Cottonwood River

Restoration Project

October 1999

Final Report

Prepared by
Redwood-Cottonwood Rivers Control Area

FOREWARD

This study of the Cottonwood River Watershed represents the first step in a long process. The idea that rivers and streams are independent of human activities is no longer valid, and people now realize that water quality depends on what we, as watershed residents, do to the surrounding landscape. The completion of this study signals beginning of us taking responsibility for the future condition of the Cottonwood River.

A study of this type requires input from many sources and dedication of many individuals. Staff of the Redwood-Cottonwood Rivers Control Area (RCRCA) were responsible for gathering most of the information needed to complete the diagnostic portion of the report and writing and assembling the Final Report. Heather Offerman, in particular, provided significant contributions in the form of overseeing the sampling program, developing loading estimates, generating watershed maps, and researching watershed characteristics. Su Beran was instrumental in suggesting and developing many of the outreach components of the Implentation Plan, and, along with Sharon Voeks provided expert assistance in the final stages of editing.

Other individuals making notable contributions included Jim Doering, who, through his position with MPCA provided consistent, reliable support to the sampling program, making sure the equipment always functioned. Pat Baskfield, MPCA, also assisted with equipment needs related to the sampling program. Greg Payne of the U.S. Geological Survey offered guidance in setting up the monitoring network and provided insight into the meaning of the water quality data. Joe Magner, MPCA, devised the tailored integrated stream and watershed assessment (TISWA) methodology and guided us in its application. Cis Berg at the Water Resources Center in Mankato developed GIS data layers and guided us in their use.

Others, too numerous to mention had a hand in shaping the goals and objectives of the Implementation Plan and for their support and encouragement we are thankful. Not the least of those involved are the many watershed residents that, over the years, have expressed a desire to do something that would benefit the Cottonwood River. Finally, support of the RCRCA Board of Directors cannot be overlooked, because for it is because of the vision and commitment of the Board that an opportunity existed to pursue this watershed study.

The point of doing a study and developing a watershed plan is that we care about the Cottonwood River, today, and into the future. We think other watershed residents care as well and that they are committed to making this plan successful and the Cottonwood River healthier.

Robert Finley
Executive Director, RCRCA

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Executive Summary

The purpose of this study was to document factors affecting sediment and nutrient transport to the Cottonwood River, and to determine reductions necessary to meet both main stem and tributary goals. The study defined characteristics of specific pollutants, the processes affecting their transport, and appropriate measures to reduce their delivery to the Cottonwood River. Priority management areas were selected based on relative contributions to the total sediment and nutrient load in the River. Attitudes and opinions of watershed residents were explored as they relate to water quality and measures for its protection.

The Cottonwood River Watershed encompasses 1,310 square miles, and is one of thirteen major watersheds in the Minnesota River Basin. The River originates on the Coteau des Prairies, flowing eastward approximately 150 miles to the Minnesota River, with a drop in elevation of about 750 feet. This topography results in periodic spring and summer flooding in the central portion of the watershed. At times, damages are severe. A related implication is rapid transport of sediment and attached nutrients from inadequately treated cropland during spring snowmelt and spring and summer rainfall events.

Nearly all wetlands have been drained by a highly efficient and interconnected artificial drainage system. This drainage system has allowed agriculture, the primary land use, to flourish. Corn and soybeans are the main crops grown in the watershed.

The study's primary research tool was a water quality monitoring program used to gather data at three main stem locations and six tributary sites. Streambank erosion assessments were made at several locations along the lower reach of the Cottonwood River. A fishery survey was used to assess populations and species diversity. Land use and physical characteristics of the watershed were analyzed through application of Geographic Information System (GIS) data layers. These evaluations were supplemented by field observations using the tailored integrated stream and watershed assessment (TISWA) methodology.

Annual sediment (TSS) loading from the Cottonwood River in 1997 was estimated at over 330,000 tons, or 252 tons per square mile. Total phosphorus (TP) was estimated at 505 tons. These are much higher figures than reported in earlier studies of the Cottonwood River. Highwater and Dutch Charley Creeks exhibited the largest sediment yield of all sampled tributaries, annually delivering approximately 136 tons per square mile, based on data collected in 1997 and 1998. Additionally, highest flow weighted mean concentrations of total suspended solids and total phosphorus of all sampling stations, including those on the main stem, were recorded on these two tributaries. Sleepy Eye Creek contributed a high nitrate nitrogen load during the study period, but a much lower sediment load than expected. Throughout the study period, flow-weighted mean concentrations of sediment and nutrients on the main stem and most tributaries exceeded expected values for minimally impacted ecoregion streams.

Recreational opportunities on the Cottonwood River are limited by degraded water quality, channel obstructions, limited access, and a general lack of awareness by watershed residents. Potentially, the river is a major recreational resource.

Ten-year goals and objectives were established in the areas of water quality, public participation, and recreation. Main stem and tributary water quality goals will require pollutant reductions of twenty-five to thirty percent. These will be accomplished by concentrating best management practices (BMPs) within priority management areas. The public participation goal will emphasize citizen involvement in watershed monitoring and observation activities. Developing means for people to personally experience the river will help achieve the recreational goal.

Project evaluation will be accomplished through continued water quality monitoring at five stations, citizen surveys, fishery and watershed inventories and assessments, and BMP tracking.

The estimated cost to carry out the six-year implementation plan is slightly under $10 million. About fifty percent of this amount will be used to convert cropland to permanent vegetation and wetlands. These funds will be derived from existing federal and state land retirement programs. Clean Water Partnership low interest loans will be used to upgrade septic systems, increase residue management, and reduce livestock impacts on water quality. State and federal cost-share funds will be used to cover costs related to other best management practices listed in the plan. Additional staff positions will be created to assess needs within priority management areas and work with landowners to select and implement appropriate practices.