

SOUTH BRANCH ROOT RIVER CLEAN WATER PARTNERSHIP PROJECT
REVISED PROJECT WORK PLAN
Submitted March, 1999

Mission Statement: To gather information and data to use in the development of plans for implementation of land use practices which protect and enhance water quality in the South Branch of the Root River and its tributaries.

GOALS AND OBJECTIVES

Goal/Program Element #1 *To prioritize the seven minor watersheds in the South Branch Root River watershed west of Forestville State Park to determine sensitive areas for future planning and implementation of best management practices.*

Objectives:

- 1) Utilize the Tailored Integrated Surface Water Assessment (TISWA) Ranking Guidance and other objective assessment tools to prioritize the minor watersheds based on both their contribution and susceptibility to ground and surface water problems. Assessment will take into account land use and land features, point and non-point sources of pollution, characteristics of the riparian zone and channel morphology, biotic and abiotic indicators of water quality, and other factors.
- 2) Incorporate minor watershed ranking data, land use data, updated soil survey data, CRP parcel data, karst feature information, and other related information into a Geographic Information System (GIS) for analysis in the development of implementation plans.
- 3) Map existing natural wetlands and drained wetlands, and prioritize them for preservation and/or restoration.

Goal/Program Element #2 *To continue investigations of prevalent karst conditions in this watershed that affect the intimate interrelationships between ground and surface waters.*

Objectives:

- 1) Complete springshed mapping within the watershed area using established dye tracing methods that have been used extensively in Fillmore County by the University of Minnesota and the MN Department of Natural Resources - Division of Waters. This information will then be used to compare the complex relationships between springshed boundaries and surface watershed boundaries that occur in a karst landscape which, in turn, has implications for predicting the consequences of land use practices in certain areas.
- 2) Determine ground water residence times using tritium analysis in the two aquifers used for most of the domestic drinking water supplies in the watershed in order to better understand the ground water recharge and potential sources of contamination.
- 3) Monitor the hydrologic, chemical, and physical responses of springs to major runoff events which directly impact water quality conditions in the surface and ground water resources downstream from the springs. Land uses in the contributing springsheds can then be studied to devise and implement practices to reduce the impacts from contamination contributed by runoff events.

4) Conduct geophysical studies in areas where depth to bedrock is uncertain to determine correlations between karst feature occurrence and bedrock depth. The probability of the occurrence of karst features is an important tool in understanding what types of land use practices are encouraged to reduce the potential for pollution.

Goal/Program Element #3 *To better understand surface water conditions in the South Branch Root River and its main tributaries.*

Objectives:

1) Develop and implement a systematic surface water monitoring program by utilizing a variety of monitoring tools, such as transparency tube measurements, biomonitoring, water flow measurements, and chemical analysis.

2) Evaluate the ecological conditions in the South Branch Root River and its tributaries by assessing fishery resources and habitat, invertebrate populations, and other biological indicators of stream health.

Goal/Program Element #4 *To communicate the project's goals and objectives to the residents and landowners in the watershed raising public awareness about the concept of a watershed and the benefits of watershed management.*

Objectives:

1) Utilize a variety of educational methods to inform the public about the project's goals and objectives and the results of the studies that are undertaken, and relating them to actions that individuals and groups can take to protect water quality.

2) Educate the watershed committee members about the issues of concern in the watershed to aid in making informed decisions about future implementation plans.

Ground Water and Spring Monitoring Plan

Tritium analysis of twenty samples from private wells in the two major aquifers used for domestic water supplies (Upper Carbonate and St. Peter-Prairie du Chien-Jordan) plus additional samples from public water supply wells (in cooperation with MN Department of Health) will be used to determine ground water residence times to gain better understanding of the recharge areas for those aquifers.

Two springsheds will be compared, one in which the majority of the land is in permanent cover and the other in which most of the land is under cultivation. Monitoring will include flow measurements during normal flow and during high flow events and collection of samples for analysis for stable isotopes.

Six dye traces per year will be completed in the watershed in order to better define springshed boundaries for those springs that supply several of the trout streams in the watershed. Three traces each year are funded from the CWP grant and three from the local water planning base grant. Four traces were completed in 1998, eight to ten are planned for 1999, with the remainder to be completed in 2000. Combining this information with land use

information for the springsheds will aid in making decisions about which BMPs to encourage which will offer the best protection for the springs which offers the dual benefit of protecting ground water and surface water.

Flow and Water Chemistry Monitoring Plan

One of the primary goals of this project is to better understand surface water conditions in the South Branch and its tributaries. Historical data is limited except for some information gathered related to the fisheries. The concerns about water quality in the project area are based mainly on residents' observations of the changes that have occurred over time and damages resulting from high-flow events.

Sedimentation, especially associated with high-flow events, has had negative impacts on fisheries and at Forestville/Mystery Cave State Park. There are historical accounts, both documented and anecdotal, of native brook trout populations that are no longer in existence, their demise believed to be due in part to increased sedimentation. Also of concern is increased nutrient loading from nonpoint erosion from agricultural land in the watershed. With the many interconnections in the karst landscape between surface water and ground water, increased nitrate levels are a health concern in drinking water supplies from wells constructed into the first bedrock aquifer. Phosphates, although not an immediate concern for the flowing streams in the watershed, do have negative impacts in the backwater lakes of the Mississippi River, as do nitrates. Potential sources of fecal coliform bacteria in the watershed include feedlots, manure applied to fields, failing septic systems and the municipal treatment plant in Ostrander. Not only are fecal coliform a concern during high-flow events, but also during low-flow when the water appears suitable for swimming and wading putting people in direct contact with potentially dangerous organisms.

Monitoring of the South Branch Root River and its tributaries will be divided into three levels utilizing three primary sampling sites on the main stem of the South Branch, five secondary sampling sites near the mouths of the major tributaries to the South Branch (Upper South Branch, Judicial Ditch #1, Etna Creek, Canfield Creek, and Forestville Creek), and the established sampling sites for the Citizen Stream Monitoring Program

The three primary sites along the main stem of the South Branch Root River are: 1) Upper South Branch just downstream from the confluence with Judicial Ditch #1, 2) Middle South Branch approximately four miles east of Ostrander downstream of the confluence with Etna Creek, and 3) Lower South Branch located in Forestville State Park. Sampling will take place twice per month from March through June and once per month from July through October for a total of 15 sampling rounds. Continuous stream stage measurements will be taken using automatic dataloggers installed at the three sites. In addition to the regularly scheduled samples, at least four samples will be taken at each site during high-flow events. Similar to the Citizen Stream Monitoring sites, transparency, temperature and stage measurements will be measured at the primary sampling sites, as well as dissolved oxygen (cooperatively with DNR Fisheries) and conductivity. Water chemistry parameters will include total suspended solids, turbidity, nitrate-nitrogen, ammonia-nitrogen, and total phosphorus. Fecal coliform samples will also be taken on five of the sampling dates with one or two during high-flow events. Total suspended particle analysis will be done on the high-flow samples to help better understand the sources of the sediment and the potential biotic impacts.

The five secondary sampling sites located near the mouths of each of the major tributaries will be monitored during the same four high-flow events as the primary sites. Stream stage will be measured manually, and the same chemical and field parameters will be analyzed.

As indicated above, all the same parameters will continue to be measured at the existing twelve Citizen Stream Monitoring sites at least on a weekly basis. On one pre-selected date, which will probably be in July, the volunteers will also collect a fecal coliform sample. Two additional samples analyzed for total suspended solids and nitrates will be collected by the volunteers, one during a high-flow event and one during lower flow as selected by the volunteer.

All sampling procedures will follow standard protocol following guidelines for holding time and preservation of the samples. Volunteers have been trained to follow the established protocol for the MPCA Citizen Stream Monitoring Program. They will receive additional training for sampling protocol for those samples to be analyzed for fecal coliform, total suspended solids and nitrates. All chemical analyses will be by a certified laboratory.

Quality assurance and quality control (QAQC) procedures will include analysis blanks, standards and duplicates. In order to evaluate sampling techniques, one field duplicate will be analyzed for every 10 basic chemistry samples for a total of six to seven duplicates. Ten percent will also be sample blanks and known standards. For quality control measures used in the laboratory, consult the QAQC guidelines that are attached for the MN Department of Health laboratory.

All laboratory results and field measurements will be entered into a spreadsheet format for ease of review, retrieval and analysis. An evaluation of the data quality, using such measures as standard deviation, percent of recovery of true value, number of representative samples, percent of true value, and replication of results, will determine the precision, accuracy, completeness, representativeness and comparability of the data. Any unusable data or data of questionable quality will be categorized as such to ensure that it does not compromise the quality of the usable data.

The data will be entered into STORET in a timely manner, as well as the spreadsheet format mentioned above. Data will also be analyzed and reported by subwatershed when appropriate. This information combined with the other assessments (crop residue surveys, feedlot inventory, wetland inventory, etc.) completed by subwatershed will aid in determining future implementation activities. Best management practices may vary depending on conditions and land use practices in each subwatershed.

Biomonitoring Plan

Winona State University staff and students will repeat the fish and invertebrate surveys at the same twelve sites surveyed in 1998. These data will be analyzed to formulate a more accurate assessment of overall stream health based on the number and type of indicator species found at each site. Additional sites may be added and/or additional information about other biological parameters may be gathered as opportunities arise, all of which will aid in understanding the ecology of the streams. Sampling protocol follows the EPA's *Rapid Bioassessment Protocols for Use in Streams and Rivers* (May, 1989). The Indexes of Biotic Integrity ratings calculated for each of the sites use methods outlined in the following documents: *Using the Index of Biotic Integrity (IBI) to Measure Environmental Quality in Warmwater Streams of Wisconsin* (1992) and *Development and Application of an Index of Biotic Integrity for Coldwater Streams of the Upper Midwestern United States* (1998) by Mundahl and Simon.

Project Support Budget

Sponsor/Contributing Sponsor	Cash Contributions	In-Kind Contributions	Total Project Support
Fillmore County	\$ 18,900.00	\$ 15,300.00	\$ 34,200.00
Mower County SWCD	\$ 1,500.00	\$ 8,300.00	\$ 9,800.00
Fillmore County SWCD	\$ 1,500.00	\$ 5,450.00	\$ 6,950.00
MN-DNR Division of Waters		\$ 19,500.00	\$ 19,500.00
MN-DNR Parks		\$ 900.00	\$ 900.00
MN-DNR Fisheries		\$ 900.00	\$ 900.00
Winona State University	\$	\$ 3,000.00	\$ 3,000.00
South Branch Root River Watershed Committee		\$ 3,600.00	\$ 3,600.00
TOTAL	\$ 21,900.00	\$ 56,950.00	\$ 78,850.00
Clean Water Partnership Grant Request			\$ 61,500.00
		Total Project Cost	\$ 140,350.00

Milestone Schedule

Program Element/Activity	Initiation	Completion
Subwatershed Assessments 1) Utilize TISWA and other assessments to evaluate contributions and susceptibility to ground water and surface water problems	Fall, 1998	Fall, 1998 complete TISWA Other assessments on-going to the end of the project grant period September, 2001
2) Consolidate existing information and incorporate new information about the subwatersheds into a GIS for analysis and development of implementation plans.	Spring, 1998 On-going process throughout the project grant period	September, 2001
3) Map existing wetlands and prioritize for preservation and/or restoration	Summer, 1998 Begin prioritization Spring, 2000	Field season, 1999 Complete mapping September, 2001 Complete prioritization
Karst Investigations 1) Springshed mapping - dye traces to delineate and better define springshed boundaries	March, 1998 Complete three per year funded by CWP + three each year funded locally	Field season, 2000

Program Element/Activity	Initiation	Completion
2) Tritium analysis of 20 wells in aquifers used for domestic water supplies and interpretation of results	Fall, 1999	September, 2000
3) Monitoring of springs for flow and chemistry during high flow events	Summer, 1999	Field season, 2000
4) Geophysical studies using ground penetrating radar and electroresistivity to determine depth to bedrock and detect buried sinkholes and crevices	Summer, 1998	Summer, 1999
Surface Water Monitoring 1) Develop and implement a systematic surface water monitoring program A) Citizen Stream Monitoring Network B) Flow and Water Chemistry Monitoring	A) Summer, 1998 B) Spring, 1999	A) On-going to end of project grant period B) September, 2001 and on-going beyond the end of project grant period
2) Biomonitoring surveys of fishery and invertebrates in order to assess overall stream health and ecological condition of the streams A) Freshwater mussel survey by Malacological Consultants, LaCrosse, WI B) Fish and invertebrate survey by WSU staff and students	A) Summer, 1998 B) Summer, 1998	A) Summer, 1998 B) Summer, 1999
Education 1) Publish two newsletters per year which is mailed directly to each resident and landowner in the watershed	March and November, 1998, 1999, 2000, & 2001	March and November, 1998, 1999, 2000, & 2001
2) Provide educational opportunities for watershed committee members (and others in the watershed) by holding at least one informational meeting related to water quality issues in the watershed/year	November, 1998	September, 2001
Administration 1) Hold at least six watershed committee meetings each year to update members on CWP project progress and discuss subsequent activities	March, 1998	September, 2001
2) Submit semi-annual and annual progress reports to MPCA as required in the CWP grant agreement and develop implementation plan for Phase II CWP	January, 1999 Annual Report July, 1999 Semiannual Report January, 2000 Annual Report July, 2000 Semiannual Report	September, 2001 Final report and Phase II Implementation Plan submitted