

# STREAM-LINE

News for residents of the Lester-Amity rivers watershed

## Shoring up the Amity

*Improvements provide fish habitat, keep clay out of creek*

It took about two years of planning, but once the shovels hit the ground a 400-foot stretch of Amity Creek was restored in just two weeks. Two exposed clay banks on the East Branch of Amity Creek were being severely eroded during big rain storms and spring runoff.

Now, as the water clears after the construction, the dace minnows and tiny brook trout have started coming back -- and perhaps more successful anglers. At least, that's the hope of Ron Weber who provided the seed money that started this, and other, stream restoration projects in Duluth.

Like a lot of Duluthians, Weber grew up fishing and swimming the Lester River. In fact, his love of fishing became his livelihood when his company marketed the popular Rapala lure in the U.S.

So when he learned that the Lester River, neighboring Amity Creek and other streams in the Superior basin were designated as "impaired" by the Minnesota Pollution Control Agency, he donated \$150,000 to UMD's Natural Resources Research Institute for research. That seed money has helped generate over \$800,000 of research focused on restoring and protecting Lake Superior's streams and nearshore zone.

Stabilizing the bank on Amity Creek was the kind of hands-on, direct-result project that Weber wanted to see.

For Keith Anderson, lead manager of the project, understanding the technical complexities of the stream system to design the right solution was an interesting challenge, and the first of its kind for a North Shore stream. Anderson is a conservation engineer with the South St. Louis County Soil and Water Conservation District.



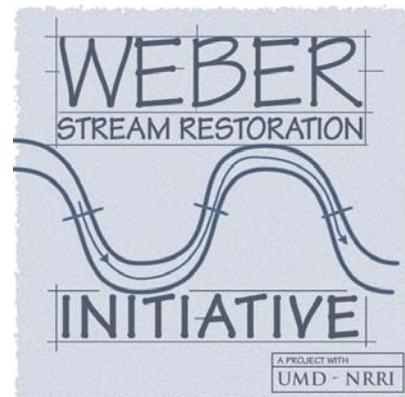
June Kallestad

Amity Creek's "face lift" includes a more gradual slope to the water, seeded mats to keep the soil out of the stream, pine root for habitat and spawning pools.

"I had to look at how the stream physics were interacting with the surrounding geography and geology," said Anderson. "It all gets down to how the stream is moving the sediments through the system."

How did this erosion happen? Anderson thinks it's possible that the soil and bank structure was weakened many decades ago when the forest was removed near the stream for a cattle pasture. Over time, the stream cut into the bank, each year getting worse and worse.

Smoothing out the slope and adding boulder vanes has already diverted the stream power away from the clay bank. Vegetation will grow back along the bank, along with the pasture. Large root masses and constructed pools are providing trout



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# When it rains, it pours (into Amity Creek)

## Stormwater issues studied in Duluth hillside neighborhood

Before streets, rooftops and driveways came to Duluth, much of the precipitation falling on the forests of the area soaked slowly into the ground. The deep roots of the trees and shrubs provided root channels for the water to follow, and the leaves reduced the amount of water reaching the ground by as much as 40 percent.

But today, forests are replaced by plentiful impervious (hard) surfaces that move water quickly away from homes, into storm sewers, and then directly into nearby streams. In the case of Amity Creek, big rain events can add more water than the stream can handle. The banks erode, the water muddies and the critters in the stream struggle.

The problem of excessive stormwater is especially troublesome for certain hilly areas of Duluth, including Ivanhoe, Idlewild and Kingston Streets in Lakeside. Plagued by wet basements and icy roads, residents on these streets welcomed taking part in a scientific study to get control of their stormwater runoff.

"We are at the base of this hill, so the water would go from neighbor to neighbor and finally end up right in our yard," said Betty Base. "We also had a problem with a spring on one side of our house."

The collaborative team addressed individual water problems experienced by residents on Idlewild and worked to reduce runoff along the street. This meant redigging a ditch system that runs between Kingston and Idlewild to the Base home and into a culvert. The springs were transformed into beautiful rain gardens and about 20 trees and shrubs were planted around Betty Base's yard to help with water infiltration.

Stormwater runoff problems were addressed as necessary at 21 homes on the street with rain barrels, swales, rain gardens and plants. Minnesota Conservation Corps students did most of



A resident of Idlewild Street in Duluth's Lakeside neighborhood receives a rain barrel to catch stormwater off her roof as part of a collaborative research project to keep excessive rainwater out of nearby Amity Creek.

the manual labor while learning about the issue.

"We won't know for sure until next spring when we have the big runoff whether the projects worked," said Base, "but with the heavy rains we've had recently, we've had no water problems and no standing water. We're just thrilled."

Retro-fitting an older neighborhood with innovative stormwater best management practices is a progressive experiment to see how much reduction in stormwater problems can be achieved.

"Fixing this isn't easy because the clay and bedrock on steep hillsides doesn't give us a break," said Scientist and Project Coordinator Valerie Brady.

What about Ivanhoe and Kingston streets? They are used for comparison to Idlewild. The scientists have been measuring how much water flows from each street since last spring. This fall and spring they'll measure again to see how effective the stormwater "fixes" are in keeping excessive water out of Amity Creek.

### Collaborative Project Team

City of Duluth  
 University of Minnesota Duluth  
 - Minnesota Sea Grant  
 - Natural Resources  
 Research Institute  
 - Facilities Management  
 - Office of Sustainability  
 South St. Louis Soil and Water  
 Conservation District  
 Barr Engineering  
 University of Minnesota  
 - Water Resources Center  
 Minnesota Conservation Corps



# Rewriting history

*Washed out Graves Road finally gets fixed to keep Amity Creek clean*



A rip rap rock channel now carries cleaner stormwater into Amity Creek and gateway to the Amity trails.

**W**ashed out in a huge deluge in the 1940's, Graves Road, connecting Lakeside in eastern Duluth to Seven Bridges Road, became an overgrown, eroding mess. Its red clay banks have been cut by storm sewer runoff from Lakeside and never stabilized. In 2004, a team from NRRI and the City of Duluth identified the area as a potential restoration project.

They secured the \$200,000 need- ed and in late 2008, with support from the Weber Initiative and Duluth Stormwater Utility funding, the project was

budgeted, designed and permitted. Federal and state grants were also received to evaluate its effect on water quality, habitat, aquatic insects and fish.

Stabilizing the steep clay banks and stopping the erosion was the goal. The City and its consultant SEH, Inc. designed a 3-phase restoration including new culverts, flow rerouting, bank slope reductions and stabilization. Design engi-

neers were given a narrow easement to work with so they decided that piping the tributary through the steepest sections offered the best long term solution to the head cutting of the banks. Two 48-inch storm sewers were installed in the first 185 feet of the tributary, and then a rip rap rock channel was built to carry the water the last 210 feet to the stream.

A plunge pool at the down- stream end of the storm sewers will dissipate energy during high flow events to reduce down- stream erosion. The construction was performed in fall

2009 when flows are usually low, and trout are not spawning. There will be extensive re-vegetation and tree planting work done next spring.

The team is very proud of the accomplishment and encourages interested groups to visit the site and see the project first hand. Best access is at the lowest bridge on Seven Bridges Road in Lakeside.

By Chris Kleist (City) and Rich Axler (NRRI)

*Why restore? The mud covers spawning beds and areas inhabited by small invertebrates that are food for trout.*

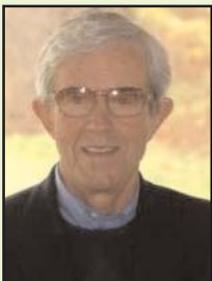
## Ron Weber

...was named Outstanding Conservationist for 2009 by the South St. Louis Soil and Water Conservation District for his contributions to

establishing the Weber Stream Restoration Initiative.

Through the seed money he provided, at least nine stream-related projects have been completed.

"Mr. Weber's actions have provided the community with an example of what can be accomplished through individual efforts," said R.C. Boehm of the SWCD.



## *Shoring up the Amity, from page 1*

cool hiding places, but the long-term goal is improving habitat by reducing sediment inputs and providing deeper pools.

"It's natural for streams to intersect valley walls and change shape over time, but in this case it likely was increased by human activity," said Anderson. "People don't always understand their relationship with the land and how it impacts streams."

NRRI scientists are monitoring the performance of the reconstruction by measuring water quality and surveying the communities of

bugs and fish living there before and after, as well as upstream and downstream from the restoration site.

"When we evaluate the changes in the stream community following construction, we hope we'll see continued native trout reproduction, plus better spawning habitat," said NRRI scientist Dan Breneman. "There are hundreds of eroding bluffs along other North Shore streams so it's important to evaluate this design as a tool that can be used in many other places."

# Great Lakes Restoration

Good news from the federal government that the *Great Lakes Regional Collaboration* will finally be released for use in restoring degraded areas of the Great Lakes basin, and protecting the rest from further deterioration.

An anticipated \$475 million will be disbursed in the first year of a five year program. That sounds like a lot until you consider the enormous economic value of the Great Lakes (over \$1 trillion), and the cost of delaying restoration and protection efforts.

The Basin is home to more than 60 million people--half of whom drink the water--and who generate half the industrial output. Economists have calculated that every \$1 spent on restoration and protection generates \$2 to \$4 return in long-term economic benefit.

The Great Lakes Restoration Initiative will focus on: 1) toxic substances and areas of concern; 2) invasive species; 3) nearshore health and non-point pollution; 4) habitat and wildlife protection and restoration; 5) accountability, monitoring, evaluation, communication and partnerships.

Locally, you'll see this funding put to use by cities, counties, tribes and non-governmental organizations such as the St. Louis River Alliance which has been working for two decades to restore the river's estuary. North Shore watersheds and streams are the focus of the Weber Stream Restoration Initiative and its partners. And we still know little about the condition of the nearshore coastal waters of Lake Superior. It provides critical habitat to fish and wildlife, drinking water, and is a valuable link between the Great Lake and our activities on land.

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](http://lakesuperiorstreams.org) Click on the Weber Restoration link for more information.

Questions?

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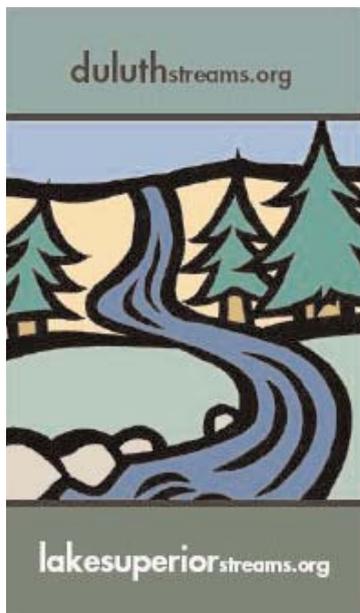


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