

Lake and Stream Data Introduction

Water quality trends conducted on stream and lake locations within the Cannon River Watershed utilized water quality information stored on the MPCA STORET database. Based on the water quality data gathered in STORET, grading tables were created to provide a general interpretation of the water quality conditions for surface waters in the Cannon River Watershed. Lake water quality was evaluated using an A-F grading system while the stream water quality was graded using a simple improvement (symbolized by a “↑”) or degradation of water quality (symbolized by a “↓”). Data collected for the stream portion of this evaluation was collected from 2007 through 2010. The abundance of water quality data collected on the lakes varied greatly. Some lakes had only one year of water quality samples collected while others lakes had data spanning over multiple decades. The years observed in the lakes table should be evaluated cautiously. The years evaluated in which samples were collected is not a complete record. Some of the lakes had years where data was not collected or some of the water quality parameters were missing. However, this information is very useful determining water quality condition of lake over a given time period. The lake trend data used only evaluated three water quality parameters (secchi depth, total phosphorus and chlorophyll-A concentrations) using the Metropolitan Council lake rating scale. It is important to note that there are a few lakes (8) in the watershed that have no water quality information and lakes that have one year’s worth of water quality data collected. These lakes should be considered “not fully evaluated” and targeted for future water quality assessment projects. Due to the fact there are no established water quality standards for streams in the State of Minnesota, the chemical parameters (chlorophyll-a, nitrate, total kjeldahl nitrogen, total phosphorus, and E. coli bacteria) used to evaluated trends was done by plotting chemical data concentrations for the multiple years of data collected. A trend line was established for each of the above mention water quality parameters. The slope of each line was used to determine if the concentrations increased or decreased over the evaluated time period. It is important to note that seasonal variations, temperature fluctuations, land-use changes and other unforeseeable variables can influence chemical concentrations and should be judged with some skepticism and caution.

Upper Cannon River Lobe Lake Monitoring Data Summary

German	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.37	60.05	30.50
Maximum	5.42	277.00	81.00
Minimum	0.55	19.00	1.00
Count	46	57	56

Caron	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.49	345.00	103.00
Maximum	0.76	657.00	200.00
Minimum	0.15	126.00	13.00
Count	15	15	11

Volney	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.64	100.00	29.60
Maximum	6.70	722.00	341.00
Minimum	0.53	3.00	1.00
Count	50	50	50

Cedar	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.80	79.00	46.00
Maximum	1.68	185.00	122.00
Minimum	0.40	36.00	7.00
Count	36	36	28

Cannon	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.08	365.00	60.00
Maximum	2.74	775.00	170.00
Minimum	0.30	65.00	3.00
Count	29	28	25

Diamond	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.61	114.00	16.00
Maximum	0.91	367.00	139.00
Minimum	0.46	40.00	1.00
Count	7	13	12

Wells	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.50	317.00	65.00
Maximum	1.60	548.00	165.00
Minimum	0.20	73.00	3.00
Count	13	13	12

Dora	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.91	353.00	52.00
Maximum	1.67	810.00	174.00
Minimum	0.61	88.00	2.00
Count	12	12	12

Reed	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.50	35.00	21.00
Maximum	4.80	63.00	48.00
Minimum	0.60	23.00	1.00
Count	27	28	27

Charles*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.41	55.00	25.00
Maximum	1.52	85.00	48.00
Minimum	1.22	38.00	8.00
Count	4	4	4

Rice-Lesueur*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	3.30	278.00	1.90
Maximum	5.40	628.00	4.40
Minimum	1.60	84.00	1.00
Count	5	10	6

Roemhildts	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	3.00	17.00	5.80
Maximum	4.80	26.00	12.00
Minimum	1.50	15.00	2.00
Count	13	13	13

* Indicates only one year of WQ data collected, 2 years required to be "fully assessed".

Upper Cannon River Lobe Lake Monitoring Data Summary

Roberds	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.90	232.00	77.00
Maximum	4.00	469.00	180.00
Minimum	0.15	23.00	2.24
Count	37	38	30

Round*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.43	130.00	58.00
Maximum	0.46	155.00	85.00
Minimum	0.40	110.00	37.00
Count	5	5	5

Silver	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.00	96.00	42.00
Maximum	4.27	203.00	126.00
Minimum	0.50	1.00	1.00
Count	12	16	12

Sabre	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.84	517.00	17.00
Maximum	4.30	1540.00	79.00
Minimum	0.50	125.00	1.00
Count	22	30	22

Tetonka	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.10	580.00	45.00
Maximum	7.50	1980.00	256.00
Minimum	0.30	102.00	1.20
Count	28	42	30

Shields	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.14	447.00	46.70
Maximum	5.10	1430.00	178.00
Minimum	0.30	44.00	1.05
Count	26	38	22

Tustin	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.85	201.70	93.50
Maximum	1.50	530.00	372.00
Minimum	0.20	5.00	1.00
Count	19	20	20

Sunfish	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.82	66.00	44.00
Maximum	1.07	123.00	171.00
Minimum	0.40	46.00	13.00
Count	13	14	14

East Jefferson	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.48	75.04	31.63
Maximum	5.00	192.00	84.00
Minimum	0.31	14.00	3.00
Count	55	62	62

Toners	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.67	177.00	74.00
Maximum	1.50	389.00	285.00
Minimum	0.30	92.00	9.00
Count	7	9	9

Jefferson (swede's Bay)	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.96	223.75	45.57
Maximum	1.83	644.00	129.00
Minimum	0.30	29.00	1.00
Count	22	48	33

West Jeffersc	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.05	82.79	50.27
Maximum	4.00	178.00	96.00
Minimum	0.30	27.00	1.00
Count	53	62	63

* Indicates only one year of WQ data collected, 2 years required to be "fully assessed".

Upper Cannon River Lobe Lake Monitoring Data Summary

Dudley	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.02	30.00	11.50
Maximum	3.05	38.00	27.00
Minimum	1.22	21.00	5.00
Count	17	17	7

Kelly	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.75	39.00	7.70
Maximum	2.10	150.00	36.00
Minimum	1.50	3.00	1.22
Count	11	24	24

Fish	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	4.00	14.80	3.60
Maximum	5.00	36.00	7.00
Minimum	3.50	8.00	1.00
Count	12	12	12

Lower sakatah	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.22	326.00	36.00
Maximum	5.20	669.00	153.00
Minimum	0.79	95.00	1.20
Count	11	20	0.3

French	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.20	1.01	53.00
Maximum	4.20	264.00	142.00
Minimum	0.46	4.00	7.30
Count	34	36	28

Mabel	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.10	110.00	81.00
Maximum	5.40	173.00	178.00
Minimum	0.30	39.00	12.00
Count	12	16	11

Gorman	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.79	952.00	29.00
Maximum	6.50	1980.00	68.00
Minimum	0.30	0.34	1.60
Count	24	32	21

Upper Sakatah	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.40	637.00	36.00
Maximum	4.60	1710.00	117.00
Minimum	0.35	171.00	1.80
Count	20	39	31

Horseshoe	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.56	87.00	69.00
Maximum	1.50	113.00	107.00
Minimum	0.30	46.00	13.00
Count	17	17	17

Perch*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.30	20.50	6.00
Maximum	2.90	24.00	12.00
Minimum	1.80	19.00	3.00
Count	4	8	4

Hunt	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.80	90.10	61.00
Maximum	2.70	142.00	115.00
Minimum	0.30	28.00	3.00
Count	11	11	11

Middle Jefferson	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.85	164.76	56.80
Maximum	1.95	861.00	426.00
Minimum	0.15	22.00	1.00
Count	54	66	59

* Indicates only one year of WQ data collected, 2 years required to be "fully assessed".

Straight River Lobe Lake Monitoring Data Summary

Sprague*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.18	357.73	279.97
Maximum	0.25	388.00	602.00
Minimum	0.15	313.00	18.90
Count	3	3	3

Goose*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.93	180.40	18.40
Maximum	1.66	350.00	34.00
Minimum	0.50	54.00	53.00
Count	5	5	5

Oak Glen	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	N/A	N/A	N/A
Maximum	N/A	N/A	N/A
Minimum	N/A	N/A	N/A
Count	N/A	N/A	N/A

Watkins*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.86	154.80	19.80
Maximum	1.33	198.00	39.00
Minimum	0.33	111.00	6.00
Count	5	5	5

Beaver*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	2.40	22.00	6.40
Maximum	2.44	28.00	8.00
Minimum	2.29	20.00	5.00
Count	5	5	5

Clear	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.44	103.22	29.40
Maximum	4.57	303.00	118.00
Minimum	0.24	1.00	0.40
Count	108	125	116

Rice*	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.60	1403.00	60.60
Maximum	0.83	5170.00	112.00
Minimum	0.33	26.00	2.00
Count	5	5	5

Loon	Secchi	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.09	268.31	35.10
Maximum	2.40	3043.00	187.00
Minimum	0.24	28.00	1.12
Count	81	100	88

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Middle Cannon River Lobe Lake Monitoring Data Summary

Byllesby	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.91	232.04	48.57
Maximum	2.70	482.00	98.00
Minimum	0.30	80.00	4.00
Count	73	75	35

Fox	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.36	81.09	43.03
Maximum	3.50	290.00	192.00
Minimum	0.46	5.00	1.60
Count	34	34	31

Chub	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.58	181.06	143.67
Maximum	1.50	335.00	178.00
Minimum	0.20	40.00	95.00
Count	11	17	6

Union	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.48	368.00	71.00
Maximum	0.61	610.00	172.00
Minimum	0.38	40.00	20.00
Count	11	17	6

Circle	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	0.87	435.39	77.14
Maximum	3.25	2743.00	425.00
Minimum	0.23	40.00	3.00
Count	30	36	24

Mazaska	Secchi (m)	TP (ug/L)	Chlorophyll-A (ug/L)
Mean	1.14	130.44	109.23
Maximum	3.20	1760.00	1690.00
Minimum	0.66	27.00	6.09
Count	30	32	23

Met Council Grades for Cannon River Watershed Lakes

Lake (Years observed)	Met Council Secchi rating (m)	Met Council TP rating (ug/L)	Met Council Chlorophyll-A rating (ug/L)
Beaver* (2008)	B	A	A
Bossuot**			
Byllesby ('91-09)	F	F	D
Cannon ('03-09)	D	F	D
Caron ('02-08)	F	F	F
Cedar ('80-09)	D	D	C
Circle ('80-09)	D	F	F
Charles* (2007)	C	B	B
Chub ('95-04)	F	F	F
Clear ('60-09)	F	D	C
Diamond ('07-08)	F	D	B
Dora ('07-08)	D	F	F
Dudley ('99-08)	C	B	B
Everson**			
Fish ('07-08)	A	A	A
Fox ('55-08)	C	D	C
Frances ('80-07)	F	C	B
French ('79-08)	C	D	D
German ('56-09)	F	C	C
Goose* (2010)	D	F	B
Gorman ('89-08)	C	F	C
Horseshoe ('81-08)	F	D	D
Hunt ('07-08)	D	D	D
East Jefferson ('56-09)	F	D	C
Middle Jefferson ('79-	F	F	D
West Jefferson ('90-05)	F	D	D
Jefferson (Swede's Bay)	F	F	C
Kelly ('80-08)	C	C	A
Knutson**			
Loon ('73-09)	D	F	C
Lower Sakatah ('03-07)	B	F	C
Mabel ('07-08)	D	D	F
Mazaska ('55-07)	F	D	D
Mud**			
Oak Glen**			
Perch* (2008)	B	A	A
Reeds ('81-08)	C	C	C
Rice-Lesueur* (2007)	A	F	A
Rice-Waseca*(2010)	F	F	D
Roberds ('80-07)	D	F	F
Roemhildts ('08-10)	A	A	A
Round* (2008)	F	D	D
Sabre ('07-08)	C	F	B
Sasse**			
Shields Lake ('80-07)	D	F	C
Silver ('08-10)	C	D	C
Sprague* (2002)	F	F	F
Sunfish ('80-08)	D	C	C
Tetonka ('55-07)	C	F	C
Toners ('08-10)	F	F	D
Tustin ('96-08)	F	F	F
Union ('03-04)	F	D	D
Upper Sakatah ('07-08)	C	F	C

Met Council Grades for Cannon River Watershed Lakes

Volney ('81-07)	D	C	C
Watkins* (2010)	F	F	B
Weinberger**			
Wells ('99-08)	F	F	D
Willing**			

* Indicates only one year of WQ data collected, 2 years required to be "fully assessed".

** Indicates no water quality data available

Years observed is the range in which lake data was derived

Data Summaries for Stream Monitoring Sites in the Cannon River Watershed

S000-003	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.022	2.65	1.17	0.20	N/A
Maximum	0.126	6.81	1.94	0.47	N/A
Minimum	0.001	0.43	0.60	0.07	N/A
Count	24	25	25	25	N/A

S001-445	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	N/A	10.11	0.15	0.11	878.00
Maximum	N/A	16.60	0.36	0.49	2420.00
Minimum	N/A	0.03	0.06	0.01	69.70
Count	N/A	27	8	64	32.00

S000-038	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.014	2.81	1.52	0.42	372.90
Maximum	0.033	7.75	2.67	0.77	2419.60
Minimum	0.002	0.81	0.90	0.19	1.00
Count	24	24	23	24	29.00

S001-446	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	N/A	12.65	N/A	0.07	420.00
Maximum	N/A	17.70	N/A	0.19	2420.00
Minimum	N/A	2.32	N/A	0.03	4.10
Count	N/A	14	N/A	18	30.00

S000-543	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.029	2.10	1.76	0.29	348.00
Maximum	0.077	6.17	2.60	0.50	2420.00
Minimum	0.001	0.29	1.13	0.02	1.00
Count	15	14	13	15	60.00

S001-582	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.015	2.82	1.20	0.30	N/A
Maximum	0.051	7.77	1.60	0.40	N/A
Minimum	0.003	1.00	0.83	0.18	N/A
Count	22	22	22	22	N/A

S001-244	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.213	3.16	0.65	0.08	N/A
Maximum	4.000	7.88	1.27	0.34	N/A
Minimum	0.001	1.31	0.33	0.04	N/A
Count	19	24	23	24	N/A

S001-762	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.015	2.66	1.15	0.30	301.00
Maximum	0.070	9.09	4.27	0.45	2420.00
Minimum	0.020	0.85	0.08	0.05	3.00
Count	26	26	26	26	60.00

S001-275	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.003	4.61	0.76	0.06	N/A
Maximum	0.010	8.29	1.65	0.15	N/A
Minimum	0.001	2.39	0.36	0.02	N/A
Count	20	25	20	25	N/A

S001-766	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	1.740	2.84	0.89	0.16	259.00
Maximum	22.000	6.69	1.51	0.33	2420.00
Minimum	0.002	1.46	0.53	0.07	0.50
Count	27	24	20	24	61.00

S001-396	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.013	2.71	1.21	0.35	30.50
Maximum	0.046	7.53	1.60	0.53	33.10
Minimum	0.002	0.92	0.73	0.18	27.90
Count	24	25	25	25	2.00

S001-782	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	13.160	2.71	1.21	0.35	222.00
Maximum	46.000	7.53	1.60	0.53	2420.00
Minimum	2.000	0.92	0.73	0.18	2.00
Count	24	25	25	25	58.00

Data Summaries for Stream Monitoring Sites in the Cannon River Watershed

S001-397	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.007	1.94	1.22	0.21	N/A
Maximum	0.049	4.36	1.97	0.56	N/A
Minimum	0.001	0.46	0.53	0.04	N/A
Count	23	23	18	23	N/A

S001-783	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.019	0.30	1.65	0.30	137.00
Maximum	0.093	1.57	2.64	0.60	1986.00
Minimum	0.001	0.03	0.92	0.09	0.50
Count	24	21	23	24	56.00

S001-436	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	3.41	0.60	0.09	908.00
Maximum	0.021	8.89	2.35	0.35	2420.00
Minimum	0.001	0.42	0.00	0.03	49.60
Count	23	24	22	24	22.00

S001-785	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.003	4.46	0.83	0.05	N/A
Maximum	0.010	8.55	2.07	0.19	N/A
Minimum	0.001	2.09	0.55	0.02	N/A
Count	25	25	19	25	N/A

S004-845	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.017	2.56	1.54	0.31	265.00
Maximum	0.081	6.00	2.55	0.58	2419.00
Minimum	0.001	0.05	0.62	0.09	7.40
Count	17	19	19	19	35.00

S004-847	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.005	1.63	1.70	0.31	309.00
Maximum	0.015	5.30	2.70	0.55	1986.00
Minimum	0.001	0.00	1.20	0.07	1.00
Count	19	19	19	19	31.00

S004-846	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.003	5.00	0.53	0.08	209.00
Maximum	0.020	14.25	0.96	0.24	2419.00
Minimum	0.001	0.05	0.33	0.02	1.00
Count	19	22	13	25	50.00

S004-848	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	5.65	1.26	0.17	350.00
Maximum	0.029	13.53	7.07	0.31	1299.70
Minimum	0.001	0.44	0.66	0.04	3.00
Count	13	17	17	17	33.00

S004-878	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.017	3.22	1.03	0.17	628.00
Maximum	0.151	13.30	3.95	0.38	2500.00
Minimum	0.001	0.22	0.00	0.07	2.00
Count	18	21	20	21	40.00

S004-917	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.040	1.75	0.91	0.08	67.20
Maximum	0.150	4.45	1.37	0.28	574.10
Minimum	0.007	0.27	0.58	0.04	3.10
Count	26	26	26	26	30.00

S005-496	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.003	4.35	0.66	0.06	N/A
Maximum	0.024	10.39	1.12	0.10	N/A
Minimum	0.001	0.05	0.00	0.02	N/A
Count	23	24	22	24	N/A

S005-497	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.006	5.83	0.77	0.07	N/A
Maximum	0.028	12.80	2.28	0.36	N/A
Minimum	0.000	0.03	0.33	0.02	N/A
Count	20	24	22	24	N/A

Data Summaries for Stream Monitoring Sites in the Cannon River Watershed

S001-935	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.143	0.11	3.04	0.40	282.00
Maximum	0.282	0.17	4.22	0.56	2419.00
Minimum	0.052	0.04	2.32	0.28	0.50
Count	10	2	10	10	37.00

S004-711	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.006	2.77	0.71	0.15	n/A
Maximum	0.015	8.95	1.32	0.33	n/A
Minimum	0.002	0.09	0.09	0.06	n/A
Count	25	25	24	25	n/A

S001-939	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	2.72	0.86	0.11	492.00
Maximum	0.011	6.40	4.00	1.23	2420.00
Minimum	0.001	1.44	0.35	0.02	6.30
Count	25	25	10	25	54.00

S004-843	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	3.37	0.96	0.10	663.00
Maximum	0.017	7.68	2.33	0.48	2419.00
Minimum	0.001	0.26	0.38	0.03	2.00
Count	19	23	12	23	50.00

S002-532	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.003	2.86	0.67	0.05	416.00
Maximum	0.008	4.92	1.75	0.23	2420.00
Minimum	0.001	1.83	0.03	0.02	0.50
Count	25	25	8	25	55.00

S004-849	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.014	0.43	0.95	0.26	289.00
Maximum	0.123	0.78	1.52	0.39	1986.00
Minimum	0.001	0.03	0.58	0.07	2.00
Count	25	25	23	25	53.00

S003-554	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	1.11	0.79	0.12	N/A
Maximum	0.017	4.79	1.67	0.35	N/A
Minimum	0.001	0.08	0.50	0.05	N/A
Count	20	24	24	24	N/A

S004-877	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.008	3.27	1.31	0.29	379.00
Maximum	0.029	11.67	2.18	0.67	2500.00
Minimum	0.001	0.00	0.67	0.05	3.10
Count	23	23	25	25	45.00

S004-388	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.005	1.77	0.72	0.11	847.00
Maximum	0.025	6.59	1.13	0.28	2420.00
Minimum	0.001	0.09	0.42	0.05	1.00
Count	22	23	22	23	57.00

S005-492	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.030	0.47	2.21	0.38	N/A
Maximum	0.121	1.21	6.19	1.06	N/A
Minimum	0.001	0.11	1.23	0.05	N/A
Count	14	11	14	14	N/A

S004-389	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.009	0.69	1.28	0.39	234.00
Maximum	0.102	2.05	2.13	0.60	1986.00
Minimum	0.001	0.09	0.68	0.11	0.50
Count	23	23	23	24	46.00

S001-586	Chlorophyll-a (mg/L)	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	TP (mg/L)	E coli
Mean	0.004	3.00	1.12	0.27	343.00
Maximum	0.022	8.46	1.62	0.64	1732.00
Minimum	0.001	0.04	0.51	0.05	5.20
Count	22	22	24	25	43.00

Cannon River Watershed Stream Nutrient Trends (2007-2010)

Watershed Lobe	Stream	MPCA STORET ID #	Chlorophyll-A	Nitrogen	TKN	Total phosphorus	E. coli Bacteria
Lower	Cannon River	S000-003	↓	↑	↑	↑	-
Middle	Cannon River	S000-038	↑	↑	↑	↓	↓
Middle	Cannon River	S000-543	↑	↑	↑	↑	↓
Middle	Cannon River	S001-782	↑	↑	↑	↑	↓
Middle	Unnamed Trib. to Prairie Creek	S001-244	↑	↑	↑	↓	-
Middle	Unnamed Trib. to Prairie Creek	S001-275	↓	↑	↑	↑	-
Middle	Cannon River	S001-396	↑	↑	↑	↑	-
Middle	Wolf Creek	S001-397	↑	↓	↑	↑	-
Lower	Little Cannon River	S001-436	↓	↑	↓	↓	↑
Middle	Cannon River	S001-582	↑	↑	↑	↑	-
Upper	Waterville Creek	S001-586	↓	↑	↑	↑	↑
Middle	Cannon River	S001-762	↑	↑	↑	↑	↓
Lower	Cannon River	S001-766	↓	↑	↑	↑	↓
Lower	Cannon River	S001-783	↑	↑	↑	↑	↑
Middle	Prairie Creek	S001-785	↑	↑	↑	↑	-
Middle	Heath Creek	S001-935	↑	↑	↑	↓	↑
Lower	Little Cannon River	S001-939	↓	↑	↑	↑	↓
Lower	Belle Creek	S002-532	↑	↑	↑	↑	↓
Middle	Spring Creek	S003-554	↓	↓	↓	↑	-
Lower	Belle Creek	S004-388	↑	↑	↓	↓	↑
Middle	Heath Creek	S004-389	↓	↑	↑	↑	↑
Upper	Crocker's Creek	S004-843	↓	↓	↑	↑	↑
Middle	N. Grove Church Creek	S004-849	↓	↓	↑	↑	↓
Straight	Falls Creek	S004-846	↓	↑	↑	↓	↑
Straight	Straight River	S004-711	↓	↑	↑	↑	-
Upper	Devil's Creek	S004-845	↑	↑	↓	↑	↑
Upper	Lake Dora Creek	S004-847	↓	↑	↑	↑	↑
Upper	Mackenzie Creek	S004-848	↓	↑	↑	↑	↓
Upper	Whitewater Creek	S004-877	↓	↑	↑	↓	↑
Upper	Riverside Cem. Creek	S004-878	↓	↑	↑	↑	↑
Middle	Spring Creek	S004-917	↓	↓	↑	↑	↑
Middle	Wolf Creek	S005-492	↑	↓	↑	↑	-
Lower	Little Cannon River	S005-496	↓	↑	↓	↑	-
Lower	Little Cannon River	S005-497	↓	↑	↓	↑	-
Middle	Rice Creek	S001-445	-	↑	-	↑	↑
Middle	Rice Creek	S001-446	-	↑	-	↑	↑

- indicates no data available