

Published September 30, 2011, 12:00 AM



## Douglas County lakes face a sea of threats

Summer days are filled with its possibilities – from swimming, boating and bubble baths to thirst-quenching crops and lawns. Its uses are immeasurable.

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Editor's note: This is the conclusion of a two-part series examining pollution in Douglas County waters.

Summer days are filled with its possibilities – from swimming, boating and bubble baths to thirst-quenching crops and lawns. Its uses are immeasurable.

And as human beings we cannot live without it: water.

But it is also a resource often taken for granted, exploited and neglected.

### DOUGLAS COUNTY LAKES

Several water bodies in Douglas County are listed as "impaired," according to the Minnesota Pollution Control Agency (MPCA), because they do not meet water quality standards.

Pollutants entering the water, including nutrients like nitrates and phosphorus, bacteria such as E. coli, and heavy metals like mercury, compromise waters.

The first segment of this series discussed pollutants running through a creek located near Don and Sharon Underhill's home and flowing into Lake Ida in Alexandria, possibly causing algae and weed growth surrounding their dock. The creek flows near agricultural land.

Water samples taken from the stream on the Underhill property in 2008 and 2009 revealed high levels of E. coli bacteria and fecal coliform, as well as nitrogen and high levels of phosphorus.

"This year, with all the precipitation we had, there is a lot more algae – just because of the amount of runoff that has taken place," said Douglas Soil and Water Conservation District Coordinator Jerry Haggemiller. "The phosphorus is attached to the sediment getting in the lake – and the more phosphorus, the more weeds are going to happen."

While nutrients are necessary for aquatic ecosystems, high amounts may lead to eutrophication, followed by algal bloom and low oxygen levels. As dissolved oxygen levels fall within the water, aquatic organisms, including fish, will die.

Eutrophication can occur after high levels of nutrients are released into bodies of water – such as through runoff from construction sites, fertilized lawns and chemicals and manure from farms. Large amounts of runoff may occur after heavy rainfalls.

Many local lakes were considered hypereutrophic or eutrophic – Lakes Clifford, Smith, Winona, Christina, Jennie, Osakis, Reno and Red Rock.

Lake Winona



Lake Winona in Alexandria is on the Minnesota Pollution Control Agency's impaired waters list for excess chloride and eutrophication associated with excess nutrients, particularly phosphorus. The lake is located near the Alexandria Lake Area Sanitary District (ALASD) wastewater treatment facility. Lake Winona receives treated water from ALASD. The water then moves down the chain of lakes to Lakes L'Homme Dieu and Carlos and then into the Long Prairie River.

Lake Winona

### Talk about it

Some scientists believe a body of water is eutrophic if it has a phosphorus concentration greater than 0.02 mg/L.

Samples taken from the creek near the Underhill's home showed phosphorus levels ranging from .615 mg/L to .746.

## HEALTH IMPACTS FROM EXCESS

### NUTRIENTS

After pollution is released into bodies of water, a chain reaction begins. Aquatic life is negatively impacted from the excess nutrients. Then, other animals, including humans, consume the fish, mussels and other aquatic organisms.

The health consequences resulting from lakes polluted with excess nutrients are diverse, especially if the water is consumed directly.

Minnesota Pollution Control Agency Watershed Coordinator Tim James said the primary health concerns are related to blue-green algal blooms.

"Blue-green algae is dependent on the amount of nutrients," James said. "People and animals can become sick if they drink that water or if they have some contact with it. It is more likely in impaired waters with nutrient impairments, but you can have one without the other."

And treatment processes do not always eliminate the toxins produced by the algae from drinking water.

Cyanobacteria may be linked to cancer. Health effects may include gastrointestinal distress, irritated skin and nasal passages, nausea, liver and kidney toxicity, confusion and possibly even coma or death.

The Centers for Disease Control and Prevention issued a warning to avoid exposure to algal blooms.

"Don't swim, water ski, or boat in areas where the water is discolored or where you see foam, scum, or mats of algae on the water," it stated on its website.

Douglas Soil and Water Conservation District Water Planner Emily Siira said, "There are cases where we have algae blooms and some are blue-green algae – usually after calm, hot stretches, generally in the middle of the summer. Soon, algae will kill off and sink into the bottom of the lake."

### E. COLI AND

#### FECAL COLIFORM

High levels of E. coli are also reason for concern. Consumption of water containing the bacteria can cause severe intestinal and kidney problems.

Sharon Underhill collected a water sample from the stream near their Lake Ida home in 2008 that revealed 2,419.6 MPN/100 ml E. Coli bacteria.

Another sample taken from the creek in 2009 by the Douglas County Land and Resource Management Feedlot Program revealed 1,008 colony forming units of fecal coliform.

According to the Minnesota Department of Health, if the fecal coliform level is above 1,000 bacteria colonies per 100 mL of water, consideration should be given to closing a swimming beach.

"You would want to collect multiple samples over several weeks to determine whether it is harmful," said Siira. Siira also said the method of obtaining the sample could influence the results.

### WELL WATER

#### SAFETY CONCERNS

Polluted runoff can seep into groundwater sources.

Water samples taken from the Underhills' well in 2010 revealed high levels of nitrates – 70 percent higher than the maximum contaminant level allowed by the Safe Drinking Water Act.

Nitrates are frequently from an agricultural source, according to Land and Resource Management Director David Rush, such as chemical or natural fertilizers, like manure.

According to the EPA, elevated levels of nitrates and nitrites in drinking water may cause cancer and be especially harmful to infants, pregnant women and fetuses.

Elevated nitrate levels are often found in sand point wells that are only 15 to 30 feet deep, Siira said.

"A sand point well takes a very shallow aquifer, which has a lot of influences from land use," she said.

A well located deeper in the soil usually goes through a layer of clay, so it is better protected from runoff.

"People should have their wells tested regularly to see if there are problems," Haggemiller said.

## MONITORING

Siira works with a program involving about 17 area lakes. Volunteers collect lake water samples. The samples are tested for phosphorus, chlorophyll-a (a measure of algae) and Secchi disk (to measure water clarity).

Siira reviewed lab results from a site located close to the Underhill property to ascertain trends from 1995 through this July.

"What it showed was that there was a declining water quality trend in total phosphorus and chlorophyll-a, no trend for Secchi and no trend in the TSI (Trophic State Index)," she said.

The TSI takes the three parameters into consideration – and it showed little change in the lake's basin since 1995, according to Siira.

## WHAT CAN BE DONE

"The people that live on the lake can do their part by not fertilizing grass and having a buffer strip adjacent to the lake," Haggemiller said.

He recommended lake property owners leave at least 16 1/2 feet of natural vegetation unmowed, with the exception of a small area for water access.

For agricultural producers, Haggemiller recommended the same buffer, suggesting grass strip buffers along drainage ditches leading to lakes.

He also suggested conservation tillage where crop residue is left on the fields.

"It will slow the runoff down and it will keep the soil on the field instead of running into a drainage ditch, stream or wetland into the lake," he said. "The biggest thing is to try to slow the water down as much as possible to get the sediment filtered down before it hits the lakes."

While new construction is required to have storm water treated before leaving the site, there are no regulations requiring agricultural producers to create storm water ponds.

Road salt applications are also concerning to scientists. Sodium chloride is finding its way into waterways, altering the salt content of the water and potentially impacting aquatic life and drinking water, according to researchers from the University of Minnesota. High levels of chloride can be harmful to aquatic life.

## REGULATORY

### OVERSIGHT

Agricultural producers are encouraged, but not required, to do soil testing to ascertain the nitrogen levels in their soil.

"It's not mandatory," Haggemiller said. "The programs we have are all voluntary programs for putting conservation practices on their land."

Who monitors the land for possible over usage of fertilizers?

"Nobody is checking," Haggemiller said.

However, he said, the high cost of fertilizer encourages agricultural producers not to over apply it.

If water samples indicate high levels of pollution are entering the water, Haggemiller said his office would contact landowners to see if they are willing to work with them to make corrections.

"We cannot tell them they need to fix the problem – but most will come [in] to keep their fields' production," he said.

Haggemiller feels community awareness about the health of local waters is improving.

"In Douglas County, the quality of our lakes is good compared to other areas of the state,"

Haggenmiller said. "Our lakes are deeper – and we are at the head of four different watersheds flowing out of Douglas County...Everybody is trying to do their part to keep the lakes clean."

## MERCURY IN LAKES

Several lakes in Douglas County were listed on the Minnesota Pollution Control Agency's (MPCA) impaired waters list for excessive mercury, including Carlos, Lobster (east and west bays), Agnes, Andrew, Burgen, Chippewa, Christina, Darling, Geneva, Ida, Irene, Latoka (north and south bays), L'Homme Dieu, Maple, Mary, Miltona, Osakis, Pelican, Victoria, Whiskey and Mina. Rivers listed as impaired waters for mercury include portions of the Chippewa River and Long Prairie River.

"That impairment [mercury] is pretty much a statewide situation," Minnesota Pollution Control Agency Watershed Coordinator Tim James said. "Not all lakes have been tested, but in lakes where we test for mercury, we typically find it."

Burning fossil fuels releases mercury into the air, which then falls to the earth in the form of rainwater, collecting in lakes, rivers and other water bodies.

The MPCA classifies mercury as a poisonous neurotoxin capable of destroying or damaging nerve tissue at high concentrations.

The DNR has posted guidelines limiting the consumption of fish caught in many Douglas County lakes.

For information on fish consumption guidelines see <http://www.dnr.state.mn.us/lakefind/index.html>.

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