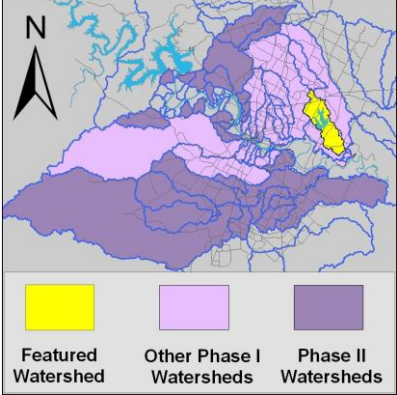


Decker Creek Watershed

Summary Sheet

Catchment	Total area	17 sq. miles						
	Area in recharge	0						
	Creek length	12 miles						
	Receiving water	Colorado River						
Demographics	2000 population	3,156						
	2030 projected population	12,341						
	30 year projected % increase	391 %						
Land Use	Impervious cover (2003 estimate)	17.2 %						
	Impervious cover (2013 estimate)	6.4 %						
Overall EII Scores	1999	2002	2005	2008	2009	2011	2013	
	63	65	62	60	68	61	66	



Flow Regime* for Sample Sites on Decker Creek

Site	Site Name	2000		2002				2005				2008				2009				2010	2011			2013										
		Jun	Jun	Feb	Feb	May	Aug	Nov	Mar	Jun	Jun	Sep	Dec	Feb	May	Jun	Sep	Dec	Feb	May	May	Oct	Dec	Dec	Mar	Jun	Jun	Sep	Jan	Apr	May	Jun	Jun	Sep
		WQ	Bio	WQ	Bio	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	WQ	WQ	WQ	Bio	WQ	WQ	WQ	Bio	WQ	Bio
1196	Lindell			B	B	B	B	B	B	B	n	n	n	n	B	B	n	n	n	B	B	B	B	n	n	n	n	n	B	B	B	n		B
1197	FM973	B	B	B																														
1974	Gilbert					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 Decker Creek sites by year

Reach	Site	Site Name	Year	Water Quality	Sediment**	Contact Recreation	Non-Contact Rec.	Physical Integrity	Aquatic Life	Benthic subindex	Diatom subindex	Total EII Score
DKR1	1197	Decker Creek @ FM973	2002	70	93	99	68	56				64
DKR3	1196	Decker Creek @ Lindell Lane	2002	54	93	87	66	55	40	51	29	66
DKR1	1974	Decker Creek @ Gilbert Rd	2005	60	83	93	86	68	74	90	57	77
DKR3	1196	Decker Creek @ Lindell Lane	2005	40	83	47	43	62				46
DKR1	1974	Decker Creek @ Gilbert Rd	2008	62	81	94	68	45	79	85	72	72
DKR3	1196	Decker Creek @ Lindell Lane	2008	51	81	70	28	60				48
DKR1	1974	Decker Creek @ Gilbert Rd	2009	62	82	70	65	63	99	98	100	74
DKR3	1196	Decker Creek @ Lindell Lane	2009	65	82	46	61	53	65	65		62
DKR1	1974	Decker Creek @ Gilbert Rd	2011	57	79	86	73	61	70	100	40	71
DKR3	1196	Decker Creek @ Lindell Lane	2011		79		27	53				40
DKR1	1974	Decker Creek @ Gilbert Rd	2013	60	84	63	88	75	78	96	59	75
DKR3	1196	Decker Creek @ Lindell Lane	2013	52	84	39	43	59	62	84	40	57

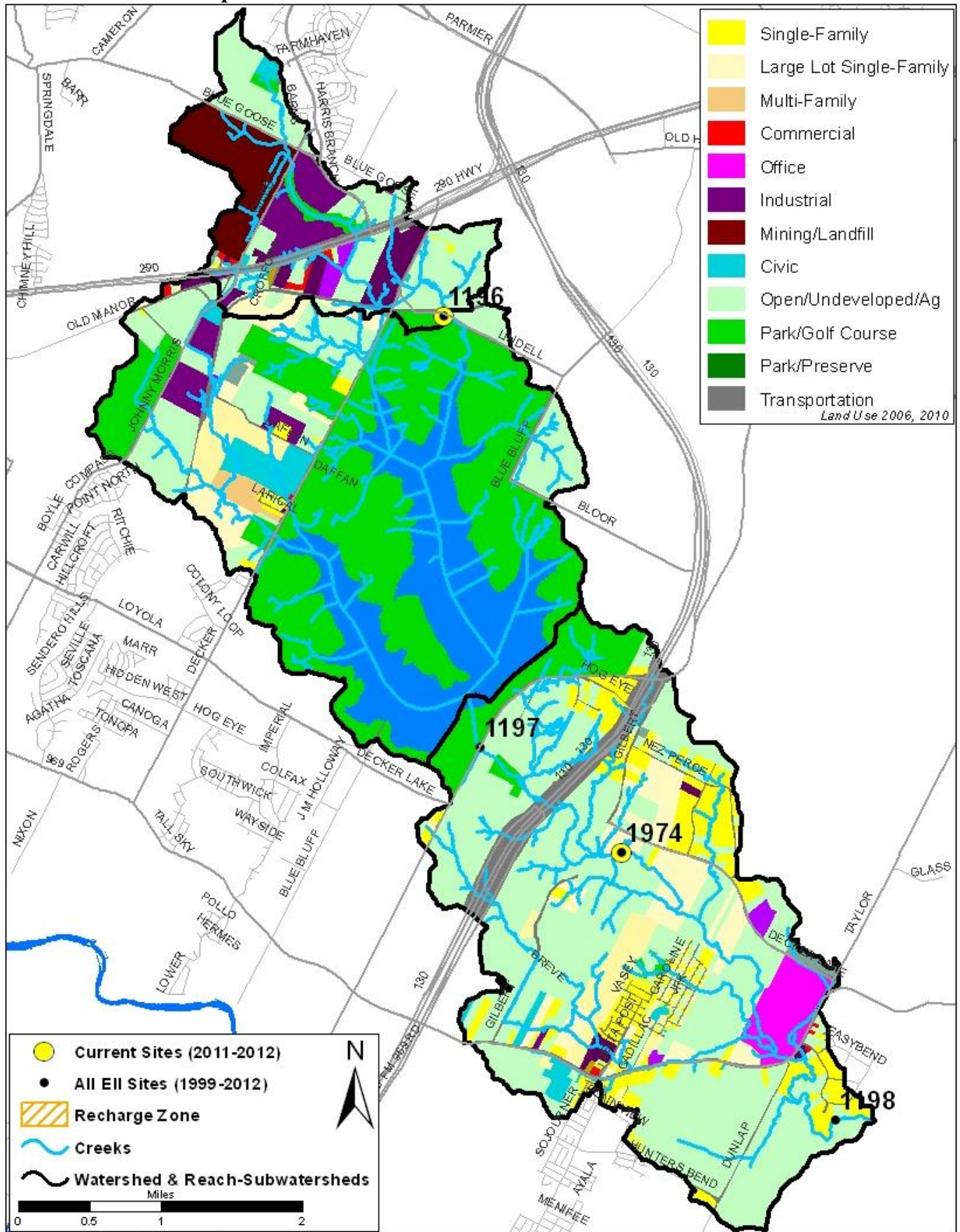
* blank cells indicate parameter was not collected, blank row indicate site was dropped

**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

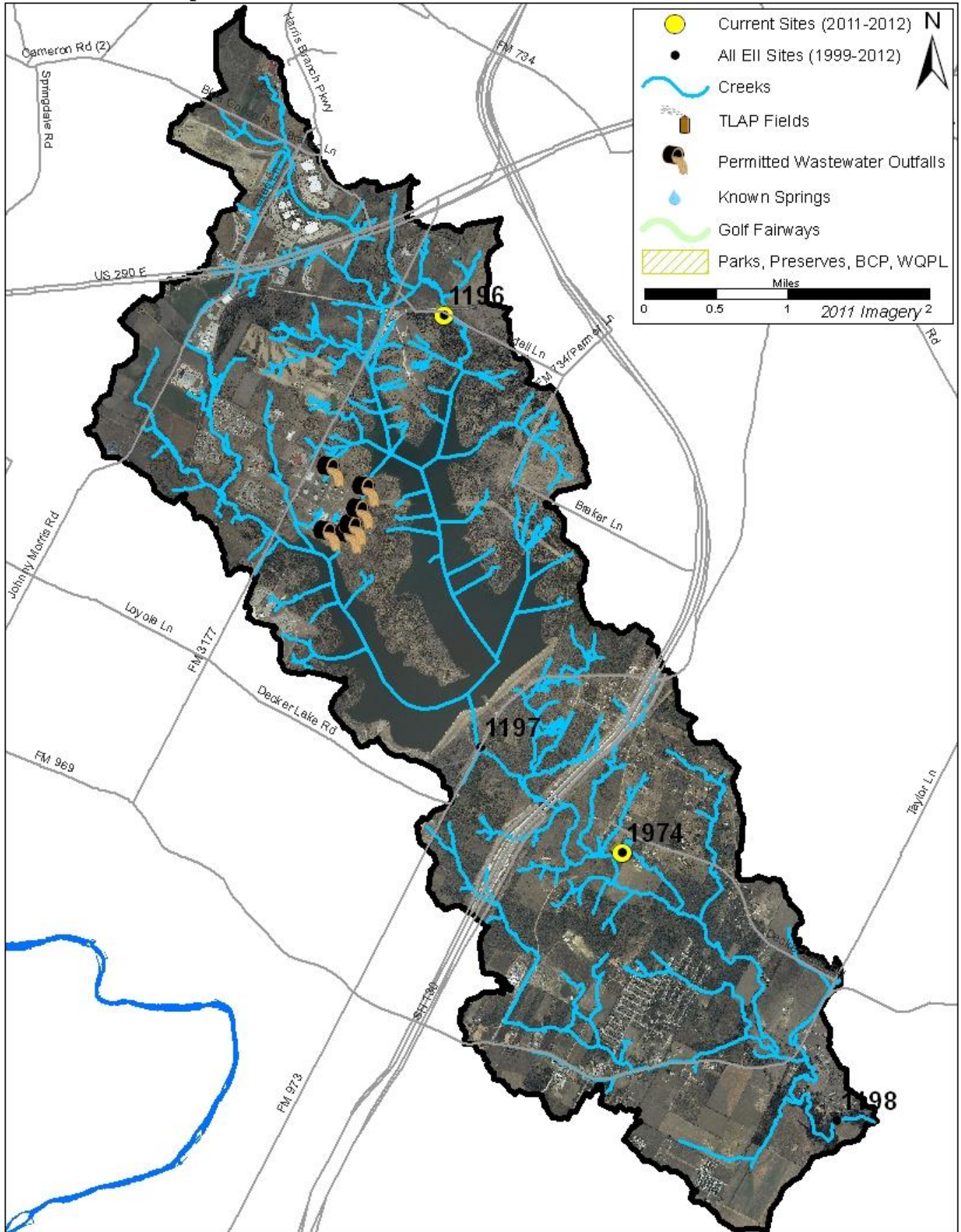
Decker Creek Watershed

Land Use Map



Decker Creek Watershed

Aerial Map



Decker Creek Watershed

Water Quality Data – Temperature, Conductivity, pH, Dissolved Oxygen & *E. coli* for 2013 Sample Sites (Downstream to Upstream)

Qualifiers to the left of value:	>	greater than	Qualifiers to the right of value:	(blank)	Useable
	<	less than		S	Exceeds standard range
	< J	less than detection limit		R	Rejected, failed QC
	J	Estimated			

Site Name	Site #	Reach	Date	Temp. Value	Temp. flag	Cond. Value	Cond. flag	pH Value	pH flag	D.O. Value	D.O. flag	<i>E. coli</i> Value	<i>E. coli</i> flag
Decker @ Gilbert Rd	1974	DKR1	01/22/2013	12.9		886		8.32		12.1		42.0	
Decker @ Gilbert Rd	1974	DKR1	04/24/2013	17.9		825		8.01		8.7		648.8	
Decker @ Gilbert Rd	1974	DKR1	06/26/2013	31.7		820		8.14		6.8	R	45.7	
Decker @ Gilbert Rd	1974	DKR1	09/26/2013	27.1		857		7.95		6.7		31.8	
Site 1974 Mean				22.4		847		8.11		8.6		192.1	
Decker @ Lindell Ln	1196	DKR3	01/22/2013	14.5		969		7.88		10.7		167.0	
Decker @ Lindell Ln	1196	DKR3	04/24/2013	15.6		1570		7.58		5.4		1986.3	
Decker @ Lindell Ln	1196	DKR3	09/26/2013	24.4		966		7.56		4.8		89.1	
Site 1196 Mean				18.2		1168		7.67		7.0		747.5	
Watershed Mean				20.6		985		7.92		7.9		430.1	

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

Summary Statistics for all 2013 – 2014 E.I.I. Sites Combined.					
Parameter	2013-2014 Average	2013-2014 Minimum	2013-2014 Maximum	1 Standard Deviation Above	1 Standard Deviation Below
Temperature (C°)	19.6	8.6	34.0	25.8	
Conductivity (uS/cm)	711	107	1783	942	
pH (Standard units)	7.86	6.96	8.97	8.19	7.52
D.O. (mg/l)	8.1	1.2	30.5	11.4	4.8
<i>E. coli.</i> (col/100ml)	435	1	4840	1127	

Decker Creek Watershed

Water Quality Data – Ammonia, Nitrate / Nitrite, Ortho-Phosphorus, Total Suspended Solids & Turbidity for 2013 Sample Sites (Downstream to Upstream)

Qualifiers to the left of value:	>	greater than	Qualifiers to the right of value:	(blank)	Useable
	<	less than		S	Exceeds standard range
	< J	less than detection limit		R	Rejected, failed QC
	J	Estimated			

Site Name	Site #	Reach	Date	NH3-N		NO3/NO2		Ortho-P		T.S.S.		Turb.					
				<>	Value	flag	<>	Value	flag	<>	Value	flag	<>	Value	flag		
Decker @ Gilbert Rd	1974	DKR1	01/22/2013		0.021			0.06		<J	0.004			6.3		8.3	
Decker @ Gilbert Rd	1974	DKR1	04/24/2013		0.025	R	<J	0.01		<J	0.004			33.6		32.1	R
Decker @ Gilbert Rd	1974	DKR1	06/26/2013		0.029		<J	0.01			0.014			15.8		17.0	
Decker @ Gilbert Rd	1974	DKR1	09/26/2013		0.016		<J	0.01		<J	0.004			24.7		18.9	
Site 1974 Mean					0.023			0.02			0.006			20.1		19.0	
Decker @ Lindell Ln	1196	DKR3	01/22/2013		0.079			0.05		<J	0.004			8.2		10.8	
Decker @ Lindell Ln	1196	DKR3	04/24/2013		0.057	R		0.03		<J	0.004			30.0		32.0	R
Decker @ Lindell Ln	1196	DKR3	09/26/2013	<J	0.008		<J	0.01		<J	0.004			9.3		16.2	
Site 1196 Mean					0.048			0.03			0.004			15.8		19.6	
Watershed Mean					0.034			0.02			0.005			18.3		19.3	

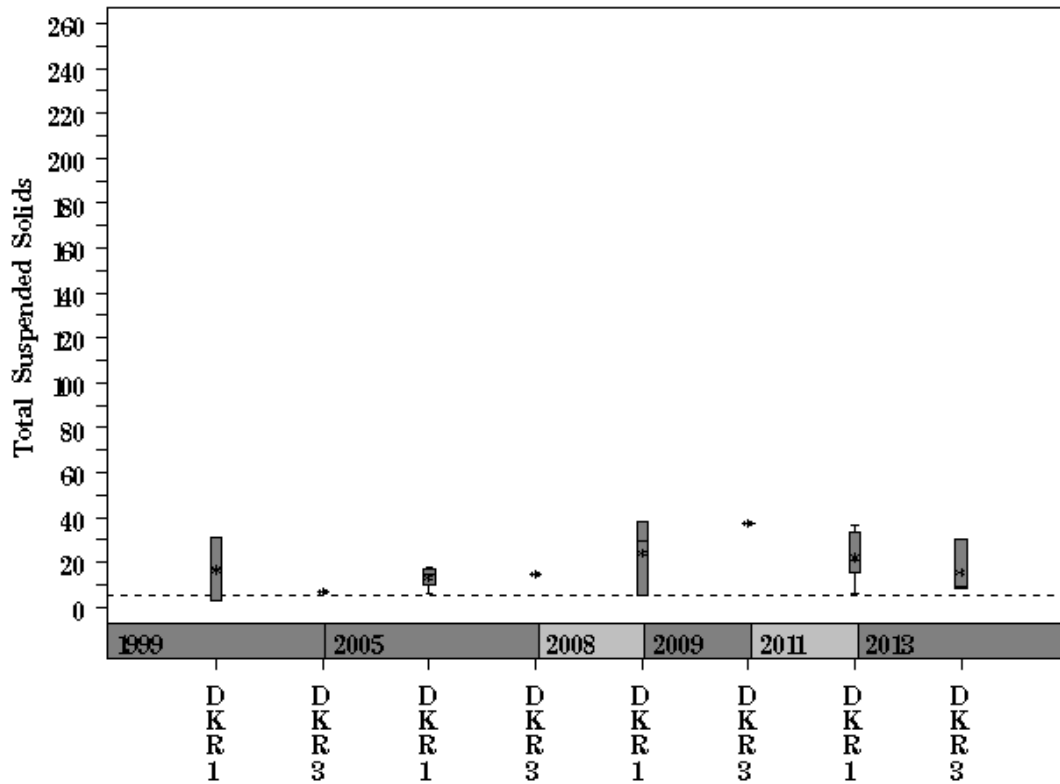
Orange highlighting indicates that the value exceeds one standard deviation from the mean of all E.I.I. sites combined.

Summary Statistics for all 2013 – 2014 E.I.I. Sites Combined.				
Parameter	2013-2014 Mean	2013-2014 Minimum	2013-2014 Maximum	1 Standard Deviation Above
NH3-M (mg/l)	0.031	0.008	2.250	0.150
NO3-N (mg/l)	1.16	0.01	16.30	4.02
Ortho-P (mg/l)	0.041	0.004	1.360	0.164
TSS (mg/l)	5.6	1.0	70.0	15.3
Turbidity (NTU)	4.5	0.0	97.1	13.2

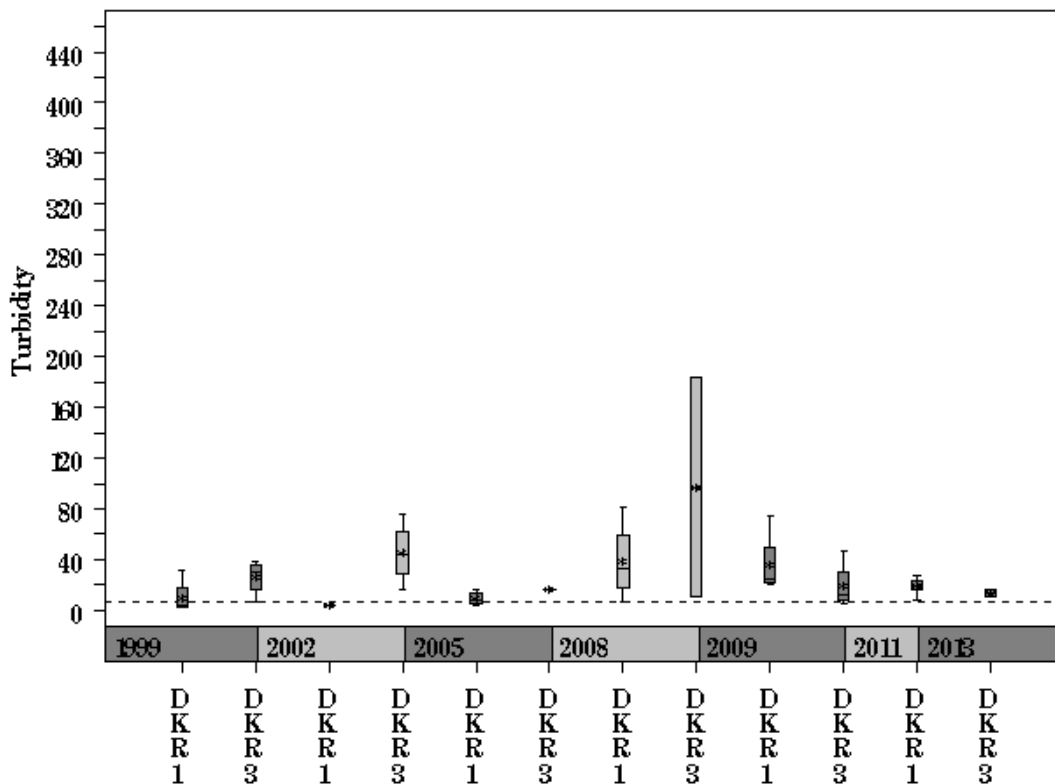
Decker Creek Watershed

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

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



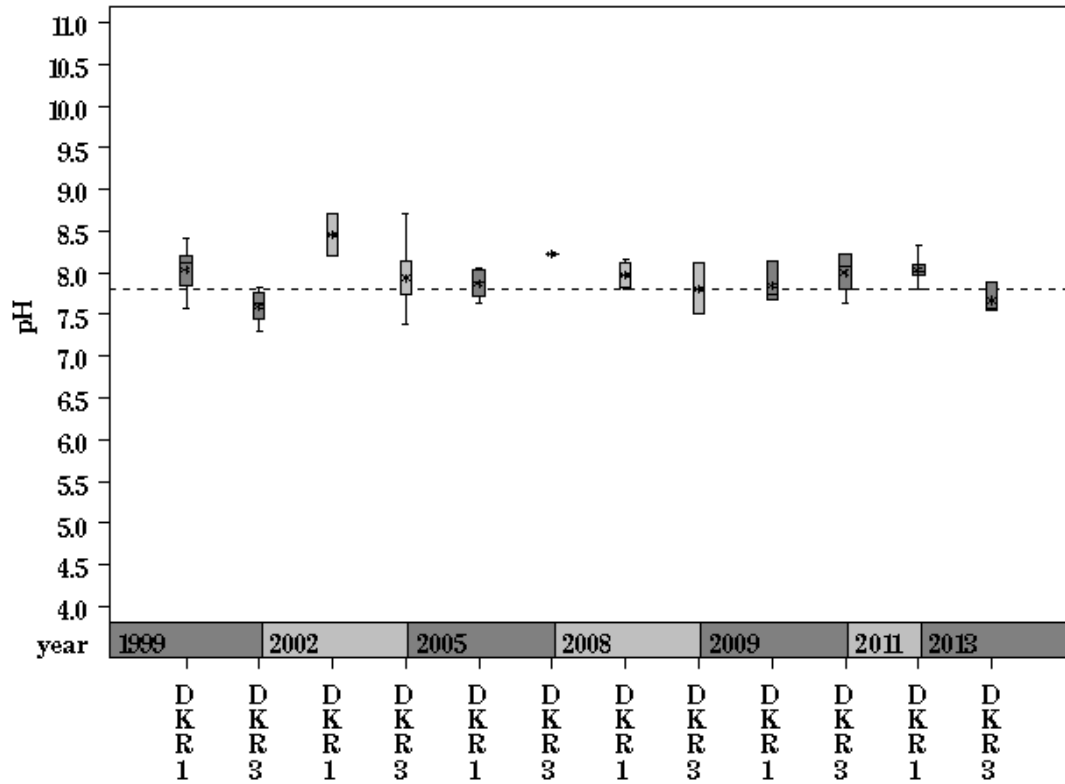
Parameter= TURBIDITY Unit= NTU Watershed= Decker



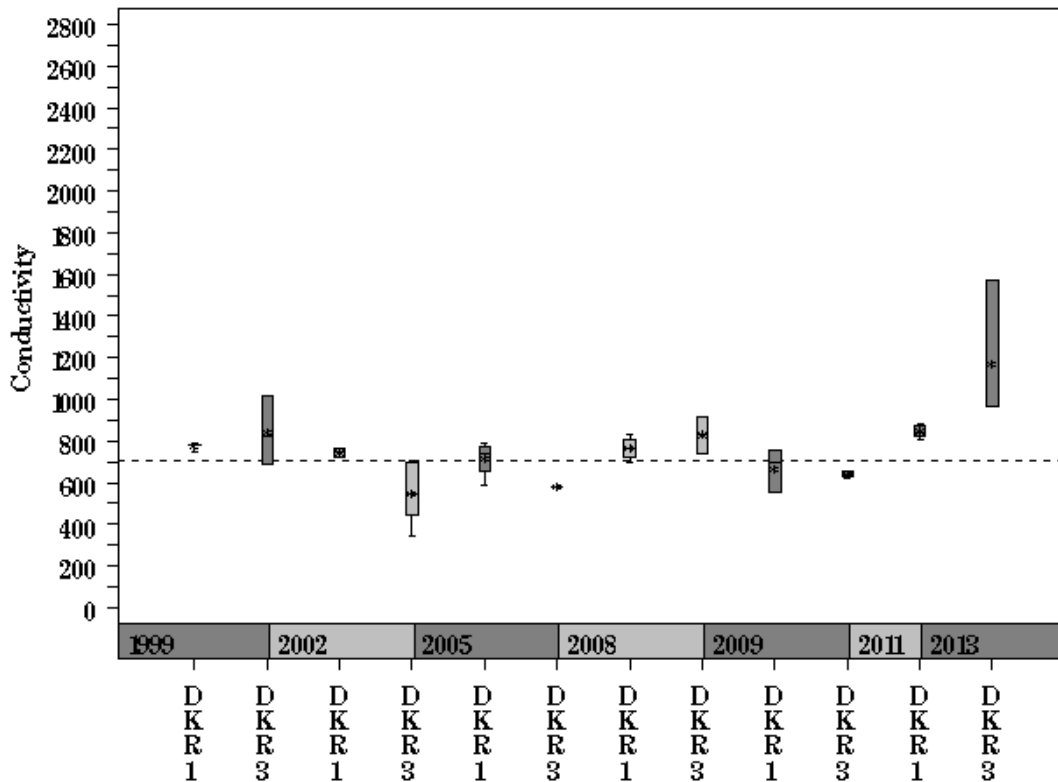
Decker Creek Watershed

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

Parameter= PH Unit= Standard units Watershed= Decker



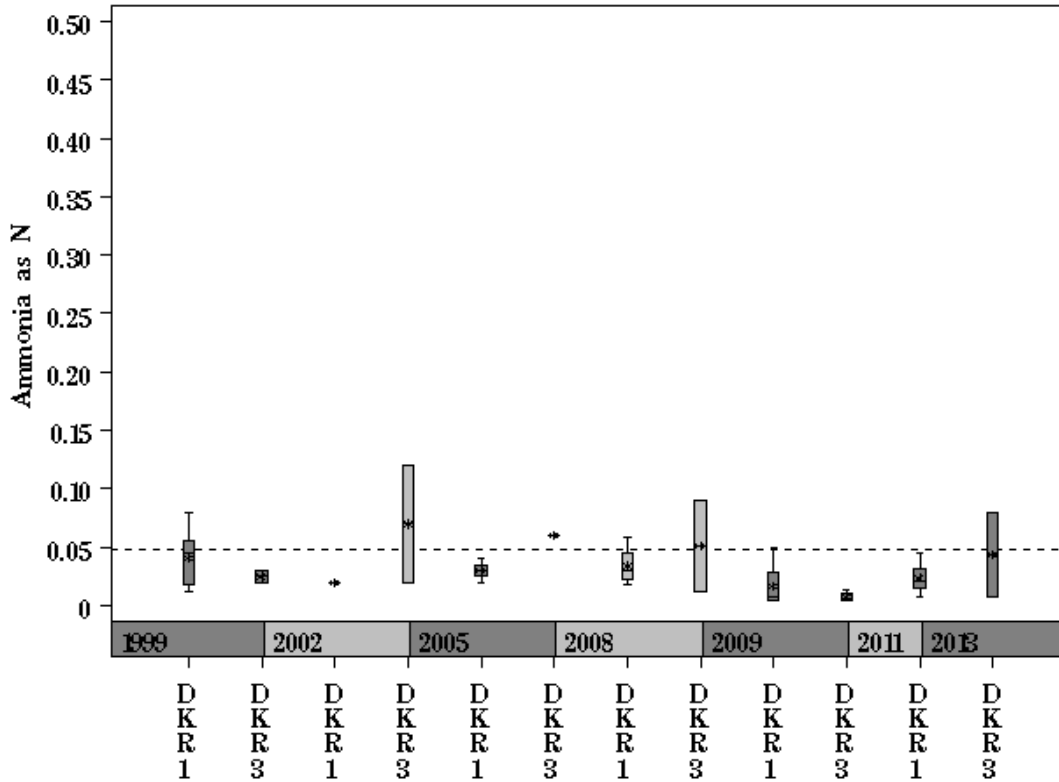
Parameter= CONDUCTIVITY Unit= uS/cm Watershed= Decker



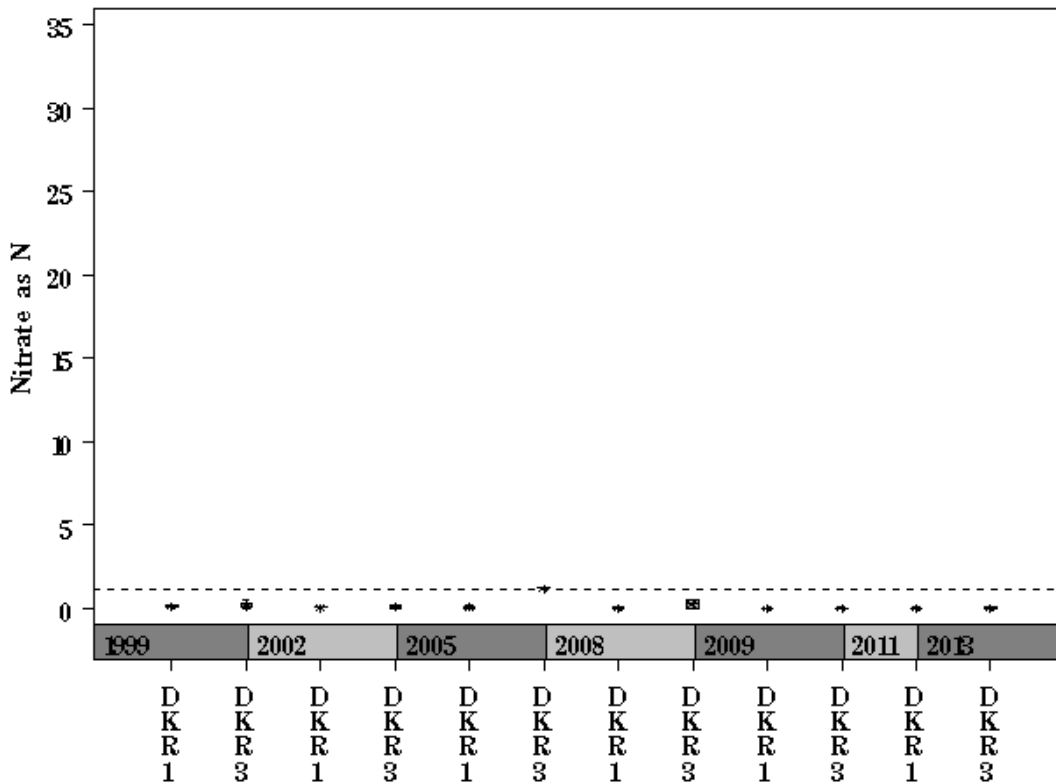
Decker Creek Watershed

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

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



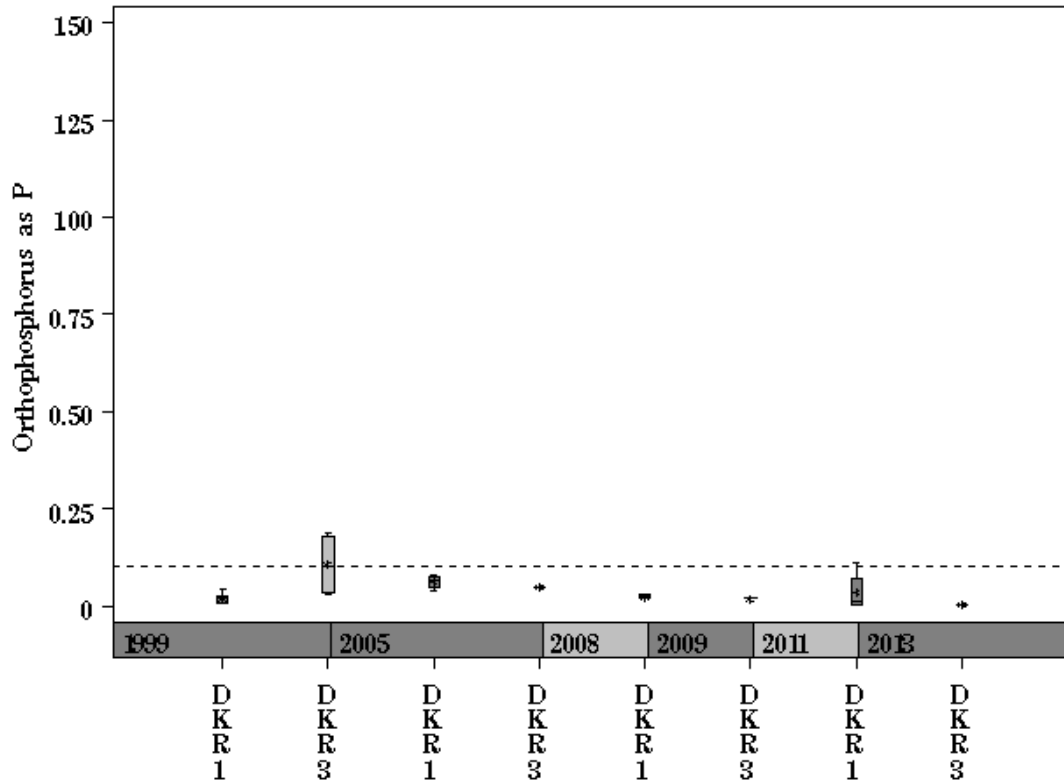
Parameter= NITRATE AS N Unit= mg/L Watershed= Decker



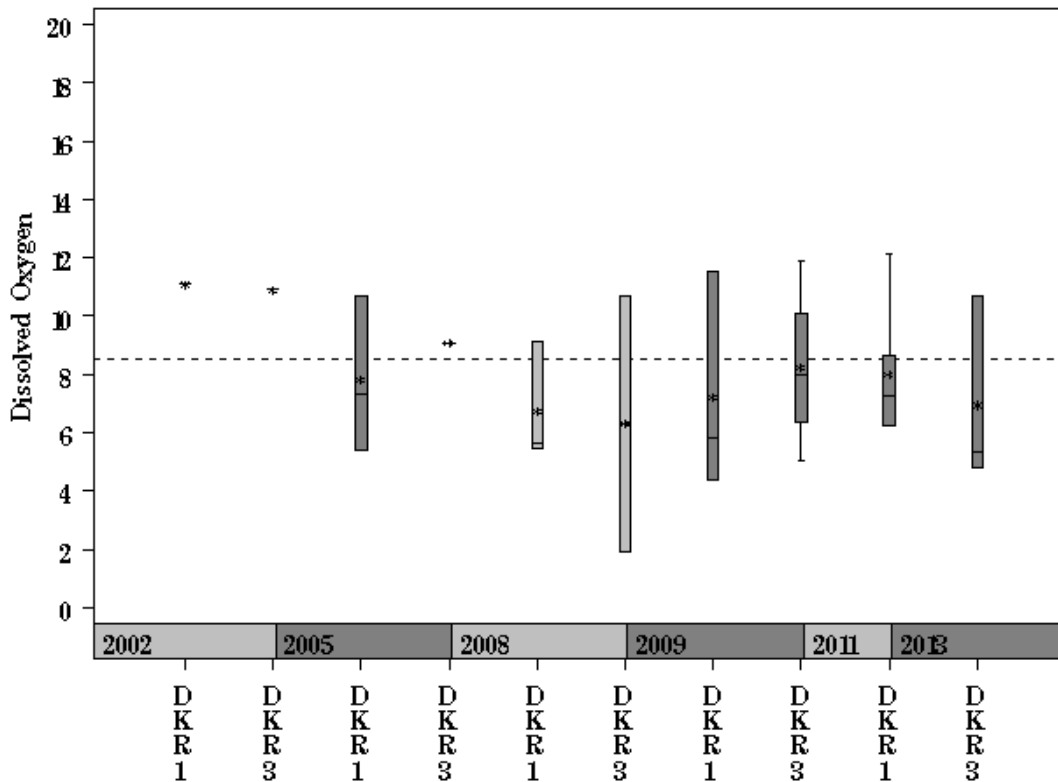
Decker Creek Watershed

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

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

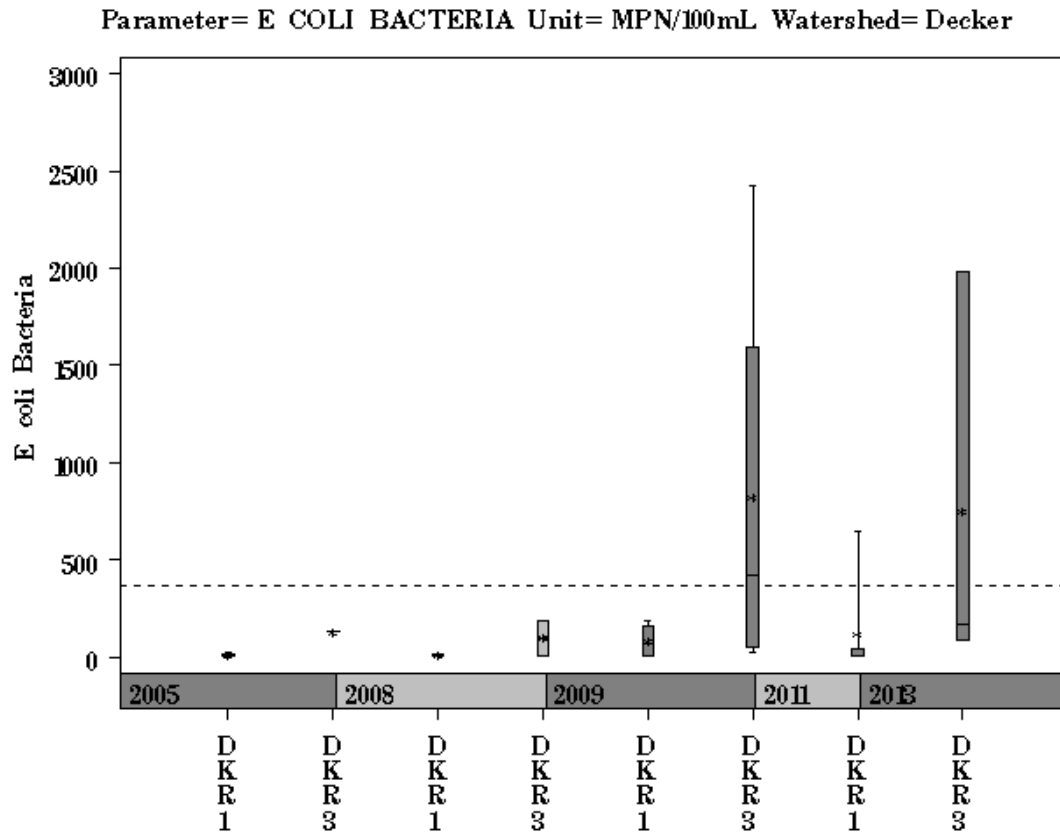


Parameter= DISSOLVED OXYGEN Unit= mg/L Watershed= Decker



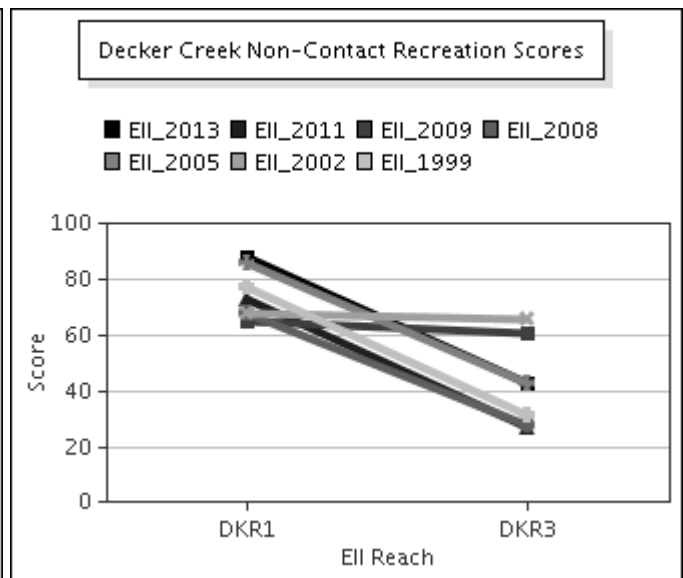
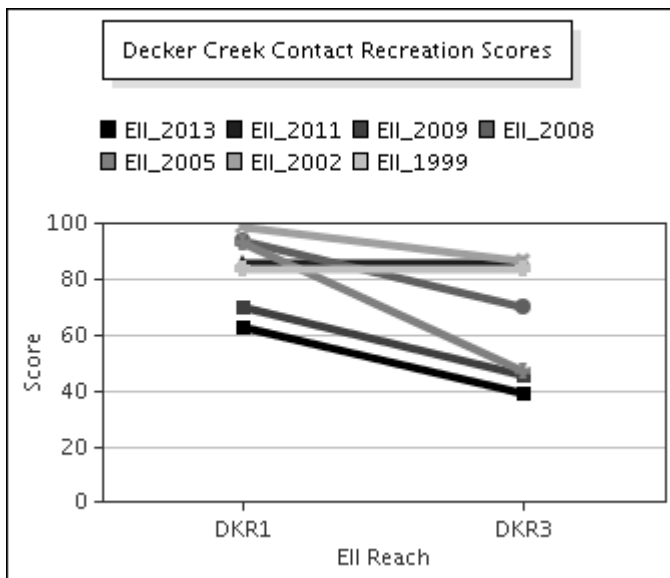
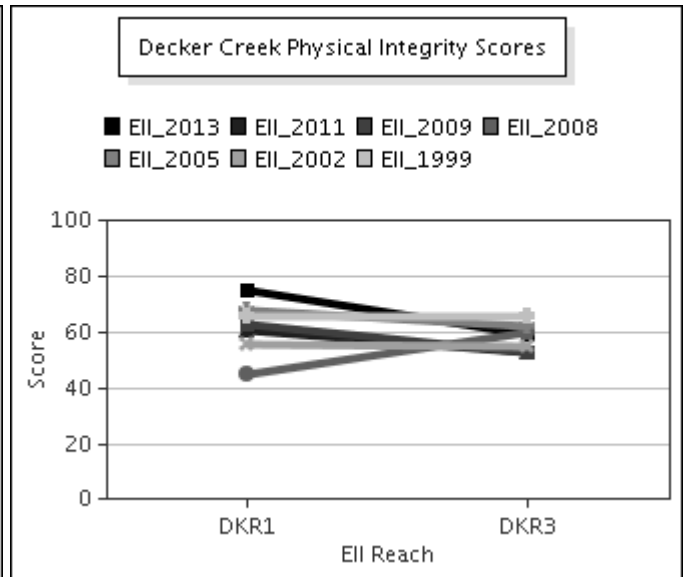
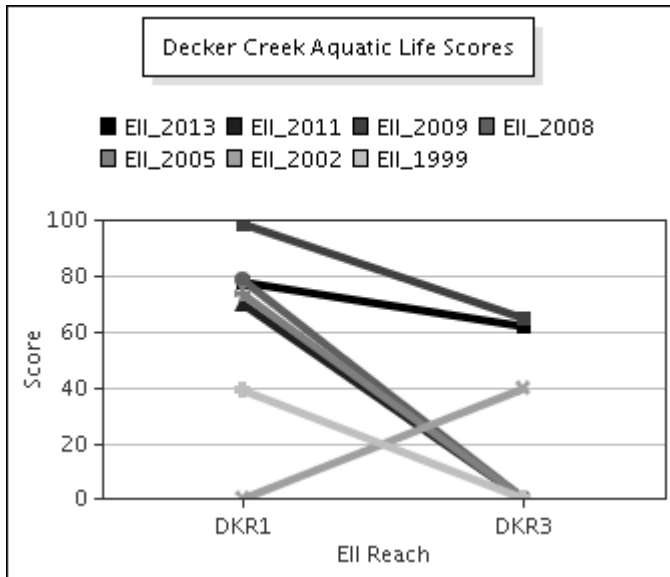
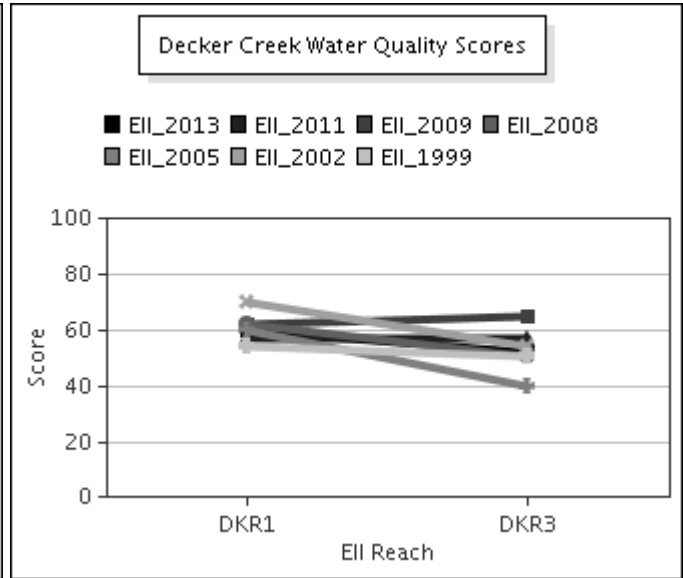
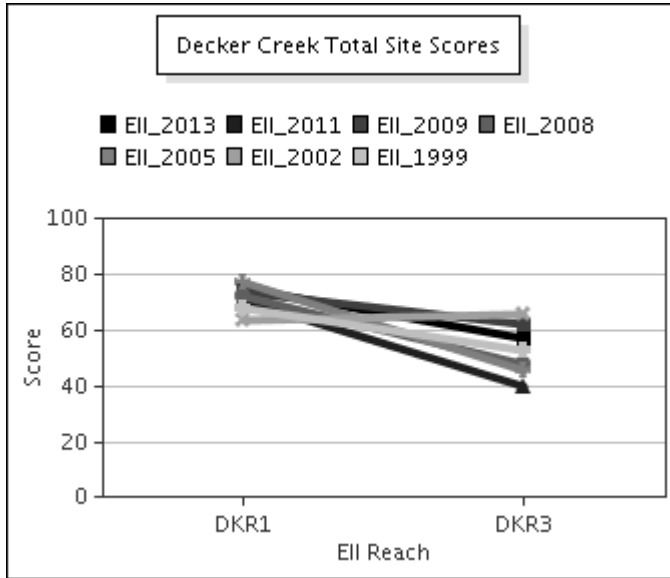
Decker Creek Watershed

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



Decker Creek Watershed

Score Summary – Reach scores for each sample year



Decker Creek Watershed

Benthic Macroinvertebrates – Taxa List, Pollution Tolerance Index & Functional Feeding Group for 2013 Sample Sites (Downstream to Upstream)

Benthic Macroinvertebrate ID	PTI	FFG	Decker @ Gilbert Rd (Site 1974)	Decker @ Lindell Ln (Site 1196)
<i>Erpetogomphus</i> sp.	1	P	2	
<i>Chimarra</i> sp.	2	FC	1	
<i>Helicopsyche</i> sp.	2	SC	16	
<i>Hexacylloepus ferrugineus</i>	2	SC,CG	10	2
Copepoda	4	SC		6
<i>Fallceon quilleri</i>	4	SC,CG	34	27
<i>Heterelmis</i> sp.	4	SC,CG		1
<i>Psephenus</i> sp.	4	SC		1
<i>Simulium</i> sp.	4	FC	5	7
<i>Smicridea</i> sp.	4	FC	1	
<i>Cincinnatia cincinnatiensis</i>	5	SC	3	
<i>Petrophila</i> sp.	5	SC	9	
<i>Tricorythodes</i> sp.	5	CG	7	
<i>Argia</i> sp.	6	P	17	
<i>Cheumatopsyche</i> sp.	6	FC	110	15
Chironomidae	6	P,FC	5	8
<i>Corbicula fluminea</i>	6	FC	6	
Tanypodinae	6	P	1	
<i>Caenis</i> sp.	7	SC,CG		25
<i>Ferrissia</i> sp.	7	SC	6	
<i>Stenelmis</i> sp.	7	SC,CG	6	
Hirudinea	8	P	1	
<i>Hyalella</i> sp.	8	SH,CG	1	
Oligochaeta	8	CG	1	1
<i>Physella</i> sp.	9	SC		8
Cambaridae		CG		1
<i>Dugesia</i> sp.		P,CG	6	2

Decker Creek Watershed

Benthic Macroinvertebrates – Metric Summary for 2013 Sample Sites (Downstream to Upstream)

Scoring Metric	Decker @ Gilbert Rd (Site 1974)	Decker @ Lindell Ln (Site 1196)
Number of Taxa *	19	13
Hilsenhoff Biotic Index *	5.2	5.6
Number of Ephemeroptera Taxa *	2	2
Percent of Total as Chironomidae *	2	8
Number of EPT Taxa *	6	3
Percent of Total as EPT *	70	64
Percent of Total as Predator *	13	10
Number of Intolerant Taxa *	7	6
Percent Dominance (Top 3 Taxa) *	67	64
EPT / EPT + Chironomidae	1	1
Number of Diptera Taxa	2	2
Number of Non-Insect Taxa	6	5
Number of Organisms	242	104
Percent Dominance (Top 1 Taxa)	45	26
Percent of Total as Collector / Gatherer	27	57
Percent of Total as Dominant Guild (FFG)	51	67
Percent of Total as Elmidae	7	3
Percent of Total as Filterers	51	29
Percent of Total as Grazers (PI & SC)	35	67
Percent of Total as Tolerant Organisms	0	8
Percent of Trichoptera as Hydropsychidae	87	100
Ratio of Intolerant : Tolerant Organisms	0.59	0.77
TCEQ Qualitative Aquatic Life Use Score	31	25
TCEQ Quantitative Aquatic Life Use Score	31	31

* **EII scoring parameter: Nine metric parameters are used in the calculation of the EII Benthic Subindex score. Other metrics are shown to supplement evaluation.**

- # of Taxa: Higher diversity (number of taxa) correlates with greater biological integrity. The average number of taxa per site for 2013/2014 samples was 15; the lowest value was 5 and the highest value was 30.
- Hilsenhoff Biotic Index (HBI): HBI values range from 0 to 10. Low HBI values reflect a higher abundance of taxa that are sensitive to organic (nutrient) pollution, thus a lower level of this type of pollution. The average HBI per site for 2013/2014 samples was 5.4; the lowest value was 3.7 and the highest value was 8.1.
- # of Ephemeroptera taxa: A higher number of Ephemeroptera (mayfly) taxa correlates with greater biological integrity. The average number of taxa per site for 2013/2014 samples was 2; the lowest value was 0 and the highest value was 7.
- % of total as Chironomidae: The percentage of the sample represented by the Dipteran family Chironomidae will increase with a decrease in biological integrity. The average percent Chironomidae per site for 2013/2014 samples was 16%; the lowest value was 0% and the highest value was 77%.
- # of EPT Taxa: A higher number of Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) taxa correlates with greater biological integrity. The average number of EPT taxa per site for 2013/2014 samples was 4; the lowest value was 0 and the highest value was 12.
- % of total as EPT: The percentage of the sample represented by the insect orders Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) will decrease with a decrease in biological integrity. The average percent EPT taxa per site for 2013/2014 samples was 46%; the lowest value was 0% and the highest value was 89%.
- % of total as Predator: The percentage of the sample represented by predators is variable with regard to biological integrity. The average percent predator per site for 2013/2014 samples was 31%; the lowest value was 3% and the highest value was 82%.
- # of Intolerant Taxa: A higher number of pollution intolerant taxa correlates with greater biological integrity. The average number of intolerant taxa per site for 2013/2014 samples was 5; the lowest value was 0 and the highest value was 15.
- % Dominance (top 3 taxa): The percentage of the sample represented by the three most abundant taxa will increase with a decrease in biological integrity. The average percent of sample dominated by the top three taxa per site for 2013/2014 samples was 72%; the lowest value was 39% and the highest value was 96%.

Decker Creek Watershed

Diatoms – Taxa List & Pollution Tolerance Index for 2013 Sample Sites (Downstream to Upstream)

Diatom Species Name	PTI	Decker @ Gilbert Rd (Site 1974)	Decker @ Lindell Ln (Site 1196)
<i>Achnanthes exigua</i>	3	4	
<i>Achnantheidium minutissimum</i>	3	5	
<i>Amphora libyca</i>	3	8	4
<i>Amphora pediculus</i>	3	16	
<i>Cocconeis pediculus</i>	3	7	
<i>Cymatopleura elliptica</i>	3		2
<i>Diploneis puella</i>	3	5	
<i>Encyonema triangulum</i>	3		1
<i>Epithemia turgida</i>	3	6	
<i>Gomphonema clavatum</i>	3		11
<i>Gomphonema grovei</i> var. <i>lingulatum</i>	3	5	
<i>Gomphonema pumilum</i>	3	2	
<i>Gyrosigma nodiferum</i>	3	14	
<i>Navicula cryptotenella</i>	3	2	
<i>Navicula kotschy</i>	3	2	
<i>Navicula radiosa</i>	3		1
<i>Nitzschia dissipata</i>	3	4	
<i>Nitzschia fonticola</i>	3	7	
<i>Nitzschia linearis</i>	3	2	
<i>Pinnularia gibba</i>	3		1
<i>Pinnularia viridis</i>	3		1
<i>Reimeria sinuata</i>	3	33	
<i>Rhoicosphenia abbreviata</i>	3		10
<i>Rhopalodia gibba</i>	3	1	
<i>Surirella tenera</i>	3	7	
<i>Amphora coffeaeformis</i>	2	13	
<i>Bacillaria paradoxa</i>	2	66	
<i>Craticula cuspidata</i>	2	2	
<i>Cyclotella meneghiniana</i>	2	9	
<i>Fallacia pygmaea</i>	2		1
<i>Navicula capitata</i>	2	6	
<i>Navicula recens</i>	2	54	
<i>Navicula tenelloides</i>	2	8	
<i>Nitzschia amphibia</i>	2	19	
<i>Nitzschia clausii</i>	2	39	
<i>Nitzschia inconspicua</i>	2	34	
<i>Plagiotropis lepidoptera</i> var. <i>proboscidea</i>	2	6	
<i>Surirella angusta</i>	2	1	
<i>Synedra ulna</i>	2	2	8
<i>Tryblionella apiculata</i>	2	17	
<i>Tryblionella levidensis</i>	2	2	
<i>Gomphonema parvulum</i>	1	4	
<i>Nitzschia palea</i>	1	12	
<i>Tryblionella punctata</i>	1	6	
<i>Cocconeis placentula</i> var. <i>lineata</i>		62	4
<i>Nitzschia angustatula</i>		5	
<i>Terpsinoe musica</i>		3	

Decker Creek Watershed

Diatoms – Metric Summary for 2013 Sample Sites (Downstream to Upstream)

Scoring Metric	Decker @ Gilbert Rd (Site 1974)	Decker @ Lindell Ln (Site 1196)
<i>Cymbella</i> Richness	1	1
Number of organisms	500	44
Number of taxa	39	11
Percent motile taxa	46	2
Percent similarity to reference condition	20	10
Pollution tolerance index	2.25	2.78

* **EII scoring parameter: Four metric parameters are used in the calculation of the EII Diatom Subindex score: *Cymbella* richness, percent motile taxa, percent similarity to reference condition and pollution tolerance index. Number of taxa is non-scoring, but is shown to supplement evaluation. The number of organisms is typically a sample of 500, but occasionally differs due to sample conditions.**

1. *Cymbella* Richness: The Cymbelloid taxa include species in the genus *Cymbella*, in addition to some species belonging to the genera *Cymbellopsis*, *Cymbopleura*, *Encyonema*, *Encyonemopsis*, *Navicymbula* and *Reimeria*. Their presence highlights the presence of sensitive species, especially with regard to impervious cover, and this value increases with an increase in overall water quality. The average number of Cymbelloid taxa per site for 2013/2014 samples was 3; the lowest value was 0 and the highest value was 7.
2. % Motile Taxa: This is a siltation index showing the relative abundance of genera that are able to move towards the surface if covered by silt. A higher percentage is indicative of a degraded condition caused by increased silt pollution. The average percent motile taxa per site for 2013/2014 samples was 16%; the lowest value was 0% and the highest value was 77%.
3. % similarity to reference condition: This percentage compares a site to reference sites that are selected based on having low percent impervious cover. A higher percentage reflects greater biological integrity. The average percent similarity per site for 2013/2014 samples was 31%; the lowest value was 6% and the highest value was 57%.
4. Pollution Tolerance Index (PTI): This is a total value for a sample, which is a function of the abundance of each taxon (usually species) in a sample and the individual PTI's for each of those taxa. Individual PTI's for each taxon range from 1 (most pollution tolerant) to 4 (most pollution sensitive), thus higher total PTI's for a site reflect greater biological integrity. The average PTI per site for 2013/2014 samples was 2.76; the lowest value was 1.70 and the highest value was 3.45.

Decker Creek Watershed

Site Photographs



1196_t00-ds-03_27_2002



1196_t00-us-03_27_2002



1196_t00-ur-06_17_2008



1196_t00-ds-06_17_2008



1196_t00-ds-05_28_2009



1196_t00-us-05_28_2009

Decker Creek Watershed

Site Photographs



1974_t00-ds-06_17_2005



1974_t00-us-06_17_2005



1974_t00-ur-06_18_2008



1974_t00-ds-06_18_2008



1974_t00-ds-05_28_2009



1974_t00-ur-05_28_2009

This page left intentionally blank