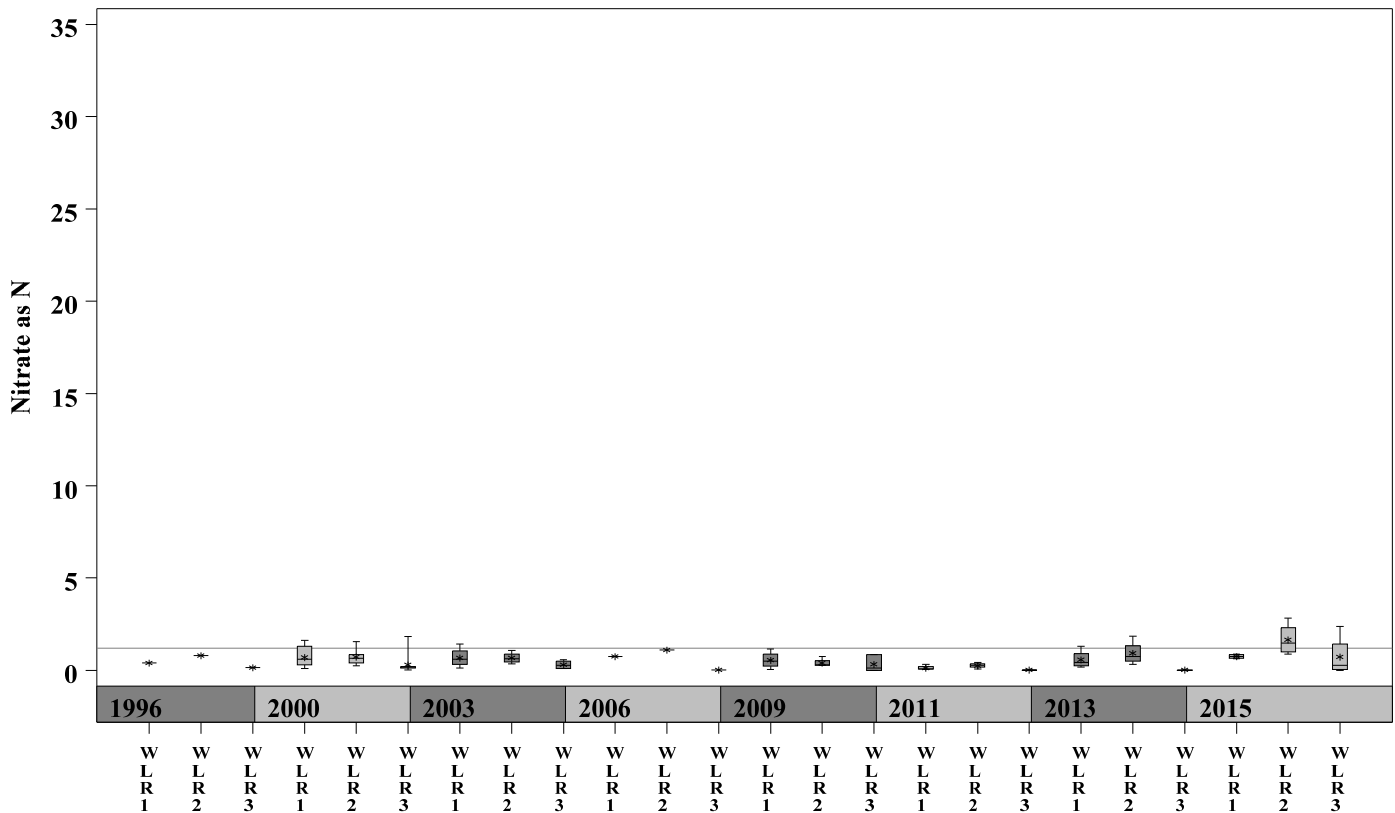
Waller Creek Watershed

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

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



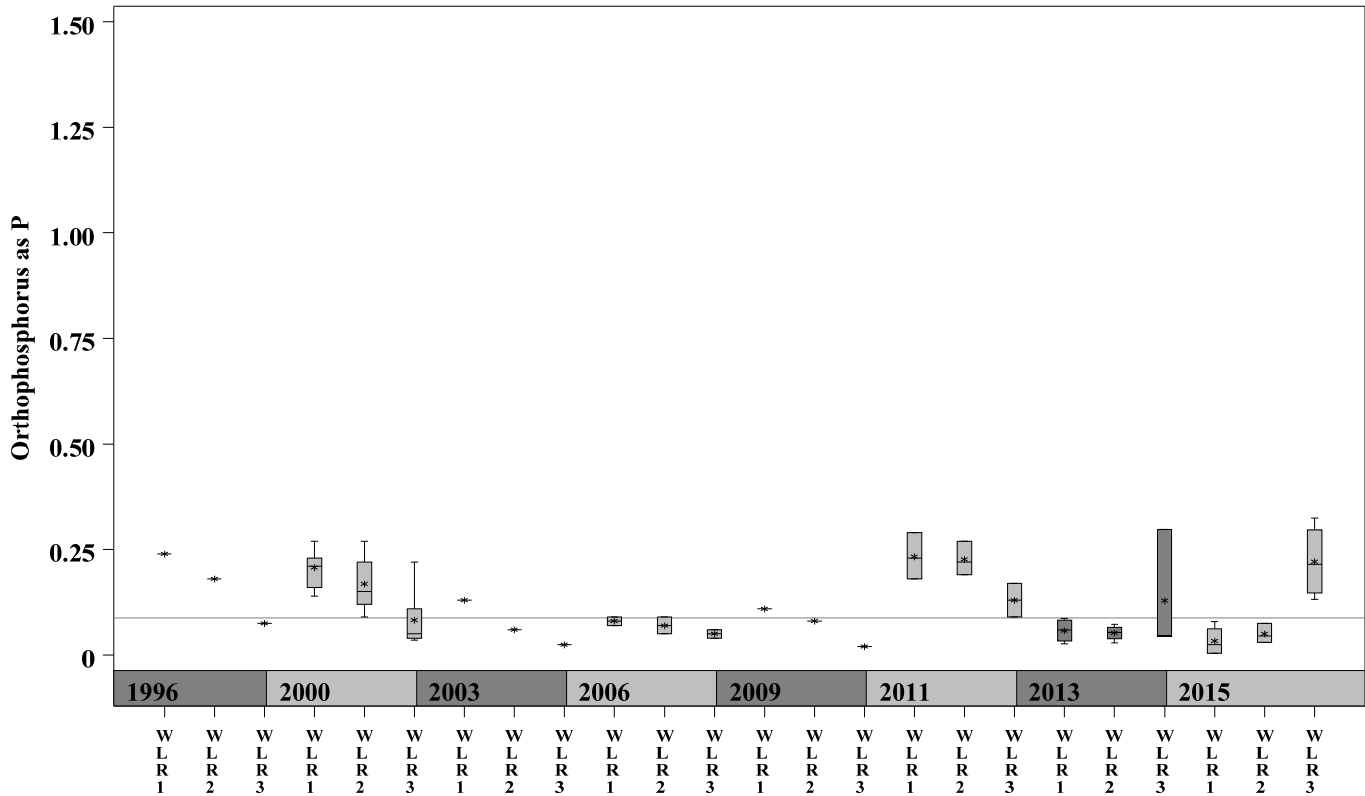
Parameter = NITRATE AS N Unit = mg/L Watershed = Waller



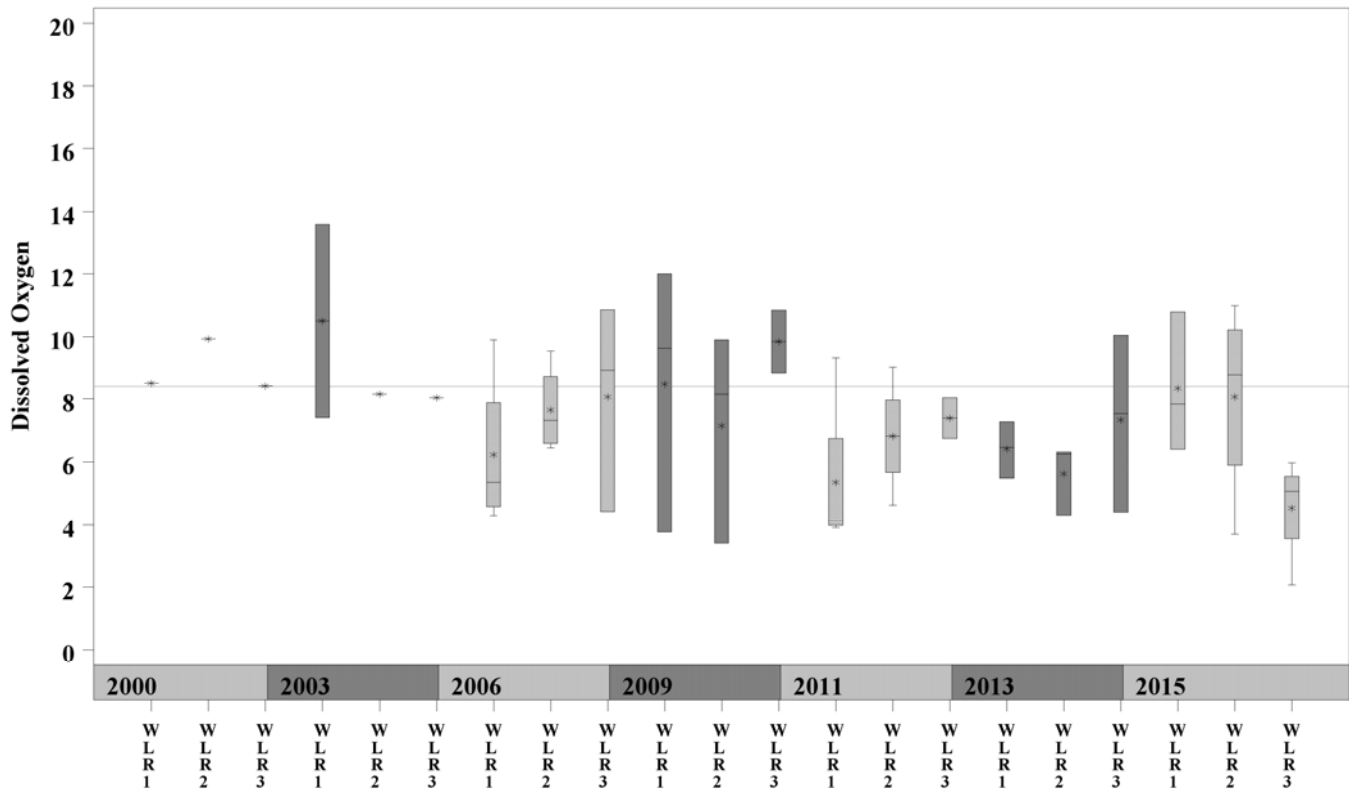
Waller Creek Watershed

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

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



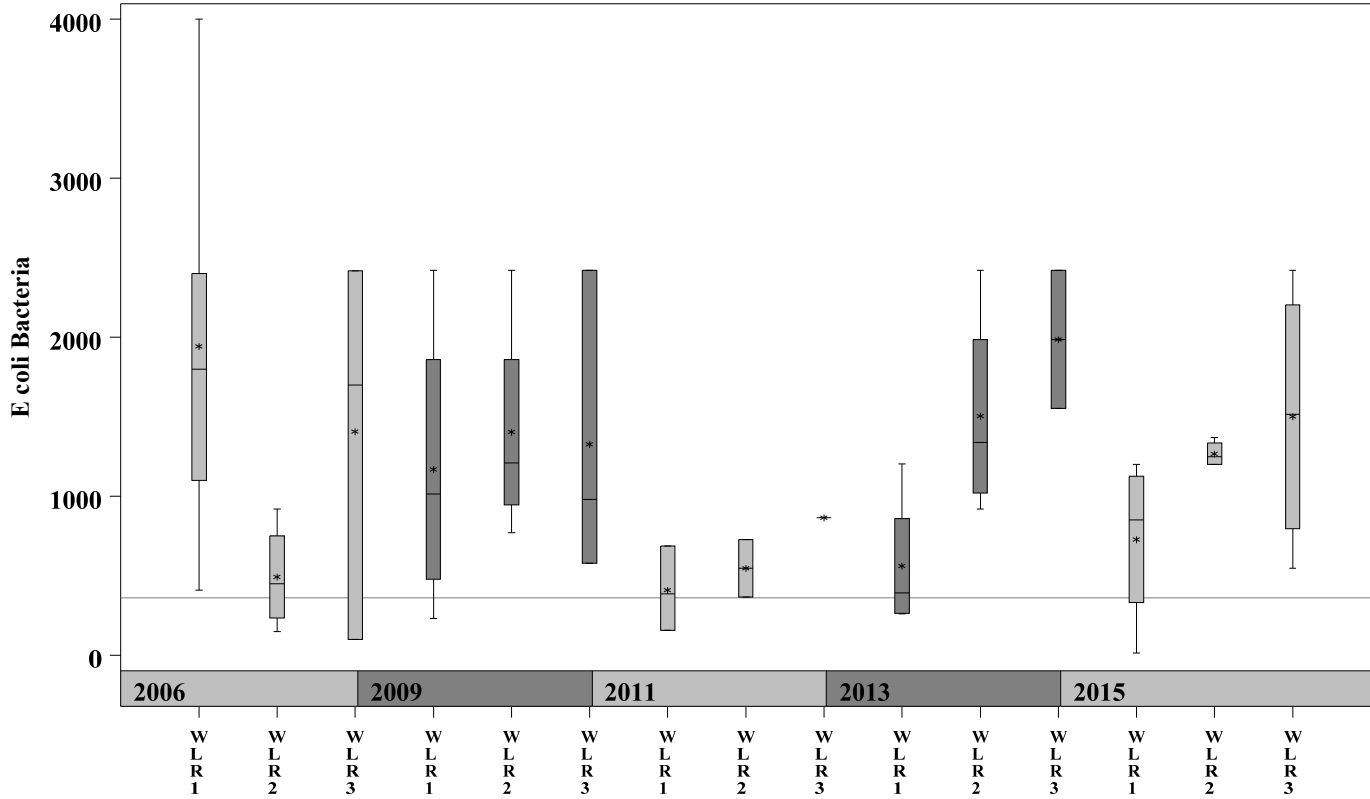
Parameter = DISSOLVED OXYGEN Unit = mg/L Watershed = Waller



Waller Creek Watershed

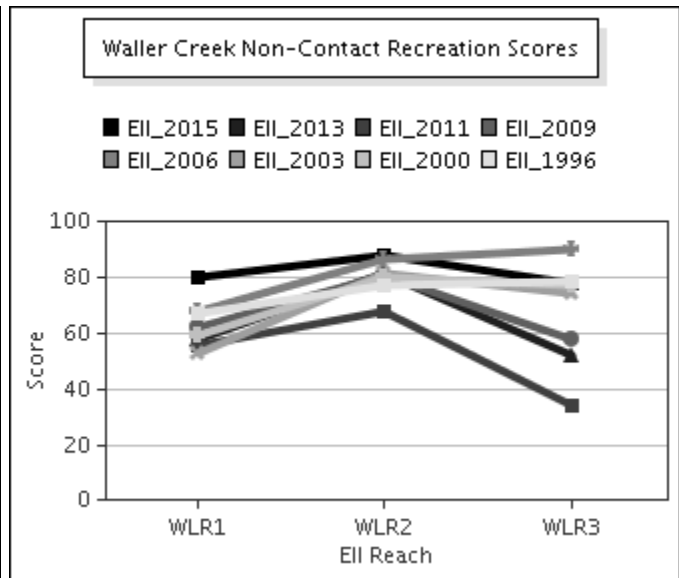
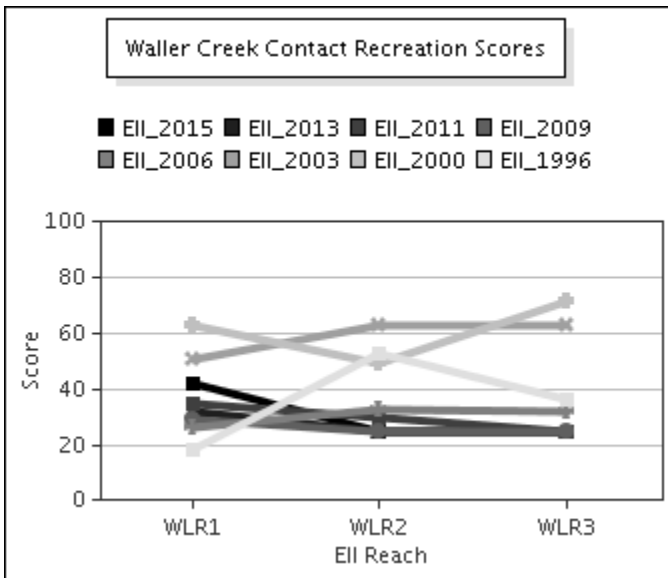
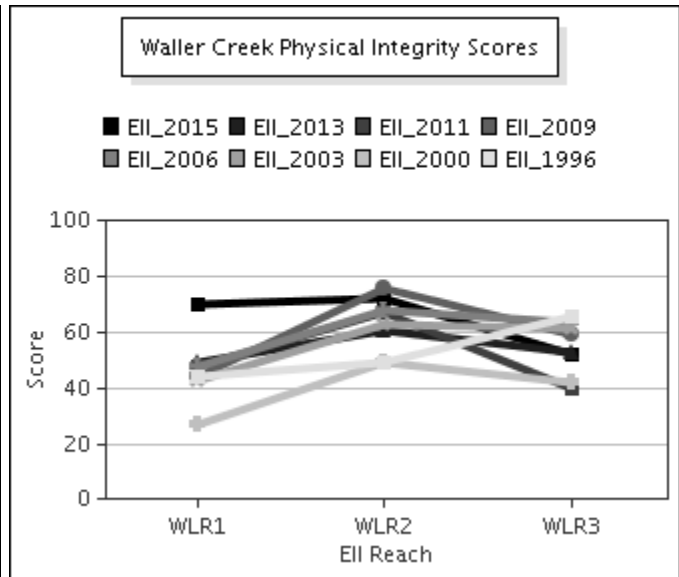
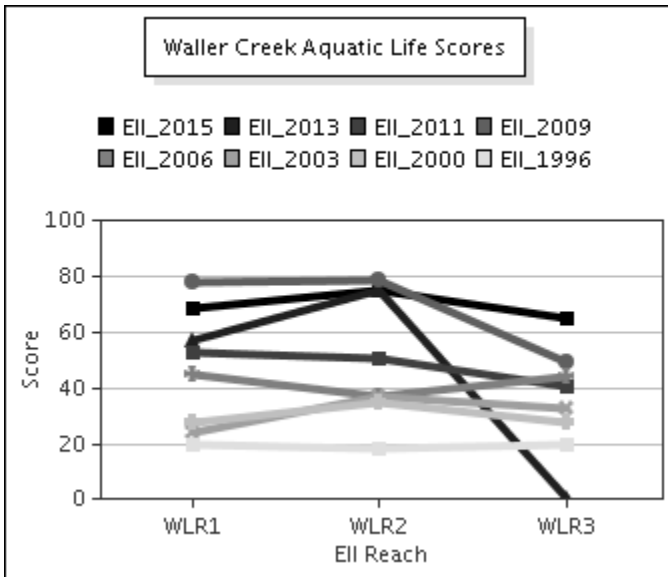
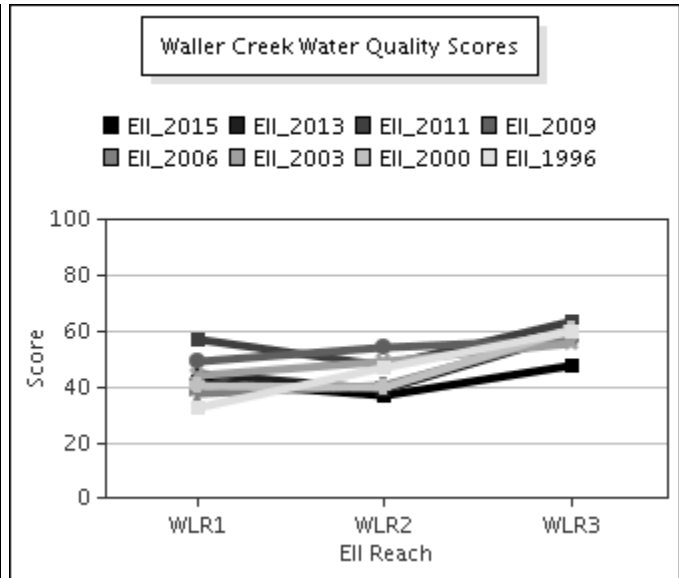
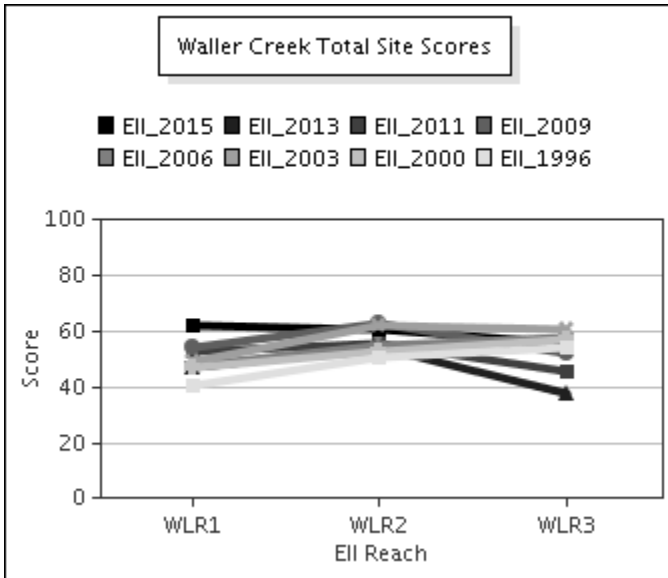
Data Summary Graphs – *E.coli* (Downstream to Upstream by Year)

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



Waller Creek Watershed

Score Summary – Reach scores for each sample year



Waller Creek Watershed

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

Benthic Macroinvertebrates - Waller Creek			WLR @ 51st (780)	WLR @ 23rd (624)	WLR ds Cesar Chavez (38)
Benthic Macroinvertebrate ID	PTI	FFG	07/13/2015 (WRE)	07/10/2015 (WRE)	07/09/2015 (WRE)
Chimarra	2	FC	2	5	4
Hydroptila	2	PI,SC			4
Camelobaetidius	4	CG	2	22	2
Fallceon	4	CG,SC	8	68	50
Simulium	4	FC	2	2	9
Argia	6	P	53	3	4
Cheumatopsyche	6	FC	31	7	24
Chironomidae	6	FC,P	23	7	65
Tanypodinae	6	P	12		1
Caenis	7	CG,SC			2
Ferrissia	7	SC			1
Hyaella	8	CG,SH	10	3	4
Oligochaeta	8	CG	3	1	1
Physella	9	SC		2	
Dugesia		CG,P	16		

Waller Creek Watershed

Site Photographs



780_t00-ds-02_21_2001



780_t00-ur-02_21_2001



780-t00-us-06-03-2009



780-t00-ds-06-03-2009



781_t00-ur-02_21_2001



781_t00-us1-02_21_2001

Waller Creek Watershed

Site Photographs



624_t00-ds1-02_21_2001



624_t00-us-03_13_2003



624_t00-us1-07_05_2006



624-t00-ds-05-28-2009



38-t00-us-05-29-2009



38-t00-ds-05-29-2009