

STREAM-LINE

News for residents of the Lester-Amity rivers watershed

Autumn 2008

Correcting Duluth's Overflows

Stormwater problem or sewage problem?

You've probably heard this on the news... "The City of Duluth had another stormwater overflow last night," the reporter says, "causing thousands of gallons of stormwater sewage to flow into Lake Superior."

Those who work on Duluth's collection system cringe at hearing the word "stormwater" associated with what is actually a sanitary sewer overflow. The overflows that Duluth experiences are the result of "Inflow and Infiltration" (I & I), basically rainwater and groundwater getting into sanitary sewer pipes, not stormwater. The differences are subtle but important and need to be addressed before we talk about solving this problem. Here are some key differences:

Duluth has two separate sewer systems: storm and sanitary. Storm sewers are an open collection system of pipes, ditches, catch basins, and culverts that pick up rainwater as it collects on the streets, roads and parking lots, moving it downhill. Storm sewers drain, without treatment, directly to streams, ponds, and eventually, Lake Superior.

Sanitary sewers are a closed system of pipes that collect wastewater from toilets, sinks, and showers and carry it to the Western Lake Superior Sanitary District (WLSSD) for treatment.



Chris Kleist

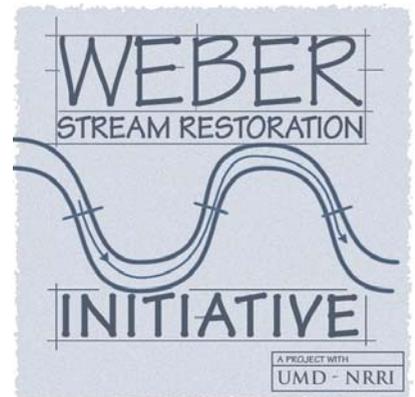
It doesn't look like much, but this overflow tank at 60th Ave E and London Rd. keeps 300,000 gallons of diluted sewage out of Lake Superior.

Rain and snowmelt, known as *clear water*, are not supposed to ever enter the sanitary sewer pipes. When they do, and if too much enters all at once, we get overflows because the pipes aren't big enough to move the excess water to WLSSD.

Clear water is clean ground water that naturally drains through the soil, and *stormwater* is what runs off the surface of the ground after a rainstorm or melting snow. *Inflow* is clean water flowing directly to the sanitary sewer system, mostly from roof and foundation drains. *Infiltration* is clean ground water leaking into the

sanitary sewer pipes through cracks and joints in the pipes.

In theory, solutions to this problem are simple. Increase capacity in the system to hold more wastewater, or reduce the total amount of wastewater, plus I & I, in



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"Sixty percent of the city's sanitary sewer system is owned by homeowners, so they need to help us reduce overflows."

~ Chris Kleist,
City of Duluth

Forests' role in keeping water clean

Quick: How many trees are in the Lester-Amity rivers watershed? Give up? Me too, but if the first thing that came to mind was "a lot," you're on the right track. Most of the land in the watershed is forested--trees cover about 71 percent of the Amity Creek watershed's 10,533 acres and 63 percent of the Lester River's 22,773 acres (that's almost 22,000 acres of forest). This is clearly the dominant land cover. As it turns out, that's a good thing for water quality in the creek, too.

Trees help protect and maintain water quality all around Lake Superior. During rainfall, a forest canopy can capture up to 50 percent of a typical rain, and hold it on their leaves or needles until it evaporates.

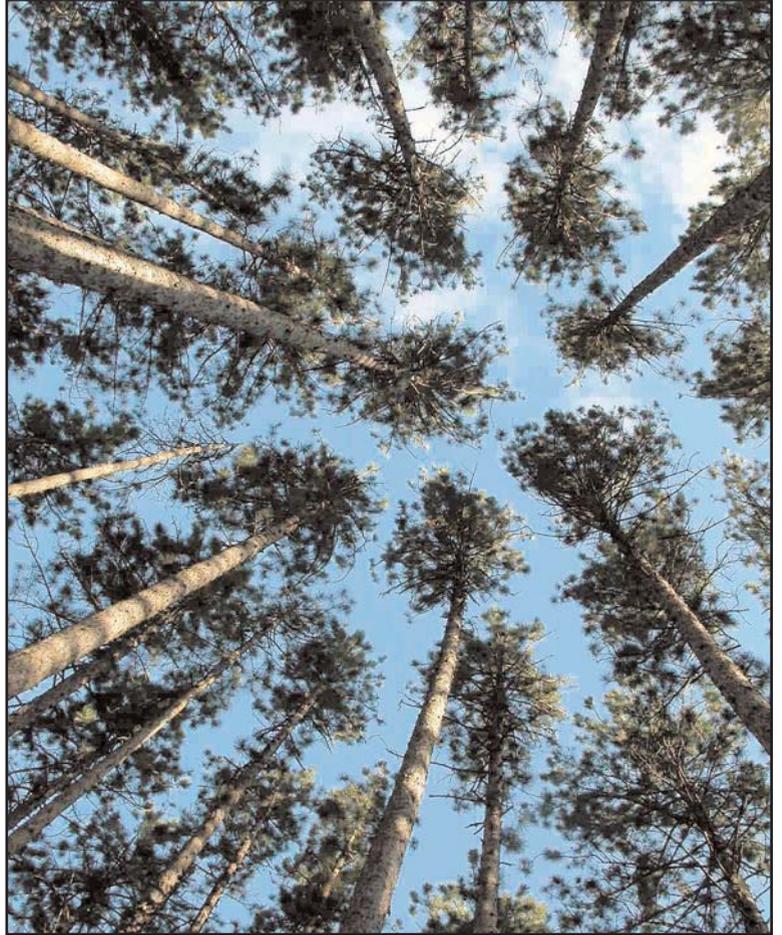
"If you remove too many trees from a watershed it increases peak stream flows, the amount of sediment in the water, and water temperatures."

The floor of a forest, with all the undergrowth and decaying leaves, can hold a significant amount of water as well, trapping three times more water than a grass lawn. The roots of trees break up the soil (a good thing for this area's clay soils), which helps water infiltrate down into the ground. During spring, the shade provided by coniferous forests reduces and delays snowmelt runoff. All of these things help keep water on the land and protect the creek from higher stormwater runoff volumes, which erode the banks and pull sediment into the creek.

Trees help keep the creek cool for brook trout that need temperatures cooler than 75 degrees. Tree roots help prevent bank erosion, and leaves that fall in the stream are eaten by many insects and bugs. Even decomposing logs in a stream provide food and create habitat and hiding places with pools and eddies.

Research has found that if you remove too many trees from a watershed it increases peak stream flows, the amount of sediment in the water, and water temperatures--all of which cause problems for sensitive trout streams.

So, along with rain barrels and rain gardens, add planting trees to the list of things you can do to help water quality in the Lester River and Amity Creek watershed.



More than just a tree

From a seedling to decaying trunk, trees provide nutrients, shade, hold and filter water, provide a food source and habitat and help maintain good water quality.

Plant a watershed steward

As part of the Weber Stream Restoration Initiative, NRRI planted over a 1,000 trees along Amity Creek to improve water quality. You can, too!

Many varieties suitable for our area are available each spring through the South St. Louis Soil and Water Conservation's annual tree sale (www.southstlouisswcd.org/tree.html)



Orders are typically due by mid-April. As you may know, deer will kill many tree seedlings, but a good five- to six-foot high fence can keep deer away until the trees are tall enough to be out of reach.

The best time to plant a tree was 40 years ago, of course, but the second best time is today!

Think you know everything about water?

Duluth scientists were surprised to learn how many residents living near Amity Creek either don't know they live near it or don't know its name.

"We need to make people aware of the water they live near," said Duluth Scientist Valerie Brady. "How we live our lives affects water quality and understanding that is key to protecting our local streams and Lake Superior."

Brady is leading a team to combat problems with stormwater--flooded basements and stream erosion--and find out if local homeowners can make a difference.

The first step was to understand how residents view stormwater problems and if they are interested in solving them. Minnesota Conservation Corps volunteers surveyed 63 households on three similar streets in Lakeside. They found that people in Duluth care about water-related issues--72 percent of the households contacted agreed to take the survey.

Even better, people are aware of the links between rain and problems from too much stormwater flow. Most know that their sanitary and storm sewer systems are separate and treated differently.

So what don't you know that you should? Stormwater causes big problems for streams--not just Lake Superior. Our buildings, roads, driveways, even lawns, cause stormwater to enter the streams much faster than before our neighborhoods were built. This means higher and quicker flows after rain storms and snowmelt, causing stream banks to erode and creating muddy water. Much of the stormwater from the lakeside area flows into some part of Amity Creek. It, along with the Lester River, are listed as "impaired" by



The Amity Creek Stormwater Survey partners are UMD's Natural Resources Research Institute and Minnesota Sea Grant, the U of M's Water Resources Center, Minnesota Dept. of Natural Resources, Minnesota Pollution Control Agency, the City of Duluth, and the MN Conservation Corps.

Right: Stormwater draining into the Amity.

the Minnesota Pollution Control Agency and the U.S. EPA because of the high turbidity (muddiness).

"We're glad that there's positive interest by citizens to learn more about stormwater problems and to help reduce run-off," said Brady. "We want to test a variety of measures with local residents, learn which work best, and which solutions homeowners like best."

Slowing and reducing stormwater before it gets to Amity Creek should help reduce erosion and will prove that

everyone can help make a difference in water quality.

"It's like this," said Brady. "A 10 minute shower uses 40 to 50 gallons of water. If someone dumped 50 gallons over your head in 10 seconds, you'd be pretty overwhelmed. And our in-town streams get most of the stormwater runoff all at once--too much, too quickly--leaving too little groundwater to sustain the flow when it's not raining. We'd like to see the runoff more spread out, like the 10-minute shower, not the 10-second shower."

Interested in knowing more about stormwater? Please visit www.LakeSuperiorStreams.org.

If someone dumped 50 gallons over your head in 10 seconds, you'd be pretty overwhelmed. Same with our streams that get too much water, too quickly, leaving too little groundwater to sustain the flow when it's not raining.

Overflow, from page 1

the system. To solve the problem and stop overflows as quickly as possible, the City is doing both.

Four overflow storage basins were built at key overflow points in Duluth, capturing millions of gallons of diluted sewage before it escapes the system. Two more are planned within the next eight years. Although the storage tanks are reasonably effective, they do not solve the problem of too much "clean" water getting into the sanitary system.

Since the 1970's the City has been

fixing problems in our system and disconnecting foundation drains, reducing the base flow to WLSSD by almost 80 percent--from about 20 million gallons per day to about 12.

But, because only about 40 percent of Duluth's sanitary sewer system is publicly owned (60 percent is owned by private homeowners), the City will expand its work with homeowners to reduce I & I from all sources.

Together we can protect Duluth's greatest asset, Lake Superior.

The Weber Stream Restoration Initiative is a unique collaboration of agencies. The overall goal is to use the best science available to keep the healthy streams clean and restore damaged systems in the Lake Superior watershed. It coordinates with the Regional Stormwater Protection Team.

For more about the western Lake Superior streams and what you can do to protect them visit lakesuperiorstreams.org Click on the Weber Restoration link for more information.

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Scientists go after the source

Why is Amity Creek so red and muddy after a big rain? Two UMD scientists collected stream samples during storms this summer to find out.

Automatic water samplers (donated by the U.S. Environmental Protection Agency) were installed at the top and bottom of Seven Bridges Road to figure out how much sediment and decomposed plant matter are transported downstream during storms, where it comes from, and how future development scenarios might affect it.

The samplers trigger when the water level rises an inch, then collect two liter samples of water

every 60-90 minutes. They also record the water level, giving researchers a detailed record of how the creek responds to each storm.

The sediment concentrations in the water spiked as much as 100 times higher at the beginning of rainstorms.

"What surprised us was that the highest sediment levels came as the water rose, rather than at the peak of the storm," said scientist Karen Gran. "The sediment may be flushing off the land and banks, or it's coming from culverts, which respond quickly to heavy rain near the sampler."

Automatic samplers in the streams...give researchers a detailed record of how the river responds to each rain storm.

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