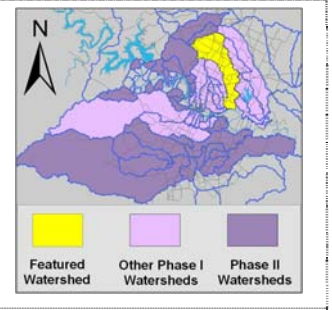


Walnut Creek Watershed

Watershed Overview

Catchment	Total area	43.5 square miles					
	Area in recharge	11.9 square miles					
	Creek length	22.3 miles					
	Receiving water	Colorado River					
Demographics	2000 population	93,934					
	2030 projected population	133,387					
	30 year projected % increase	42 %					
Land Use	Impervious cover (2003 estimate)	18.0 %					
	Impervious cover (2013 estimate)	30.5 %					
Overall EII Scores	2000	2003	2006	2009	2011	2013	2015
	76	71	72	68	69	74	71



Flow Regime* for Sample Sites on Walnut Creek

Site	2000	2001		2002	2003						2004		2006				
	Jun	Feb	Feb	Mar	Feb	Mar	Mar	May	Sep	Dec	May	May	Feb	May	Jul	Aug	Nov
	Bio	WQ	Bio	Bio	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	Bio	WQ	WQ
463													B	B	B	B	B
895					B	B	B	B	B	B			B	B	B	B	B
464		B	B	B	B	B	B	B	B	B			B	B	B	B	B
659			B														
465		B	B		B	B	B	B	B	B							
500		B	B														
502	B			B	B	B	B	B	B	B	B	B	B	B	B	B	B
503		B	B		B	B	B	B	B	B			B	B	B	n	B

Flow Regime for Sample Sites on Walnut Creek (Cont.)

Site	2009						2010	2011				2013						2015				
	Feb	May	May	Jun	Oct	Dec	Dec	Mar	Jun	Jun	Sep	Jan	Apr	May	Jun	Jun	Sep	Jan	Apr	May	Jul	Sep
	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ
463	B	B	B		B	B	B	B	B	B	n	B	B	B	B		B	B	B		B	B
895	B	B	B		B	B	B	B	B	B	B	B	B	B	B		B	B	B		B	B
464	B	B	B		B	B	B	B	n	n	n	B	B	B	B		B	B	B		B	n
659																						
465																						
500																						
502	B	B	B		B	B	B	B	B	B	n	B	B	B	B		B	B	B	B	B	B
503	B	B		B	B	B	n		n	n	n	B	B		n	B	n	B	B	B	B	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 Walnut Creek Sites by Year

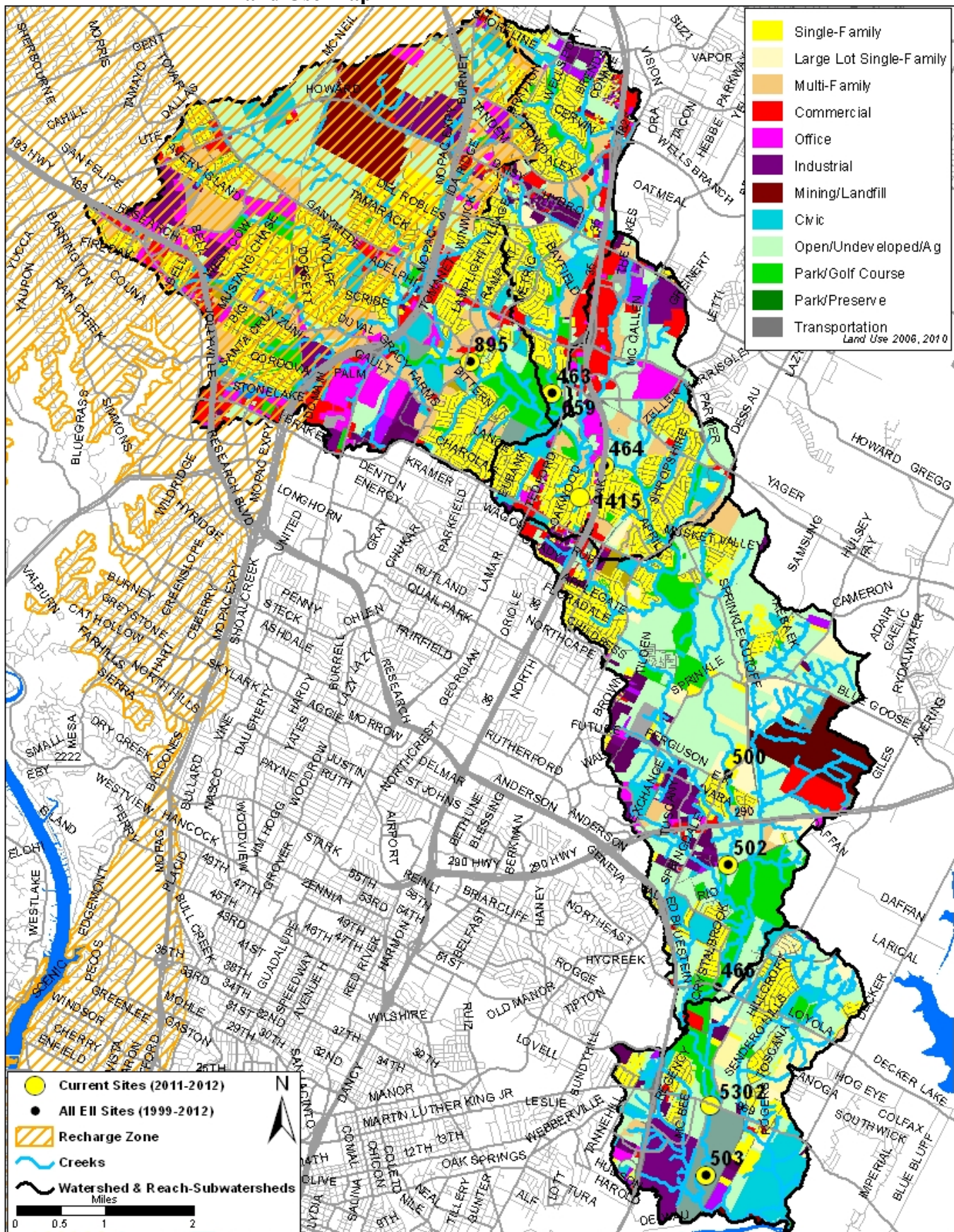
Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
WLN1	503	Walnut Creek US of Freescale	1996	50	84	73	78	41	74	86	62	63
WLN2	465	Walnut Creek @ Loyola Lane	1996	55	84	79	60	53	72	88	55	64
WLN2	500	Walnut Creek @ Springdale Rd	1996	63	84	23	86	44	81	100	61	64
WLN3	464	Walnut Creek DS of IH35	1996	52	84	53	80	54	75	79	70	66
WLN3	659	Walnut Creek @ Lamar Blvd	1996	58	84	93	73	65	86	85	86	77
WLN1	503	Walnut Creek US of Freescale	2000	51	95	91	68	55	67	75	58	68
WLN2	465	Walnut Creek @ Loyola Lane	2000	62	95	97	92	49	88	100	75	81
WLN2	500	Walnut Creek @ Springdale Rd	2000	73	95	97	96	40	79	100	57	80
WLN3	464	Walnut Creek DS of IH35	2000	67	95	90	72	50	72	87	57	74
WLN3	659	Walnut Creek @ Lamar Blvd	2000	66	95	87	80	52	72	71	72	75
WLN1	503	Walnut Creek US of Freescale	2003	64	75	86	78	48	56	69	42	68
WLN2	465	Walnut Creek @ Loyola Lane	2003	56	75	88	71	63	69	87	51	70
WLN2	502	Walnut Creek @ Old Manor Road	2003	61	75	88	73	64	66	84	47	71
WLN3	464	Walnut Creek DS of IH35	2003	59	75	72	82	75	79	97	60	74
WLN4	895	Walnut Creek DS of Metric Blvd	2003	64	75	51	78	74	76	88	63	70
WLN1	503	Walnut Creek US of Freescale	2006	58	82	54	70	63	100	100	99	71
WLN2	502	Walnut Creek @ Old Manor Road	2006	72	82	59	58	69	97	100	93	73
WLN3	464	Walnut Creek DS of IH35	2006	67	82	56	78	69	95	93	97	75
WLN4	895	Walnut Creek DS of Metric Blvd	2006	60	82	28	81	73	94	95	92	70
WLN5	463	Wells Branch Creek @ Walnut Metro	2006	66	82	43	87	71	80	78	81	72
WLN1	503	Walnut Creek US of Freescale	2009	66	72	45	69	64	83	73	92	67
WLN2	502	Walnut Creek @ Old Manor Road	2009	65	72	34	82	57	96	97	95	68
WLN3	464	Walnut Creek DS of IH35	2009	67	72	37	79	71	96	100	91	70
WLN4	895	Walnut Creek DS of Metric Blvd	2009	61	72	25	74	79	81	83	79	65
WLN5	463	Wells Branch Creek @ Walnut Metro Pk	2009	64	72	40	83	74	92	93	91	71
WLN1	503	Walnut Creek US of Freescale	2011	74	78	72	47	41	65	80	50	63
WLN2	502	Walnut Creek @ Old Manor Road	2011	76	78	91	63	63	74	56	92	74
WLN3	464	Walnut Creek DS of IH35	2011	81	78	65	68	67	77	70	83	73
WLN4	895	Walnut Creek DS of Metric Blvd	2011	52	78	35	72	68	75	78	71	63
WLN5	463	Wells Branch Creek @ Walnut Metro Pk	2011	81	78	59	71	67	86	90	82	74
WLN1	503	Walnut Creek US of Freescale	2013	78	79	84	81	74	94	93	95	82
WLN2	502	Walnut Creek @ Old Manor Road	2013	74	79	58	75	62	96	91	100	74
WLN3	464	Walnut Creek DS of IH35	2013	76	79	43	72	77	95	92	98	74
WLN4	895	Walnut Creek DS of Metric Blvd	2013	57	79	29	70	76	95	92	97	68
WLN5	463	Wells Branch Creek @ Walnut Metro Pk	2013	72	79	46	78	78	88	79	96	74
WLN1	503	Walnut Creek US of Freescale	2015	59	77	61	81	66	96	95	97	73
WLN2	502	Walnut Creek @ Old Manor Road	2015	57	77	57	87	64	97	94	100	73
WLN3	464	Walnut Creek DS of IH35	2015	60	77	48	85	57	92	96	87	70
WLN4	895	Walnut Creek DS of Metric Blvd	2015	59	77	31	77	74	92	100	84	68
WLN5	463	Wells Branch Creek @ Walnut Metro Pk	2015	63	77	46	82	67	82	82	81	70

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

**sediment samples only collected at the downstream site

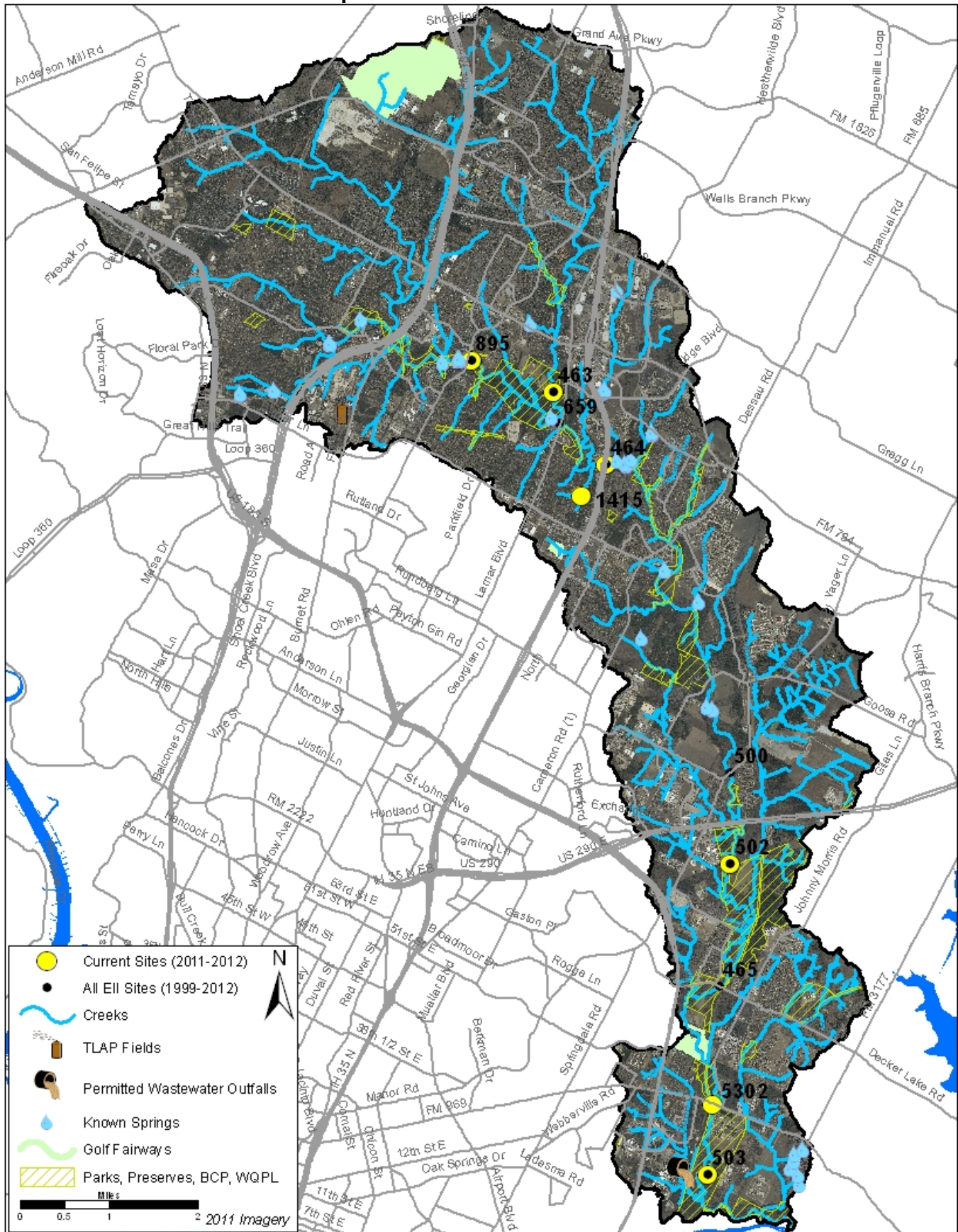
100-87.5 Excellent
 87.5-75 V. Good
 75-62.5 Good
 62.5-50 Fair
 50-37.5 Marginal
 37.5-25 Poor
 25-12.5 Bad
 12.5-0 V. Bad

Land Use Map



Walnut Creek Watershed

Aerial Map



Walnut 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.	Cond.	pH	D.O.	E. Coli
Walnut	503	WLN1	01/14/2015	7.3	544	8.15	11.1 R	172.0
Walnut	503	WLN1	04/15/2015	23.2	616	8.03	10.0	105.0
Walnut	503	WLN1	0505/2015	24.2	536	8.08	10.4	
Walnut	503	WLN1	07/14/2015	31.4	685	9.87	12.3	15.3
WLN1 Mean				21.5	595	8.53	10.9	97.4
Walnut	502	WLN2	01/14/2015	8.0	572	7.99	10.6 R	1050.0
Walnut	502	WLN2	04/15/2015	22.3	641	7.87	9.5	142.0
Walnut	502	WLN2	05/05/2015	21.2	564	7.71	6.8	
Walnut	502	WLN2	07/14/2015	27.5	665	7.76	7.8	57.3
Walnut	502	WLN2	09/09/2015	27.5	664	7.50	5.6	9.6
WLN2 Mean				21.3	621	7.77	8.0	314.7
Walnut	464	WLN3	01/14/2015	7.8	600	8.13	11.9	148.0
Walnut	464	WLN3	04/15/2015	17.8	578	7.98	9.4	114.0
Walnut	464	WLN3	07/06/2015	27.5	645	8.00	10.2	
Walnut	464	WLN3	07/14/2015	26.8	650	9.81	8.3	80.1
WLN3 Mean				20.0	618	8.48	10.0	114.0
Walnut	895	WLN4	01/14/2015	8.2	509	7.91	10.7	178.0
Walnut	895	WLN4	04/15/2015	17.9	644	7.51	6.5	> 2419.6
Walnut	895	WLN4	05/05/2015	25.1	665	8.00	7.9	
Walnut	895	WLN4	07/14/2015	25.8	668	9.34	7.9	2420.0
Walnut	895	WLN4	09/09/2015	26.4	626	7.60	5.2	> 2420.0
WLN4 Mean				20.7	622	8.07	7.7	1859.4
Walnut	463	WLN5	01/14/2015	8.3	652	8.18	12.0	137.6
Walnut	463	WLN5	04/15/2015	17.6	494	8.12	9.2	218.7
Walnut	463	WLN5	07/06/2015	27.1	652	7.96	10.2	
Walnut	463	WLN5	07/14/2015	25.9	609	9.34	8.4	70.3
Walnut	463	WLN5	09/09/2015	26.0	715	7.86	6.3	123.4
WLN5 Mean				21.0	624	8.29	9.2	137.5
Walnut Mean				20.9	617	8.20	9.1	548.9

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	

Walnut 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
Walnut	503	WLN1	01/14/2015	0.008	0.69	<J 0.004	1.5	4.6 R
Walnut	503	WLN1	04/15/2015	0.008	1.00	<J 0.004	1.7	3.7
Walnut	503	WLN1	05/05/2015					
Walnut	503	WLN1	07/14/2015	0.008	1.43	<J 0.004	3.0	4.2 R
WLN1 Mean				0.008	1.04	0.004	2.1	4.2
Walnut	502	WLN2	01/14/2015	0.008	0.78	<J 0.004	4.5	5.8 R
Walnut	502	WLN2	04/15/2015	0.008	0.92	<J 0.004	2.0	4.4
Walnut	502	WLN2	05/05/2015					
Walnut	502	WLN2	07/14/2015	0.008	1.82	<J 0.004	1.6	2.4 R
Walnut	502	WLN2	09/09/2015	0.008	1.93	<J 0.004	2.3	3.2 R
WLN2 Mean				0.008	0.99	0.004	2.6	4.0
Walnut	464	WLN3	01/14/2015	0.008	0.99	<J 0.004	<J 1.0	1.7 R
Walnut	464	WLN3	04/15/2015	0.008	0.79	<J 0.004	<J 1.1	1.3
Walnut	464	WLN3	07/06/2015					
Walnut	464	WLN3	07/14/2015	0.008	1.49	<J 0.004	<J 2.2	1.2 R
WLN3 Mean				0.008	1.09	0.004	1.4	1.4
Walnut	895	WLN4	01/14/2015	0.008	0.31	<J 0.004	<J 1.1	6.6 R
Walnut	895	WLN4	04/15/2015	0.008	1.26	<J 0.004	2.3	2.6
Walnut	895	WLN4	05/05/2015					
Walnut	895	WLN4	07/14/2015	0.008	1.36	<J 0.004	1.5	2.7 R
Walnut	895	WLN4	09/09/2015	0.037	<J 0.04	<J 0.004	2.6	5.3 R
WLN4 Mean				0.015	0.74	0.004	1.9	4.3
Walnut	463	WLN5	01/14/2015	0.008	1.20	<J 0.004	<J 1.0	0.8 R
Walnut	463	WLN5	04/15/2015	0.008	0.62	<J 0.004	<J 1.1	1.7
Walnut	463	WLN5	07/06/2015					
Walnut	463	WLN5	07/14/2015	0.008	1.14	<J 0.004	1.1	1.1 R
Walnut	463	WLN5	09/09/2015	0.008	<J 0.01	<J 0.004	3.4	1.5 R
WLN5 Mean				0.008	0.74	0.004	1.7	1.3
Walnut Mean				0.010	0.99	0.004	2.0	3.0

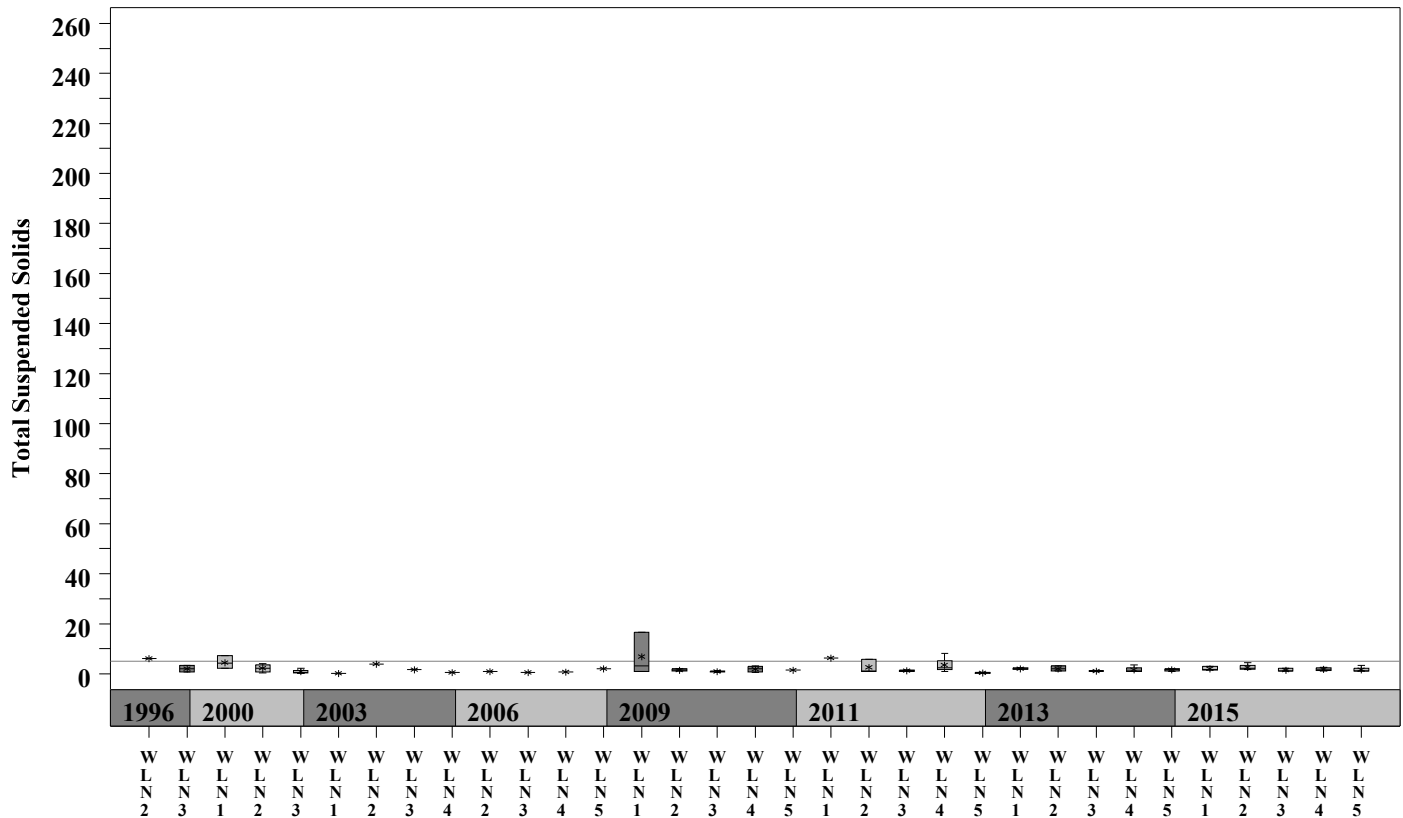
Gray highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

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

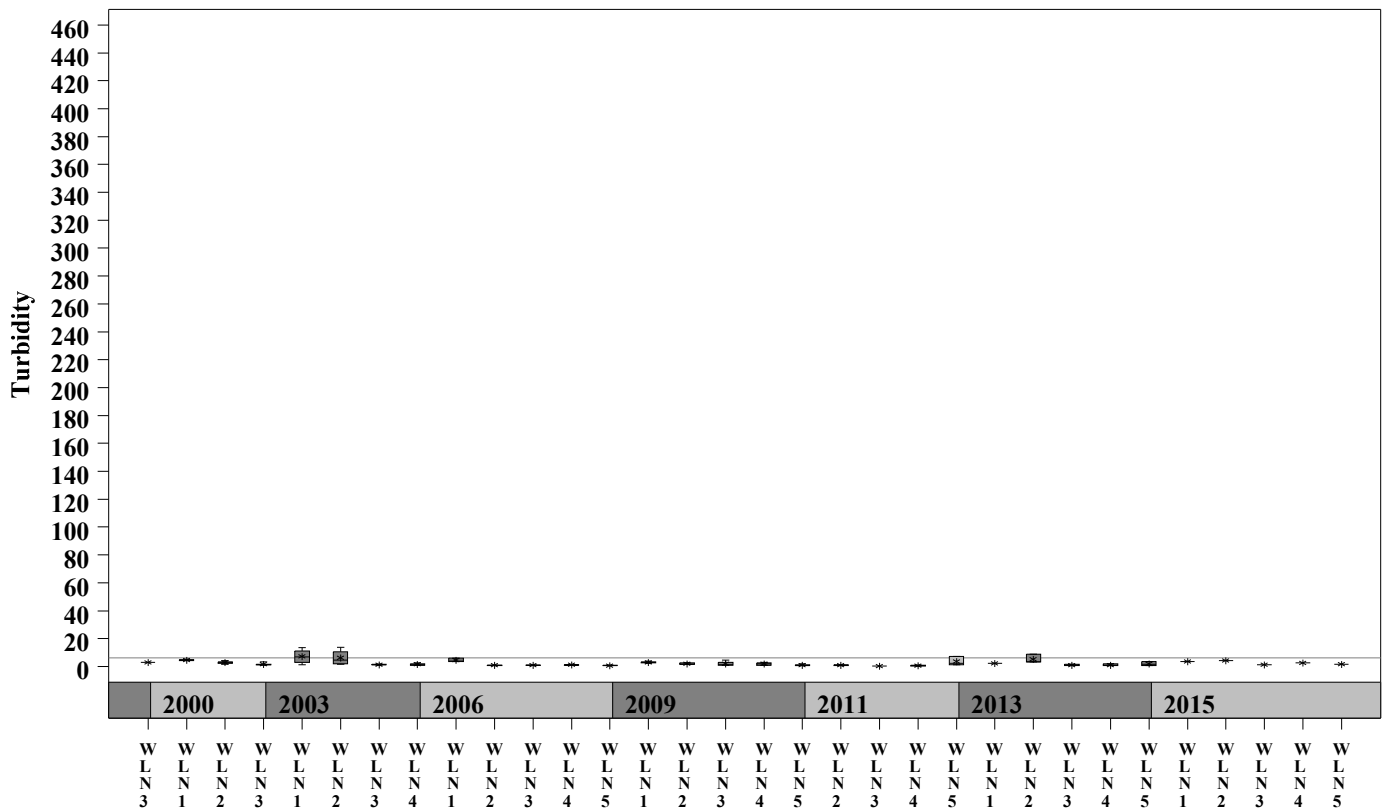
Walnut Creek Watershed

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

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



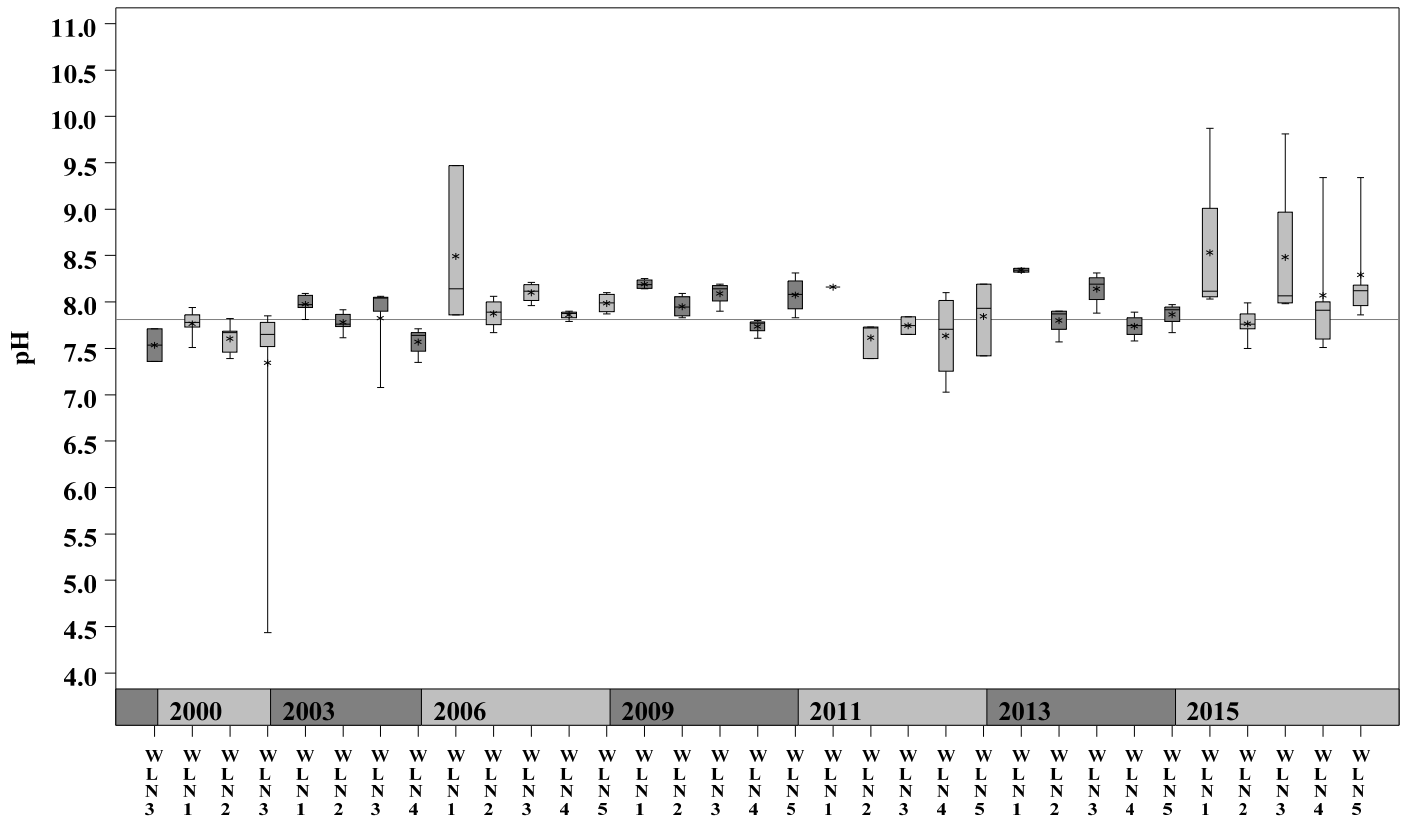
Parameter = TURBIDITY Unit = NTU Watershed = Walnut



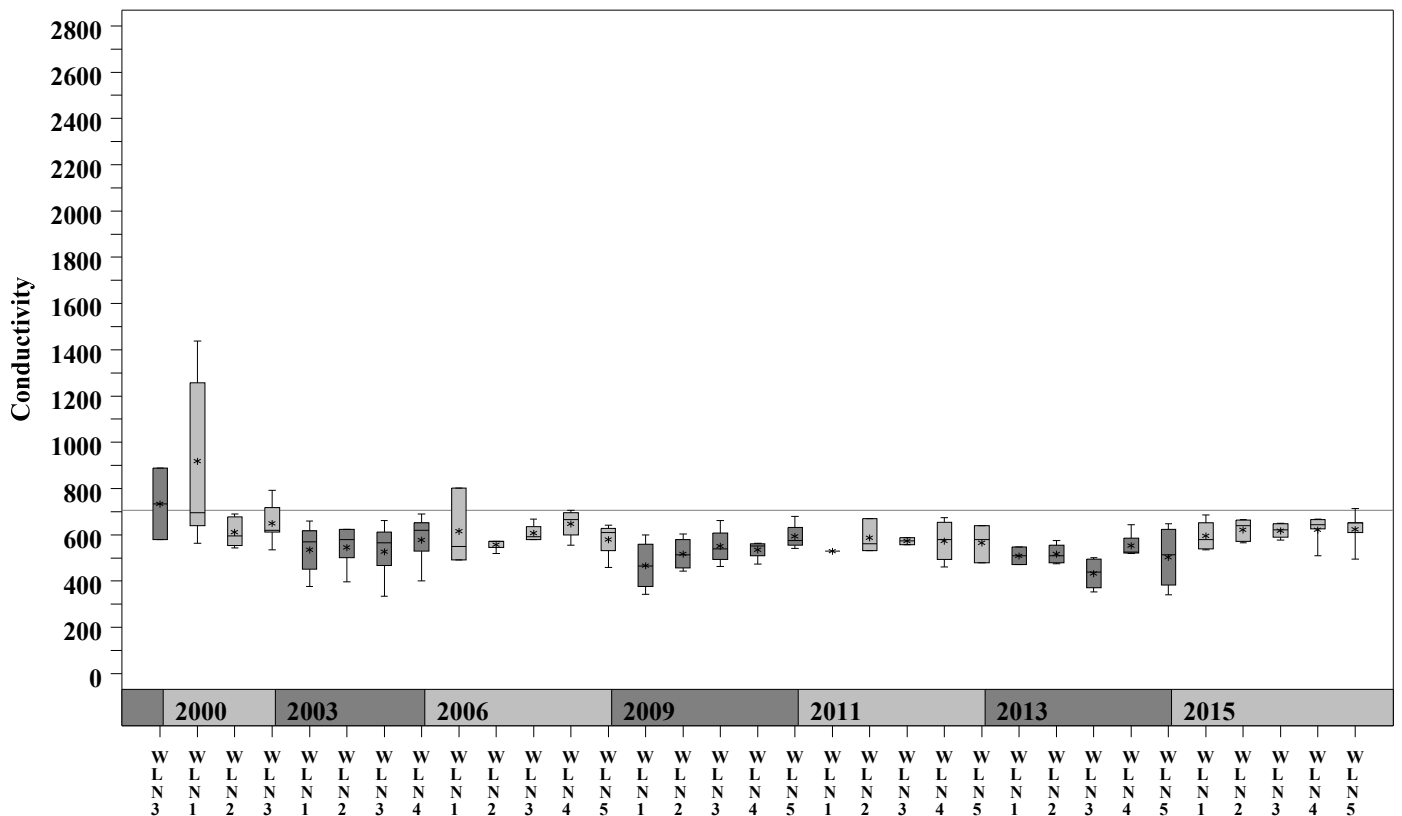
Walnut Creek Watershed

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

Parameter = pH Unit = Standard Units Watershed = Walnut



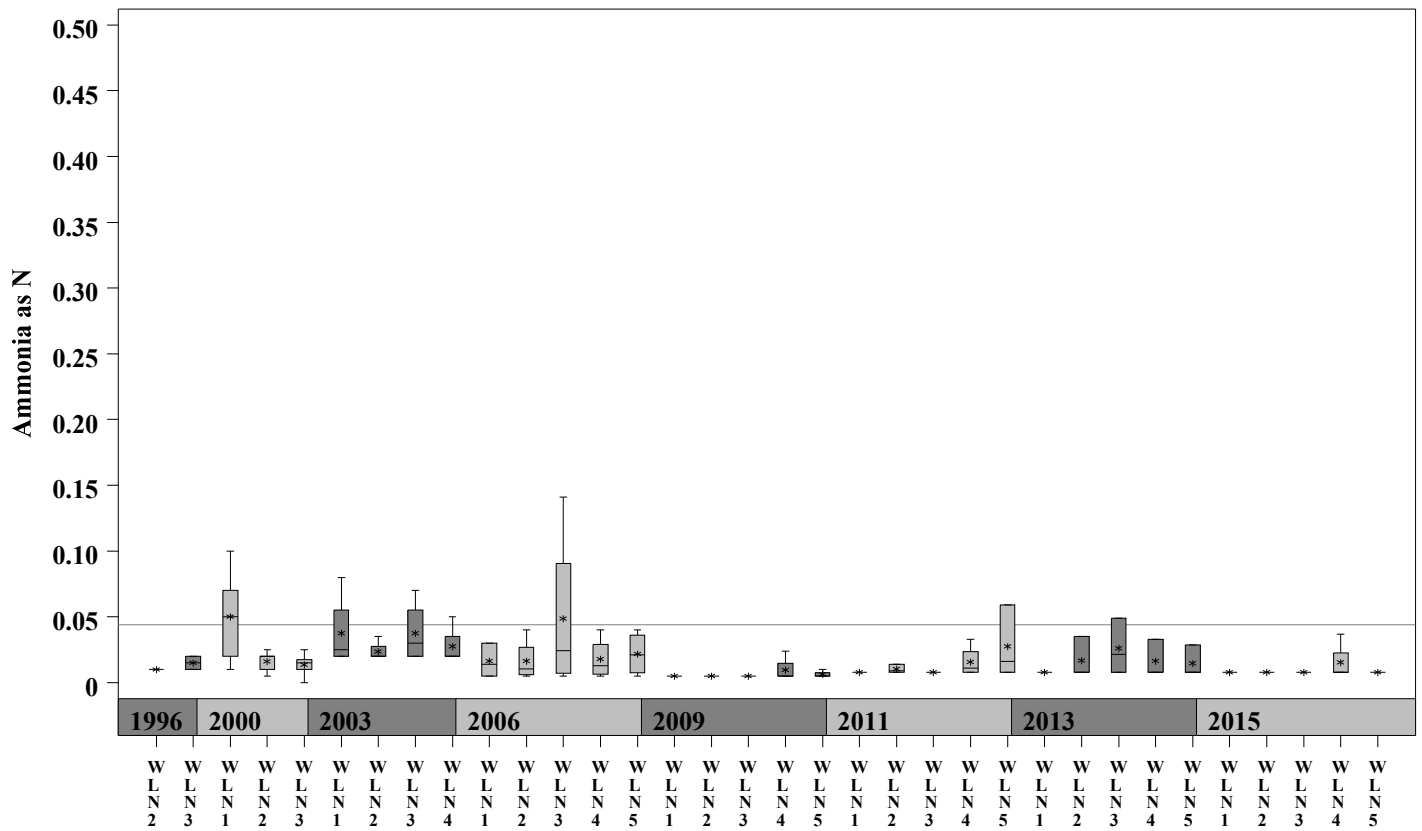
Parameter = CONDUCTIVITY Unit = uS/cm Watershed = Walnut



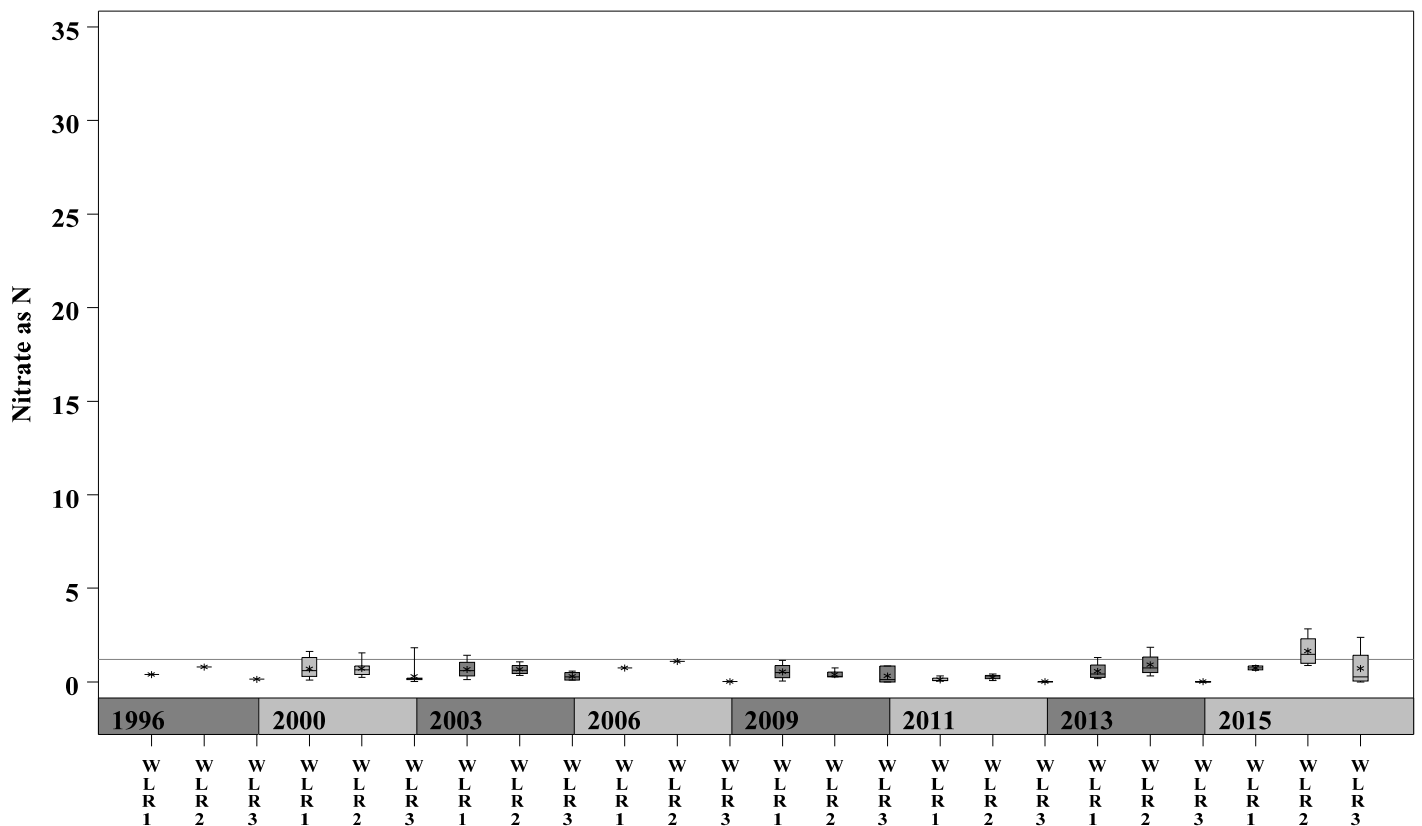
Walnut Creek Watershed

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

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



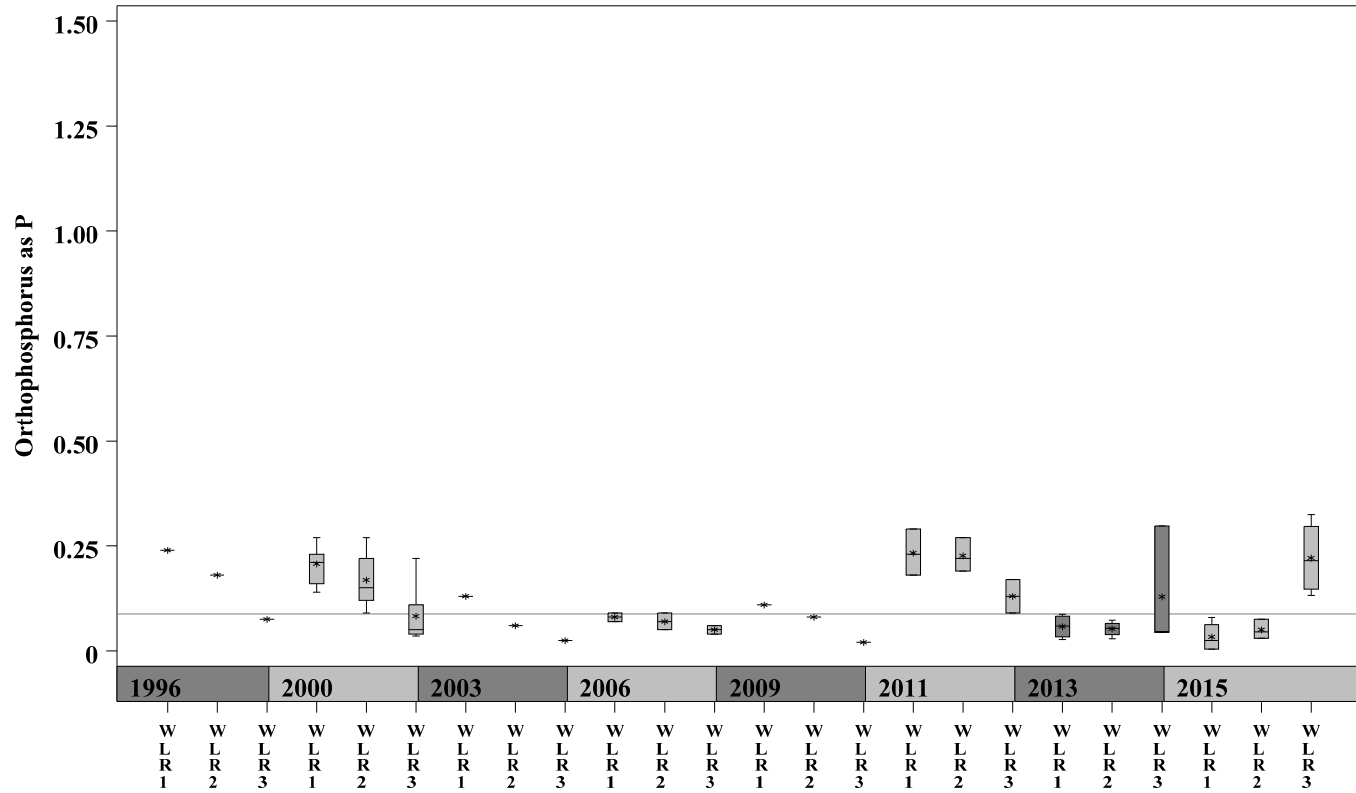
Parameter = NITRATE AS N Unit = mg/L Watershed = Waller



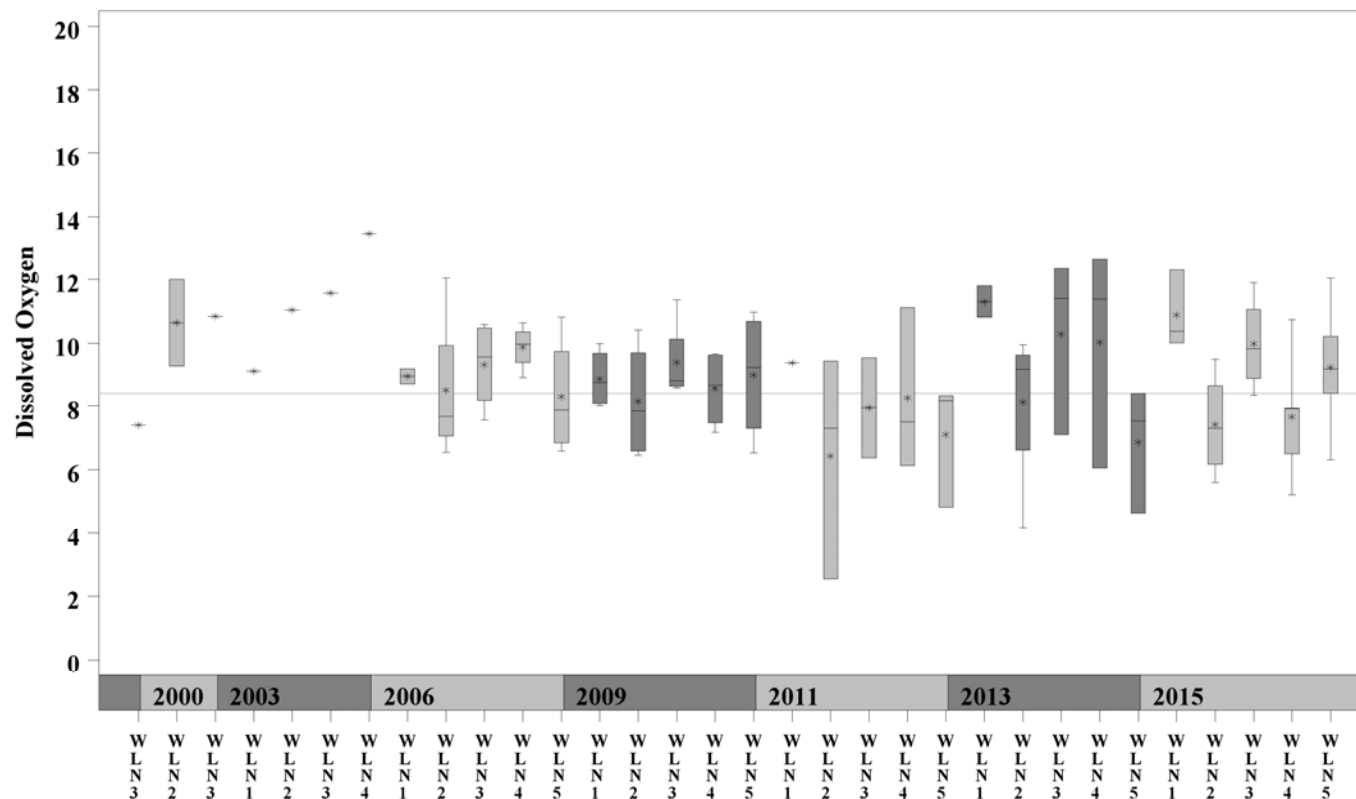
Walnut Creek Watershed

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

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



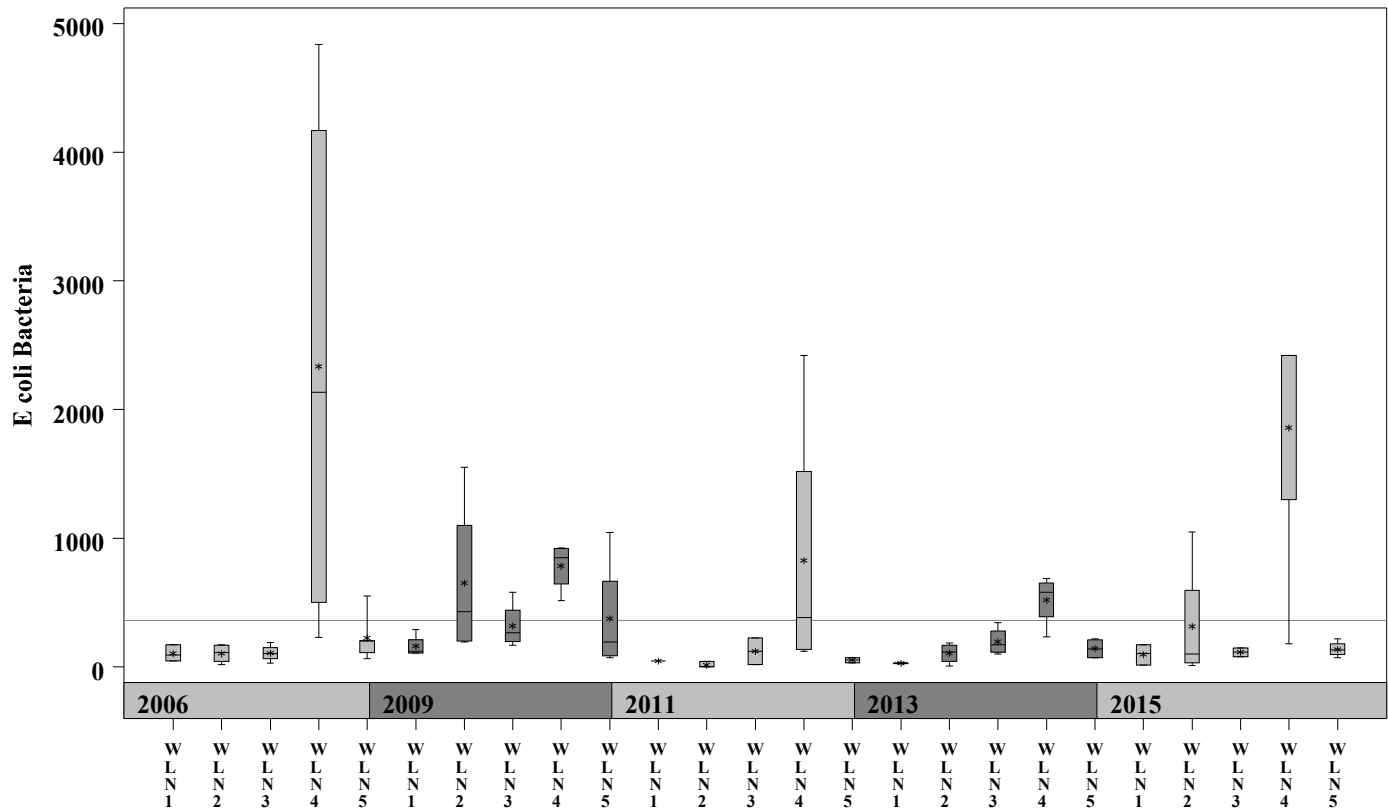
Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Walnut



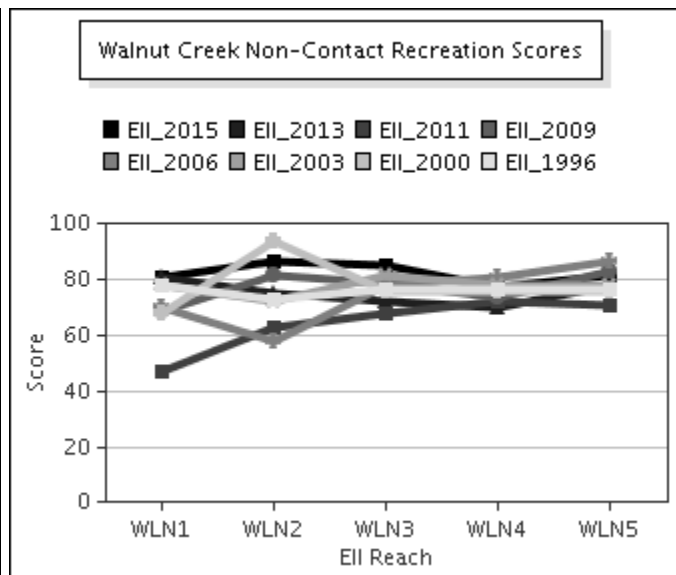
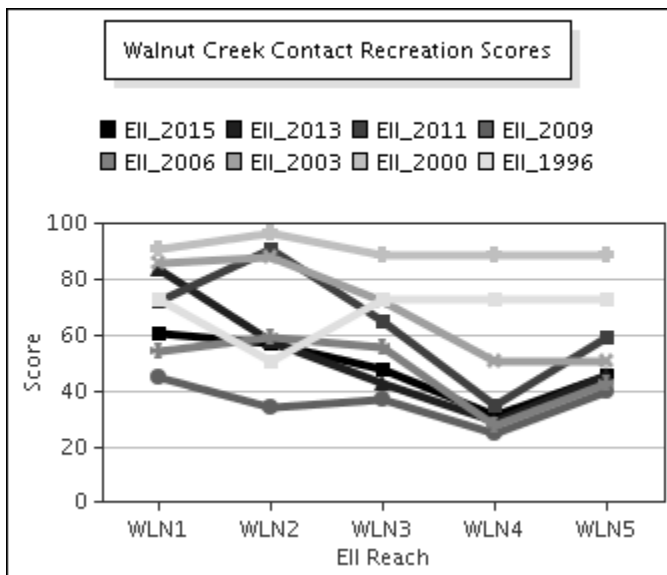
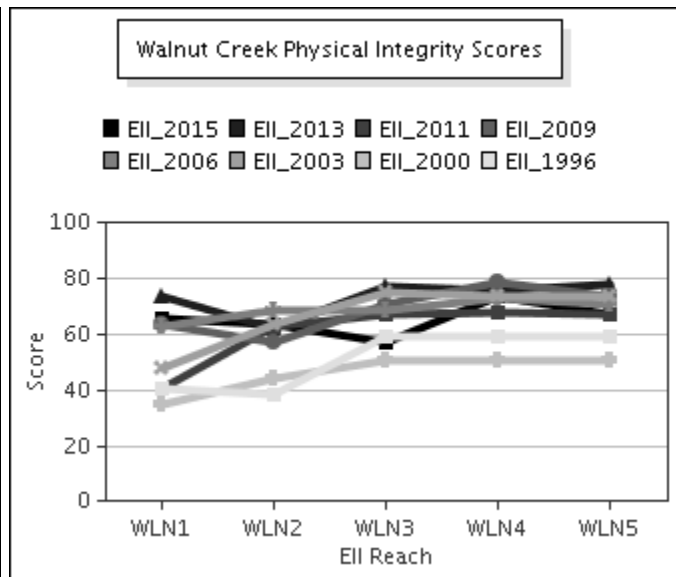
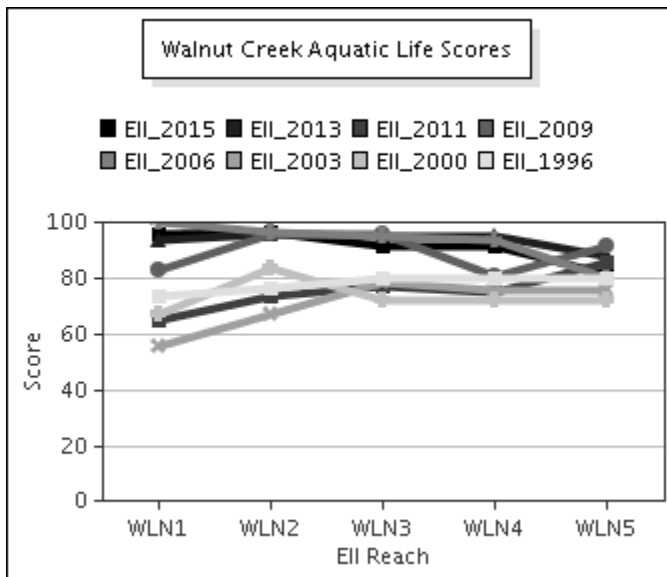
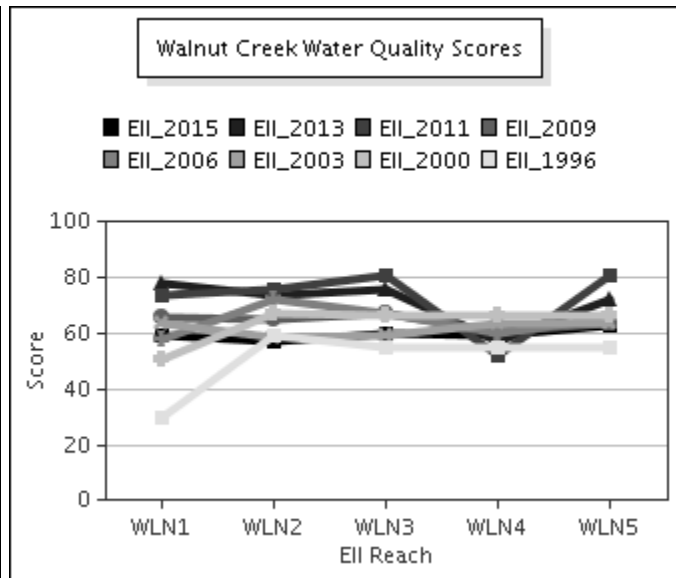
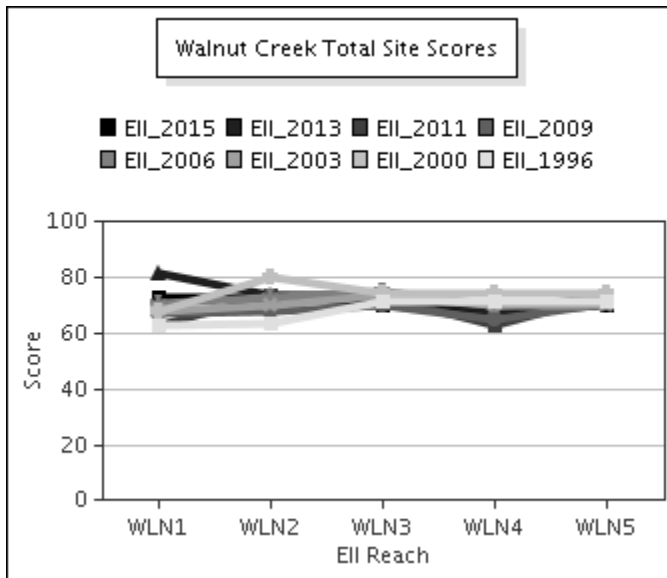
Walnut Creek Watershed

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

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



Score Summary – Reach scores for each sample year



Walnut Creek Watershed

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

Benthic Macroinvertebrates - Walnut Creek			WLN ds Metric (895) 07/06/2015 (WRE)	WLN ds IH35 (464) 07/06/2015 (WRE)	WLN @ Old Manor (502) 05/05/2015 (WRE)	WLN us Freescale (503) 05/05/2015 (WRE)
Benthic Macroinvertebrate ID	PTI	FFG				
Perlesta	0	P			20	
Chimarra	2	FC	29	22	40	92
Helicopsyche	2	SC	1	7		
Hexacylloepus Ferrugineus	2	CG,SC		1		
Hydroptila	2	PI,SC			1	1
Microcyllloepus Pusillus	2	CG,SC		3		
Neoelmis Caesa	2	CG,SC	1			
Baetodes	4	SC	1			
Camelobaetidius	4	CG	33	47	6	21
Fallceon	4	CG,SC	20	11	107	181
Macrelmis	4	CG,SC	5	1	3	
Neochoroterpes	4	CG	1	3	84	110
Psephenus	4	SC	6	1		
Simulium	4	FC	17	14		2
Oecetis	5	P,SH				1
Petrophila (Moth)	5	SC	1			1
Argia	6	P	7	5	1	
Brechmorhoga Mendax	6	P		1		
Cheumatopsyche	6	FC	27	21	32	86
Chironomidae	6	FC,P	18	30	24	17
Hetaerina	6	P	1			
Hydracarina	6		1			1
Tanypodinae	6	P		1	7	8
Stenelmis	7	CG,SC	5	4	18	
Caloparyphus/Euparyphus	8	CG,SC				1
Berosus	9	CG				1
Dugesia		CG,P	1		17	

Walnut Creek Watershed

Site Photographs



463_t00-us-05_29_2009



463_t00-ds-05_29_2009



895_t00-us1-07_07_2006



895_t00-ds-07_07_2006



464_t00-us-05_29_2009



464_t00-ds-05_29_2009

Walnut Creek Watershed

Site Photographs



502_t00-ds-07_11_2006



502_t00-us1-07_11_2006



465_t00-us-03_12_2002



465_t00-ds-12_07_2000



503_t3-ds-06_14_2006



503_t00-ds-03_12_2003