Watershed Outlet Monitoring Program

Eagle Creek Station

Savage, MN

2008 Annual Report

Preliminary Data

Prepared By:

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Introduction

The Eagle Creek Watershed Outlet Monitoring Program (WOMP) site is located in Savage near Hwy 13 and Hwy 101 on 126th Street. Eagle Creek is a designated Class 2A trout stream that has been monitored at this location since 1999.

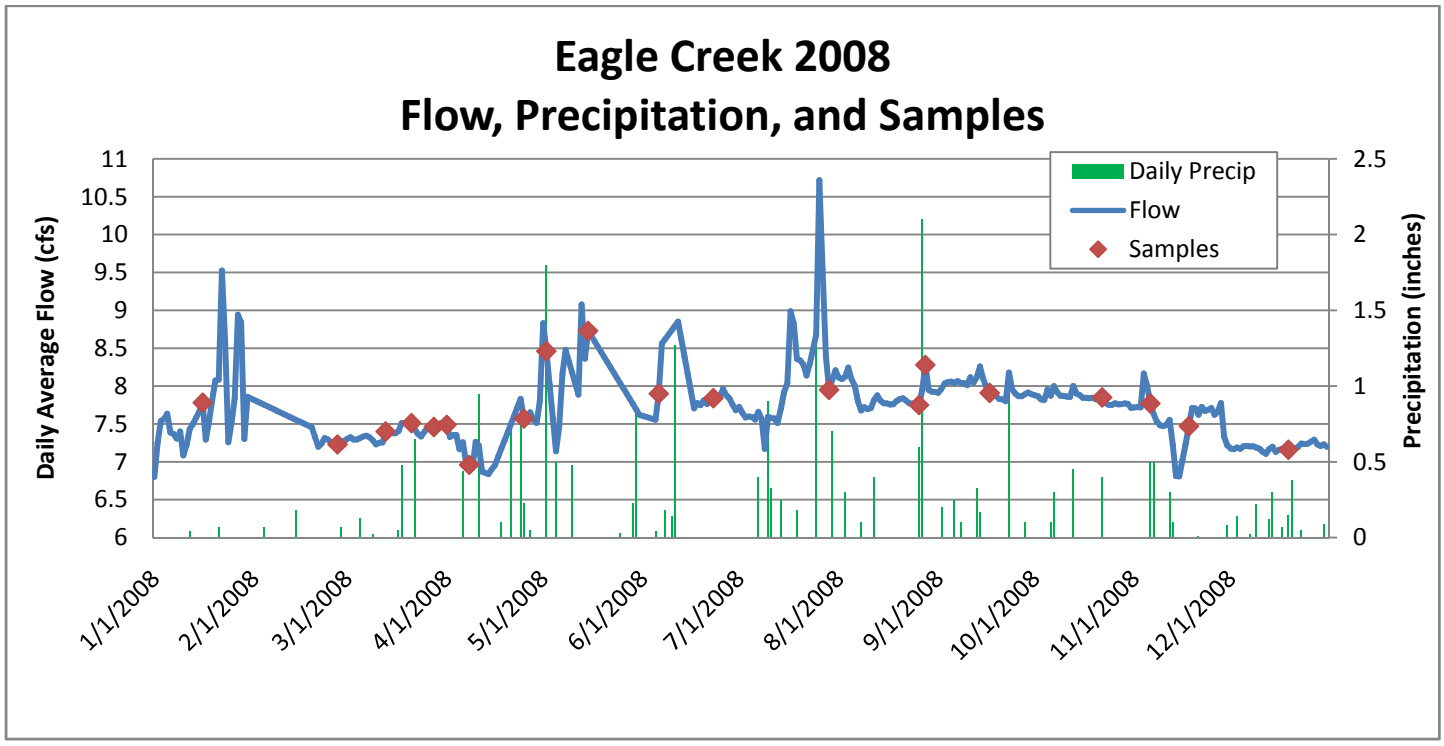
Eagle Creek is unique in many ways. It is one of few naturally reproducing trout streams in the metro area. Also, DNR has managed and revegetated 200 feet of corridor on most of the creek as well as diverted storm water from entering the creek. In a sense, Eagle Creek can be used as a "control" for metro area trout stream's water quality because of the negligible amount of human impact on the creek. However, because Eagle Creek is spring fed, it does not freeze during winter months. This can lead to poorer water quality conditions possibly due to the high traffic of waterfowl congregating on the open waters. Nevertheless, this is a natural condition that should be considered when analyzing water quality results.

Note: The data presented in this report is preliminary and is subject to change until Metropolitan Council submits the final report for this time period.

Flow, Precipitation, and Sample Frequency

Flow was difficult to monitor during 2008. Beaver dams downstream of the monitoring station affected the rating curve making it unusable for most of the year. Even after the beaver dams were removed in April, the stream bed had changed enough that the rating curve was still ineffectual, possibly because of sediment deposition. A new piece of equipment (Sontek Argonaut) was installed in September to make instantaneous flow measurements. Flow for 2008 was calculated by Metropolitan Council.

Twelve base flow, six composite, and three event grab samples were taken during 2008. Below is a graph showing the daily average flow, precipitation, and sample days. Daily precipitation values were used from a volunteer rain gauge monitor in Shakopee.



Water Quality

2008 was a typical year for Eagle Creek in regards to water quality. As observed from year to year, the creek remains ice-free all winter long. Resident waterfowl have been observed congregating on the stream during winter months. Turbidity and bacteria (*E. Coli* and *F. Coli*) increased substantially during the winter, which could be contributed to waterfowl activity upstream of the monitoring location. During the rest of the year, water quality was generally very good. However, *E Coli* did exceed the state water quality standard during warmer months as well. *E Coli* is a sub specie of *F Coli* bacteria that is specific to fecal matter from warm blooded animals (resource - http://www.epa.gov/volunteer/stream/vms511.html). More monitoring will be needed to assess whether a concern persists.

Average concentrations at Eagle Creek WOMP Station. (Numbers in red indicate that the parameter exceeded the state standard or ecoregion mean for that quarter)

Parameter	1st quarter Avg	2nd Quarter Avg	3rd Quarter Avg	4th Quarter Avg	Unit	Notes
Alkalinity	270	266	227	256	mg/L	No state standard. 20 – 200 mg/L typical. Less than 10 mg/L indicate poor buffer.
BOD5	1.03	1.20	1	1	mg/L	Ecoregion mean = 2.7 mg/L.
Cadmium	.5	.5	.5	.5	ug/L	State standard = 2.0 ug/L.
Chloride	20	22.57	29.5	29.7	mg/L	State standard = 230 mg/L.
Chlorophyll-a	79.5	75.75	54	86	ug/L	% Pheo-Corrected Average Of Result
Chromium	.7	2.3	4	3	ug/L	State standard = 365 ug/L.
COD	8.67	10.57	9.25	6.25	mg/L	
Conductivity	589	579	599	602	mMHOs	
Copper	4	13.4	.5	.5	ug/L	State standard = 15 ug/L.
Dissolved Oxygen	8.73	8.05	8.25	8.55	mg/L	State standared = 7 mg/L.
*Escherichia coli (E Coli)*Bacteria	200	51	111	350	CFU/100 mL	State Standard = 126 organisms/100 ml as a geometric mean of not < 5 samples within any calendar month (Apr 1 – Oct 31)
Fecal Coliform Bacteria	142	37.75	101	101	CFU/100 mL	State standard = 200 CFU/100 ml water as geomean of at least 5 samples/month Apr – Oct.
Hardness	305	319	267	310	mg/L	No state standard. Water above 180 mg/L considered very hard water.
Lead	.33	0.9	.1	.1	ug/L	State standard = 7.7 ug/L.
Nickel	3.0	2.5	2.5	3.1	ug/L	State standard = 283 ug/L.

Parameter	1st quarter Avg	2nd Quarter Avg	3rd Quarter Avg	4th Quarter Avg	Unit	Notes
Nitrogen Ammonia Unionized	<.004	<.007	<.004	<.002	mg/L	State standard = .016 mg/L.
Nitrate + Nitrite	.22	.17	.13	.13	mg/L	
pH	7.84	8.07	7.99	7.81	su	State standard = not less than 6.5 nor greater than 8.5.
Phosphorus, Total	.057	.08	.01	.01	mg/L	Ecoregion mean = 0.13 mg/L. EPA recommends less than 0.1 mg/L. These results are the unfiltered average of result.
Suspended Solids	7.83	7.71	3.25	7.5	mg/L	Ecoregion mean = 13.7.
Total Kjeldahl Nitrogen	.28	.59	.20	.19	mg/L	
Total Organic Carbon	2.12	2.60	2.65	2.7	mg/L	
Turbidity	7.70	4.23	4.25	8.75	NTRU	State standard for trout waters = 10 NTU, however lab reports in NTRU. Not quite comparable.
Volatile Suspended Solids	N/A	2.43	1	2.5	mg/L	
Zinc	17.3	.03	1	1	ug/L	State standard = 191 ug/L

mg/L = milligrams per liter

µg/L = micrograms per liter

mMHO = micromhos or micorseimens

CFU = colony forming units

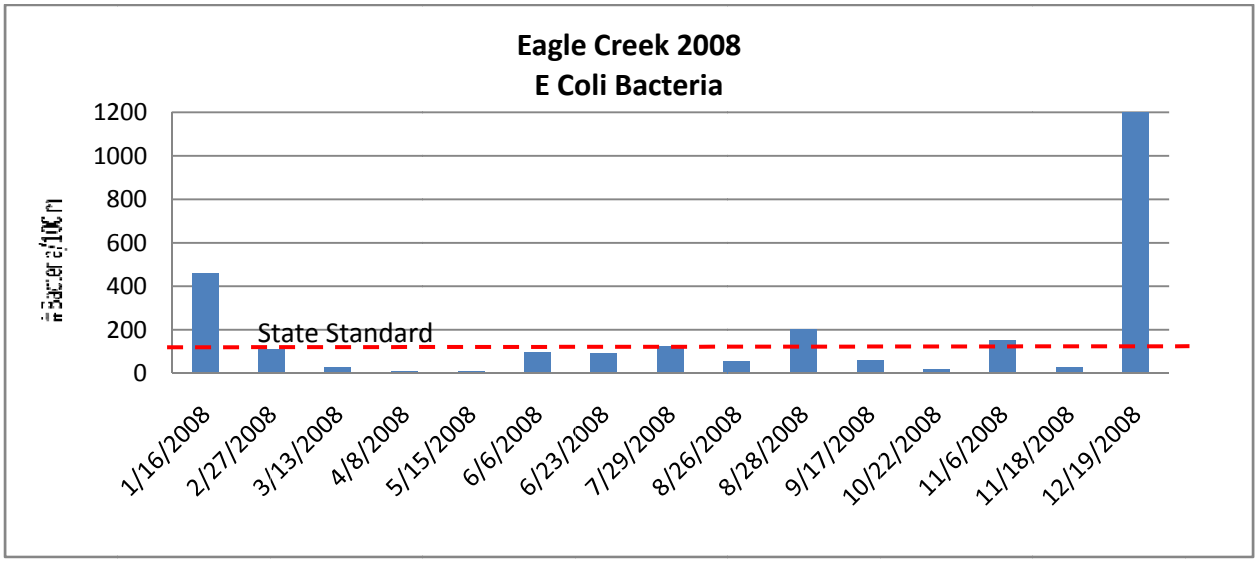
NTRU = nephelometric turbidity ratio units

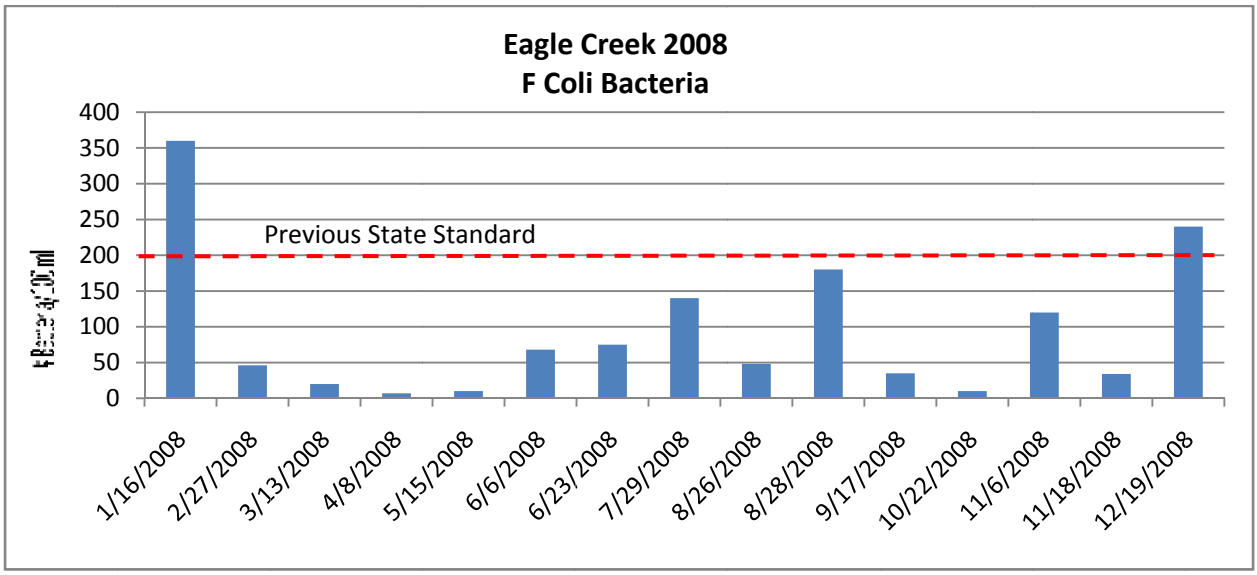
Red text indicates areas of concern.

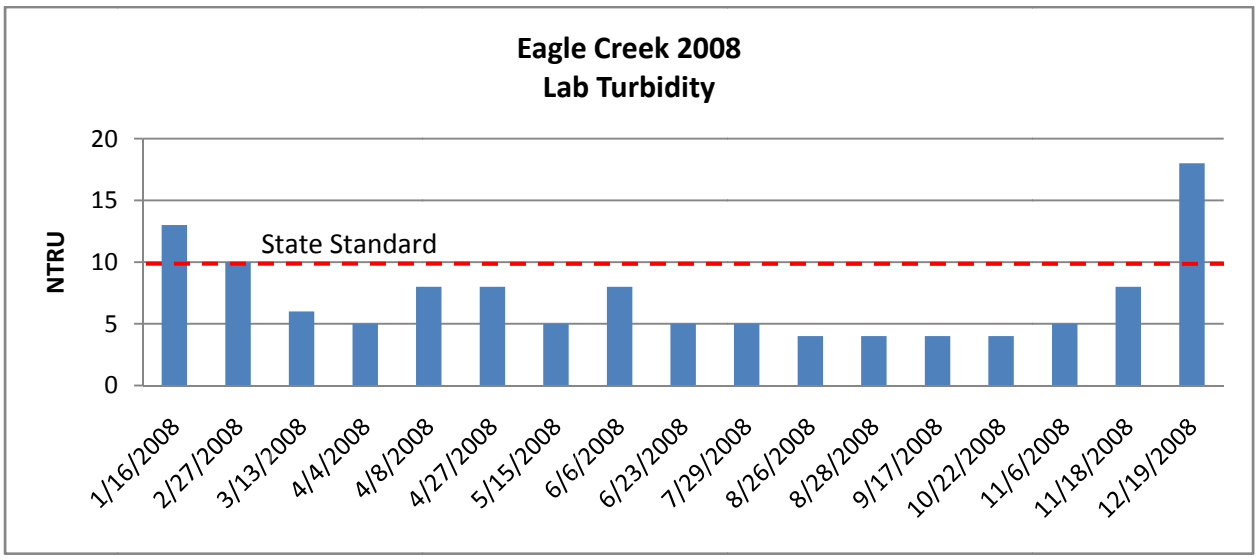
su = standard units

State standard = state standard for Class 2A waters, hardness greater than 200

The graphs on this page show the trends of bacteria and turbidity worsening during winter months, possibly due to the waterfowl congregating on the ice-free Eagle Creek.

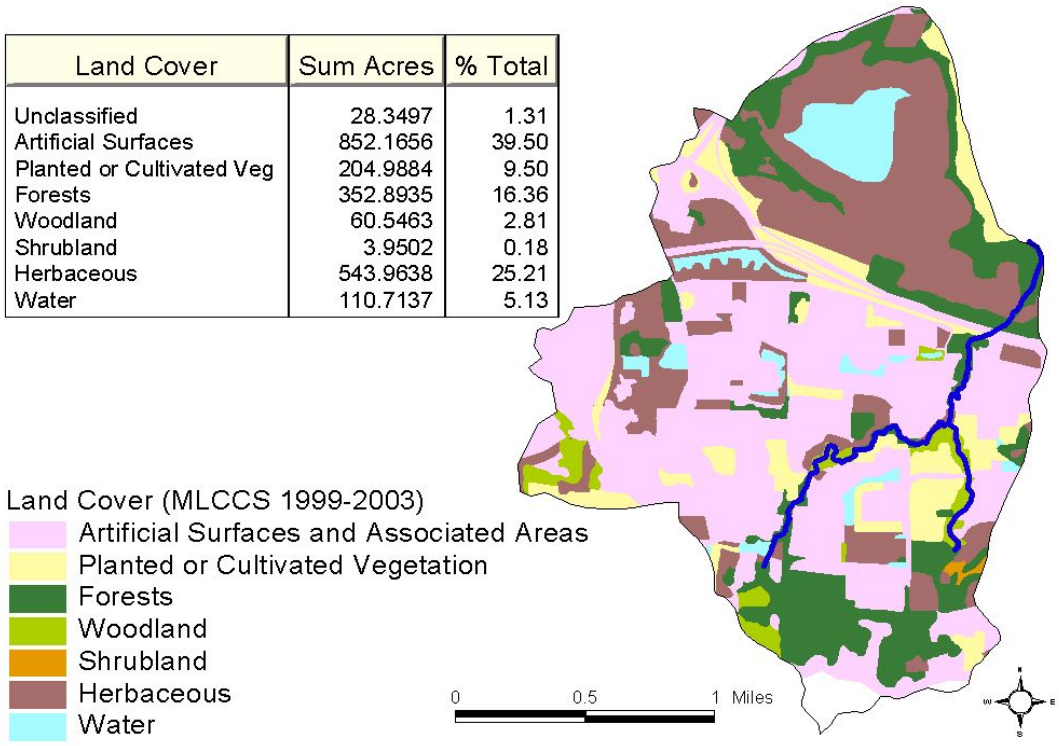






Estimated land cover, Eagle Creek *historical* watershed (Resource: MN DNR, Division of Fish and Wildlife, Section of Fisheries "Stream Survey Report, Eagle Creek 2005.")

Land Cover	Sum Acres	% Total
Unclassified	28.3497	1.31
Artificial Surfaces	852.1656	39.50
Planted or Cultivated Veg	204.9884	9.50
Forests	352.8935	16.36
Woodland	60.5463	2.81
Shrubland	3.9502	0.18
Herbaceous	543.9638	25.21
Water	110.7137	5.13



Estimated land cover, Eagle Creek *current* watershed (Resource: MN DNR, Division of Fish and Wildlife, Section of Fisheries "Stream Survey Report, Eagle Creek 2005.")

Land Cover	Sum Acres	% Total
Artificial Surfaces	54.8893	7.25
Planted or Cultivated Veg	67.9305	8.97
Forests	189.2233	25.00
Woodland	25.4945	3.37
Shrubland	3.9502	0.52
Herbaceous	348.3519	46.02
Water	67.1899	8.88