



Working Together:

A Plan to Restore the Minnesota River

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Minnesota River Citizens' Advisory Committee's
Final Report to the Minnesota Pollution Control Agency

WORKING TOGETHER: A PLAN TO RESTORE THE MINNESOTA RIVER



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**Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194**

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“The grand circle of movement of water from ocean to atmosphere to continent and back to ocean is the essential mechanism that allows organisms — including humans — to emerge, to develop, and to live on Earth.”

— Luna Leopold

December 1994

The Minnesota River Citizens' Advisory Committee was formed to assist the Minnesota Pollution Control Agency and other collaborators in developing viable options for improving water quality in the Minnesota River. After many months of discussion and deliberation, we have developed a series of recommendations that we believe will move us closer to achieving the goal of a fishable and swimmable river by the year 2002.

In this document, we present some background information and some recommendations. The document does not provide the level of detail that agencies may need to guide internal decision-making. What it does include, however, is a set of recommendations that will provide the framework for continued discussions among those who care about the future of this great river.

We invite you to consider the steps we have outlined herein. We urge you to help define a sensible path for improving land and water within the Minnesota River basin.

The Minnesota River Citizens' Advisory Committee

WORKING TOGETHER: A PLAN TO RESTORE THE MINNESOTA RIVER

EXECUTIVE SUMMARY

In September 1992, Governor Arne Carlson issued a challenge: Make the Minnesota River swimmable and fishable within 10 years. This is an ambitious goal. It will require all Minnesotans to make a major financial investment and to make some fundamental changes in the ways we manage land and water.

The Minnesota River Citizens' Advisory Committee here presents a plan to meet Governor Carlson's challenge. The Committee, 30 members strong, represents the geographical and cultural diversity of the Minnesota River basin. There were members from Big Stone Lake to the mouth of the river and everywhere in between. There were farmers, county commissioners, conservationists, business people, and representatives from several state and local agencies. They met more than 30 times over a two-and-a-half year period, hearing presentations from experts in a wide variety of disciplines and discussing at length the river's problems and potential solutions. The recommendations outlined in this executive summary and detailed in the body of the report chart the path that the Committee believes must be taken to restore the Minnesota River.

Recommendations

Restore floodplains and riparian areas

It is time to restore the Minnesota River floodplain to its natural purpose. The Reinvest in Minnesota (RIM) program, in concert with local and federal initiatives, should acquire all of the Minnesota River floodplain between Jordan and Big Stone Lake — roughly 200,000 acres in all. Procurement should be made with willing landowners through permanent easements and selective fee-title acquisitions.

Riparian areas — the vegetative buffers along river banks — should be reestablished along all of the Minnesota River's major tributaries. Special attention should be given to connecting riparian areas to non-riparian natural areas so as to create corridors for wildlife.

Restore wetlands

In the Minnesota River basin, more than 90% of the original wetlands have been drained or filled. We must restore some of those wetlands. We should begin by purchasing perpetual easements on lands that will be inexpensive to restore, that offer the biggest "return" in the form of pollution reduction, water retention and habitat restoration, and that landowners want to restore. The RIM program and the U.S. Fish and Wildlife Service wetland restoration programs should be funded at sufficient levels to meet the demand from all landowners who want to participate.

Manage drainage ditches and storm sewers as tributaries

We must acknowledge that these drainage systems are in fact tributaries of the Minnesota River. We must recognize that the amount and quality of water they convey has a major impact on the physical, chemical, and biological characteristics of the Minnesota River and its tributaries. If we are to achieve a swimmable and fishable river, we must revise the state drainage code to weigh the environmental

costs against the economic benefits of ditch projects, and we must require treatment of all urban storm water before it is discharged into natural bodies of water.

Improve land management practices

The cleanup of the Minnesota River can only be accomplished when we recognize that the quality of the water is determined by what we do on the land. Widespread adoption of responsible land-use practices on the part of homeowners, farmers, developers, businesses, and government agencies will significantly reduce polluted runoff to the Minnesota River. We should provide more financial incentives for whole-farm resource planning, and, in cases where voluntary compliance is not working, we must establish certain mandatory land-use practices.

Monitor water quality throughout the Minnesota River basin

It is essential for us to precisely measure the impact that our efforts are having. We need to know how dirty the river is now, how much cleaner it becomes as we implement our restoration plans, and when we have achieved a swimmable, fishable river. In order to do that, we will need to establish a permanent water-quality monitoring network throughout the river basin. The Minnesota Pollution Control Agency should establish state-of-the-art monitoring stations at the mouths of the 12 major tributaries of the river, and local organizations and units of government should install a network of monitoring stations in their watersheds. All of the data gathered should be housed in an academic institution and made readily available to the public.

Establish a "Minnesota River Commission" to oversee the cleanup effort

A new institutional structure is needed to ensure government accountability and citizen participation in meeting Minnesota River cleanup goals. The Citizens' Advisory Committee proposes the creation of the Minnesota River Commission. Composed of private citizens as well as representatives of local organizations, state agencies, and the Dakota communities in the river basin, the functions of the commission will be to establish specific goals for the cleanup effort, provide broad oversight of major agency activities, evaluate the effectiveness of expenditures, and holding an annual conference on the state of the river.

Establish local joint powers agreements

The major goals for the river basin will be developed by the Minnesota River Commission, based on the work of the Citizens' Advisory Committee and the Minnesota River Assessment Project. The strategies used to accomplish these goals, however, should be developed and managed at the local level. The counties and other units of government within each of the 12 major watersheds in the Minnesota River basin should establish joint powers agreements which allow them to collaborate and share responsibilities for improving the water quality in their particular watershed.

The Minnesota Pollution Control Agency and the Metropolitan Council are now in the process of developing "pollution load allocations" for each of these watersheds. It is imperative that this work be completed as soon as possible. Pollution load allocations specify the amounts of various pollutants that

can safely be discharged from a particular watershed. The information will be used by each of the joint powers organizations to develop their cleanup strategies.

Improve technical assistance to local governments

Technical expertise is a major limitation for local organizations trying to address nonpoint source pollution in the Minnesota River basin. The lack of technical capabilities at the local level manifests itself in an inability to satisfactorily define local problems, set realistic goals, and carry out successful implementation programs. State government, through its agencies and university system, has an obligation to guide local governments in building the expertise that is needed to successfully implement water cleanup projects. Guidance is needed in a number of areas, such as designing surface water monitoring networks, establishing water quality goals, training in the use of Geographical Information Systems, creating design standards for pollution abatement measures, and interpreting research findings.

Engage the general public

Citizens throughout the basin need to come to understand the costs of a polluted river, the benefits of a clean river, and the actions they can take to help make the river clean. Within each of the 12 major watersheds, citizens should be involved in developing shared visions of social, economic, and environmental health. Unlike some educational programs, the emphasis should not be on materials development but on encouraging citizen participation. Existing information exchange and peer support networks will be utilized and supplemented as necessary. Examples include chapters of the Sustainable Farming Association of Minnesota, Clean Up our River Environment, Land Stewardship Project, Friends of the Minnesota Valley, Coalition for a Clean Minnesota River, Citizens for Big Stone Lake, ridge till clubs, and other groups where farmers and urban residents are encouraged to share information on sustainable practices.

Enforce existing laws

Minnesota has many laws designed to protect water quality. Unfortunately, the laws are not always enforced. A strengthened and coordinated system of enforcing existing environmental laws is needed at both the state and local levels. To start, the newly formed Minnesota River Commission should convene a conference on enforcement to develop a thorough assessment of enforcement problems. Additional resources will be needed to train enforcement staff. We will need to hire more DNR conservation officers and other staff. We should appoint a Minnesota River ombudsperson who will act to ensure that violators of the law are prosecuted when a state or county government has failed to do so. And the Office of the Legislative Auditor should conduct periodic audits of state and local governments charged with enforcement activities.

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BACKGROUND



Minnesota River Basin



A HISTORICAL VIEW OF WATER QUALITY IN THE MINNESOTA RIVER – PUTTING THE MINNESOTA RIVER ASSESSMENT PROJECT INTO PERSPECTIVE

The word “Minnesota” has no clear translation in the Dakota language. “Somewhat clouded” or “sky-tinted” water — “not blue, but rather the color of a clouded sky,” are now more accepted translations.

An appreciation for the Minnesota River in its natural state is important to framing a common vision of what the river could become in the future. Changes in the river have come gradually over 130 years. Constructing a picture of the river during presettlement days is more art than science, since readers of history may draw different conclusions from the same information. The historical record cannot substitute for highly technical, scientific data, but by exercising discretion in the use of historical records, it is possible to describe, with reasonable accuracy, the changes in the physical condition of the Minnesota River.

Early explorers of the Minnesota River Valley lacked precise tools for measuring and evaluating soil, water or biological systems. They did, however, compile a valuable record of careful observations and personal perspectives from their journeys through the Minnesota Valley during the early 1800s.

What can be said with reasonable certainty is that the river was a cleaner, more healthy system before Europeans settled in the valley. The explorers’ journals described river water that was safe for drinking and human contact. The river system at that time supported healthy populations of fish and wildlife. Wild rice, which requires stable water levels and clear water to grow, was commonly found along the river above Mankato.

How much sediment was naturally carried by the Minnesota River is a matter of current debate. The word “Minnesota” has no clear translation in the Dakota language. “Somewhat clouded” or “sky-tinted water — not blue, but rather the color of a clouded sky” are now more accepted translations (1). This translation appears to complement the descriptions of the early explorers who noted that the river looked as if “whitish clay had been dissolved in it” and that it was “slightly troubled, a little whitish, without transparency in the water.” (2)

The precise condition of the river during presettlement times will never be able to be proven; however, early studies of the river, conducted at the turn of the century, indicated that significant changes in water quality had already taken place.

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Historical Studies on the Minnesota River Reveal Consistent Themes

Research conducted over the past 87 years reveals a consistent pattern of information about the quality of water in this river basin. Studies conducted as early as 1907 by the U.S. Geological Survey describe the Minnesota River as one which “carries a noticeable quantity of organic matter, as evinced by the nitrogen determinations. Nitrates are found in measurable quantity and nitrates and nitrites are present, especially during flood time” (3). In addition to these findings, this study found that the river contained excessive levels of bacteria and experienced high turbidity during runoff events.

As early as 1934, the Minnesota Health Department found that the river suffered from the effects of pollution coming from industrial, domestic and farm runoff.

In 1934, the Minnesota Health Department found that the river suffered from the effects of pollution coming from industrial, domestic and farm runoff. Their report found that although the river was “used for bathing at a great many places,” it was unfit even then for human contact (4). At that time, habitat within the Minnesota River system was already considered “unfit for the development of fish” (5).

Throughout the 1960s and ‘70s, additional research efforts on the river revealed similar results. Much of the emphasis at that time was on getting point sources of pollution under control, specifically pollution coming from industries and municipalities. During those years, a number of wastewater treatment plants were built or upgraded to alleviate domestic sewage problems coming from cities along the river.

Significant achievements were made in addressing point sources of pollution during the 1970s, especially in the lower Minnesota River. As the very visible and obvious domestic sewage was eliminated from the river, another pollution source became the focus of attention. This type of pollution, called nonpoint source pollution, was the result of overland runoff. This kind of pollution results when rain or melting snow move over the land, carrying a variety of pollutants to rivers, lakes and streams.

Nearly all of the studies that have been conducted on the Minnesota River, describe the same general problems — frequent violations of instream water quality standards for bacteria and turbidity; occasional violations of standards for ammonia; and moderate-to-high levels of suspended solids, oxygen-demanding substances, nitrates and phosphorus (6).

A study done in 1985, which focused on the quality of water in the lower Minnesota River, found that its problems were in part caused by the movement of pollutants from the upstream portion of the river basin. The study’s authors observed that “implementation of a constructive and sustained basin-wide program dealing with surface runoff related to

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sources of nonpoint pollutants and soil erosion is critical to the ultimate achievement of water quality objectives.” (7).

The Minnesota River Assessment Project

Nearly all of the studies that have been conducted on the Minnesota River describe the same general problems -- frequent violations of instream water quality standards for bacteria and turbidity; occasional violations of standards for ammonia; and moderate-to-high levels of suspended solids, oxygen-demanding substances, nitrates and phosphorus.

The Minnesota River Assessment Project (MRAP) involved gathering scientific data on the river over a four-year period, from 1988-1992. A number of other studies on the Minnesota River have been completed; however, none of these has painted a clear picture of how the river ecosystem is being affected by human activities on the land. As analytical techniques have become more sophisticated, technicians are able to better understand the ways in which pollution enters the system and how it affects the water chemistry and biological systems in the river and its tributaries.

The Minnesota River Assessment Project Report has drawn considerable attention since it was released in early 1994. Since that time, a great deal of information about the river has been presented through the media, public forums and special meetings with citizens. Reactions to the report were varied. Some were skeptical of the results and disputed their accuracy. Others felt that the study merely corroborated what they already knew from living day-to-day on the river.

UNDERSTANDING THE MINNESOTA RIVER TODAY

Pollution in the Minnesota River and its tributaries has significantly diminished the value of these waters for recreation, fish and wildlife habitat and scenic beauty. The lower reaches of the Minnesota River, from Shakopee to its confluence with the Mississippi River, no longer provide water of sufficient quality to support recreational activities such as fishing and swimming. In many areas of the river basin, pollution has degraded water quality below what is needed to support healthy fish and invertebrate populations. In some tributaries of the river, water quality has been so degraded that very little aquatic life can survive.

Since the early part of the century, a variety of government policies related to development, agriculture and flood control have actually contributed to both water quality and quantity problems.

The condition of the Minnesota River is a reflection of the ways in which we are managing the land within its discharge area or watershed. It is important to acknowledge that the Minnesota River basin has generated wealth and prosperity as a result of these land management activities; however, the negative impacts of those activities are often not acknowledged. Data recently collected through the Minnesota River Assessment Project makes a compelling case that the Minnesota River is in trouble and that its problems are largely caused by the cumulative impact of individual activities on the land. These activities include knowing violations of the law as well as day-to-day actions that are assumed harmless. Members of society have held firmly to the belief that each individual has a right to engage in private actions on private land. Some activities detrimental to water quality have been restricted by a variety of laws and regulations; some detrimental activities have gone unchecked.

Public policies have also played a role in the river's decline. Since the early part of this century, a variety of government policies related to development, agriculture, and flood control have actually contributed to both water quality and quantity problems by providing incentives to drain wetlands, to farm in marginal areas, to remove important buffer zones along tributaries, and to build dams and levees along the river. There have been a variety of mixed messages given to landowners regarding what are the appropriate practices and technologies to apply on their land.

"A river is only local to those who do not think or have not learned to see."
-Andy Russell

The impacts of a degraded Minnesota River spill over into waters of another great river — the Mississippi. The Minnesota River is the largest single source of pollution to the Mississippi River. When the two rivers converge at Fort Snelling, water quality in the Mississippi is degraded significantly. As the state which serves as the headwaters for the Mississippi River, Minnesota has an obligation to deliver clean water to its downstream neighbors. The responsibility for maintaining clean water in

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these rivers and for our downstream neighbors rests with each individual and each community within their watershed boundaries.

There are very real public costs that we will bear if we allow the Minnesota River to remain in its present state. These costs include the loss of plants and animals, fish for eating, increased drinking water treatment costs, increased public health risks, loss of topsoil for agricultural production, reduced visual appeal, dredging costs, and payments for flood damages. In addition, there is lost economic potential for communities when recreation and tourism industries cannot succeed due to poor water quality and limited aesthetic appeal of the river.

We “must look again at the conventional wisdom of using a river as a resource, not treating it as a living thing.”
-Andy Russell

We are at a critical juncture in defining a future for the Minnesota River. We can no longer accept the river as it is now, with its limited uses, diminished economic potential, and the heavy cost associated with doing nothing to improve it.

Instead, we must find ways to improve the river in a way that will improve economic stability for those who live in the river basin. As we develop ideas regarding what can be accomplished, we must ensure that responsibility for change is shared fairly among those who live in the river basin. For example, a better balance is needed between harshly regulating point sources of pollution, such as wastewater treatment plants and industrial facilities, and doing little or nothing to address rural and urban runoff problems.

WHAT IS THE MINNESOTA RIVER CITIZENS' ADVISORY COMMITTEE?

In May 1992, the Minnesota Pollution Control Agency (MPCA) convened the Minnesota River Citizens' Advisory Committee. The committee was brought together to assist the MPCA in defining reasonable and effective ways in which to reach water quality goals that have been established for the lower Minnesota River.

"There is a new organization of citizen effort, a new system of environmental laws and programs, new interpretations of old customs, new cracks in the old order."

-Thomas Waters

The Citizens' Advisory Committee was a diverse group of 30 individuals. Members of this committee were nominated by individuals and organizations across the river basin. They represent various occupations, affiliations and geographical areas of the river basin (see Appendix A for a list of committee members).

How did the committee accomplished its task?

Early in its process, the committee accomplished several important things. First, the Citizens' Advisory Committee developed a mission statement and goals to serve as a framework for their process. The mission statement reads:

The Citizens' Advisory Committee shall develop a set of recommendations for improving water quality, biodiversity and the natural beauty of the Minnesota River.

Goals included the following:

- encourage local units of government, other entities and individuals to play a major role in implementing solutions to Minnesota River problems
- encourage improved intergovernmental cooperation
- encourage equity between what will be expected of rural and metropolitan areas in solving problems
- significantly improve public involvement and awareness
- ensure viable farms, rural and urban communities in the river basin.

During the first year or more of its process, the committee heard testimony from a variety of environmental professionals who have been involved in studying the river. These presentations led to the identification of several issues that the committee was interested in learning about in greater detail.

Background

The key issues we identified were: 1) the impact of land use on the quality and the quantity of water in the Minnesota River, and 2) how drainage specifically might be affecting the river. The committee has also heard from landowners, business people, academic experts, agency representatives, and other interested parties who wished to share their views on water quality in the Minnesota River.

Based on the information it had received so far, the Citizens Advisory Committee released a Progress Report in January 1994. Shortly thereafter, the committee held a series of open houses across the river basin. Descriptions of the Progress Report and the open houses appear below. The work of the Citizens' Advisory Committee culminated with the release of this report.

Comments on the Progress Report

The Citizens' Advisory Committee Progress Report was released to the public in January 1994. The public was asked to comment on the conclusions that the committee had drawn. The committee received approximately 30 written responses. The overwhelming majority of comments were supportive and positive. As one respondent put it,

“I commend you on your efforts to this point. Now we need action, not just talk, meetings, etc. Your report is good but somewhat general. We need specific ideas to act on that will improve the quality of the river. We also need to educate the general public. This is where your report can do some good. Keep it up!”

Most respondents felt that the problems of the Minnesota River should be addressed in a serious, sustained way. Respondents urged the committee to advocate for a number of actions that they felt would help the river recover to a reasonable level of quality. Individuals urged action in the following areas:

- general public education and outreach
- improved fertilizer and manure management
- promotion of minimum and no-till cropping practices
- development of a permanent Minnesota River Advisory Committee
- organization and promotion of local level initiatives for the river
- provision of adequate funding to state cost-share programs and land retirement programs
- improved enforcement of existing regulations (feedlots, permitted facilities)
- promotion and funding for wetland restorations

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- review and revision of the drainage code
- better control of storm water runoff in cities and towns
- enforcement of laws requiring installation and maintenance of septic systems

Public Participation at Minnesota River Open Houses

- Verbal comments at the open houses

In addition to receiving written comments on the Progress Report, members of the Citizens' Advisory Committee had an opportunity to talk directly to the public at four open houses held throughout the river basin during February and March of 1994. Approximately 330 people attended those meetings. Included in the open house displays were the Citizens' Advisory Committee's draft recommendations that the public could review.

Many participants voiced support for the project and were glad that something was finally being done to improve the river system. A number of people provided anecdotal evidence regarding the condition of the river during their lifetimes. Others acknowledged that the river was polluted, but that no one group should be blamed for its current condition. Strong opinions were voiced in defense of the farming community, with a number of farmers feeling that agriculture is being unfairly blamed for the river's problems. Many farmers felt that they were not being given adequate credit for what has already been accomplished by conservation measures in the basin.

Finally, many of the participants raised concerns about how the feedlot enforcement program was being handled by the MPCA and the Minnesota Department of Natural Resources (DNR) and questioned the wisdom of the current approach.

- Written comments from the open houses

The written comments that resulted from these meetings indicated a diversity of perspectives regarding what should be done to improve water quality. In general, people seemed to support the draft recommendations that were presented by the committee. Many supported the same kinds of actions that those who commented on the Progress Report were advocating for — greater public education, more citizen involvement, more funding for land retirements, etc.

Some of the written comments reflected real concerns about the draft recommendations. Some individuals felt there should be a greater respect

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for property rights and individual freedoms. Others were concerned that state agencies would make best management practices mandatory and use regulatory “hammers” to force change. Many participants felt that farmers and others needed education and positive incentives instead.

How is the Minnesota River Assessment Project related to the work of this committee?

Data and information that have been gathered through the Minnesota River Assessment Project have played a significant role in this planning process. The Minnesota River Assessment Project was a four-year, intensive study of the water quality in the Minnesota River basin. The study involved numerous federal, state and local government agencies and was completed in January 1994. This information proved valuable to focusing the work of the Citizens’ Advisory Committee over the past two-and-a-half years. An overview of the MRAP Findings appears in Appendix D.

GENERAL FINDINGS OF THE CITIZENS' ADVISORY COMMITTEE ABOUT THE MINNESOTA RIVER BASIN

In order to fully understand the effects of human activity on the Minnesota River, we must take a broader view of the entire system, recognizing the interactions between land, water and people.

The Minnesota River is an impressive state resource stretching 335 miles from the western border of Minnesota to its confluence with the Mississippi at Fort Snelling. The Minnesota River drains a 16,770 square-mile area, which includes all or part of 37 counties in Minnesota. Several counties in Iowa and South Dakota are also part of this expansive watershed. The Minnesota River flows through some of the richest agricultural land in Minnesota. Approximately 92 percent of the land area within the river basin is agricultural (8).

A serious deterioration in the river's water quality has resulted from both agricultural practices and urban development within the river basin. As prairie soils have been exposed to the ravages of wind and water, erosion has occurred throughout the contributing watersheds. Wetlands that once purified water, were important homes for fish and wildlife, and stored flood waters throughout the basin were drained and farmed. Large-scale use of agricultural chemicals (fertilizers and pesticides) have contributed to the decline in water quality. Land that once captured and stored rain and snow melt was paved over in favor of cities, suburban development and roads.

As a result of these activities, soil, pesticides, animal wastes, fertilizers, paints, litter, oil, grease and other chemicals have been transported to the river through storm sewers, tiles, ditches and overland flow.

Inadequate sanitary sewer systems from towns and cities (often referred to as point sources) have also historically plagued this river. Most of these systems have been improved or replaced by effective treatment systems; however, some smaller communities and most rural households continue to discharge untreated or inadequately treated wastewater directly to surface waters throughout the basin (9).

The state of Minnesota is mandated by the Clean Water Act to ensure that water quality standards in the river are maintained. The United States Environmental Protection Agency has given the MPCA until 1996 to reduce nonpoint source pollution (contaminated runoff from the land) in the lower Minnesota River by 40 percent. Scientific models have shown that if nonpoint sources of pollution can be reduced by this amount, the lower reaches of the Minnesota (between Shakopee and the mouth of the river) will sustain aquatic life, even during summer, low-flow conditions (10).

What are the principal factors affecting the quality of the Minnesota River?

In order to fully understand the effects of human activity on the Minnesota River, we must take a broader view of the entire system, recognizing the interactions between land, water and people. All have some influence over the quality of the river environment and its surroundings. Because these three elements so strongly influence water quality in the Minnesota River, each will be discussed separately. We recognize that, in reality, they are inseparable.

Water

The Minnesota River is being degraded by high levels of nutrients (such as nitrogen and phosphorus), bacteria, and sediment. These pollutants cause the river to have low levels of dissolved oxygen, be unsafe for swimming, and have poor aesthetic qualities due to high turbidity. Sedimentation and habitat degradation are major negative forces affecting biological communities in the Minnesota River. Recreational opportunities, fishing, and other domestic and industrial uses of the river are also significantly diminished as a result of degraded water quality.

a. Water quality

Nutrients

Nutrients are being delivered to the Minnesota River largely from agricultural areas. The Minnesota River environment is currently being degraded by nutrient enrichment — or excessive levels of nutrients, both nitrogen and phosphorus. The sources of these pollutants include commercial fertilizers and animal wastes. In most cases, nutrients are noted for the positive influences they have on improving crop yields and helping plants to grow. In water environments, however, high levels of nutrients create an imbalance in water chemistry and in plant and animal life. When plants and algae die, the decomposition process removes oxygen from the water. Without proper levels of dissolved oxygen, the entire biological community in the river can be affected (11).

Suspended solids/sedimentation

The Minnesota River regularly carries heavy loads of sediment and organic matter. These suspended solids give the river its turbid or muddy appearance. As the water in the river rises, the amount of suspended

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material in the water also rises. As the river level drops, the amount of material in suspension also falls. In the river, silts and clays represent a large proportion of the suspended material. Silts and clays are very fine particles which, once in suspension, do not settle out easily. Finer material has a greater impact because it is easily transported long distances in the river (12).

“Rivers form lifelines, housing fisheries of eclectic diversity.”
-Tim Palmer

Reduced water clarity in the river significantly reduces the amount of sunlight that penetrates the water. Without proper light conditions, photosynthesis is reduced in rooted aquatic vegetation and microscopic algae. Aquatic plants and algae are critical to providing proper levels of oxygen, habitat, and food for aquatic insects and fish.

High levels of suspended solids are also harmful to fish species by making sight-feeding difficult and by smothering important fish nest sites and their eggs. In addition, toxic substances and phosphorus attach to sediment particles and are then carried to the reservoirs and wetlands along the river. Finally, suspended solids greatly affect our ability to use the water for activities such as swimming, boating, drinking, industrial processing and fishing.

Bacteria

The Minnesota River often carries high levels of bacteria. High bacteria counts occur under both low and high flow, suggesting that some bacterial inputs are constant, such as inadequate municipal treatment plants, septic systems, and directly discharging feedlots (13). A constant source of bacteria enters the river and is evident at both low flow and during runoff. These bacteria levels are often found wherever human and/or animal wastes are present. Infectious diseases, which are often associated with these bacteria, may also be present. Recreational activities, such as swimming or canoeing, that involve body contact with the water are no longer possible when bacteria levels are too high.

b. Biological diversity

The combined effects of human settlement in rural and urban areas within the Minnesota River basin have resulted in significant changes in the physical environment. The health of plant and animal life in the river is an indicator of the quality of the physical environment in which they live. Within the Minnesota River and its tributaries, many impacts to life forms in the river are a result of habitat alterations (such as channelization, diking, and drainage activities) and sedimentation in which they live.

Background

The combined effects of human settlement in rural and urban areas within the Minnesota River basin have resulted in significant changes in the physical environment.

Smaller, headwater streams in the Minnesota River basin appear to be more seriously affected by habitat alteration than the larger streams and main stem of the river. This becomes an important issue when one considers that these headwater areas are often the spawning and nursery areas for a number of fish species. Impacts to fish communities in the river and tributaries due to chemicals in the river are difficult to evaluate in light of habitat degradation and due to the limited water chemistry monitoring that is available (14).

The desirable condition for aquatic organisms is for rivers to have a combination of pools, riffles, rock and rubble river beds, and woody debris for habitat (15). The large amounts of silts, clays, and sand on the bottom of the Minnesota River means that many of the rock and gravel habitats have been destroyed. This greatly reduces the amounts of habitat for invertebrates, algal communities, and fish. The tributaries of the Minnesota River generally have fewer problems with sediments settling on their river bottoms than the main channel of the river. The bottoms of the river's reservoirs, however, are covered with sand and heavier soil particles that settle out of water more easily (16).

Agriculture/Urbanization

Conversion of the natural landscape to agriculture and urban development has resulted in a serious degradation of water quality, biodiversity and the natural beauty of the Minnesota River Valley.

a. Drainage

The landscape of the Minnesota River Valley has changed significantly since settlers first planned towns and cities along the river. The journals of the early European explorers described a river and valley which were beautiful and inspiring. The river upstream of Mankato was described in many areas as exceedingly clear, with white sand bottoms in many places (17). In upland areas, prairie and wetlands extended as far as the eye could see.

As late as the mid-1800s, the landscape remained more or less unchanged. Surveyors' notes and maps generated during the 1850s showed that a significant portion of the river basin was dominated by wetlands and wet prairie. The landscape was peppered with small, isolated lakes and wetlands. Most of these small basins had no permanent surface water

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Artificial drainage has created a vast network which can move water and pollutants great distances and at a much faster rate than would have occurred under natural conditions.

outlet. In other words, they did not drain directly to the Minnesota River and its tributaries. These lakes and wetlands had small drainage areas. Most of the precipitation that fell within these small subwatersheds was retained within the watershed and either evaporated to the atmosphere or percolated through the soils to recharge shallow ground water aquifers (18).

Since the turn of the century, however, the landscape has been drastically altered. Wetland drainage became a standard practice. A vast and efficient network of drainage tiles and ditches changed the ways in which water moves through the river basin and the quality of that water. As a result of expanding drainage tile lines and ditches, large, previously isolated wetland basins were artificially connected to the Minnesota River.

Artificial drainage has created a vast network that can move water and pollutants great distances and at a much faster rate than would have occurred under natural conditions. Rain water and snow melt moves quickly through this system, increasing the potential for bank erosion and flooding.

While the conversion of wet areas to agricultural fields has created rich, productive agricultural lands, there have been disadvantages as well. Along with water, some drainage systems carry sediments, nutrients, pesticides, and animal and human wastes to surface water. The delivery of these pollutants causes degradation of water quality as well as changes in the plant and animal life in the river and eradication of some species (19).

Downstream of areas where drainage projects have been completed, the following impacts can be identified:

- increased suspended materials in the water,
- increased flow velocity (how fast water moves through the system),
- greater extremes of flow (both how much and how often),
- reduced amount of habitat area (such as pools, riffles and raceways) due to shortened channels,
- less stable stream banks and greater potential for erosion,
- decreased instream and streamside cover,

Background

- shifts in aquatic invertebrate (small, spineless animals) and fish populations,
- shifts in the kinds of species present,
- changes in habitat and food availability, and
- changes in spawning and nursery areas for fish.

Important wetland ecosystems have also been lost due to drainage activities. It has been estimated that 2-3 million acres of historic prairie wetlands have been eliminated in the Minnesota River basin due to drainage practices. Wetland destruction can result in a loss of flood storage capacity, nutrient entrapment and assimilation potential, reduced ground water recharge areas, and elimination of critical habitats for fish and wildlife (20).

b. Impacts of various land use activities

The way we have settled and cultivated the land has resulted in the loss of a significant amount of habitat in and around the river and its tributaries.

While drainage practices have significantly altered the way water moves through the river system, other land management practices have also drastically changed the landscape. Intensive cropping activities and development of feedlots have resulted in certain economic benefits; however, in many cases they have also resulted in negative impacts of water and wildlife. The use of most land for row crop and monoculture agriculture has reduced the diversity of plant and animal habitats in the basin (21). The number, size, and management of some feedlots in the river basin has created problems related to the collection, storage and disposal of animal manure.

c. Development patterns

In the metropolitan area and in small cities in the Minnesota River basin, development patterns have created another set of problems. With the thousands of acres of pavement and other impermeable surfaces in our cities and towns, rain water and melted snow move swiftly to the Minnesota River and are deposited untreated through storm sewers. A host of pollutants are carried by storm water, including dust and dirt, atmospheric fallout, animal waste, sediment from construction sites, plant matter, and chemicals from a variety of sources.

Pollution concentrations in receiving streams sometimes exceed recommended guidelines for good water quality. Fish and wildlife can also be seriously affected. In addition, physical alterations take place in the receiving stream due to increased volumes of runoff. This can lead to channel scour, devegetation of stream banks, flooding, habitat destruction, and debris deposition (22).

d. Loss of corridors and pathways for wildlife

The way we have settled and cultivated the land has resulted in the loss of a significant amount of habitat in and around the river and its tributaries. Specifically, we have lost or degraded many of the green corridors that are pathways and thoroughfares for the movement of many species of plants and wildlife. In addition, there remain very few of the large tracts of undisturbed land necessary for the successful reproduction and rearing of many wildlife species (23).

Riparian corridors are especially critical to the health of the river system. Riparian zones are the transition zones between rivers and upland areas. They form important corridors for the movement of living things within larger landscapes. In their natural state, they include a rich assortment of organisms and vegetation. Their trees and vegetation stabilize stream banks and shade the water, thereby regulating light and temperature conditions.

The importance of these areas is even greater than their total land mass would seem to suggest, since they serve such a wide variety of important functions (24). For example, riparian areas capture and retain surface water runoff that comes from upland areas, holding some of the nutrients and soil that might have otherwise reached rivers and streams.

“...The greatest influence in protection of our flowing waters is a citizenry newly aware of the value of this resource.”
-Thomas Waters

People

Cultural factors involving the attitudes, behaviors, and perceptions of rural and urban landowners in the Minnesota River basin add to the complexity of addressing environmental problems facing the river.

The Minnesota River is currently more affected by the cumulative impacts of many small abuses than by extreme or flagrant acts of environmental abuse. The river's deterioration has occurred slowly and almost imperceptibly over many decades. The public has, for the most part, come

Background

Minnesotans will have to develop a culture of cooperation and joint stewardship of natural resources, one that looks beyond individual benefit.

to accept its limited value. With this acceptance comes a belief that its polluted status is not a “big problem.” As a result, there are very different degrees of perceived urgency regarding when a cleanup should begin and how it should proceed.

There is a perception among a portion of the agricultural community that the elimination of water pollution in the Minnesota River can only adversely affect the economic status of farmers. A companion perception is that there are no viable alternative methods of farming that will both eliminate pollution and be economically successful. These perceptions encourage an unwillingness to closely evaluate the costs and benefits of changing land use and agricultural practices.

In urban areas, many residents remain unaware or are not focused on water issues. For the majority of citizens, once water is “down the drain,” it is no longer of concern to them. Even less awareness exists among homeowners regarding how they may be contributing to urban runoff problems in nearby rivers and streams. There is a common misperception that once water has traveled to a storm sewer, it is routed to a wastewater plant for treatment. This misperception leads to the dumping of many harmful wastes into our city storm sewers each year.

Ultimately, state and local politics will play a significant role in the health and quality of the Minnesota River. State and local politics can result in less-than-vigorous enforcement of state and local regulations related to land use practices and water quality. Areas where enforcement has traditionally been weak include feedlot management, drainage, construction runoff management, illegal dumping, home septic system maintenance, and protection of wetlands.

If the restoration of the river is to be successful, Minnesotans will have to develop a culture of cooperation and joint stewardship of natural resources, one that looks beyond individual benefit.

**AN ACTION PLAN
FOR IMPROVING WATER QUALITY
IN THE MINNESOTA RIVER**



“I encourage you to think big.”

- Sondra Simonson

RESTORE FLOODPLAINS AND RIPARIAN AREAS

Rationale

Restoring the floodplain to its natural purpose will make a powerful statement about the state's commitment to cleaning up the river.

A floodplain is an area of relatively flat land adjacent to a river. When there is more water than can be contained within a riverbed, the excess water goes onto the floodplain. When human activities take place in a floodplain, those activities are at risk of being flooded. The less human activity that takes place in a floodplain, the less damage is done by a flood.

Even during times of normal water levels, floodplains perform a vital water-cleansing function. As water moves from the uplands toward a river after a rainfall or snow melt, floodplains retain some of the water and trap sediment, nutrients, bacteria, and other pollutants.

Riparian zones — the vegetative areas along the banks of a river — usually make up a small percentage of land area in a river basin, but they perform three important functions disproportionate to their size. First, they assist in the overall floodplain's water-cleansing process. Second, they provide an unbroken green corridor for the movement of wildlife. Third, riparian areas make a river more beautiful.

In June 1994, the federal Interagency Floodplain Management Review Committee published *Sharing the Challenge: Floodplain Management into the 21st Century*. The abstract of the report states:

“The federal government can lead by example; but state and local governments must manage their own floodplains. Individual citizens must adjust their actions to the risk they face and bear a greater share of the economic costs.”

The floodplain of the Minnesota River is the most visible and identifiable portion of the river basin. Restoring the floodplain to its natural purpose will make a powerful statement about the state's commitment to cleaning up the river. Clearly visible green belts along the major tributaries will confirm Minnesota's intention to safeguard one of our major ecosystems.

Action Plan

1. Restore the Minnesota River floodplain

The Reinvest in Minnesota (RIM) program, in concert with local and federal initiatives, should acquire all of the Minnesota River floodplain between Jordan and Big Stone Lake — roughly 200,000 acres in all.

Procurement should be made with willing landowners through permanent easements and selective fee-title acquisitions.

In the case of permanent easement acquisitions, the administering agency should interpret easement provisions flexibly. Some agricultural activity may still be allowed on some of the lands acquired. Pasturing or haying, for example, may not interfere with some parcel's ability to filter floodwaters during storm events. In those cases, the state should not pay for both cropping rights and haying or grazing rights.

2. Establish riparian areas along the major tributaries

"A river ...can be tamed but it resents it. And then far-reaching and very destructive things happen, all the way from the trickles of its source clear down to its deltas and entrances at the edge of the ocean."
-Andy Russell

The RIM Reserve program has the authority to acquire easements in riparian areas along the major tributaries of the Minnesota River. Statewide, more than 5,000 acres of riparian land are currently enrolled in the Reserve. The program is well run and needs no major legislative changes. What is needed is support for the Board of Water and Soil Resources (BWSR) to substantially increase the amount of their resources for riparian corridor restoration, both through internal reallocation and external supplements.

No riparian corridor easements should be acquired where such action would not reduce erosion or maintain a continuous green belt. Special attention should be given to connecting riparian areas to non-riparian natural areas so as to create corridors for wildlife. The monies allocated to this program should be for acquisitions within an average 50-foot corridor on each side of a tributary.

Costs

The cost of permanent easement acquisition along the main stem of the Minnesota River is estimated to be \$400–\$700 per acre for cropping (but not full agricultural) rights. To acquire such rights, the state would face a one-time cost of \$80–\$140 million. For each particular parcel, the cost of permanent easement acquisition should be weighed against the costs and benefits of fee-title acquisition.

This expenditure may be reduced to the extent that other public and private organizations conduct their own acquisition and development programs. For example, the U.S. Fish and Wildlife Service has made a preliminary proposal to expand the Minnesota Valley National Wildlife Refuge along the river from Jordan to Le Sueur. The Citizens Advisory Committee supports this proposal.

Action Plan

Acquiring a complete riparian corridor on the major tributaries of the Minnesota River will cost about \$42 million. This is based on an average width of 50 feet on each side of 5,000 miles of major tributaries (about 60,000 acres) at \$700 per acre.

These floodplain and riparian acquisitions will lower the market value of the properties themselves. This will reduce the tax base of the property's various taxing jurisdictions and, as a result, would increase property tax payments of other properties in the jurisdictions. To reduce these tax shifts, the state should pay property taxes on the easements share of the property value. This would add another \$6–10/acre/year or \$1,560,000–\$2,600,000 to the annual cost of the programs.

"A river is nature's
own wilderness
road."
-Tim Palmer

Acquiring the floodplain will reduce expenditures in other areas. Estimates of the cost of the 1993 flood in the Minnesota River basin were \$233 million in property damage and \$550–\$800 million in crop damage. These costs would have been even higher had not the Minnesota Valley National Wildlife Refuge protected the metro-area floodplain from development. The costs would have been lower had restoration of the floodplain and riparian areas outside the metropolitan area occurred before the flood.

Translating all of the environmental benefits of floodplain restoration into economic terms is an inexact science. One can be confident in asserting, however, that water quality and scenic values will improve, which will result in an increase in recreational fishing and tourism throughout the basin.

Restoration of the Minnesota River floodplain and tributary riparian areas should be accomplished over a period of five years. The 1995 Legislature should allocate a special fund of \$30 million to ensure that these programs get off to a good start.

RESTORE WETLANDS

Rationale

If our goal is to improve water quality in the Minnesota River, we must look beyond the old ways of thinking and understand water within a larger context. Rather than think of water as a liability — something we must get off the land and send downstream as quickly as possible — we must recognize that water is a precious natural resource and attempt to retain as much of it as we can. This is true in urban and rural areas alike.

“The Minnesota in its meandering way exerts subtle pressures of the sort that make it endearing, if not a famous river. One of the finest attributes is that it is not intimidating.”
-Suzanne Winckler

Beyond the floodplain, the best way for us to manage water on the land is wetland restoration. While drainage has dramatically altered surface and subsurface hydrology throughout the Minnesota River basin, wetland restoration can compensate by allowing water to be retained on the land. As Minnesotans now recognize, wetlands perform many important functions, such as reducing peak flow during runoff events, recharging groundwater aquifers, slowing the movement of surface water, trapping sediment and nutrients, and providing habitats for fish and wildlife.

In the Minnesota River basin, more than 90 percent of the original wetlands have been drained or filled. We must restore some of those wetlands. The percentage of the land in a particular area to be restored will depend upon the land-use practices, soils, and drainage patterns of that area.

Action Plan

We should begin our wetland restoration effort by purchasing perpetual easements on lands that will be inexpensive to restore, that offer the biggest return in the form of pollution reduction, water retention and habitat restoration, and that landowners want to restore. The RIM program and the U.S. Fish and Wildlife Service wetland restoration programs should be funded at sufficient levels to meet the demand from all landowners who want to participate.

The Wetland Reserve Program is a sound alternative to draining existing wetlands and should be continued for an additional 10 years.

Costs

Initial expenditures for wetland restoration vary considerably, with an upper limit of about \$1,000 per acre. As is the case with floodplain restoration, the costs are at least partially offset by the economic benefits of cleaner water and improved wildlife habitat.

MANAGE DRAINAGE DITCHES AND STORM SEWERS AS TRIBUTARIES

Rationale

The flow of water in the Minnesota River basin has been significantly altered over the past century due to extensive ditching and tiling. Formerly landlocked areas are now connected to tributaries of the Minnesota River, resulting in the downstream delivery of water, sediments, and nutrients that otherwise would not have reached the river. The story is similar in urban areas. Water that formerly soaked into the ground is now transported from roofs, roads, and parking lots to storm sewers that drain into the Minnesota River and its tributaries.

We must acknowledge that these drainage systems are in fact tributaries of the Minnesota River. We must recognize that the amount and quality of water they convey has a major impact on the physical, chemical, and biological characteristics of the Minnesota River and its tributaries. Improving the quality and reducing the quantity of water reaching the Minnesota River via drainage systems is an essential step in making the river fishable and swimmable.

Action Plan

We must acknowledge that drainage systems are in fact tributaries of the Minnesota River.

1. Revise the state drainage code

Since its inception, drainage law in Minnesota and across the country has assumed that all drainage is beneficial since it increases crop production and the tax base. Scant consideration has been given to the adverse impacts of drainage such as increased sedimentation rates, decreased water quality, wetland destruction, and the loss of native plants and animals. When drainage projects are considered, drainage laws should recognize these adverse impacts and weigh them in the public interest.

The Minnesota Drainage Code still encourages drainage, in many cases to the detriment of the environment. The law currently promotes activities that are in direct conflict with other state laws which aim to preserve and protect wetlands, reduce nonpoint source pollution, save endangered species of plants and animals, and protect groundwater supplies. The state drainage laws are outdated and in need of significant revision. Revised drainage laws need to do the following:

- Provide clear guidance regarding how to determine costs and benefits of drainage projects. The costs of mitigating for the negative impacts of a drainage project must be weighed against the projected benefits of

the project. Costs should be calculated before a petition for a project is circulated.

- Provide design standards that ditch projects must meet during construction and maintenance. To the greatest extent possible, water from ditches should not degrade the quality of the water in the receiving streams.
- Allow drainage projects (that is, tiling, new ditches, and repairs to existing ditches) only where benefiting landowners are willing to implement soil- and water-quality programs on their land.
- Provide for collaborative efforts between government and private groups in maintaining ditches.
- Encourage wetland restoration that is done in such a way that it does not have a negative impact on the drainage of upland agricultural crop land.

2. Require treatment of urban storm water

In many instances drainage waters from urban areas are discharged directly into lakes and rivers. This has a serious negative impact on water quality and aquatic life. All storm water from cities and towns should be treated before it is discharged into public waters. As part of this approach, all state agencies, especially the Minnesota Department of Transportation, should be required to include effective storm water management as an integral part of every construction project. The level of treatment should depend on the amount and kinds of pollution in the storm water, the increased flow of water caused by the discharge (which can cause serious streambank erosion), and the overall health of the receiving body of water.

The Metropolitan Council requires cities in the metropolitan area which seek sewer extensions to adopt and enforce a storm water management ordinance. The ordinances require contractors, developers, and others to adopt best management practices to control storm water runoff. This requirement should be enacted throughout the Minnesota River basin.

IMPROVE LAND MANAGEMENT PRACTICES

Rationale

The cleanup of the Minnesota River can only be accomplished when we recognize that the quality of the water is determined by what we do on the land.

The cleanup of the Minnesota River can only be accomplished when we recognize that the quality of the water is determined by what we do on the land. Widespread adoption of responsible land-use practices on the part of homeowners, farmers, developers, businesses, and government agencies will significantly reduce polluted runoff to the Minnesota River. Many important practices are not implemented on a voluntary basis, even though it is widely agreed that their adoption would significantly improve water quality.

Improved land management practices will depend on several factors:

- Education and technical assistance (these are included as separate recommendations in this report).
- Economic incentives, such as expanded cost-share programs and conservation tax credits or other forms of payments. These can partially compensate landowners for the costs of implementing environmentally benign land management practices.
- Mandatory adoption of certain practices. Clear legal authority is needed for state and local government agencies to require certain land-use practices on land which has been demonstrated through monitoring and research to be contributing unacceptable levels of pollution to the Minnesota River or its tributaries. In short, it is time to make people responsible for the public consequences of their private actions.

Action Plan

In short, it is time to make people responsible for the public consequences of private actions.

1. Increase financial assistance for whole-farm resource planning and best management practices implementation

More resources should be devoted to assisting in the development and implementation of land management practices that protect and improve water quality. This could include the following:

- Increased state funding for the cost share program administered by BWSR and the Soil and Water Conservation Districts. Increases should be targeted at those practices which are most effective over the long run for improving water quality.

Action Plan

- Increased state funding for integrated whole-farm resource planning and implementation. Many farmers may wish to make more radical changes in their operations than simply incorporating best management practices into their current operations. This could be done as a pilot program.

2. Enact a “bad actor” law

A “bad actor” law should be developed so that the MPCA or local government can require that environmentally sound practices be put into place at sites where there are unacceptable water quality impacts and where voluntary programs have not been effective in changing behavior or practices. This legal authority would encourage voluntary compliance and would be an important tool within a comprehensive enforcement package.

3. Establish mandatory land-use practices where necessary

Mandatory land-use practices should be imposed carefully and strategically when voluntary actions or economic incentives have not been effective.

There is a need to establish mandatory land-use practices in areas (both urban and rural) where it has been shown that efforts to address the problem on a voluntary basis have not been successful. In these cases, there may not be any bad actors, but the nature of the watershed, soil, and land-use patterns mean that special strategies are necessary. Without capacity to affect all pollution sources that diminish water quality within a watershed, technical assistance and other efforts may be only partially effective.

Mandatory land-use practices should be imposed carefully and strategically when voluntary actions or economic incentives have not been effective. State and local governments will be responsible for setting water quality objectives within a watershed and must make it clear to landowners what will be expected of them. At the same time, landowners must be given some flexibility in selecting which practices will allow them to achieve those objectives. The application of mandatory practices needs to be as site-specific as possible and address all parts of a site rather than only small portions that may be eroding heavily, for example.

MONITOR WATER QUALITY THROUGHOUT THE MINNESOTA RIVER BASIN

Rationale

Restoring the Minnesota River will require a significant financial investment as well as fundamental changes in the ways we use the land. It is essential, therefore, for us to precisely measure the impact that our efforts are having. We need to know how dirty the river is now, how much cleaner it becomes as we implement our restoration plans, and when we have achieved a swimmable, fishable river.

"There was a time when rivers determined the destiny of cities; now cities determine the fate of rivers. This is certainly true for the lower stretches of the Minnesota."
-Suzanne Winckler

In the past, monitoring and assessment activities have been undertaken only for short periods of time. As a result, there is virtually no long-term trend information that can identify changes in nonpoint source pollution. The Minnesota River Assessment Project (MRAP), for example, provided critical information on the quality and quantity of water in the Minnesota River over a four-year period. But the study period is now over and funding to continue this work has not been secured.

Currently, much of the data that has been collected on the Minnesota River is scattered and difficult to access. Data is stored in any number of agency and government databases. Much of the data has yet to be compiled, analyzed, or summarized in a form that the public can readily understand. It is time for all of this data to be gathered in a central location.

In order to assess whether our efforts are actually resulting in improvements in water quality, a long-term commitment is needed to continue gathering, collecting, and analyzing water-quality information. Unless we monitor our progress, we may make erroneous conclusions about the effectiveness of our programs and spend our resources unwisely. The monitoring system should provide answers to critical questions regarding the condition of the river, the effectiveness of cleanup activities, and where we should place additional staff and resources.

Action Plan

1. Develop a permanent monitoring network

It is absolutely essential that we create a permanent monitoring network in the basin. This monitoring effort should be an extension of the MRAP study, although it does not need to be as comprehensive. Information from MRAP and subsequent monitoring efforts should be used to evaluate progress on river cleanup activities and to identify watersheds where additional resources may be needed. In particular, the data collected from

monitoring should be used to evaluate and refine the pollution load allocations currently being developed by the Minnesota Pollution Control Agency (MPCA) and the Metropolitan Council. (More information on pollution load allocations appears later in this report.)

The MPCA should maintain state-of-the-art monitoring stations at the mouths of the 12 major watersheds in the Minnesota River basin. Within each watershed, local organizations, with help from the MPCA, should set up a network of monitoring stations that will help them pinpoint where pollution is coming from. To the greatest extent possible, the MPCA and the local organizations should engage schools, environmental organizations, and individual landowners in the monitoring process. The Citizens' Advisory Committee recognizes that monitoring water quality in rivers and streams is a complex process that requires technical expertise. Nevertheless, the Committee believes that involving citizens in the monitoring process is one of the best ways to give the general public a sense of ownership in the Minnesota River cleanup effort.

2. Collect, store, analyze, and interpret data on a regular basis

All data gathered through the monitoring process should be collected and housed in an academic institution where it will be analyzed, interpreted, and checked for quality assurance. Annual reports on water quality should be developed by this institution and presented to the newly formed Minnesota River Commission. (For a description of the Minnesota River Commission, see the next recommendation in this report.)

The academic institution should also develop a user-friendly system for retrieving the information. It is important that governments, agencies, and individuals throughout the basin have easy access to the data. This information system should be networked with the Land Management Information Center and the state agencies that maintain water quality databases.

Water quality trends should be related to the fishable/swimmable goal for the river and be put into language that the public can readily understand.

Costs

The creation and maintenance of this monitoring system when fully implemented could cost \$2–3 million per year.

ESTABLISH A MINNESOTA RIVER COMMISSION TO OVERSEE THE CLEANUP EFFORT

Rationale

A new institutional structure is needed to ensure government accountability and citizen participation in meeting Minnesota River cleanup goals. The Citizens' Advisory Committee proposes the creation of the Minnesota River Commission.

Action Plan

The functions of the Commission will include:

- Establishing goals for the cleanup effort. (It is hoped that this report and the work of the Minnesota River Assessment Project will guide and expedite the planning efforts of the Commission.)
- Providing broad oversight of major agency activities related to the Minnesota River and facilitating inter-agency cooperation.
- Evaluating the effectiveness of expenditures.
- Advocating for and educating people about the river and the cleanup effort.
- Holding an annual conference on the state of the river.

The Commission will not be involved in the day-to-day operations of agencies, but will have access to information and the decision-makers within those agencies. In addition to being accountable to the citizens of Minnesota, the Commission will report to the Governor and the Legislature. The following structure is recommended.

Citizens — These members should be chosen to represent the diversity of interests in the river basin — farmers, business people, educators, and conservationists. These citizens should be knowledgeable about and actively interested in the Minnesota River. To convince the general public that the Commission is not just another government agency, it is essential that at least half the members of the Commission come from this group.

Local organizations — These members should be elected officials or agency staff who have already been working to clean up the river and who have been cooperating with other local organizations in that effort.

Action Plan

State agencies — These members should be the Commissioners or Deputies of agencies directly involved in Minnesota River issues, including MPCA, BWSR, MDA, and MDNR. In addition, one or more top representatives from Minnesota Extension Service (MES) or the University of Minnesota should be included.

Dakota communities — Members should include representatives of the Shakopee Mdewakanton, Lower Sioux, Upper Sioux, and Prairie Island Dakota communities.

Costs

The costs, estimated at \$100,000 per year, will include staff and administrative support as well as per diem expenses for Commission members.

ESTABLISH LOCAL JOINT POWERS AGREEMENTS

Rationale

The major goals for the cleanup effort will be developed by the Minnesota River Commission, based on the work of the Citizens' Advisory Committee and the Minnesota River Assessment Project. The strategies used to accomplish these goals, however, should be developed and managed at the local level.

There are two major political problems confronting local governments and agencies as they address the Minnesota River cleanup project. One is that counties are drawn along political lines that do not coincide with the geographical boundaries of the various watersheds within the river basin. The other is that within each watershed there are often several units of government which must develop their own plans for managing water quality. Those plans are not always coordinated, and they sometimes conflict.

The counties and other units of government within each of these watersheds should establish joint powers agreements which allow them to collaborate and share responsibilities for improving the water quality in their particular watershed.

Action Plan

There are 12 major watersheds in the river basin (as shown on the map opposite page 3):

Upper Minnesota River	Middle Minnesota River
Pomme de Terre River	Cottonwood River
Lac Qui Parle River	Blue Earth River
Hawk Creek/Yellow Medicine River	Watsonwan River
Chippewa River	Le Sueur River
Redwood River	Lower Minnesota River

The Minnesota Pollution Control Agency and the Metropolitan Council are now in the process of developing pollution load allocations for each of these watersheds. It is imperative that this work be completed as soon as possible. Pollution load allocations specify the amounts of various pollutants that can safely be discharged from a particular watershed. The information will be used by each of the joint powers organizations to develop their cleanup strategies. It will mean that the most cost-effective level of treatment can be determined based on the unique characteristics of each watershed.

Action Plan

Each joint powers organization will be responsible for meeting the pollution load allocations at the mouth of their watershed. It will be up to all of the local organizations, working together, to find ways to meet those goals. Activities of the joint powers organizations should include:

- maintaining open lines of communication with the general public
- coordinating county and watershed water plans
- administering SWCD programs
- working with landowners to develop farm plans
- enforcing environmental laws
- administering soil loss ordinances
- monitoring water quality
- conducting urban planning, zoning, and land-use planning
- performing public education

Joint powers organizations will report to the Minnesota River Commission. This will help the Commission assess progress and identify where additional resources may need to be targeted.

Agencies in the Upper Minnesota River and Blue Earth watersheds have been working with their counterparts in South Dakota and Iowa, respectively. These efforts have been productive and should continue under the joint powers agreements.

IMPROVE TECHNICAL ASSISTANCE TO LOCAL GOVERNMENTS

Rationale

Technical expertise is a major limitation for local organizations trying to address nonpoint source pollution in the Minnesota River basin.

A successful Minnesota River improvement program requires that people at the local level be actively engaged in the process. Many local agencies and units of government would like to become more active in water quality projects but lack the financial and human resources to do so. At the same time, state agencies lack the resources to respond to the needs of local governments.

Technical expertise is a major limitation for local organizations trying to address nonpoint source pollution in the Minnesota River basin. The lack of technical capabilities at the local level manifests itself in an inability to satisfactorily define local problems, set realistic goals, and carry out successful implementation programs. These factors make local water resource initiatives difficult to undertake and even more difficult to sustain.

Nevertheless, local government is still in the most favorable position to conduct the projects necessary to achieve water quality goals. Planning and implementation are best done at the local level because many of the land-use decisions and laws are local in nature, and because people at the local level are the ones who have the most to gain. There are a number of successful locally managed programs in the Minnesota River basin that are working to reduce nonpoint source pollution. Examples include Big Stone Lake Restoration, the Redwood River Clean Water Partnership, and the Blue Earth River Initiative. These projects have been initiated, in most cases, because local people have determined a need and have been able to gain assistance from experts at the state and federal levels. This same spirit of cooperation must be fostered throughout the Minnesota River basin.

Action Plan

State government, through its agencies and university system, has an obligation to guide local governments in building the expertise that is needed to successfully implement water cleanup projects. Guidance is needed in a number of areas, such as designing surface water monitoring networks, establishing water quality goals, training in the use of Geographical Information Systems, creating design standards for pollution abatement measures, and interpreting research findings.

Promotion, design, and applications of individual land-use plans also rely on having qualified technical assistance at the local level. Having

sufficient technical staff within a watershed (which will be aided by the creation of joint powers organizations), supplemented by state guidance, will greatly accelerate and improve the effectiveness of implementation activities.

Implementation strategies must be based on sound water quality data. This data will be provided at the outset by the pollution load allocations and throughout the cleanup effort by regular monitoring. The State of Minnesota, acting through its agencies and university system, can be of further assistance by offering training programs for local staff.

Collaboration by state and local government brought about by the type of partnership outlined in this recommendation will lead to a much more efficient use of tax dollars.

Technical assistance will be a fundamental part of improving the Minnesota River. This will require immediate and sustained attention, so that every effort is made to achieve adequate support in the first year and maintain that support through a project's duration. The temptation to provide a small staff at the onset and then gradually build capacity should be resisted.

Costs

Expanding technical capabilities will require more staff at both levels of government. Based on costs incurred in watersheds where adequate technical assistance is now being offered, it is expected that implementing this program basin-wide would cost about \$2.3 million per year. These costs will be offset by better decision-making, increased efficiency, and accelerated application of sound land-use practices. The system currently in operation tends to be based less on the needs of the resource in question and more on political expediency. This results in funds not being targeted to projects that may have the greatest positive effect on water quality. Collaboration by state and local government brought about by the type of partnership outlined in this recommendation will lead to a much more efficient use of tax dollars.

ENGAGE THE GENERAL PUBLIC

Rationale

Urban residents are often unaware that their activities as individuals and as users of an urban infrastructure contribute to polluted runoff in nearby rivers and streams. Some people in the agricultural community believe that there are no viable agricultural production systems that will reduce pollution and still be profitable. In order for the Minnesota River cleanup project to be successful, these perceptions must change. People throughout the basin need to come to understand the costs of a polluted river, the benefits of a clean river, and the actions they can take to help make the river clean.

"To preserve river values, our streams must be deliberately managed for diversity -- not just for the canoeist, not just for the species of fish that provide sport to the angler, but rather for the myriad of life forms that living interdependently are unique to flowing waters."
-Thomas Waters

Education efforts should foster an ongoing exchange of information and peer support for residents of urban and rural municipalities to make the transition to sustainable practices. The public needs to develop a basic understanding of the ecosystem, regional environmental goals, and trends that affect the environment. In addition, educational programs should model outreach, cooperation, and joint stewardship of natural resources. Programs should foster the use of holistic planning frameworks with which to evaluate alternatives and make decisions that strengthen our human community and restore ecological integrity to the basin.

Action Plan

1. Use participatory educational approaches

Unlike some educational programs, the emphasis should not be on materials development but on encouraging citizen participation. Citizens should be involved in designing local programs and training the trainers. High turnout goals for participation should be developed and monitored.

Existing information exchange and peer support networks will be utilized and supplemented as necessary. Examples include chapters of the Sustainable Farming Association of Minnesota, Clean Up our River Environment, Land Stewardship Project, Friends of the Minnesota Valley, Coalition for a Clean Minnesota River, Citizens for Big Stone Lake, ridge till clubs, and other groups where farmers and urban residents are encouraged to share information on sustainable practices.

2. Conduct whole resource planning

Existing providers should be trained to assist farmers and municipalities in whole resource planning. The process should include participatory field days and events.

Farmers will be engaged in whole farm resource planning and decision-making to integrate quality of life, profitability, and long-term health of the ecosystem. This type of holistic decision-making can lead to significant changes in farming systems that will improve water quality and be profitable for the farmer.

Municipalities also will be trained in whole resource planning to incorporate into existing watershed and community planning efforts. Schools, churches, business associations, and community education should be involved to help commercial and residential landowners improve their management practices.

3. Form collaborative teams

The processes of creating shared visions and collaborative educational training will require partnerships among existing information providers and networks. These include the Minnesota Department of Agriculture, nonprofit sustainable agriculture, environmental and wildlife organizations, MES, Minnesota Institute for Sustainable Agriculture (MISA), other academic groups, agencies, consultants, farm organizations, community education programs, elected and appointed officials, and business leaders.

The University of Minnesota, the MES, and MISA should prepare comprehensive research and extension plans for community capacity building. The plans should integrate state and local partnerships and existing staff capabilities. At the same time, the newly created joint powers organizations should develop a whole resource plan that includes a nonpoint source pollution education program.

Citizens within each watershed should be involved in developing shared visions of social, economic, and environmental health. These visions will become the basis for a shared vision for the Minnesota River basin as a whole.

Costs

Basin-wide, the cost for these programs is estimated at \$1 million per year. It is expected that this investment will lead to long-term improvements in water quality and the flexibility to adapt to changing market, regulatory, and social climates.

ENFORCE EXISTING LAWS

Rationale

Minnesota has many laws designed to protect water quality. Unfortunately, the laws are not always enforced. Enforcement is difficult for several reasons:

- Under the current system, there are often very few incentives for state and local governments to enforce environmental laws. Enforcement can be costly, time-consuming, and politically unpopular.
- Neither local governments nor state agencies are adequately staffed to develop education and outreach programs that encourage voluntary compliance or to vigorously look for and prosecute violators.
- There is currently no institution charged with oversight of state or local enforcement activities. Citizens and environmental advocacy organizations do not have a clear channel of communication when they see individual landowners breaking the law or government agencies failing to fulfill their enforcement responsibilities.

A strengthened and coordinated system of enforcing existing environmental laws is needed at both the state and local levels if the goal of a clean Minnesota River is to become a reality.

Action Plan

1. Convene a conference on enforcement

The newly formed Minnesota River Commission, in collaboration with state and local enforcement agencies, should convene a conference on enforcement of environmental laws. The purposes of the conference should be to develop a thorough assessment of enforcement problems and prescribe corrective actions.

2. Increase staff and funding for enforcement

Additional resources are needed at both the state and local levels to improve compliance with existing environmental laws.

- Additional funding is needed to train staff who are involved in enforcement activities.
- Additional county staff are needed to enforce existing laws.

- There should also be an expansion of state agency staff, including an expanded number of MDNR Conservation Officers, who are trained to enforce environmental laws in cooperation with local officials.
- The Attorney General's Office needs additional staff to serve as a consultation team on state and local environmental law enforcement cases and to assist in the prosecution of cases when requested by County Attorneys.

A strengthened and coordinated system of enforcing existing environmental laws is needed at both the state and local levels if the goal of a clean Minnesota River is to become a reality.

3. Appoint a Minnesota River ombudsperson

A Minnesota River ombudsperson role should be created, including adequate resources for staffing and administrative costs. The ombudsperson, who will be affiliated with the Minnesota River Commission, will investigate citizen complaints and work with the appropriate agency (either state or local) to resolve problems. The ombudsperson will act to ensure that violators of the law are prosecuted when a state or county government has failed to do so and will work with agencies to improve the manner in which they handle enforcement actions.

The ombudsperson should have independent authority to investigate complaints and to enter into dispute resolution with the appropriate agencies.

The ombudsperson should report to the legislature annually.

4. Perform periodic performance audits of state and local governments responsible for enforcement

A periodic audit should be conducted of state and local government agencies charged with enforcement responsibilities. The audit should be coordinated by the Office of the Legislative Auditor. The audit team should include representatives of local and state government, environmental organizations, and industry.

Costs

The cost of strengthening enforcement at the state and local levels of government is estimated at \$3.5 million per year during the initial stages of the river cleanup. Reduction or reallocation of these costs to education and incentive programs should be considered as voluntary compliance with environmental laws increases.

SUPPORT CHANGES IN FEDERAL FARM POLICY

Rationale

Agriculture has been and will continue to be a primary contributor to Minnesota's economic and social health. At the same time, we must also acknowledge a shift in society's attitudes about agriculture. This shift has meant an increased willingness to publicly fund protection of lands for future generations and a decreased willingness to fund commodity-based program payments to farmers. Consequently, a federal farm program must be crafted that protects public interests within the constraints of private property rights. National policy should build on past successes and capitalize on the willingness of the public to fund the protection of agricultural land. Changes are needed in the federal farm bill that will reward and aid landowners who manage the land in an environmentally sound manner.

Action Plan

1. Develop and implement whole farm plans

Development and implementation of whole farm plans should eventually be required in order for producers to receive program payments. This approach should be phased in over a certain number of years in order to phase out the use of commodity crop bases to determine payments.

2. Shift set-aside programs from annual to multi-year options

Set-aside programs should be blended with existing land retirement programs such as Conservation and Wetland Reserve Programs to comprehensively accomplish whole farm resource management objectives, as well as meet commodity supply targets of the federal government. Cropland most sensitive to environmental damage should be targeted for permanent retirement.

3. Continue to fund CRP and WRP at sufficient levels

The Conservation Reserve Program and the Wetland Reserve Program have been effective and have broad support from producers and the public. The CRP and WRP must be expanded within environmentally sensitive lands/ecosystems.

4. Shift research emphasis to sustainable agriculture

Sustainable agriculture consists of farming systems that provide sustained economic return to the producer while also emphasizing long-term stewardship of land, air, and water. Research and development of sustainable agriculture systems should be encouraged by grants, cost-sharing, and other appropriate incentives.

5. Revise erosion control policies

We must revise soil conservation programs that only address highly erodible land and not the entire farm site. We should not focus all attention on a small portion of the farm site and ignore other areas where the total soil loss may actually be much more serious.

ADDITIONAL COMMENTS BY CITIZENS' ADVISORY COMMITTEE MEMBERS GREG MIKKELSON AND ORVILLE PIOSKE

The purpose of these comments is to add some of the other ideas which surfaced during Committee discussions.

Our concern in endorsing this report as the game plan to follow in cleaning up the river, is due to conflicting reports and research. We feel more research is needed and also more time to apply this information to recommend changes to help the river. We also are not convinced some of these ideas will improve the river substantially, nor do we think they may be the wisest use of public money.

The following comments are a response to the topic areas included in the report.

Restore Floodplains and Riparian Areas

These are excellent ideas, but simply buying land is not going to make beautiful green belts along our rivers and tributaries.

We have not been told how to make these areas green, nor do we know if it is possible, especially with the changes that have occurred along the river.

Also, when it is suggested to acquire all land in the floodplains, we presume this only means agricultural land, since we can't expect cities and people to move.

This will be very costly, with no plans after the purchase is made.

Restore Wetlands

This is a good idea and good use of money, but when you analyze the specific areas, very few would ever help the river, but they do have many other advantages that are worthwhile.

Manage Drainage Ditches and Storm Sewers as Tributaries

These are again good ideas, but requiring treatment of urban storm sewers will be too costly for the benefits to the river. In most cases we should let drainage ditches and storm sewers be repaired and remain in their present use and try to work on changes in new construction, expansion, and development.

Monitoring Water Quality Throughout the Minnesota River Basin

We already have a lot of data that is being collected, but it needs to be compiled and used.

Establish a “Minnesota River Commission” to Oversee the Cleanup Effort

We already have too many commissions and others working on the problem. It could be effective if we would end many of the other existing groups.

Establish Local Joint Powers Agreements

Pollution load allocations is how we got in trouble in the first place. Why should we put anything into the river and just because you have more water flowing by one area is no reason to be able to dump more in per person than another area.

Improve Technical Assistance to Local Governments

The amount of technical expertise needed is minimal. Many of the problems can be corrected by using common sense and the biggest change needed is to re-evaluate our priorities in water use on a personal and local level.

Enforce Existing laws

As we learned in our meetings, enforcement should be the last step, but as shown in the report, this might be closer to the first step. Administration, inspection, and education should come first. We need fewer enforcement staff and more teachers, inspectors, and education staff. We need more positive reinforcement, and more people helping people change the river. Many people and groups will gladly pay the fines to pollute because it is cheaper. This is one reason why we are looking at nonpoint source pollution. It is to maintain pollution load allocations from some point sources.

Changes That Need to Be Made

The farm programs should not encourage land to be farmed that should only be grazed or used in other ways.

Farmers have made many changes already that will show up in the future on the river condition such as: less tillage, less fertilizer and chemical use,

Action Plan

CRP, HEL requirements, more residue, and other BMP's. Data has been collected but not released, that should show these practices are already working.

All people need to review the pros and cons and the impact on water quality such as development along waterways, the need for fast drainage from our roads and streets, the use of salt and chemicals by the city, county, and state, the use of water chemicals, and fertilizer on our lawns, the amount of wastewater from our households, and many other causes of pollution in our lives that we call progress. Almost everything we have touched has had a negative impact on the river.

We believe the agricultural community has and will continue to make improvements. We do need time to adjust to a new set of priorities. It was not too long ago we were encouraged by the federal government that our duty was to feed the world by producing food cheaply. So farmers tiled, dug drainage ditches, bought more and larger equipment, and used more fertilizer and chemicals in trying to be a part of this noble cause of feeding the world, which we felt was what society wanted. This did not happen overnight, nor can we now make any of these changes overnight. Likewise, cities, roads and sewers, etc., would have been built much differently with our clear 20/20 hindsight of our present priority.

Again, we feel that agriculture will rise up to meet this challenge when given information, time, and a level playing field to make changes to reduce the potential economic hardships that may occur.

As farmers and concerned citizens, we are willing to be a part of this change to have an economically sound and significantly noticeable impact on the river before it leaves our state to join the Mississippi River.

NOTES

1. Lass, William, *Minnesota Place Names*, in Currents Minnesota Valley Review, p. 26, Eagan, Minnesota, Vol. 1, No. 2, 1990.
2. Featherstonhaugh, George W., *A Canoe Voyage Up the Minnaw Sator*, (Reprint), Minnesota Historical Society, St. Paul, 1970, p. 286.
3. Dole, R.B. and F.F. Wesbrook, *The Quality of Surface Waters in Minnesota*. U.S. Water Supply and Irrigation Papers, 1907, p. 73.
4. Minnesota State Board of Health, *Report on the Pollution of the Minnesota River from above New Ulm to the Junction with the Mississippi at Mendota*, 1934. p. 16.
5. Ibid, p. 18.
6. Minnesota Pollution Control Agency, *Lower Minnesota River Waste Load Allocation Study*, 1985, p. 11-13.
7. Ibid, p. 9.
8. Minnesota Pollution Control Agency, *Minnesota River Assessment Project Summary*, 1994, p. 1-11.
9. Minnesota Pollution Control Agency, *Wastewater Treatment Needs in Unsewered Communities: A Report to the Legislature*, St. Paul, Minnesota, 1993, p.2.
10. Hamilton, J.D., *Strategies for Documenting Progress in Reaching the Nonpoint Source Reduction Goal for the Minnesota River*, Metropolitan Council, St. Paul, Minnesota, 1992, p. 2.
11. Wetzel, Robert G., *Limnology*, Philadelphia, W.B. Saunders Co. 1975, pp. 518-520.
12. Minnesota Pollution Control Agency, *Minnesota River Assessment Project Summary*, 1994, p. 6-2.
13. Minnesota Pollution Control Agency, *Minnesota River Assessment Project Summary*, 1994, p. 6-3.
14. Bailey, Patricia A. et. al., *A Fish Community Analysis of the Minnesota River Basin*, Minnesota Pollution Control Agency, 1993.
15. Caduto, Michael, J., *Pond and Brook*, University Press of New England, 1985, p. 156.
16. John W. Arthur, Jo A. Thompson, Charles T. Wallbridge and Harry W. Read, *Ambient Toxicity Assessment in the Minnesota River Basin*, Minnesota River Assessment Project Level III Biological and Toxicological Assessment, Appendix Table 2.

Action Plan

17. Featherstonhaugh, George, *A Canoe Voyage Up the Minnaw Sator*, (Reprint), Minnesota Historical Society, St. Paul, 1970.
18. Magner, J.A., G.D. Johnson and T.J. Johnson, *The Minnesota River Basin: Environmental Impact of Basin-Wide Drainage*, Y. Eckstine and A. Zaparozec (eds), *Industrial and Agricultural Impacts of the Hydrologic Environment*, Volume 5, Water Environment Federation, Alexandria, VA.
19. Karr, J.R., L.A. Toth and G.D. Garman, *Habitat Preservation for Midwest Stream Fishes: Principles and Guidelines*, EPA-600/3-83-006, 1983, p. 8.
20. White House Office on Environmental Policy, *Protecting America's Wetlands: A Fair, Flexible and Effective Approach*, Washington, D.C., August 24, 1993, p. 2.
21. Nelson, Sharon, *Heritage Program*, Minnesota Department of Natural Resources, Personal Communication, February 18, 1993, Presentation to the Minnesota River Citizens' Advisory Committee.
22. Oberts, Gary L., *Magnitude and Problems of Nonpoint Pollution for Urban and Urbanizing Areas*, St. Paul, Minnesota 1985, p. 4.
23. Johnson, Lucinda, Natural Resources Research Institute, *Importance and Role of Riparian Zones*, Presentation to the Minnesota River Citizens' Advisory Committee, February 18, 1993.
24. Ibid.

APPENDICES



Appendices

APPENDIX A

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APPENDIX B

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APPENDIX C

FUNDING OPTIONS FOR GOVERNMENT AGENCIES

Restoring, enhancing, and preserving the environmental quality of the Minnesota River Basin will require significant funding from both private and public sources. Funds utilized in watershed improvement programs should be viewed as an investment in the future of the basin.

Nonpoint source pollution programs have traditionally been underfunded, with the bulk of federal and state funds going to address point sources of pollution.

Government and the public must now be willing to invest the resources that will be needed to tackle the greatest remaining threat to water quality.

A number of programs that focus on nonpoint source pollution already exist in Minnesota. These programs, however, are often poorly coordinated and are not usually targeted within specific areas of the state. Within the Minnesota River basin, some state and federal program funds are beginning to be targeted to this particular river basin. These funds, however, are inadequate and will not likely lead to significant improvement in water quality in the short or long term.

In developing future funding programs for the Minnesota River project, the following principles should be considered:

- Internalize external costs where possible — the polluter pays.
- Consider the ability to pay and provide financial assistance when necessary.
- Share costs fairly among those who benefit.
- Look for ease of administration.
- Look for long-term predictability of funding source.
- Spread costs broadly to minimize specific impacts.

This committee will not advocate for particular funding sources, but presents a list of possibilities for agency staff and legislators to consider.

1. Federal funds

- a. Clean Water Act section 319 funds for nonpoint source pollution programs.
- b. USDA Conservation Programs
- c. US Fish and Wildlife North American Waterfowl Plan Funds

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2. State funds

- a. State bonding
- b. State revolving funds
- c. General revenue funds
- d. Permit and regulatory fees (ex. Feedlot permits)
- e. Fish and wildlife funds - fishing/hunting license fees
- f. Fertilizer and pesticide tax
- g. Storm water utility fees
- h. Real estate transfer fees
- I. Local taxes and levies
- j. State sales tax
- k. Private sector funds
- l. Motor vehicle transfer fees
- m. Water appropriation fees
- n. LCMR funds

APPENDIX D

GENERAL OVERVIEW OF THE MINNESOTA RIVER ASSESSMENT PROJECT

The Minnesota River Assessment Project (MRAP), completed in 1992, measured the causes and extent of pollution in the Minnesota River. The study's findings suggest that an aggressive, broad-based implementation program will be needed in order to return the river to a fishable/swimmable condition.

The quality of water in the Minnesota River has been significantly degraded by surface runoff or "nonpoint source pollution." Nonpoint source pollution cannot generally be traced to a single source. Nonpoint sources of pollution can include discharges from septic tanks, runoff from construction sites, agricultural fields, feedlots, and suburban and urban developments.

Wastewater treatment plants and industrial facilities can also contribute to water quality problems. Their impact is typically more pronounced during low flow periods when the volume of water in the river is lower and pollutants entering the river cannot be diluted.

Four major water quality problems were identified by the MRAP report. They are:

- bacterial contamination
- sedimentation
- nutrient enrichment
- watershed (hydrologic) modifications

Bacterial levels, especially fecal coliform bacteria, were elevated throughout the river system. Fecal coliform is an indicator of pollution caused by sewage and animal manure. Fecal coliform levels are used to indicate if water is safe for full-body contact during water-related activities, such as swimming. High bacteria counts were found during high and low flow conditions, suggesting that there are constant sources of bacteria entering the river system. These sources may include faulty treatment plants, septic systems or feedlots that discharge directly to the river.

Ninety percent of the sediment in the Minnesota River is characterized by fine particles of silt and clay that are easily transported in water (Payne 1994). The Minnesota River carries more suspended sediment than most other rivers in the state. Sediment can degrade water quality by filling reservoirs, smothering aquatic habitats, altering biotic communities, increasing water treatment costs and reducing the river's aesthetic qualities. Sediment also absorbs solar energy, raising water temperatures and reducing the amount of dissolved oxygen that is available for aquatic life. Nutrients and toxic substances can become attached to sediment particles and move with them, creating water quality problems where they settle in the river bed downstream.

Appendices

Nitrate-nitrogen exceeded the standard of 10 mg/l most of the year below Mankato. Phosphorus levels generally exceed 200 µg/l. These levels suggest highly enriched conditions that favor the growth of algae in the river. When algae dies, the decomposition process begins, removing dissolved oxygen

from the water. Without adequate levels of dissolved oxygen, the river cannot support healthy populations of fish and invertebrates.

Historically, the river basin's upland areas had limited connection to the Minnesota River. The river's flow was controlled by deep aquifers and surface water delivered by its tributaries. The tributaries, however, delivered very little sediment or nutrients from the uplands because of the existence of well developed riparian zones and natural vegetation in their watersheds. Construction of storm sewers, drainage ditches and tiling systems over the past century have changed the landscape dramatically and accelerated the movement of water and pollutants from the land to the river.

Today, large quantities of organic and inorganic matter are transported to the Minnesota River during surface runoff events. Although a tributary stream may appear to generally have better water quality than the main river, this can change quickly during brief and intense storms. During those events, the tributaries can deliver significant pollution loads that ultimately affect water downstream.