

APPENDIX B: SUMMARY BY SITE¹

MAINSTEM SITES

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	
MAINSTEM SITES	Mankato							
	SSC	1967-2007 <i>(without composites)</i>	-0.16	-6.53%	0.2351	1967-2007	-19.64%	0.0016
	St. Peter	<i>(without composites)</i>						
	TSS	1971-2006	-0.94	-29.53%	0.0082	1971-2006	+2.8%	0.0801
	NO3	1976-2006	-0.20	-6.11%	0.6762	1971-2006	-2.95%	0.7271
	TP	1971-2006	-1.69	-46.69%	8.38e-10	1971-2006	+7.89%	0.5755
	St. Peter	<i>(without composites)</i>				<i>(without composites)</i>		
	TSS	1998-2008	-1.94	-19.35%	0.0859	1998-2008	+7.152%	0.0869
	NO3	1998-2008	+0.02	+0.17%	0.9752	1998-2008	-29.84%	0.0708
	TP	1998-2008	-3.18	-29.93%	0.0090	1998-2008	+24.7383%	0.0838
	PO4	1998-2008	-2.22	-21.85%	0.2783	1998-2008	-36.32%	1.09e-07

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.

St. Peter	<i>(with composites)</i>				<i>(with composites)</i>			
	TSS	1998-2008	-1.99	-19.8%	0.0615	1998-2008	+26%	0.0053
	NO3	1998-2008	-0.14	-13.89%	0.976	1998-2008	-12.9%	0.6121
	TP	1998-2008	-3.11	-29.32%	0.0047	1998-2008	+51.01%	0.044
	PO4	1998-2008	-2.10	-20.82%	0.0027	1998-2008	-48.24%	3.56e-05
Judson								
	TSS	1998-2008	-2.88	-27.51%	9.08e-04	1998-2008	+1.39%	0.8674
	NO3	1998-2008	+4.06	+36.62%	0.0094	1998-2008	-43.11%	0.0053
	TP	1998-2008	-2.09	-20.71%	0.0871	1998-2008	-58.39%	0.0052
	PO4	1998-2008	-1.69	-17.08%	0.3085	1998-2008	-34.234%	0.0099

MAJOR TRIBUTARY SITES

Site	SEASONAL KENDALL				QW TREND			
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value	
MAJOR TRIBUTARY	Chippewa							
	TSS	1998-2008	-6.53	-52.41%	5.54e-04	1998-2008	4.95%	0.00
	NO3	1998-2008	+3.10	+29.27%	0.0681	1998-2008	-22.37%	0.1105
	TP	1998-2008	-1.37	-14.09%	0.4000	1998-2008	56.67%	0.0967
	PO4	1998-2008	-3.49	-29.92%	0.4000	1998-2008	-19.46%	2.75e-04
Hawk								

TSS	1999-2008	-11.34	-69.99%	0.0011			
NO3	1999-2008	+1.74	+16.10%	0.1503			
TP	2001-2008	+2.53	+18.51%	0.5695			
PO4	2001-2008	+2.86	+20.70%	0.2343			
Redwood							
TSS	1990-2008	-1.61	-26.49%	0.0323	1990-2008	-0.4595%	0.9530
NO3	1990-2008	+2.25	+35.12%	0.0022	1990-2008	-61.45%	0.0057
TP	1990-2008	+1.24	+21.15%	0.2019	1990-2008	-15.2772%	0.5734
PO4	1990-2008	-1.71	-27.96%	0.4364	1990-2008	-2.051%	0.9227
Cottonwood							
TSS	1997-2008	-2.10	-22.45%	0.2021	1997-2008	-18.90%	9.98e-04
NO3	1997-2008	+4.85	+44.94%	4.61e-05	1997-2008	-49.18%	0.0860
TP	1997-2008	-1.35	-15.01%	0.4000	1997-2008	-22.01%	0.5118
PO4	1997-2008	-3.32	-33.30%	0.0785	1997-2008	-52.137%	7.71e-04
Watonwan							
TSS	2000-2008	-3.77	-29.25%	0.0247	2000-2008	-3.62%	0.33
NO3	2000-2008	-2.15	-17.79%	0.1089	2000-2008	-54.92%	8.92e-05
TP	2000-2008	-7.12	-48.55%	3.85e-05	2000-2008	-18.90%	0.0048
PO4	2000-2008	-8.52	-55.15%	1.79e-05	2000-2008	-56.36%	5.47e-13
Blue Earth							
	<i>(without composites)</i>				<i>(without composites)</i>		
TSS	1999-2008	-2.37	-21.29%	0.1579	1998-2008	+6.169%	0.0502

	NO3	1999-2008	-0.90	-8.66%	0.4941	1998-2008	-40.02%	0.0002
	TP	1999-2008	-5.75	-44.69%	2.15e-05	1998-2008	+3.99%	0.8126
	PO4	1999-2008	-4.65	-37.89%	0.0907	1998-2008	-43.38%	1.29e-07
	Blue Earth					<i>(with composites)</i>		
	TSS					1999-2008	+5.44%	0.079
	NO3					1999-2008	-30.82%	0.0013
	TP					1999-2008	-2.95%	0.8418
	PO4					1999-2008	-36.61%	1.93e-06
	Le Sueur	<i>(without composites)</i>						
	TSS	1998-2008	-2.62	-25.36%	0.0636	1998-2008	+6.169%	0.1273
	NO3	1998-2008	-0.17	-1.89%	0.8086	1998-2008	-25.01%	0.1118
	TP	1998-2008	-2.78	-26.69%	0.03531	1998-2008	-13.50%	0.2501
	PO4	1998-2008	+0.15	+1.68%	0.8558	1998-2008	-35.88%	0.0078
						<i>(with composites)</i>		
	TSS					1999-2008	+7.4%	1.09e-05
	NO3					1999-2008	-37.05%	0.0133
	TP					1999-2008	-14.69%	0.2653
	PO4					1999-2008	-34.69%	0.0078
	High Island							
	TSS	1999-2008	-0.52	-5.05%	0.7871			
	NO3	1999-2008	+3.11	+27.11%	0.1498			
	TP	1999-2008	-2.14	-19.44%	0.5861			
	PO4	1999-2008	-4.96	-39.87%	0.1911			

MINOR TRIBUTARY SITES

Site	SEASONAL KENDALL				QW TREND		
	Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value
MINOR TRIBUTARY SITES	(Le Sueur) Little Cobb	<i>(without composites)</i>					
	TSS	1998-2008	-4.85	-42.11%	0.0053		
	NO3	1998-2008	-2.40	-23.41%	0.1006		
	TP	1998-2008	-0.17	-1.89%	0.1		
	PO4	1998-2008	+2.69	+25.95%	0.1425		
	(Le Sueur) Little Cobb	<i>(with composites)</i>					
	TSS	1998-2008	-5.22	-44.55%	0.0053		
	NO3	1998-2008	-2.39	-23.37%	0.0337		
	TP	1998-2008	-1.10	-11.42%	0.4665		
	PO4	1998-2008	+0.79	+8.37%	0.7588		
	(Chippewa) Shakopee						
	TSS	1999-2008	-0.27	-2.62%	0.9407		
NO3	1999-2008	+1.61	+14.96%	0.3940			
TP	1999-2008	+1.72	+13.93%	0.1810			

	PO4	1999-2008	+5.28	+41.87%	0.0815			
	(Chippewa) Dry Weather							
	TSS	1999-2009	-8.86	-63.97%	1.63e-05			
	NO3	1999-2009	-0.58	-6.17%	0.9115			
	TP	1999-2009	+0.25	+2.76%	0.8236			
	PO4	1999-2009	+6.29	+51.04%	0.0495			
	(Chippewa) Clontraf							
	TSS	1999-2008	-3.84	-32.42%	0.1372			
	NO3	1999-2008	+14.52	+79.18%	0.0085			
	TP	1999-2008	-2.032	-18.56%	0.1372			
	PO4	1999-2008	-5.22	-41.51%	0.1703			
	(Hawk Creek) Priam							
	TSS	1999-2008	-11.95	-71.99%	0.0083			
	NO3	1999-2008	+0.78	+7.49%	0.4259			
	TP	2001-2008	+0.26	+2.04%	0.7517			
	PO4	2001-2008	-1.57	-11.92%	0.4313			
	(Hawk Creek) Beaver Creek Outlet							

	TSS	1999-2008	-6.06	-46.47%	0.1479			
	NO3	1999-2008	+2.35	+21.19%	0.4559			
	TP	2001-2008	+0.15	+11.36%	0.9079			
	PO4	2001-2008	+0.95	+7.35%	0.6033			
	(Hawk Creek) Chetomba							
	TSS	1999-2008	-3.45	-29.60%	0.1289			
	NO3	1999-2008	+9.89	+64.70%	0.0281			
	TP	2001-2008	+5.49	+36.33%	0.0494			
	PO4	2001-2008	-59.91	-99.93%	0.0280			
	(Hawk Creek) WFBC							
	TSS	1999-2008	-6.39	-48.35%	0.0177			
	NO3	1999-2008	+11.12	+69.23%	0.0253			
	TP	2001-2008	-2.23	-16.51%	0.7377			
	PO4	2001-2008	+2.03	15.11%	0.8233			
	(Cottonwood) Leavenworth							
	TSS	1997-2008	-2.20	-23.39%	0.1289			
	NO3	1997-2008	+4.16	+39.93%	0.1624			
	TP	1997-2008	-5.15	-46.98%	0.0133			
	PO4	1997-2008	Insufficient data					

STREAM FLOW

		MINNESOTA RIVER BASIN STATISTICAL TRENDS SUMMARY						
Site		SEASONAL KENDALL				QW TREND		
		Period	Change per year (% median)	Overall Change	p-value	Period	Change	p-value
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			
	Dry Weather	1999-2009	-0.50	-4.94%	0.3542			