

# Rice Creek Assessment Project, Year One Update

## *Scientists and citizens angle for trout facts to feed decisions*



Rice Creek is the *only* trout stream in Rice County, Minnesota, but its health is threatened. Bridgewater Township, Cannon River Watershed Partnership, St. Olaf College and other partners are sponsoring a project to study Rice Creek and recommend actions to improve and protect it. The project is funded in part by the Minnesota Pollution Control Agency.

Scientists and volunteers completed the first of two years monitoring the stream's health. This fact sheet (#2) provides a progress report. These early results are preliminary and may change. See fact sheet #1 for more information on the project and its various studies.

### Trout: More than expected

Thirty citizen and student volunteers helped to capture and measure trout and insect populations in the stream from February to October 2011. Brook trout are the dominant fish in Rice Creek; other fish are smaller prey species. Contrast this to nearby Wolf and Heath Creeks where warm-water fish are common and cold-water brook trout are not found.

Researchers inserted microchips into 500 trout, while volunteers measured their length and weight. The average length was seven inches—good breeding size—with few trout greater

than 10 inches. The largest was 12 inches. Many young trout started to appear in the nets in May.

With data from recapturing, scanning and measuring the “tagged” trout, an ecologist estimated the adult trout population at 2,400. This is higher than expected and shows good trout survival and reproduction rates. Individual fish displayed good growth during 2011. A few deep pools with cooler water proved to be important refuges during warm weather and low flow conditions.



### Diet: Shoreland plays a role

Researchers and volunteers collected monthly samples of fish tissue, stomach contents and aquatic insects to better understand the trout's diet. Analysis of carbon and nitrogen forms in tissue can determine whether food originated from land or water.

Initial results point to the land as the primary source of food throughout the year for trout in Rice Creek. The pathway is likely indirect (for example, plant litter to aquatic insects to trout). If this is the case, changes to the shoreland may impact the trout population in positive or negative ways. Anglers will not be surprised that the stomach contents of trout revealed aquatic insects and other invertebrates, such as midges and scuds, as the primary food.



### Habitat: Fair, room to improve

Project partners braved heat, buckthorn, mosquitoes and other hazards to assess the quality of stream habitat at 101 sites along nearly two miles of Rice Creek. On a formal scale of 100, ratings ranged from 23 (very poor) to 86 (excellent). The average was 52 (fair) leaving much room for habitat improvement.

The best habitat scores were near Decker Avenue due to a rocky stream bottom and good channel structure. Many tools are available to improve stream habitat for aquatic life such as adding rocks, stabilizing banks and improving shade.



### Flows: Flood to drought

Crews established four solar-powered monitoring stations along Rice Creek to measure flow and collect water-quality samples. Flow-gauging equipment was calibrated to a

number of actual in-stream measurements. This year delivered an excellent test with flows ranging from flood to drought measured as 41 to zero cubic feet per second (cfs).

Floods posed challenges to gauging, especially when water spilled over banks. Rice Creek was “flashy” during storm events, with water levels rising very quickly. For example, the level rose 1.62 feet in less than 19 hours on June 20-21. This represents a high degree of energy that can shape the stream. The drought allowed an estimate of the critical base flow provided year-round by ground water: 2.1 cfs at Armstrong Road.



## Water quality: Impaired

Local stream specialists collected from 9 to 13 water samples at each of the four monitoring stations in 2011. They operated automatic samplers to collect samples during storm-driven events and grabbed samples by hand at other times. A laboratory tested the samples for bacteria, suspended solids, and nutrients (nitrogen and phosphorus).

Over 60% of samples exceeded state standards for bacteria and turbidity (clarity) in trout streams and human-health standards for nitrate nitrogen. All but one sample exceeded proposed chronic toxicity standards for nitrates in trout streams. More than 70% of samples exceeded proposed standards for phosphorus. As a result of high nutrient levels, thick beds of attached algae were observed at some locations in summer. Rice Creek is likely to remain

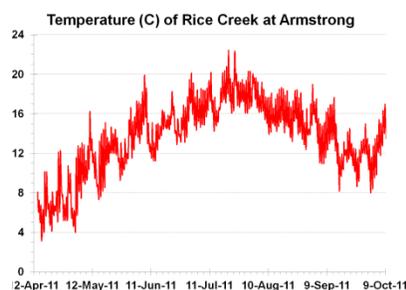
on Minnesota’s list of impaired waters unless actions are taken to reduce pollutants.



## Temperature: Periods of stress

College volunteers helped to monitor water temperature continuously at three stations using small electronic sensors anchored in the creek. They observed Rice Creek warming from April to July and then cooling to fall as stream temperature fluctuated with seasonal air temperature. Water temperature at the three locations behaved similarly; however, water temperature at the forested site was slightly cooler than at the open sites.

At times, water temperatures were higher than the healthy maximum for brook trout (68°F or 20°C). This temperature was exceeded on 13 days at Armstrong Road. On some days, the morning low and afternoon high temperatures differed by more than 9°F (5°C), which can also stress trout. The large changes in daily temperature suggest that the stream does not have a large influx of deep ground water to help maintain cooler temperatures or minimize daily temperature changes.



## Next steps

Monitoring and field studies will continue through 2012 under the direction of the Cannon River Watershed Partnership and St. Olaf College. More volunteers will be enlisted to help. Information they collect will be analyzed for problems, causes, and possible solutions.

Throughout the two-year project, the team will share information with the public at meetings and through the newspaper, web, and other media. A final report is due in June 2013. The report will contain study findings and specific recommendations for management practices to protect and improve Rice Creek. It will set priorities for future actions.

## Project sponsors

Bridgewater Township  
(Local government sponsor)  
Cannon River Watershed Partnership  
(Project manager)  
St. Olaf College Environmental Studies  
MN Department of Natural Resources  
Trout Unlimited

The project is funded in part by a Clean Water Partnership grant from the Minnesota Pollution Control Agency. The Rice Creek Concerned Citizens, Rice County, and other groups are also participating.

## For more information

If you want more information, please visit the Rice Creek website at [www.crwp.net/ricecreek](http://www.crwp.net/ricecreek).

To volunteer, comment or ask a question, contact Lucas Bistodeau at [lucas@crwp.net](mailto:lucas@crwp.net), (507) 786-3912, or Kathleen Doran-Norton at [kdoran-norton@bridgewater.org](mailto:kdoran-norton@bridgewater.org), (507) 645-7663.