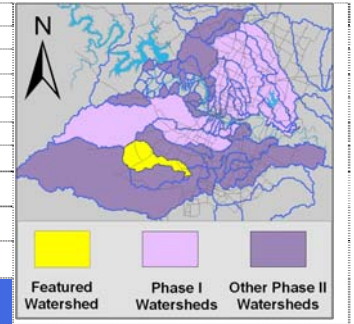


Bear Creek Watershed

Watershed Overview

Catchment	Total area	26.93 sq. miles					
	Area in recharge	6.47 sq. miles					
	Creek length	17 miles					
Demographics	Receiving water	Onion Creek					
	2000 population	5,419					
	2030 projected population	31,009					
	30 year projected % increase	472 %					
Land Use	Impervious cover (2003 estimate)	3.6 %					
	Impervious cover (2013 estimate)	8.2%					
Overall EII Scores	2001	2004	2007	2010	2012	2014	2016
	79	67	79	72	69	81	85



Flow Regime* for Sample Sites on Bear Creek

Site	1999		2001				2004								2007					2010				2011	2012				2014					2016					
	Jan	Jan	Mar	Mar	Jun	Sep	Dec	Mar	May	May	Jun	Jun	Oct	Dec	Feb	May	Jun	Sep	Dec	Mar	May	May	Oct	Dec	Mar	Apr	Jul	Sep	Jan	Apr	May	Jul	Sep	Jan	Apr	May	Jul	Sep	
	WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	WQ	
600	B	B	B	S	B	B	B																																
1089	B	B	B	S	B	B	B	n	n			B		n	B																								
1090	B	B	B	S	B	B	B																																
1534								B				B	B	B	B																								
4112															B	B	S	B	B	B	B	B	B	B	B	B	B	n	B	B	B	B	B	B	B	B	B	B	
1088	n	n	B	B	n	n	B																																
3935															n	B	B	B	n	B	n	n	n	n	n	n	n	n											
1087	B	B	B	B	B	B	B	B	B	B	B			n	B	B	S	B	B	B	B	B	B	n	B	B	B	n	B	B	B	B	n	B	B	B	B	B	B

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

Index scores* for Bear Creek Sites by Year

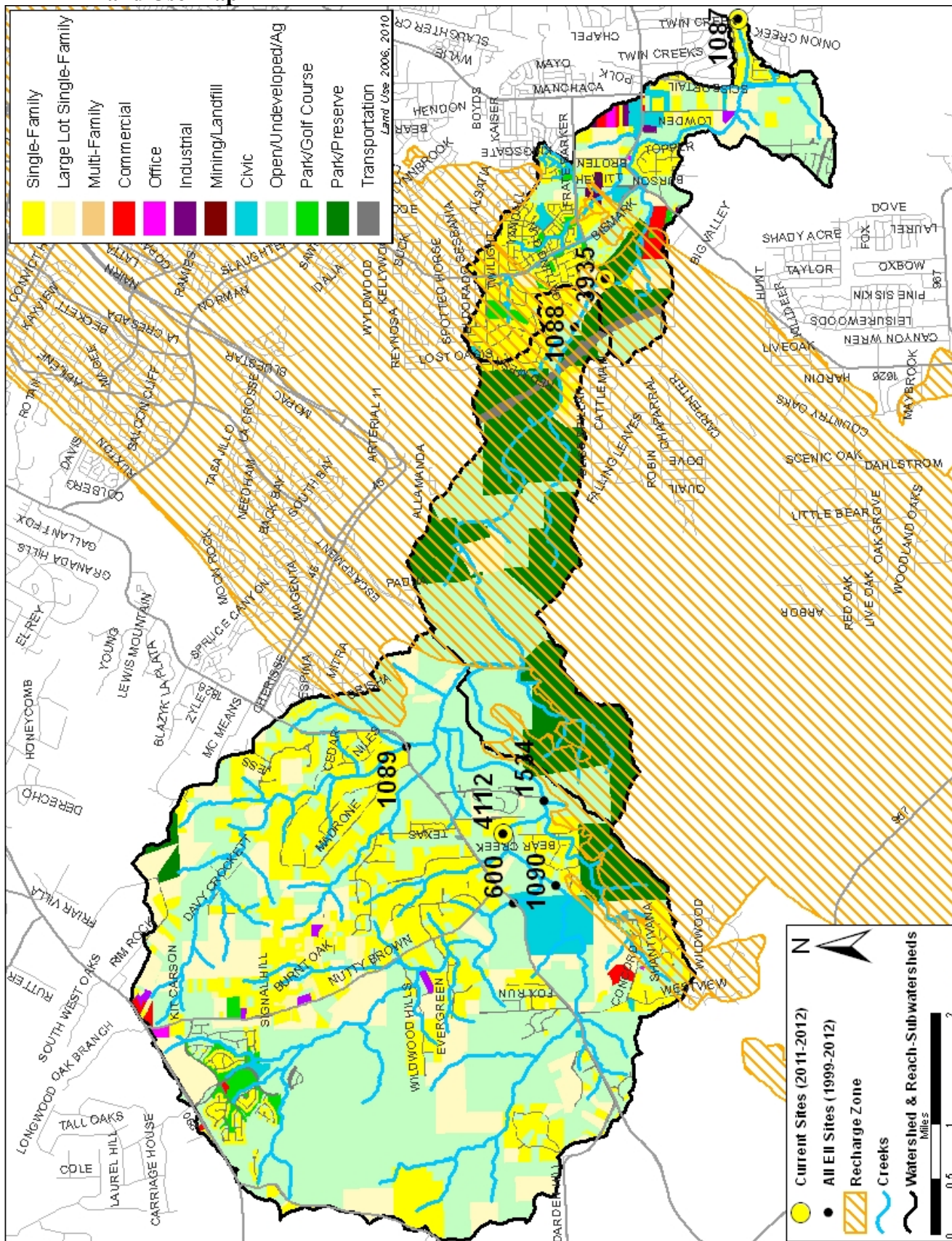
Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
BER1	1087	Bear Creek @ Twin Creeks Road	1998	72	81	99	78	69	75	54	95	79
BER2	1088	Bear Creek @ Bears Den Court	1998	74	81	95	68	80				66
BER3	600	Bear Creek @ FM 1826 (S. Fork)	1998	76	81	95	96	88	85	84	85	87
BER3	1089	Bear Creek DS of FM 1826 (N. Fork)	1998	72	81	96	93	74	69	66	71	81
BER3	1090	Bear Creek @ Spanish Oaks Circle	1998	80	81	94	93	84	84	83	85	86
BER1	1087	Bear Creek @ Twin Creeks Road	2001	54	82	90	68	91	62	58	66	71
BER2	1088	Bear Creek @ Bears Den Court	2001	61	82	90	91	80	75	61	88	76
BER3	600	Bear Creek @ FM 1826 (S. Fork)	2001	65	82	90	98	84	74	72	76	78
BER3	1089	Bear Creek DS of FM 1826 (N. Fork)	2001	55	82	83	97	83	49	66	33	71
BER3	1090	Bear Creek @ Spanish Oaks Circle	2001	66	82	89	99	81	81	100	62	80
BER1	1087	Bear Creek @ Twin Creeks Road	2004	59	74	71	59	72	64	62	66	67
BER3	1089	Bear Creek DS of FM 1826 (N. Fork)	2004	64	74	59	63	70				55
BER3	1534	Bear Creek DS of Bear Creek Pass	2004	75	74	89	90	73	74	66	82	79
BER1	1087	Bear Creek @ Twin Creeks Road	2007	65	82	64	85	71	95	91	98	77
BER2	3935	Bear Creek @ Escondido	2007	76	82	69	92	73	77	100	54	78
BER3	4112	Bear Creek @ Bear Creek Pass	2007	67	82	74	92	82	98	99	97	83
BER1	1087	Bear Creek @ Twin Creeks Road	2010	62	74	57	54	69	87	89	85	67
BER2	3935	Bear Creek @ Escondido	2010	72	74	94	67	70				63
BER3	4112	Bear Creek @ Bear Creek Pass	2010	67	74	86	98	89	98	96	100	85
BER1	1087	Bear Creek @ Twin Creeks Road	2012	55	79	64	74	76	76	85	67	71
BER2	3935	Bear Creek @ Escondido	2012		79		62	82				56
BER3	4112	Bear Creek @ Bear Creek Pass	2012	65	79	61	78	90	97	100	94	78
BER1	1087	Bear Creek @ Twin Creeks Road	2014	66	77	94	61	78	85	90	79	77
BER3	4112	Bear Creek @ Bear Creek Pass	2014	77	77	92	88	76	98	100	96	85
BER1	1087	Bear Creek @ Twin Creeks Road	2016	67	81	87	93	84	89	96	81	84
BER3	4112	Bear Creek @ Bear Creek Pass	2016	70	81	82	98	93	92	94	89	86

* 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

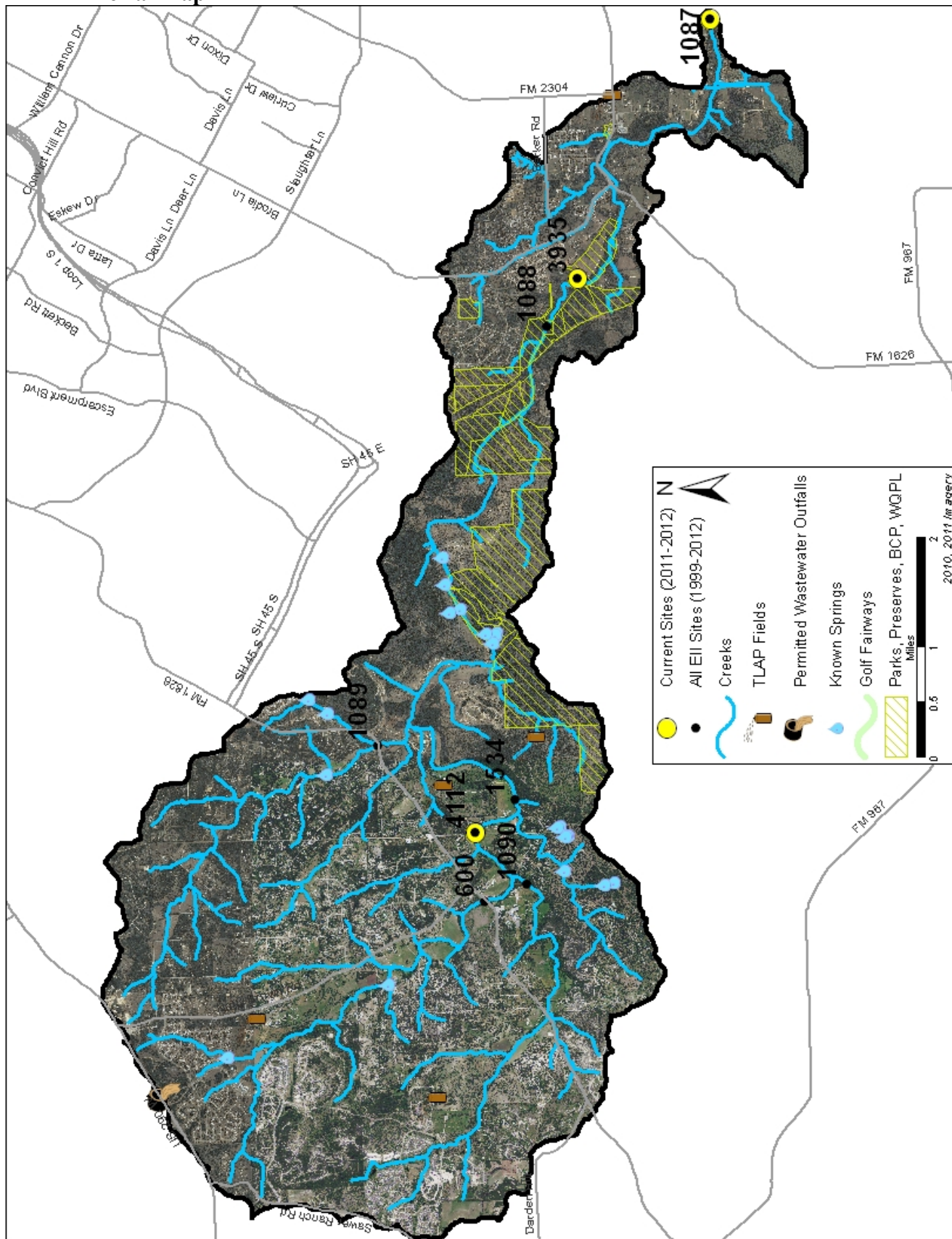
Bear Creek Watershed

Land Use Map



Bear Creek Watershed

Aerial Map



Bear Creek Watershed

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & *E. coli* for 2016 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
				<> flag	<> flag	<> flag	<> flag	< flag
Bear	1087	BER1	1/12/2016	10.5	607	7.95		3.1
Bear	1087	BER1	4/12/2016	21.2	691	7.41	6.4	10.8
Bear	1087	BER1	5/6/2016	21.6	573	7.72	7.1	
Bear	1087	BER1	7/12/2016	29.8	651	7.46	7.7	5.2
Bear	1087	BER1	9/13/2016	28.6	595	7.60	8.5	59.8
BER1 Mean				22.3	623	7.63	7.4	19.7
Bear	4112	BER3	1/12/2016	11.4	719	10.2	10.0	33.6
Bear	4112	BER3	4/12/2016	21.3	692	7.85	7.9	35.5
Bear	4112	BER3	5/9/2016	21.7	679	7.93	9.2	
Bear	4112	BER3	7/12/2016	27.7	613	7.89	6.2	18.9
Bear	4112	BER3	9/13/2016	25.0	631	7.76	7.5	29.2
BER3 Mean				21.4	667	8.36	8.2	29.3
Bear Mean				21.9	645	7.99	7.8	24.5

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	

Bear Creek Watershed

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2016 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
Bear	1087	BER1	1/12/2016	<J	0.008		1.08	<J	0.004	<J	1.0		0.7 R
Bear	1087	BER1	4/12/2016		0.037		0.89	<J	0.004		1.5		3.3
Bear	1087	BER1	5/6/2016										
Bear	1087	BER1	7/12/2016	<J	0.008		0.52	<J	0.004		1.4		2.3 R
Bear	1087	BER1	9/13/2016		0.020		0.58	<J	0.004	<J	1.0		2.6
BER1 Mean					0.018		0.77		0.004		1.2		2.2
Bear	4112	BER3	1/12/2016	<J	0.008		0.87	<J	0.004	<J	1.0		0.8 R
Bear	4112	BER3	4/12/2016	<J	0.008		0.22	<J	0.004	<J	1.0		0.9
Bear	4112	BER3	5/6/2016										
Bear	4112	BER3	7/12/2016	<J	0.008		0.14	<J	0.004	<J	1.1		1.7 R
Bear	4112	BER3	9/13/2016	<J	0.008		0.44	<J	0.004		2.2		1.2
BER3 Mean					0.008		0.42		0.004		1.3		1.1
Bear Mean					0.013		0.59		0.004		1.3		1.7

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

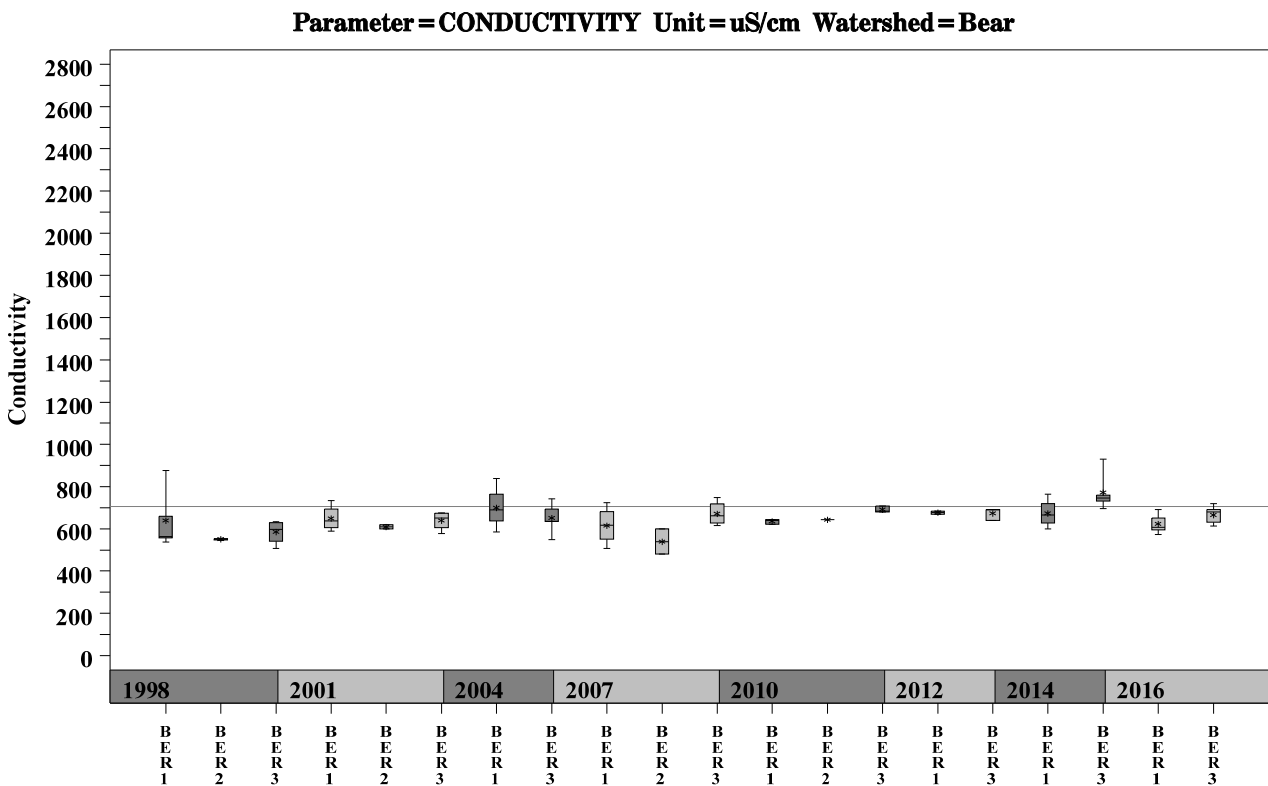
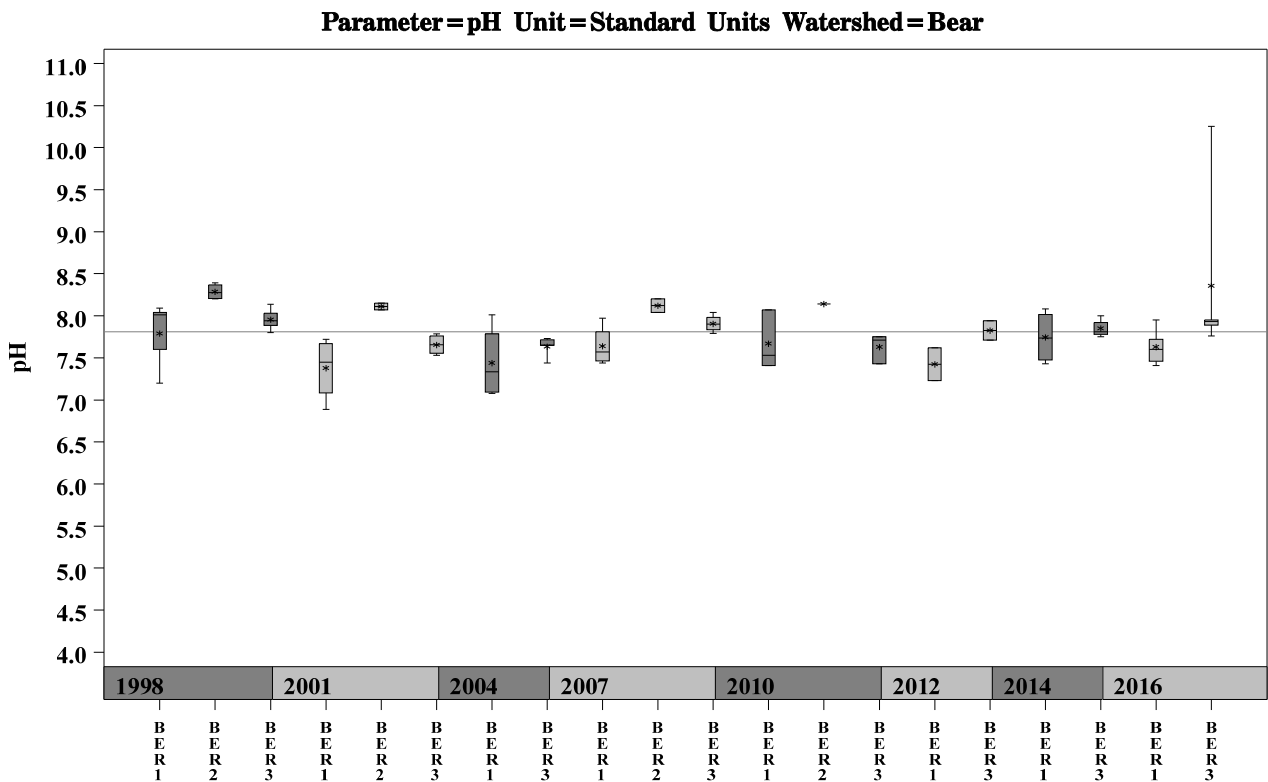
Summary Statistics for all 2015-2016 E.I.I. Sites Combined				
Parameter	2015-2016 Average	2015-2016 Minimum	2015-2016 Maximum	1 Standard Deviation Above
NH3-N (mg/l)	0.018	0.008	0.881	0.085
NO3-N (mg/l)	1.14	0.01	12.0	3.16
Ortho-P (mg/l)	0.016	0.004	0.661	0.08
T.S.S. (mg/l)	3.7	1.0	58.2	9.7
Turbidity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

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

[illegible]

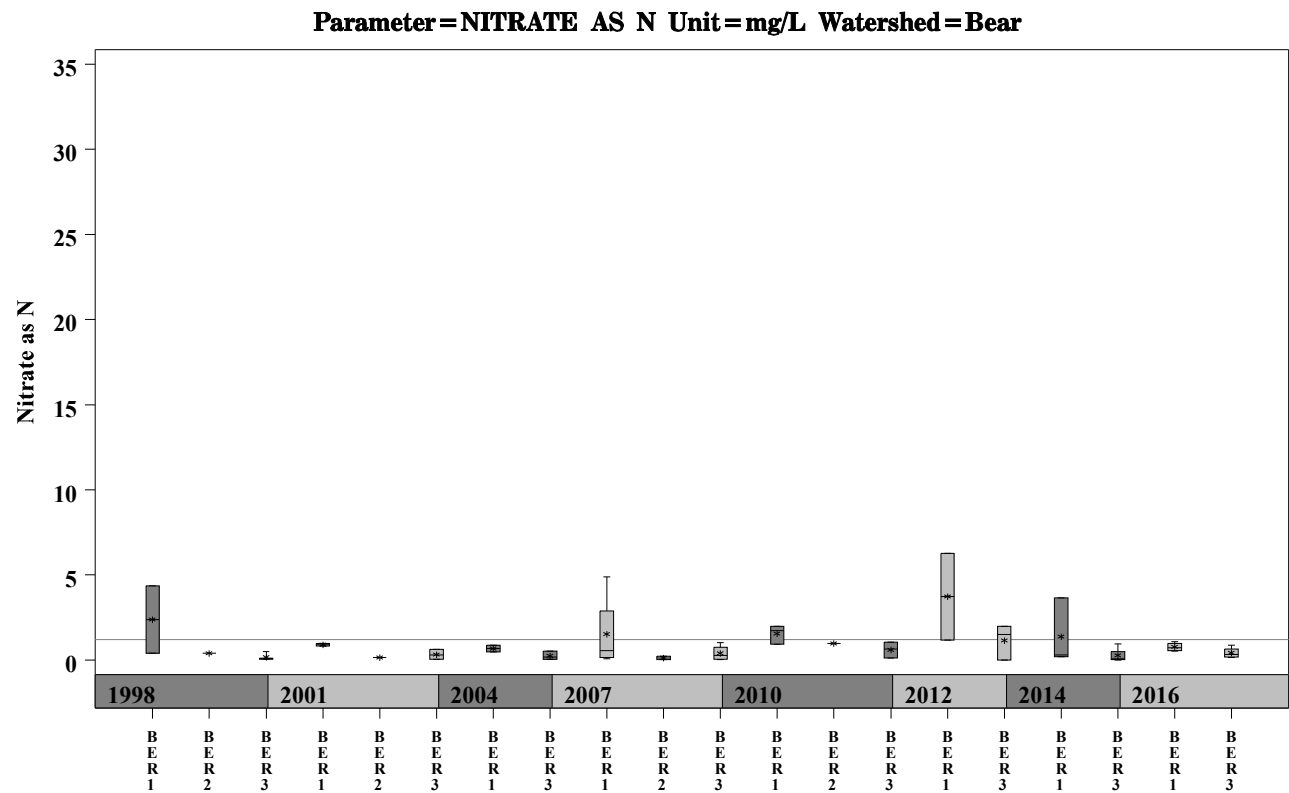
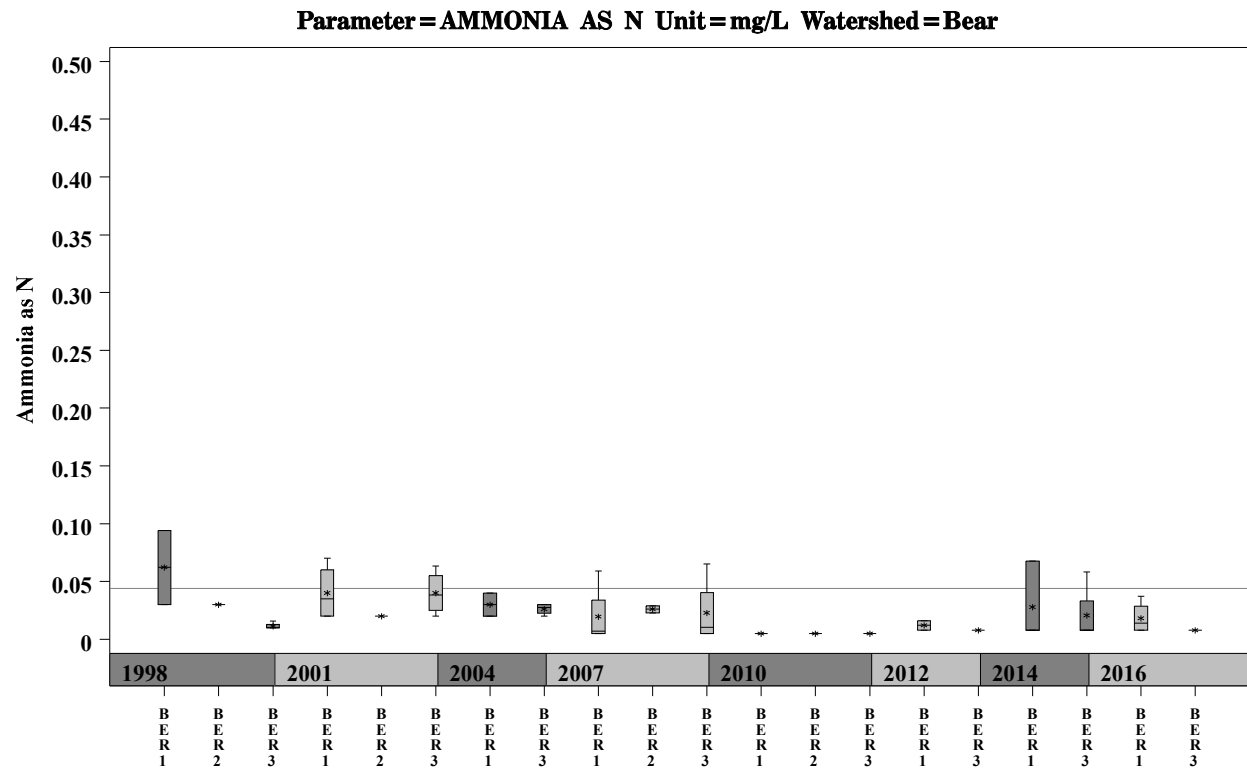
Bear Creek Watershed

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



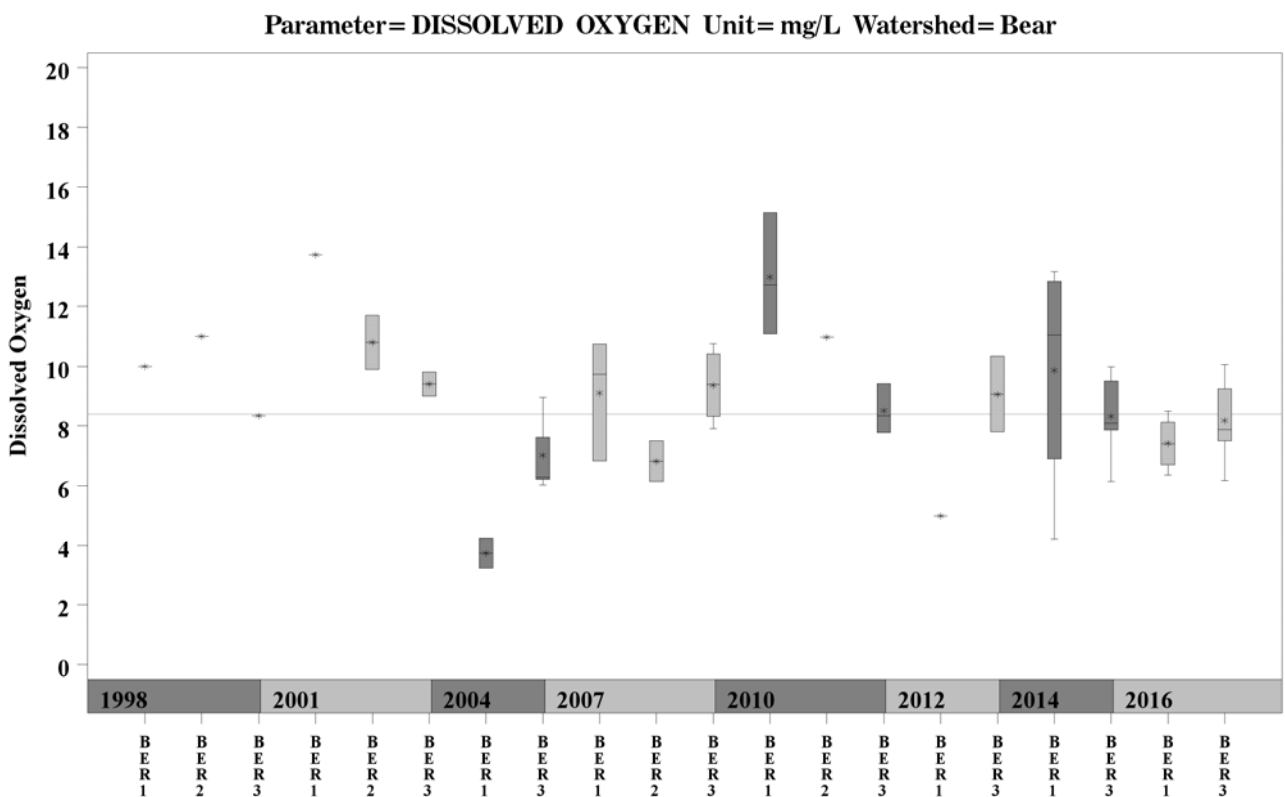
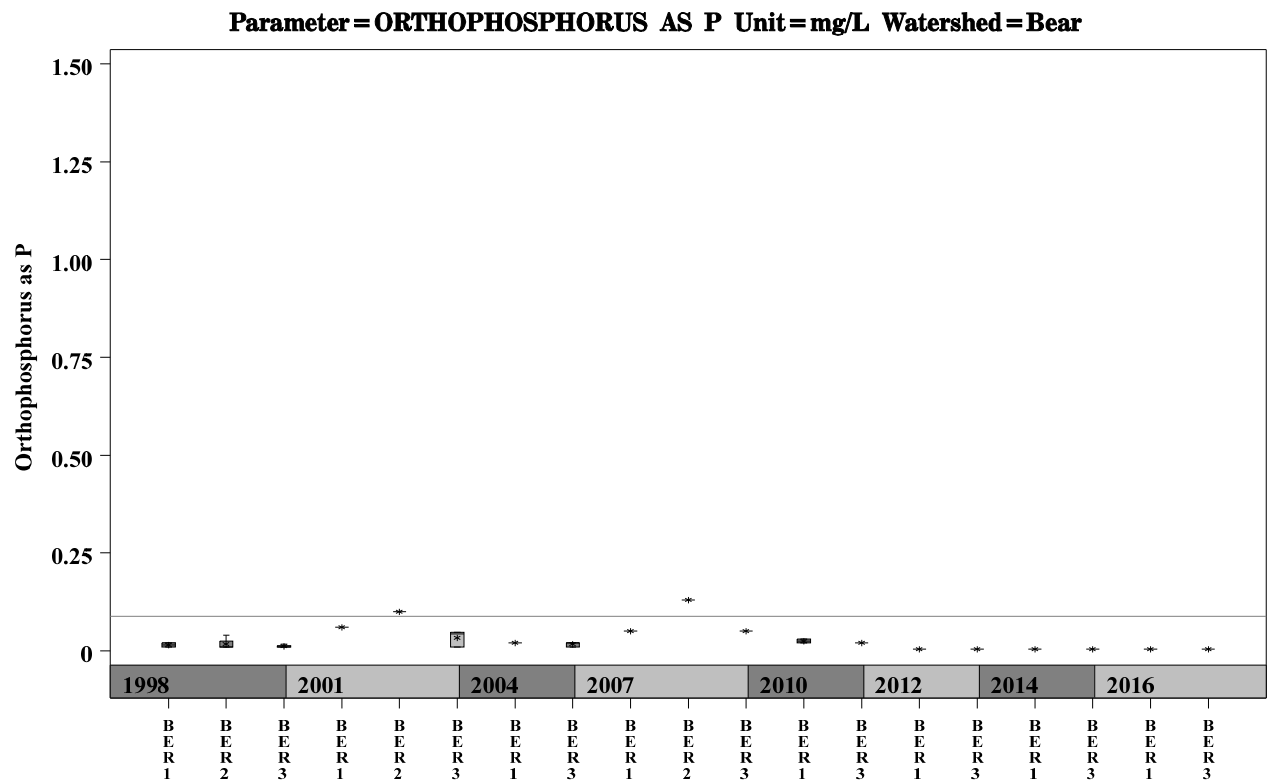
Bear Creek Watershed

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



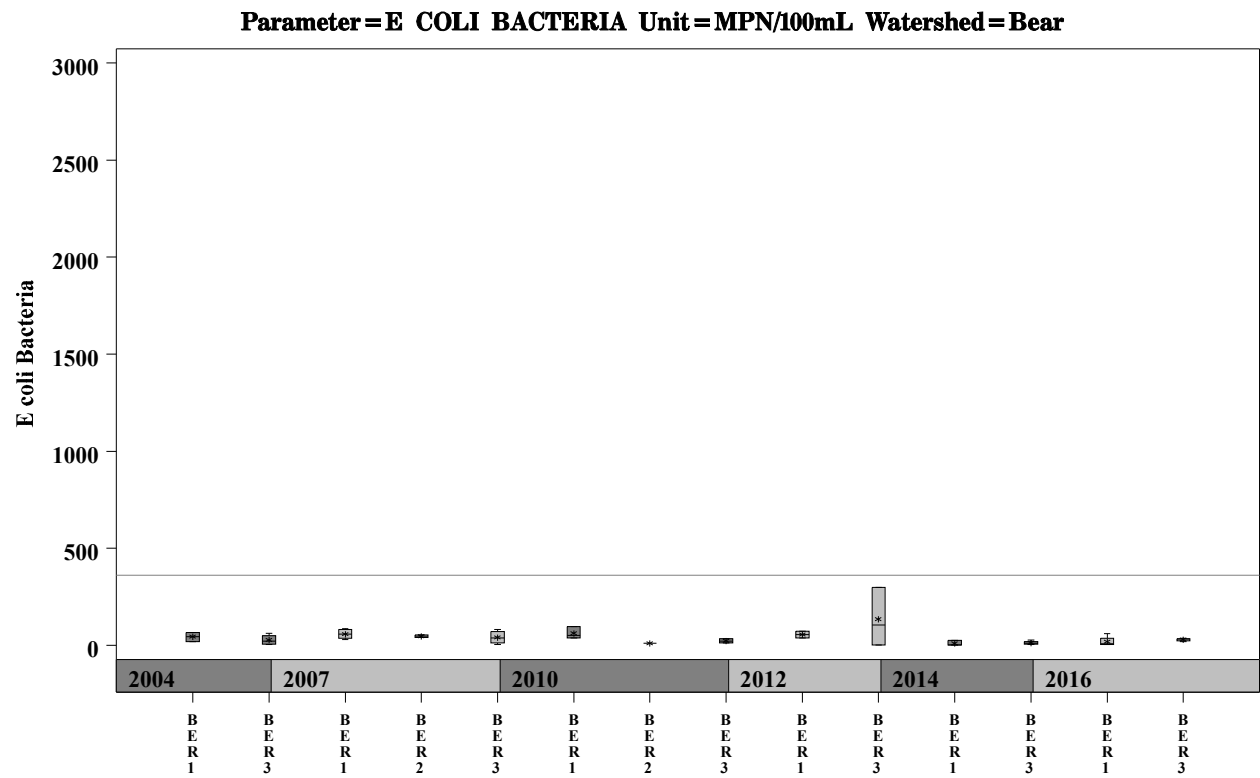
Bear Creek Watershed

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



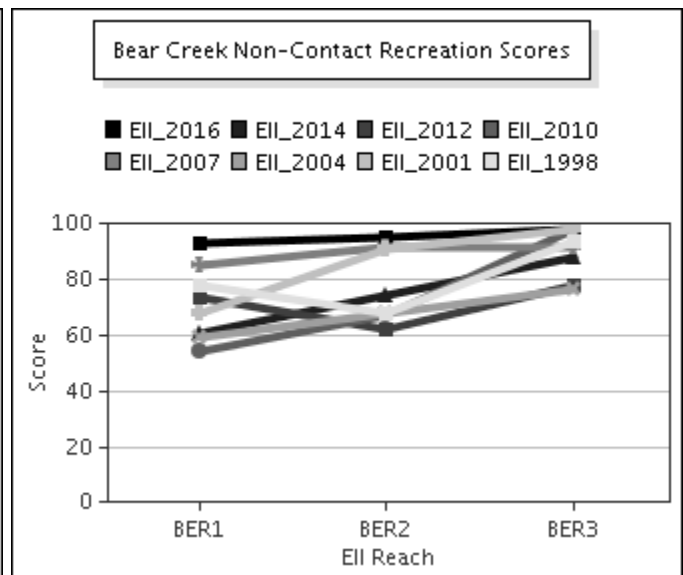
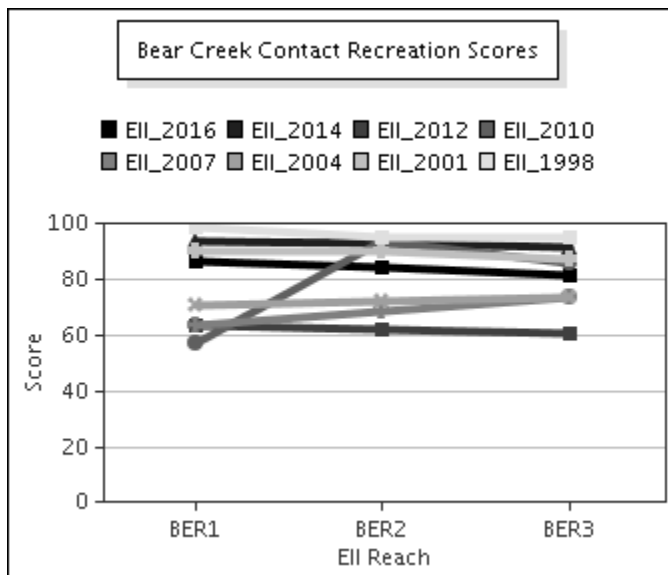
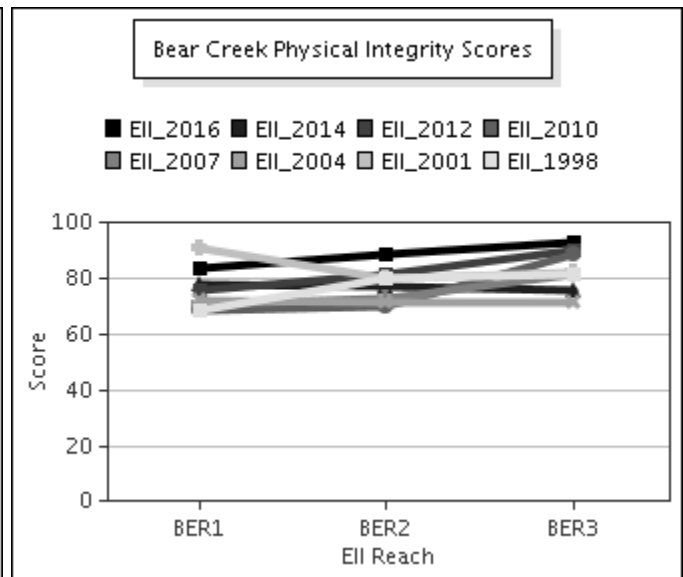
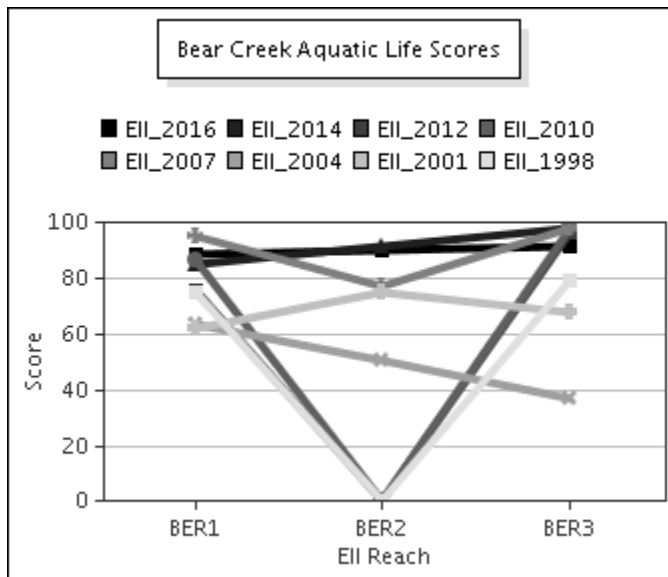
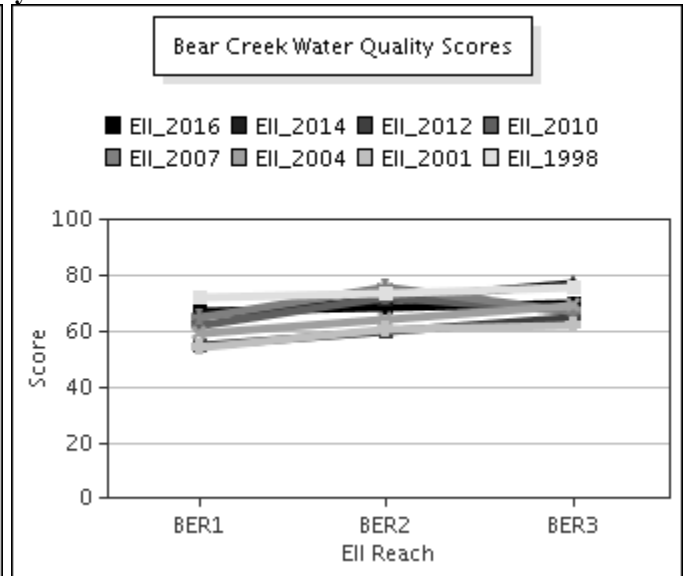
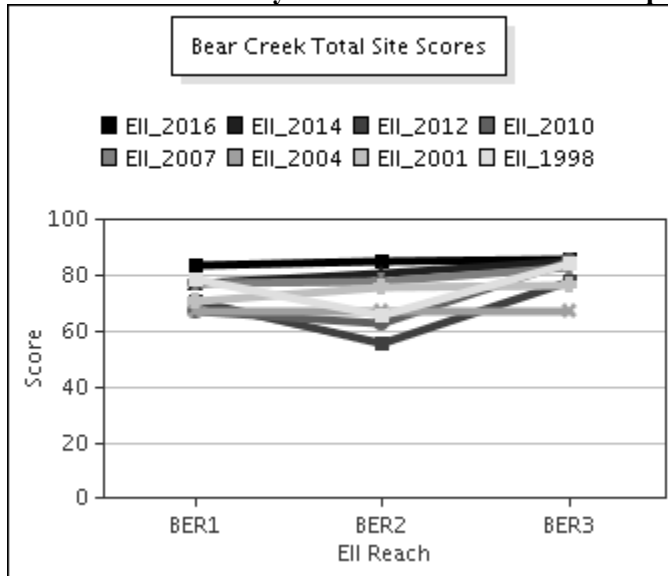
Bear Creek Watershed

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



Bear Creek Watershed

Score Summary – Reach scores for each sample year



Bear Creek Watershed

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2016 Sample Sites (Downstream to Upstream)

Benthic Macroinvertebrates - Bear Creek			BER @ Bear Creek Pass (4112) 05/09/2016 (WRE)	BER @ Twin Creeks (1087) 05/06/2016 (WRE)
Benthic Macroinvertebrates ID	PTI	FFG		
Erpetogomphus	1	P	1	
Chimarra	2	FC	2	263
Hydroptila	2	PI,SC	6	2
Microcylloepus Pusillus	2	CG,SC	1	
Gammarus	3	CG,SH		1
Baetodes	4	SC		3
Camelobaetidius	4	CG	9	15
Fallceon	4	CG,SC	300	47
Ostracoda	4	CG,FC	2	
Psephenus	4	SC		1
Simulium	4	FC	12	135
Ambrysus	5	P	1	
Dubiraphia	5	CG,SC	1	
Petrophila (Moth)	5	SC	2	2
Tricorythodes	5	CG	2	
Argia	6	P	16	4
Cheumatopsyche	6	FC	2	69
Chironomidae	6	FC,P	6	7
Hydracarina	6		4	
Tanypodinae	6	P	5	1
Bezzia / Palpomyia	7	CG,P	3	
Caenis	7	CG,SC		1
Caloparyphus/Euparyphus	8	CG,SC	2	
Cladocera	8	FC	1	
Hyaella	8	CG,SH	5	2
Oligochaeta	8	CG	1	9
Cambaridae		CG		1
Dugesia		CG,P		4

--- **Bear Creek Watershed** ---

Site Photographs



4112_00-ds-05_19_2010



4112_00-ur-05_19_2010



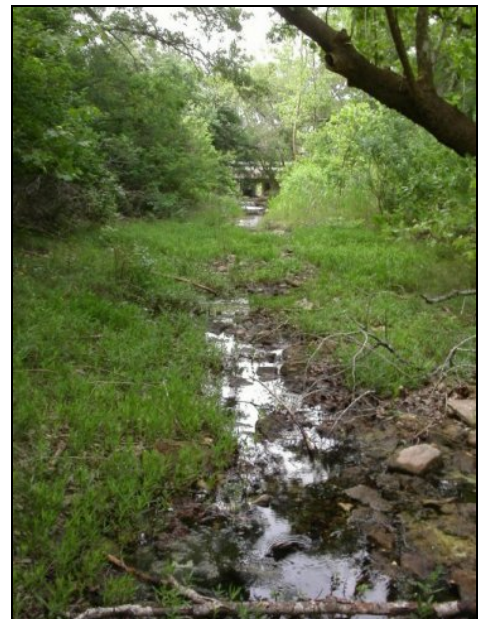
1534_ur_06_20_2007



1534_ds_06_20_2007



1089_t00-ur-05_26_2004



1089_t00-ds-05_26_2004

Bear Creek Watershed

Site Photographs



3935_ur_06_27_2007



3935_ds_06_27_2007



1087_ur_06_20_2007



1087_t00-ds-05_20_2004



1087_00-us-05_27_2010



1087_00-ds-05_27_2010