

# SWCD Monitoring

# 2009

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In 2009 Hay Creek and Dry Creek were monitored through a grant from the Minnesota Pollution Control Agency. Chisago Soil & Water Conservation District staff monitored these sites.

Surface  
Water  
Assessment  
Grant

Chisago Soil & Water Conservation District staff monitored both Hay Creek and Dry Creek in 2009. The watersheds of the two creeks have very different watersheds. One is mostly rural agricultural, while the other is mostly forested. Hay Creek is a moderately healthy stream, while Dry Creek is a very healthy stream.

Portions of Hay Creek have been monitored in the past for information regarding the tributary to Hay Creek (Beaver Creek) being listed in the past as a trout stream. Currently there are not large known populations of trout in Hay Creek.

The groundwater fed Dry Creek was monitored within Wild River State Park near the St. Croix River. Cool, clear water makes trails along this stream desirable for walking, biking and horseback riding.

## Expected Ranges for Water Quality Parameters for Chisago County

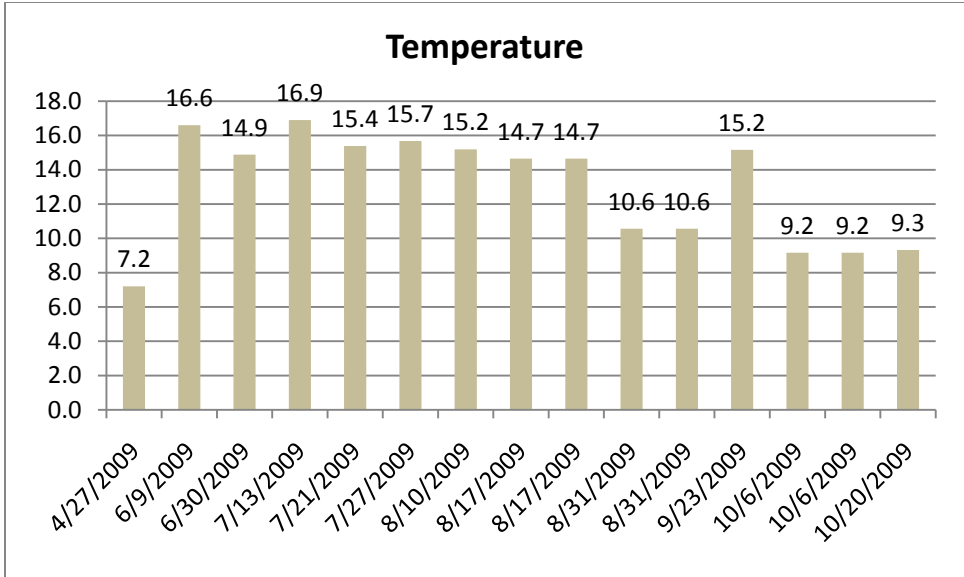
PARAMETER	EXPECTED RANGE OR STANDARD	UNIT
Total Phosphorus	0.06 – 0.15	mg/l
Total Suspended Solids	4.8 – 16.0	mg/l
Total Kjeldahl Nitrogen	0.5 – 3.0	mg/l
Ammonia Nitrogen * Samples listed as 0.02 mg/l are <0.02 which is the minimum reporting limit	0.02 – 0.28	mg/l
Transparency	>40	cm
Temperature	2.0 – 21.0°	Celsius
Field pH	7.9 – 8.3	
Escherichia coli	Standard 126	org/100 ml
Dissolved Oxygen	No more than 50% of samples below 7.0	mg/l

## HAY CREEK

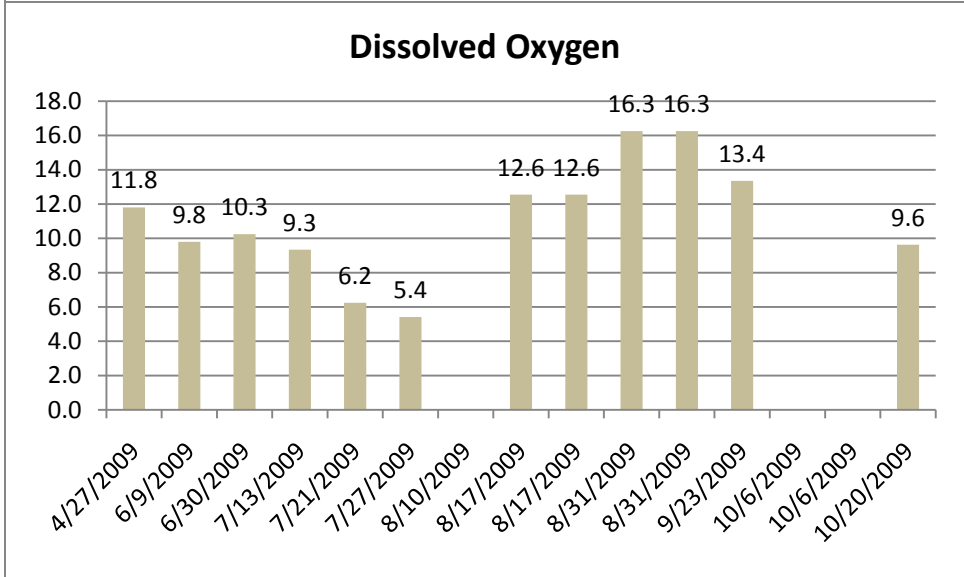
S002-093 | HAY CREEK AT COUNTY ROAD 88



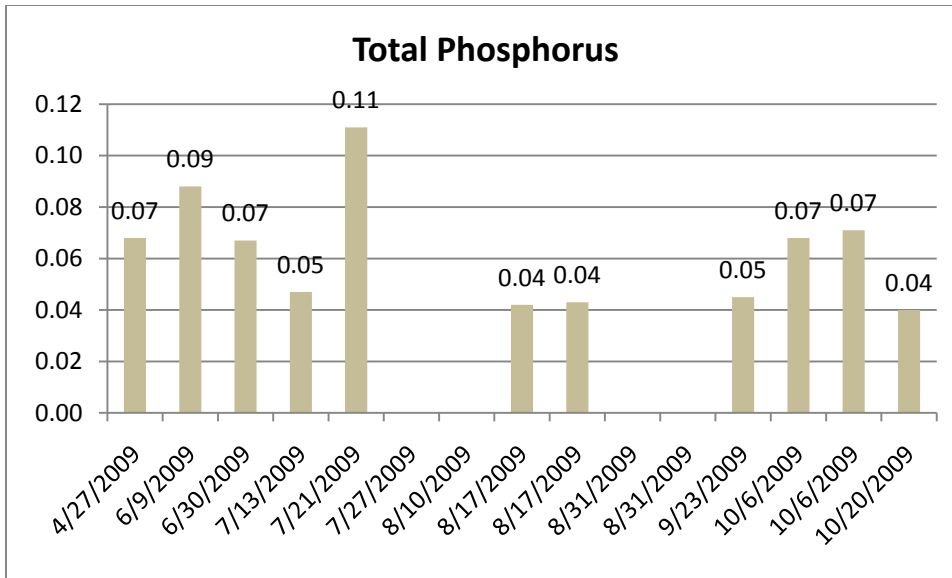
Hay Creek is a small tributary to the Sunrise River. This stream is fed by numerous drainage ditches from a highly agricultural region of Chisago County. The drainage comes from the Peaceful Valley which produces a variety of commodity and vegetable crops. A portion of Hay Creek is on the impaired waters list for Turbidity which can affect aquatic life.



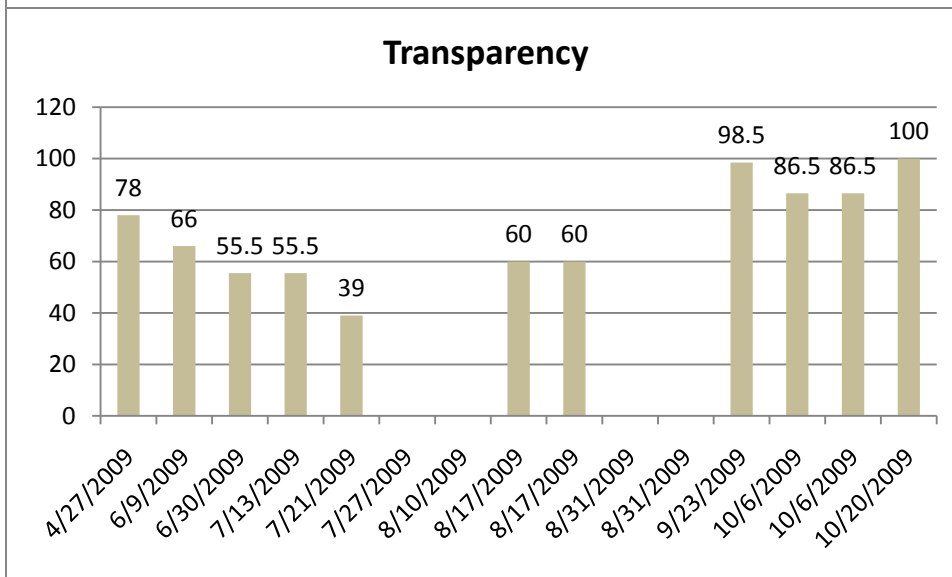
Temperature levels are within normal ranges for Chisago County.



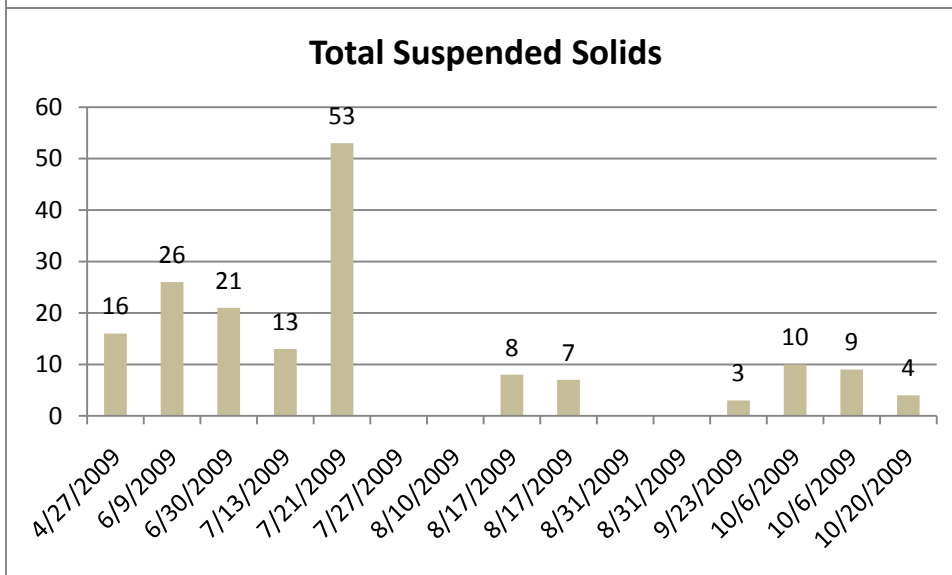
Dissolved Oxygen levels are mostly higher than expected, which would help fish and invertebrate survival, a couple are below normal.



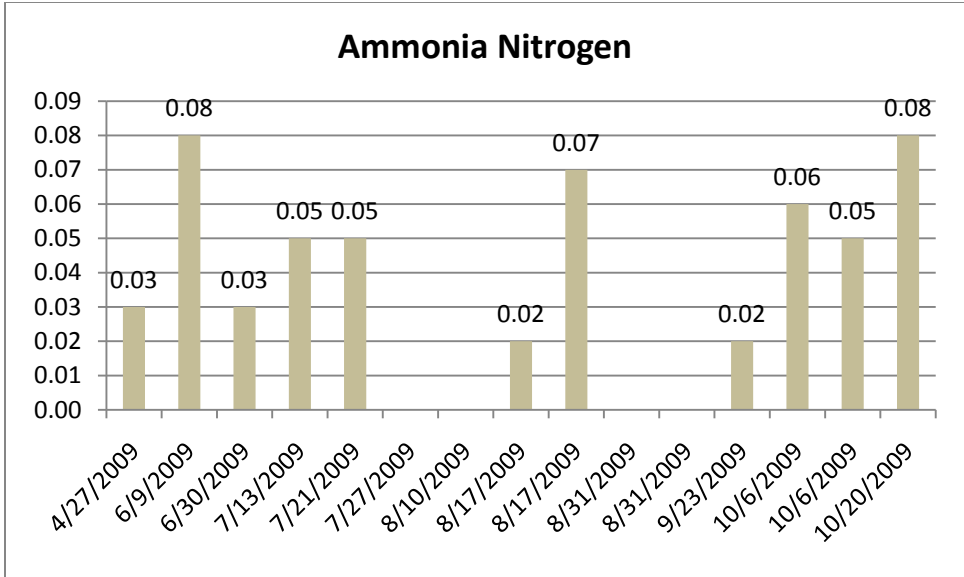
Total phosphorus levels are within or below the expected ranges for Chisago County.



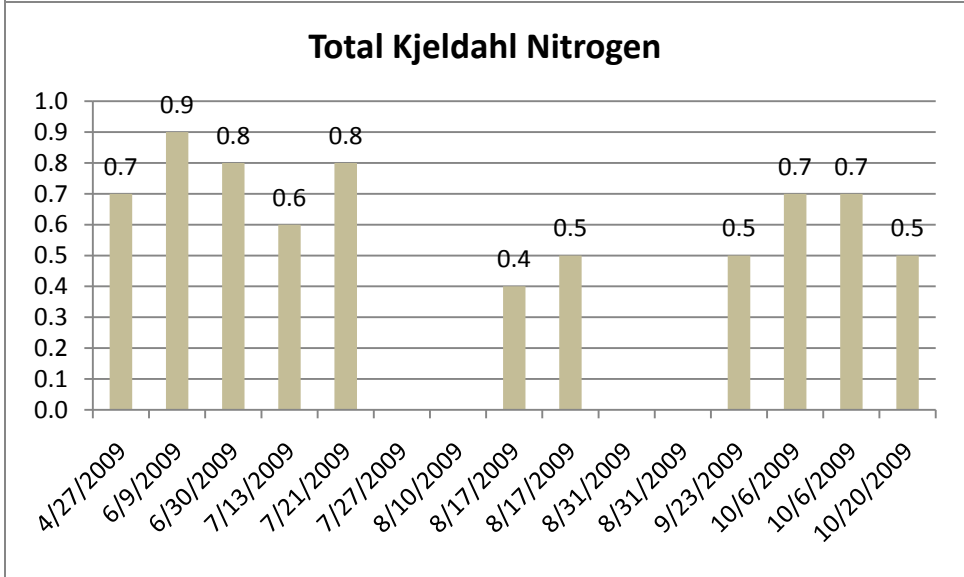
Transparency levels are lower than most monitored streams within Chisago County, and all but one were still better than the MPCA Standard.



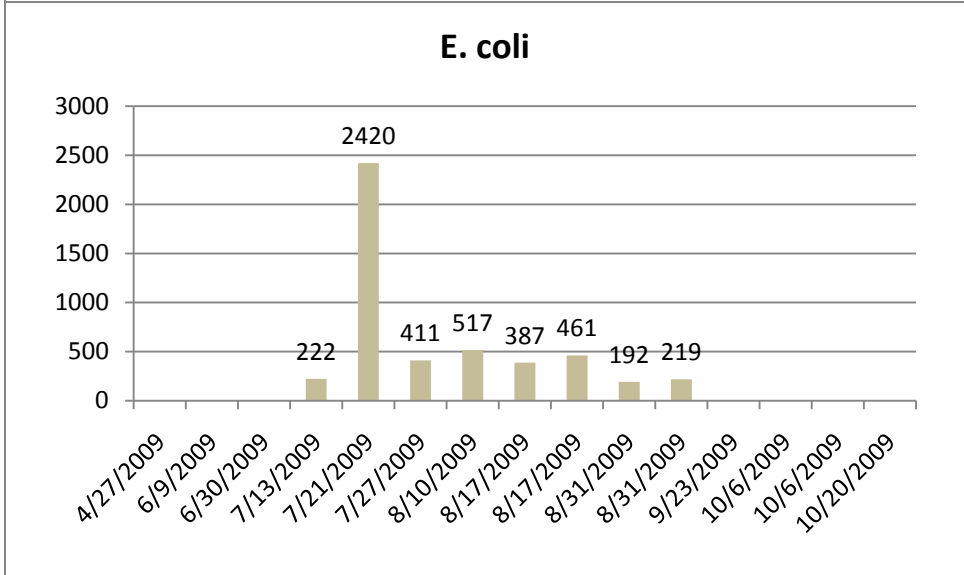
Three of the 11 Total Suspended Solids samples taken are above the expected range for Chisago County, one of those samples is very high.



Ammonia Nitrogen levels are within the expected ranges for Chisago County.



Total Kjeldahl Nitrogen levels are within or better than the expected range for Chisago County.



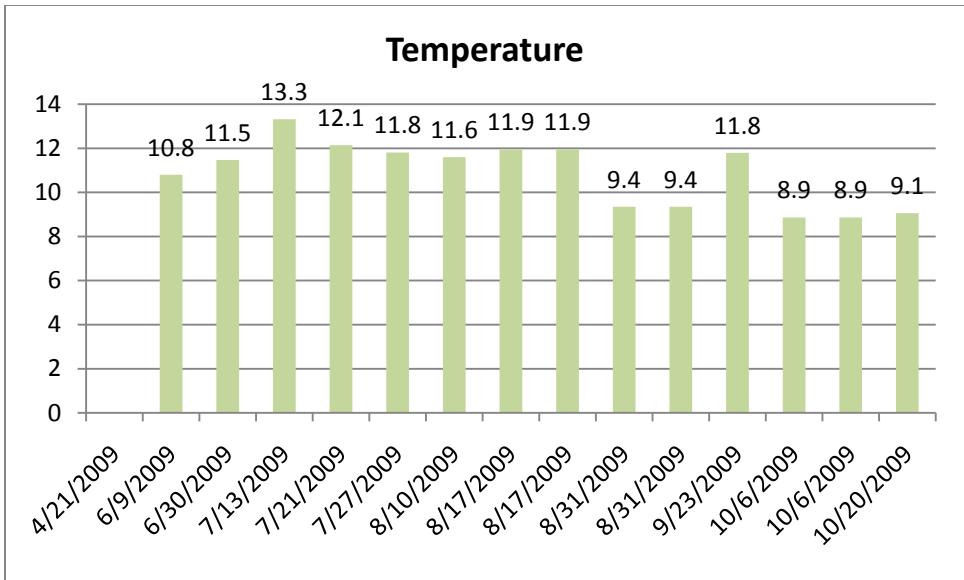
All E. coli samples taken in 2009 at Hay Creek were above the MPCA Standard of 126 organisms/100 ml or water.

## DRY CREEK

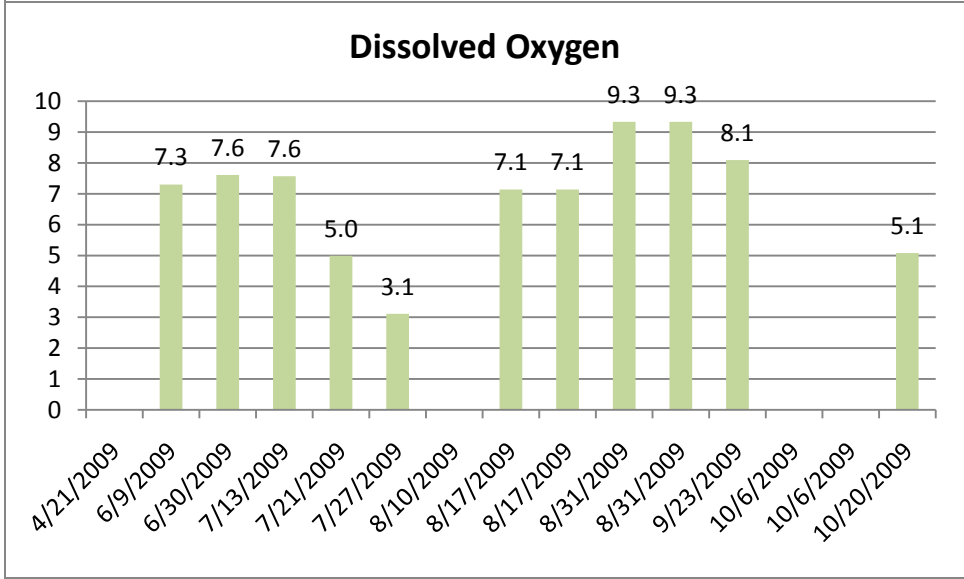
S005-513 | DRY CREEK AT WILD RIVER STATE PARK



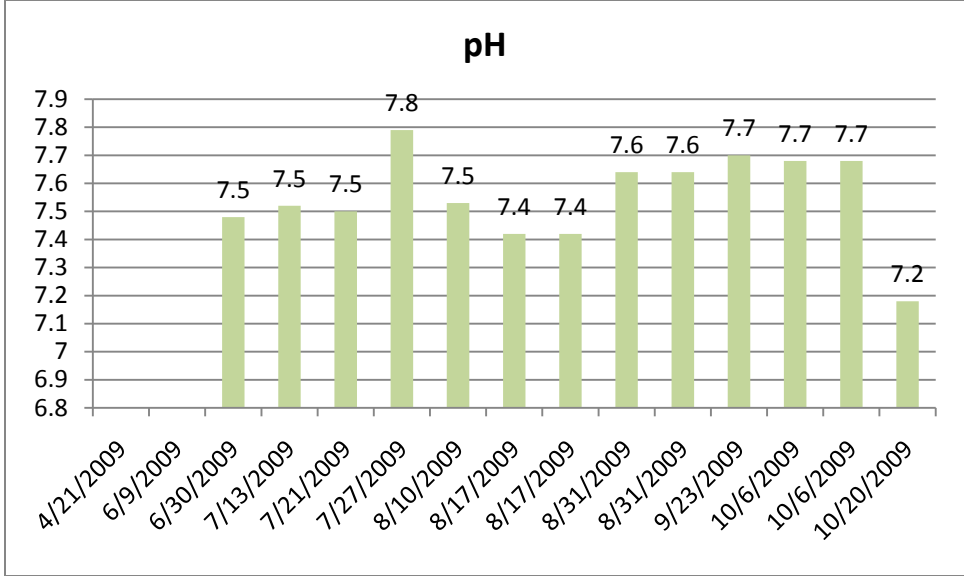
The Dry Creek site was monitored at Wild River State Park. As the name implies, portions of this stream are dry during the open water season. Within Wild River State Park, the majority of flow in the summer is ground water. The water quality in this stream is very good overall.



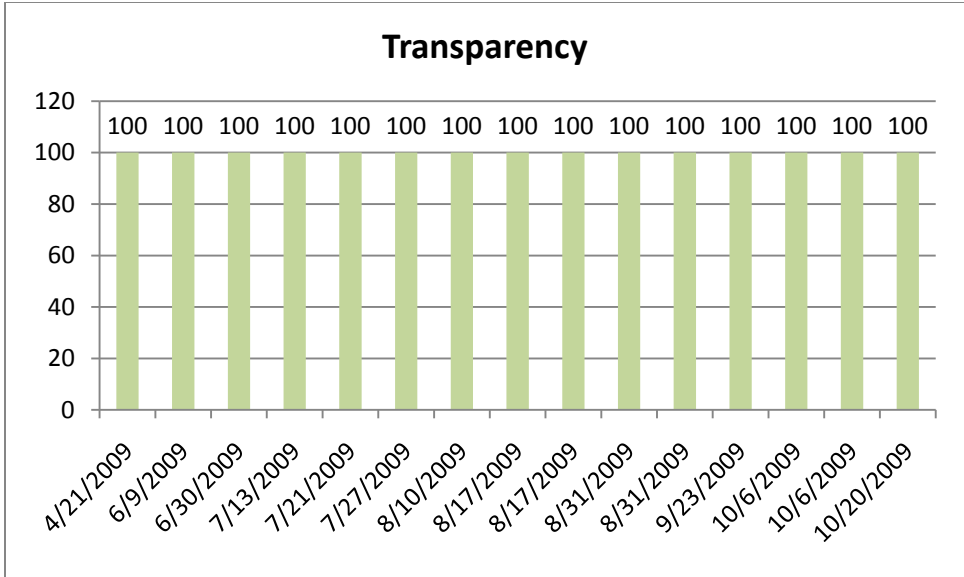
Temperature levels are within normal ranges for Chisago County. The temperatures are lower than normal because the majority of the stream is groundwater fed.



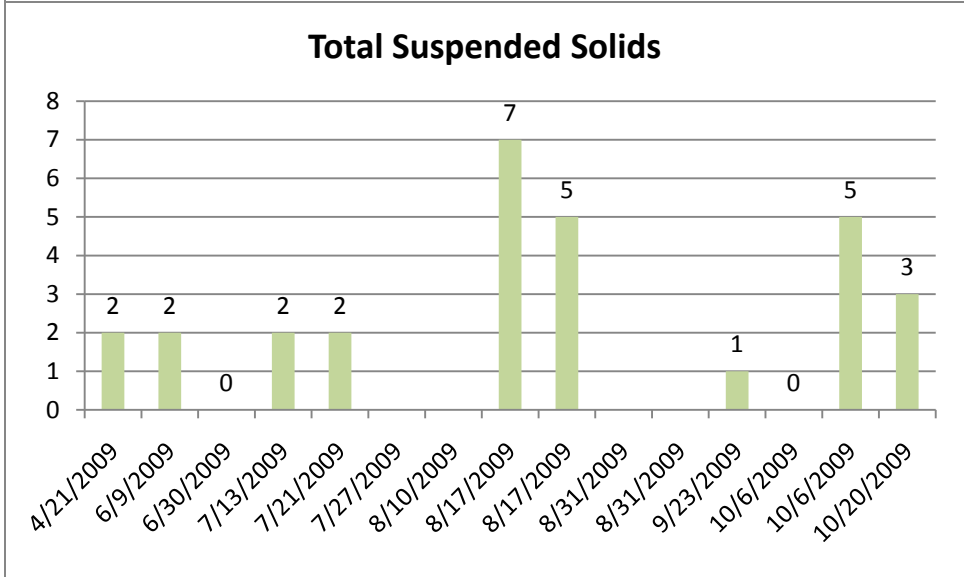
Dissolved Oxygen levels are mostly within the expected range; however, a few are below normal.



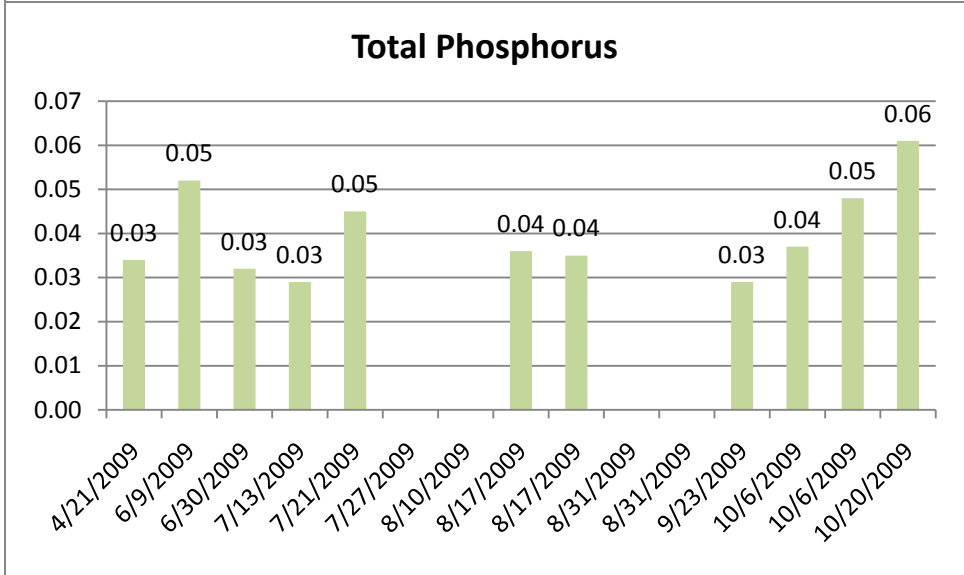
pH levels are a little lower than the expected range, which could be due to groundwater.



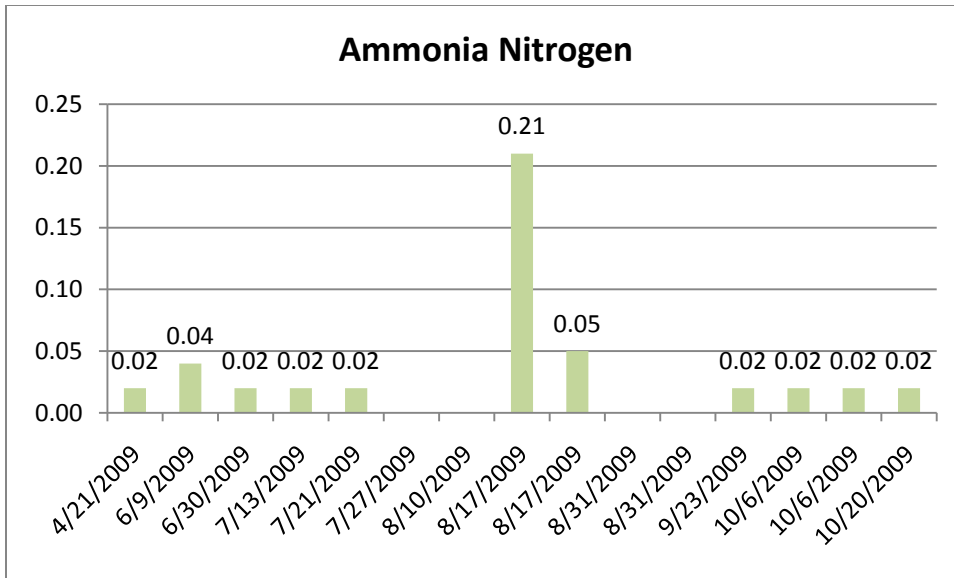
Transparency of Dry Creek is very high. The clarity far exceeds most other streams in Chisago County.



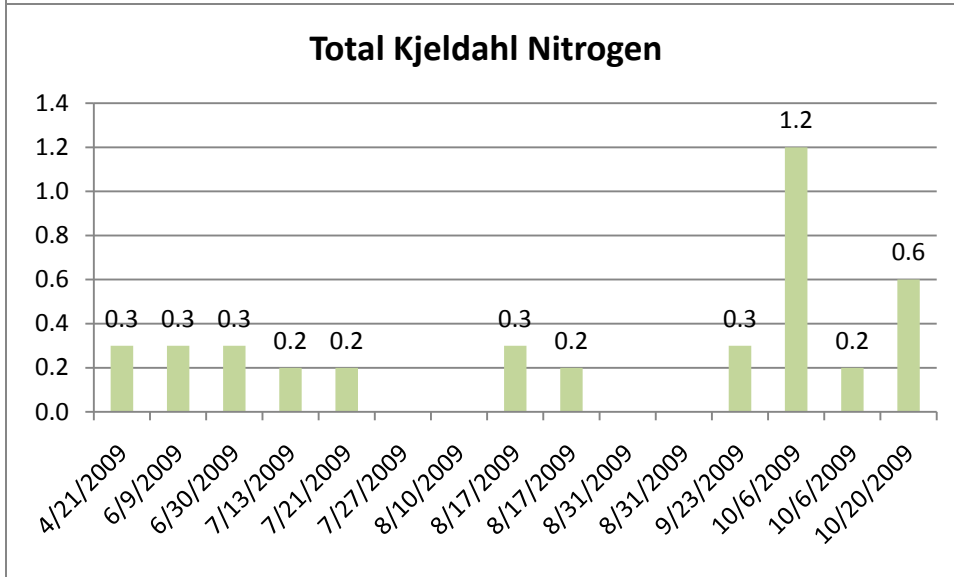
Total Suspended Solids levels are very low for Chisago County. Only 2 samples are within the expected range, the remainder are lower than the level. Low TSS yields high clarity.



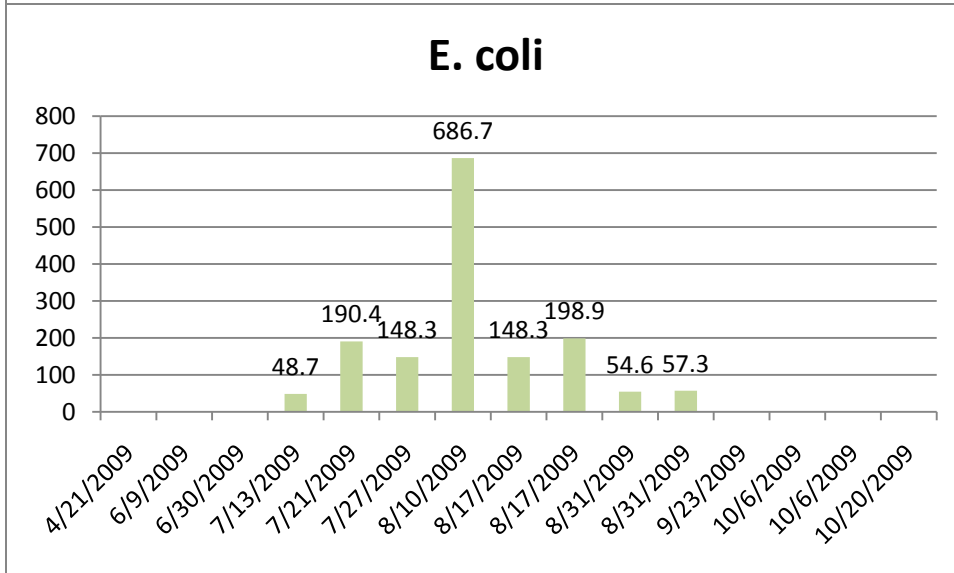
All the Total Phosphorus samples are better than expected levels. This means low amounts of algae in the water.



One Ammonia Nitrogen sample is at the higher end of Chisago County's expected range, while the others are very low. The samples listed as 0.02 = <0.02.



Total Kjeldahl Nitrogen levels are within or better than expected ranges for Chisago County.



5 of the 8 E. coli bacteria samples were measured at higher than the MPCA Standard. This data is unexpected in a high quality stream such as Dry Creek.

## DEFINITIONS

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**Ammonia Nitrogen:** an inorganic form of nitrogen, is contained in fertilizers, septic system effluent, and animal wastes. It is also a product of bacterial decomposition of organic matter. The minimum reporting limit for Ammonia Nitrogen is 0.02. Therefore, in the graphs  $0.02 = <0.02$ . Measured in mg/l.

**Dissolved Oxygen:** The concentration of molecular oxygen ( $O_2$ ) dissolved in water, usually expressed in milligrams per liter (mg/l), parts per million, or percent of saturation. The DO level represents one of the most important measurements of water quality and is a critical indicator of a water body's ability to support healthy ecosystems. Levels above 5 mg/l are considered optimal, and most fish cannot survive for prolonged periods at levels below 3 mg/l. Microbial communities in water use oxygen to breakdown organic materials, such as manure, sewage and decomposing algae. Low levels of dissolved oxygen can be a sign that too much organic material is in a water body.

**Escherichia coli (E. coli):** Escherichia coli, a subgroup of fecal coliform bacteria that is present in the intestinal tracts and feces of warm-blooded animals. It is used as an indicator of the potential presence of pathogens. Although most strains of E. coli are harmless and live in the intestines of healthy humans and animals, the E. coli O157:H7 strain produces a powerful toxin and can cause severe illness.

**pH:** A measure of acidity, with 7 being neutral. Numbers under 7 are acidic and numbers over 7 are alkaline.

**Temperature:** A measure of surface water temperature measured in °Celsius.

**Total Kjeldahl Nitrogen (TKN):** The sum of nitrogen and ammonia in a water body. High measurements of TKN typically result from sewage and manure discharges to water bodies (MPCA). The lower the reading, the clearer the water will be.

**Total Phosphorus (TP):** A nutrient essential to the growth of organisms, and is commonly the limiting factor in the primary productivity of surface water bodies. TP includes the amount of phosphorus in solution (reactive) and in particle form. Agricultural drainage, wastewater, and certain industrial discharges are typical sources of phosphorus, and can contribute to the eutrophication of surface water bodies (MPCA). The lower the reading, the clearer the water will be.

**Total Suspended Solids (TSS):** Very small particles remaining dispersed in a liquid due to turbulent mixing that can create turbid or cloudy conditions. Measured in milligrams per liter (mg/l). 1. A measure of the material suspended in wastewater. Total suspended solids (TSS) cause: a) interference with light penetration, b) buildup of sediment and c) potential reduction in aquatic habitat. Solids also carry nutrients that cause algal blooms and other toxic pollutants that are harmful to fish. 2. Very small particles remaining dispersed in a liquid due to turbulent mixing exceeding gravitational sinking that can create turbid or cloudy conditions (MPCA). The lower the reading, the clearer the water will be.

**Transparency Tube (T-tube):** A measure of water clarity in a 100 cm tube with a black and white disk at the bottom. Letting water out of the tube until you can see the disk will give you the transparency reading. The higher the reading, the clearer the water will be.



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