

APPENDIX C: SUMMARY RESULTS BY PARAMETER¹

TOTAL SUSPENDED SOLIDS (TSS) & SSC

MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY								
Site <i>Green & Red=95% grey=not statistically significant</i>	SEASONAL KENDALL				QW TREND			
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value	
	Mankato							
	SSC	1967-2007	-0.16	-6.53%	0.2351	1967-2007	-19.64%	0.0016
	St. Peter	1971-2006 <i>(without composites)</i>	-0.94	-29.53%	0.0082	1971-2006	+2.8%	0.0801
		1998-2008 <i>(with composites)</i>	-1.99	-19.8%	0.0615	1998-2008	+26%	0.0053
		1998-2008 <i>(without composites)</i>	-1.94	-19.35%	0.0859	1998-2008	+7.15%	0.0869
	Judson	1998-2008 <i>(without composites)</i>	-2.88	-27.51%	0.0009	1998-2008	+1.39%	0.8674
	Chippewa	1998-2008	-6.53	-52.41%	5.54e-04	1998-2008	+4.95%	0.00
	Hawk	1999-2008	-11.34	-69.99%	0.0011			

¹ ¹ Results indicated in green or red in this table are for statistically significant trends (at a 95% confidence level). Green indicates decreasing trend in pollutant /improving water quality and red indicates increasing trend in pollutant / declining water quality. Results in grey are not statistically significant trends.

	Redwood	1990-2008	-1.61	-26.49%	0.0323	1990-2008	-0.46%	0.9530
	Cottonwood	1997-2008	-2.10	-22.45%	0.2021	1997-2008	-18.90%	9.98e-04
	Watonwan	2000-2008	-3.77	-29.25%	0.0247	2000-2008	-3.62%	0.33
	Blue Earth	1999-2008 (without composites)	-2.38	-21.29%	0.1579	1998-2008	+6.17%	0.0502
						1999-2008 (with composites)	+5.44%	0.079
	Le Sueur	1998-2008 (without composites)	-2.62	-25.36%	0.0636	1998-2008	+6.17%	0.1273
						1999-2008 (with composites)	+7.4%	1.09e-05
TSS	High Island	1999-2008	-0.52	-5.05%	0.7871			
	(Le Sueur) Little Cobb	1998-2008 (with composites)	-5.22	-44.55%	0.0053			
		1998-2008 (without composites)	-4.85	-42.11%	0.0053			
	(Chippewa) Shakopee	1999-2008	-0.27	-2.62%	0.9407			
	(Chippewa) Dry Weather	1999-2009	-8.86	-63.97%	1.63e-05			
	(Chippewa) Clontraf	1999-2008	-3.84	-32.42%	0.1372			
	(Hawk Creek) Priam	1999-2008	-11.95	-71.99%	0.0083			
(Hawk Creek) Beaver Creek Outlet	1999-2008	-6.06	-46.47%	0.1479				

	(Hawk Creek) Chetomba	1999-2008	-3.45	-29.60%	0.1289			
	(Hawk Creek) WFBC	1999-2008	-6.39	-48.35%	0.0177			
	(Cottonwood) Leavenworth	1997-2008	-2.20	-23.39%	0.1289			

NITRATE-N (NO3)

MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY								
Site	SEASONAL KENDALL				QW TREND			
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value	
St. Peter	1976-2006 <i>(without composites)</i>	-0.20	-6.11%	0.6762	1971-2006	-2.95%	0.7271	
St. Peter	1998-2008 <i>(without composites)</i>	+0.02	+0.17%	0.9752	1998-2008	-29.84%	0.0708	
	1998-2008 <i>(with composites)</i>	-0.14	-13.89%	0.976	1998-2008	-12.9%	0.6121	
Judson	1998-2008	+4.06	36.62%	0.0095	1998-2008	-43.11%	0.0053	
Chippewa	1998-2008	+3.10	+29.27%	0.0681	1998-2008	-22.37%	0.1105	
Hawk	1999-2008	+1.74	+16.10%	0.1503				
Redwood	1990-2008	+2.25	+35.12%	0.0022	1990-2008	-61.45%	0.0057	
Cottonwood	1997-2008	+4.85	+44.94%	4.61e-05	1997-2008	-49.18%	0.0860	
Watonwan	2000-2008	-2.15	-17.79%	0.1089	2000-2008	-54.92%	8.92e-05	
Blue Earth	1999-2008 <i>(without composites)</i>	-0.90	-8.66%	0.4941	1998-2008	-40.02%	1.6e-04	
					1999-2008 <i>(with composites)</i>	-30.82%	0.0013	
Le Sueur	1998-2008	-0.17	-1.89%	0.8086	1998-2008	-25.01%	0.1118	

						(without composites)		
						1999-2008 (with composites)	-37.05%	0.0133
	High Island	2000-2008	+3.11	+24.77%	0.1498			
	(Le Sueur) Little Cobb	1998-2008 (with composites)	-2.39	-23.37%	0.0337			
		1998-2008 (without composites)	-2.40	-23.41%	0.1006			
	(Chippewa) Shakopee	1999-2008	+1.61	+14.96%	0.3940			
	(Chippewa) Dry Weather	1999-2009	-0.58	-6.17%	0.9115			
	(Chippewa) Clontraf	1999-2008	+14.52	+79.18%	0.0085			
	(Hawk Creek) Priam	1999-2008	+0.78	+7.49%	0.4259			
	(Hawk Creek) Beaver Creek Outlet	1999-2008	+2.35	+21.19%	0.4559			
	Hawk Creek) Chetomba	1999-2008	+9.89	+64.70%	0.0281			
	(Cottonwood) Leavenworth	1997-2008	+4.16	+39.93%	0.1624			

TOTAL PHOSPHORUS (TP)

MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY								
Site	SEASONAL KENDALL				QW TREND			
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value	
St. Peter	1971-2006 <i>(without composites)</i>	-1.69	-46.69%	8.38e-10	1971-2006	+7.89%	0.5755	
	1998-2008 <i>(without composites)</i>	-3.18	-29.93%	0.0090	1998-2008	+24.74%	0.0838	
	1998-2008 <i>(with composites)</i>	-3.11	-29.32%	0.0047	1998-2008	+51.01%	0.044	
	Judson	1998-2008	-2.09	-20.71%	0.0871	1998-2008	-58.39%	0.0052
	Chippewa	1998-2008	-1.37	-14.09%	0.4000	1998-2008	+56.67%	0.0967
Hawk	2001-2008	+2.53	+18.51%	0.5695				
Redwood	1990-2008	+1.24	+21.15%	0.2019	1990-2008	-15.28%	0.5734	
	Cottonwood	1997-2008	-1.35	-15.01%	0.4000	1997-2008	-22.01%	0.5118
	Watonwan	2000-2008	-7.12	-48.55%	3.85e-05	2000-2008	-18.90%	0.0048
	Blue Earth	1999-2008 <i>(without composites)</i>	-5.75	-44.69%	2.15e-05	1998-2008	+3.99%	0.8126
						1999-2008 <i>(with composites)</i>	-2.95%	0.8418

	Le Sueur	1998-2008 <i>(without composites)</i>	-2.78	-26.69%	0.0353	1998-2008	-13.50%	0.2501
						1999-2008 <i>(with composites)</i>	-14.69%	0.2653
	High Island	2000-2008	-2.14	-17.68%	0.5861			
	(Le Sueur) Little Cobb	1998-2008 <i>(without composites)</i>	-0.17	-1.89%	0.1			
		1998-2008 <i>(with composites)</i>	-1.10	-11.42%	0.4665			
	(Chippewa) Shakopee	1999-2008	+1.72	+13.93%	0.1810			
	(Chippewa) Dry Weather	1999-2009	+0.25	+2.76%	0.8236			
	(Chippewa) Clontraf	1999-2008	-2.032	-18.56%	0.1372			
	(Hawk Creek) Priam	2001-2008	+0.26	+2.04%	0.7517			
	(Hawk Creek) Beaver Creek Outlet	2001-2008	+0.15	+11.36%	0.9079			
	(Hawk Creek) Chetomba	2001-2008	+5.49	+36.33%	0.0494			
	(Hawk Creek) WFBC	2001-2008	-2.23	-16.51%	0.7377			
	(Cottonwood) Leavenworth	1997-2008	-5.15	-46.98%	0.0133			

ORTHOPHOSPHORUS (PO4)

MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY							
Site	SEASONAL KENDALL				QW TREND		
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value
St. Peter	1998-2008 <i>(without composites)</i>	-2.22	-21.851%	0.2783	1998-2008	-36.32%	1.09e-07
	1998-2008 <i>(with composites)</i>	-2.10	-20.82%	0.0027	1998-2008	-48.24%	3.56e-05
Judson	1998-2008	-1.69	-17.08%	0.3085	1998-2008	-34.23%	0.0099
Chippewa	1998-2008	-3.49	-29.92%	0.0610	1998-2008	-19.46%	2.74e-04
Hawk	2001-2008	+2.86	+20.70%	0.2343			
Redwood	1990-2008	-1.71	-27.96%	0.4364	1990-2008	-2.051%	0.9227
Cottonwood	1997-2008	-3.32	-33.30%	0.0785	1997-2008	-52.14%	07.71e-04
Watonwan	2000-2008	-8.52	-55.15%	1.8e-05	2000-2008	-56.36%	5.47e-13
Blue Earth	1999-2008 <i>(without composites)</i>	-4.65	-37.89%	0.0907	1998-2008	-43.38%	1.29e-07
					1999-2008 <i>(with composites)</i>	-36.61%	1.93e-06
Le Sueur	1998-2008 <i>(without composites)</i>	+0.15	+1.675%	0.8558	1998-2008	-35.88%	0.0078
					1999-2008 <i>(with composites)</i>	-34.69%	0.0078

PO4	High Island	2000-2008	-4.68	-35.06%	0.1911			
	(Le Sueur) Little Cobb	1998-2008 <i>(without composites)</i>	+2.69	+25.95%	0.1425			
		1998-2008 <i>(with composites)</i>	+0.79	+8.37%	0.7588			
	(Chippewa) Shakopee	1999-2008	+5.28	+41.87%	0.0815			
	(Chippewa) Dry Weather	1999-2009	+6.29	+51.04%	0.0495			
	(Chippewa) Clontraf	1999-2008	-5.22	-41.51%	0.1703			
	(Hawk Creek) Priam	2001-2008	-1.57	-11.92%	0.4313			
(Hawk Creek) Beaver Creek Outlet	2001-2008	+0.95	+7.35%	0.6033				
(Hawk Creek) Chetomba	2001-2008	-59.91	-99.93%	0.0280				
(Hawk Creek) WFBC	2001-2008	+2.03	15.11%	0.8233				
(Cottonwood) Leavenworth	1997-2008	Insufficient data						

STREAM FLOW

MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY							
Site		SEASONAL KENDALL			QW TREND		
		Period	Change per year (% median)		p-value	Period	Change
STREAM FLOW	Stream Flow						
	Blue Earth	1999-2008	+5.73	-44.56%	0.0616		
	Le Sueur River	1998-2008	+0.53	+5.67%	0.5225		
	Shakopee	1999-2008	-5.27	-41.81%	0.1286		
	DryWeather	1999-2009	-0.50	-4.94%	0.3542		