
WATER QUALITY MANAGEMENT

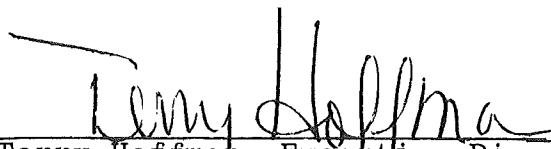
Minnesota's 208 Plan

MINNESOTA POLLUTION CONTROL AGENCY
DIVISION OF WATER QUALITY, PLANNING SECTION
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ROSEVILLE, MINNESOTA 55113

February 1980

ACKNOWLEDGMENT

The Minnesota Water Quality Management Plan was developed through the efforts of many Minnesotans. I would like to express the appreciation of the Minnesota Pollution Control Agency for the contributions of the citizens who served on Regional Advisory Committees and the members of the 208 State Task Force who provided valuable guidance and input throughout the planning process. I also wish to thank the subcontractors who prepared background information for the Plan and all the technical advisors and private citizens who spent innumerable hours reviewing and commenting on the many documents produced in the development of this Plan. The combined efforts of all of these individuals and groups have produced a Plan that will, upon implementation, improve and maintain the quality of Minnesota's waters for generations to come.



Terry Hoffman, Executive Director
Minnesota Pollution Control Agency

Feb 20, 1980
(date)

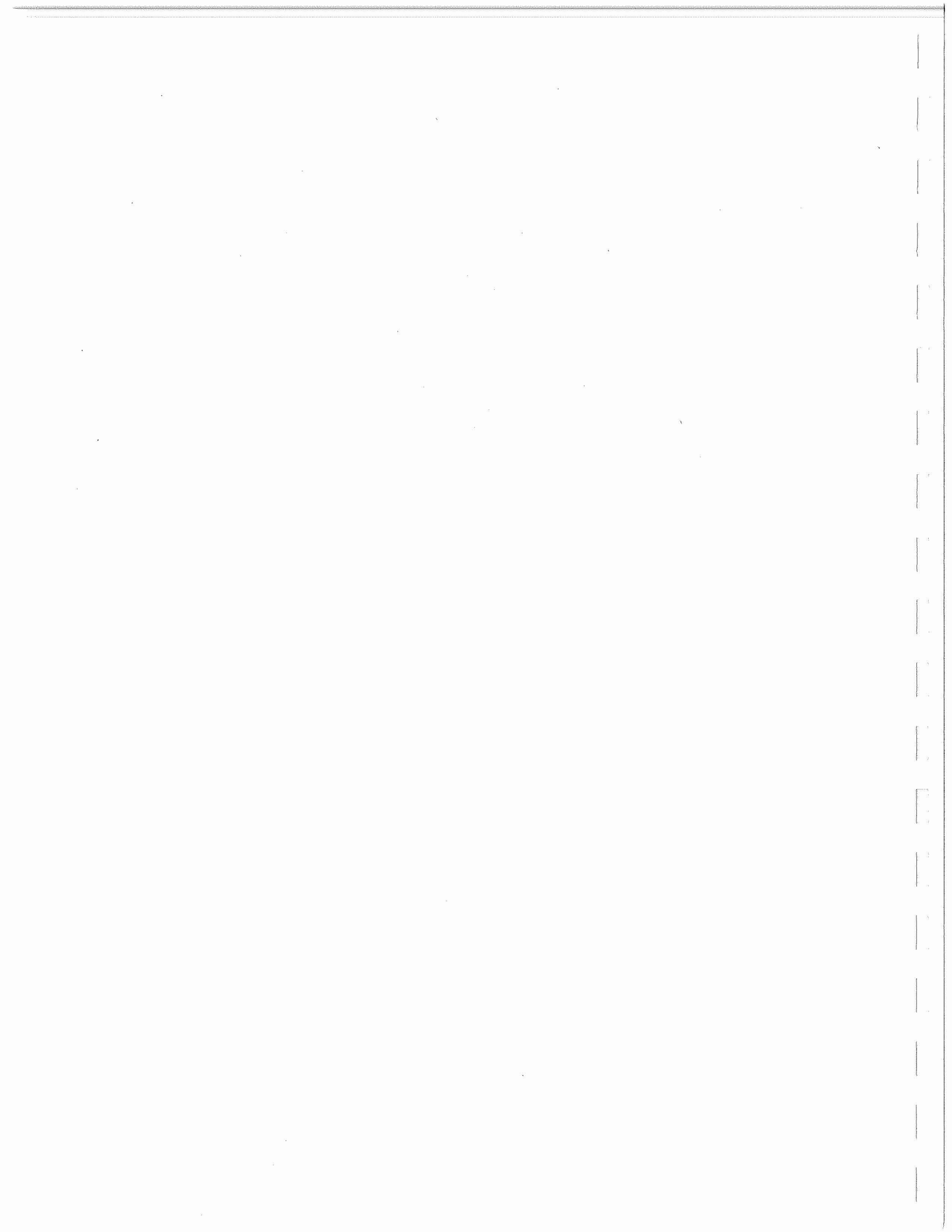
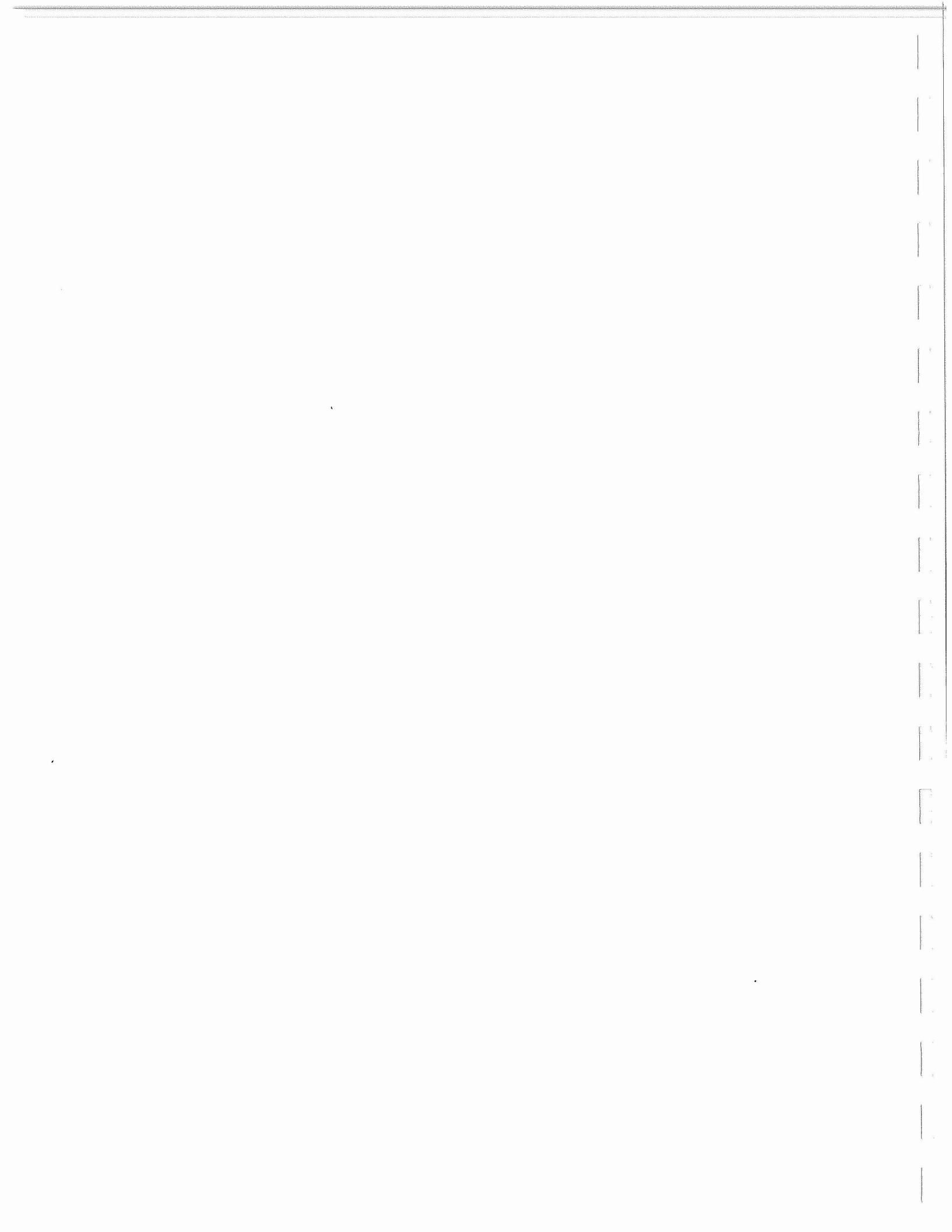


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Region 1	Irving Beyer	
Region 2	Leonard Kellerhuis	Vernon Scott
Region 3	Loren Rutter	Darlene Vobejda
Region 4	James Nelson	Gerald Lacy
Region 5	Robert Siegel	Howard Tyrell
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Region 6W	Willard Pearson	
Region 7E	Roger Bergman	Ronald Drude
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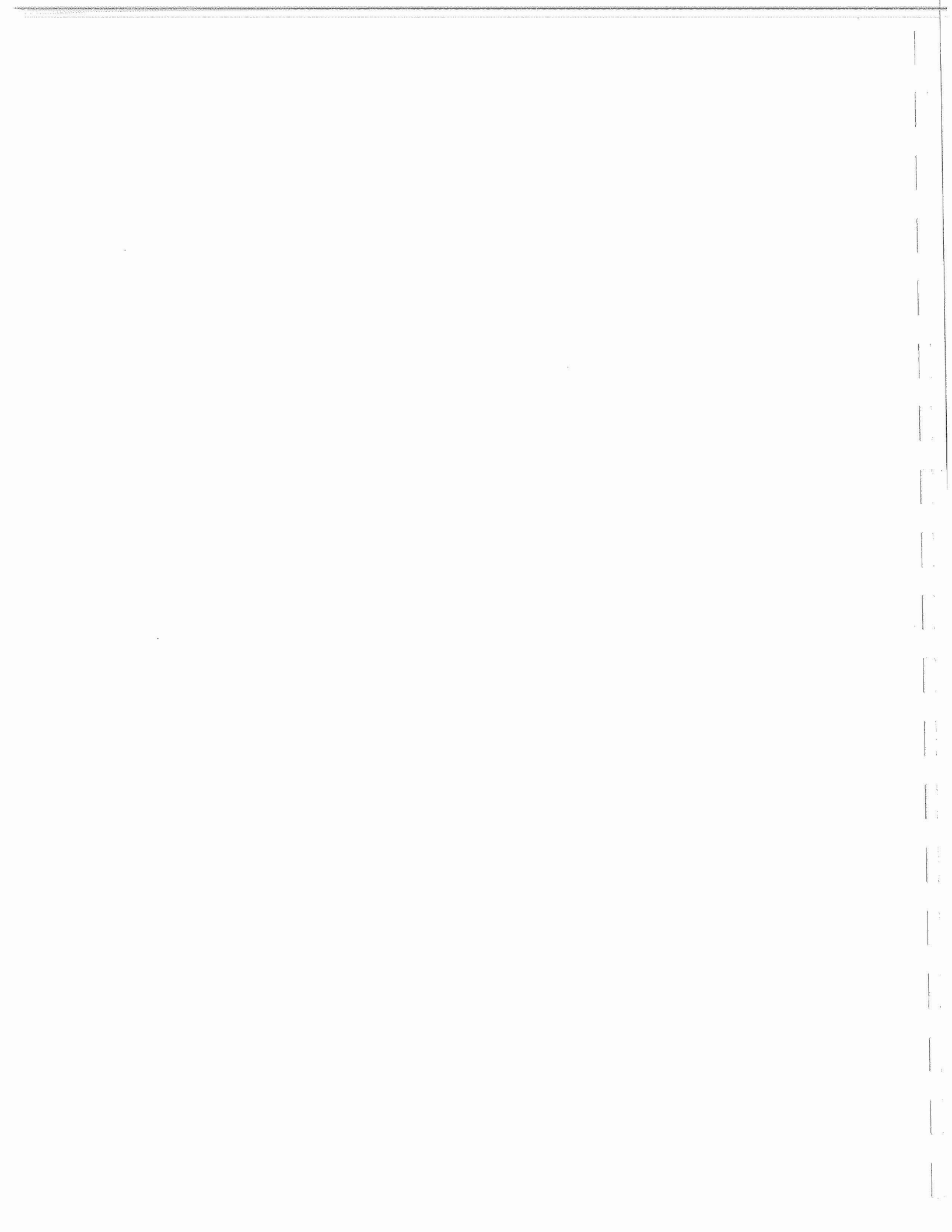
PREFACE

This document represents the initial Water Quality Management (WQM) Plan prepared by the State of Minnesota pursuant to federal regulations 40 CFR, Parts 130 & 131, and Sections 208 and 303 of the 1972 Federal Water Pollution Control Act (amended in 1977 as the Federal Clean Water Act). Preparation of this Plan was financed by grants from the U.S. Environmental Protection Agency, as authorized under Section 208 of the Act. This Plan may be referred to as the 208 Plan, the WQM Plan, or the 208 WQM Plan.

The Minnesota Pollution Control Agency was delegated responsibility for 208 planning in the 80 counties outside the Twin Cities Metropolitan Area by the Governor in January, 1976. The Governor assigned responsibility for developing a similar plan for the 7-county Twin Cities Metropolitan Area to the Metropolitan Council. Recommendations contained in this Plan are intended for statewide application. These recommendations should be viewed as the minimum program necessary for the Metropolitan Area. The Metropolitan Council has the option to develop a stronger Plan for the Metropolitan Area. The Metropolitan Council is currently initiating its 208 planning for non-point sources.

This WQM document is the result of a 3-year planning effort. The purpose of the planning effort was to identify significant water quality problems due to non-point sources of water pollution and to set forth effective programs to correct those deficiencies. The point source section of this document is not a Plan in the sense of recommendations for actions and policies. It is a description of already-existing management programs and policies which affect point source water pollution. These programs and policies did not result from studies and recommendations made through the 208 planning process.

Issues which were not studied, or for which recommendations were not made through the process, are not addressed in this document (the scope of each non-point source topic study is defined later in this document). For this reason, the Plan is not "complete" at this time. It is the first step towards a complete Plan for managing non-point sources defined by the provisions of federal regulation 40 CFR, Part 35. Additional 208 planning will be done in the future to fill in the gaps in this initial Plan and to identify new non-point source problems. The Plan document will be annually updated.



INTRODUCTION

The Background of 208 Water Quality Management Planning: A major national effort to combat water pollution began with the passage of the federal Clean Water Act of 1972 (later amended in 1977). This legislation created a variety of programs to study and regulate the sources of water pollution. Most of the responsibility for carrying out these programs was assigned to state governments, under supervision of the federal Environmental Protection Agency (EPA). In Minnesota, responsibility was assigned to the Pollution Control Agency (MPCA).

The basic goal of the Clean Water Act was to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." One step toward reaching the goal was "that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water to be achieved by July 1, 1983." This goal is generally referred to as the "fishable-swimmable goal."

Since passage of the legislation, the states and the EPA concentrated their water cleanup efforts on so-called "point sources" of pollution: discharges of wastewater, usually via pipes, from municipal sewage systems and from industrial or commercial operations. At the heart of these efforts were a permitting program for all point sources and a grant program to pay most of the cost of building municipal sewage treatment facilities. The Clean Water Act recognizes point sources as generally the largest contributors of water pollution and as the sources most easily controlled. Great progress in eliminating pollution from point sources has been achieved since these programs began operating.

However, water pollution is not always caused solely by point sources. Many human activities (as well as natural events) may unintentionally allow polluting materials to escape into waters. Runoff from rain or snowmelt can wash these materials into surface water. They can also seep into the groundwater. Collectively, these causes of water pollution are termed "nonpoint sources". The Clean Water Act identified these possible kinds of non-point source pollution-causing activities: agriculture, silviculture (forestry), mining, construction, on-land disposal of residual wastes and other pollutants, hydrologic modifications, and urban runoff.*

* Since urban runoff generally flows through pipes or channels, it technically falls under the point source definition. However, EPA and MPCA permitting programs do not cover urban runoff discharges except under special circumstances. Therefore, 208 water quality management planning was to examine urban runoff along with the non-point sources. For convenience, urban runoff will be considered a non-point source in this document.

Unlike the uniform federal permitting and grant program used to control point sources, a decentralized program was set up to give the states, and some regional authorities, responsibility for developing their own solutions to non-point source problems. This program is commonly called "208 planning" because it was created under Section 208 of the Clean Water Act. Federal funding for 208 planning was initiated in 1975-76. The EPA provided funds for the state or local agencies that each state governor designated to identify non-point sources and create procedures for their control. These procedures were to be developed in a Water Quality Management Plan--commonly called a "208 plan"--and submitted by each governor to the EPA for review and approval.

Another function of 208 planning is "areawide" planning. Area-wide planning considers the best option for designing the whole system of sewage collection and treatment in large population centers, where more than one plant may be built. The Metropolitan Council has already completed areawide planning for the 7-County Metropolitan Area. Areawide planning was not necessary for other areas in Minnesota, because the point source pollution produced by sewage collection and treatment is adequately managed by existing programs. Therefore, the MPCA's 208 program included only non-point source planning.

Having completed areawide planning, the Metropolitan Council is now beginning to plan for non-point sources. 208 statewide planning has been coordinated by the MPCA's Planning Section, Division of Water Quality.

THE 208 PLANNING PROCESS - HOW THE 208 WATER QUALITY
MANAGEMENT PLAN WAS PREPARED

The Scope of the Study: Minnesota's Work Program limited the scope of 208 planning to non-point source issues. All areawide point source issues were excluded because it was the MPCA position that point sources are adequately addressed by MPCA issued permits which control point source discharges. In addition, on-site sewage disposal systems (e.g., septic tanks and drainfield systems) are also adequately regulated by proposed MPCA rules which recently went into effect. Brief descriptions of these MPCA regulatory programs are contained in Part II of this document.

To determine what non-point source problems might need investigation, the MPCA staff consulted with other state and federal agencies and local officials. The general public was consulted through a series of public meetings. All of the information developed by this process was considered in preparing the 208 planning Work Program.

The Work Program outlined activities designed to study the role of ten potential non-point sources of water pollution in Minnesota:

1. Agriculture: The objective of the agriculture study was to determine whether agricultural activities have the potential to, or do, adversely affect water quality. Tasks performed included an inventory of the extent and magnitude of erosion from farmlands, including upland, gully, drainage ditch, and stream-bank erosion; identification of areas in the State where potential for nutrient loss from farmlands is highest; an inventory of the extent and nature of drainage and irrigation activities in the State, and determination of their function in non-point source processes; determination of the amount of erosion and nutrients which travel to surface waters after they have left the field's edge; identification of the causes for all of the above; determination of the water quality effects of agricultural-generated materials; and identification of effective corrective measures (Best Management Practices) for identified problems.

Most of this information was obtained under contract with the State Soil and Water Conservation Board, which in turn had subcontracts with: the U.S. Department of Agriculture's (USDA's) North Central Soil Conservation Research Laboratory at Morris, Minnesota; the University of Minnesota's Department of Agricultural Engineering at St. Paul; and the USDA's Soil Conservation Service at St. Paul.

2. Construction: Study of this topic investigated the role of the construction process itself in water pollution and corrective actions to be taken. It did not specifically address pollution caused by the structures after construction.
3. Feedlots: Feedlots have been regulated by an MPCA program for a number of years. Therefore, the 208 feedlot study was not intended to determine if feedlots are sources of pollution. Rather, the study was designed to gather actual data on Minnesota feedlots to use in better operating the existing program. This information was obtained through contract with the State Soil and Water Conservation Board, which had subcontracts with local Soil and Water Conservation Districts. The Soil and Water Conservation Districts gathered the data.
4. Forestry: This study largely investigated activities in forest areas which contribute to sedimentation. Some work on nutrients and other pollutants was also performed. This work was prepared under contract by the State Department of Natural Resources and the University of Minnesota.
5. Highway De-Icing Chemicals: This study addressed water pollution caused by the application and storage of salt and salt/sand mixtures used for winter road maintenance. Measures to correct this problem were also studied.
6. Mining: The mining study was very limited in scope. It consisted mainly of a field survey by the MPCA to investigate possible sedimentation from abandoned waste piles. This narrow scope was chosen because other mining non-point source issues--active iron ore and taconite mining, peat mining, and potential copper/nickel mining--were already under investigation by other state agencies. The strategy adopted by the MPCA staff was to wait for the results of these other studies and follow up, if necessary, in future 208 planning.
7. Pesticides: The pesticide study was a literature review which investigated all types of pesticides, pesticide use, pesticide effects on water quality, and Best Management Practices.
8. Residual Wastes: Residual wastes are any polluting substances left over after treatment of industrial wastewater, sewage, or air emissions. Such wastes are already subject to several MPCA regulatory programs. Consequently, the 208 investigation took the form of a

survey to gather data about residual wastes and their disposal in Minnesota. The survey was limited to MPCA-permitted industries. This data will be used to improve existing programs.

9. Roadside Erosion: This study investigated sedimentation associated with previously constructed roadways. It also studied methods for correcting problems caused by roadside erosion.
10. Urban Runoff: This study examined the pollutants generated in urban-type environments, the water quality impacts of those pollutants, and measures to control them. Highway de-icing chemicals, construction activities, and eroding urban roads were covered under separate topics.

The amount of effort expended on each study was based on a preliminary evaluation of the relative impact of each non-point source on water quality (quantity of pollutants, numbers, and types of waters affected), and existing government programs already known to deal with the problem. Non-point source issues not addressed by this document can be addressed by future 208 planning.

The Reports Leading to the Plan:

Under the initial 208 planning program, ten non-point source topics were selected for study; agriculture, urban runoff, mining, highway de-icing chemicals, residual wastes, feedlots, construction, roadside erosion, pesticides, and forestry. The MPCA staff designed and conducted most of the non-point source studies. Some study topics were assigned to contractors; in which case, the MPCA coordinated the studies. For most topics, three reports or "packages" were developed by the MPCA staff.

- Package I identified possible water quality problems and described best management practices for dealing with the problems.
- Package II described existing agencies and programs which are related to non-point source topics. Each Package II was accompanied by a form called the Institutional Evaluation System to assist reviewers in evaluating the described agencies and programs.
- Package III evaluated the need for additional regulation to control water pollution from the non-point source and presented alternative courses of action for dealing with each non-point source. It also explained the environmental, social, and economic implications of each alternative.

The topics of mining and residual waste were approached in a more limited fashion; due to the scope of the study activity, only one report, incorporating the information from all three Packages, was prepared for each.

Each Package contains a Bibliography of information sources. Supplements were prepared for each Package I. These Supplements report comments received on the Packages and MPCA responses to the comments.

For several topics additional reports, or supplements, were prepared:

- The Agricultural Management Practices Supplement described Best Management Practices and developed some conclusions about the role of agricultural activities in generating pollutants.
- The Roadside Erosion Management Practices Supplement gave detailed information about the Best Management Practices presented in Roadside Erosion, Package I.

Several additional, special documents were also prepared to supplement the information found in the "Packages":

- Agriculture Package I, Supplement; Economic Considerations: an explanation of the economic implications of various, possible management alternatives.
- Water Quality and Non-Point Sources: a report on existing water quality in Minnesota as it relates to suspected non-point source pollution; and
- Water Quality Standards and Non-Point Sources: an explanation of how water quality problems were identified, using water quality standards as a yardstick.

The Studies Leading to the Plan:

The need for additional regulation of each non-point source was determined by three factors; (1) evidence that the non-point source is causing, or could cause, water pollution in Minnesota; (2) availability of adequate and affordable Best Management Practices to correct the problems; and (3) adequacy of existing or proposed government management programs.

A Package I was developed in the following way: The MPCA carried out the studies done for most of the topics. However, in the areas of agriculture, feedlots, and forestry this work was contracted to appropriate agencies and organizations. Several sources were used to gather information about whether, where, to what extent, and why each potential non-point source is contributing to water pollution. The most generally useful sources of information were reports from previously done research. Such reports were analyzed, and their results and conclusions evaluated. Comparisons were drawn with conditions in Minnesota to find the degree to which the same conclusions logically would be valid in the State. Studies done in Minnesota were given special emphasis. The specific details of how studies for each topic were completed are explained in each Package I.

Actual data from water quality sampling done over the years was also examined. Unfortunately, the data contained little information applicable to non-point source questions, but when something did apply it was presented in Package I or in the document entitled "Water Quality and Non-Point Sources."

Other sources of information were also used: Data on residual wastes and feedlots was gathered by telephone and field surveys, respectively; areas where water pollution from de-icing chemicals, roadside erosion, and forestry activities was most likely were identified through computer mapping techniques--these techniques identified sites having the most unfavorable combinations of factors contributing to pollution; sedimentation from abandoned iron ore wastes was investigated by a field inspection; and agricultural sedimentation and nutrient runoff were estimated

for individual townships through the use of specially designed computation techniques. These techniques were created and applied by personnel at the United States Department of Agriculture's North Central Soil Conservation Research Laboratory at Morris, Minnesota, and the University of Minnesota, Department of Agricultural Engineering at St. Paul.

Information obtained from all sources was used to determine whether the non-point source activities degrade water quality to the extent that national and state goals are not reached. The EPA and the MPCA have developed numerical criteria for making this judgement. These criteria define the limits on pollutants necessary to achieve the goal. These criteria, which have been officially adopted as rules WPC 14, 15, 22, 24, and 25 by the MPCA are termed the water quality standards. These standards were used as the yardstick by which the information on non-point sources was gauged. If the evidence indicates that the source frequently causes pollutant levels to exceed standards, then the source has been judged to require pollution control.

Information about Best Management Practices (BMP) for each topic was obtained from reports. In some cases (e.g. Construction or Roadside Erosion) BMPs are well known and fairly standardized. They have been compiled in previous documents and are frequently employed by government and industry. In other cases (e.g. nutrient runoff from agricultural activities) it was necessary to develop a set of BMPs from research reports. Most BMP write-ups for Package I were done by the MPCA staff. However, for the Agriculture and Forestry topics, information was researched for the MPCA by contractors: The University of Minnesota, and the Minnesota Department of Natural Resources.

One of the elements considered in determining a need for new or revised management programs was the adequacy of existing programs to regulate non-point sources. An investigation was performed by the MPCA to learn what agencies and programs relate to each non-point source. This information was presented in the Package II documents. To judge the effectiveness of these programs, a form was sent to agencies and Regional Advisory Committee members asking questions designed to rate the effectiveness of programs. The results of these surveys were analyzed by the MPCA and reported as part of the Package III documents.

The final step was an evaluation of how well the existing programs addressed each identified pollution problem. This discussion was presented in Package III. Package III then presented overall conclusions based on the Package I and Package II information and on comments received from reviewers. The overall conclusions address whether a well-defined threat of water pollution was attributable to the source, whether it could be feasibly abated with current knowledge, and what changes in the existing management situation would be needed to accomplish abatement. Package III then presented options for meeting these needs.

Public Participation

Introduction: Section 208 of the Clean Water Act mandates that a meaningful public participation program be a part of 208 planning. The EPA rules and regulations guiding public participation in 208 planning are published in 40CFR Part 130.10 (a) (1). EPA rules and regulations 40 CFR Part 130.10 (a) (2) guide inter-governmental participation. The policies and procedures used by the MPCA for public participation were established by the Continuing Planning Process document.

The 208 planning process in Minnesota has two main elements: (1) the information developed by the MPCA staff with the assistance of technical advisors and (2) the public participation provided by the citizens of the State and local units of government.

The Participants: A description of the major public participants will be followed by an outline of the way in which the public participation process worked:

- Regional Advisory Committees- Citizen Advisory Committees were organized in each state development region. Membership in these Committees was carefully selected to meet EPA public participation requirements. Staff support for the Regional Committees was supplied by the Regional Development Commissions under grant agreements with the MPCA, MPCA regional staff personnel, and field representatives of those agencies participating in the Technical Advisory Groups.
- State Task Force- The State Plan Development Task Force was comprised of a delegate from each Regional Advisory Committee and a representative of each of eleven state agencies: State Planning, Transportation, Natural Resources, Water Resources Board, Agriculture, Health, Water Planning Board, Economic Development, Soil and Water Conservation Board, Energy, and the MPCA.
- Mailing Lists- An extensive list of those groups and individuals who had indicated a desire to review 208 documents was maintained. This list included environmental groups, business groups, legislators, educators, concerned citizens, and others. All informational materials and notices of State Task Force meetings were mailed to this group.

The Participation Process- A description of how study topics were selected and how Packages I, II, and III were developed is found on pages 3 through 11.

Each Package I was submitted in draft form to the Technical Advisors. This group varied with each study topic to assure that each topic was reviewed by individuals having expertise in that specific area. Corrections and amendments to the Package were

based on corrections, suggestions, and comments made by the Technical Advisors.

Package I was then sent to the Regional Advisory Committees for review and comment. The committees met, often calling upon local experts to provide information on their specific area. The Regional Committee meetings were publicized locally and the public was encouraged to attend. Each region maintained a library of information for interested citizens. MPCA staff members were also available to attend these meetings as resource persons.

At the same time that the Regional Committees were considering Package I, the Package I was also sent to the groups and individuals on the mailing list. When the reviewers of Package I had submitted their comments to the MPCA, a Supplement to Package I was prepared. The Supplement contained the reviewer's comments and MPCA responses to comments where responses were appropriate or necessary.

Review of Package II drafts was similar to the review of Packages I. After corrections based on the technical reviewers' comments were made, Package II was sent to the Regional Advisory Committees and the public. Accompanying each Package II was an Institutional Rating Sheet to assist reviewers in rating the programs and agencies described in that particular Package. Some reviewers used the rating sheets; others used their own rating system. The MPCA analyzed these ratings and used the results in preparing Packages III.

Package III review was identical to the reviews of Packages I and II. As explained earlier, Packages III presented alternative courses of action for controlling pollution from the study topic under consideration. The Advisory Committee members met to consider these options. MPCA staff members attended many of these meetings as resource persons. Each Regional Committee acted on the alternatives presented and instructed its State Task Force Delegate to present this position to the State Task Force. The public was notified of these meetings and invited to participate.

At this point the work of the State Task Force began. After the Regional Advisory Committees had submitted their decisions on each Package III, the State Task Force was convened. The MPCA, acting as staff to the Task Force, sent out meeting notices (to the entire mailing list); agendas; minutes of the last Task Force meeting; summary sheets on the topic to be considered; and copies of comments received from the Regional Committees, the state agencies, and other reviewers. News releases were sent to the media, announcing the meetings and the agenda and encouraging public attendance.

State Task Force meetings were chaired by the MPCA. Regional delegates and state agency representatives presented their positions, experts were invited as resource persons, and members of the pub-

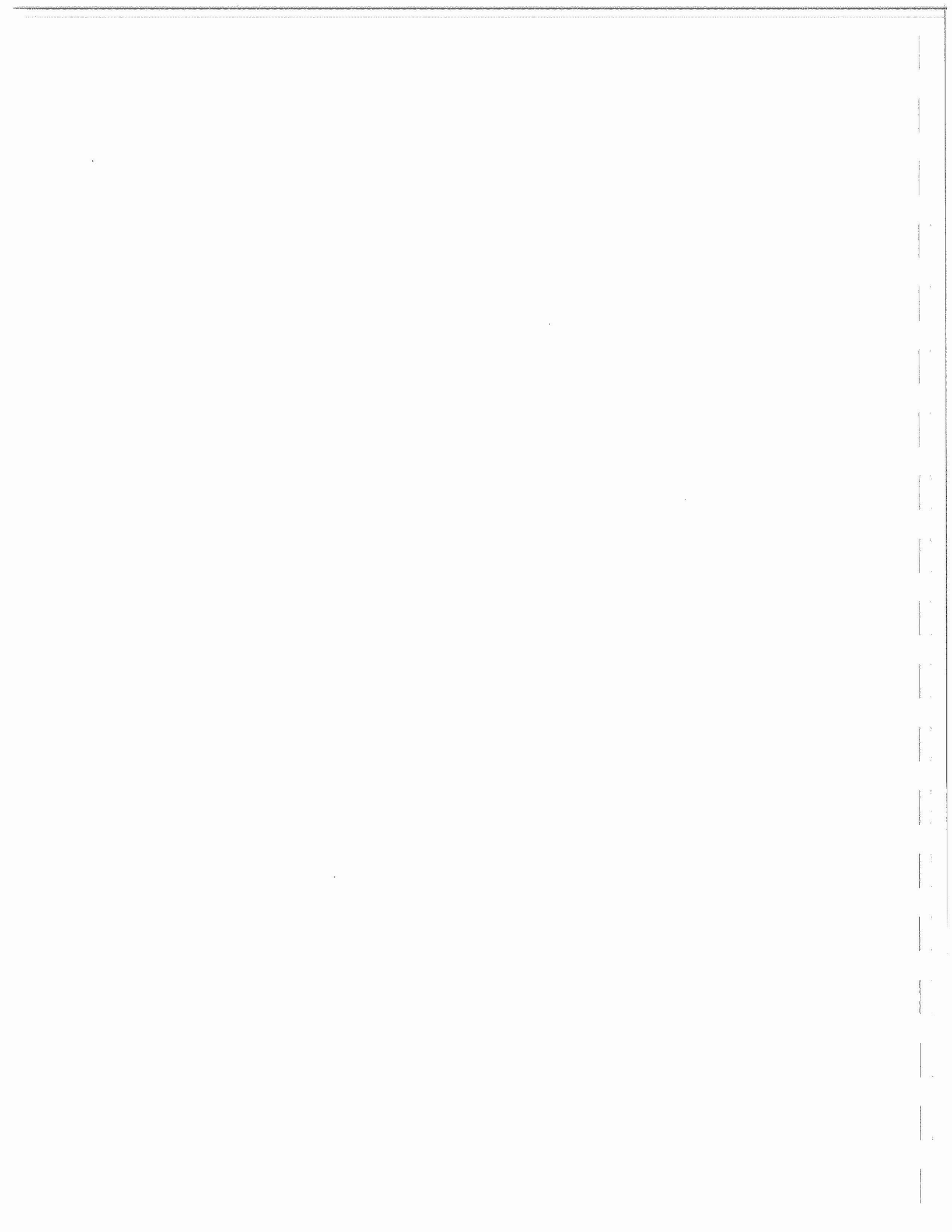
lic who attended were encouraged to participate in the discussion. The Task Force then adopted one of the management alternatives for recommendation to the MPCA Board. Some of the alternatives were amended or expanded. The Task Force also registered additional concerns and recommended their inclusion in the 208 Plan.

After the State Task Force had met and reached decisions on all ten non-point source topics, a first draft of the 208 Water Quality Management Plan was compiled by the MPCA staff.

Public meetings on the November 1979 Draft Plan were held in each Minnesota Region by the Citizens' Advisory Committees. MPCA staff members attended all of these public meetings to assist in presenting the draft Plan to the Public. Taking into account comments recorded at the public meetings, the Regional Advisory Committees once again instructed their State Task Force delegates, and the Task Force was convened. When the State Task Force met to consider the November 1979 Draft Plan, the public was again invited to attend.

The recommendations and programs proposed by the State Task Force were presented to the MPCA Citizen Board at a public meeting. After hearing the public concerns expressed at that meeting, the MPCA Board has taken the recommendations under consideration.

At each step of the 208 planning process the public (Technical Advisory Group, Regional Citizens' Advisory Committees, State Task Force, Environmental groups, business groups and the general public) were kept informed. They were given the opportunity to respond, and their concerns were incorporated in the development of the Plan.





SUMMARY OF PLAN RECOMMENDATIONS AND PRIORITY RANKING

Construction Activities

Construction activities were found to harm water quality significantly. Enactment of a state erosion and sediment control law is recommended. This law would require local units of government to require the implementation of runoff and erosion control practices as part of the planned construction. For road construction, the various state road authorities would enter into agreements stating their commitment to use appropriate control measures for all road construction. The remaining construction activities occurring in the State would be permitted by local units of government upon approval of the development's erosion and sediment control plan.

Roadside Erosion

Roadside erosion was found to be occurring along many established roads in the State and is of serious proportions in many cases. A state cost-share program requests legislative funding to assist local road authorities in correcting and preventing erosion from roadsides. The recommended program would allow local Soil & Water Conservation Districts, in conjunction with the local governments within their jurisdictions, to develop roadside erosion control programs and to receive state funds to offset a portion of the program cost.

Highway De-Icing Chemicals

Study of highway de-icing chemicals found that all exposed salt stockpiles are potential sources of groundwater contamination and that intensive use of salts on roadways has the potential to cause problems in lakes and small streams. The recommended programs request legislative funding to finance the implementation of Best Management Practices (BMPs) for all the publicly owned salt stockpiles in the State. It also provided an educational program for all local road authorities on the proper implementation of identified BMPs for application of salts to roadways.

Agriculture

Cropland erosion was determined to be a primary source of sedimentation; it also contributes to lake eutrophication. Streambank and lakeshore erosion were determined to be significant sources of sediment in some areas. Improper manure storage and handling, improper fertilizer storage and use, improper pasturing practices, and certain other agricultural practices were also found to cause water pollution in some cases. The management program recommended would provide additional funding to the existing soil conservation programs. The State legislature and Congress would be requested to double the present funding for the State Agricultural Cost-Share

Program and the Agricultural Conservation Program. Congress is also requested to fund the Rural Clean Water Program. An expanded education and information program would be developed to inform the public of the programs and to provide farmers with information on the conservation practices which are effective in controlling pollution related to agriculture. Many important questions about the relationship of agricultural practices to water pollution remain, especially information about effective corrective measures.

Feedlots

Of the 90,000 feedlots in Minnesota, 10-15% are estimated to be located in shoreland areas and are considered pollution hazards. In addition, any feedlot which discharges pollutants during a 25-year/24-hour rainstorm is considered a pollution hazard. The recommended management program would continue the existing regulatory and cost-share program for feedlots statewide and would provide increased enforcement of the regulatory program and additional cost-share moneys in special "target areas" around the State. The target areas would be watersheds where control of feedlot pollution is necessary to protect groundwater or surface waters of high resource value, or where a practicable level of effort for feedlot pollution is expected to improve the quality of specific waters.

Pesticides

Pesticides have the potential to seriously damage the environment. Such damage may occur if the pesticides are improperly used, and sometimes even with proper usage. Because pesticides potentially harm the environment, there exists a large number of pesticide programs at both the federal and state levels. These programs regulate the manufacture and use of pesticides. The study of pesticides found that even with the host of current programs and studies, there is inadequate knowledge about the amounts being applied in the State, how much of the pesticides get into water, and what effect they have. The recommended management program calls for establishing controls to reduce agricultural erosion and nutrient runoff, the proper disposal of pesticide containers, and a comprehensive and coordinated water monitoring program.

Forestry

The study of forestry found that activities common to forested lands in Minnesota do not constitute frequent or widespread harm to water quality. Where pollution has been found to occur from forests, sediment is generally found to be the cause. The Plan recommends that the Department of Natural Resources (DNR) establish staff positions in the fields of forest hydrology or forest soil science. These new staff members would review the water quality-related activities occurring in forest areas and recommend implementation of appropriate Best Management Practices.

Mining

The Minnesota Pollution Control Agency (MPCA) investigated the potential water quality effects of sedimentation from abandoned iron ore mining wastes. No problem was shown to exist. Under the recommended program, the MPCA would conduct a field study to determine if heavy metals leached from mining wastes affect either ground or surface water. Current studies of copper/nickel and peat mining would be reviewed to identify possible water quality problems. The MPCA would investigate the potential water quality effects of possible uranium mining. The Soil and Water Conservation Board would give technical assistance to local governments in the regulation of sand and gravel operations. Active mining operations are regulated by Department of Natural Resources and MPCA permits.

Urban Runoff

While Minnesota waters are being polluted by runoff from urban areas, the current state of technical knowledge is insufficient to justify the implementation of any management programs. The recommended study program would determine the effectiveness and feasibility of urban runoff controls and Best Management Practices in meeting water quality goals. It would also initiate a monitoring program to assess the water quality impacts of urban runoff.

Residual Wastes

The work on the residual wastes topic was restricted to a survey of the wastes generated by industry and the disposal of these wastes. A result of that review is the recommendation that the MPCA improve its waste permitting process.

Priorities

In addition to making recommendations for each of the non-point source topics, the 208 State Task Force (STF) assessed the relative importance of the recommendations. This assessment is necessary to indicate to the MPCA Board, the Governor, the State legislature, and the federal government which problems and programs should receive the most emphasis in the future. Money and other governmental and private resources are not unlimited. The problems identified by the 208 STF as having greater importance should be addressed first. More money and time should be spent on programs dealing with priority problems.

The STF determined the relative importance of the ten topics by the following methods:

- (a) Each member of the 208 STF was given 100 points to allo-

cate among the topics according to the degree of concern about them.

- (b) The scores assigned by the 208 STF members were totaled, and an average score was calculated for each topic.

The 208 State Task Force's Priority Ratings

Agriculture	29.1
Feedlots	14.7
Pesticides	12.2
Urban Runoff	11.3
Construction	10.7
Roadside Erosion	6.2
Residual Wastes	6.0
Highway De-Icing Chemicals	4.5
Forestry	2.8
Mining	2.4

RECOMMENDED PROGRAMS AND POLICIES

INTRODUCTION

This section describes policies and programs recommended for each of the ten potential non-point sources of pollution investigated by Minnesota's 208 planning program. It also includes summaries of the problem and program evaluations presented in supporting documents, Packages I, II, and III. These summaries describe the impact, or potential impact, of the non-point sources on water quality in Minnesota and the adequacy of existing governmental programs to control them.

Information about each non-point source topic is organized in the following format:

- Goal
- Objectives (of the management program)
- Water Quality Problem Assessment (from Packages I and III)
- Management Program Assessment (from Package III)
- Findings and Conclusions (the relationship of the water quality problems to the existing programs and the need for new or modified programs)
- Recommended Policies and Programs (chosen through the 208 planning process)
- Management: Who Does What (the recommended management roles of various government units).
- How Important Aspects of the Program Are Carried Out
- Further Study Needs (issues which need further investigation before informed decisions can be made)
- Environmental, Social, and Economic Impacts of Recommended Programs (presented in a chart)

Certain of these sections were not relevant to some topics; in which case they were omitted.

In the Recommended Policies and Programs Sections, some sentences are printed in italics. The italicized sentences are statements of policy and recommendations adopted by the State Task Force.

Most of the recommendations identified in this Plan will require the commitment of significant financial resources. It is the concern of the State Task Force that adequate financing be made available to carry out the recommendations.

The State Task Force recommends that the MPCA seek sufficient funding to implement the programs identified in this Plan. Priority should be given to developing federal funding sources. If federal funding is unavailable, the MPCA should seek funding from the State legislature. If state and federal funding is not available to finance the "state-mandated" programs, local units of government must have the authority to raise funds over and above their present tax levy limits.

CONSTRUCTION

Goal: To prevent detrimental water quality effects caused by construction activities.

Objective: Enactment of a statewide erosion and sediment control law, and implementation of a sediment and erosion control program by 1983.

Water Quality Problem Assessment: Construction activities are known to be a significant source of sediment. High sediment loadings from construction activity can be detrimental to fish and other aquatic life. The section on agriculture describes the typical effects.

A review of current information and data collected nationally indicates that the problem of construction site erosion has been identified in all areas of the country. The extent of the problem varies according to local characteristics.

Management Program Assessment: A variety of government agencies and programs are attempting to regulate and control erosion and sedimentation related to construction activities. There is, however, a large variance in the amount, type, and effectiveness of erosion control programs from one governmental unit to another. Some areas exercise no control over erosion and sedimentation, while in others the controls exist only through the shoreland management program. Erosion and sediment control are not a major focus of the shoreland management program. For many of the local units of government which are attempting to provide erosion and sediment controls, the lack of adequate financial resources and manpower is a significant problem. Also, no overall guidance for erosion and sediment control exists among state agencies.

In contrast to the general construction situation, there is a fairly comprehensive system for controlling erosion and sediment from road construction. All federal-aid, state, and state-aid highways must be built to specific Minnesota Department of Transportation (MnDOT) standards. These standards include erosion and sediment control measures. In addition, MnDOT conducts a training program for local highway engineers. This program includes discussion of erosion and sediment control measures. The degree of erosion and sediment control measures required by, or applied to, county and municipal highway projects is unknown. Two specific concerns relate to road construction: (1) the general lack of erosion and sediment controls in the construction of township roads, and (2) the need for a more comprehensive and consistent approach to erosion and sediment control by local highway authorities.

Findings and Conclusions: Construction activities do cause significant water quality problems. The existing management system does not adequately address the pollution problem caused by construction activities.

Recommended Policies and Programs: *It is recommended that a state erosion and sediment control law regulating construction activities be enacted for the purposes of requiring the implementation of Best Management Practices (BMPs) on construction sites.*

For general construction activities, the law would require the implementation of erosion control measures on all construction projects, with the following exemptions: (1) construction of single-family residences on lots of one acre or more in size when not part of a larger development; (2) projects of five acres or less in areas outside shorelands, municipalities, and urban townships; and (3) construction activities directly related to mining.

Before construction on a project could begin, a developer would have to prepare an erosion and sediment control plan and submit it to the erosion control authority. Usually, the project will be reviewed as part of the land-use control system's general development review. A permit would be issued based on the plan; during construction, the erosion control authority would inspect the project to see that the plan was being followed. If the approved measures were not being carried out, measures to bring about compliance could be required by the erosion control authority (stop-work orders and fines are possible methods). Performance bonds would be required of developers so that the erosion control authority could carry out needed measures if the developer failed to do so.

The lead state agency, the Minnesota Pollution Control Agency (MPCA), would develop the program guidelines and model ordinances, provide training programs, and review the progress of the program. The MPCA would enter into a Memorandum of Agreement with the Soil and Water Conservation Board to provide assistance in the development of program guidelines. The MPCA would also handle review and approval of major public utility projects--those requiring an Environmental Impact Statement--and would develop the measures that must be followed on construction carried out by state agencies. The MPCA would also have the authority to inspect the projects to see that the agreements were being honored.

Most management activities will be carried out at the local level. The county or municipality would enact erosion control ordinances, review plans, issue permits, inspect projects, and enforce the program. Townships could carry out all the necessary functions or could work out shared responsibilities with the county or neighboring municipality. Small municipalities--those under 2,500 in population--could arrange with the county to administer the program if they desire. Soil and Water Conservation Districts (SWCDs) would provide technical assistance, in meeting the requirements of the law, to local units of government as requested.

As part of the new state erosion and sediment control law, road construction projects would be required to use appropriate ero-

sion and sediment control measures. The program would apply to all areas within the jurisdiction of the unit of government having responsibility for the program. Permits would not be required for each road construction project. Instead, Memorandums of Agreement would be developed between the erosion control authorities and the road-building agencies. The Agreements would establish the kinds of erosion control measures that would be used by the road-building agencies. The lead state agency, the MPCA, would enter into an agreement with MnDOT and would have authority to require compliance with the Agreement if appropriate measures are not being taken in individual cases. The Agreement would apply to all federal, state, and state-aid road construction projects. MnDOT has already established specifications for erosion control measures on these projects. The Agreement would adopt those measures as part of the state program. MnDOT's existing technical assistance and inspection programs would be used in the program.

At the local level, the state erosion and sediment control law would allow the local erosion control authority to enter into a similar type of agreement with the local road-building agency (including townships). The local erosion control authority could require compliance with the Agreement when appropriate measures were not being taken in individual cases. SWCDs could, when requested, provide technical assistance to other local units of government.

To help meet the administrative needs of the program, the State would provide financial assistance to local units of government. A special task force of state agencies, local government representatives, and private developers should be established to assist in drafting the proposed legislation and to identify the administrative and financial needs of the local units of government.

Legislation drafted should require that the selection and use of BMPs for construction activities be based on the following general principles:

- (1) Prevent erosion where possible.
 - Identify highly erodible areas during the planning stage, and disturb them as little as possible.
 - Keep disturbed areas small, and expose them for as short a time as possible.
 - Stabilize exposed areas with a surface cover of some sort, and divert or slow runoff from areas that remain exposed.
- (2) Apply "good housekeeping practices" to prevent materials used on construction sites from being carried away in runoff.

- (3) Maintain infiltration and runoff characteristics on the site as reasonably close to pre-development conditions as possible.
- (4) Use detention structures where necessary to prevent sediment and other pollutants from leaving the site and reaching lakes and streams.

A discussion of particular BMPs can be found in the MPCA's Construction, Package I, August 1978, and Roadside Erosion, Package I, November 1978; and in the MnDOT manual of erosion control specifications.

Management - Who Does What:

Minnesota Pollution Control Agency

- Drafts legislation
- Develops rules and regulations
- Administers state program for review and approval of major utility projects
- Provides training and technical assistance to local units of government
- Evaluates program progress

Minnesota Soil and Water Conservation Board

- Assists the MPCA in developing program guidelines
- Assists in providing training and technical assistance

Minnesota State Planning Agency

- Administers program of financial assistance to local governments

Minnesota Department of Transportation

- Establishes specifications for erosion control on road construction projects
- Provides technical assistance and inspection

Counties

- Enact erosion control ordinances
- Administer programs for all projects, except those delegated to the MPCA

Municipalities

- Enact erosion control ordinances
- Administer programs for all projects, except those delegated to the MPCA

Townships and Watershed Districts

- Enact erosion control ordinances
- Administer programs for all projects, except those delegated to the MPCA

Soil and Water Conservation Districts

- Provide technical assistance to other local units of government

How Important Aspects of Program Are Carried Out:Minnesota Pollution Control Agency

- Establishes a task force to assist in drafting legislation and other activities
- Drafts legislation
- Develops administrative procedures for program
- Develops estimate of local government needs (staffing and funding)
- Reviews the progress of program implementation, and submits annual report to the U.S. Environmental Protection Agency and the public

Local Units of Government (Counties, Municipalities, Townships, Watershed Districts)

- Enact ordinances, issue permits, inspect construction sites, and enforce programs
- Counties administer program for townships and small municipalities that choose not to administer their own programs.

Soil & Water Conservation Districts and Watershed Districts

- Provide technical assistance to other local units of government upon request
- Under formal agreement, share administrative responsibilities and coordinate program implementation for those local units of government that wish to delegate program responsibilities.

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the seven-county metropolitan area. The Council may propose programs which are different from, and more stringent than, those identified here.

Construction

Economic, Social, and Environmental Impact Assessment

Environmental Impacts	Institutional Financial Impacts	Economic Impacts	Social Impacts
<u>Water Quality</u> Program would prevent many of the harmful effects of construction projects on water quality.	<u>Institutional</u> Program would require additional administrative support by governmental units.	<u>Production of Goods and Services</u> No significant impact exists due solely to erosion control program.	<u>Housing Supply</u> No significant impact exists due solely to erosion control program.
<u>Physical Resources</u> Program would provide some benefits because less damaging construction methods would be used. A few sites might not be developed or roads relocated because of erosion control problems.	<u>Financial</u> Additional costs would be incurred on these road construction projects that have not had erosion control requirements applied to them (township roads mainly).	<u>Income and Investment</u> No significant impact exists due solely to erosion control program.	<u>Physical Mobility</u> No significant impact exists.
<u>Energy</u> No significant impact exists.	Administration of program would cause an increase in governmental expenditure.	<u>Consumer Expenditures</u> There is a very slight increase in housing cost.	<u>Land Use Pattern</u> Slight change could occur because certain areas would be more difficult to develop with erosion control requirements.
<u>Amenities</u> Program would provide some benefits because less damaging construction methods would be used.	Some savings would be realized because there would be less of a need to spend money to repair off-site damages caused by sediment from project sites.		<u>Equity</u> Slight impact exists because the small increase in housing cost might prevent a few additional buyers from entering the housing market.

ROADSIDE EROSION

NOTE: This topic deals only with erosion occurring along existing roads. Erosion caused by road construction is dealt with under the Construction topic.

Goal: To prevent erosion from existing roads from harming water quality.

Objective: Enactment of a statewide cost-share program for correcting erosion along existing roads by 1983.

Water Quality Problem Assessment: The Roadside Erosion study showed that roadside erosion is occurring along many established roads in Minnesota and is of serious proportions in many cases. Areas of the State with the most serious roadside erosion problems generally have high concentrations of lakes and streams. Roadside erosion was found to be caused by:

- Inadequate design for drainage from land adjacent to roadsides (drainage from parking lots, county and judicial ditches, agricultural drainage, open ditches, etc.);
- Poor maintenance practices;
- Use of roadsides by recreation vehicles (four-wheel drive vehicles, dirt bikes, snowmobiles, and other all-terrain vehicles or off-the-road vehicles); and
- Use of roadsides for utilities construction, livestock moving, or crop planting.

The full extent of the roadside erosion problem is difficult to assess at any one time because new erosion sites are developing continually (especially during wet seasons) and sites already identified may be either corrected or stabilized by the action of natural forces. Township roads were found to have by far the most incidents of erosion.

To correct all roadside erosion problems in the State would cost an estimated \$25,000,000 (based on a 1973 study).

Management Program Assessment: A number of road authorities exist in Minnesota: the Minnesota Department of Transportation (MnDOT), counties, municipalities, and townships. Each is responsible for setting maintenance policies for roads under its authority.

Of all the road authorities examined, MnDOT was found to have the most comprehensive erosion control program. It was found that the more populous the county or municipality, the more definitive its program for roadside erosion control. Though

townships have the greatest number of erosion incidents, their programs were found to be the least comprehensive.

Several identified programs provide either technical or financial assistance to local units of government for erosion control (Roadside Erosion, Package II, contains a detailed description). The Soil Conservation Service's (SCS's) Resource Conservation & Development (RC&D) Program appears to be the most effective. This program provides both planning and financial assistance in erosion control areas. Presently, 43 Minnesota counties are in RC&D project areas and are eligible for RC&D assistance. Of these, about three-fourths have developed plans for controlling roadside erosion. Unfortunately, due to recent funding cuts, the assistance provided by the RC&D Program will be reduced significantly. Though other programs provide some level of assistance to local units of government, there are no other programs as comprehensive or as effective as RC&D.

Because of its role in assisting local units of government to assess erosion problems, design plans, and finance corrective action, the SCS's RC&D Program is the most effective management program for roadside erosion control. Congress and the Administration are presently discussing the possibility of modifying and reducing the scope of RC&D programming. A reduction in RC&D funds or program activities would mean that local units of government that would have been eligible to participate in an RC&D Program will have to find alternative sources of funds.

The Soil and Water Conservation Board has a cost-share grant program for streambank, lakeshore, and roadside erosion control projects for areas located outside RC&D project areas. This program began in 1975 and is funded by the State legislature.

Findings and Conclusions: Erosion occurring along roadsides contributes a significant portion of the total erosion occurring in Minnesota. Local units of government (especially townships) lack adequate financial and physical resources to correct the existing roadside erosion problem. Reductions in the funding and activities of the RC&D Program reduce the effectiveness of local erosion control efforts. Therefore, the existing management structure does not adequately address the roadside erosion problem.

Recommended Policies and Programs: *It is recommended that a state cost-share program for the control of roadside erosion be established by the legislature for the purpose of assisting Minnesota's road maintenance authorities in correcting and preventing roadside erosion.*

The proposed management program delineates funds for the implementation of Best Management Practices (BMPs). These funds are intended to offset a portion of the total cost of correcting Minnesota's roadside erosion problem. The proposed management program will provide adequate assistance to local units of government in the absence of an RC&D Program. However, *it is*

strongly recommended that the Administration and Congress appropriate sufficient funds to the RC&D Program to assist in meeting the State's roadside erosion control needs.

The proposed management program would provide financial assistance to road maintenance authorities for program implementation, and for training and education in roadside erosion control. It would also provide data on the location and extent of erosion sites. The proposed program has two elements: (1) a periodic survey of the location, extent, and impact of roadside erosion in each county, and (2) funding of erosion control projects.

An educational and financial assistance program will be used to encourage road maintenance authorities and governmental units to voluntarily implement roadside erosion control measures. The program will be managed by the Soil and Water Conservation Board (SWCB); Soil and Water Conservation Districts (SWCDs) will assume responsibility in areas where RC&D Programs are not organized. All public roads in Minnesota will be included in the program.

A survey program would be designed in consultation with the SCS, MnDOT, and representatives of local road authorities. A full survey (every mile of road) would be taken at ten-year intervals. A mid-term survey (every other five years) would be taken on major erosion sites to determine if effective corrective action has been taken. SWCDs would be responsible for conducting the survey and for preliminary tabulation of the data.

The cost-share element of the program would require local SWCDs to develop needs lists and countywide erosion control programs for all roads in each county (this includes state, county, municipal, and township roads). The Soil and Water Conservation Board would review these programs for compliance with adopted regulations and award the cost-share funds. Priority would be given to erosion control plans that identify erosion problems affecting water quality.

A Task Force comprised of representatives of the SWCDs, the Association of County Engineers, the Association of Municipal Engineers, the Township Officers Association, the Minnesota Department of Transportation, and the MPCA should be formed to assist the SWCB in defining eligible projects and specific program details.

The MPCA will monitor and evaluate local government compliance with the program and will issue an annual report to the Environmental Protection Agency and to the public.

Due to the individual characteristics of each erosion site, no Best Management Practice (BMP) or group of BMPs is effective for every situation. For this reason, no specific BMPs are identified or recommended. Descriptions of BMPs and the conditions under which they could be used effectively can be found in the MPCA's Roadside Erosion, Package I (pp. 56-64) and Roadside Erosion, Package I, Supplement. They can also be obtained from the Minnesota Department of Transportation, Division of Erosion Control and Materials Establishment.

Program costs are estimated at \$660,000 per decade for the survey work and \$900,000 for the cost-share element.

Management - Who Does What

Minnesota Soil and Water Conservation Board

- Is responsible for program development, coordination and implementation, monitoring, and evaluation.
- Awards cost-share grants.

Soil and Water Conservation Districts

- Develop county roadside erosion control plans in conjunction with state and local road authorities.

Minnesota Department of Transportation

- Advises the Soil and Water Conservation Board on program development.
- Participates at local level in roadside erosion control plan development.

Minnesota Pollution Control Agency

- Assists the Soil and Water Conservation Board in setting priorities for awarding funds.
- Monitors and evaluates progress of program.

Counties, Municipalities, and Townships

- Assist in development of county roadside erosion control plans.
- Provide local share of plan financing.
- Implement county plans.

How Important Aspects of Program Are Carried Out

Minnesota Soil and Water Conservation Board

- Designs survey in consultation with the Soil Conservation Service, the Minnesota Department of Transportation, and representatives of local road authorities.
- Administers survey program.

- Designs administrative structure for reviewing roadside erosion control plans and awarding grant requests.

Soil and Water Conservation Districts

- Carry out roadside erosion site survey.
- Develop county roadside erosion control plans, needs lists, and costs.
- Submit requests for cost-share funds to the Soil and Water Conservation Board.
- Administer implementation of county roadside erosion control plans.

Minnesota Pollution Control Agency

- Reviews the progress of program implementation and submits annual report to the Environmental Protection Agency and the public.

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the Seven-County Metropolitan Area. The Council may propose programs which are different from, and more stringent than, those identified here.

Roadside Erosion

Economic, Social, and Environmental Impact Assessment

Environmental Impacts	Institutional Financial Impacts	Economic Impacts	Social Impacts
<u>Water Quality</u>	<u>Institutional</u>	<u>Production of Goods and Services</u>	<u>Housing Supply</u>
Reduction in one source of sedimentation to surface waters of the state	Would require expansion of the responsibilities and scope of the SWCB with possible corresponding increase in staffing needs	No impact	No impact
<u>Physical Resources</u>		<u>Income and Investment</u>	<u>Physical Mobility</u>
Reduced sedimentation benefits aquatic resources	<u>Financial</u>	No impact	No impact
<u>Energy</u>	Program would require substantial funding by legislature with a corresponding effort from local government revenue resources	<u>Consumer Expenditures</u>	<u>Health and Safety</u>
No impact		No impact	No impact
<u>Amenities</u>			<u>Land Use Patterns</u>
Secondary benefit of the program would be the elimination of unsightly scars and ruts along roadsides	Could prevent severe erosion of roads and save on costly reconstruction		No impact
			<u>Equity</u>
			No impact

HIGHWAY DE-ICING CHEMICALS

Goal: To prevent highway de-icing chemicals from harming water quality

Objective: Implementation of Best Management Practices for storage and application of highway de-icing salts.

Water Quality Problem Assessment: The study of highway de-icing chemicals in Minnesota identified two distinct sources of problems for the State's waters: 1) the storage of salt or salt/sand mixtures in outdoor stockpiles (stockpiles); and 2) the spreading of salt and salt/sand mixtures upon roadways (application).

Stockpiles can generate very high concentrations of dissolved salt if water percolates through them. These concentrations can easily increase groundwater levels of sodium and chlorides in violation of the Minnesota Pollution Control Agency (MPCA) anti-degradation policy for groundwater. They may also exceed the specific 250 ppm limit for chlorides in drinking water supplies. MPCA Regulation WPC 22 establishes that all underground waters shall be protected for drinking water supply.

Since almost any location in Minnesota lies over vulnerable underground waters which may be used for human or animal consumption, all unprotected stockpiles containing salt must be considered potential sources of groundwater contamination.

The potential for water pollution caused by the application of de-icing chemicals to streets and roadways is more difficult to determine than the potential for pollution from stockpiles. Evidence indicates that intensive or concentrated application of salts to roadways can cause water quality problems, particularly in lakes and small streams. Application of de-icing salts to roads in rural areas generally appears very unlikely to cause water quality problems.

Management Program Assessment: A number of autonomous road authorities exist in Minnesota: The Minnesota Department of Transportation (MnDOT), counties, municipalities, and townships. Each is responsible for setting maintenance policies (including the use of highway de-icing chemicals) for roads under its authority. Except for standard procedures established by MnDOT, statewide, for roads in its authority, highway de-icing chemical practices vary widely among road authorities.

In 1971, the Minnesota Legislature passed a law (Minnesota Statute 160.215) expressing concern about the effects of salt usage and advocating reduced usage where safely possible. No standards or regulating responsibilities were identified.

MnDOT has a formal policy to protect groundwater from salt stockpile runoff. However, insufficient resources have prevented total implementation of that policy. MnDOT also has an efficiency policy in operation for salt application to state roads.

Many local units of government have taken some precautions to protect ground and surface waters from road salts. However, few, if any, local units of government have adopted formal policies related to de-icing chemicals.

Several private firms stockpile large amounts of salt in Minnesota; in one reported case, a stockpile has been identified as a source of salt contamination in the Mississippi River. Except for occasional berming, private firms do not follow uniform procedures for controlling leaching or runoff.

The MPCA has no explicit authority to directly regulate highway de-icing chemicals, beyond its general authority to investigate and take appropriate action against those causing water pollution problems.

Findings and Conclusions: All exposed stockpiles containing salt, because of their relationship to groundwater, must be considered potential sources of groundwater contamination. While the pollution potential of the application of de-icing salts to roadways is less certain, enough evidence has been presented to justify designating salt application as a problem.

The existing management system does not address the problem adequately for these reasons: local units of government have not adopted standard policies and practices, MnDOT lacks funds to implement its policies completely, and MPCA responsibility is not clearly defined.

Recommended Policies and Programs: *It is recommended that a state-financed program for the voluntary implementation of Best Management Practices for stockpiles be established by the State legislature. It is also recommended that the Minnesota Department of Transportation, counties, municipalities, townships and private road owners voluntarily adopt and implement Best Management Practices for the application of road salts.*

Stockpiles: The stockpile proposal recommends a voluntary program to control leaching and runoff from salt stockpiles. This program relies upon the Minnesota Department of Transportation and county, municipal and township governments to voluntarily implement the following Best Management Practices (BMPs) for stockpiles.

- 1) When locating new salt or sand/salt mixture storage sites, the proximity of the site to existing water wells, lakes, rivers, streams, groundwater recharge areas and flood-prone areas must be considered; the use of such areas for stockpiles must be avoided whenever possible.

- 2) All salt and sand/salt stockpiles must be placed on impervious pads constructed to hold all stored material and to drain all runoff to a holding tank or basin.
- 3) Impervious pads should be constructed for enclosed stockpiles to prevent surface water from running through the base of the stockpile.
- 4) All salt/sand mixtures should be moved to salt sheds at season's end. If sufficient enclosed space is not available, the mixture should be covered during the spring and summer. All mixtures remaining on the site through the warm months should be enclosed or covered as soon as possible, but no later than May 1; they should remain covered until October 1. Mixtures which will be moved to a salt shed on another site should be moved as soon as possible after load restrictions are lifted in the spring. They should remain enclosed at least until October 1.

The proposed program emphasizes information, education, and technical assistance. These services would be provided by MnDOT and the MPCA. Costs for installing minimum BMPs are approximately \$11,500 per stockpile. Depending on the number of stockpiles which require BMPs, total costs to the State range in the neighborhood of \$4 million.

For the best protection, it is best to store salt in enclosed sheds. While this practice is encouraged, it is not being recommended at this time because MnDOT estimates the cost to be \$50,000 per shed.

Funding for the program would be appropriated by the Legislature. This would be a one-shot appropriation. Any government agency that failed to comply with the program during the designated funding years would have to assume the total costs of implementing BMPs for its stockpiles. Funding would be a direct appropriation to the State Aid Highway Fund, specifically for implementing BMPs for stockpiles. MnDOT administers the State Aid Highway Fund and would do so for this program.

The MPCA would be responsible for tracking the progress of voluntary implementation of BMPs. The Agency would issue an annual report to the U.S. Environmental Protection Agency (EPA) and the public.

MnDOT divisions (those responsible for salt stockpiles), counties municipalities, and townships would be responsible for selecting stockpile sites to be upgraded, designing appropriate BMPs and applying for funding.

Application: The goal of the application of salts management program is the voluntary implementation of the following recommended

Best Management Practices by the appropriate road authorities (Minnesota Department of Transportation, counties and municipalities, and urban townships of 5,000 or more in population):

- 1) Spreading equipment should be recalibrated each fall and after each major breakdown.
- 2) Use of de-icing salt should be restricted to the amount having the greatest melting effect per unit volume. Salts should not be applied to roads when conditions prevent effective melting (the MnDOT has developed a salt/sand application manual which details the amounts of salt which should be used in given situations).
- 3) Drivers should be trained in correct application techniques.
- 4) Records should be kept of milage and of the amounts and location of salt applied for each vehicle trip.

The application of road salts in municipalities under 5,000 or in rural areas is not now considered to be a problem. However use of BMPs by all road authorities is encouraged.

Futher Study Needs: In addition to the stockpile and application problems which warrant management action, four situations which require further study have been identified:

- 1) Further study of the measures needed to protect water quality from road salt application; e.g./i.e., determination of whether additional, more stringent BMPs are needed and where; and identification of other sites which may require management.
- 2) Snow removed from city streets is sometimes piled on or near water bodies. This snow may contain certain large amounts of salt and street contaminants. Further study is needed to determine if this practice harms water quality.
- 3) Compounds containing ferrocyanide are sometimes added to salt mixture to prevent caking. It is known that in the presence of sunlight, cyanide is released from ferrocyanide in anti-caking agents. It is also known that minute quantities of cyanide are toxic to aquatic animals. Investigation of the generation and persistence of cyanide from anti-caking agents is necessary to determine if, under conditions actually present in Minnesota, cyanide threatens aquatic life.
- 4) The effect on aquatic ecosystems of abrasive substances (slag, sand, etc.) should be investigated.

Management-Who Does What:

Stockpiles

Minnesota Department of Transportation;

- Awards funds through State-Aid-Highway Financing program
- Provides information and educational and technical assistance to local units of government.
- Installs Best Management Practices for its stockpiles

Minnesota Pollution Control Agency;

- Reviews the progress of program implementation and submits annual report to the U.S. Environmental Protection Agency and the public.

Counties;

- Apply for funds and install Best Management Practices.

Municipalities;

- Apply for funds and install Best Management Practices.

Townships;

- Apply for funds and install Best Management Practices.

Application

Minnesota Department of Transportation;

- Provides information, education, and technical assistance to local units of government.
- Adopts and implements Best Management Practices.

Minnesota Pollution Control Agency;

- Monitors and evaluates progress of program.

Counties;

- Adopt and implement Best Management Practices

Municipalities;

- Adopt and implement Best Management Practices

Townships;

- Adopt and implement Best Management Practices.

How Important Aspects of Program are Carried Out:

Stockpiles

Minnesota Department of Transportation;

- Appropriates funds for stockpile Best Management Practice implementation through State-Aid-Highway program.
- Develops information, education, and technical assistance program for local units of government on proper design and implementation of Best Management Practices.
- Designs, schedules, and installs Best Management Practices on state-owned stockpiles.

Minnesota Pollution Control Agency;

- Assists in development of information, education, and technical assistance program
- Reviews the progress of program implementation and submits annual report to the Environmental Protection Agency and the public.

Counties, Municipalities, and Townships;

- Initiate, schedule, design, and implement Best Management Practices.

Application

Minnesota Department of Transportation;

- Develops an information, education, and technical assistance program for local units of government
- Adopts and implements road application Best Management Practices

Minnesota Pollution Control Agency;

- Reviews the progress of program implementation and submits an annual report to the Environmental Protection Agency and the public.

Counties;

- Adopt and implement Best Management Practices

Municipalities;

- Adopt and implement Best Management Practices

Townships;

- Adopt and implement Best Management Practices.

Highway De-Icing Chemicals

Assessment of Environmental, Social, and Economic Impacts: Stockpiles

Environmental Impacts	Institutional Financial Impacts	Economic Impacts	Social Impacts
<u>Water Quality</u> At a minimum, one source of salt effects on surface waters would be eliminated. Man-induced salt intrusion on groundwater would be eliminated.	<u>Institutional</u> MnDOT would be required to implement a small change in an existing funding program for a period of 12 months. No changes in personnel are foreseen.	<u>Production of Goods and Services</u> Employment would provide jobs during construction phase. <u>Income and Investment</u> No impact exists.	<u>Housing Supply</u> No impact exists. <u>Physical Mobility</u> There is protection of groundwater for use as drinking water.
<u>Physical Resources</u> Aquatic resources are indirectly benefited as water quality is protected.	<u>Financial</u> The Minnesota legislature would be required to allocate one year's financing for the program.	<u>Consumer Expenditures</u> No impact exists,	<u>Land Use Patterns</u> No impact exists.
<u>Energy</u> No impact exists.			<u>Equity</u> Private stockpile owners would be required to assume costs. No impact is foreseen on wholesale costs of salt, as construction costs are negligible.
<u>Amenities</u> No impact exists.			

Highway De-icing Chemicals

Assessment of Environmental, Social, and Economics Impacts: Application

Environmental Impacts	Institutional Financial Impacts	Economic Impacts	Social Impacts
<u>Water Quality</u> At minimum, the program would limit the influence of salts on surface waters	<u>Institutional</u> <u>Financial</u>	<u>Production of Goods and Services</u> No impact	<u>Housing Supply</u> No impact
<u>Physical Resources</u> Aquatic resources are indirectly benefited as water quality is protected	Elimination or reduction of salt usage should provide costs savings in the use of equipment, personnel, and materials	<u>Income and Investment</u> No impact	<u>Physical Mobility</u> No impact
<u>Energy</u> No impact		<u>Consumer Expenditures</u> No impact	<u>Health and Safety</u> No impact
<u>Amenities</u> Elimination or reduced use of salts would prevent or reduce the killing of roadside vegetation by de-icing chemicals			<u>Land Use Patterns</u> <u>Equity</u> No impact

AGRICULTURE

NOTE: Feedlots, which are an agricultural source of pollution, are covered under a separate section.

Goal: To prevent detrimental water quality effects caused by runoff from agricultural lands.

Objective: To expand and accelerate existing agricultural programs by requesting additional funding for the programs and by providing incentives for participation in the programs.

Water Quality Problem Assessment: The 208 study investigated the role of agricultural activities in generating five kinds of water pollutants: sediment, algae-stimulating nutrients, nitrogen compounds, oxygen-consuming substances, and microbiological contaminants. In addition, effects upon the aquatic habitat were considered. The following conclusions were reached:

1. Overall, cropland erosion is the most significant source of sediment in Minnesota. Though, in some areas streambank and lakeshore erosion is also significant, cropland erosion is also the major sediment source in most watersheds where agriculture is the dominant land use. Water quality data from these areas shows that levels of sediment frequently are high enough to cause serious water quality problems. Sediment changes the number and kinds of organisms in water. It decreases the amount of light available to plants for photosynthesis and germination, leading to a decrease in the amount of food available for fish and other organisms. Fish vacate polluted areas. Bottom-dwelling organisms may drift downstream; this can cause their death and reduce the availability of food for fish. Turbidity decreases visibility, further altering feeding patterns and predator/prey relationships. Suspended sediment causes fin rot, alters fish gills, affects the respiratory rates of fish and, in extreme cases, causes suffocation. Abrasions caused by sediment make fish more susceptible to infection. Sediment deposited on stream or lake bottoms can destroy habitat by covering formerly variable gravel bottoms with uniform, fine, particles. Sediment absorbs heat and may lead to thermal pollution or interfere with normal vertical mixing of water. A stream may eventually transport added sediment deposits out of the initial deposit area. However, this removal and corresponding ecosystem recovery may take years, depending on the initial magnitude and duration of the sediment deposit, the ability of the stream to transport added deposits, and the availability of nearby healthy organisms to re-colonize the damaged sites. It is possible that the

flushed sediment may be re-deposited further downstream, thus affecting those areas as well. Pesticides adhere to sediment and may accumulate on the bottom and in aquatic life. Nutrients also adhere to sediment and accelerate plant growth.

Monitored waters in the major farming areas of Minnesota show sediment levels which frequently exceed the criteria indicative of good conditions for aquatic life. These areas include the Minnesota, Missouri-Des Moines, Cedar, and Lower Upper Mississippi basins and parts of the Red and Upper Upper Mississippi basins. Also, in these watersheds, sediment levels markedly exceed those in non-farming watersheds. This sediment also transports appreciable quantities of phosphorus and probably certain pesticides.

2. Lake eutrophication is a major water quality concern in Minnesota. Essentially all monitored lakes in the predominantly agricultural basins of Minnesota (as listed under the sediment section above) are in a eutrophic condition, characterized by excessive algae and/or weed growth. This growth causes unpleasant appearance, oxygen depletion, and changes in fish populations; it sometimes produces toxic substance which may harm animals drinking the water. If the phosphorus quantities in these lakes could be reduced enough, these conditions could be controlled.

While farming is not the only, or in many cases even the most important, cause of the eutrophic condition of many Minnesota lakes, reducing phosphorus in runoff from farming can be a means of attaining lake improvement. However, in almost all of these lakes, reducing only the phosphorus washing in from the watershed is unlikely to lower the phosphorus amounts sufficiently. In shallow lakes, which almost all of these are, recycled phosphorus from bottom sediments appears to contribute a very large amount of phosphorus. This internal source can only be reduced by use of special restoration techniques.

In some watersheds, situations may arise where agriculture will expand, or agricultural practices change, so that phosphorus loadings to a lake which is not yet eutrophic may increase and threaten the lakes' condition. Unless the phosphorus increase is insignificant, abatement of these sources is warranted to protect the lake.

3. Improper manure storage and handling, improper storage and use of nitrogen fertilizers, and allowing livestock direct access to streams and lakes can contribute to surface water pollution by ammonia, oxygen-consuming organic materials, or microbiological contamination;

ammonia and organic materials may also lead to ground-water pollution by nitrates or bacteria, particularly in the Karst areas of southeastern Minnesota and in southwest Minnesota.

Ammonia is a breakdown product of nitrogen in organic matter and is itself converted to nitrate. While in the ammonia form, nitrogen can be harmful, even lethal, to aquatic animals. MPCA water quality data indicates that harmful levels occur infrequently. It is, therefore, unlikely that agricultural runoff in general causes pollution by ammonia. However, specific situations, which place a high concentration of organic matter into waters all at once, can be harmful.

Organic materials in water are largely broken down by bacterial action. This process consumes oxygen from the water and can lead to oxygen depletion, harming or killing aquatic life. Analysis of available water quality data indicates that only concentrated agricultural loadings contribute to the problem in most situations.

Nitrate, if present at elevated levels in water fed to infants may cause methemoglobinemia. There is some threat from groundwaters, especially in southwestern Minnesota where natural nitrate levels are high, and in southeastern Minnesota where the fissures and underground channels of the Karst area allow easy access and movement of pollutants.

Water quality data show that the potential for microbiological contamination measured by fecal coliform counts, very frequently exceeds state standards in the basins predominantly devoted to agriculture. There is some threat to groundwaters as well, especially on the Karst areas of southeast Minnesota.

4. Serious damage to the habitats of aquatic life can result from straightening or channelizing streams to promote drainage. Such damage can also be caused by removing streamside vegetation (either for conversion to cropland or by livestock grazing) or by streambank erosion caused by grazing animals. Destruction of habitat can be as harmful to aquatic life as pollution.

Straightening or channelization eliminates the varied character of natural streams (pools and riffles) and substitutes a uniform environment. Removal of vegetation allows strong light to penetrate to the water, altering temperatures and promoting algae and plant growth. Bank erosion destroys habitat both directly, and by sediment pollution.

5. In specific waters or watersheds, other agricultural activities (not included above) may contribute to water pollution. Presently, these problems can only be identified through investigation of the conditions in the watershed.
6. There are serious limits to existing knowledge about the relationship of many aspects of agricultural activities to water quality. Until knowledge is increased, cost-effective management will be difficult, especially for pollutants other than sediment.

Management Program Assessment: Several management agencies and programs at the federal, state, and local levels deal directly, or indirectly, with agricultural non-point source pollution. Programs of major interest are the Agricultural Conservation Program (ACP) of the Agricultural Stabilization and Conservation Service of the United States Department of Agriculture (USDA); the Conservation Operations Program of the USDA's Soil Conservation Service (SCS); the Rural Clean Water Program (RCWP); the State Cost-Share Program of the Minnesota Soil and Water Conservation Board and the Soil and Water Conservation Districts (SWCD's); and the Technical Assistance Program of the SWCDs. The Agricultural Conservation Program, the Rural Clean Water Program, and the State Cost-Share Program provide financial assistance to farmers who wish to install conservation practices.

Other programs of importance are the research programs of the USDA's Science and Education Administration-Agricultural Research, the University of Minnesota's Agricultural Experiment Station, the educational programs of the Agricultural Extension Service, and the water quality monitoring programs of the MPCA.

At no level of government are there current programs, which require farmers to install conservation measures.

Findings and Conclusions:

1. Sedimentation from cropland, streambank, and lakeshore erosion is being addressed by a variety of existing programs. It seems prudent to base sedimentation control for water quality purposes upon these programs. However, the resources presently available are insufficient to do the job.

In the future, when more is known about the relationship between erosion and the transport-and-delivery of sediment, it may turn out that erosion control for soil conservation alone is not sufficient to protect water quality. If so, changes in the management programs should be considered at that time.

2. It does not appear useful to attempt across-the-board reductions in phosphorus runoff at this time, except

reduction that will occur automatically from soil erosion control. Where clean-up or protection of specific lakes is being attempted, the agricultural contribution should be examined and reduction measures should be identified as necessary. A variety of existing programs may be used to implement these measures. When more knowledge about the relationships between agricultural runoff and lake eutrophication abatement is available, new or modified programs may need to be considered.

3. The other agriculturally-related water pollution sources identified in items 3, 4, and 5 of the Water Quality Assessment above are not addressed by soil conservation programs. They could, however, be addressed by education and information efforts, such as those currently administered by several agencies.
4. Continual and intensified research efforts are needed to learn more about the relationships between agricultural practices and water quality.

Recommended Policies and Programs: *It is recommended that the existing voluntary programs be continued at an increased (doubled) rate of funding and effort. Funding of the Rural Clean Water Program is also recommended. Educational, research, monitoring and technical assistance programs should be strengthened. To provide greater incentive for participation in conservation activities, federal policy should be altered through the addition of the proposed "green ticket" incentive program.*

In the agriculture program recommended, present voluntary programs will be continued but at an increased rate. The legislature will be requested to double the funding for the State Cost-Share program. Congress will be requested to double the amount of funding and to fund the Rural Clean Water Program at an adequate level.

The Soil and Water Conservation Board and the Soil and Water Conservation Districts will provide major leadership for the implementation of the program. Through the State Cost-Share program, money will be made available to farmers for installing management practices.

Through its Agricultural Conservation Program, the Agricultural Stabilization and Conservation Service will play a major role in the program by providing money to assist farmers in installing conservation practices. Information from the 208 program will also be used to direct the money from this and other programs to those areas of most concern. Agricultural Stabilization and Conservation Service funds would also be used to assist in the implementation of special water quality projects.

During implementation of the federal Rural Clean Water program the lead management agency would be the Agricultural Stabilization and Conservation Service with assistance from the Soil Conservation Service, the Soil and Water Conservation Board, the MPCA, and local Soil and Water Conservation Districts.

Technical assistance will be provided by the Soil Conservation Service and the Soil and Water Conservation Districts. A request for funds will be made to Congress and the State Legislature based on the estimated additional staffing needs of these agencies. The Soil and Water Conservation Board will take the lead and work with the Soil Conservation Service and the MPCA in developing a staffing needs estimate. This work should be done in conjunction with the development of estimates of needs for the natural resource management fund provided through a state water resources coordinating agency. The National Association of Conservation Districts has proposed to Congress that farmers who participate in soil conservation and water quality programs be provided additional benefits in the agricultural income-support programs. The U. S. Department of Agriculture and the Carter administration are studying this proposal and other measures at the present time. The State of Minnesota supports these efforts, and

recommends that the federal government establish a policy that provides more incentives to farmers to participate in conservation programs. The "Green Ticket" Program proposed by the National Association of Conservation Districts is supported by the State of Minnesota.

The "Green Ticket" program would provide economic incentives to farmers who voluntarily apply conservation practices to their land. A farmer would sign an agreement with his local Soil and Water Conservation District (SWCD). The SWCD would set forth the conservation practices to be installed, the schedule of implementation, the regular management practices to be carried out, and any harmful practices to be avoided. The agreement would form the basis for issuing a conservation certificate (the "Green Ticket") to the farmer. The economic incentives available under the program might include larger crop price-support payments, additional crop insurance, better interest rates for farm loans, and other incentives.

A strengthened education and information effort will inform the public of the value and goals of the programs, the need for cooperation among all those concerned, and ways by which they can participate in the decisions on implementation. The lead agencies for the effort will be the Soil and Water Conservation Board and the Agricultural Extension Service with major assistance from the MPCA and the Soil Conservation Service. A general estimate of the cost for starting such a program is \$100,000 per year, with financing by EPA and the State.

Congress should provide additional funding to the United States Department of Agriculture (USDA) for agricultural water quality research efforts by the University of Minnesota's Agricultural Experiment Station and the USDA's Science and Education Administration-Agricultural Research.

The complexity of the problems of agricultural non-point source pollution and the present uncertainty about the effects of management practices and different environmental factors on water quality make additional research necessary. The 208 implementation program will be a long-term success only if there are solid facts on which to base its activity. Specific questions which should be researched are presented later in this document.

The time frame for implementation of this program depends on approval of funding requests by Congress and the State Legislature. A reasonable estimate for the start of the program would be three years following approval of the 208 Plan.

Best management practices which should be implemented through the above programs are identified in the Management Practice Supplement to Agriculture; Package I.

While the above voluntary program based on incentives was adopted as the State plan for agricultural non-point sources, it was recognized that the voluntary approach may not prove to be a total solution. Consequently,

mandatory statewide controls should be enacted by the State and implemented by the local Soil and Water Conservation Districts when voluntary methods prove to be inadequate.

Management-Who Does What:

Minnesota Pollution Control Agency;

- Performs continued planning and analysis of agriculture/water quality relationship.
- Develops criteria for directing cost-share money to areas of greatest concern.
- Monitors and evaluates progress of program.

Minnesota Soil and Water Conservation Board;

- Administers State cost-share program.
- Develops educational/informational program.

Agricultural Stabilization and Conservation Service (USDA);

- Administers Agricultural Conservation Program (ACP).
- Coordinates funding of the Rural Clean Water Program
- Administers individual Rural Clean Water Program projects.

Soil Conservation Service (USDA);

- Provides technical assistance to farmers.

Soil and Water Conservation Districts;

- Administer State Cost-Share Program within the District
- Provide technical assistance to farmers.

Agricultural Extension Service;

- Develops education/information program.

University of Minnesota, Agricultural Experiment Station;

- Conducts agriculture/water quality related research.

United States Department of Agriculture, Science and Education Administration, Agricultural Research (USDA's SEA-AR);

- Conducts agriculture/water quality related research.

How Important Aspects of Program Are Carried Out:

Minnesota Pollution Control Agency;

- Accelerates its efforts in monitoring water quality, evaluating effectiveness of Best Management Practices, and analyzing effects of special watershed projects.
- Develops criteria for directing cost-share money to areas of greatest concern.
- Reviews program progress and submits annual report to the Environmental Protection Agency and the public.

Minnesota Soil and Water Conservation Board-Agricultural Stabilization and Conservation Service (USDA);

- Funding for State Cost-Share Program and Agricultural Conservation Program would be doubled. The technical assistance staff of the Soil Conservation Service and Soil and Water Conservation Districts would be increased to handle added work. Federal agricultural policies would be modified to provide greater incentives to farmers to participate in conservation programs.
- The Rural Clean Water Program (RCWP) would be funded. The Agricultural Stabilization and Conservation Service would coordinate the effort. Individual RCWP projects would be administered by the Agricultural Stabilization and Conservation Service in consultation with the Soil and Water Conservation Board, the Soil and Water Conservation Districts and the MPCA.

- The Soil and Water Conservation Board, with assistance from the University of Minnesota, Agricultural Extension Service, would develop an education/information program on the efforts of the expanded funding program.
- The Soil Conservation Service (SCS) would provide technical assistance to the ASCS, SWCB, SWCDs and farmers during implementation of cost-share programs. SCS would also assist the MPCA in further 208 planning efforts.

U.S. Department of Agriculture's Science and Education Administration, Agricultural Research;

- Agricultural/water quality related research would be expanded through increased funding.

Further Study Needs: In addition to the need for more detailed data in order to apply existing knowledge, as in watershed studies, much more knowledge is needed to quantitatively analyze non-point source effects on watersheds. The major topics which must be studied further are listed below.

1. Quantitative evaluation of the effectiveness of management practices, especially in reducing pollutants other than sediment and in regard to time and storm-event variations;
2. Techniques for pinpointing major source areas of pollutants that will actually be delivered to waters;
3. Actual effects of non-point source pollutants on water quality: do existing water quality criteria adequately take into account the sporadic nature of pollutant loads delivered by runoff?
4. Response of streams to reductions in upland sediment loads: to what extent will channel erosion occur in response?
5. What proportion of agriculturally generated phosphorus loads are: (1) available to plants in a lake environment, (2) transported along watercourses, (3) effectively reduced by erosion control, and (4) effectively reduced by management of manure and fertilizer use?
6. Role of wetlands as sinks for pollutants and the effects of draining them;
7. Effects of feedlots and irrigation on groundwater quality particularly in the southwestern area and the karst area of southeastern Minnesota;
8. Quantitative effect of the runoff of organic matter from diffuse agricultural sources on oxygen levels and on ammonia levels in streams;

9. Quantitative effects of conservation and reduced tillage, residue management, cover crops, and terracing practices on runoff of plant-available nutrients;
10. The net water quality effects of drainage systems;
11. The effects of accelerated nutrient runoff into streams; and
12. The relative contribution of streambank, lakeshore, and upland erosion to sediment problems in watersheds in different parts of the State.

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the Seven-County Metropolitan Area. The Council may propose programs which are different from, and more stringent than, those identified here.

Agriculture

Environmental, Social, and Economic Impacts Assessment

<u>Environmental Impacts</u>	<u>Institutional Financial Impacts</u>	<u>Economic Impacts</u>	<u>Social Impacts</u>
<u>Water Quality</u> Program is significant step toward reducing amounts of sediment and nutrients reaching water bodies	<u>Institutional</u> Additional staff and resources would be needed to handle the accelerated program	<u>Production of Goods and Services</u> Some slight decrease in crop acreage could occur if certain types of BMP's (such as field borders) were used extensively. No major change in overall crop production would probably occur	<u>Housing Supply</u> No impact
<u>Physical Resources</u> Program would be beneficial in maintaining soil productivity and long-term agricultural production capacity	<u>Financial</u> More money would be required for cost-sharing, monitoring, research, technical assistance, and educational efforts	<u>Income and Investment</u> No major change on an overall basis would probably occur, but some farmers on marginal lands might have to receive high cost-sharing payments if they are to participate in the program and not have their income affected	<u>Physical Mobility</u> No impact
<u>Energy</u> No major impact			<u>Land Use Patterns</u> Less use of marginal land for cropland could occur
<u>Amenities</u> Benefits would occur particularly in those cases where alteration of streams and wetlands does not occur		<u>Consumer Expenditures</u> Slight impact due to increased expenditures by government	<u>Equity</u> No major change from existing situation

FEEDLOTS

Goal: To prevent harmful water quality effects caused by runoff from animal feedlots

Objective: To increase enforcement, education, and technical and financial assistance in watersheds where water quality is especially threatened by feedlot runoff.

Water Quality Problem Assessment: There are an estimated 90,000 feedlots in Minnesota; of these, 9,000 to 14,000 are estimated to be located in shoreland areas and are considered to be pollution hazards. In addition, any feedlot which discharges pollution during a 25-year/24-hour rainstorm--the "design storm" established in federal and state standards--is considered a pollution hazard. Feedlots are considered non-point sources of pollution, because runoff from feedlots is generally diffuse surface runoff.

The most important pollutants carried in feedlot runoff are organic matter (including pathogens) and nutrients. Organic matter entering surface waters can use up oxygen which sustains aquatic life and can carry pathogenic organisms, which can cause a variety of diseases in humans and animals. Phosphorus can cause excessive algal growth and lead to undesirable levels of aquatic vegetation. Nitrogen can harm infant health and is a problem in groundwater for this reason.

Effects of feedlot pollutants on groundwater are not easily measured and are still being studied. It is known, however, that these effects are most severe in the karst region of southeastern Minnesota. Because the karst geology coincidentally underlies one of Minnesota's principal livestock-raising areas, and because underground aquifers there serve as the major source of water for human consumption, agriculture, and commerce, it is critically important to control feedlot pollution in this area.

Management Program Assessment: Feedlots are regulated by MPCA rules and regulations. By law, all feedlots in excess of ten animal units (different animals produce differing quantities of wastes; animal units is a way of standardizing the measurement of an animal's waste capacity--e.g., 5 hogs = 1 cow) must meet the MPCA's animal feedlot pollution control requirements.

Administration of the feedlot regulatory program is divided between the MPCA and the local counties. Under the current procedure, counties may regulate feedlots of 300 animal units or less where no pollution hazard exists or where the hazard will be corrected in one construction season. Counties may also regulate feedlots of 1,000 units or less if no pollution hazard exists. The MPCA is responsible for all other regulations.

Counties are not required to regulate feedlots, and a majority of the counties in the State have indicated that they will not assume responsibility for feedlot regulation.

The MPCA does not actively seek out polluting feedlots to regulate. Most permits are issued on the basis of a feedlot operator's voluntary application. The MPCA may also regulate feedlots found to be potentially hazardous after inspection by the MPCA staff or a county feedlot officer. Most of these inspections are made on the basis of complaints about a particular feedlot.

Feedlot operators may be eligible for financial assistance in constructing feedlot pollution controls. This assistance is provided by either the State Cost-Share Program, administered by the State Soil and Water Conservation Board (SWCB), or the Agricultural Conservation Program, which is administered by the USDA's Agricultural Stabilization and Conservation Service (ASCS).

The USDA's Soil Conservation Service (SCS) provides technical assistance in designing cost-share practices, executing the design, or approving designs produced by others.

Findings and Conclusions: Feedlots located in shoreland areas and in environmentally sensitive areas such as the karst region pose serious hazards to local water quality. Present management programs can satisfactorily handle the normal situation. To prevent pollution in shoreland areas and environmentally sensitive areas, there is a need to intensify the enforcement, and correspondingly the financial assistance, of feedlots in these areas.

Recommended Policies and Programs: *It is recommended that an intensified feedlots program be applied in targeted areas (shorelands and other environmentally sensitive areas) around the State to abate the pollution hazard from feedlot runoff.*

Target areas are watersheds where the abatement of feedlot pollution is necessary to protect ground or surface waters of high resource value, or where a practicable effort to control feedlot pollution is expected to pay large dividends in the improved quality of specific waters.

Under the Target Area Program, the effort devoted to program administration, enforcement, information, and education would be increased; the level of cost-sharing and technical assistance would also be increased in the target area. Outside the target areas, the regular feedlot program would remain in effect.

The intent of the Target Area Program would be to abate pollution from 90% of those feedlots in the target areas which are determined to be potential pollution hazards. This would be accomplished in a specified period of time. On completion of the target program in one area, one or more new target areas would be selected.

The number and size of target areas selected would depend largely on the financial resources available. At present, the allocation of cost-sharing funds to counties is administered by the Minnesota State Agricultural Stabilization and Conservation office committee and the Soil and Water Conservation Board according to the criteria of their respective programs. County Agricultural Stabilization and Conservation committees and local Soil and Water Conservation District Boards determine how those funds are allocated within their counties. The proportion of available cost-sharing funds allocated to feedlot pollution control ranges from practically none in some counties to the entire allocation in others.

Under the recommended program, the amount of cost-share funds available to feedlots should be increased in the target areas. Implementation of the increased funding would be the responsibility of the State Agricultural Stabilization and Conservation Committee and the Soil and Water Conservation Board, with the cooperation of the county committees and district boards. The State Committee would allocate additional funds to each county or district within the target area on condition that they be used to fund feedlot pollution control measures.

Funds available to Minnesota for feedlot cost-sharing from the Agricultural Conservation Program and the Soil and Water Conservation Board State Cost-Share Programs should be restricted to a specific percentage of the funds available for these programs statewide. Feedlot cost-share money above this amount should come from increased federal and state appropriations.

If no increased appropriations become available, the target area concept should be dropped.

The MPCA would provide technical and administrative assistance to counties in the target area to assist them in setting up and operating the programs. This assistance would include providing a model administrative structure, training in both administrative and technical areas, and frequent consultation as the program is initiated. Costs to the counties for administration of the program could be funded from the natural resources management assistance fund proposed in the State Framework Water Plan (June 79). If the fund is not activated, legislative funding for this program would be sought.

Under this program, MPCA regional officials serving the target area would have increased responsibility. One additional staff member would be assigned to serve full time as a feedlot specialist in the target area. This person would seek out all feedlots in the target area which are potential pollution hazards. Each such feedlot would be urged to adopt a schedule for implementing Best Management Practices (BMPs) to abate the pollution hazard and to file a feedlot permit application. Best Management Practices for feedlots are discussed in Feedlots, Package I.

The feedlot specialist would carry out preliminary review of permit applications. If the feedlot is in a county which has a county feedlot program, the feedlot specialist would work closely with the county feedlot officer. If the feedlot is in a county which lacks such a program, the feedlot specialist would work with the MPCA's central office and would provide a more local source of information and assistance to the feedlot operator. Certifications of compliance would be issued, and permits would be expedited. County personnel would generally not be engaged directly in enforcement; they would process the increased volume of applications resulting from the MPCA's enforcement efforts.

The MPCA would increase education and information efforts in the target area. News releases would be sent to newspapers, farm magazines, and county extension and other newsletters. Talks would be given to students, civic groups, and others; brochures would be published.

The MPCA should consider the following factors when selecting feedlot target areas:

- (1) Determinations of the pollution hazard posed by feedlots should be made using the analytical method employed by the Agricultural Stabilization and Conservation Service, the Minnesota Pollution Control Agency, the Soil Conservation Service, and the Soil and Water Conservation Board. Priority ranking of these determinations may serve as a factor for approval of cost-share assistance.*
- (2) Waters of high resource value and vital groundwater aquifers should have priority over other waters when measuring the resource value(s) of the water(s) affected.*
- (3) Likelihood that feedlot pollution in the target area can be controlled successfully within the resources and time frame available.*
- (4) Existence of a Clean Lakes Program or equivalent lake restoration project.*
- (5) Designation of a project area under the Rural Clean Water Program.*

Management - Who Does What?

Minnesota Pollution Control Agency

- Responsibility for program development, coordination, implementation, monitoring, and evaluation
- Enforcement of regulations
- Information and technical assistance

Counties

- Enforcement of regulations (optional)

Minnesota State Agricultural Stabilization and Conservation Committee

- Appropriation of funding for Target Area Program and county administrative costs

Minnesota Soil and Water Conservation Board

- Appropriation of funding for Target Area Program

County Agricultural Stabilization and Conservation Committees

- Allocation of cost-share funding to feedlot operators.

Soil and Water Conservation Districts

- Allocation of cost-share funding to feedlot operators.

Soil Conservation Service (USDA)

- Provision of technical assistance in design of BMPs.

How Important Aspects of Program Are Carried Out:

Minnesota Pollution Control Agency

- Determines the need for, and selects, target areas.
- Increases enforcement in target areas; seeks out and identify all potentially polluting feedlots in area.
- Implements issuance of certificates of compliance and permits.
- Provides technical assistance to counties for training in administrative and technical areas
- Reviews the progress of program implementation, and submits annual report to the U.S. Environmental Protection Agency and the public.

Minnesota Soil and Water Conservation Board and Agricultural Stabilization and Conservation Service (USDA)

- Allocates cost-share funds for Best Management Practices to local districts and committees.

Counties

- Implement enforcement of MPCA feedlot regulations (optional).

Soil Conservation Service (USDA)

- Provides technical assistance in the design of Best Management Practices, executing the design or approving the design produced by others

Further Study Needs: In addition to the recommended program, the following study needs were identified:

- (1) Relatively few feedlots (about 4%) are fully confined operations, and most operators will expect to use open feedlots for the foreseeable future. There is a need to determine the effect of open feedlots on the quality of groundwater. This entails examining how the quality of feedlot runoff is affected as it percolates through soils, as well as the effects of that percolated water on groundwater.
- (2) In some cases, feedlot operators may need to spread more manure on their fields than crops can effectively use. There is a need to identify ways for determining the maximum rate at which manure can be applied to land without causing pollution of surface or ground waters.
- (3) Residential development and feedlot operations are daily coming into closer proximity, creating conflicts due to feedlot odors. There is a need to identify ways to ensure that measures taken to protect water quality will also protect air quality.
- (4) There is some reason to believe that water pollution from feedlots is most severe in the spring, when snow-melt may remove large quantities of pollutants from frozen ground. There is a need to determine the magnitude of this problem and devise remedial measures.

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the Seven-County Metropolitan Area. The Council may propose programs which are different from, and more stringent than, those identified here.

Feedlots

Environmental, Social, and Economic Impact Assessment

Environmental Impacts	Institutional Financial Impacts	Economic Impacts	Social Impacts
<u>Water Quality</u> Accelerate the correction of water quality problems from feedlots.	<u>Institutional</u> Improve coordination among existing agencies dealing with feedlots.	<u>Production of Goods and Services</u> No significant impact exists.	<u>Housing Supply</u> No significant impact exists. <u>Physical Mobility</u>
<u>Physical Resources</u> Accelerate slightly the concentration of the animal-raising industry.	<u>Financial</u> Allocate additional funds for cost-sharing and associated expenses from both federal and state financial resources.	<u>Income and Investment</u> Increase feedlot operators' investments.	No significant impact exists. <u>Land Use Patterns</u>
<u>Energy</u> Increase the energy intensiveness of livestock feeding.		<u>Consumer Expenditures</u> No significant impact exists.	There is a slight decrease in total land area dedicated to production of meat and milk.
<u>Amenities</u> They may have a positive or negative effect on odor generation from any particular feedlot, depending on the situation.			<u>Equity</u> Make it more difficult for undercapitalized operations to continue.

PESTICIDES

Goal: To prevent detrimental water quality effects caused by high concentrations of pesticides in the State's waters.

Objective: To establish a program to facilitate the proper use and disposal of pesticide containers and to develop a comprehensive pesticides monitoring program for the State.

Water Quality Problem Assessment: In certain cases of use, or misuse, pesticides have the potential to harm plants and animals living in, or using, water. The ill effects may range from death, to lesser long-term disabilities, to subtle disruptions of the whole ecosystem. Such damage may occur if the pesticides are improperly applied on, or near, water. Sometimes damage occurs even with careful application if the pesticide is both persistent enough, and mobile enough, to get to water.

Excess pesticides, or the pesticides remaining in "empty" containers, may cause the same problems if not disposed of properly. Such pesticides make up a small part of the total amount used, but they may be present in great concentrations. The greatest concern is, of course, with large containers (one-gallon and up) used in large quantities by large-scale applicators.

Finally, there is this overriding fact: there is a lot that is not known about pesticides. There is admittedly a great body of knowledge resulting from a great deal of research; but there are, nonetheless, many remaining gaps in such information as long-term and indirect effects on non-target organisms. Furthermore, with regard to the actual situation in Minnesota, there is inadequate knowledge of even the amounts of pesticides being applied for certain uses. Less is known about how much of the pesticides ever get into the water; and even less about what they actually do when they get there.

Management Program Assessment: There exists a great variety of management practices to deal with pesticides. Likewise, there exists a host of programs dealing with nearly all aspects of pesticide use. While all problems which have been addressed have not been solved, a concerted and widespread effort is presently being undertaken. It is largely through the various programs which do exist that many of the abuses and problems of the past have been remedied.

The U.S. Environmental Protection Agency(EPA), U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), universities, and pest-control industries perform research and development on more environmentally sound pesticides and on nonpesticidal control. Work is being done both on new pesticides that are

less persistent and more selective, and on various physical, chemical, biological, and cultural pest-control methods--some already in use, others only experimental.

All pesticide use is already governed by existing regulatory programs. The most important is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as amended by the Federal Environmental Pesticide Control Act. This law gives the Environmental Protection Agency broad and flexible authority, extending from the registration of pesticides to the control of their use. All pesticide producers and all pesticides must be registered under FIFRA, and all pesticides must meet certain requirements of effectiveness and safety for both humans and the environment. The result has been the prohibition of certain pesticides and the classification of the others for either general or restricted use, depending on their potential for harm. Pesticides classified for restricted use can be used only by applicators who are certified as competent in their use. All pesticides are required to have a label containing explicit directions as to purpose, rate, timing, and method of application. The label is a legal document, and to use a pesticide in a fashion other than as prescribed on the label is a violation of the law. FIFRA is administered nationally by the EPA and at the state level by the Minnesota Department of Agriculture through the Minnesota Pesticide Control Law, which also requires the licensing of pesticide dealers and commercial applicators and the maintenance of certain records.

In addition, certain water quality standards for pesticides have been set by the EPA under the Federal Water Pollution Control Act; aerial applicators are certified and regulated by the Federal Aviation Administration; and aquatic application of pesticides is regulated for the State by the Department of Natural Resources (DNR) through a permit system.

At the same time, technical assistance, as well as education and information on proper usage, is provided by existing programs of the EPA, the United States Department of Agriculture, the United States Ground Water Survey, the Minnesota Department of Natural Resources, the Minnesota Department of Agriculture, and Agricultural Extension Service. These programs include applicator training, educational classes, technical guidance, reports, and bulletins.

On the issue of pesticide disposal, the EPA has published a recommended set of procedures for the disposal of excess pesticides. In addition, upon written request to the appropriate Regional Administrator, the EPA is required to accept, for safe disposal, certain pesticides which have been banned.

As for disposal of pesticide containers, while EPA has made certain "recommendations," there are no federal or state laws (other than litter laws) specifically regulating the disposal of empty containers. Furthermore, there is a lack of commonly recognized and accepted disposal practices among private users.

Many basic research questions about the environmental fate and pollution potential of pesticides have been and are being addressed by various research programs. These programs are sponsored by industry and the government through the EPA, the United States Department of Agriculture, the United States Forest service, the United States Fish and Wildlife Service, and universities. The questions of actual problems in Minnesota, however, are largely questions of monitoring. At present there are no widespread systematic programs to monitor the pesticides currently being used.

Findings and Conclusions: The dangers of pesticides to the environment have been extensively studied and documented. Pesticides with a long history of ecological damage have been banned. Others, of a less severe nature, have been restricted to use by certified applicators. The remaining pesticides are considered safe for the public to use if manufacturers' instructions are followed carefully. The exact nature and extent of the impact of these latter pesticides on water quality is unknown, except for isolated incidences.

There are a number of programs involved in the management of pesticides. While not all problems which have been addressed have been solved, a concerted and widespread effort is presently being undertaken. Many of the abuses and problems of the past have been remedied. The areas where present problems may exist or the management situation needs improving are: 1) runoff and erosion management, 2) container disposal management, and 3) monitoring.

Recommended Policies and Programs: *It is recommended that existing management programs be continued, that an educational program facilitating proper disposal of pesticide containers be developed; and that a monitoring program of currently used pesticides be established.*

Runoff management and erosion controls have been identified in the agriculture, roadside erosion, and construction sections of this document. Though programs are designed to reduce erosion runoff they will also reduce pesticide runoff. The primary emphasis is on keeping the pesticides in place at the point of application and out of the water.

Under its Solid Waste Landfill guidelines, the MPCA has adopted the position that empty pesticide containers are not hazardous after triple-rinsing, and may be 1) reconditioned (30- and 55-gallon drums), 2) crushed and sold for scrap, or

3) disposed of in sanitary landfills.

To further encourage proper rinsing and disposal of containers, the MPCA will participate in a program to educate pesticide users in the proper rinsing and disposal procedures. As part of this program, the MPCA and the Minnesota Department of Agriculture are supporting the Minnesota Plant Food and Chemicals Association in developing a set of disposal instructions to be distributed with pesticides sold at retail outlets. Included in this program is a voluntary certification system for the recycling of pesticide (30 and 55 gallon) drums. This system will identify the pesticide user and ensure that the instructions have, in fact, been followed. The MPCA will work with the Minnesota Department of Agriculture and the Agricultural Extension Service to make sure that instructions on proper rinsing and disposal are included as a part of the existing educational programs.

In addition, it is recommended that the Joint Legislative Committee on Solid and Hazardous Waste develop a program and identify implementation agencies for disposal and recycling of pesticide containers that includes:

- (1) Proper rinsing and/or disposal methods for pesticide containers;*
- (2) Final location of disposed containers; and*
- (3) Incentives and regulations for recycling pesticide containers.*

The need for monitoring pesticides has been identified here and in the recommendations of several other non-point source topics. A number of state and federal agencies conduct monitoring programs, but these programs are carried out independently with little, if any, exchange of information. *It is recommended that the MPCA establish an inter-agency pesticide monitoring review task force to assess the present monitoring structure, to determine the future monitoring needs of the State, and to recommend a comprehensive and coordinated pesticides monitoring program for the State of Minnesota.*

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the seven-county metropolitan area. The Council may propose programs which are different from, and more stringent than, those identified here.

FORESTRY

Goal: To continue to prevent silviculture activities from harming water quality

Objective: To strengthen the implementation of silvicultural management practices and programs on Minnesota forest lands by establishing forest hydrology and soil science capabilities in the Department of Natural Resources

Water Quality Problem Assessment: The study of forestry activities in Minnesota identified several areas of concern: construction of roads in forest lands, recreational activities, grazing, and clearing for firebreaks. Certain site preparation activities also have a high potential for causing problems (root and rock raking and plowing), but these techniques are not widely used in Minnesota. The extent of concern about these activities is related to their ability to disturb a forest site and to the magnitude of those disturbances. Three types of site disturbance are of concern: (1) exposure of mineral soil, (2) compaction of mineral soil, and (3) removal of growing material.

Road construction requires the removal of all growing material and obstructions; mineral soil is exposed, and repeated travel over the roads lead to soil compaction.

Recreational activities involve the entry of people and their mode of transportation into the same area year after year. This leaves little time, if any, for a site to recover. Recreation is often restricted to certain areas (trails and campgrounds, etc). Constant use of these areas compacts the mineral soil and, over a period of time, exposes the mineral soil.

Grazing is not a forest management practice. However, grazing does involve constant and repeated use of a given area. The presence of many heavy-hoofed animals causes the soil to become compacted. This, in time, exposes bare mineral soil. Any herbaceous vegetation is either eaten or trampled.

Clearing for firebreaks usually involves bulldozing along the entire length of the fire front. All combustible material is removed from the firebreak, exposing mineral soil and removing growing material. The action of the bulldozer is restricted to the firebreak line and tends to cause heavy compaction of soils in these areas.

Problems occurring because of these activities can be corrected and prevented by the implementation of both Best Management Practices and sound planning practices.

Management Program Assessment: Management of forestry activities in Minnesota is divided between three governmental agencies: the United States Forest Service, which is responsible for activities in Minnesota's two national forests, the Chippewa and

the Superior; the Minnesota Department of Natural Resources, which is responsible for all state forests; and the counties, which are responsible for all county forests.

Policies and procedures established by the United States Forest Service (USFS) regulate the activities occurring within the national forests and provide for the protection of water quality. The USFS has forest hydrologists assigned to each of the national forests. These hydrologists are responsible for reviewing activities which may have an impact on water quality.

The Department of Natural Resources (DNR) and the counties have similar authority to control activities occurring within state and county forest lands. In addition, the DNR also provides management, or management assistance, to county and private forest lands. One of the problems facing the DNR and the counties in carrying out their objectives is lack of staff expertise, especially in forest hydrology, soil science, and logging engineering. This lack of expertise, especially in setting the policy for the construction of logging roads and other logging activities, has resulted in a policy that is directed more towards assisting loggers in their harvesting activities than in controlling erosion and protecting water quality.

Findings and Conclusions: The study of the relationship of forestry activities to water quality in Minnesota indicates that water pollution is not generally severe in forested areas. However, in both the current and proposed, revised water quality classifications, an extremely high proportion of highly classified waters are in forested areas. Therefore, whenever pollution does occur from forested lands, it is likely to harm a high-quality environment.

The USFS, the DNR, and the counties have sufficient existing authority to protect water quality by regulating activities occurring within public forest lands. The DNR, however, lacks the necessary staff expertise to adequately establish and carry out forestry activity policies related to both prevention of soil erosion and water quality protection. This lack on the part of the DNR also affects the ability of counties to adequately address the problem. In addition, the DNR can adequately review and monitor pesticide application and other water quality related activities occurring in forest areas (refer to Pesticide topic which recommends the study of all pesticide monitoring needs for the State and development of a statewide coordinated monitoring program).

Recommended Policies and Programs: There are known effective Best Management Practices for controlling and preventing pollution from forestry activities. Management agencies have the necessary authority to regulate the activities occurring on federal, state, and county forest lands.

The required implementation of Best Management Practices for the State's forest lands can be improved by establishing staff expertise in the areas of forest hydrology, soil science, and/or logging engineering in the DNR's Division of Forestry. These

staff members could also develop educational material and training programs to inform counties and private landowners, and assist them in implementing correct forest management practices.

Department of Natural Resources, Division of Forestry, staff expertise in soil science and forest hydrology is not now adequate. Therefore, staff positions should be established in the DNR, Division of Forestry, in these fields.

An experimental forestry practices cost-share program has recently been established in southeastern Minnesota. The program provides approximately \$100,000 to be cost-shared by the Soil and Water Conservation Board, through the Soil and Water Conservation Districts, to private woodland owners for forestry practices.

This cost-share program should be monitored closely to assess its effectiveness and to determine if it is applicable to the remainder of the State. If the current cost-share program for forestry practices proves to be successful, it should be implemented statewide.

Grazing of farm animals on forest areas has been identified as an agricultural activity which contributes to water quality problems. Therefore, the costs of implementing Best Management Practices (for example, restricting the access of farm animals to certain forest areas) are eligible for agricultural Best Management Practice, cost-share programs.

MINING

Note: Most of the present and future mining activities in Minnesota come under the jurisdiction of proposed Department of Natural Resources (DNR) and existing MPCA rules and regulations. This study dealt only with those mining activities not covered by state or federal rules and regulations.

Goal: To prevent mining-related activities from harming water quality.

Objective: To establish a program to investigate the potentially harmful impacts of mining activities on water quality and to recommend corrective measures.

Water Quality Problem Assessment:

Sand and Gravel and Building-Stone Mining

Sand and gravel excavation is Minnesota's most widely occurring mining activity. Geological events distributed this basic resource throughout the State.

Sand, gravel, and building-stone mining operations may generate significant amounts of suspended solids. These suspended solids may have direct, adverse water quality effects or may contribute to turbidity.

Process and wash water from these operations is regulated under existing permit programs.

Copper/Nickel and Peat Mining

Copper/nickel and peat mining are two activities with potential to contribute to the economy of Minnesota. Possible copper/nickel deposits of commercial significance extend across the northern part of the State. Prospecting and exploration have been limited by the thick layer of surface overburden covering much of the potentially mineralized rock. If copper/nickel ores are mined in northeastern Minnesota, there may be adverse effects on the water quality of this now pristine area. These ores contain substances which cause toxic conditions and sulfides which can seriously alter the acidity of receiving waters.

Prior to the copper/nickel study, (see below) there was little existing knowledge about the actual amounts of pollutants that could be expected to occur from copper/nickel mining, what their water quality effects would be, and what could be done to abate adverse effects. (The results of this study were not available to the MPCA during the initial planning process.)

Minnesota contains an estimated 7.5 million acres of peatland, the largest peat area of any of the lower 48 states. The State owns or administers an estimated 50% of these peatlands.

It is, therefore, in a strong position to influence any development (State Planning Agency, 1978).

Prior to the peat mining study, (see below) little was known about the potential water quality effects of peat mining. Even basic characteristics of the peat resource--locations, amounts, and exact compositions--were not well known. (The results of the peat mining study were not available to the MPCA during the initial planning process.)

It is reasonable to suspect that materials released from peat and copper/nickel mining will alter the character of receiving water bodies. In addition, changes in how much and in what way water leaves the watershed may result from these operations. Such changes may adversely affect water quality.

Inactive Iron Ore Mines- Abandoned or Exhausted

Left behind by past iron mining operations, there are many abandoned piles and tailings ponds in northeastern Minnesota. These piles and ponds contain waste soil, overburden rock, lean ore, and tailings. Some of these sites may become operative again. If so, they will fall under DNR and MPCA regulations. Others will probably remain abandoned. These wastes could be sources of suspended solids and dissolved metals, all of which are harmful to aquatic life.

The MPCA undertook a field investigation in April, 1978, to assess the potential of waste piles to be sources of suspended solids through erosion. The question of whether waste piles and tailings ponds generate dissolved metals was not within the scope of this investigation. Neither did the investigation consider the question of the long-range stability of tailings pond dikes, although the current erosion potential of several was assessed. The investigation found that mining wastes are not a significant source of suspended solids in mining area waters. Generation of dissolved metals and the long-term stability of tailings ponds are subjects that require future study.

Management Program Assessment:

Mineland Reclamation Program (Minerals Division, Department of Natural Resources)

This program implements mineland reclamation legislation enacted in 1969 and strengthened in 1973 by the State legislature. The intent of this law is the prevention of environmental damage caused by all active and future metallic mineral operations, including taconite, iron, and copper/

nickel mining. Water quality protection is included in this program. Based on draft rules presented at a public hearing, it is anticipated that this program will fill in most of the gaps in the permit system.

MPCA/EPA National Pollutant Discharge Elimination System (NPDES) and State Disposal System

Any "point source" discharge of wastewater falls under the NPDES permit program. In Minnesota, this program is administered by the MPCA, which has been delegated this authority by the EPA; the EPA retains review authority over the permits.

Discharge of pit water and process water is covered by the NPDES program. All such discharges must comply with the limits on water pollutants set by these permits. The limits are designed to prevent water quality problems in receiving waters.

The State, through the MPCA, also requires its own State Disposal System permits for the construction and operation of any wastewater disposal system. In most cases, these State Disposal System permits and the NPDES permits are issued together and have the same requirements. There are some mining situations, however, where there is no discharge from a disposal system; thus, no NPDES permit is required. Tailings basins are a primary example of this situation. These permit programs leave two areas inadequately regulated at present: the programs do not cover water from precipitation that runs off either the active mine site or disposal areas after the mine is closed. They also do not cover the possibility of this precipitation water seeping into the groundwater. As mentioned above, the mineland reclamation program covers most of these areas. However, runoff and seepage from inactive areas of active sites will not be covered as of the date of promulgation of the mineland reclamation rules.

Copper/Nickel and Peat Studies

For several years, ongoing studies have been conducted to determine the environmental, social, and economic impacts of potential copper/nickel and peat mining in Minnesota.

The copper/nickel study work program coordinated by the Minnesota Environmental Quality Board, included the following specific water quality considerations:

- a. The existing biotic community;
- b. The historic levels of heavy metals in lake sediment and peat;
- c. The hydrologic conditions in lakes and streams; and
- d. The amounts of heavy metals and sulfides leached from stockpiles, and their movements through the environment.

The above information could be used to predict possible water quality problems which could result from copper/nickel mining.

The peat study work program included assessment of the following specific water quality considerations:

- A. The existing water quality and quantity at selected locations;
- b. A compilation of the water quality effects of peat mining based on reports and other literature and field studies of existing operations;
- c. A comprehensive inventory of the locations, quantities, and composition of Minnesota's peat resources; and
- d. The water pollution potential of peat extraction.

This information should identify any potential water quality problems which could result from peat mining.

The results of neither study were available during the initial 208 planning period. Therefore, no conclusions as to whether water quality problems will actually result from copper/nickel mining or peat mining can be drawn in this 208 planning phase.

Findings and Conclusions: Sand and gravel and building-stone mining can be adequately regulated by current permitting programs, local ordinances, and MPCA inspections, either scheduled or in response to requests. However, there are no standard procedures by which local units of government regulate mining activities.

Sedimentation from abandoned mine waste piles and tailings basins is not endangering water quality to a degree sufficient to warrant control programs.

The possibility exists of ground or surface water contamination by dissolved metals from abandoned waste piles and tailings basins; this includes portions of active mine sites which became inactive prior to promulgation of DNR rules. No programs regulate abandoned waste piles or tailings basins.

Recommended Policies and Programs: Technical guidelines and assistance in the regulation of sand and gravel operations are needed by local units of government. To meet this need, *the Soil and Water Conservation Board (SWCB) should lead an interagency task force in developing guidelines for existing and abandoned sand and gravel operations. These guidelines would be voluntarily incorporated in county and local ordinances. Such guidelines would include, but not be limited to, control of runoff, sedimentation control, and reclamation procedures. The SWCB should be available to give advice on the use of guidelines.*

Data is needed to determine whether heavy metals are leached out of mine wastes into either ground or surface waters, and in what quantities. Of particular concern are wastes at recently worked mine sites which, because they have become inactive, will not be covered by the new DNR rules. *The*

MPCA should undertake a field study designed to identify leaching of heavy metals out of mine wastes. The MPCA should continue to review and comment on the promulgation of new or revised rules on metallic-mineral mining to assure that water quality protection is adequately addressed.

The copper/nickel and peat studies will provide the foundation for evaluating potential water quality problems from copper/nickel and peat mining activities. The MPCA should carefully evaluate all relevant outputs of these studies and take appropriate action to protect water quality based on the information contained in these documents.

The MPCA should investigate potential water quality impacts associated with possible uranium mining operations and initiate any required controls. In establishing future rules for mining of copper/nickel and peat, the DNR should cooperate with the MPCA in addressing the water quality aspects of the rules.

URBAN RUNOFF

Goal: To prevent pollutants in urban runoff from harming water quality.

Objective: To develop an urban runoff management plan for the State of Minnesota.

Water Quality Problem Assessment: The Minnesota Pollution Control Agency's (MPCA) study of urban runoff in Minnesota, as well as results of other urban studies completed since the MPCA study, indicate that urban runoff contributes a significant share of pollutants to the State's waters.

Urban runoff pollution is caused by precipitation falling in urban areas. This precipitation picks up pollutants from the air. It also picks up chemicals, oils, metals, paper, and other organic and inorganic matter from littered and dirty streets, roads, and sidewalks.

Urban runoff can contain substantial amounts of organic materials, inorganic solids, coliform bacteria, nutrients, pesticides, and heavy metals. These pollutants can all degrade the receiving water quality. This degradation often results in decreased dissolved oxygen levels and high turbidity. Coliform bacteria indicate the presence of pathogenic bacteria; nutrients (phosphorus and nitrogen) contribute to increased eutrophication. Pesticides and heavy metals destroy certain aquatic biota. Unregulated or poorly regulated runoff can increase the erosion of pond areas and stream banks and cause deposition of sediments in channels.

Studies in other states have shown that metals in urban runoff (lead, copper, iron, etc.) can exceed water quality standards several times a year. Levels of BOD and suspended solids can frequently be greater than allowable effluent limits for point-source discharges. Chlorides standards can be violated by urban runoff from snow melt. Oil and grease in urban runoff cause visible oil film on the surface of waterways. This also is a violation of the State's water quality standards.

Management practices identified in Urban Runoff-Package I are designed to control the quantity and quality of urban runoff. Source controls can control both the availability of pollutants and the quantity of runoff available for transporting the pollutants. The quality of runoff can be controlled through both source and treatment controls.

Source controls are essentially preventive measures. They reduce the amount of pollution entering a water body by reducing the amount of runoff available to pickup and transport pollutants and/or the amount of pollutants available for transportation.

Treatment controls either reduce or remove pollutants from the runoff before it enters a water body. It is similar to a wastewater treatment program. Treatment of urban runoff is an impractical consideration at this time; the cost of implementing such a program is high and there is no evidence of a need to treat runoff from any urban area in the State.

Runoff control is a management concept that applies to developing urban areas where human activities are more subject to control and drainage is essentially natural.

Management Program Assessment: A number of Minnesota agencies have some sort of management responsibilities for urban runoff. This management responsibility is, however, neither coordinated among the various agencies nor directed toward the protection of water quality (except in the instance where a particular storm water discharge point has proven to violate MPCA Water Quality Rules and Regulations and has had certain conditions on its discharge under the National Pollutant Discharge Elimination System (NPDES)).

Management of activities related to urban runoff takes many stances. Under policy and program development, for example, counties, municipalities, townships, watershed districts, Soil and Water Conservation Districts, the Minnesota Department of Natural Resources (MDNR), the Minnesota Department of Administration, and Regional Development Commissions develop guidelines or specific policies related to planning, development, and other urban-related activities.

Under their regulation of activities related to urban runoff, counties, municipalities, townships, watershed districts, the MDNR, and the MPCA all have authority to establish and enforce rules, regulations, and ordinances related to development and construction in urban areas or to the protection of water quality from the impacts of those activities.

The problem is that these responsibilities are fragmented; agency responsibilities are narrowly defined in most cases and duplicative in others. For example, the MDNR flood plain and shoreland management programs require counties and municipalities to adopt and administer flood plain and shoreland ordinances in accordance with criteria established by the MDNR. The Minnesota Department of Administration administers the Uniform Building Code which has established minimum standards for excavation, grading, and construction in flood plains as well as other areas. Watershed districts have the authority to control, under an overall plan, activities within the flood plain of its watershed.

Findings and Conclusions: The MPCA study of Urban Runoff and other contributing non-point source problem areas (construction and highway de-icing runoff and associated pollutants) gives strong indication that Minnesota waters are polluted by runoff from urban areas. However, the current state of technical knowledge is insufficient to justify the implementation of any management programs. This assessment is based on the MPCA's lack of knowledge about pollutant sources, pollutant accumulation patterns, washoff and transport mechanisms, instream behavior of the pollutants, impacts of water quality on aquatic ecosystems, and control effectiveness.

There are existing management systems that have programs related to controlling urban runoff, but they do so in a secondary manner. The overall approach to managing urban runoff problems is duplicative in some cases and fragmentary in most. None of the management programs, with the possible exception of one or more watershed district plans, is concerned with the water quality impacts of urban runoff.

A comprehensive management approach to urban runoff is needed. This approach should clearly delineate management agency responsibilities, authority, and relationships. Water quality control, air pollution control, land use, environmental protection, recreation, water supply, water conservation, flood control, and erosion control are all programs which will have to be integrated in an overall management scheme.

Recommended Policies and Programs: Before an urban runoff management plan can be developed, answers must be found to questions about pollutant sources, pollutant accumulation patterns, washoff and transport mechanisms, instream behavior of the pollutants, impacts on water quality and aquatic ecosystems, and control effectiveness.

The following programs are designed to answer these and other relevant questions about urban runoff and to reduce existing or potential urban runoff problems in the State.

- 1) Determine the impacts of urban runoff by establishing a monitoring program in metropolitan areas outside of the Twin Cities.

The Minnesota Pollution Control Agency should select several urban watersheds and develop a monitoring program to establish a relationship between pollutant sources, loading, concentrations, and resultant effect on water quality. This program would also determine the impact of land use (residential, commercial, industrial) on water quality.

- 2) Develop methods by which urban runoff problems can be assessed.

The Minnesota Pollution Control Agency should select an appropriate urban runoff simulation model for the pur-

poses of estimating pollutant loadings and the impacts of urban runoff on Minnesota's lakes and streams which have been identified as receiving urban runoff.

- 3) Determine effectiveness and feasibility of urban runoff controls and Best Management Practices in meeting water quality goals.

The Minnesota Pollution Control Agency should use a model to estimate the impact of urban runoff pollutant loads on receiving waters under various management practices. The practices should be evaluated for effectiveness in controlling different types of pollutants under various urban land-use conditions. This program should identify the costs of management practices and evaluate the costs of different levels of pollution reduction. The program should also evaluate ways to achieve these levels of reduction.

Upon completion of the above problem assessment (management practice evaluation and determination of the extent of the problem),

The Minnesota Pollution Control Agency should recommend the implementation of a management program to reduce the impact of urban runoff on receiving waters. This management program should identify effective management practices and the conditions under which they are to be put into effect. The program should also identify instructional and financial arrangements and establish an evaluation process to monitor implementation of management programs. A task force composed of local, regional, and state government representatives should be established. The task force could provide the Minnesota Pollution Control Agency with expertise on local issues and concerns. Progress reports should be made available to the public through the 208 Continuing Planning Process.

It is estimated that it will take three years to carry out the recommended proposals, assuming adequate funding support from the Environmental Protection Agency (EPA). The EPA has initiated a nation-wide urban runoff program. This EPA program will fill the information gaps regarding pollutant sources, areal accumulation patterns, washoff and transport mechanisms, instream behavior of pollutants, and control effectiveness. The major goal of the program is to provide the United States Congress and state and local officials with supplementary information on urban runoff issues. This will insure informed decisions on urban runoff control programs. Combining the results of the National Urban Runoff Program with the MPCA's data collection and planning efforts (identified above) will make the development of a comprehensive state urban runoff management plan possible.

The Minnesota Pollution Control Agency needs to emphasize continued cooperation between state agencies, Regional Development Commissions, and the Metropolitan Council's efforts in developing an urban runoff management program.

Those communities that wish to implement management practice programs are referred to the management practices listed in Urban Runoff Package I, May 1978, (pp. 54-91) for viable alternatives to be used in controlling the amount of pollutants entering urban runoff. Certain measures are good general planning tools as well as practices which can be used to improve and protect water quality. The following practices are recommended to regional and local planning agencies.

Urban Resource Planning- includes a number of traditional community activities, including land-use planning, recreation and open-space planning, public facilities planning, transportation planning, and housing and economic development planning. The concept is to integrate water resource issues into a comprehensive planning process. This process would identify water quality problems caused by urban development patterns and reduce the negative effects.

Urban planning focuses on the location, density, and timing of development. By applying principles of hydrology to land-use planning, undeveloped lands where soils are naturally impervious could be identified for industrial, commercial or other high density use. Areas where permeable soils exist could be set aside for open-space and/or low-density residential use. Using this approach, natural runoff characteristics would be altered only minimumly by development. This practice will affect only new development. It will have little, if any, impact on existing areas where urban runoff is already a source of pollution.

Protection of Environmentally Sensitive Areas- would identify natural areas where alteration or disruption could cause non-point source pollution. Ordinances would be developed to protect these areas. Environmental features which are particularly sensitive to development abuses, or contribute to the natural functioning of the hydrologic cycles, are stream and creek beds, floodplains, wetlands, steep slopes, and woodlands.

Local governmental units could use land-use restriction ordinances to supplement their zoning ordinances. These restrictions would identify and minimize interference with the land's natural capacity to retain, absorb, and purify stormwater runoff. As an example, to reduce erosion, land-use ordinances could require that a minimum percentage of natural vegetation be maintained after hillside development. Filling of wetlands could be prohibited to protect their ability to moderate peak

stormwater flows, to filter nutrients and sediment, and to recharge groundwater supplies.

This program does not address existing problems and will only be effective where new development would have occurred in environmentally sensitive areas.

On-Site Management of Runoff- proposes the creation of local ordinances that would require developers to install on-site stormwater control devices as a condition of development. Typical on-site methods have been described in Urban Runoff, Package I.

On-site management is basically preventative and has little application to existing development. In addition, local planning or engineering expertise on the concepts of on-site stormwater detention and retention is limited. Technical assistance will be provided by appropriate state agencies.

While the programs and recommendations identified for this topic are applicable statewide, it should be noted that the Metropolitan Council is developing a separate plan for the seven-county metropolitan area. The Council may propose programs which are different from, and more stringent than, those identified here.

RESIDUAL WASTES

Residual wastes are defined by Section 208 in 40 CFR 131.11(K) as "solid, liquid, or sludge substances from man's activities in the urban, agricultural, mining, and industrial environment remaining after collection and necessary treatment." The regulation requires Water Quality Management plans to include: "An identification of the necessary controls to be established over the disposition of residual wastes which could affect water quality and a description of the proposed actions necessary to achieve such controls."

Residual wastes are not easily categorized as either point sources or non-point sources. Because existing controls over the disposal of residual wastes are aspects of point source programs, the MPCA largely views residual waste issues as point source-related. The existing programs are indicated briefly in Part II, Section K of this document.

Study of residual wastes carried out in the 208 planning program was limited to a survey of approximately 1,000 individual sources of residual waste. The purpose of the survey was to learn what these wastes are, in what quantities they are generated, and how they are disposed of. The survey emphasized residual wastes produced by air and water pollution control devices. Details and results of this survey are presented in the 208 report "Residual Wastes."

One important issue discovered by the survey was that many residual wastes are not disposed of in accordance with MPCA rules. A major reason for this problem was found to be an inadequate exchange of information between the three divisions of the MPCA--Air, Water, and Solid Waste. The MPCA introduced this issue to the 208 decisions-making process (i.e., the State Task Force, the Regional Committees, and the State agencies) for consideration. The following recommendations were made:

Each MPCA division, on initiating a permitting or renewal process, should be required to solicit comments from the other sections and divisions.

The MPCA should establish a task force, comprised of state and local officials. The task force would establish procedures and policies to provide better involvement in residual waste management at the local level.

The procedures and policies should include: 1) guidelines and standards for residual waste management for administration by the counties, 2) efforts to seek funding assistance for establishing county environmental officers to coordinate permit functions and residual waste management at the local level, 3) establishment of criteria which should be included in any county residual and solid waste management program,

4) consideration of state legislation to provide local administration of residual waste management based on state guidelines, standards, and criteria, 5) improved technical assistance by the Minnesota Pollution Control Agency to the counties, and 6) educational programs for county administrative personnel and the general public.

HYDROLOGIC MODIFICATION

Federal 208 regulations, in 40 CFR Part 131.11(j)(3)(vii), require that water quality effects caused by hydrologic modifications (e.g., dams, channel changes) are to be addressed in 208 Plans.

The Minnesota Pollution Control Agency's initial 208 planning effort did not include studies of the effects of hydrologic modification on water quality. A study of the water quality effects of dredge and fill activities will begin in fiscal year (FY) 1980 using 208 funds from the FY 1978 allocation. Management programs will be developed to abate any water quality problems discovered by this study.

The Minnesota Pollution Control Agency will continue to review projects which require federal permits or licenses under the Section 401 certification process. This review will include a study of the potential water quality effects of these projects. The Minnesota Pollution Control Agency also requires State Disposal System permits for dredging disposal sites.

GENERAL RECOMMENDATIONS AND SPECIAL CONCERNS

Some State Task Force recommendations do not apply to specific non-point sources. They do, however, reflect general concern with insuring successful implementation of the Plan. These recommendations are presented here to emphasize their importance to the entire Water Quality Management program.

In reviewing the existing rules and regulations pertaining to the permitting of various polluting activities, the State Task Force developed concern for the coordination of all pollution permitting activities. The Task Force expressed concern that permitting activities be consistent with present laws and regulations.

The State Task Force recommends that the MPCA permit requirements be reviewed by an interagency task force to insure that permitting regulations are consistent with federal requirements, state legislative mandates, and other state agency requirements and activities.

The Clean Water Act requires the MPCA to establish an advisory group to provide "continued attention of an informed core group of citizens" in the continuing development of the Minnesota Water Quality Management planning program.

The State Task Force recommends that representatives from the state's regional development commissions be included on this committee so as to provide for geographical representation.

To provide a way for the public to communicate its views on the implementation of the programs recommended in this document and on continuing planning activities, it is necessary for the MPCA to continue its 208 public information and participation program.

As part of the public information and participation program, the State Task Force recommends that this 208 Plan and all subsequent revisions include as supplementary information a "summary of annual planning strategies" (work programs) for each of the management agencies identified in the State Water Quality Management Plan.

This strategy should serve as a report from the management agencies regarding their program objectives for implementing recommendations from the 208 WQM Plan.

The Minnesota Pollution Control Agency should be the responsible agency for producing this annual "summary report".

In developing the proposals and recommendations in this Plan, the State Task Force members made several recommendations which were related to specific non-point source topics but were not appropriate to include in the recommendations on that topic. These statements of concern should receive particular attention from the agencies implementing the 208 Plan.

Agriculture: Once the programs are funded, a time limit should be set for compliance. If compliance does not occur in that time, mandatory controls should be implemented by the local

Soil and Water Conservation District Boards.

There should be a mechanism to determine priority areas on two levels; statewide and local. There should also be adequate funding and technical assistance.

One Best Management Practice for controlling wind erosion in the prairie areas of the State is single row windbreaks. The department of Natural Resources, Forestry, should supply the appropriate species and size of nursery stock for single row wind breaks.

Agriculture and Feedlots: Reference to the Karst region of the State should be included in discussions of "targeted areas" to emphasize the potential for serious problems in that area.

Construction: It should be recognized that the program for construction is regulatory because there are proven, cost-effective, and acceptable Best Management Practices for controlling erosion from construction activities. The system is already in place and can be easily expanded.

Site designs for road construction should be comprehensively reviewed during plot reviews to minimized road area.

Pesticides: The use of insecticides should be limited near fishable streams and lakes and in flood plains.

The container disposal section of the pesticides recommendation should receive continued support.

General: A better, more comprehensive monitoring effort should be developed.

Regional differences should be recognized in developing management programs.

General emphasis should be placed on the need for county environmental officers.

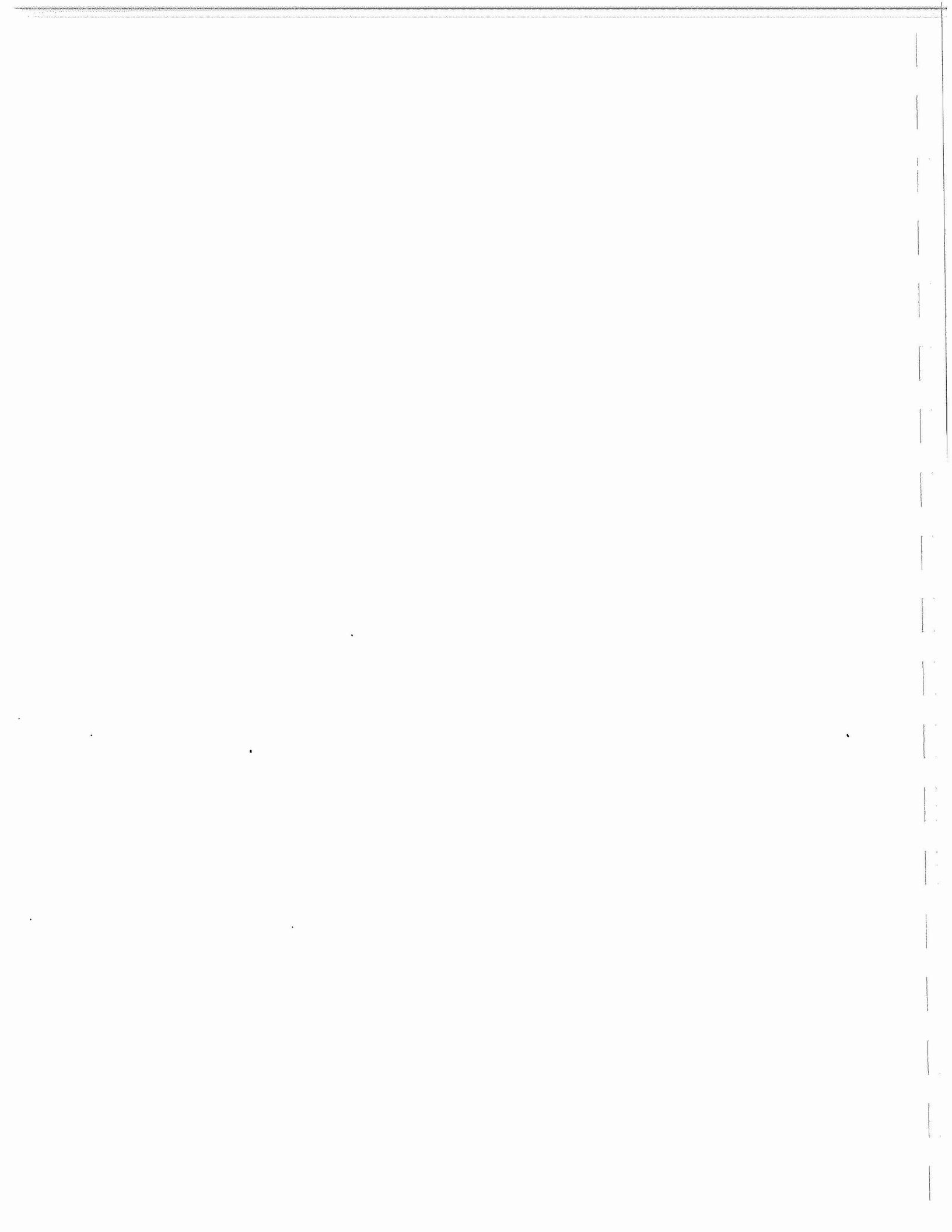
Off-the-road vehicles cause problems that apply to several topics and should be addressed.

Selection of target areas should be connected to waters of high resource value.

Point sources should not be allowed to undo what will be accomplished by cleaning up non-point sources of pollution.

The State Task Force should be continued.





Introduction: This part of the Plan document is not really a "plan" in the sense of laying out a blueprint for future action. The programs described and the outputs incorporated result from ongoing state actions in water pollution control. These programs are independent of, and generally pre-date, the planning program which developed the non-point source-related part of this document.

These programs and their outputs are incorporated in the following pages of this document in order to formally fulfill the areawide point-source-related water quality management (WQM) planning requirements of the Clean Water Act as enumerated in 40 CFR, part 131.11. This incorporation is also fulfilling commitments made in the Continuing Planning Process (CPP), the Work Program, and the State/EPA Agreement to update Phase I basin plans and to incorporate relevant outputs of ongoing programs in the Water Quality Management Plan.

The incorporated outputs are presented here in the order in which topics are listed in 40 CFR, part 131.11. The same lettering and numbering system is also followed.

a. Planning Boundaries:

- 1) Approved state planning areas: these boundaries are as presented in Appendix A of the CPP document.
- 2) Facilities planning areas: such areas are identified by the Minnesota Pollution Control Agency (MPCA) in consultation with local officials prior to a municipality's preparation of a study plan for a 201 Facilities Plan. Areas for essentially all communities with treatment needs have been completed. Planning area delineation for all communities of 3,000 or more was documented in the August 5, 1977, Interim Output Report to the EPA. That report was prepared to fulfill a special condition in the initial 208 grant offer. All such planning areas are hereby incorporated in this Plan in satisfaction of this requirement.
- 3) Segment boundaries: present segment boundaries are presented in Appendix B of the Continuing Planning Process (CPP) document. Because of new requirements under section 304 (a) (2) (d) of the Clean Water Act, it is anticipated that these boundaries will change. Changes will be incorporated in the CPP document. All wastewater treatment facilities are inventoried in the Wastewater Disposal Facilities Inventory, prepared and regularly updated by the MPCA; that report and its revisions are hereby incorporated in this Plan.
- 4) Significant discharges: locations of discharges are shown in Phase I basin plans.
- 5) Monitoring stations: the location of monitoring stations is shown in the annual Program Plan.

b. Water Quality Assessment:

- 1) Assessment of existing and potential water quality problems, POINT SOURCE-RELATED ONLY: such assessment is made through the State's 305(b) water quality reports to Congress; they are hereby incorporated in the Plan in fulfillment of this requirement.
- 2) Segment classifications: present segment classifications established in Appendix B of the CPP document. Because of new requirements (published December 28, 1978) under section 304(a) (2) (D) of the Clean Water Act, these classifications will be reviewed and likely changed. These changes will be established through revision of the CPP.

c. Inventories and Projections:

- 1) Inventory of municipal and industrial discharges, and a ranking of municipal sources: the MPCA maintains and periodically revises an inventory called "Wastewater Disposal Facilities Inventory." In addition, the MPCA is developing a computerized discharger inventory; referred to as MEDVTS, it is described on page 11 of the fiscal year (FY) 1979 Program Plan. These inventories are hereby incorp-

orated in this Plan. The MPCA maintains a priority list of inadequate municipal facilities. Prepared pursuant to rule WPC 34, this list provides the basis for awarding construction grants. This Municipal Needs List and subsequent revisions are hereby incorporated in this Plan in satisfaction of this requirement.

- 2) Summary of existing land use patterns: such information is contained in A Notebook of Land Use Projections (June, 1978), prepared by the State Planning Agency. This information is hereby incorporated in this Plan in satisfaction of this requirement.
- 3) Demographic and economic projections: population projections for each municipality with a treatment need are developed by the municipality as part of the 201 facilities planning process. These projections are reviewed and approved by the MPCA pursuant to federal construction grant regulations 40 CFR, part 35, Appendix A. All such projections contained in approved facilities plans are hereby incorporated in this Plan in satisfaction of this requirement.

Economic projections contained in "Minnesota Employment Projections to 1990" (November, 1977), by the State Planning Agency, are hereby incorporated in this Plan.

- 4) Municipal and industrial waste load projections: these projections are determined, as necessary, in the development of 201 facilities plans and National Pollutant Discharge Elimination System (NPDES) permit conditions, and they are contained in these plans and permits. The projections are hereby incorporated in this Plan in satisfaction of this requirement.
- d. Non-Point Source Assessment: this element is contained in Part I of this Plan.
 - e. Water Quality Standards: rules WPC 14,15,22,24, and 25 are hereby incorporated in this Plan as the state Water Quality Standards. Revised standards are now being developed. They will be incorporated in this Plan through future revisions.
 - f. Total Maximum Daily Loads(TMDLs): for purposes of this initial plan, no TMDLs are presented, as the CPP under which this Plan was prepared had certified their inapplicability to the state planning area.

In view of new requirements concerning TMDLs published by EPA on December 28, 1978, it is no longer possible for Minnesota to certify out of TMDLs. Activities to rectify this situation will be addressed in the State/EPA Agreement, and results will be incorporated in this Plan through future revisions.

- g. Point Source Load Allocations: load allocations for all point

sources are developed through the NPDES permitting process with assistance for municipalities from the 201 facilities planning process. All such permit conditions are hereby incorporated in this Plan in satisfaction of this requirement.

- h. Municipal Waste Treatment System Needs: all such Plan elements are developed through the 201 facilities planning process. The applicable contents of all approved facilities plans are hereby incorporated in this Plan in satisfaction of these requirements.
- i. Industrial Waste Treatment Systems Needs: all necessary State involvement in such planning is conducted through NPDES and State Disposal System (SDS) permits preparation, and through review and approval of disposal system plans by the MPCA pursuant to Minnesota Statute (MS) 115.07. Applicable outputs contained in the permits are hereby incorporated in this Plan in satisfaction of these requirements.
- j. Non-Point Source Control Needs: this element is contained in Part I of this Plan.
- k. Residual Waste Control Needs; Land Disposal Needs: conditions for the control of residuals generated by wastewater treatment and water treatment facilities (including industries) are contained as provisions in NPDES permits, SDS permits, and in 201 Construction Grant applications. Land-spreading activities and lagoons are controlled by the SDS permit system. All the above programs are administered by the MPCA, Division of Water Quality.

Residuals generated by air pollution control equipment are controlled by conditions in Air Pollutant Emission Facility permits by the MPCA's Division of Air Quality according to rule APC 3. The deposition of residuals in landfills is controlled by the conditions in Solid Waste Disposal Facility permits issued by the MPCA's Division of Solid Waste (DSW) according to rules SW 4, 5, 6, and 9. Permitting or closure of existing nonpermitted facilities will continue in the future based on the results of an open-dump inventory conducted by the DSW. Additional permit requirements are contained in rule HW 6 of the Hazardous Waste Regulations.

The disposal of residuals and other materials on land is recognized as a current major concern in Minnesota. The following planning is underway: the State Solid Waste Management Plan, prepared under Public Law 94-580; a state Hazardous Waste Management Plan, prepared under MS 116; and activities of the Joint Legislative Committee on Solid and Hazardous Waste.

Septic tank systems are currently regulated by MPCA rule WPC 40. This rule is enforced through county and municipal ordinances containing the provisions of WPC 40. Local units are required

to adopt and enforce such ordinances under State Shoreland, Floodplain, and Wild and Scenic Rivers legislation. Large individual septic systems (those with discharges greater than 15,000 gallons per day, systems serving 15 dwellings, or systems with a discharge greater than 5,000 gallons per day) are required to obtain SDS permits. The MPCA administers several additional programs related to WPC 40: programs for contractors, inspectors, and site evaluators (expected to begin in FY 1980). The MPCA has issued guidelines for septage disposal entitled, "Land Application and Utilization of Septage: Recommended Guidelines."

All programs, permit conditions, reports, and plans described above are hereby incorporated in this Plan in fulfillment of the requirements of this element.

- l. Urban Stormwater System Needs: this is included in Part I of this Plan.

Note: Non-point source-related aspects of elements n.-p. are covered in Part I of this Plan.

- m. Target Abatement Dates, POINT SOURCE-RELATED ONLY: all schedules of compliance established in MPCA permits are hereby incorporated in this Plan in satisfaction of this requirement.

- n. Regulatory Programs, POINT SOURCE-RELATED ONLY:

- 1) Wastewater discharges are controlled through the NPDES/ SDS permitting programs and Construction Grants program. Descriptions of these programs and various supporting programs (such as compliance and enforcement activities, monitoring, standards development, and operator training) are presented in the annual Minnesota Water Pollution Control Program Plan. The programs thus described are hereby designated as critical ongoing programs for the regulation of municipal and industrial wastewater disposal.
- 2) Residual waste and land disposal: the relevant programs are described and have been incorporated as part of element k. above.
- 3) Pre-treatment of industrial wastes sent to municipal facilities (pursuant to regulation 40 CFR, part 403): program responsibility for this task has been delegated to the MPCA by the EPA. The Minnesota program is described in the documentation supporting the delegation of request.

- o. Management Agencies, POINT SOURCE-RELATED ONLY: the MPCA and the EPA are the management agencies which carry out the wastewater disposal programs described and designated in n.2 above; the MPCA and the EPA are hereby designated as the management agencies for their respective roles. The various municipalities are hereby designated as management agencies

for their respective roles. The various municipalities are hereby designated as management agencies responsible for construction, operation, and maintenance of publicly owned treatment works, except where another entity has assumed these responsibilities under an appropriate law of the State.

The Minnesota Pollution Control Agency, municipalities, the Minnesota Department of Health, and the Department of Natural Resources are hereby designated as management agencies for their respective roles (described in element k.) in regulating individual sewage disposal systems.

- p. Economic/Social/Environmental Impact, POINT SOURCE-RELATED ONLY: Impacts of municipal facilities construction are identified through the environmental assessment (EA) component of each 201 facilities plan. Impacts of many major industrial or commercial facilities, including wastewater treatment and disposal, are prepared through a state EA process pursuant to MS 116(d) and Environmental Review Program rules promulgated by the Environmental Quality Board. The applicable outputs of these are hereby incorporated in this Plan.

FUTURE 208 WATER QUALITY MANAGEMENT PLANNING

The significance of the nonpoint source section of this document lies in the management programs and policies recommended for nonpoint sources of water pollution. After the Governor has certified the Plan the Minnesota Pollution Control Agency (MPCA) will be responsible for seeing that the provision of the Plan are implemented and that identified management agencies fulfill their roles. In some cases, these roles are well defined in the Plan, and they can be assumed immediately. In other cases, specific program elements must be worked out through legislation or inter-agency agreements. The MPCA will be responsible for ensuring that these actions are taken.

208 Water Quality Management is intended to continue until all significant nonpoint sources of pollution are being addressed by effective management programs and all provisions of federal regulations 40CFR Parts 35, 130, and 131 are met. At present, some nonpoint sources are being adequately managed; some require new or modified management programs; and so little is known about others, or certain aspects of them, that it is impossible to tell whether they cause water quality problems. Thus, continuation of the 208 program will involve three functions: actual implementation of management programs, pre-implementation activities which will lead to putting these recommended programs into operation, and continued study of nonpoint source issues. Implementation of an identified management program is the responsibility of the management agencies designated by the Water Quality Management Plan. The MPCA is responsible for monitoring the effectiveness of the management programs, performing necessary pre-implementation work, and carrying out necessary further studies.

Annual Work Programs which are prepared by the MPCA when making application to the EPA for supporting funds, will describe the 208 planning work to be done during that year. A Five-Year Strategy document will also be updated annually and submitted to the EPA with the Work Program. The Five-Year Strategy establishes a framework and sets priorities for implementing the programs and carrying out pre-implementation and study activities established by the 208 WQM Plan or required by federal regulation. It provides a longer range outline of future work upon which the yearly activities in the Work Programs are based.

The Continuing Planning Process document (CPP) which establishes the overall decision-making procedure for developing the WQM Plan, the Five-Year Strategy, and the Annual Work Program is updated annually as needed. It assigns planning responsibilities, defines how decisions will be made, and sets the overall framework for the planning process. These documents are prepared to assist the MPCA in efficient management of water quality planning activities and to report on those activities to the EPA.

All of these documents will be made available for public review and comment through the public participation process.

Because resources available for studies and pre-implementation work will be limited, the MPCA must select which of the recommended activities will be carried out each year. The nonpoint sources identified in this Plan have been assigned overall priority based on State Task Force action. The MPCA will use these priorities as a guide in developing the yearly work program. However, other factors must also be considered. The most important of these is guidance from the EPA. The EPA directs the nationwide 208 program through control of funding. The EPA prepares and updates guidelines for priority uses of available 208 funds. Because the MPCA is largely dependent on EPA funds to carry out nonpoint source planning and pre-implementation activities, the MPCA Continuing Planning Process, Five-Year Strategy, and annual work programs must comply with EPA guidelines. Though the EPA allows considerable latitude to the states, it is likely that national priorities and EPA decisions will influence the rate at which studies and programs recommended by the Water Quality Management Plan will be carried out. In addition, as the results of 208 studies across the nation are analyzed and coordinated, the EPA may modify the regulations under which states are conducting 208 planning. These modifications may require changes in the programs and studies recommended in Minnesota's 208 Plan. Such changes will be made through annual revisions to the Plan, the Five-Year Strategy, and the Continuing Planning Process.

During the initial planning phase, questions arose which require further study before recommendations for management programs can be made. These further study needs are identified in the sections pertaining to each topic. They will be scheduled for future 208 study based on the priority of the topic, EPA guidance, the cost of the study, and other factors.

BIBLIOGRAPHY

Information documents on non-point sources available from the Minnesota Pollution Control Agency, 1935 West County Road B2, Roseville, Mn. 55113 Phone 612/296-7245

Information Packages Addressing Non-Point Sources of Water Pollution - Prepared by the Minnesota Pollution Control Agency, Division of Water Quality

Highway De-icing Chemicals, Package I and Supplement

Highway De-icing Chemicals, Package II

Highway De-icing Chemicals, Package III

Feedlots, Package I

Feedlots, Package II (also titled: Description of Existing Institutions and Programs Related to Water Quality Management Planning Study Topics).

Feedlots, Package III

Agriculture, Package I and Supplement

Agriculture, Package I Supplement: Management Practices

Agriculture, Package I Supplement: Economic Considerations

Agriculture, Package II

Agriculture, Package III

Irrigation and Drainage, Package II

Roadside Erosion, Package I and Supplement

Roadside Erosion, Package I Supplement: Management Practices

Roadside Erosion, Package II

Roadside Erosion, Package III

Pesticides, Package I and Supplement
Pesticides, Package II
Pesticides, Package III
Urban Runoff, Package I and Supplement
Urban Runoff, Package II
Urban Runoff, Package III
Forestry, Package I
Forestry, Package II
Forestry, Package III
Construction, Package I and Supplement
Construction, Package II
Construction, Package III
Residual Wastes and Supplement
Mining and Revised Mining
Wild Rice
Water Quality and Non-Point Sources
Water Quality Standards Applicable to Non-Point Source Pollution

Reports of Work Done for the MPCA by Other

Agencies: Agriculture and Forestry

University of Minnesota College of Forestry

Non-Point Pollution Related to Forest Management Practices

Focus on Northeastern Minn- May 78

Final Report- Non-Point Source Pollution Related to Forest
Management Activities in Northeastern Minnesota- Sept. 1978

Minnesota Department of Natural Resources Division of Forestry

Minn. Forestry Management Non-Point Source Pollution Assessment
Segment I Forest Management and Factors Which Contribute to
Non-Point Source Water Pollution, an Overview - Dec. 1978

Minnesota Forest Management Non-Point Source Pollution Assess-
ment- March 1979

"Project 208 Public Landowners Survey Findings", N.J. Beckwith,
Mn. DNR Forestry Study Report, 1978

University of Minnesota Department of Agricultural Engineers

Progress Report June 78

"Effects of Conservation Practices on Nutrient Losses"

Final Report Effects of Conservation Practices on Nutrient Loss

Minnesota Soil and Water Conservation Board

Subcontractor- USDA-SEA-AR

Report A3- Tentative Selection of Predictive Mechanisms

Report A4- General Classification of Sediment Production

Areas in Minnesota

✓ Assessment of Upland Erosion and Sedimentation From Agricultural
Non-Point Sources in Minnesota Nov. 1978

Subcontractor USDA-SCS

Narrative Review of Streambank Erosion

Streambank Erosion Inventory

Streambank Erosion Inventory

Narrative Review of Drainage Ditch and Gully Erosion

Gully Hazard Map of Minnesota 12-16-77

Gully Erosion in Minnesota

Drainage Ditch Erosion Inventory

Subcontractor U of M Dept. of Ag. Engineering

Report E-3 Nutrient Predicting Mechanisms Oct. 77

Report E-4 Agricultural Non-Point Nutrient Sources Oct. 77

February Progress Report. Nutrients and Pathogens Section-
1978

Predicting Potential Nutrient and Pathogen Loss in Minn

Agricultural Non-Point Source Pollution Oct. 78 to Feb. 79

A Survey of Agricultural Irrigation and Drainage Practices
in Minnesota- March 78.

Reports generated by SWCD or SWC districts.

Bibliography, Literature Search and Narrative Review of
Roadside and Roadway Erosion in Minnesota

Preliminary Feedlot Inventory

Detailed Feedlot Inventories of approximately 38 Soil and
Water Conservation Districts

Short Report on Management Practices

USDA-SEA-AR and Univ. of Minn. Dept. of Ag. Eng.

✓ Preliminary Identification of Literature, Models and Data

for Evaluating Rural Nutrient, Sediment and Pathogen Sources

May 77

Minnesota Pollution Control Agency

General Report on Stream and River Development

Report on Streambank Erosion in Minnesota

Effectiveness of Non-Structural Feedlot Discharge Control
Practice

The Analysis of Water Quality Data As Related to NPSS,
Cliff Angstman, MPCA Sept. 78

"Sediment-Associated Phosphorus and Eutrophication", MPCA
Staff Sept. 78; (this is unpublished appendix to Ag 1)