

Lake Austin Tributaries

Watershed Overview

Catchment	Total area	24 sq. miles						
	Area in recharge	0						
	Creek length	26 miles						
Demographics	Receiving water	Town Lake						
	2000 population	23,303						
	2030 projected population	78,558						
Land Use	Impervious cover (2013 estimate)	BRW = 16.5%, RDR = 18.2%, CMF = 6.4%						
	Each stream abbr. as reach ID	PAN = 8.4%, CRN = 15.3%, TRK = 10.5%						
Overall EII Scores	1999	2002	2005	2008	2010	2012	2014	2016
	81	82	68	61	80	76	77	82

Flow Regime* for Sample Sites on Lake Austin Tributaries

Site	2002					2005					2008					2010			
	Feb	Feb	May	Aug	Nov	Mar	Jun	Jun	Sep	Dec	Feb	May	Jun	Sep	Dec	Mar	May	May	Oct
	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ
1224	B	B	n	B	B	B	B	B	B	B	B	B	n	B	B	B	B	B	B
316	B	B	n	B	B	B	B	B	n	B	B	B	B	B	B	B	B	B	B
1048	B	B	n	B	B	B	B	n	n	n	B	B	n	B	n	B	B	B	B
1223	B	B	n	B	B	B	B	B	n	n	B	B	n	n	n	B	B	B	B
1222	B	B	n	B	B	B	n	n	n	n	n	B	n	n	n	B	B	B	B
1221	B	B	n	B	B	B	B	B	n	n	n	B	n	n	n	B	B	B	B

Flow Regime* for Sample Sites on Lake Austin Tributaries (Cont.)

Site	2011	2012					2014						2016				
	Dec	Mar	Apr	May	Jul	Sep	Jan	Apr	May	Jun	Jul	Sep	Mar	May	Jun	Jul	Oct
	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	Bio	Bio	WQ	WQ	WQ	WQ	WQ	WQ	WQ
1224	B	B		B	B	B	B	B	B		B		B	B	B	B	B
316	B	B		B			B	B	B		B	n	B	B	B	B	B
1048	B	B		B			B	B		B	B	n	B	B	B	B	B
1222	B	B		B			B	B	n		B	n	B	B	B	n	B
1223	B	B	B				B	B	B	B	n	n	B	B	B	B	B
1221	n	B	B				B	B	n		B	n	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

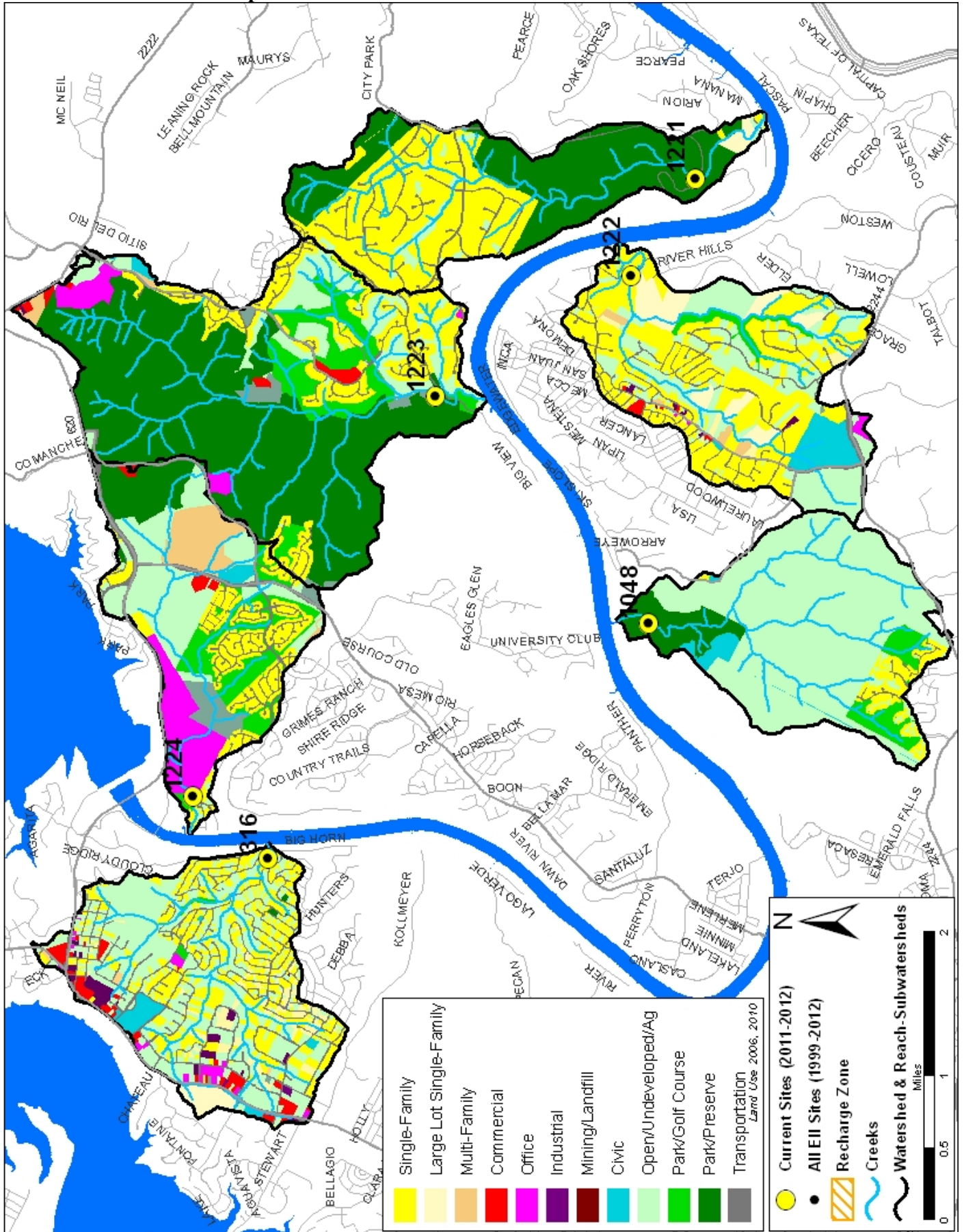
Summary of 2016 Data for Lake Austin Tributaries

Index scores* for LA Tributaries by Year			Year	Water Quality	Sediment**	Contact Rec.	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
Reach	Site	Site Name										
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	1999	79	94	95	97	79	48	31	64	82
RDR1	316	Deer @ Running Deer Trail (AST)	1999	75	90	97	91	79	54	38	70	81
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	1999	90	93	99	93	80	56	52	59	85
PAN1	1223	Panther Hollow Creek @ Big View Road	1999	72	94	89	89	79	67	76	58	82
CRN1	1222	Cuernavaca Creek @ River Hills Road	1999	55	93	89	82	84	45	17	72	75
TRK1	1221	Turkey Creek @ City Park Road	1999	81	92	89	97	85	56	51	60	83
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2002	65	92	95	89	72	82	68	96	83
RDR1	316	Deer @ Running Deer Trail (AST)	2002	62	94	92	97	76	75	63	87	83
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	2002	72	93	96	92	81	73	60	86	85
PAN1	1223	Panther Hollow Creek @ Big View Road	2002	68	76	98	85	74	81	69	93	80
CRN1	1222	Cuernavaca Creek @ River Hills Road	2002	56	91	86	83	71	64	42	85	75
TRK1	1221	Turkey Creek @ City Park Road	2002	76	85	97	100	81	61	55	67	83
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2005	70	82	56	89	63	80	63	97	73
RDR1	316	Deer @ Running Deer Trail (AST)	2005	66	90	46	86	55	73	73		69
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	2005	73	88	69	69	56				59
PAN1	1223	Panther Hollow Creek @ Big View Road	2005	76	89	79	69	60	90	79	100	77
CRN1	1222	Cuernavaca Creek @ River Hills Road	2005	50	89	25	81	61				51
TRK1	1221	Turkey Creek @ City Park Road	2005	75	87	86	87	68	80	60	100	81
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2008	65	86	80	71	75	69	69		74
RDR1	316	Deer @ Running Deer Trail (AST)	2008	69	84	45	84	52	93	88	98	71
CMF1	1048	Commons Ford Trib -Common Ford Metro Pk	2008	59	82	56	60	68				54
PAN1	1223	Panther Hollow Creek @ Big View Road	2008	59	86	70	48	76				57
CRN1	1222	Cuernavaca Creek @ River Hills Road	2008	57	83	25	63	61				48
TRK1	1221	Turkey Creek @ City Park Road	2008	61	85	49	69	81	35	35		63
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2010	69	81	70	91	77	82	64	100	78
RDR1	316	Deer @ Running Deer Trail (AST)	2010	67	87	74	97	61	96	92	99	80
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	2010	78	86	87	81	60	96	91	100	81
PAN1	1223	Panther Hollow Creek @ Big View Road	2010	71	84	84	88	89	85	78	92	84
CRN1	1222	Cuernavaca Creek @ River Hills Road	2010	61	85	65	96	70	86	72	100	77
TRK1	1221	Turkey Creek @ City Park Road	2010	67	87	80	88	75	66	65	66	77
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2012	62	85	57	90	88	81	82	79	77
RDR1	316	Deer @ Running Deer Trail (AST)	2012	61	86	63	90	80	58	71	45	73
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	2012	66	85	83	91	80	97	93	100	84
PAN1	1223	Panther Hollow Creek @ Big View Road	2012	56	86	71	71	64	81	72	89	72
CRN1	1222	Cuernavaca Creek @ River Hills Road	2012	48	85	53	96	81	85	77	92	75
TRK1	1221	Turkey Creek @ City Park Road	2012	55	85	50	98	84	63	42	83	73
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2014	77	74	76	86	84	98	96	100	83
RDR1	316	Deer @ Running Deer Trail (AST)	2014	48	80	31	92	79	99	100	97	72
CMF1	1048	Commons Ford Trib - Common Ford Metro Pk	2014	77	84	94	76	76	86	81	90	82
PAN1	1223	Panther Hollow Creek @ Big View Road	2014	64	76	82	70	62	79	79		72
CRN1	1222	Cuernavaca Creek @ River Hills Road	2014	59	82	75	74	63	94	98	90	75
TRK1	1221	Turkey Creek @ City Park Road	2014	67	82	85	75	82	78	55	100	78
BRW1	1224	Bear Creek (West) @ Fritz Hughes Park Rd	2016	56	86	70	98	92	86	80	91	82
RDR1	316	Deer @ Running Deer Trail (AST)	2016	51	82	50	100	66	89	88	89	73
CMF1	1048	Commons Ford Trib- Common Ford Metro PK	2016	81	85	70	96	92	95	98	92	87
PAN1	1223	Panther Hollow Creek @ Big View Road	2016	76	85	96	96	84	90	88	91	88
CRN1	1222	Cuernavaca Creek @ River Hills Road	2016	58	84	62	97	78	95	100	89	79
TRK1	1221	Turkey Creek @ City Park Road	2016	74	87	73	96	89	84	83	85	84

* 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

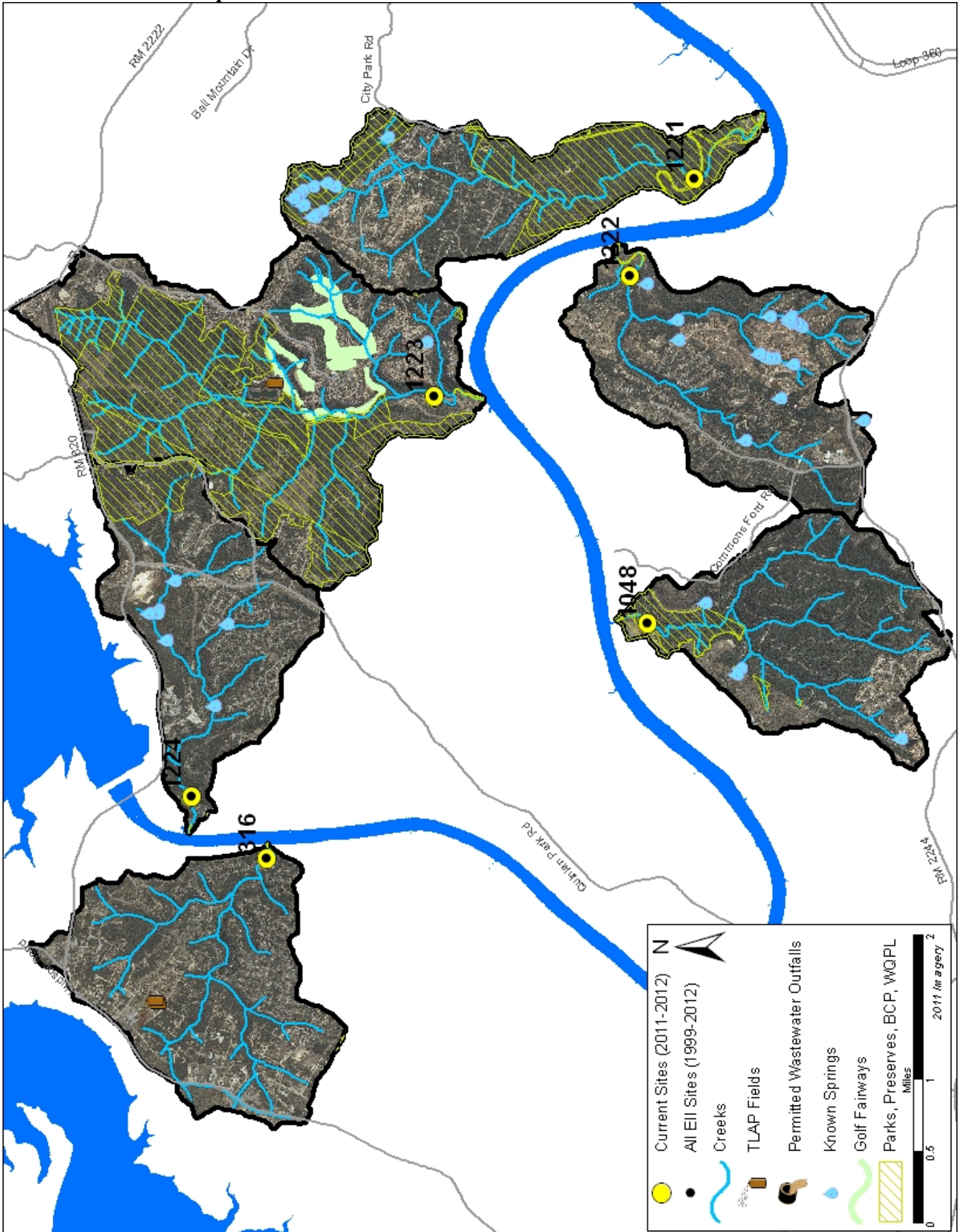
Lake Austin Tributaries

Land Use Map



Lake Austin Tributaries

Aerial Map



Lake Austin Tributaries

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & *E. coli* for 2016 Sample Sites

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
Bear West	1224	BRW1	12/28/2015	12.3	607	7.54		
Bear West	1224	BRW1	03/31/2016	18.3	731	7.87	9.0	101.2
Bear West	1224	BRW1	05/10/2016	21.4	665	7.96	8.5 R	
Bear West	1224	BRW1	06/29/2016	25.1	647	7.98	8.3	38.4
Bear West	1224	BRW1	10/03/2016	20.4	888	7.93	8.7	25.6
BRW1 Mean				19.5	708	7.86	8.6	55.1
Commons Ford	1048	CMF1	01/12/2016	9.7	541	7.92	10.6	43.2
Commons Ford	1048	CMF1	04/12/2016	18.2	556	7.75	6.7	18.7
Commons Ford	1048	CMF1	06/21/2016	24.5	543	7.78	6.9	
Commons Ford	1048	CMF1	07/12/2016	25.1	568	7.20	1.5	185.0
Commons Ford	1048	CMF1	09/13/2016	24.8	522	7.73	6.6	40.8
CMF1 Mean				20.4	546	7.68	6.5	71.9
Cuernavaca	1222	CRN1	01/12/2016	12.0	782	7.70	11.1	34.1
Cuernavaca	1222	CRN1	04/12/2016	17.9	795	7.78	8.7	62.0
Cuernavaca	1222	CRN1	06/21/2016	23.5	723	7.78	7.9	
Cuernavaca	1222	CRN1	09/13/2016	24.2	728	7.77	8.1	96.0
CRN1 Mean				19.4	757	7.76	8.9	64.0
Panther Hollow	1223	PAN1	01/12/2016	10.6	668	7.89	10.3	7.4
Panther Hollow	1223	PAN1	04/12/2016	18.1	674	7.74	6.2	1.0
Panther Hollow	1223	PAN1	05/10/2016	21.8	633	7.96	8.3 R	
Panther Hollow	1223	PAN1	07/12/2016	25.4	674	7.33	0.1	3.1
Panther Hollow	1223	PAN1	09/13/2016	24.2	602	7.77	6.5	16.6
PAN1 Mean				20.0	650	7.74	6.3	7.0
Running Deer	316	RDR1	12/28/2015	13.7	655	8.55	10.5	
Running Deer	316	RDR1	03/31/2016	18.4	743	7.80	9.2	90.9
Running Deer	316	RDR1	05/10/2016	20.8	708	7.91	8.5 R	
Running Deer	316	RDR1	06/29/2016	24.6	402	7.83	9.0	313.0
Running Deer	316	RDR1	10/03/2016	22.4	883	7.74	8.7	52.0
RDR1 Mean				20.0	678	7.97	9.2	152.0
Turkey	1221	TRK1	01/12/2016	9.2	718	7.97	11.1	9.8
Turkey	1221	TRK1	04/12/2016	18.4	730	7.83	7.4	45.7
Turkey	1221	TRK1	05/10/2016	24.7	671	7.99	7.9 R	
Turkey	1221	TRK1	07/12/2016	26.1	622	7.74	5.3	53.8
Turkey	1221	TRK1	09/13/2016	25.2	614	7.87	7.0	57.8
TRK1 Mean				20.8	671	7.88	7.7	41.8
Lake Austin Tributaries Mean				20.0	668	7.81	7.9	65.3

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	

Lake Austin Tributaries

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2016 Sample Sites

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 West	1224	BRW1	12/28/2015	<J	0.008		0.46			<J	1.0		0.6
Bear West	1224	BRW1	03/31/2016	<J	0.008		0.44				4.0		1.1
Bear West	1224	BRW1	05/10/2016										
Bear West	1224	BRW1	06/29/2016	<J	0.008		0.22			<J	1.1		0.5
Bear West	1224	BRW1	10/03/2016	<J	0.008		0.46			<J	1.1		1.9
BRW1 Mean					0.008		0.39				1.8		1.0
Commons Ford	1048	CMF1	01/12/2016	<J	0.008		0.13	<J	0.004	<J	1.0		1.0 R
Commons Ford	1048	CMF1	04/12/2016	<J	0.008	<J	0.01	<J	0.004		1.8		1.3
Commons Ford	1048	CMF1	06/21/2016										
Commons Ford	1048	CMF1	07/12/2016	<J	0.008	<J	0.01	<J	0.004	<J	1.0		1.6 R
Commons Ford	1048	CMF1	09/13/2016	<J	0.008	<J	0.01	<J	0.004	<J	1.0		10.1
CMF1 Mean					0.008		0.04		0.004		1.2		3.5
Cuernavaca	1222	CRN1	01/12/2016	<J	0.008		2.98	<J	0.004	<J	1.0		0.9 R
Cuernavaca	1222	CRN1	04/12/2016	<J	0.008		2.82	<J	0.004	<J	1.0		0.2
Cuernavaca	1222	CRN1	06/21/2016										
Cuernavaca	1222	CRN1	09/13/2016	<J	0.008		1.33	<J	0.004	<J	1.1		2.2
CRN1 Mean					0.008		2.38		0.004		1.0		1.1
Panther Hollow	1223	PAN1	01/12/2016	<J	0.008		1.10	<J	0.004	<J	1.0		0.4 R
Panther Hollow	1223	PAN1	04/12/2016	<J	0.008		0.30	<J	0.004		2.0		0.7
Panther Hollow	1223	PAN1	05/10/2016										
Panther Hollow	1223	PAN1	07/12/2016	<J	0.008	<J	0.01	<J	0.004	<J	1.0		1.4 R
Panther Hollow	1223	PAN1	09/13/2016	<J	0.008		0.14	<J	0.004	<J	1.0		1.0
PAN1 Mean					0.008		0.39		0.004		1.2		0.9
Running Deer	316	RDR1	12/28/2015	<J	0.008		5.15			<J	1.0		1.3
Running Deer	316	RDR1	03/31/2016	<J	0.008		3.52				1.7		1.1
Running Deer	316	RDR1	05/10/2016										
Running Deer	316	RDR1	06/29/2016	<J	0.008		2.18			<J	1.4		2.4
Running Deer	316	RDR1	10/03/2016	<J	0.008		1.58			<J	1.0		2.5
RDR1 Mean					0.008		3.11				1.3		1.8
Turkey	1221	TRK1	01/12/2016	<J	0.008		0.64	<J	0.004	<J	1.0		0.4 R
Turkey	1221	TRK1	04/12/2016	<J	0.008		0.16	<J	0.004	<J	1.0		0.4
Turkey	1221	TRK1	05/10/2016										
Turkey	1221	TRK1	07/12/2016	<J	0.008		0.05	<J	0.004	<J	1.0		6.5 R
Turkey	1221	TRK1	09/13/2016	<J	0.008		0.05	<J	0.004		1.9		1.2
TRK1 Mean					0.008		0.22		0.004		1.2		2.1
Lake Austin Tributaries Mean					0.008		1.09		0.004		1.3		1.7

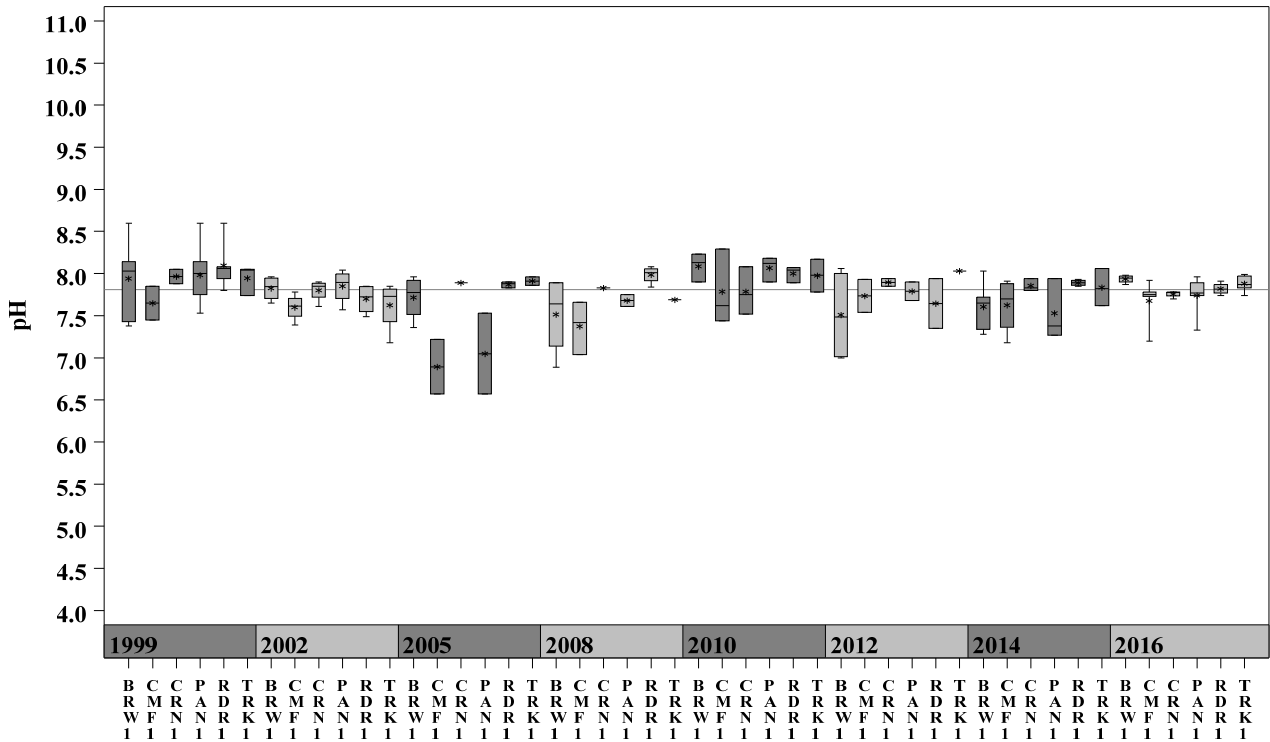
Gray highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

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

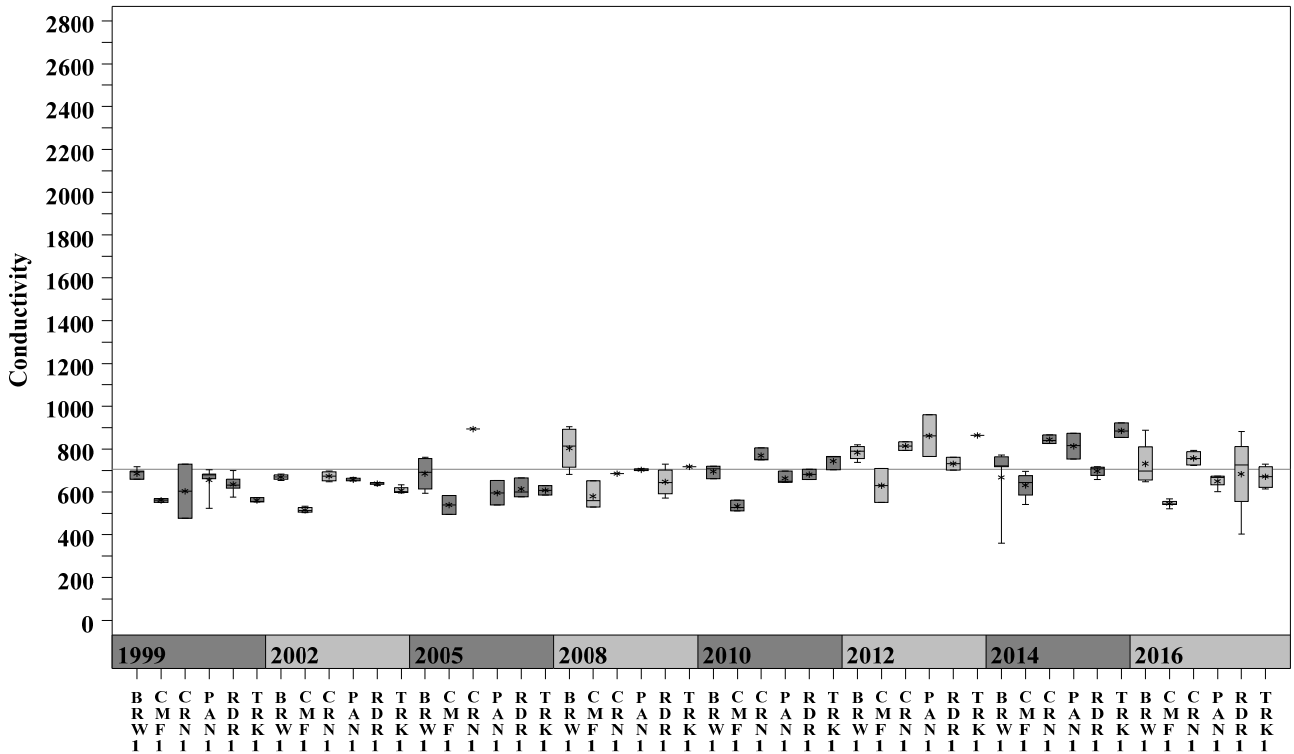
Lake Austin Tributaries

Data Summary Graphs – pH and Conductivity (By Year)

Parameter=pH Unit=Standard Units Watershed=Lake Austin



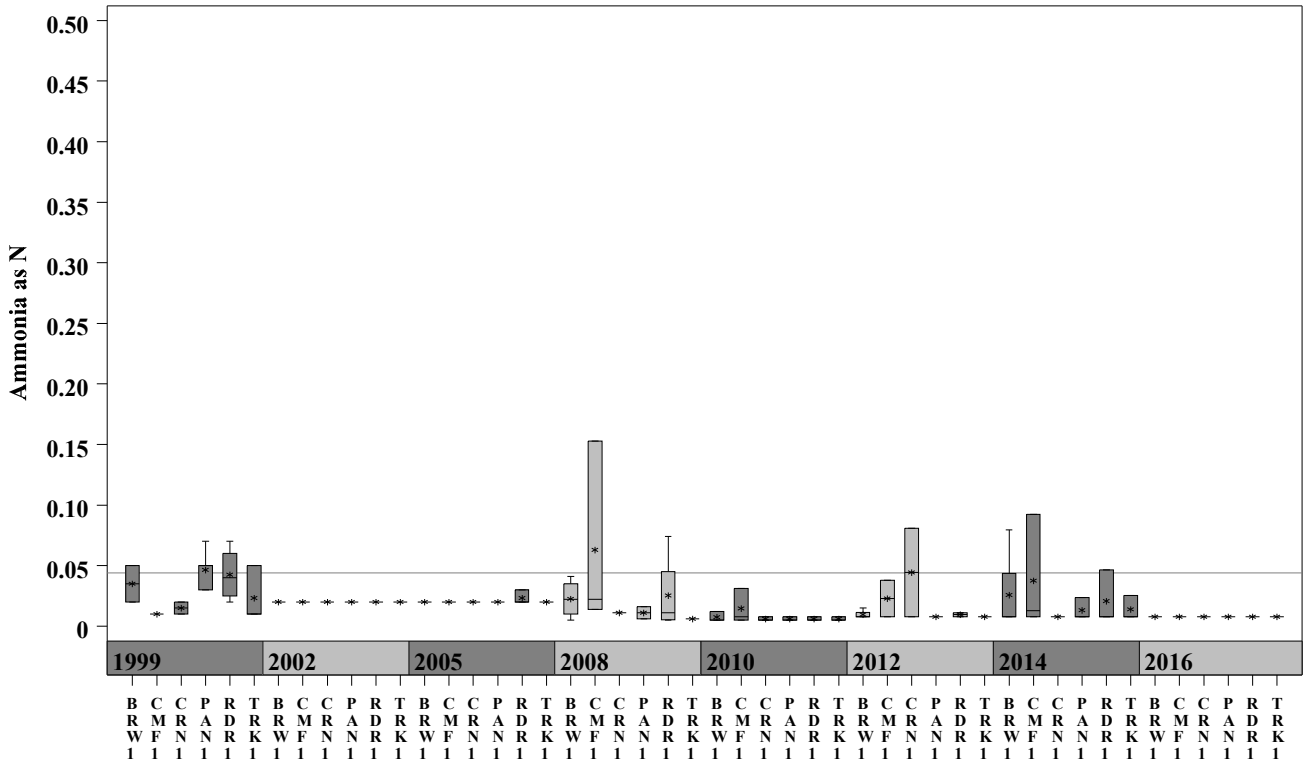
Parameter=CONDUCTIVITY Unit=uS/cm Watershed=Lake Austin



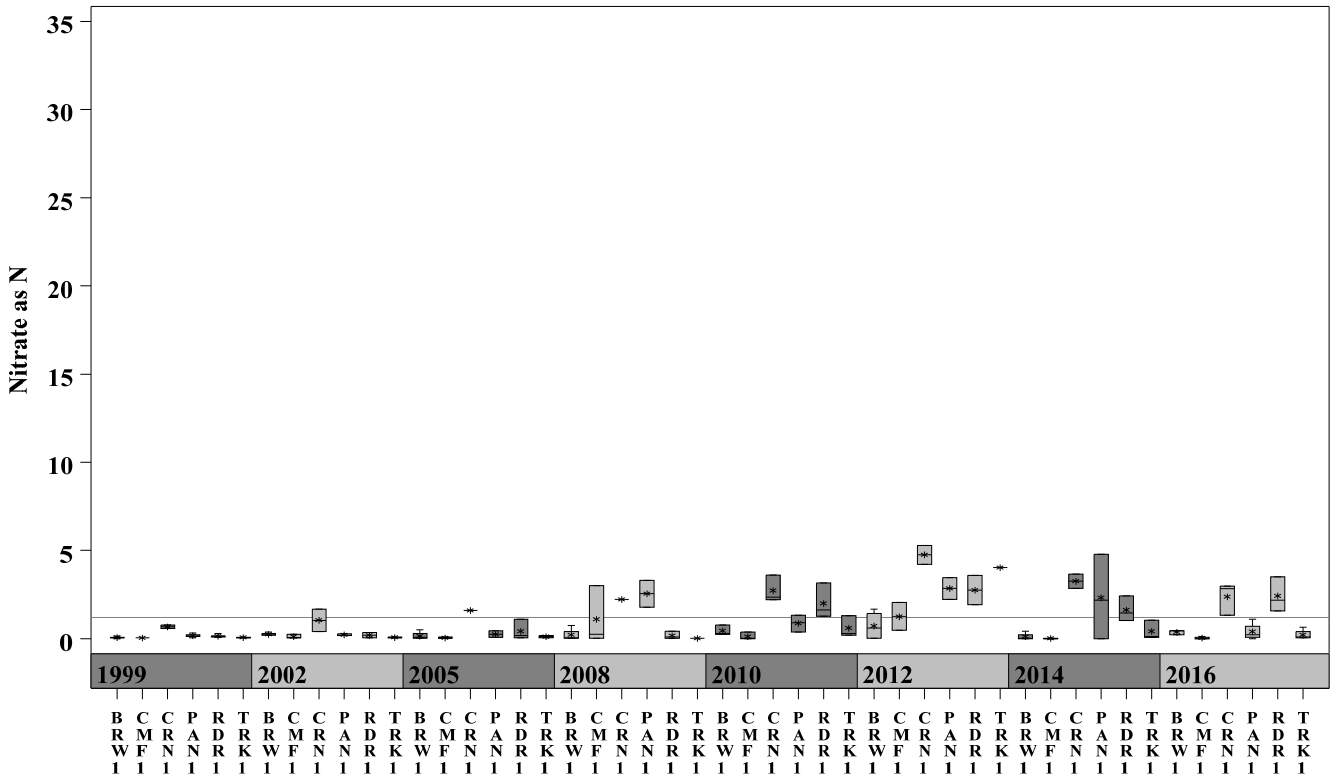
Lake Austin Tributaries

Data Summary Graphs – Ammonia and Nitrate/Nitrite (By Year)

Parameter = AMMONIA AS N Unit = mg/L Watershed = Lake Austin



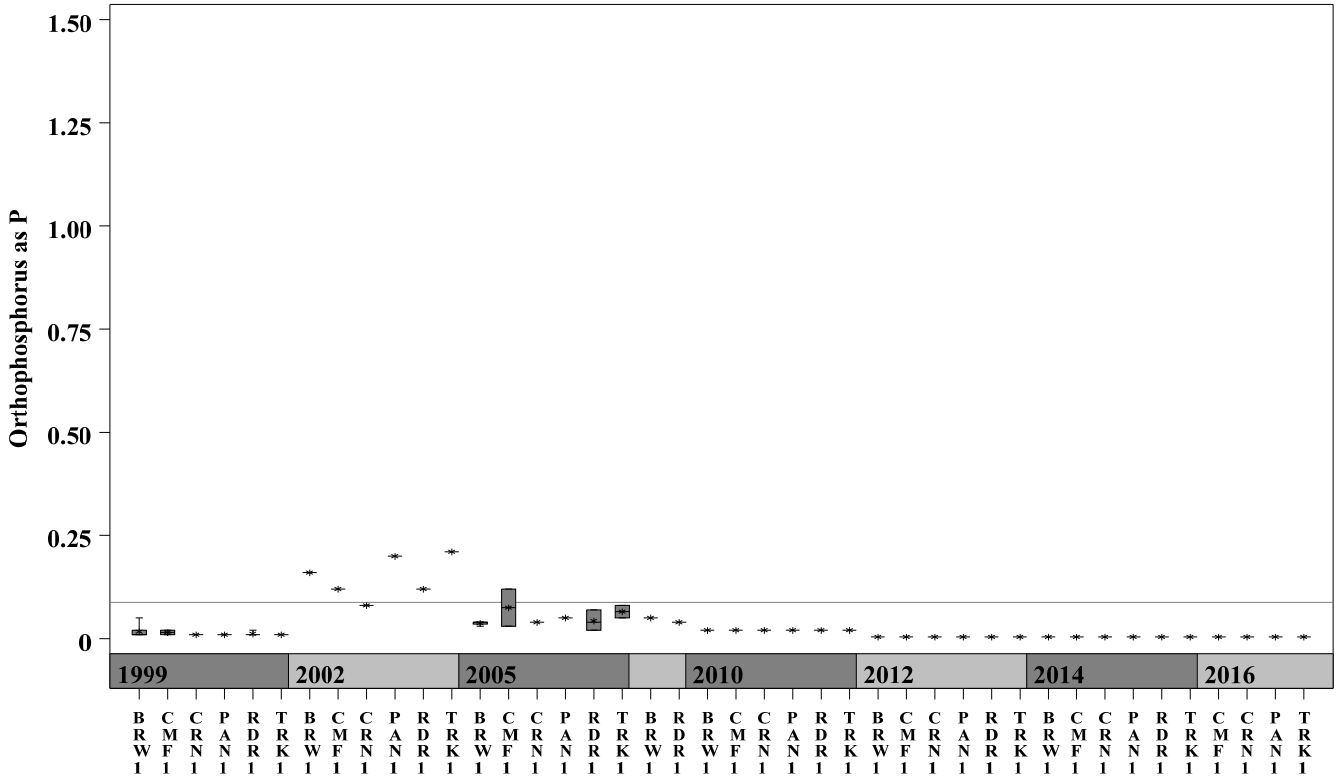
Parameter = NITRATE AS N Unit = mg/L Watershed = Lake Austin



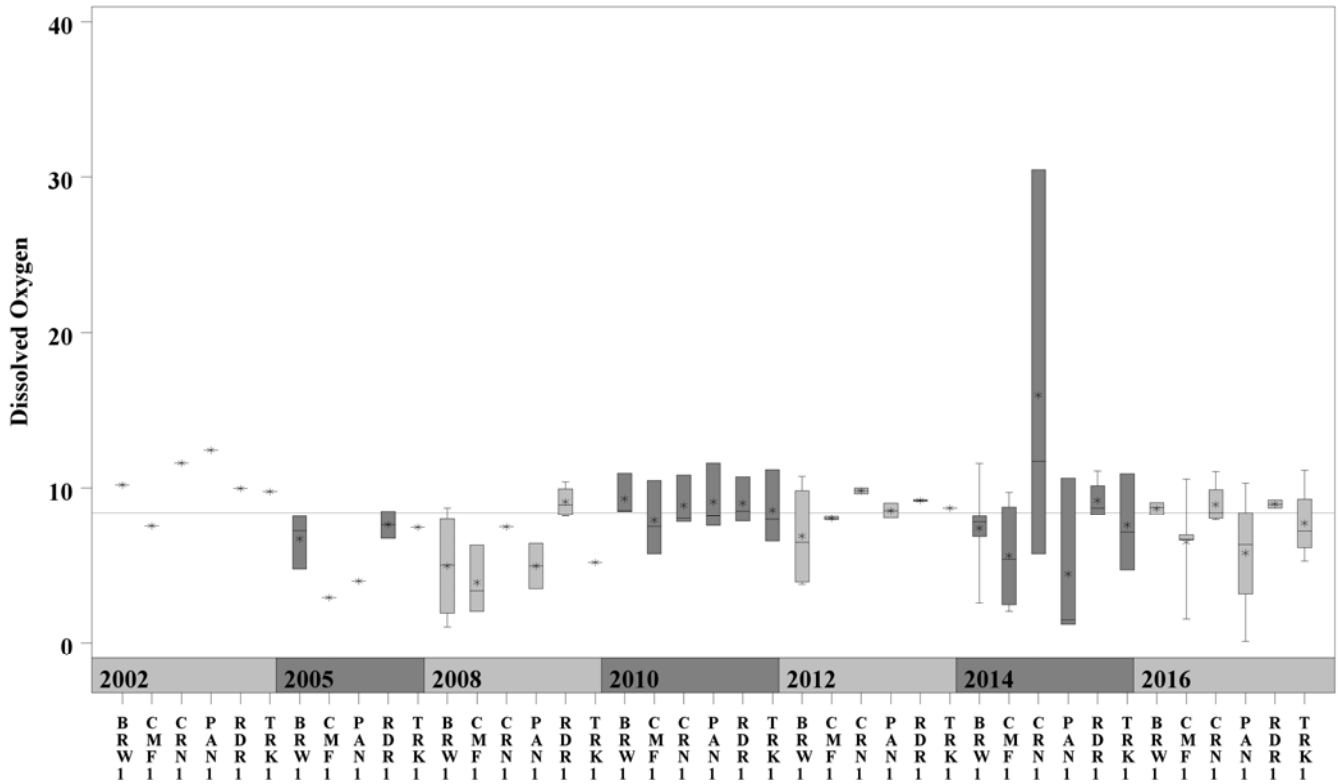
Lake Austin Tributaries

Data Summary Graphs – Orthophosphate and Dissolved Oxygen (By Year)

Parameter = ORTHOPHOSPHORUS AS P Unit = mg/L Watershed = Lake Austin

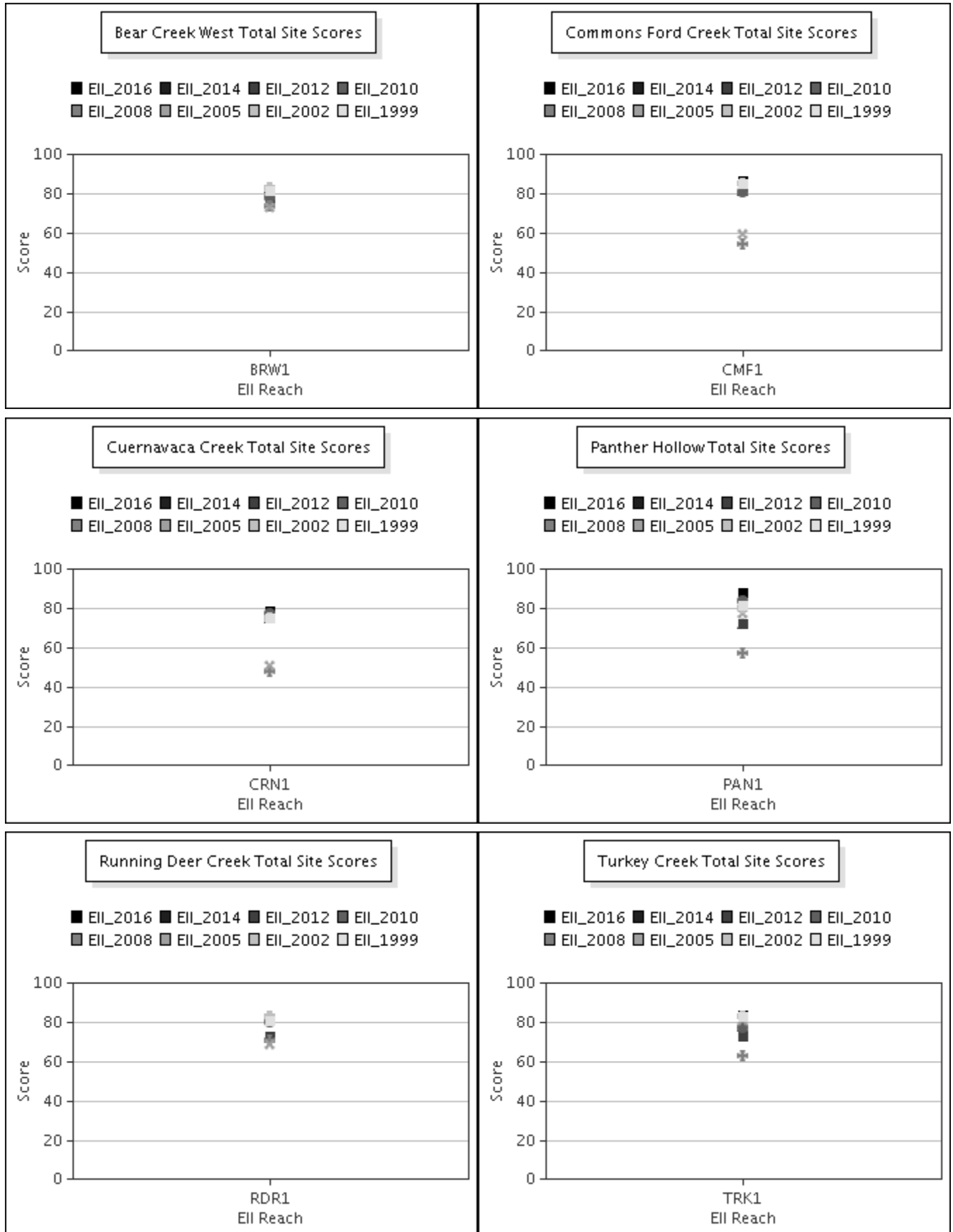


Parameter = DISSOLVED OXYGEN Unit = mg/L Watershed = Lake Austin



Lake Austin Tributaries

Score Summary – Reach scores for each sample year



Lake Austin Tributaries

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2016 Sample Sites

Benthic Macroinvertebrates - Bear Creek West			BRW @ Fritz Hughes (1224) 05/10/2016 (WRE)	CMF in CF Metro Pk (1048) 06/21/2016 (WRE)	CRN @ River Hills (1222) 06/21/2016 (WRE)	PAN @ Big View (1223) 05/10/2016 (WRE)	RDR @ Running Deer Trl (316) 05/10/2016 (WRE)	TRK @ City Pk (1221) 05/10/2016 (WRE)
Benthic Macroinvertebrate ID	PTI	FFG						
Chimarra	2	FC	2	138	17	10	29	5
Hydroptila	2	PI,SC		1		1	1	1
Helicopsyche	2	SC				1		
Xiphocentron	3	FC		1				
Polycentropus / Cernotina	3	FC,P			1			2
Camelobaetidium	4	CG	3	25	44		1	3
Baetodes	4	SC		3				
Fallceon	4	CG,SC	7	49	38	51	15	25
Mayatrichia	4	SC	3		2			
Ostracoda	4	CG,FC						5
Simulium	4	FC	44	48	19	23	7	14
Psephenus	4	SC					1	
Aquarius	5	P	3			3		2
Paracymus	5	CG		1				
Notonecta	5	P	2					
Helochaeres	5	CG			1			
Argia	6	P		20	1	1	4	
Brechmorhoga Mendax	6	P		5	3		1	
Hydracarina	6		1	7	4	3		2
Cheumatopsyche	6	FC	10	119	24	55	25	10
Chironomidae	6	FC,P		6	3	15	1	20
Hetaerina	6	P		1	2			
Rhagovelia	6	P		1	1		11	2
Stenonema Femoratum	6	CG,SC		1	1	4		
Tanypodinae	6	P		1			1	6
Stenelmis	7	CG,SC	4		12		4	
Caloparyphus/Euparyphus	8	CG,SC	1	1		3		
Oligochaeta	8	CG	3			1	1	
Hyalella	8	CG,SH				1		
Physella	9	SC					1	
Dugesia		CG,P		6				

Lake Austin Tributaries

Site Photographs



1048-ds-03_04_2010



1048-us-03_04_2010



1222_00-us-05_17_2010



1222_00-ur-05_17_2010



1223_00-ds-05_26_2010



1223_00-us-05_26_2010

Lake Austin Tributaries

Site Photographs



316_00-ds-05_27_2010



316_00-us-05_27_2010



1221_00-ds-05_26_2010



1221_00-us-05_26_2010



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