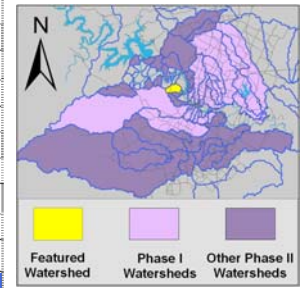


# Bee Creek Watershed

## Watershed Overview

ICatchment	Total area	3.3 sq. miles						
	Area in recharge	none						
	Creek length	3 miles						
	Receiving water	Lake Austin						
Demographics	2000 population	2,037						
	2030 projected population	10,984						
	30 year projected % increase	439 %						
Land Use	Impervious cover (2003 estimate)	14.8 %						
	Impervious cover (2013 estimate)	12.5 %						
Overall EII Scores	2001	2004	2007	2010	2012	2014	2016	
	78	75	81	80	79	76	79	



### Flow Regime\* for Sample Sites on Bee Creek

Site	1999		2001					2004					2007				2010				2011				2012					2014					2016				
	Jan	Jan	Mar	Mar	Jun	Sep	Dec	Mar	May	May	Jun	Oct	Dec	Feb	May	Jun	Sep	Dec	Mar	May	May	Oct	Dec	Mar	May	Jul	Sep	Jan	Apr	May	Jul	Sep	Jan	Apr	Jun	Jul	Sep		
1104	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	B	B	B			
322	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	B	B	B			
319	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	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 Bee Creek Sites by Year

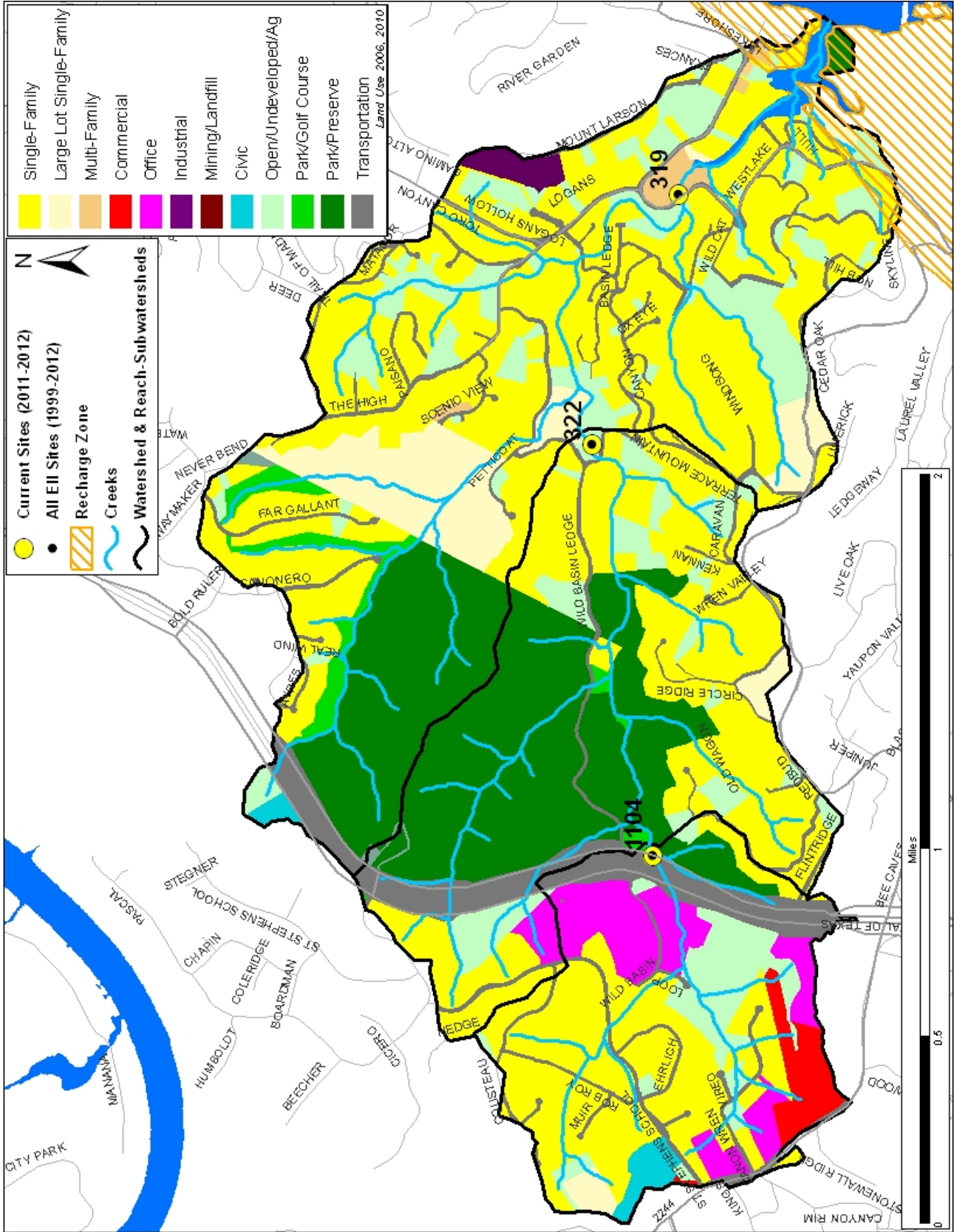
Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
BEE1	319	Bee Creek @ Lake Austin	1998	70	85	97	85	68	76	65	86	80
BEE2	322	Bee Creek @ Road Runner Rd	1998	63	85	83	92	86	87	74	100	83
BEE3	1104	Bee Creek @ Loop 360	1998	47	85	82	70	69	62	52	71	69
BEE1	319	Bee Creek @ Lake Austin	2001	60	94	93	84	70	64	43	85	74
BEE2	322	Bee Creek @ Road Runner Rd	2001	58	94	86	88	69	83	75	91	76
BEE3	1104	Bee Creek @ Loop 360	2001	59	94	81	94	84	54	37	70	74
BEE1	319	Bee Creek @ Lake Austin	2004	63	85	60	87	81	87	83	91	77
BEE2	322	Bee Creek @ Road Runner Rd	2004	61	85	62	94	79	76	54	97	76
BEE3	1104	Bee Creek @ Loop 360	2004	47	85	46	89	82	82	74	90	72
BEE1	319	Bee Creek @ Lake Austin	2007	68	88	81	95	80	90	84	96	84
BEE2	322	Bee Creek @ Road Runner Rd	2007	65	88	79	98	79	87	75	98	83
BEE3	1104	Bee Creek @ Loop 360	2007	57	88	76	95	82	60	68	51	76
BEE1	319	Bee Creek @ Lake Austin	2010	63	85	81	100	76	94	87	100	83
BEE2	322	Bee Creek @ Road Runner Rd	2010	66	85	85	91	77	85	72	97	82
BEE3	1104	Bee Creek @ Loop 360	2010	55	85	59	96	82	83	78	88	77
BEE1	319	Bee Creek @ Lake Austin	2012	58	86	79	89	67	81	72	90	77
BEE2	322	Bee Creek @ Road Runner Rd	2012	45	86	37	98	89	94	100	88	75
BEE3	1104	Bee Creek @ Loop 360	2012	57	86	73	98	98	98	96	99	85
BEE1	319	Bee Creek @ Lake Austin	2014	69	81	94	90	67	92	84	100	82
BEE2	322	Bee Creek @ Road Runner Rd	2014	58	81	78	93	71	80	76	83	77
BEE3	1104	Bee Creek @ Loop 360	2014	54	81	59	91	63	70	57	82	70
BEE1	319	Bee Creek @ Lake Austin	2016	74	87	84	95	67	81	82	79	81
BEE2	322	Bee Creek @ Road Runner Rd	2016	67	87	67	96	72	82	74	89	79
BEE3	1104	Bee Creek @ Loop 360	2016	58	87	53	93	83	85	81	88	77

\* 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

# Bee Creek Watershed

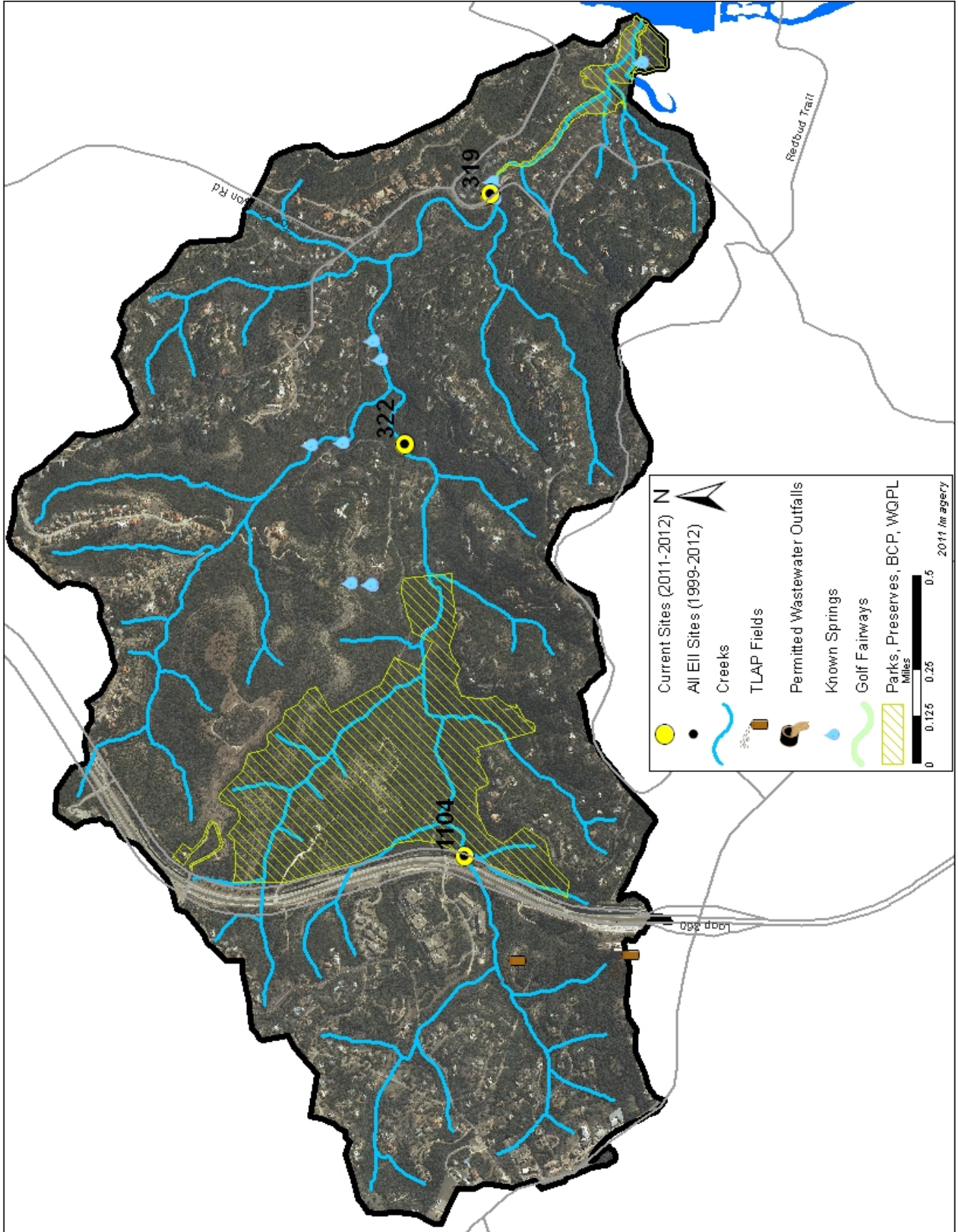
## Land Use Map





# Bee Creek Watershed

Aerial Map



# Bee 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. flag	Cond. flag	pH flag	D.O. flag	E. Coli flag
Bee	319	BEE1	1/12/2016	8.8	730	8.07	11.2	8.6
Bee	319	BEE1	4/12/2016	18.7	732	8.00	9.0	30.1
Bee	319	BEE1	6/22/2016	30.0	659	8.09	8.6	
Bee	319	BEE1	7/12/2016	25.7	752	7.60	5.1	37.4
Bee	319	BEE1	9/13/2016	25.0	697	7.90	7.2	28.1
Bee	319	BEE1 Mean		21.6	714	7.93	8.2	26.0
Bee	322	BEE2	1/12/2016	9.1	784	8.00	11.2	33.2
Bee	322	BEE2	4/12/2016	19.3	795	8.01	9.1	50.4
Bee	322	BEE2	6/22/2016	29.8	733	7.99	9.2	
Bee	322	BEE2	7/12/2016	25.2	762	7.87	6.6	86.0
Bee	322	BEE2	9/13/2016	24.6	773	7.97	7.6	45.7
Bee	322	BEE2 Mean		21.6	769	7.97	8.7	53.8
Bee	1104	BEE3	1/12/2016	10.7	872	8.04	10.6	83.9
Bee	1104	BEE3	4/12/2016	18.2	899	7.95	9.9	133.3
Bee	1104	BEE3	6/21/2016	23.2	823	7.84	7.6	
Bee	1104	BEE3	7/12/2016	23.5	857	7.61	7.1	52.9
Bee	1104	BEE3	9/13/2016	23.3	854	7.76	8.0	88.4
Bee	1104	BEE3 Mean		19.8	860	7.88	8.4	89.6
Bee		Bee Mean		21.0	781	7.92	8.5	56.5

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
E. Coli (col/100ml)	316.1	1.0	2420.0	883.7	

# Bee 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
Bee	319	BEE1	1/12/2016	<J	0.008	<	1.64	<J	0.004	<J	1.0	<	0.3 R
Bee	319	BEE1	4/12/2016		0.008		0.42	<J	0.004	<J	1.1		0.7
Bee	319	BEE1	6/22/2016										
Bee	319	BEE1	7/12/2016	<J	0.008	<J	0.008	<J	0.004	<J	1.0		0.8 R
Bee	319	BEE1	9/13/2016	<J	0.008		0.031	<J	0.004	<J	1.0		1.0
Bee	319	BEE1 Mean			0.008		0.526		0.004		1.0		0.7
Bee	322	BEE2	1/12/2016	<J	0.008		1.570	<J	0.004	<J	1.0		0.6 R
Bee	322	BEE2	4/12/2016	<J	0.008		0.586	<J	0.004	<J	1.1		0.9
Bee	322	BEE2	6/22/2016										
Bee	322	BEE2	7/12/2016	<J	0.008	<J	0.008	<J	0.004	<J	1.0		0.3 R
Bee	322	BEE2	9/13/2016	<J	0.008	<J	0.008	<J	0.004		1.2		1.0
Bee	322	BEE2 Mean			0.008		0.543		0.004		1.1		0.7
Bee	1104	BEE3	1/12/2016	<J	0.008		2.140	<J	0.004	<J	1.0		0.6 R
Bee	1104	BEE3	4/12/2016	<J	0.008		1.300	<J	0.004	<J	1.0		0.4
Bee	1104	BEE3	6/22/2016										
Bee	1104	BEE3	7/12/2016		0.058		0.184	<J	0.004	<J	1.0		1.9 R
Bee	1104	BEE3	9/13/2016		0.037		0.056	<J	0.004	<J	1.1		1.1
Bee	1104	BEE3 Mean			0.028		0.920		0.004		1.0		1.0
Bee		Bee Mean			0.014		0.662		0.004		1.0		0.8

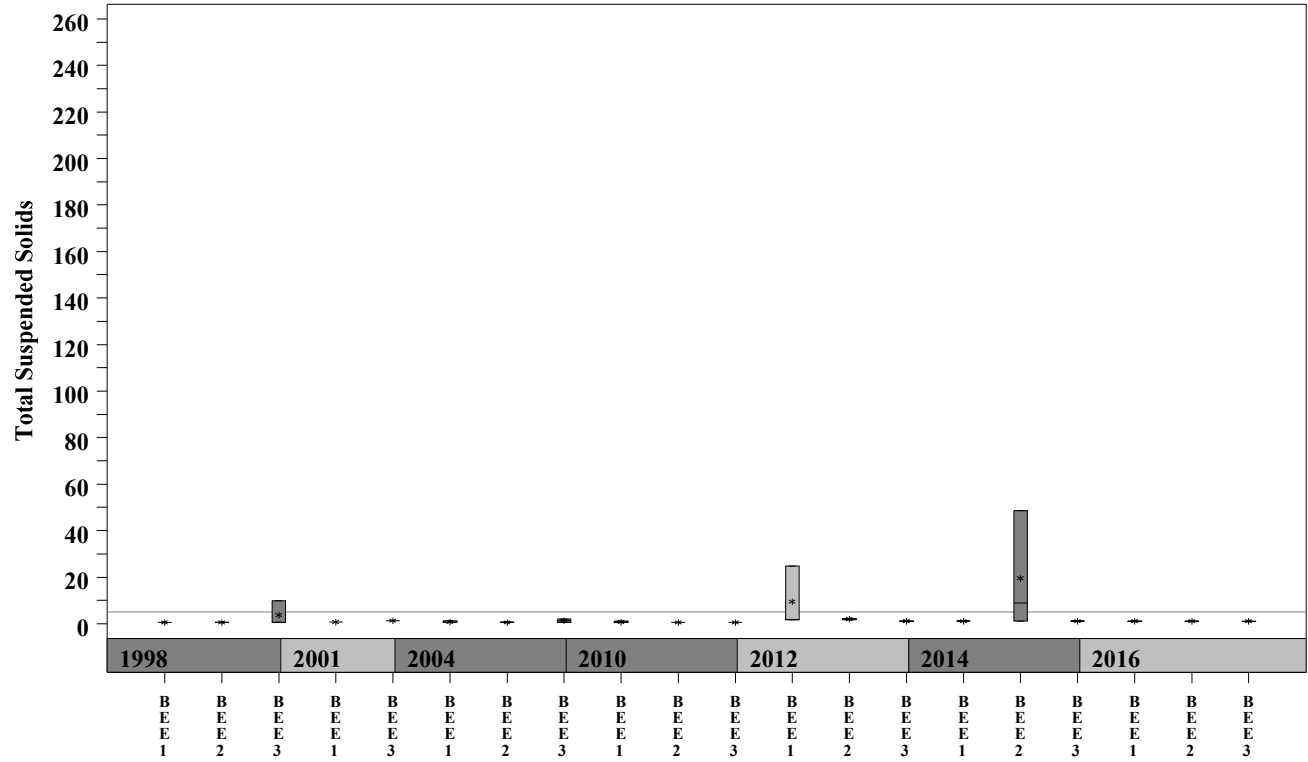
Gray highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

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

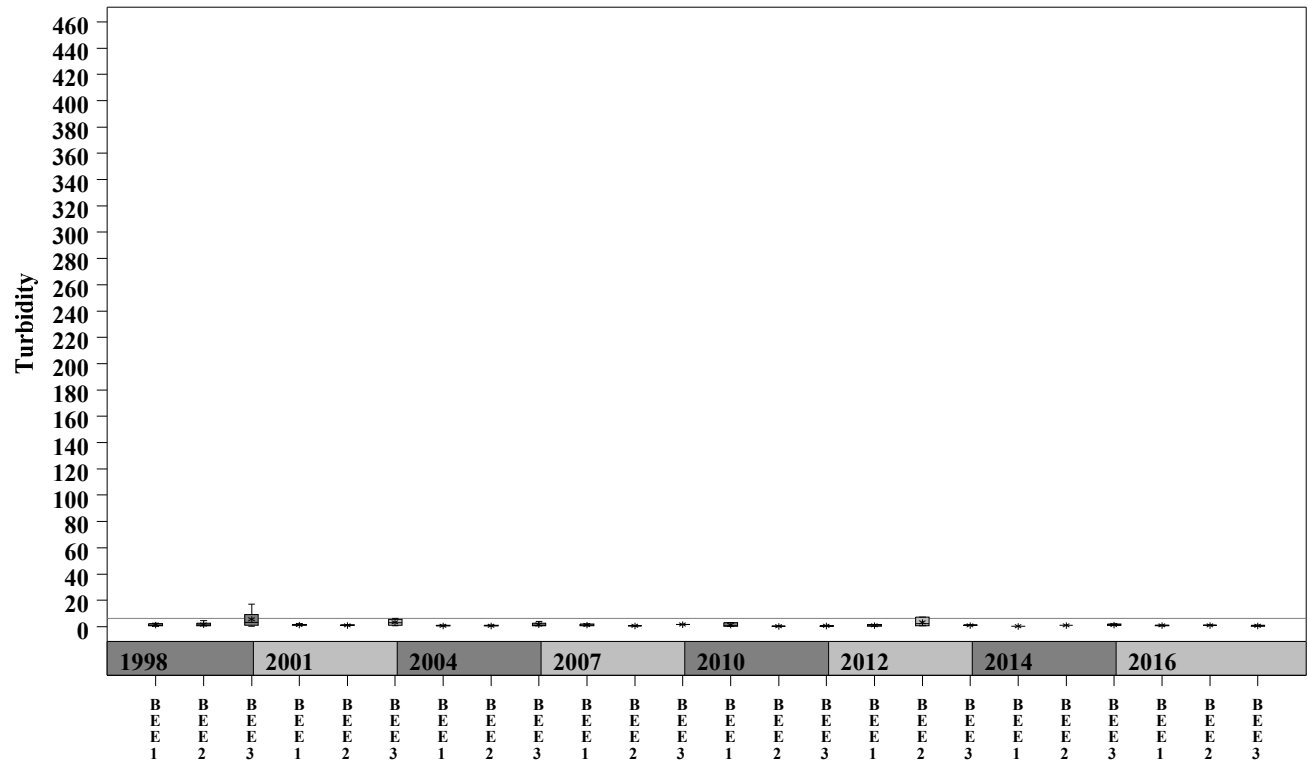
# Bee Creek Watershed

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

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

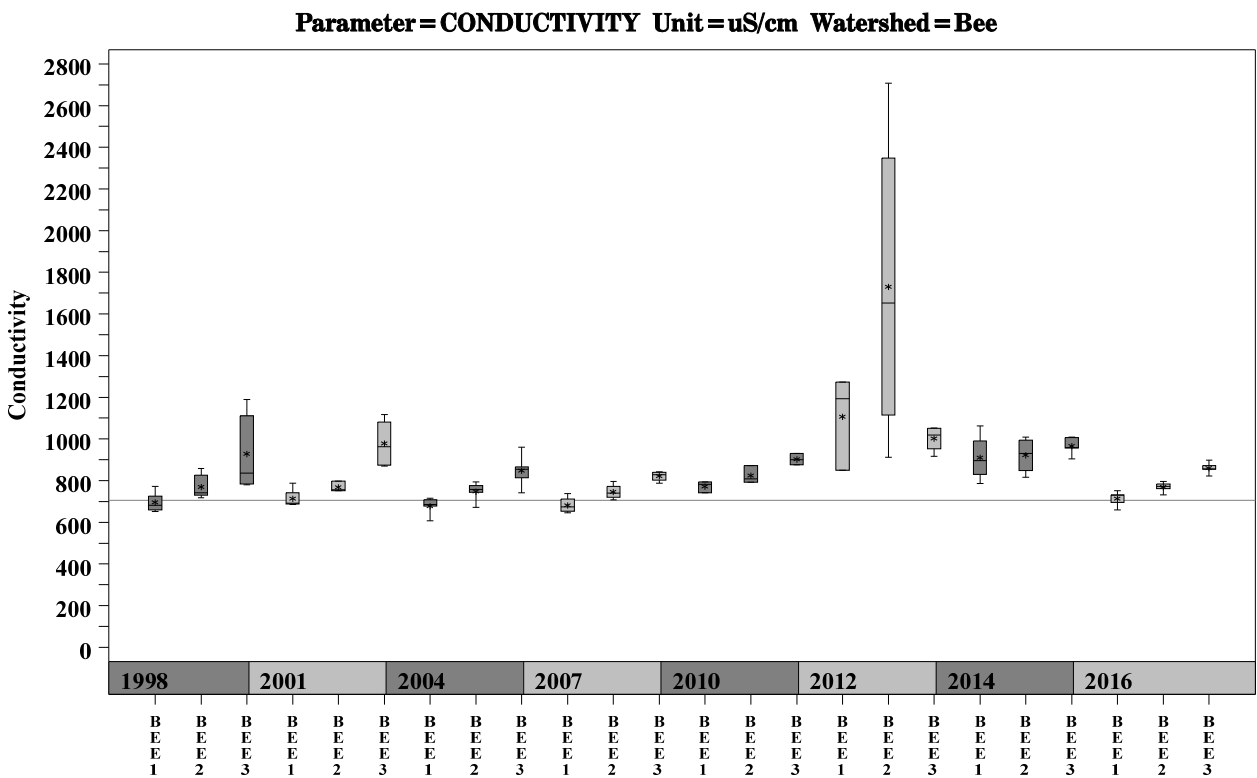
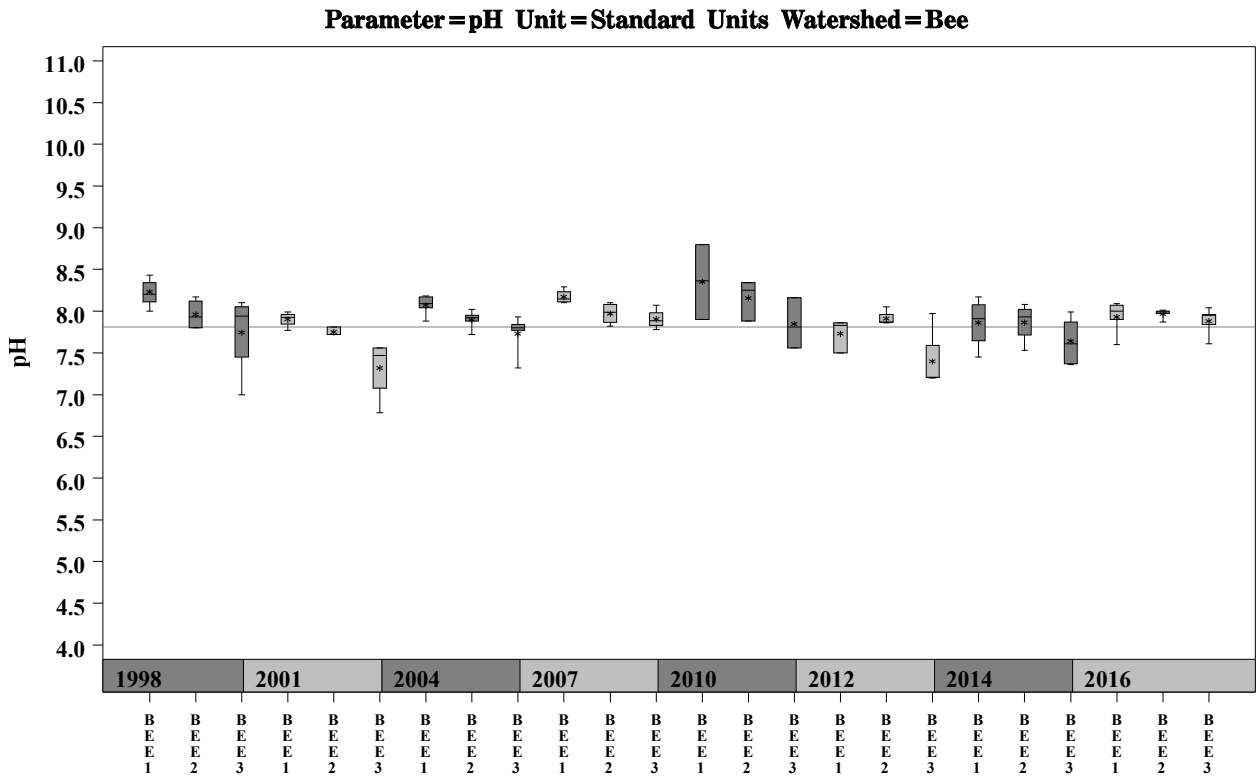


Parameter = TURBIDITY Unit = NTU Watershed = Bee



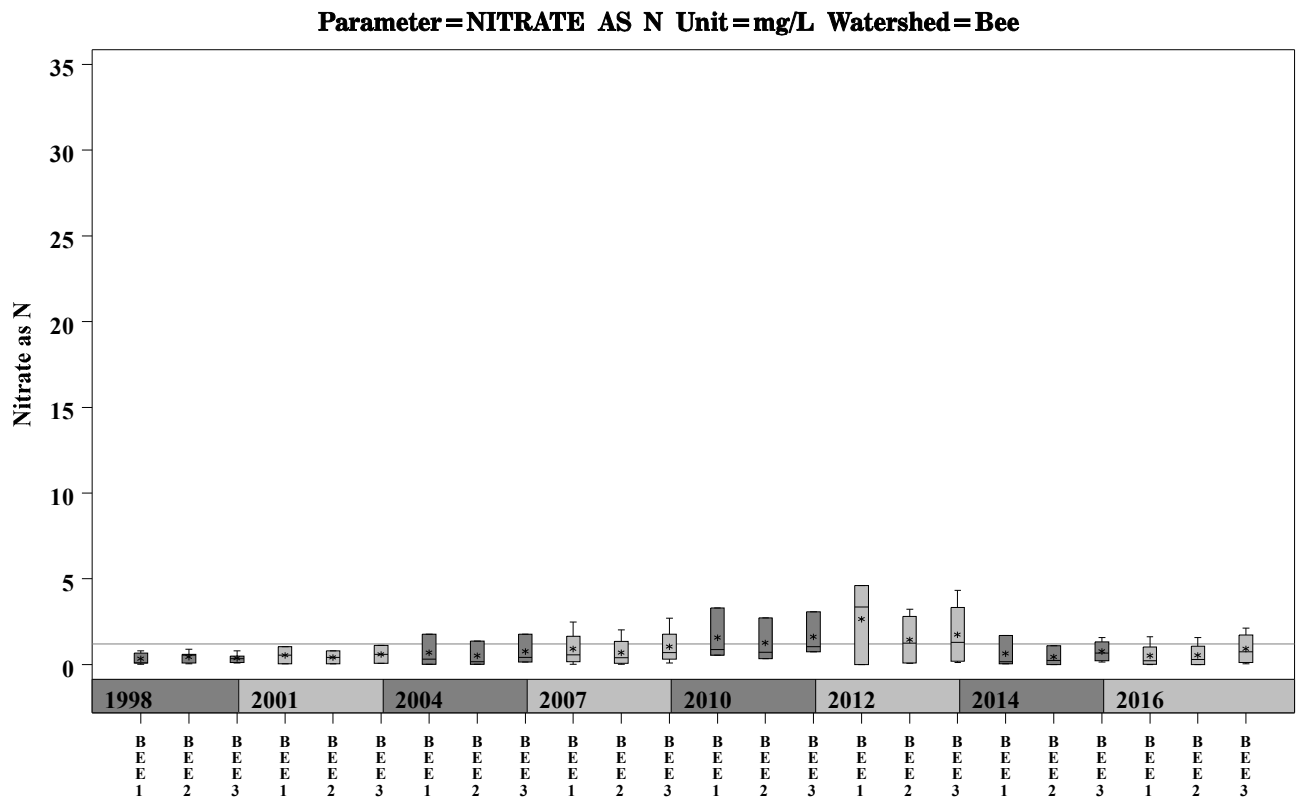
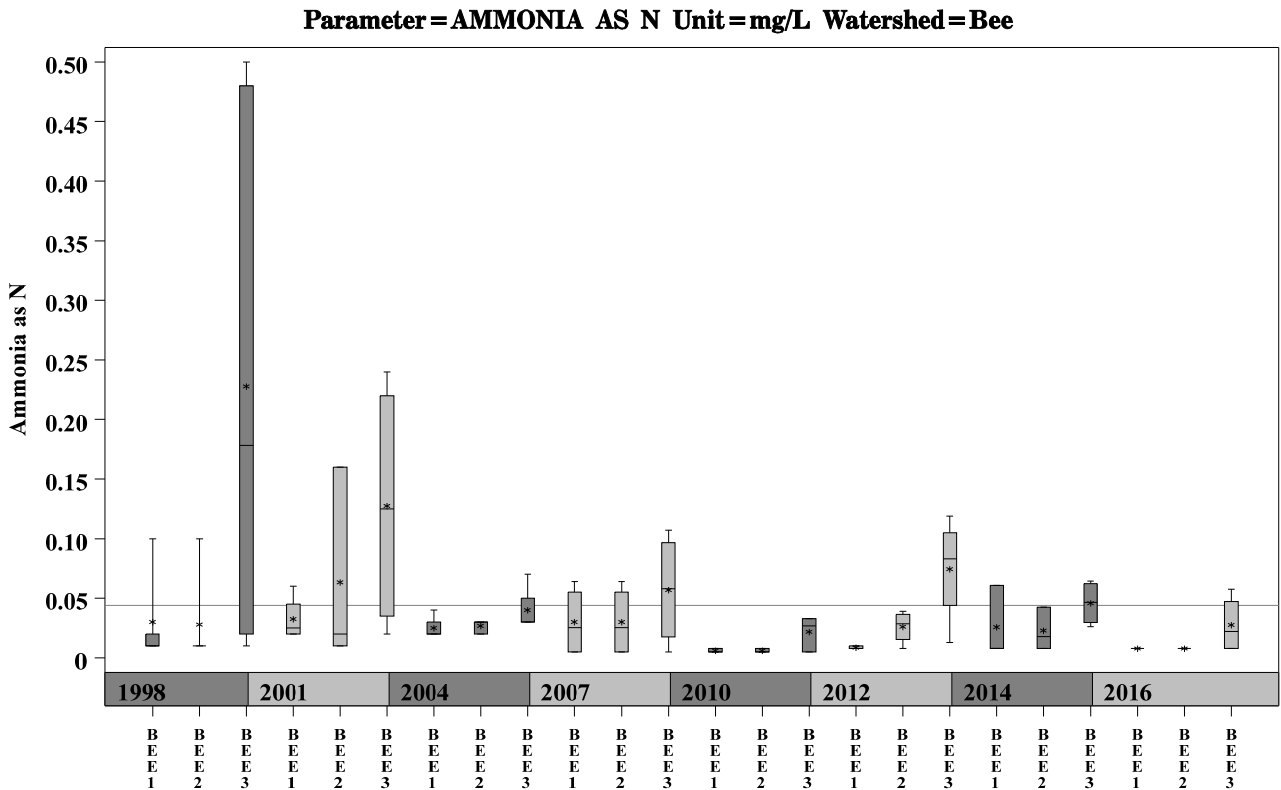
# Bee Creek Watershed

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



# Bee Creek Watershed

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

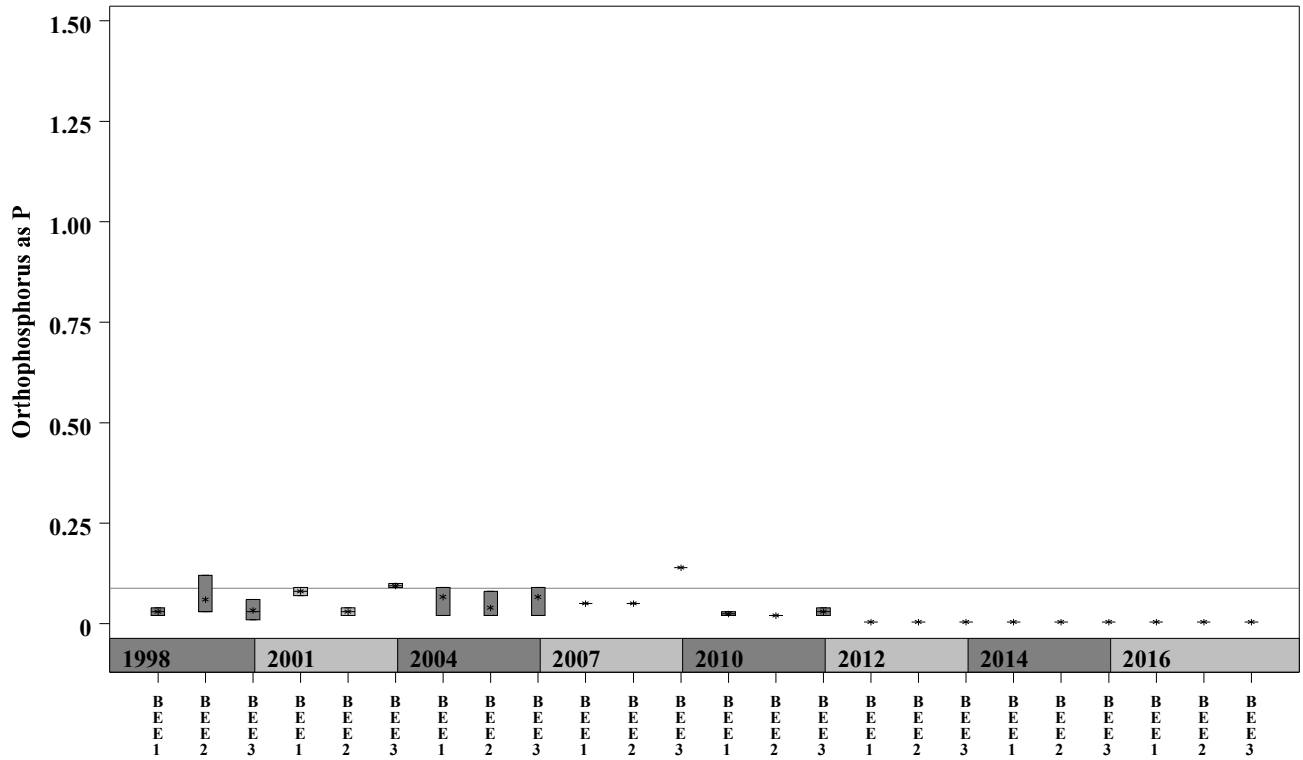




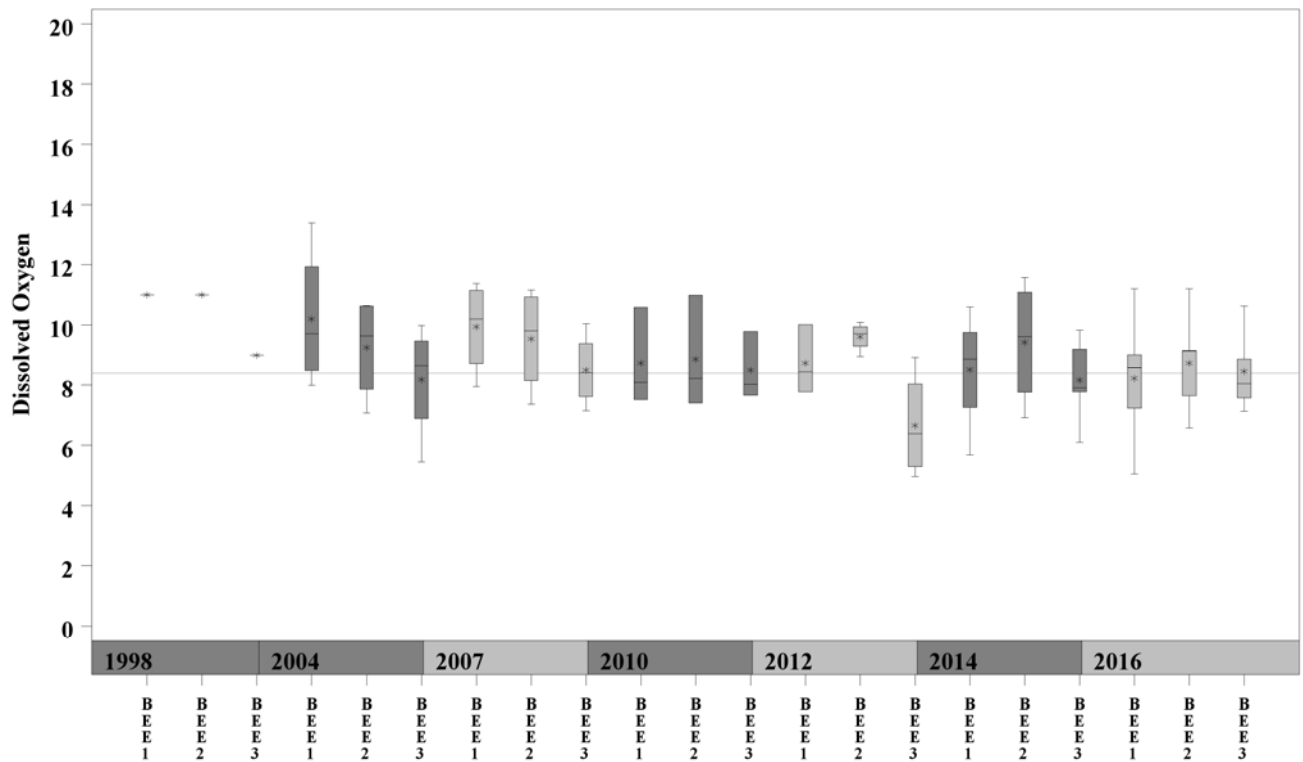
# Bee Creek Watershed

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

**Parameter = ORTHOPHOSPHORUS AS P Unit = mg/L Watershed = Bee**



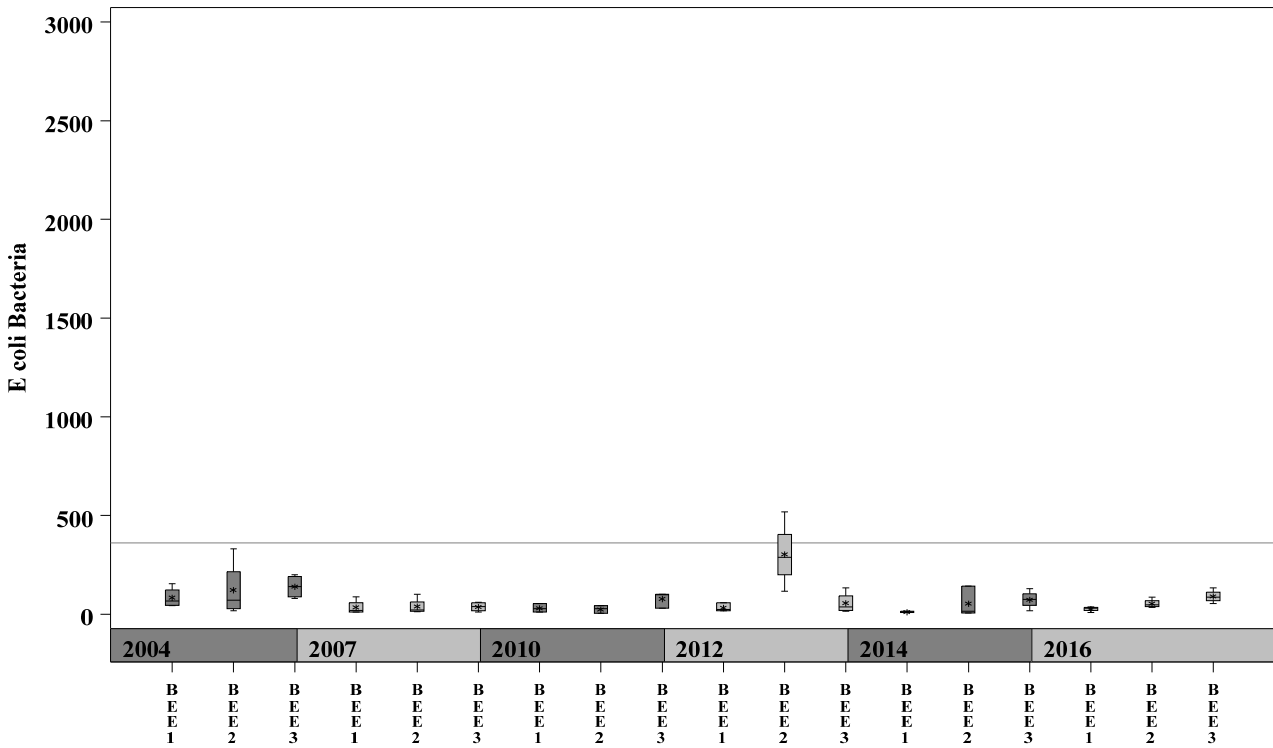
**Parameter = DISSOLVED OXYGEN Unit = mg/L Watershed = Bee**



# Bee Creek Watershed

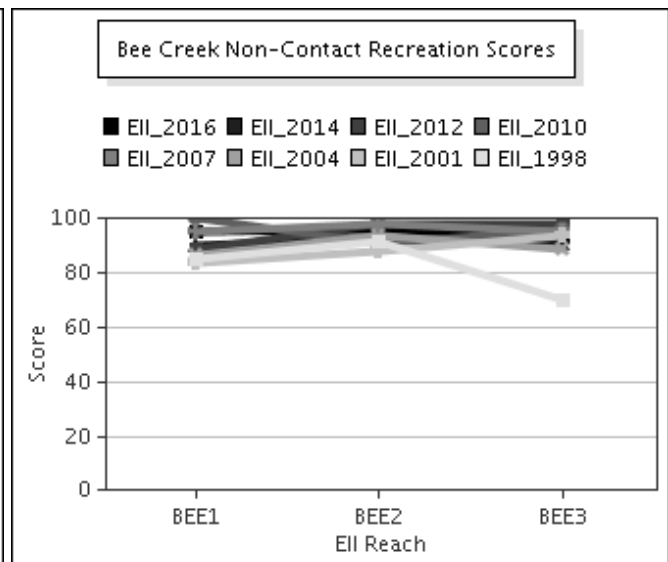
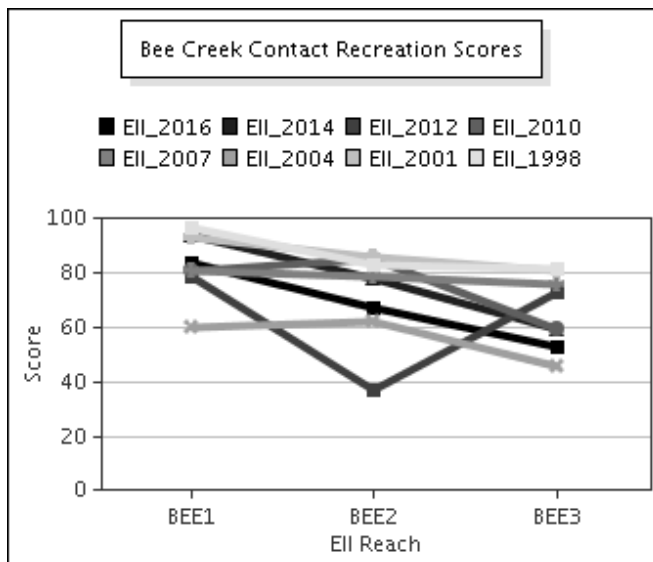
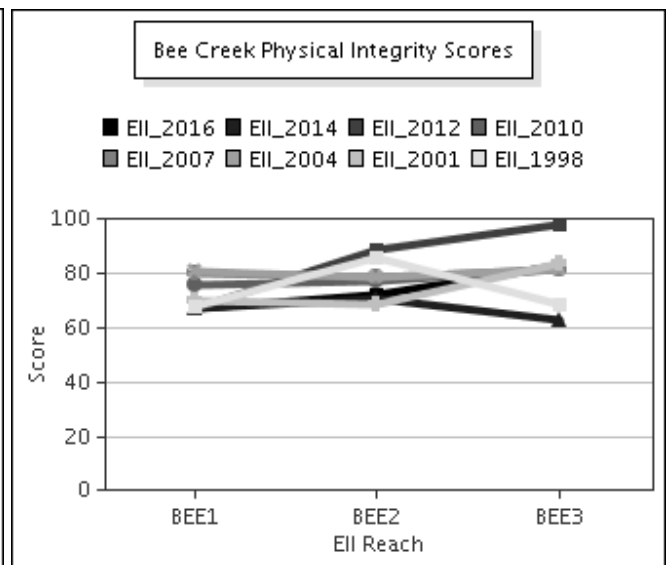
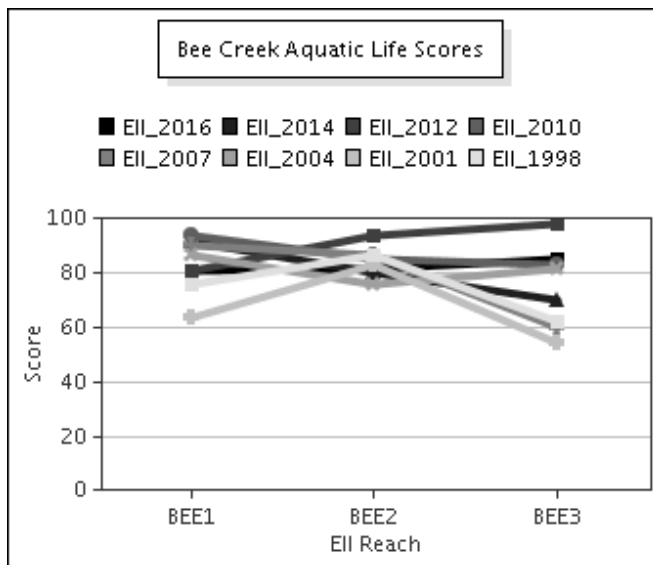
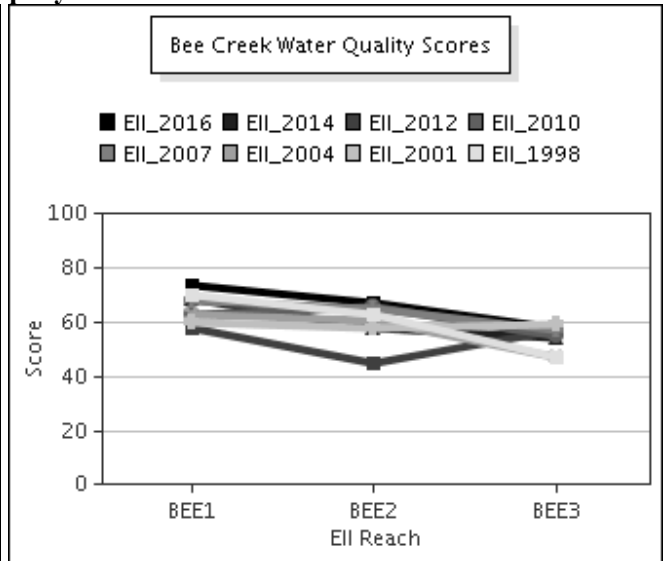
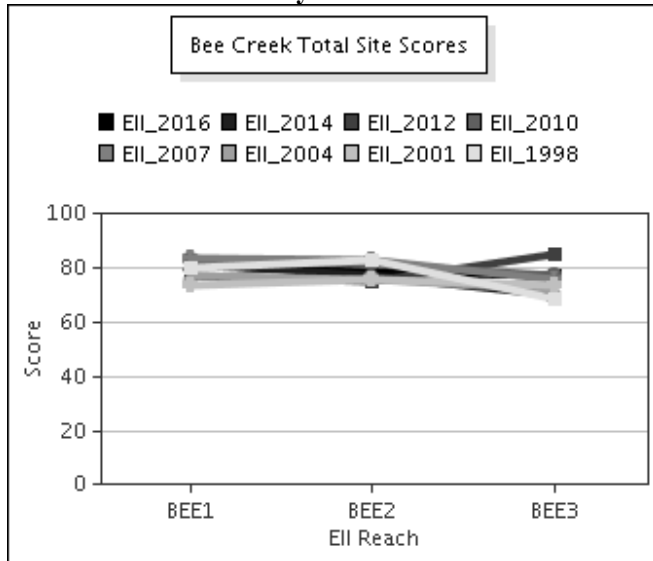
Data Summary Graphs – *E.coli* (Downstream to Upstream by Year)

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



# Bee Creek Watershed

## Score Summary – Reach scores for each sample year



# Bee Creek Watershed

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

Benthic Macroinvertebrates - Bee Creek			BEE @ 360 (1104)	BEE @ Roadrunner	BEE @ LKA (319)
Benthic Macroinvertebrates ID	PTI	FFG	06/21/2016 (WRE)	(322) 06/22/2016 (WRE)	06/22/2016 (WRE)
Chimarra	2	FC	29	55	1
Xiphocentron	3	FC	18		
Camelobaetidius	4	CG	4	6	13
Fallceon	4	CG,SC	64	6	
Ochrotrichia	4	CG			1
Simulium	4	FC	274	2	3
Aquarius	5	P	1		
Lutrochus	5	CG		1	
Argia	6	P	15	26	3
Brechmorhoga Mendax	6	P		4	2
Cheumatopsyche	6	FC	48	26	1
Chironomidae	6	FC,P	4		
Hemerodromia	6	CG,P	1		
Hydracarina	6		5		
Microvelia	6	P		4	
Rhagovelia	6	P		1	3
Stenonema Femoratum	6	CG,SC			3
Stenelmis	7	CG,SC	3		
Caloparyphus/Euparyphus	8	CG,SC	1		3
Dugesia		CG,P	1	7	



# Bee Creek Watershed

## Site Photographs



322\_t00-us-05\_21\_2004



322\_t00-ds-05\_21\_2004



322\_us\_06\_18\_2007



322\_ds\_06\_18\_2007



322\_00-us-05\_17\_2010



322\_00-ds-05\_17\_2010



# Bee Creek Watershed

## Site Photographs



1104\_t00-us-05\_21\_2004



1104\_ur\_06\_19\_2007



319\_t00-ds-05\_21\_2004



319\_ds\_07\_13\_2007



319\_00-us-05\_17\_2010



319\_00-ds-05\_17\_2010