

Rice Creek (Spring Brook) Concerned Citizens Group Report and Recommendations

13 November 2009

The Cannon River Watershed provides a home for a number of valuable natural resources in Minnesota and Rice County. The close proximity of a cold water stream, Rice Creek, and a warm water stream, Heath Creek, and the wild and scenic character of the Cannon River represents a valuable resource in our community. The Rice Creek watershed, approximately 6.5 square miles or 4130 acres, is a rarity. It is the only trout stream in Rice County and one of only a few in Minnesota with a naturally reproducing population of brook trout. Brook trout are the only native species of trout in Minnesota streams and are much more sensitive to environmental conditions than the introduced Brown trout. The cold-water springs feeding Rice Creek are critical to maintaining the viability of the trout population. Currently the watershed drains agricultural land, provides a scenic wildlife corridor enjoyed by area residents, sustains a suite of organisms that rely on cold-water stream features, and provides a valuable study area for students, staff and faculty involved in K-16 education.

To date land uses along the stream have allowed trout to survive; however, future changes could affect the stream. As Figures 1 and 2 illustrate the watershed's position within Bridgewater Township and the planning boundaries of Dundas and Northfield makes it susceptible to a number of different pressures, including land use changes associated with development. To further complicate matters natural wetlands were drained and agricultural ditches developed and connected to Rice Creek in the late 1940s. As Figure 1 shows, County Ditch 22 represents the longest segment of the water channel; although, depending on precipitation and land use practice, water does not flow in this segment year round. In terms of stream miles, the area proposed for annexation into the City of Northfield contains over 40 percent of the trout stream habitat (0.85 miles vs. 1.90 miles of total trout stream habitat).

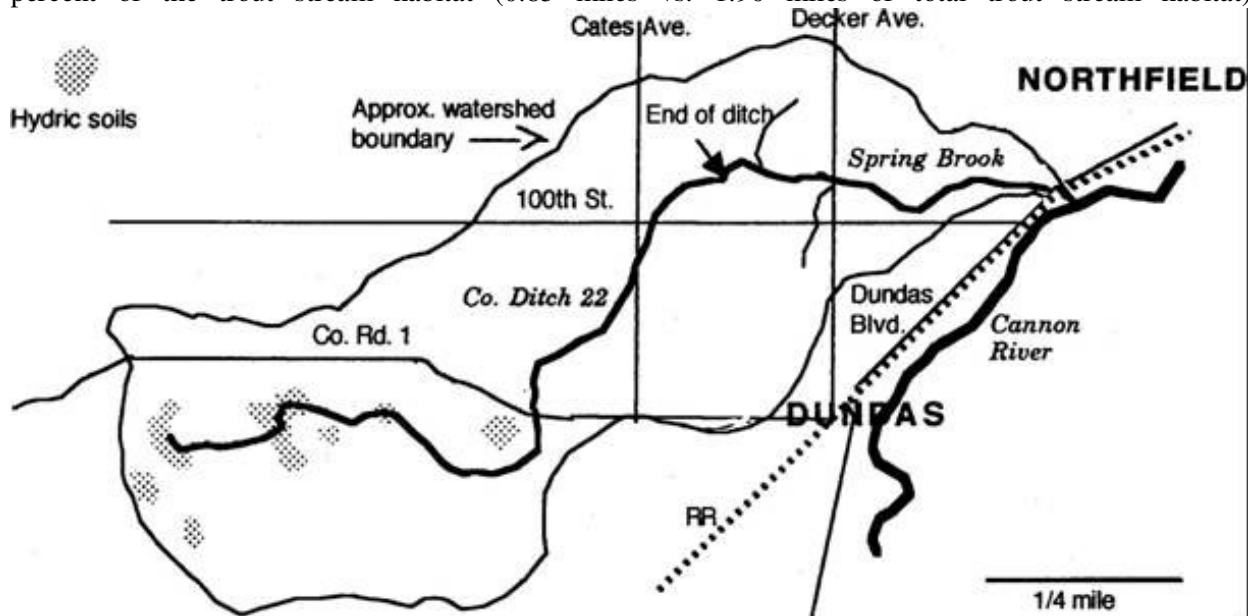


Figure 1. Sketch map of the Rice Creek (Spring Brook) Watershed, from the 1999 SpringBrook Committee Report.

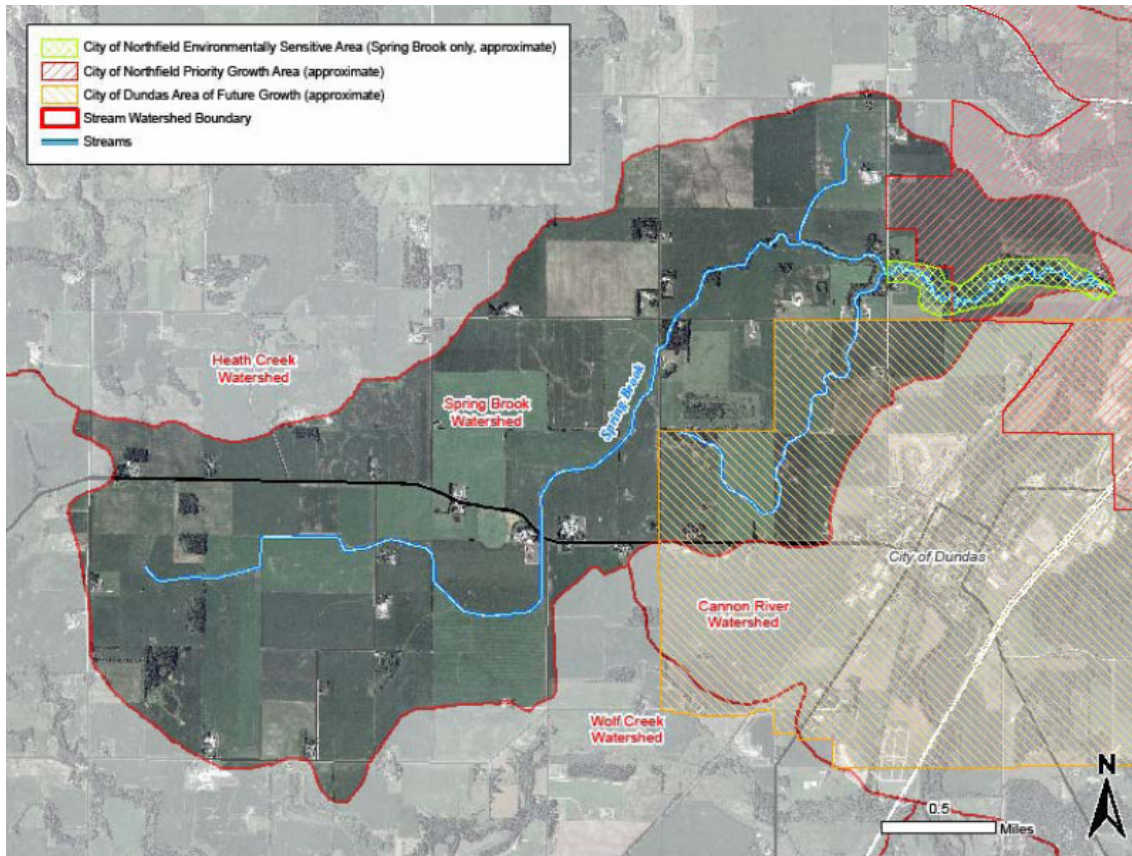


Figure 2. GIS map of Rice Creek (Spring Brook) Watershed showing Growth Areas of Neighboring Cities (CRWP, 2008)

Naturally reproducing brook trout streams were common in Southeastern Minnesota in earlier natural history of the state; however, few brook trout streams maintain healthy populations without regular stocking efforts. The loss of habitat meeting the requirements of the fish is the primary reason so many natural brook trout streams have vanished. Brook trout or ‘brookies’ require clean, cool (10-20 °C or 50-68 °F), clear water with a high oxygen content. As such Brook trout are very sensitive to landscape alterations and stream temperature increases. Recent studies by the Maryland DNR (Stranko, 2008) show the impact of landscape alteration and temperature on Brook trout populations. As development and urbanization have occurred in the Baltimore area, brook trout populations have been eliminated. Stranko reviews the range of threshold values at which impervious land cover negatively affects plants, animals and microorganisms in the stream. Ten to fifteen percent impervious cover in a stream catchment has most often been reported as the threshold for maintaining ecological integrity; however, certain sensitive organisms may be eradicated from streams when total impervious land cover exceeds 3 to 5%. Overall, correlations between stream ecological conditions and imperviousness are likely to be region, watershed, and species specific. They may depend on other landscape factors - soil type, forested land cover and surface water management strategies, such as distributed infiltration systems.

Even though a naturally reproducing population of Brook Trout calls Rice Creek home, the habitat is far from the ideal. Both Heath Creek and Rice Creek are currently on the state’s list of impaired waters, the 303d list. Rice Creek is listed for excess turbidity (2006), bacteria (2010), and nitrates (2010); Heath Creek is listed for turbidity (2008) and bacteria (2010). Sedimentation is a known problem in both streams and is detrimental to trout survival. Trout need clear waters to forage for food and to avoid predation by other organisms. Sediment accumulates over coarser materials such as rock and gravel needed to support the aquatic insects that are the major food source for trout. Rock and gravel bottom

structure provides suitable reproductive habitat for trout. Other habitat such as fallen trees or stable, undercut banks provide places for trout to wait for prey or to avoid predators. Temperature is critical for trout, as illustrated by Figure 3. Note that once water temperatures exceed 68 °F (20 °C) trout survival rapidly decreases; on occasion Rice Creek temperatures border on the high end of the range need to

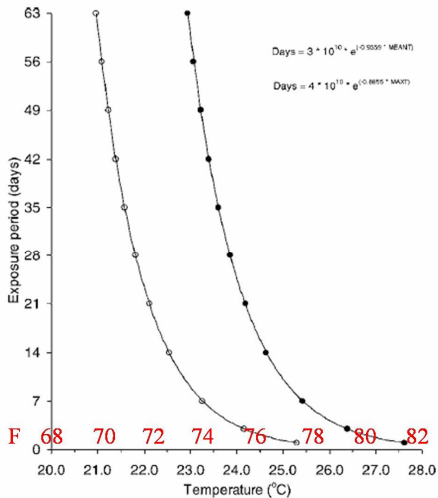


Figure 3. Estimates of two measures of thermal tolerance the maximum daily mean temperature (MEANT; open circles) and the maximum daily maximum temperature (MAXT; solid circles) of brook and brown trout as functions of exposure period. (Wehrly, 2007)

support a healthy trout population. (CRWP, 2008) In order to survive higher temperatures, the trout require deep pools for refuge. When stream banks are degraded due to lack of appropriate stabilization (e.g., vegetated buffers) and/or access to the bank by livestock, sediments build up in pools and silt them in thereby eliminating critical areas of habitat. Stable stream banks provide for a natural meander to occur in the stream, refuge habitats to form, and maintain appropriate flow to limit sediment build up. Seasonal flood events serve to scour additional sediment and attached algae from the system and help maintain a good gravel and rock bottom to the stream channel. As one can see, there is ample opportunity to improve the habitat for organisms along the two creeks, especially Rice Creek (Spring Brook).

Since local landowners submitted a request for annexation to the City of Northfield in July 2009, a group of concerned citizens, elected local officials, and staff from local governmental units (LGUs) gathered to share, listen and learn from one another. We aimed to discover information about the current state of the Rice Creek and Heath Creek Watersheds in an effort to update the 1999 Spring Brook Committee Report, to understand how city and township documents and ordinances speak to issues related to the watersheds, and to consider

proactive ways to sustain and improve the ecosystem functions of these areas as opportunities arise through future land use changes. To educate ourselves we solicited information from local scientists, the Cannon River Watershed Partnership, a trout habitat specialist with the Minnesota DNR, a former county ditch inspector, area farmers, Northfield Council Members, Northfield City Staff, Township Supervisors, habitat restoration agents, agricultural drainage experts, and local citizens engaged in agricultural practice and water monitoring.

Based on the dialogue at our meetings and the information we have discovered, we think there are ample opportunities to improve the current state of the watershed(s) through the cooperative action of local landowners, local, regional and state governmental units, nongovernmental organizations, development professions, scientific experts, educators, and concerned citizens. Challenges will arise in the adoption and implementation of recommendations from various stakeholders. We encourage approaches that build consensus, use common sense, avoid duplication of efforts, take advantage of local expertise and resources, and serve to both improve the quality of life in the area and the quality of the environment in which we live.

We make the following recommendations to landowners and governmental units within the watershed and to the general community within and in proximity to the watershed. These recommendations are consistent with the recently released report by the nonpartisan Citizens League (2009). Embedded within these recommendations is the recognition that the human element, with its individual, social and political actions, represents the greatest unknown component in the system.

Recommendations:

1. Conserve and protect the naturally reproducing brook trout community and improve trout habitat by following accepted guidelines for the conservation of cold-water streams. We suggest guidelines published by groups such as Trout Unlimited (Williams, 2006).
2. Local governmental units (LGUs), City of Northfield, City of Dundas and Bridgewater Township, must effectively work together to develop and implement a long-term monitoring project along Rice and Heath Creeks. We anticipate partnerships with the MN DNR, Rice County Soil and Water Conservation District, local/regional nongovernmental organizations, the colleges and citizen volunteers would be beneficial to sustaining and funding such an endeavor.
 - a. Emphasize the collection and analysis of current (baseline) information on the physical, chemical, and biological health of the stream. These data will permit one to track changes and support assessments that occur in the future. Adopt protocols that assure data quality. In 2008 a report on Rice Creek was published by the Cannon River Watershed Partnership.
 - b. Development will likely occur in small increments over long periods of time, 20+ years; consequently, long-term commitment to the collection and analysis of data related to the physical, chemical, and biological health of the stream is vital to assessing the impact of land use change and development decisions on the watershed.
 - c. Develop a plan and identify parties to monitor the following parameters: Temperature and turbidity (or transparency) - the most important and least expensive variables to monitor. Other important parameters include: bacteria (*E. coli*), nitrates/nitrites, phosphates, macroinvertebrates (*Ephemeroptera*, *Trichoptera*, *Plecoptera*), flow, discharge, groundwater recharge and habitat quality indicators.
 - d. Compile historical information on land use in the watershed and health of the stream to determine what has changed over the past century and determine what could be achieved through restoration and/or preservation, and development efforts.
3. Employ and coordinate stream protection tools available at each level of government: State of Minnesota, Rice County, Cities (Northfield, Dundas) and Townships (Bridgewater). Coordination and cooperation is especially important among LGUs with jurisdiction over planning and zoning in the watershed.
 - a. Form a group charged with protection of the watershed(s); a cooperative body within the framework provided by LGUs is of high value. A Joint Powers Board represents a formal, cooperative working agreement between LGUs. An alternative strategy could involve creation of a watershed district, but it does represent an additional layer of government. Brief descriptions of a joint powers board and a watershed district are included at the end of the document.
 - b. Require environmental studies to assess potential impacts on the stream before approving development projects. For example, hydrologic studies are needed to determine whether it is better to route stormwater out of the watershed or implement a distributed system to keep stormwater in the watershed closest to its origin. We strongly encourage designs that replicate the pre-settlement conditions - keeping water falling within the watershed staying within the watershed while simultaneously permitting infiltration.

- c. Adopt ordinances to ensure that development in the watershed, especially by and downstream of the springs located between Cates and Decker Avenues, has minimal impact on Rice Creek (Spring Brook). In this lower reach, trout numbers are highest and groundwater is very sensitive to pollution. Some good examples of low-impact development are Lakeville (South Creek and Vermillion River), River Falls (Kinnickinnic River), Stillwater (Browns Creek), Ramsey Metro Watershed District, and Inver Grove Heights.
 - d. Use overlay districts in land use planning and zoning that provide for recognition of environmentally sensitive areas needing stronger ordinance or planning provisions.
 - e. Adopt a stream protection ordinance or watershed management plan; a dated but good example exists in the form of the South Creek Management Plan (Lakeville, 2000). Require a riparian buffer that verifiably serves to capture sediment and inhibits pollutants from reaching the creek, promotes water infiltration, and stabilizes the banks of the creek. Buffer width will likely vary according to topography and functionality required of the buffer; see information in the most recent revised draft for shoreland regulations underway at the MN DNR related to trout streams or cold water streams. (Fisher, 2000; MN DNR, 2009) The stream protection must address infiltration of water associated with areas covered by impervious surfaces as well as temperature changes to the water associated with the impervious surface (CA EPA 2009, Herb 2007). A functional requirement that closely mimics the pre-settlement land character's ability to infiltrate rainfall is most desired; however, requiring up to a 2 inch rainfall to be infiltrated within the watershed in a highly distributed system is strongly encouraged.
 - f. Require low impact development best practices for all stages of the development process. This is especially critical in early development stages where high impacts can occur due to site preparation activities (e.g., clearing, grading, top soil removal). Keep as much rainfall within the watershed by encouraging green roof systems, rain gardens, small distributed wetlands; avoid traditional pipe and pond strategies.
 - g. Prepare proposals to obtain grant monies for habitat restoration, water-quality improvement, and parklands from the Legacy Amendment, Legislative-Citizens Commission on Minnesota Resources, and other funding sources. Private-public partnerships as well as partnerships with local institutions of higher education should be explored.
 - h. Seek MN land trust, state/DNR, city, or other public ownership for ecologically sensitive areas, especially in the riparian areas of the streams. Examples are the Kinnickinnic River Land Trust and DNR-purchased buffers on Eagle Creek (Savage) and the Vermillion River (Farmington). If public ownership of ecologically sensitive areas is not feasible, we encourage LGUs to work with individual land owners to provide public access to the areas along the creek and encourage land owners to practice good stewardship of land consistent with protection of the watershed. Use of easements should be considered as a tool.
4. Take actions to correct the water-quality impairments, MN PCA 303(d) list, through education, cooperation, incentives, ordinances, planning and zoning. A watershed or multi-watershed management plan is likely to be most effective in addressing the multiplicity of issues.
 5. Identify and prioritize problems in current land-use practices along the watershed. Work with landowners to implement or continue best management practices to protect and improve the ecological health of Rice Creek (Spring Brook) as well as Heath Creek.

- a. Maintain county ditches in ways that: 1) reduce sediment loads, 2) reduce temperature of tile and surface water flowing into the stream, and 3) reduce nutrient and pesticide loads. Enforce Minnesota Statute 103E.021, requiring permanent strips of perennial vegetation, 16.5 feet wide on each side of the ditch. Encourage planting native trees and/or shrubs on the south sides of ditches to promote shading of the water.
 - b. Explore the possibility of decoupling county ditch 22 from the stream. Terminating the ditch in a wetland prior to the springs feeding Rice Creek is one possibility. The impacts of this on the temperature, nutrient load, and sediment load of Rice Creek will need to be considered. The Public Land Survey System 1855-56 plat map indicates historic wetland areas to the west and southwest of the springs.
 - c. Encourage a prairie mix for creation of vegetated buffers; these plant species promote stream bank stabilization. The general consensus is that a wider vegetated buffer strip is generally better than a narrow one; wider buffer strips removed or capture more pollutants and sediments. Most researchers consider a minimum width of 100 feet combined with a slope modifier reasonable. (Fisher, 2000; MN PCA, 2009)
 - d. Enforce the state and county shoreland rules requiring 50 ft minimum width buffers of perennial vegetation along each side of Rice and Heath Creek. Encourage wider buffers when and where possible, see 5c.
 - e. Maintain forestation in areas with good canopy cover along the streams to cool waters as well as maintain terrestrial habitat connectivity.
 - f. Work with agricultural practitioners to implement conservation tillage strategies, promote rotational grazing, and minimize livestock access to the stream banks to improve water quality.
 - g. Discourage mining of gravel within the watershed
6. Encourage rehabilitating the historic wetlands in depressions upstream of the springs and around Cates Avenue. Wetlands serve to reduce nitrate and sediment loads, restore natural hydrology, and replenish the local groundwater system.
 7. Allow and increase public access to this unique resource in a way that is sensitive to the environment.
 8. Ensure that groundwater withdrawal does not impact the springs of Rice Creek or impact local groundwater recharge. Any new well drilling should require a hydrologic study and include modeling impacts to the groundwater system and local streams.
 - a. Protect drinking water sources for this area and the surrounding communities by ensuring abandoned wells are appropriately sealed and that industries do not store/produce quantities of pollutants that may spill into Rice and Heath Creeks or into well head capture zones of area residents/municipalities.
 - b. Discourage large withdrawals of groundwater.
 9. Individual and group septic systems work well when appropriately designed and maintained. Encourage best practices in design, care and maintenance of septic systems in use by rural residents. Regular inspections, on three years cycles, to ensure proper septic system functions are encouraged.

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A note about **Joint Powers Boards** and **Watershed Management Districts**

A joint powers board represents a working agreement between the cities and townships within the watershed. Any authority for taxation or rule-making must come from the municipalities and townships that make up their membership. Representation of the board is appointed by member municipalities and townships.

Watershed districts are special purpose local units of government that work to solve and prevent water-related problems. The boundaries of the districts follow those of a natural watershed, an area in which all water drains to one point. Minnesota has 46 watershed districts, most of which are named after the primary lake or river within the watershed. Minnesota's watershed districts do not cover the entire state. They are created at the request of local citizens, county boards or cities by petitioning the Minnesota Board of Water and Soil Resources (BWSR) under the procedures set forth in the Watershed Act. Laws that affect Watershed Districts are in Minnesota Statutes 103D. The watershed districts manage surface water and groundwater, can create and implement rules and have individual taxing authority among others.

For more information see

http://www.bwsr.state.mn.us/planning/WD-WMO_overview.html

<http://www.bwsr.state.mn.us/watermgmt/whatiswd.pdf>

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