

Rice Creek Assessment Project

Measuring the health of the only trout stream in Rice County

Rice Creek, also known locally as Spring Brook, is the *only* trout stream in Rice County, but its health is threatened by pollutants. Bridgewater Township, Cannon River Watershed Partnership, St. Olaf College and other partners are sponsoring a project to study Rice Creek and recommend actions to protect and improve the stream. Local scientists plan to measure the stream's health, including the trout and the cold, clean water they need to thrive. The project is funded in part by the Minnesota Pollution Control Agency.



Why study Rice Creek?

Rice Creek is located southwest of Northfield in Bridgewater Township. The waterway is roughly seven miles long: the eastern third is a trout stream, while the western portion is a county ditch. Rice Creek is on Minnesota's list of impaired waters due to high levels of bacteria, nitrate nitrogen and turbidity (suspended sediment). What makes it a trout stream and threatens it are areas to study.

Rice Creek drains approximately 4,130 acres before flowing into the Cannon River. The dominant land use is agriculture (84%); however, portions are within annexation zones of Northfield and Dundas. It is likely that development pressures will increase in the next decade. The project team will study how to protect the stream.



Rice Creek supports a naturally reproducing population of brook trout, the only trout native to Minnesota. Rice Creek is not stocked with trout; in fact, it has provided stock for other streams. Brook trout are rare compared to other fish due to their sensitivity to many factors, especially temperature, water quality and habitat. Rice Creek provides an opportunity to study this rare and sensitive fish.

What do we hope to learn?

During 2011 and 2012, the project team will evaluate the health of Rice Creek by collecting information on the following:

- Fish population, habits and diet
- Aquatic insects and other prey
- Stream and shoreland habitat
- Flow and water quality
- Water temperature
- Ground-water sources

The data will provide a valuable baseline before development or restoration activities. The results will help guide these activities to best improve and protect Rice Creek.

How healthy are the trout?

With the help of students and local volunteers, the project team will survey the trout population multiple times and take different measure-

ments to assess the population's overall health.

Teams of volunteers will "tag" hundreds of trout by inserting microchips under their skin. The tags are scanned like barcodes at a store. Field crews record each trout's weight, length and sex. By recapturing and measuring the trout over time, scientists learn about their population, growth and habits.

To learn about their diet, small clips are taken from fins and analyzed. By measuring different forms (isotopes) of carbon, nitrogen and hydrogen, researchers can tell what trout have eaten and where they obtain food. They examine stomach contents as another check. Diet provides valuable information for stream restoration.

The trout diet typically includes aquatic insects, such as mayfly larvae, as well as terrestrial insects that enter the stream. The project team will evaluate the aquatic insect community. The kinds and numbers of insects serve as an excellent indicator of stream health.



How good is the habitat?

The structure of a stream is important to trout. For example, they like to hunt for prey under overhanging banks or trees, and females lay eggs in shallow depressions ("redds") among pebbles. Good quality shore-

land habitat is important. Tall grasses or trees help to shade and maintain cool waters. Land use near the stream can affect the biological community, especially prey species for trout. The project team will complete a detailed habitat assessment of Rice Creek including inventories of the channel, streambed, shore land and surrounding land use.

How clean is the water?

Brook trout need clean water for good health. Four monitoring stations were placed along Rice Creek to measure flow and collect water-quality samples. The data will provide information on the timing and sources of water and pollutants.



At each station a sensor continuously measures the velocity and stage (height) of water in the stream. A scientist calculates the relationship (rating curve) between stage and channel dimensions. Combined, they provide daily estimates of flow.

Increases in stream flow will trigger automatic samplers at each station. The samplers pump water from the stream into bottles over a period of time. In addition to these *event* samples, single *grab* samples are collected from the stream by field crews at various flows and seasons.

The samples are tested for suspended solids (soil, algae and other particles) and nutrients (phosphorus and nitrogen). Too many suspended solids make it difficult for trout to see, feed, breathe and reproduce. Excess nu-

trients may be toxic to aquatic organisms or produce algae that decrease water quality. These problems spread to downstream waters such as the Cannon and Mississippi Rivers.

How cold is the water?

Brook trout do best in water temperatures below 68 °F (20 °C). They do poorly when temperatures exceed this value or vary by more than 5 °C in a day. Trout are not found in nearby Heath Creek because water temperatures are too high.

Ground water is an important source of cold, clean water to trout streams in southern Minnesota. Springs have been observed along Rice Creek but have not been surveyed.

The project team and volunteers will measure temperature along the entire length of Rice Creek. Where temperatures decrease sharply, a spring can be located with GPS. The result will be an inventory of ground-water sources. Protecting these sources of cold water is important to the trout stream's future.

Field crews will measure dissolved oxygen and specific conductance, too. Trout require a certain level of oxygen and do not like wide daily swings. Specific conductance measures the ability of water to move electrical charges; changes can indicate a new source such as ground water. In addition sensors were installed at various locations in Rice Creek to continuously record temperature.



When will we see results?

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 action.



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 Minnesota Pollution Control Agency awarded a Clean Water Partnership grant to the project. The Rice Creek Concerned Citizens Group, Rice County, and other groups and volunteers are participating.

For more information

If you want more information, please visit the Rice Creek website at www.crowp.net/ricecreek or follow via twitter.com/troutthattweet.

To volunteer, comment or ask a question, contact Lucas Bistodeau at lucas@crowp.net, (507) 786-3912, or Kathleen Doran-Norton at kdoran-norton@bridgewaterwp.org, (507) 645-7663.