

Minnesota Board of Water and Soil Resources. Minutes.

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BOARD OF WATER AND SOIL RESOURCES
ROOM 112 STATE CAPITOL BUILDING
75 CONSTITUTION AVENUE
ST. PAUL, MINNESOTA 55155
JANUARY 22, 1992

Appointed Members in Attendance
Jim Nielsen
John Brooks, Jr.
Don Ogaard
Loren Harste
Howard Peterson
Don Warner
Dwain Otte
John Boulton
Jack Graba
Diane Jensen
Jim Rossman
Warren Rodning

Agency Members in Attendance
Kim Benson-Johnson, Department of Health
Tom Lutgen, Department of Natural Resources
Doug Wise, Department of Agriculture
Fred Bergsrud, University of Minnesota/Extension Service

Others in Attendance
Gary Nordstrom, Soil Conservation Service
John Sumption, Minnesota Association of Conservation District Employees
Danny Potter and Bob Pigeon, Minnesota Association of Soil and Water Conservation Districts
Marlin Libbesmeier, Minnesota Association of Townships

Staff in Attendance
Ron Harnack
Eric Mohring
Dave Behm
Mel Sinn
Mark Nelson
Bruce Sandstrom
Mary Jo Anderson

Meeting Called to Order - Chairman Nielsen called the meeting to order at 9:04 a.m.

** 01-92 Adopt Agenda - Moved by Warner, seconded by Otte, to adopt the agenda as presented. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks,Jr., Harste, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 02-92 Approval of Minutes of December 18, 1991 - Moved by Rossman, seconded by Harste, to approve the minutes of December 18, 1991, as circulated. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Peterson, Jensen, and Rossman. Opposed: None. Carried.

Chairman's Report - Chairman Nielsen reported that the Wetland Heritage Advisory Committee held their first meeting on January 16, 1992. Their next meeting is scheduled for February 13, 1992.

Chairman Nielsen attended the Environmental Quality Board (EQB) meeting. The EQB has the task of recognizing and setting no-net loss environmental policy.

Chairman Nielsen briefly commented on the issue of reimbursement to board members for attending various meeting. This issue will be discussed at the February meeting.

Executive Director's Report - Ron Harnack reported that the Study Area II Board agreed to participate in a work group to develop a memorandum of understanding between Area II, BWSR, DNR, and MPCA that would define each organization's expectations concerning Area II project planning, selection, and design. Jeff Nielsen, BWSR staff, will serve as the facilitator of the work group.

Warren Rodning entered the meeting at 9:13 a.m.

Ron reported that a meeting was held with the Minnesota Pollution Control Agency (MPCA) on January 13 to discuss the issue of feedlots and how to become more effective in the future. MPCA will put more effort in this area. Dwain Otte suggested that Ron work with the Soil Conservation Service (SCS) and Agricultural Stabilization and Conservation Service (ASCS) to resolve the allocation issue. A coordinated strategy is being developed to accelerate elimination of the feedlot pollution issue.

Ron reported that staff has initiated an Affirmative Action Committee to put in place an agency affirmative action plan.

An SWCD Management Level I Training Session was held January 13-14, 1992, at Cragun's in Brainerd. This session was initiated as part of the BWSR's five-year training plan.

EQB/Water Resources Committee (WRC) Report - Ron Harnack reported that the WRC

is developing a long-term analysis regarding an environmental trends. Summary of the report is available on request.

LCMR Proposals - Ron Harnack explained that LCMR has initiated its proposal process for the 1993-95, biennium with project proposals due on February 7, 1992. He briefly summarized the BWSR proposals: 1) Feedlots; 2) Minnesota River Nonpoint Acceleration; 3) RIM Reserve; 4) Block Grant for Natural Resources; 5) Education and Training for Local Government; 6) Color Infrared Photography; 7) Database Development for Inventories; and 8) Nonindustrial Forest Management/Windbreak Acceleration. See attached summary of each proposal.

BWSR Education Committee Report - Don Ogaard reported that the Education Committee met last week. Don read the mission of the Minnesota Environmental Education Plan for the Board's information. He briefly summarized the responses of the informational survey that was sent out by the BWSR.

1991 Rollover Allocation - Ron Harnack reported that each year soil and water conservation districts turn back grant dollars that were not expended due to various reasons. The BWSR then allocates those monies at the beginning of each year. Ron suggested that this item be delayed for action until the February meeting due to the budget situation.

Well Sealing Allocation - Eric Mohring explained that the legislature appropriated monies for a pilot abandoned well inventory to determine what resources would be required to conduct a statewide abandoned well inventory and prioritization. The inventory was to have a geographical representation as well as meeting other basic criteria. In addition, the LCMR appropriated monies for sealing of abandoned wells. The BWSR previously approved the framework for the grants. Eric presented the staff recommendation for allocations of the abandoned well inventory grant program and the well sealing cost-share grants. Discussion followed. Moved by Harste, seconded by Otte, to approve the abandoned well inventory grant program allocation of $200,000 as well as the well sealing cost-share grant program allocation of $356,000. Staff also authorized to make future grants consistent with the approved criteria and report regularly to the Board on the types of wells being sealed (not technical information) which are critical wells and high priority wells. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 03-92

Chairman Nielsen called for a break in the meeting at 10:30 a.m. The meeting reconvened at 10:38 a.m.

RIM Strategic Plan Committee Report - Dave Behm explained that the BWSR RIM Committee was established to review the RIM Reserve Program and suggest some fundamentals philosophies to guide the program in the future. Dave updated the Board of its initial findings. The next meeting of the committee is February 10. Dave will bring those recommendations to the February meeting. Members were encouraged to share their

ideas with the RIM committee or Dave.

Tri-County Conservation Project (TCCP) - Dave Behm introduced Mary Kells, Tri-County Conservation Project Coordinator. Mary reported on the accomplishments of the TCCP and explained that the BWSR allocated $100,000 of the RIM Reserve easement funds to enrollments from Meeker, Stearns and Wright SWCDs within the TCCP area. The TCCP is requesting continued cooperation and financial support from the BWSR and for the incentive program to be included in the next RIM Reserve Program sign-up. Discussion followed. Moved by Boulton, seconded by Harste, to accept the request of the Tri-County Conservation Project and continue to implement their request. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 04-92

Metro Region Presentation - Mark Nelson and Bruce Sandstrom distributed an informational overview packet for the Board's review. They reported on the clientele in the Metro Area; activities they are involved in; accomplishments in 1991; tentative work plan for 1992; and potential issues facing the BWSR in the future.

Don Ogaard left the meeting at 12:15 p.m.

Update on Washington County Land Exchange between Department of Natural Resources (DNR) and Andersen Window Corporation - Kim Hennings, DNR, and Jerry Larson, Andersen Window Corporation, were present to explain the land exchange. It was reported that it has been decided to pursue a legislative sale of the property directly to Andersen Windows. Legislation is being drafted by the DNR authorizing the sale of the 245 acres to Andersen Window Corporation at current market value. The sale will still be subject to requirements of Minnesota Statutes 103F.535. A preliminary site development plan has been completed by Andersen Window Corporation and copies have been provided to the Washington County SWCD and BWSR staff for review. Comments have been received on the plan from the Washington County SWCD. The plan protects the wetland and incorporates erosion and sediment control during development. Proceeds from the land sale would go to DNR to acquire other state land. Discussion followed. Moved by Rodning, seconded by Rossman, that preliminary approval be granted for releasing marginal land from easement based on the preliminary site plan and the concurrence of DNR, subject to final approval of the site development plan developed by Andersen Window Corporation. Opposed: None. Carried. subject to final approval by BWSR.

** 05-92

Chairman Nielsen adjourned the meeting for lunch at 12:35 p.m. The meeting reconvened at 1:25 p.m.

Joint Notice of Application/Wetlands Program - Ron Harnack reported that at the December BWSR meeting a presentation was made on permit simplification. It is proposed to initiate a joint application notice that would assist individuals to ensure that all potential permitting agencies would be notified of any request that effects a wetland. In December

the BWSR tabled action on the report so members could review the report. In order for the joint notice of application to be implemented, staff suggested that the BWSR endorse the recommendation so proper interagency agreements can be developed and finalized. The agreements will institute timeframes for agencies to respond to applicants with respect to the need for individual permits. Ron stated that six organizations (DNR, SCS, counties, SWCDs, WDs, and the Corps of Engineers) have primary regulations. Staff recommends the BWSR take affirmative action so memorandums of agreement can be developed with these organizations. Moved by Warner, seconded by Otte, to authorize staff to continue working with agencies on process for implementation. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 06-92

Watershed District Legislation - Mel Sinn summarized the BWSR initiatives for amending the Watershed District Act: 1) Termination process (opposed by MAWD); 2) Open appointments (approved by MAWD); 3) Metro appointment process (approved by MAWD); 4) Permit fee exemptions (approved by MAWD); 5) Audit requirements (approved by MAWD); and 6) Appeal procedures. Mel reported on S.F. 831 (Minnehaha Creek), which addresses appeal procedures; recovery of attorney fees; and civil fines. Following are issues the BWSR must take action on:

1) Should the BWSR's dispute resolution committee adjudication role in appeals of watershed district decisions be maintained, modified, or changed to a mediation role? Discussion followed. Moved by Jensen, seconded by Graba, to instruct the executive director to support amendments to address the jury trial issue, but maintain the dispute resolution committee's existing role. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 07-92

2) Should BWSR drop or continue to pursue a change in the watershed district termination process? Discussion followed. Moved by Jensen, seconded by Peterson, to table now, but bring this issue up for reconsideration next year. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 08-92

3) Should BWSR support civil fines? Discussion followed. Moved by Graba, seconded by Rodning, to not support giving civil fine authority to watershed districts. Affirmative: Nielsen, Boulton, Warner, Graba, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 09-92

4) Should BWSR promote a single bill approach? Discussion followed. Moved by Otte, seconded by Rossman, to direct the executive director to take the appropriate approach. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 10-92

Wetland Rules Process Recommendations - Greg Larson reported that the Wetlands Heritage Advisory Committee (WHAC) met for the first time on January 16, 1992. The

committee consists of two departmental commissioners and seven citizens appointed by the governor. The WHAC recommends that a concurrent working committee be established to assist with the rules development process, and to be recognized as a review and comment committee. Greg distributed a suggested listing of participants for the wetlands rules working committee for the BWSR's review. The next WHAC meeting will be held February 13 at the Department of Agriculture Building in St. Paul. Discussion followed. Moved by Otte, seconded by Graba, to approve endorsement of the working committee and guidelines. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

** 11-92

Ron Harnack announced that an issue of concern is burning on wetlands. A resolution has been drafted for certification of burning and will be circulated to board members for review and comment to staff.

Advisor Comments

- Minnesota Association of Conservation District Employees (MACDE), John Sumption, reported that Jim Stewart from Winona SWCD is the new MACDE vice-president. John congratulated the BWSR and staff for a very favorable SWCD management level training session held last week at Cragun's in Brainerd. The MACDE requests suggestions to improve communications. The MACDE will not have representation at the National Association of Conservation Districts (NACD) annual meeting in Reno this year due to budget constraints.

- Minnesota Association of Townships (MAT), Marlin Libbesmyer will be representing the MAT at the BWSR meetings, replacing Franklin Denn.

- Soil Conservation Service (SCS), Gary Nordstrom, distributed aerial photo quad maps for the BWSR's review. Efforts will be made to get the maps into digitizational form. Gary reported on the current progress of implementation of compliance plans; 50 percent have been applied to date, with a target date for completion in 1994. Gary stated that wetland delineation is a major issue for SCS. The twelveth CRP sign-up is scheduled for June 1992. Gary announced that the Anoka Sand Plain exhibit will be at the NACD annual convention in Reno. Gary reported that SCS has applied for an additional RC&D area in Minnesota and are awaiting the results.

- Minnesota Association of Watershed Districts (MAWD), Howard Peterson, reported that IRS seminars are scheduled for February.

- Minnesota Association of Soil and Water Conservation Districts (MASWCD), Danny Potter distributed a brochure that has been circulated to 6,000 regarding statewide informational sessions on the Wetlands Conservation Act of 1991. Danny stated that the MASWCD Board of Directors will be attending the NACD annual convention in Reno, Nevada, February 2-6, 1992. Danny reported that the MASWCD Board of Directors met yesterday.

Don Warner would like to be reimbursed by the BWSR for attending various statewide meetings, such as the wetland sessions. Discussion followed. Moved by Warner, seconded by Boulton, to authorize BWSR members who don't have local representation to receive reimbursement for attending wetland training sessions. Affirmative: Boulton, Warner, Otte, and Jensen. Opposed: Nielsen, Graba, Brooks, Jr., Harste, Rodning, Peterson, and Rossman. Defeated.

** 12-92

John Brooks, Jr., invited the BWSR to Bemidji in April for the meeting and tour. Moved by Boulton, seconded by Brooks, Jr., to hold the BWSR meeting on held April 22 in Bemidji with a tour on April 23 of the Clearwater area. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed. Carried.

** 13-92

BWSR Retreat - Ron Harnack explained that the BWSR retreat has been scheduled in conjunction with the February meeting to be held at the Riverwood Conference Center in Monticello. The meeting will be February 26, with the retreat to begin following the meeting and continue through the morning on the 27th. The retreat will provide an opportunity to review and discuss the BWSR's strategic plan; establish objectives, discuss priorities, and discuss policy items for future agendas. If members have any questions or comments regarding the retreat they should contact Ron Harnack or Jim Nielsen.

** 14-92

Moved by Warner, seconded by Rossman, to adjourn the meeting at 3:35 p.m. Affirmative: Nielsen, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Jensen, and Rossman. Opposed: None. Carried.

Respectfully submitted,

D. James Nielsen
Chairman

January 20,1992

BWSR LCMR PROPOSALS SUMMARY

1. FEEDLOTS - The proposal accelerates the elimination of high priority polluting feedlots by providing financial and technical assistance for the design and construction of animal waste systems meeting current state and federal requirements; providing for relocation of feedlots and buy-out of feedlots where these alternatives are acceptable to the landowner and are more economical than the construction alternative. The proposal setsforth a 7 year program to achieve this objective. The program utilizes the cost-share program through SWCD'S that is already in place.

2. MINNESOTA RIVER NONPOINT ACCELERATION - This proposal will focus on the Blue Earth River basin, a priority basin identified in the Mn. River Assessment Program, with wetland restoration; riparian lands reserve, seeding and plantings; cost-share fencing riparian areas for cattle; acceleration of traditional cost-share for conservation practices; and review and assessment of institutional and fiscal options for long term implementation of the non-pt. needs of the Minnesota River basin.

3. RIM RESERVE - This proposal would provide funding for the reserve program for the 93-95 biennium. Wetland restoration as well as riparian lands and erodible lands would be eligible. The proposal also would leverage funds from special interest organizations such as Pheasants Forever, Ducks Unlimited, etc.

4. BLOCK GRANT FOR NATURAL RESOURCES - This proposal would pilot a block grant approach to natural resources in the NW SWCD region. The block grant would result in more efficient delivery of technical assistance by SWCD'S and be more effective in addressing regional natural resource priorities.

5. EDUCATION AND TRAINING FOR LOCAL GOVERNMENT - This proposal would build on the 5 year training plan; demonstrate in each BWSR area the development of education and training plans through SWCD'S, watershed districts, and counties; establish a Minnesota Envirothon; and purchase wetland education kits for SWCD's to distribute to schools in their area.

6. COLOR INFRARED PHOTOGRAPHY - This proposal would place recent photography in SWCD's offices for local government use in natural resources management. The photos are from flights in spring 1991.

7. DATA BASE DEVELOPMENT FOR INVENTORIES - This proposal would develop data bases for the inventory guide manuals developed by BWSR last year. Although an excellent tool for establishing consistency for acquisition of data, no computer based system was developed to store or interface the data with other GIS based data sets.

8. NONINDUSTRIAL FOREST MANAGEMENT\WINDBREAK ACCELERATION - This proposal would enhance marketing, technical assistance and cost-share for the implementation of windbreaks in wind erosion areas; establish a current inventory of nonindustrial forest lands; and accelerate integrated private forest management at the local government level. This proposal is in cooperation with the DNR Division of Forestry.

There are a couple of other proposals that private interests are developing under the sustainable agr. heading and would involve coordination with the Dept. of Agriculture.

The details of these proposals are still being reviewed with other agencies and local governments. When finalized copies will be circulated Board members. The LCMR will be reviewing these and other proposals over the next six months and recommending specific proposals to the 93 legislature.

lcmrjan92

1/22/92
03-92

Date: January 13, 1992

To: Board

From: Eric Mohring EM (612) 297-7360

Subject: FUNDING RECOMMENDATIONS FOR ABANDONED WELL GRANT PROGRAMS

ABANDONED WELL INVENTORY GRANT PROGRAM ($200,000 available)
This program will provide assistance to selected counties to conduct inventories of abandoned wells and to determine priorities for well sealing.

Objectives
- Select counties representative of different geographic and geologic areas of the state.
- Look for creative ideas and new approaches.
- Inventories should include prioritization for sealing.
- County inventories should be set up to drive future well-sealing efforts and future well-sealing cost-share funding requests.
- Grants matched 1/1 with local in-kind or cash.

Criteria for selection of counties
- Representation of different areas.
- County on schedule with water planning.
- Original & innovative ideas.
- Capability to do job.
- Strength, feasibility of proposal.

Application Review & Funding Recommendations
- 23 applications received totalling $322,000.
- Applications were reviewed and scored by an interagency advisory group.
- On enclosed table of funding recommendations, applications are listed in order of a composite score: 5=strongly recommend funding; 1=strongly do not recommend funding.

WELL-SEALING COST-SHARE GRANTS ($750,000 available)

- BWSR will make grants to counties to share the costs with landowners of sealing high-priority abandoned wells.
- Grant applications were accepted under 2 options:
  "Well Criteria Option"
  - Counties apply with list of wells or specific project.
  - Funding decision based on wells meeting criteria for being high priority.
  - 10% administrative costs allowed

  "County Criteria Option"
  - no list of wells for sealing required.
  - Selection on strength of proposal, ability of the county to administer the program, and extent of planning and inventory efforts.
  - no administrative funds - all funds will go toward well sealing costs.
  - all wells sealed must be high priority.

- This was the only application period for the "County criteria" option.
- Remaining funds will be made available for future applications under the "well criteria" option.

Application Review & Funding Recommendations

- 11 applications received for the "well criteria" option totalling $168,000.
- 24 applications received for the "county criteria" option totalling $504,000.
- Applications were reviewed and scored by the same interagency advisory group.
- On enclosed tables of funding recommendations, applications are listed in order of a composite score: 5=strongly recommend funding; 1=strongly do not recommend funding.
- Staff and advisory group recommend not fully funding all requests under the "county criteria" option in order to reserve funds for future requests under the "well criteria" option.
- Staff recommended funding option allocates 47% of the $750,000 available to the "county criteria" option, and 53% to the "well criteria" option.

Please feel free to contact me with any questions, especially before the board meeting.

ABANDONED WELL INVENTORY GRANT PROGRAM
FUNDING RECOMMENDATIONS

COUNTY	AVE SCORE	REQUEST	RECOMMENDED FUNDING
Hennepin	4.60	$35,000	$34,500
Beltrami	4.55	$19,000	$18,500
Olmsted	4.45	$13,120	$13,000
Clearwater	4.00	$4,000	$4,000
Fillmore	4.00	$9,200	$9,000
Washington	4.00	$25,000	$15,000
Winona	3.85	$25,000	$13,000
Nicollet	3.85	$7,000	$7,000
Hubbard	3.80	$7,000	$7,000
Stearns	3.75	$20,000	$19,500
Houston	3.61	$10,335	$10,000
Mille Lacs	3.60	$6,500	$6,500
Ramsey	3.60	$8,500	$8,500
Dakota	3.55	$25,000	$5,000
Wabasha	3.45	$20,000	$10,000
Benton	3.35	$10,000	$8,000
Cottonwood	3.33	$12,975	$6,500
Chippewa	3.25	$10,000	
Sibley	3.25	$6,200	$5,000
Carleton	3.20	$6,600	
Swift	2.95	$11,000	
Jackson	2.90	$23,380	
Kanabec	2.35	$7,500	
TOTAL		$322,310	$200,000

INVFUND2.WK1

WELL SEALING COST-SHARE GRANT PROGRAM

COUNTY CRITERIA OPTION

FUNDING RECOMMENDATIONS

COUNTY	AVE SCORE	FUNDING REQUESTED	RECOMMENDED FUNDING
Blue Earth	4.00	$25,000	$20,000
Hennepin	3.83	$30,000	$30,000
Washington	3.75	$25,000	$25,000
Mower	3.67	$25,000	$20,000
Brown	3.67	$10,000	$10,000
Wabasha	3.67	$34,000	$20,000
Jackson	3.67	$20,000	$15,000
Fillmore	3.58	$8,000	$8,000
McLeod	3.58	$10,000	$8,000
Goodhue	3.58	$35,000	$25,000
Stearns	3.50	$20,000	$15,000
Red Lake	3.50	$12,500	$10,000
Polk	3.50	$20,000	$15,000
Houston	3.42	$22,000	$15,000
Dodge	3.42	$35,000	$20,000
Nobles	3.33	$27,000	$20,000
Dakota	3.33	$35,000	$20,000
Marshall	3.20	$13,500	$10,000
Stephens	3.17	$10,000	$10,000
Lincoln	3.17	$30,000	$15,000
Yellow Med.	3.17	$30,000	$15,000
Pipestone	2.92	$11,250	$10,000
Sherburne	2.75	$7,500	$0
Freeborn	2.58	$8,000	$0
TOTAL		$503,750	$356,000

CCFUND2.WK1

WELL SEALING COST-SHARE GRANT PROGRAM

WELL CRITERIA OPTION

FUNDING RECOMMENDATIONS

COUNTY	AVE SCORE	REQUEST	RECOMMENDED FUNDING
Marshall	4.17	$19,511	$19,500
Brown	4.17	$6,855	$6,850
Mille Lacs	4.00	$2,750	$2,750
Dakota	3.83	$40,000	$35,000
Martin	3.83	$16,285	$16,300
Benton	3.83	$16,200	$16,200
Faribault	3.75	$27,506	$27,500
Pennington	3.50	$3,250	$3,250
Watonwan	3.33	$23,500	$23,500
Big Stone	3.00	$10,200	$10,200
Douglas	2.67	$7,000	$0
TOTAL		$173,057	$161,050

$750,000	-	Total well sealing funds
($356,000)	-	Recommended "county criteria" funding
($161,050)	-	Recommended "well criteria" funding (1/92)
$232,950	-	Remaining funds for "well criteria" grants

WCFUND.WK1

ABANDON ED WELL GRANT PROGRAMS

FUNDING RECOMMENDATIONS FOR WELL SEALING AND INVENTORY GRANTS

	COUNTY CRITERIA OPTION		WELL CRITERIA OPTION		INVENTORY		TOTAL
COUNTY	FUNDING REQUEST	RECOM. FUNDING	FUNDING REQUEST	RECOM. FUNDING	FUNDING REQUEST	RECOM. FUNDING	TOTAL RECOM.
Beltrami					$19,000	$18,500	$18,500
Benton			$16,200	$16,200	$10,000	$8,000	$24,200
Big Stone			$10,200	$10,200			$10,200
Blue Earth	$25,000	$20,000					$20,000
Brown	$10,000	$10,000	$6,855	$6,850			$16,850
Carleton					$6,600	$0	$0
Chippewa					$10,000	$0	$0
Clearwater					$4,000	$4,000	$4,000
Cottonwood					$12,975	$6,500	$6,500
Dakota	$35,000	$20,000	$35,000	$35,000	$25,000	$5,000	$60,000
Dodge	$35,000	$20,000					$20,000
Douglas			$7,000	$0			$0
Faribault			$27,506	$27,500			$27,500
Fillmore	$8,000	$8,000			$9,200	$9,000	$17,000
Freeborn	$8,000	$0					$0
Goodhue	$35,000	$25,000					$25,000
Hennepin	$30,000	$30,000			$35,000	$34,500	$64,500
Houston	$22,000	$15,000			$10,335	$10,000	$25,000
Hubbard					$7,000	$7,000	$7,000
Jackson	$20,000	$15,000			$23,380	$0	$15,000
Kanabec					$7,500	$0	$0
Lincoln	$30,000	$15,000					$15,000
Marshall	$13,500	$10,000	$19,511	$19,500			$29,500
Martin			$16,285	$16,300			$16,300
McLeod	$10,000	$8,000					$8,000
Mille Lacs			$2,750	$2,750	$6,500	$6,500	$9,250
Mower	$25,000	$20,000					$20,000
Nicollet					$7,000	$7,000	$7,000
Nobles	$27,000	$20,000					$20,000
Olmsted					$13,120	$13,000	$13,000
Pennington			$3,250	$3,250			$3,250
Pipestone	$11,250	$10,000					$10,000
Polk	$20,000	$15,000					$15,000
Ramsey					$8,500	$8,500	$8,500
Red Lake	$12,500	$10,000					$10,000
Sherburne	$7,500	$0					$0
Sibley					$6,200	$5,000	$5,000
Stearns	$20,000	$15,000			$20,000	$19,500	$34,500
Stephens	$10,000	$10,000					$10,000
Swift					$11,000	$0	$0
Wabasha	$34,000	$20,000			$20,000	$10,000	$30,000
Washington	$25,000	$25,000			$25,000	$15,000	$40,000
Watonwan			$23,500	$23,500			$23,500
Winona					$25,000	$13,000	$13,000
Yellow Med.	$30,000	$15,000					$15,000
TOTAL	**$503,750**	**$356,000**	**$168,057**	**$161,050**	**$322,310**	**$200,000**	**$717,050**

1/22/92
05-92

SALE OF BAYPORT STATE WILDLIFE MANAGEMENT AREA LANDS TO ANDERSEN CORPORATION

Jerry Larson, Andersen Corporation, and Roger Holmes and Kim Hennings, MN DNR, met with the Board of Water and Soil Resources (Board) at their May, 1991 meeting to discuss the proposed land exchange with Andersen Corporation involving 245 acres of state lands in the Bayport WMA, Washington County. Approximately 50 acres of marginal lands and one small wetland were identified on the state property that would be subject to a conservation easement under M.S. 103F.535 if exchanged or sold. Andersen Corporation was requesting a release of the conservation easements on the marginal lands after conveyance of the land. The Board directed their staff to work with Andersen on preparing a site development plan that addressed soil erosion and sediment control, storm water treatment, and protection of the wetland area.

Since the May meeting with the Board, it has been decided to pursue a legislative sale of the property directly to Andersen Corporation. Legislation is being drafted by the DNR authorizing the sale of the 245 acres to Andersen at current market value. The sale will still be subject to the requirements of M.S. 103F.535.

A site development plan has been completed by Andersen and copies have been provided to the Washington County SWCD and Board staff for review. Comments have been received on the plan from the Washington County SWCD.

A5

Action Requested: Preliminary approval, subject to final approval, of the site development plan developed by Andersen.

Metro Region Overview (page 1 of 3)

Profile of BWSR's Principal Metro Clientele

- 2 million people in 5 percent of land area
- 7 SWCDs
- 10 WDs
- 36 Joint Powers WMOs
- 7 counties
- 140+ cities and townships
- complex problems
- high land values
- high taxes
- leaders in innovative water resource management
  - **Eagan's water quality plan** (phosphorus reduction)
  - **Ramsey - Wash. - Metro WD** (detailed WL & basin mgt.)
  - **Basset Creek storm water tunnel** (USCE / mega bucks)
  - **Blackdog WMO's Crystal Lake project** (hypolimnetic withdrawal)
  - **Valley Branch WD** (under lake siphon pipe by-pass)
- local expenditures towards water & soil management

SWCD budgets	$1,715,000 (1990)
WD budgets	$3,845,000 (1989)
WMO budgets	$500,000 -$1,000,000 (estimate)

- city storm water utilities (Range = $1,500,000 to $500,000)
  (Eagan, Roseville, Shoreview, Maplegrove, Chanhassen, Bloomington)
- county local water planning levy

Some Accomplishments in 1991

- 16 WMO plans approved by BWSR
- 2nd through 8th draft of "509" rules developed
  - 6 public informational meetings
  - overview provided to Public Works Directors Conference
- Wetland Conservation Act outreach
  - 2 training sessions for SWCD staff & supervisors
  - numerous one on one discussions with client groups
  - "509" advisory group
- 4 issues of Urban Update published and distributed
- continued work with Anoka Sandplains project
- facilitated erosion control workshop (March)
- audit of Anoka SWCD
- erosion and sediment control handbooks reprinted
- survey sent to 300 WMO managers (see tentative results)
- participation in Lower Minnesota River Technical Advisory Group (LMRTAG)
- participation in Scott County annual planning meeting
- participation in development of NPDES storm water general permit

Tentative Work Plan for 1992

- analysis of WMO survey **(January)**
- report to Leg. Water Commission on metro water planning **(January)**
- establish Metro Region office & procedures **(February)**
- promulgate Metro Watershed Management Rules **(Jan. - Apr.)**
- assist in five training sessions on WCA **(February)**
- develop report on metro ditches report **(March)**
- 2 erosion control workshops **(March and May)**
  - Assoc. of General Contractors
  - International Erosion Control Assoc.
  - Assoc. of Metropolitan Soil & Water Cons. Districts
- attempt to facilitate development of a WMO association **(July)**
- regular program activities such as: **(Jan. - Dec.)**
  - continue review of draft 509 plans
  - review of metro county groundwater plans
  - coordination of cost-share & SLR grants
  - work on team assignments
  - Anoka Sandplains study
  - Urban Update
  - notification of non-functioning WMOs
  - general technical and program assistance
  - general coordination (LMRTAG, Anoka Sandplains Study, NPDES storm water permitting, Agencies, etc)

Potential Future Issues Facing BWSR

- 40% NPS reduction for Minnesota River by July, 1996
- Met Council interim program for Minnesota River
- Met Council's pollutant loading goals
- Met Council's groundwater supply plan (future system?)
- streamlining Metro water planning and implementation
- financing of WMO plan implementation
  - fees v. taxes
  - regional taxes
- role of BWSR grant funds
  - Should WMOs be allowed to apply directly?
  - Should BWSR promote monitoring, projects, studies?
- local turf battles
  - cities v. WDs
  - WDs v. SWCDs
  - SWCDs v. counties
- financing urban SWCD operations (fee v. county funding)
- BWSR relationship with Met Council
- should cities have a representative on BWSR?
- NPDES permits for storm water discharges

Potential Future Projects

- handbook on metro water planning financing options
- guidelines for compliance with Chap 160, Laws of 1991 (Reding Bill)
- model environmental management ordinance
- model 2nd generation 509 plan

a:metro.ol

STATUS OF METROPOLITAN WATER MANAGEMENT ACT PLANNING (509)
As of January 3, 1992
Prepared by the Minnesota Board of Water and Soil Resources

Plan Status Uncertain	Local Review In Progress	Met. Council Review in Progress	Agency Review In Progress	MBWSR Review In Progress	Plans Approved By BWSR	
Hazeltine-Bavaria	Cottage Grove Ravine		Carnelian-Marine	East Mississippi *	Ramsey-Wash. Metro	(9/12/86)
Middle Miss. River			Lower Minn. River	Nine Mile Creek *	Vadnais Lake	(4/07/87)
Upper Rum River				Riley-Purg.-Bluff Crk *	Grass Lake	(8/19/87)
Chaska Creek				Minnehaha Creek *	Valley Branch	(9/08/87)
					Pioneer Creek	(2/24/88)
					Elm Creek	(5/25/88)
					Coon Creek	(7/27/88)
					Six Cities	(7/27/88)
					Lower Mississippi R.	(7/26/89)
					Bassett Creek	(7/26/89)
					Gun Club Lake	(8/23/89)
					Vermillion River	(8/23/89)
					Black Dog	(11/22/89)
					Browns Creek	(1/24/90)
					Forest Lake	(2/28/90)
					Shingle Creek	(4/25/90)
					West Mississippi	(4/25/90)
					Rice Creek	(7/25/90)
					Richfield-Bloom	(1/23/91)
					Lower Rum River	(1/23/91)
					Central Ramsey	(3/27/91)
					Southwest Ramsey	(3/27/91)
					Bevens Creek	(3/27/91)
					Credit River	(3/27/91)
					Sand Creek	(4/24/91)
					Shakopee Basin	(4/24/91)
					Southwest Scott	(4/24/91)
					Middle St. Croix	(4/24/91)
					Prior L - Spring L	(5/22/91)
					Marine on St. Croix	(5/22/91)
					Lower St. Croix	(6/26/91)
					Carver Creek	(7/24/91)
					Sunrise River	(9/25/91)
					North Cannon River	(10/23/91)
					Crow River	(12/18/91)

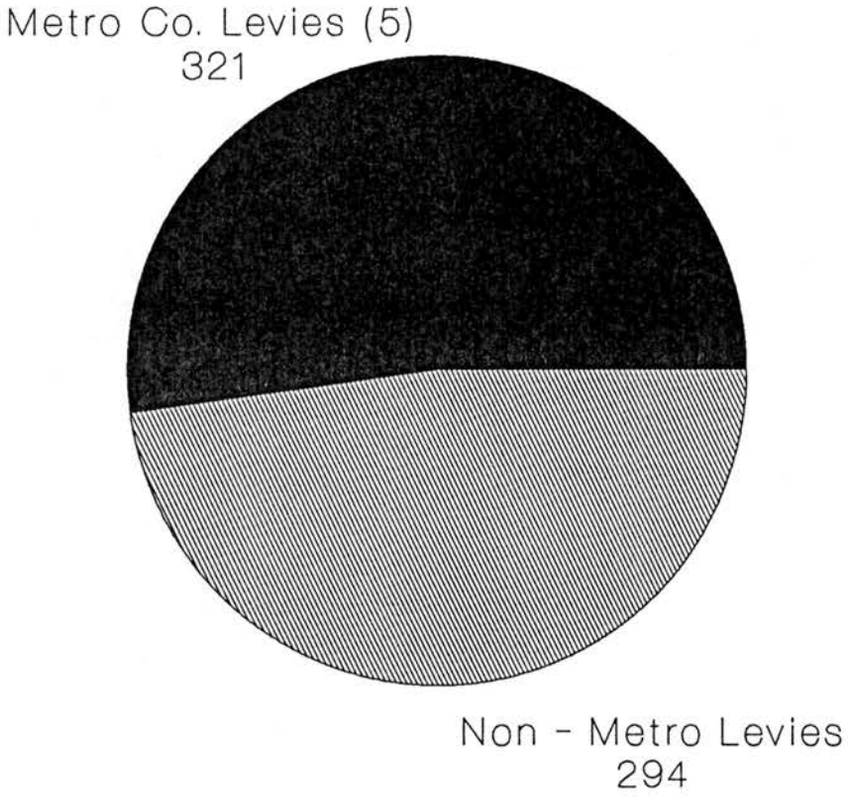
* = BWSR has taken formal position and is waiting for plan revisions.

Note 1: Some state agencies may be reviewing some plans concurrent with the BWSR review process but have not commented in writing.

Note 2: Any person noting errors in this status report are requested to contact Bruce Sandstrom at 297-4958 so that corrections can be made.

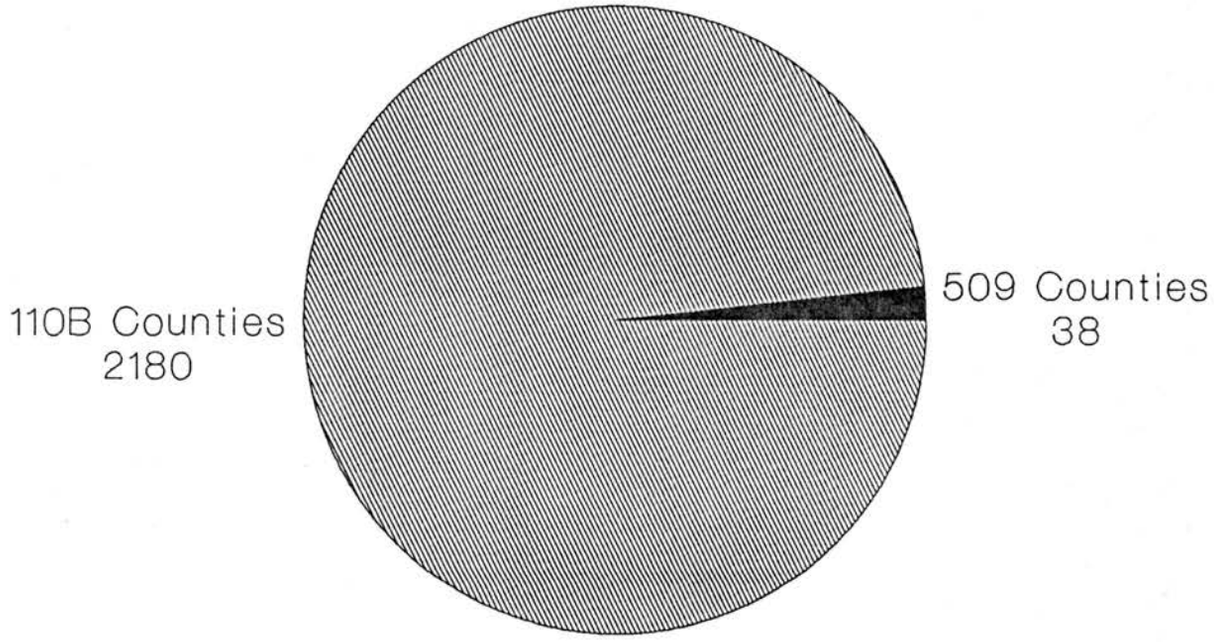
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BWSR

LWRPMP 1992 County Levies
Metro vs. Non-metro



(in thousands of dollars)

LWRPMP 1992 Grant Allocations
Metro vs. Non-metro



(in thousands of dollars)

Metropolitan Watershed Management Organization Survey
Minnesota Board of Water and Soil Resources

Purpose: The information provided by this survey will be used to help set program priorities for the Board of Water and Soil Resources and may be included in our annual status report on metropolitan water management which is due to the Legislative Water Commission on January 15 of each year (MS 103B.351).

Instructions: This survey is being sent to all members of WMOs the BWSR has on file. If you are no longer serving as a WMO board member, please indicate appropriately in question #1 and return the form in the self addressed envelope.

Tentative Results

Part A. - To be filled out by all WMO board members.

1. Answer one of the following:

[ ] I am currently a member of the _____ WMO (or WD). My name is _____. My title is ( ) President or Chair, ( ) Vice President or Vice Chair, ( ) Secretary, ( ) Treasurer or ( ) general member.

[ ] I am no longer a member of the _____ WMO (or WD), please take my name off your mailing list. My name is _____.

2. Please indicate which category best describes your relationship to the unit of government which appointed you.

a. [ ] elected local official – 18%
b. [ ] appointed local official – 25%
c. [ ] staff of appointing authority – 32%
d. [ ] citizen of appointing authority – 24%

3. The BWSR was required by the legislature to attempt to facilitate the formation of an association for metropolitan watershed management organizations. Do you support such a concept and effort?

[ ] yes, [ ] no, [ ] no opinion
59% 18% 18%

4. To what degree do you feel that the purpose of the Metropolitan Surface Water Management Act ("509") is being met?

[ ] mostly, [ ] somewhat, [ ] not at all
52% 45% 1%

5. What would your WMO benefit most from:

21% – a. [ ] BWSR sponsored training in specific areas of interest
20% – b. [ ] individualized assistance from BWSR in specific areas of interest
36% – c. [ ] both a. and b.
14% – d. [ ] neither a. or b.
9% – e. [ ] other: _____

6. If the BWSR were to sponsor training activities or provide direct assistance, how would you rank the importance of the following general areas of training or assistance where 5 = highest

Question #6 continued ...

and 0 = lowest priority? Note: each category listed may have the same priority.

Rank

1st → a. [ ] training on the implementation of the Wetland Conservation Act
4th → b. [ ] erosion control design
2nd → c. [ ] water quality monitoring design
7th → d. [ ] assistance on ordinance development
type of ordinance(s) _____)
2nd → e. [ ] methods of financing plan implementation
6th → f. [ ] water plan development / amendment assistance
3rd → g. [ ] training on the contents of the "509" rules (not yet adopted)
5th → h. [ ] implementation of best management practices
8th → i. [ ] WMO administrative options
9th → j. [ ] case histories on successful WMO projects or programs
k. [ ] other _____

Part B - To be filled out by only the president or chair of the WMO.

6. Enclosed is a blank information form to gather key information related to your organization. Please fill this out and return it along with this survey. If you are no longer the president or chair, please either fill the form in behalf of your president or chair or forward this survey to the current president for him or her to answer questions 6, 7 and 8. As soon as we have the 1992 directory available, we will send you a copy. We only update our directory once every two years so we appreciate your help in keeping our records accurate and available to the general public.

7. List the names of the cities and townships that have their local water plans approved by your WMO. (Attach additional pages as necessary.)

_____
_____
_____
_____

8. List the names of the cities and townships that have either submitted their local water plan for WMO approval or that the WMO believe's are working towards development of their local plan. (Attach additional pages as necessary.)

_____
_____
_____
_____

Wetland Session Registration Form

Date _____

Name _____

Address _____

City _____ Zip _____

County _____

Home Phone _____

Date Attending _____

City/Site Attending _____

Your affiliation:

_____ County Commissioner
_____ City Council
_____ SWCD Supervisior
_____ Watershed Manager
_____ Staff
_____ Other _____

Registration Fee: $10.00 (Lunch included)

Please make check payable to **MASWCD** and send to:



D'Wayne D. De Ziel,
Executive Director
MN Association of Soil and Water Conservation Districts
1884 Como Avenue
St. Paul, MN 55108

Phone: 612/649-1440 **Fax:** 612/645-7518

Dates for Wetland Sessions

Feb. 20-21, 25-28	**Brooklyn Park** 5800 85 Ave. N. (City Council Room)
Mar. 2	**Worthington** Communtiy College 1450 College Way (Auditorium)
Mar. 3	**Marshall** Southwest State HWY 23 and State Street (Auditorium) **Rochester** Communtiy College 851 30th Ave. SE (Memorial Hall #223)
Mar. 4	**Montevidio** Royal Inn Best Westen 207 N. 1st St. (Lower Level Rooms 5 & 6) **Rochester** Communtiy College 851 30th Ave. SE (Memorial Hall #223)
Mar. 5	**Waseca** University Campus 1000 University Drive S. W. (Auditorium)
Mar. 9	**Morris** University of Morris 4th and College Ave. (Conf. Auditorium) **Mankato** Mankato State Ellis & South Road (Conf. Auditorium)
Mar. 11	**Twin Valley** Community Center Pleasant Ave. South West **Redwood Falls** Armory 530 HWY 101 N.
Mar. 12	**Fergus Falls** Community College 1414 College Way (Waage Theatre) **Willmar** Holiday Inn 2100 E. HWY 12
Mar. 13	**Brainerd** Holiday Inn 2115 S. 6th Street
Mar. 16	**Bemidji** Holiday Inn Hwy 2 West **Hinkley** Tobies Restaurant I 35 E Intersection
Mar. 17	**Thief River Falls** (Registrants will be contacted)
Mar. 18	**Virginia** Mesabi Community College 9th & W Chestnut
Mar. 23, 24	**St. Cloud** St. Cloud State S. 3rd Ave. (Atwood Theatre) **Duluth** Duluth Entertainment and Convention Center(DECC) 350 Harbor Drive (Gooseberry Room, Lower Level)

Meetings will be held from 9:00 A.M - 3:00 PM

WETLANDS, WETLANDS, WETLANDS.

THAT'S ALL I HEAR ABOUT, AND NOW YOU WANT ME TO ATTEND A WETLAND SESSION... ARE YOU **CRAZY?**



Heh, Heh, Heh, we know you're swamped, inundated, busy up to your eyeballs! But this is another task that is being handed down to you... and you will be responsible!

So in order to make life easier, we're coming to your area to help you gain wetland knowledge. Through up-to-the minute discussions and lectures, you'll have the best in current information about the wetland interim program.

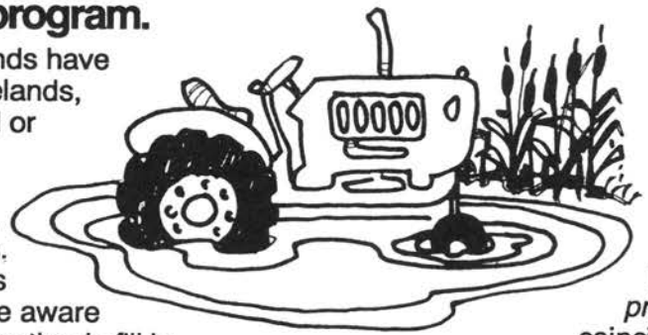
For many years, wetlands have been considered wastelands, and have been drained or filled to make way for development and agricultural production. Over the last few years. however, the public has become more and more aware of the important niche wetlands fill in our ecological system. This increased awareness about wetlands led the legislature to approve the Wetland Conservation Act of 1991 in order to expand the net gain in the number of Minnesota wetlands.

How does this process affect me and why do I need to attend this session?

The interim program, beginning January 1, 1992 and continuing through July 1, 1993, is the first of two phases involved with the Minnesota Wetland Conservation Act. This interim program contains regulatory provisions and prohibits wetland alteration.

This session will better define your responsibilities with the interim program and answer any questions you may have on the interim guidelines.

As you probably know, this process is designed so local government units (LGUs) have the opportunity to decide who will administer the interim program.



Since the law restricts who can administer the permanent program, we suggest that your *interim program structure* coincide with the *permanent program structure* when possible. The following will have regulatory authority and will be eligible to administer the **permanent program**.

A. Metro area — (Within 7 county metro area) Cities, townships, and water management organizations.

B. Greater Minnesota — (Outside the 7 county metro area) City Councils or Boards of Commissioners.

Therefore, we suggest that you choose one of the LGUs listed above to administer the interim program.

Things to Know

The legislature designated the Soil and Water Conservation Districts (SWCD) to serve as a "Clearinghouse" for information in the Act. SWCD's will:

A. Serve as technical experts to LGUs.

B. Provide "one stop shopping" for wetland permits. The bill states, "persons planning to conduct activities that may affect wetlands should first consult their local Soil and Water Conservation District (SWCD) office." SWCD's may refer you to the Corp. of Engineer, DNR etc, for permits.

C. Maintain National Wetlands Inventory (NWI) maps prepared by the United States Soil Conservation Service and other available maps that provide useful information.

D. **Not** have regulatory authority.

Sponsors of this event:

The legislature mandated that the Minnesota Association of Soil and Water Conservation Districts (MASWCD) provide education and training on the act to local government officials. The Minnesota Board of Water and Soil Resources (BWSR) is involved with the technical aspects of training and the logistics of the interim process. MASWCD is working closely with BWSR, as well as other involved state agencies, in coordinating the training sessions.



January 15, 1992

Dear Friends of Conservation:

The Minnesota Association of Soil and Water Conservation Districts (MASWCD) through the state legislature received a grant of $100,000 for the 1992 fiscal year. The purpose of the grant is for education and training of local government officials about the Minnesota Wetland Conservation Act.

I hope that you can find the time to help us. Training will be done on the local level; unfortunately, I am limited on the number of persons to be trained. My goal is to have one SWCD Supervisor and employee, one County Commissioner, employee and auditor, one Watershed manager and employee, member of Watershed Management Organization, all Legislators, Mayor, Councilmember, Sheriff, and a DNR Conservation Officer to attend per county.

Ideally, the person(s) appointed must be capable of accepting responsibility of wetlands throughout the interim process and proficient in communicating the new information. **Please circulate this information within your office. Since we have to limit the number of attendees, the registration brochure must go to the appropriate person(s) that would meet the above criteria!** Enclosed is the registration brochure with a list of the 25 meeting sights. I have room for 200 people per meeting, therefore, if a registration form arrives late and the meeting is full, we will contact that person and ask him\her to choose a different meeting sight.

The meetings will go from 9:00 a.m. - 3:00 p.m. and lunch will be provided. Further information may be provided if necessary.

Thank you for your cooperation; if you have any questions please call the office at 649-1440.

Sincerely,

D'Wayne De Ziel SA

D'Wayne De Ziel
Executive Director

Minnesota Association of Soil and Water Conservation Districts
1884 Como Avenue • Suite 25 • St. Paul, Minnesota 55108 • 612-649-1440 • Fax: 612-645-7518

Minnesota Board of Water and Soil Resources
155 S. Wabasha, Suite 104 • St. Paul, Minnesota 55107 • 612-296-3767 • Fax: 612-297-5615

Clearwater
River
Watershed
District

Dedication

The Board of Managers of the Clearwater River Watershed District, in recognition of his contributions and sincere commitment to the restoration of the quality of the lakes and streams within our District, and in appreciation of his friendship to us and our environment, dedicate this brochure to the memory of David G. Winters, former Manager and Secretary-Treasurer, who died June 12, 1985.

Clearwater River Watershed District

Background and Beginnings

The area encompassed by the Clearwater River Watershed District (CRWD) is rich in soil and water resources. The presence of those abundances has encouraged the growth of two economic mainstays in this Central Minnesota territory — farming and tourism. Around these basics have grown the communities that support their needs.

As population and industry grow, those priceless resources, which we often take for granted, may deteriorate.

A number of years ago, those who fished and enjoyed the waters of the Clearwater Chain of Lakes began to notice a decrease in the clarity of those waters, an increase in the number of rough fish (bullheads and carp), and an increase in the growth of algae on the surface of the water. Studies showed that the lakes were nutrient-rich — they were polluted with phosphorus in amounts many times higher than the norm.

The lakes through which the Clearwater River flowed were aging much too quickly. That process, which is a natural phenomenon called "eutrophication," was being helped along at an alarming rate via runoff from cities, farmland, private septic systems, and industry.

The Clearwater River Watershed District was established as a unit of local government on April 9, 1975, by order of the Minnesota Water Resources Board, acting under authority of Chapter 112, MSA (the Minnesota Watershed Act).

The waters of Clearwater Lake were first tested in 1946. In the late 1960s and early 1970s, because water clarity seemed to be diminishing, property owners sought new tests from scientists interested in water quality. Those tests revealed that the nutrient content of the water had increased substantially since 1946 — phosphorus was coming into the lake at a rate almost double the rate considered damaging. Further reports concluded that the rate of phosphorus input could be reduced by as much as fifty percent if the cities of Watkins, Kimball, and Annandale, and the Modern Craftsmen's Milk Association of Watkins installed on-land waste treatment systems instead of discharging sewage and industrial effluents into the Clearwater River and Warner Creek. If, in addition, the phosphorus input

from all nonpoint sources, such as septic tanks, agricultural wastes, storm water runoff, and soil erosion could be significantly reduced, the water quality in the watershed could be restored to an acceptable level.

After a lengthy series of meetings and legal research, those concerned came to the conclusion that only a watershed district, with its powers of enforcement and its abilities to assess and to obtain federal and state funding, could tackle the pollution problem in the Chain of Lakes. The Clearwater River Watershed District was the culmination of years of hard work, and the beginning of many more years of work aimed at undoing some of the damage done over a long period of time to one of our most important resources — our lakes and streams.

Though the original thrust of the CRWD and its five-member Board of Managers was the improvement of water quality in the Clearwater River and Chain of Lakes, its scope has grown into a complete program of water management within its boundaries.

As you read the following pages, we hope a picture of the operations and the nature and range of projects undertaken by the watershed district on behalf of the environment and its inhabitants will become clear to you.

The Board of Managers

The Clearwater River Watershed District is governed by a five-member Board of Managers. The Managers serve three-year terms on a staggered basis. Two are appointed by the Wright County Board of Commissioners, two by the Stearns County Board, and one by the Meeker County Board. (The largest portion of the district lies in Wright and Stearns Counties, with a smaller portion in Meeker.) The powers and duties of watershed districts and their boards of managers are set forth in Minnesota Statute 112.

Regular meetings of the CRWD Board of Managers are held on the second Wednesday of each month at 8:00 p.m. at the elementary school in Annandale, Minnesota, and are open to the public. Meeting notices and minutes are published in the Annandale, Kimball, and Watkins weekly papers.

CRWD Business Office

The Clearwater River Watershed District maintains an office at the Midtown 55 Building, Highway 55 on South Cherry Avenue, Annandale. The mailing address for the watershed district is: Box 481, Annandale, MN 55302. Phone 612/274-3935. The phone is answered during normal business hours. Copies of all CRWD public documents are on file at the District's office.

Plans, Rules, and Regulations

Two important documents underlie the conduct of CRWD business: the Overall Plan is a comprehensive statement of management philosophy, policies, and programs for the watershed pursuant to objectives stated in the enabling legislation. This plan was formally adopted by the Minnesota Water Resources Board in 1976. It is updated every five years, and a copy is on file in the CRWD office, as well as in the public libraries or city halls of Annandale, Kimball, and Watkins.

Watershed Rules and Regulations delineate specific requirements and administrative procedures for implementing the Overall Plan and for achieving the purposes of the District on a continuing basis. Copies of the current regulations may be obtained by writing or phoning the CRWD office.

The Watershed Area

The Clearwater River Watershed District encompasses the entire drainage area of the Clearwater River — about 159 square miles. It includes portions of Meeker, Stearns, and Wright Counties in Central Minnesota, and the municipalities of Watkins, Kimball, and Annandale, as well as all or parts of various townships.

The lakes through which the Clearwater River flows are divided into an Upper and Lower Chain by the Fair Haven dam. The Upper Chain includes Lakes Betsy, Union, Scott, Louisa, Marie, and Millpond. The Lower Chain includes Lakes Caroline, Augusta, Clearwater, Grass, and Wiegand. Other major lakes in the District are: Clear Lake, Willow Lake, School Section Lake, Pleasant Lake, Cedar Lake, Bass Lake, Swart Watts Lake, Albion Lake, and Otter Lake.

The Clearwater River begins southwest of Watkins and is joined by a tributary known as County Ditch 20 as it meanders south, then east, where it enters the Upper Chain of Lakes. It flows north and under State Highway 55 between Kimball and South Haven, then the general direction of flow through the chain is east, then northeast out of Clearwater Lake, through Grass and Wiegand Lakes, and on into the mighty Mississippi at the City of Clearwater. (See map, center section of this brochure.)

Cooperative Efforts

Over its several years of existence, the CRWD has methodically formed working relationships, and sometimes partnerships, with other governmental units and agencies, as well as with groups of private property owners. These relationships, built on common need and a growing trust in the abilities and motives in both sectors, have been mutually gratifying and productive, accomplishing efficiently now what might have taken months or years and an abundance of red tape only a short time ago.

The Planning and Zoning Departments of Wright, Stearns, and Meeker Counties routinely screen permit applications, looking for those that could have adverse impact on water quality, and sending those to the CRWD for comments and conditions. County Sanitarians carefully check septic system plans, and cooperate with the CRWD in making sure those systems won't pollute. The counties now have Shoreland Management Ordinances to protect their lakes and streams. The County and State Highway Departments submit plans for highway and bridge maintenance to the CRWD for approval. Farmers seeking tiling permits appear before the Board of Managers for engineering advice and approval. The CRWD and the County Soil and Water Conservation Districts cooperate to plan for proper drainage of farmland to prevent erosion and excess runoff. Various lake property owners associations have worked with the CRWD to undertake lake level and bog removal projects. And, individuals appear at CRWD meetings to ask for help, to voice opinions, state criticisms, or just to listen.

What Can You Do?

Our water resources are vitally important to our health, to our economies, and to our senses. You can help maintain and improve the quality of our lakes, streams, and groundwater by keeping shorelines neat and free from debris, by always being aware of the consequences of your actions — simple things such as overfertilizing your lawn, removing vegetation from a slope, running crop rows in the wrong direction, picking cattails, filling a marshy spot, spilling gas and oil from an outboard motor, or taking more than your limit of game fish might seem insignificant, but, when added together, can cause damage to our precious waters.

If you are unsure if a project you intend to undertake might require a CRWD permit, please call the office — the Watershed District is not in the business of denying your rights to use your property, but it would like to help you accomplish your goals without damage to the environment or to neighboring or downstream properties!

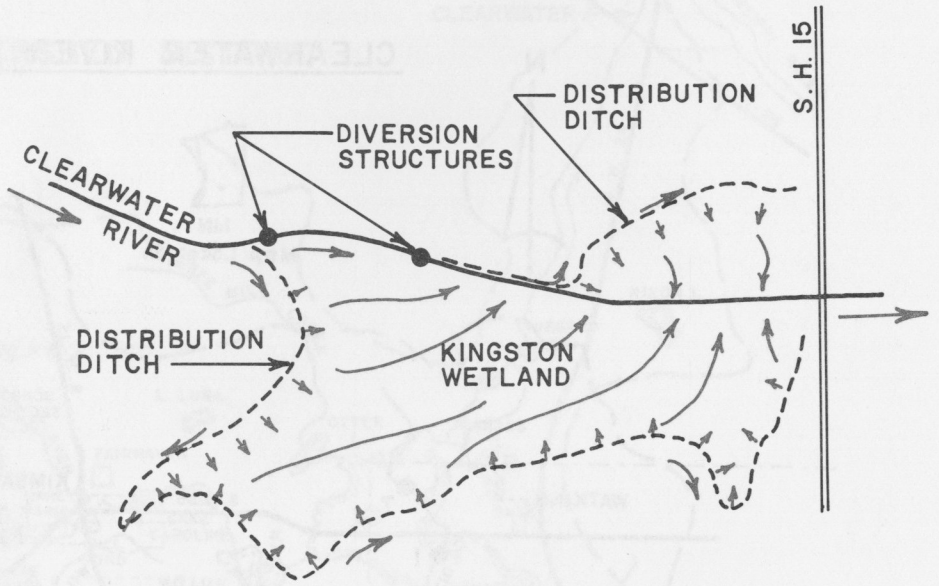
Projects of
The Clearwater River Watershed District

Clearwater River Chain of Lakes Restoration Project

The Clearwater River Chain of Lakes Restoration Project is a series of eight lake and watershed restoration measures undertaken to improve the water quality of the Clearwater River Chain of Lakes. The lakes which will benefit from the project include Clearwater Lake, Grass Lake, Lake Augusta, Lake Caroline, Millpond, Lake Marie, Lake Louisa, Scott Lake, and Lake Betsy. The eight projects are described briefly below and on the following pages.

Wetland Treatment Systems. Wetlands are natural traps for phosphorus and other nutrients which promote over-abundant algae in lakes. The nutrient entrapment can be increased by forcing the inflowing water to spread over the whole wetland (rather than following a channel) when flows are moderate or low. This is the principle of the three wetland treatment systems that form the backbone of the lake restoration project.

The County Ditch 20 Wetland Treatment System contains approximately 40 acres of wetlands which are served by a diversion structure and two channels. A total of approximately 7,000 feet of diversion channels distributes the contaminated runoff over the wetland. The approximate expense of this project is $200,000 and it was completed in late 1984. This wetland is expected to remove approximately 600 pounds of phosphorus annually.

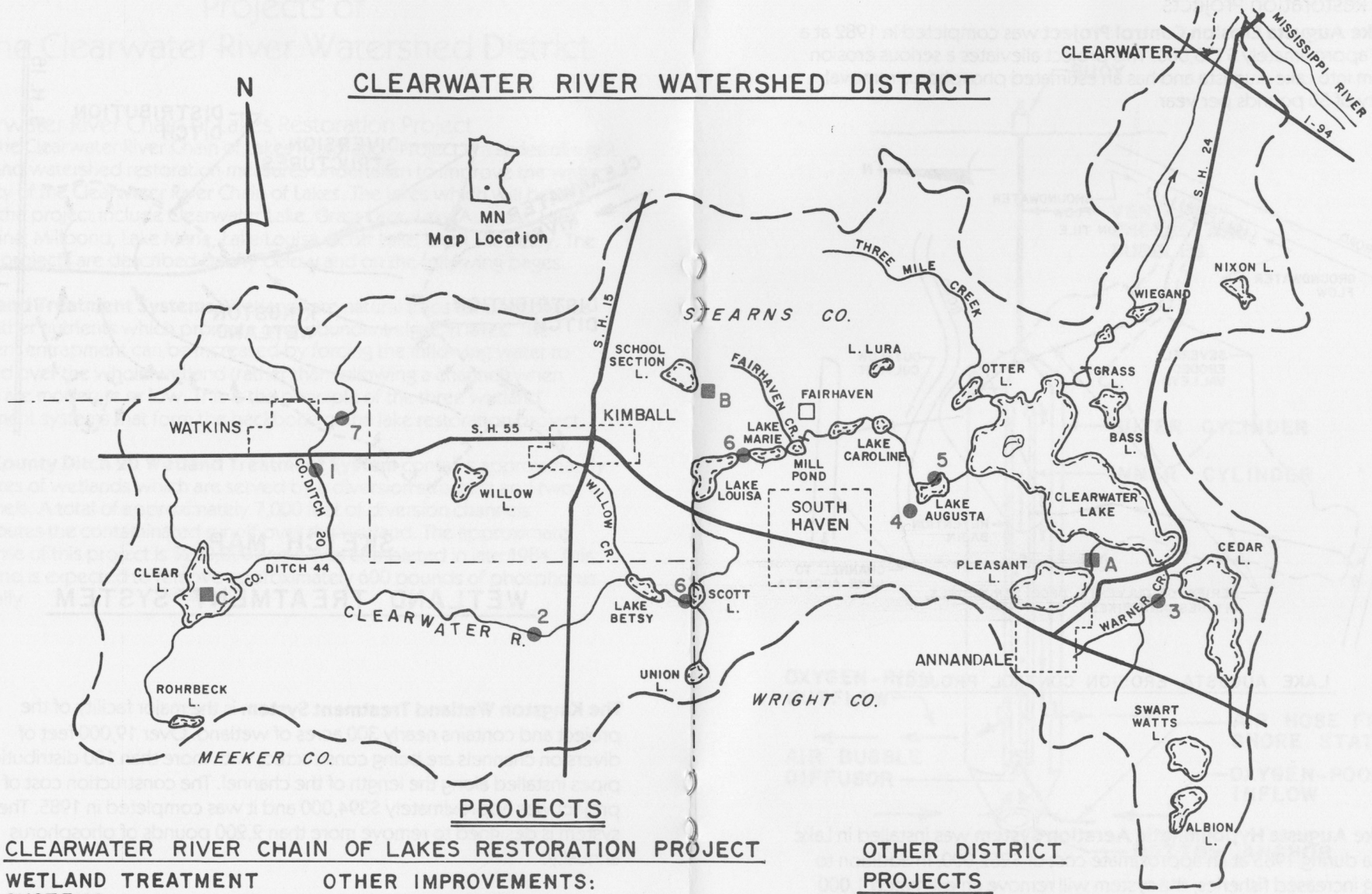


SKETCH MAP

WETLAND TREATMENT SYSTEM

The Kingston Wetland Treatment System is the major facility of the project and contains nearly 300 acres of wetland. Over 19,000 feet of diversion channels are being constructed, with more than 150 distribution pipes installed along the length of the channel. The construction cost of this project was approximately $394,000 and it was completed in 1985. The system is designed to remove more than 2,200 pounds of phosphorus annually.

The Annandale Wetland Treatment System consists of approximately 40 acres of wetlands in two locations, with 4,600 feet of diversion ditches. The approximate construction expense of this project is $120,000 and it was completed in late 1984, with an expected phosphorus removal capacity of 300 pounds per year.



PROJECTS

CLEARWATER RIVER CHAIN OF LAKES RESTORATION PROJECT

WETLAND TREATMENT SYSTEMS:

- 1 ● CO. DITCH 20
- 2 ● KINGSTON
- 3 ● ANNANDALE

OTHER IMPROVEMENTS:

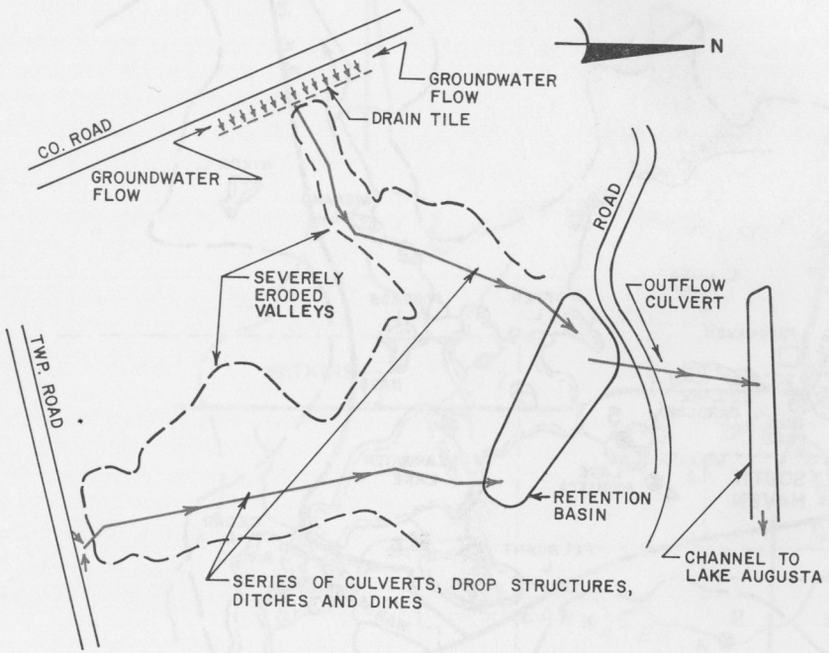
- 4 ● L. AUGUSTA EROSION CONTROL
- 5 ● L. AUGUSTA HYPOLIMNETIC AERATION
- 6 ● UPPER LAKES AERATION & FISH REMOVAL
- 7 ● UPPER WATKINS WETLAND ISOLATION
- ● NON-POINT POLLUTION ABATEMENT (various locations-not shown)

OTHER DISTRICT PROJECTS

- A ■ PLEASANT L. OUTLET
- B ■ SCHOOL SECTION L. OUTLET
- ■ BOG CONTROL PROJECT (various lakes-not shown)
- C ■ CLEAR LAKE PROJECT

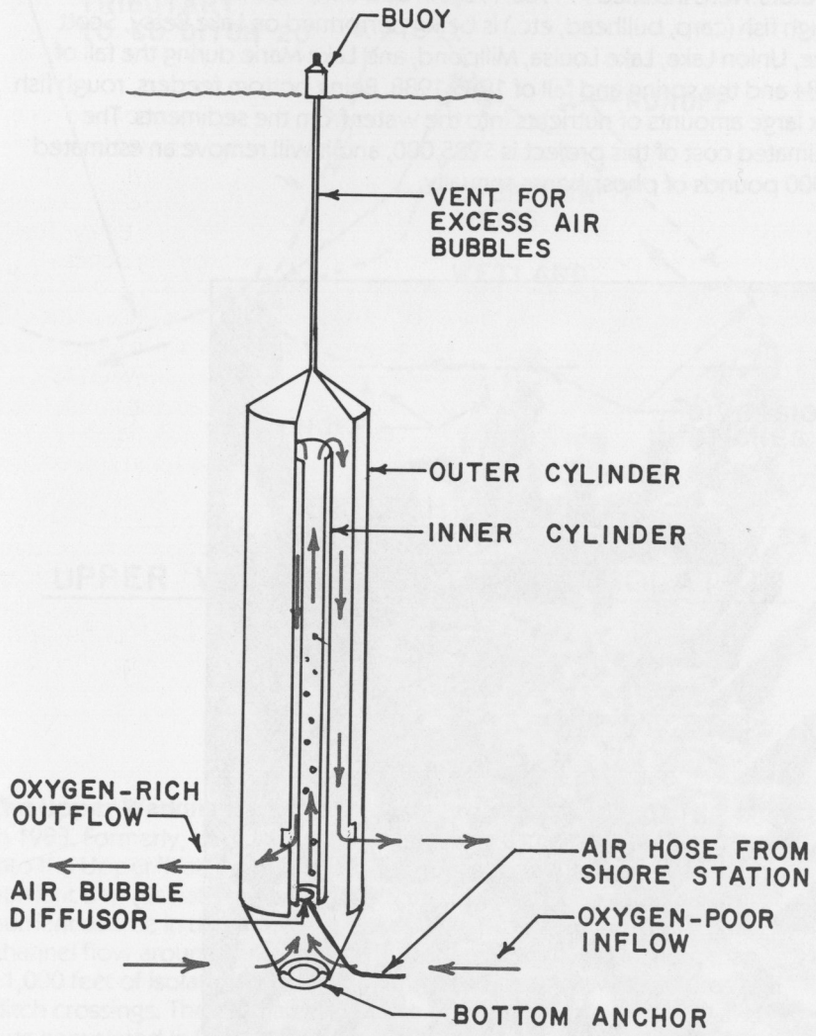
Other Restoration Projects

The Lake Augusta Erosion Control Project was completed in 1982 at a cost of approximately $133,000. This project alleviates a serious erosion problem into Lake Augusta and has an estimated phosphorus removal capacity of 50 pounds per year.



LAKE AUGUSTA EROSION CONTROL PROJECT

The Lake Augusta Hypolimnetic Aeration System was installed in Lake Augusta during 1985 at an approximate cost of $262,000. In addition to assuring increased fisheries, the system will remove an estimated 1,000 pounds of phosphorus annually by maintaining near-bottom oxygen and thereby suppressing phosphorus release from the sediments.



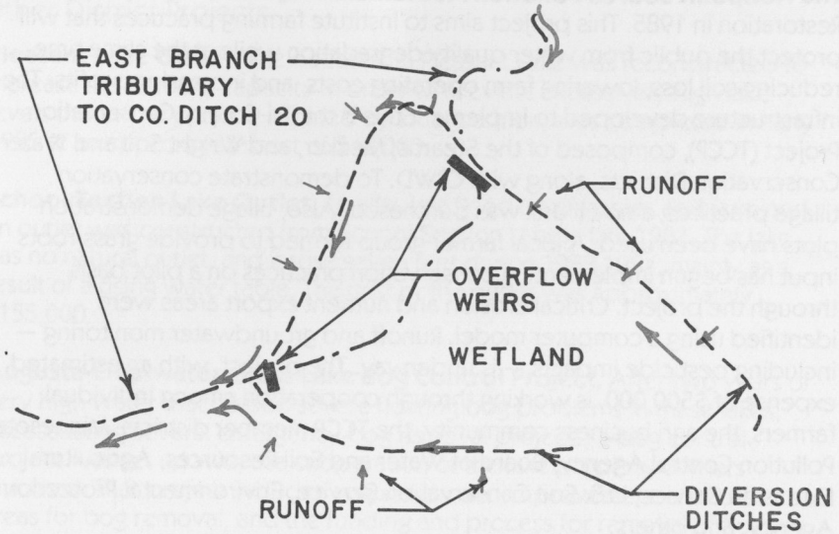
CUTAWAY VIEW

HYPOLIMNETIC AERATOR

(AFTER ATLAS-COPCO)

The Upper Lakes Aeration and Mechanical Fish Removal Project anticipates the hypolimnetic aeration of Lakes Louisa and Marie. These aerators were installed in 1985-1986. In addition, mechanical removal of rough fish (carp, bullhead, etc.) is being performed on Lake Betsy, Scott Lake, Union Lake, Lake Louisa, Millpond, and Lake Marie during the fall of 1984 and the spring and fall of 1985-1988. Being bottom feeders, rough fish mix large amounts of nutrients into the water from the sediments. The estimated cost of this project is $285,000, and it will remove an estimated 1,000 pounds of phosphorus annually.





SKETCH MAP

UPPER WATKINS WETLAND ISOLATION

The Upper Watkins Wetland Isolation Project was added to the project in 1983. Formerly, untreated wastewater from a cheese plant discharged into the Upper Watkins Wetland. This transformed the wetland from a nutrient trap (its natural state) into a nutrient source — in fact, the largest nutrient source in the entire watershed. The project diverts runoff and channel flow around the edge of the wetland and includes more than 11,000 feet of isolation dikes and channels plus overflow structures and ditch crossings. The estimated expense of this project is $460,000 and it was completed in late 1984.

The Nonpoint Source Pollution Abatement Project was added to the Restoration in 1985. This project aims to institute farming practices that will protect the public from water quality degradation while at the same time reducing soil loss, lowering farm operating costs, and increasing profits. The infrastructure developed to implement this is the Tri-County Conservation Project (TCCP), composed of the Stearns, Meeker, and Wright Soil and Water Conservation Districts, along with CRWD. To demonstrate conservation tillage practices, a no-till drill was purchased. Also, tillage demonstration plots have been used. A local farmer group formed to provide grass-roots input has begun implementing conservation practices on a pilot basis through the project. Critical erosion and nutrient export areas were identified using a computer model. Runoff and groundwater monitoring — including pesticide impacts — is underway. The project, with an estimated expense of $500,000, is working through cooperation among individual farmers, the agri-business community, the TCCP member districts, Minnesota Pollution Control Agency, Board of Water and Soil Resources, Agricultural Extension Service, U.S. Soil Conservation Service, Environmental Protection Agency, and others.

Monitoring Program. Since 1981 a monitoring program including lake and stream water quality, stream flows, and precipitation (beginning in 1983) has been a part of the lake restoration project. The monitoring program helped bring about important modifications, including the addition of the Upper Watkins Wetland Isolation and the Nonpoint Source Pollution Abatement Projects.

Other District Projects

Pleasant Lake Outlet. The outlet from Pleasant Lake was reconstructed to increase the outflow capacity in order to alleviate excessively high lake levels there. The project, initiated by local petition, was completed in early 1985 at an approximate cost of $48,000.

School Section Lake Outlet. To alleviate flooding of homes and farmland, an outlet was constructed from School Section Lake in late 1984. The lake has no natural outlet, and it rose seven feet during 1983-1984, mainly as a result of a rising water table. The cost of the outlet was approximately $155,000.

Augusta-Clearwater-Grass Lake Bog Control Project. After two years of very high water that caused severe floating bog problems in these lakes, necessitating several emergency bog removal projects, a bog control project was set up with the cooperation of the lake property owners involved. That project includes acquisition and improvement of access areas for bog removal, and the funding and process for removal of floating bogs deemed harmful. Estimated cost for the project is $17,000. It is scheduled to be on line in the summer of 1985.

Clear Lake Restoration Project. Accelerated reduction of water quality in Clear Lake during the past several years prompted the property owners around Clear Lake to file a petition in 1987 with the District to correct the problem. In response, the District will begin a diagnostic and feasibility study in 1988 to investigate the causes of the lake's problems and determine the appropriate remedial action. The estimated project cost is $46,000.

Milestones

1975 Clearwater River Watershed District formed.

1978 The Modern Craftsmen's Milk Association installed on-land spray irrigation equipment and holding ponds on land adjacent to its cheese making plant in Watkins, in the hope of reducing to zero the phosphorus it discharged into the Clearwater River.

1980 Funding was granted by the Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) for the Clearwater River Chain of Lakes Restoration Project, in the amount of $2.4 million. (Funding was 50 percent federal, 25 percent state, and 25 percent from local property owners determined to directly benefit from the cleanup of the lakes.) Several projects were included in the Restoration — those projects are defined in words and diagrams in this brochure.

1980 Annandale municipal on-land spray irrigation sewage treatment plant went on line, effectively reducing to zero the amount of phosphorus discharged from that city's sewage.

1982 Lake August Erosion Control Project completed.

1983 The City of Watkins put on line its new on-land sewage treatment plant, reducing to zero its sewage pollution of the watershed.

1984 Beginning of rough fish removal in the Chain of Lakes.

1984 Upper Watkins Wetland Isolation Project completed.

1984 School Section Lake Flood Control Project completed.

1985 Kimball municipal on-land sewage treatment plant went on line, eliminating that city's pollution of the Clearwater River.

1985 Wetland Treatment Systems on line.

1985 Pleasant Lake Level Project completed.

1985 Bog Removal and Maintenance Project in effect.

1985 EPA and MPCA approval of additional Restoration Project funds to be used in a cooperative effort with Soil and Water Conservation Districts and other agencies to abate nonpoint source pollution. The current total Restoration Project now stands at $3,330,000. The grant has been extended to 1990.

1985 Installation of aeration equipment in Lakes Augusta, Marie, and Louisa.

1986 Tri-County Conservation Project (TCCP) developed to abate non-point source pollution.

1986 No-till drill purchased and began operating under TCCP.

1987 Pilot implementation of conservation practices began through TCCP Farmer Project Committee.

1987 Operation and maintenance budget instituted for Clearwater River Chain of Lakes Restoration Project.

Clearwater River Watershed District Board of Managers:

Donald Markwardt, President
Roland Froyen, Vice President
Doris Wynia, Secretary-Treasurer
Clarence Klein
Norman Osterby

Engineer: Wenck Associates, Inc.
Attorney: Hall, Byers, Hanson, Steil & Weinberger, P.A.

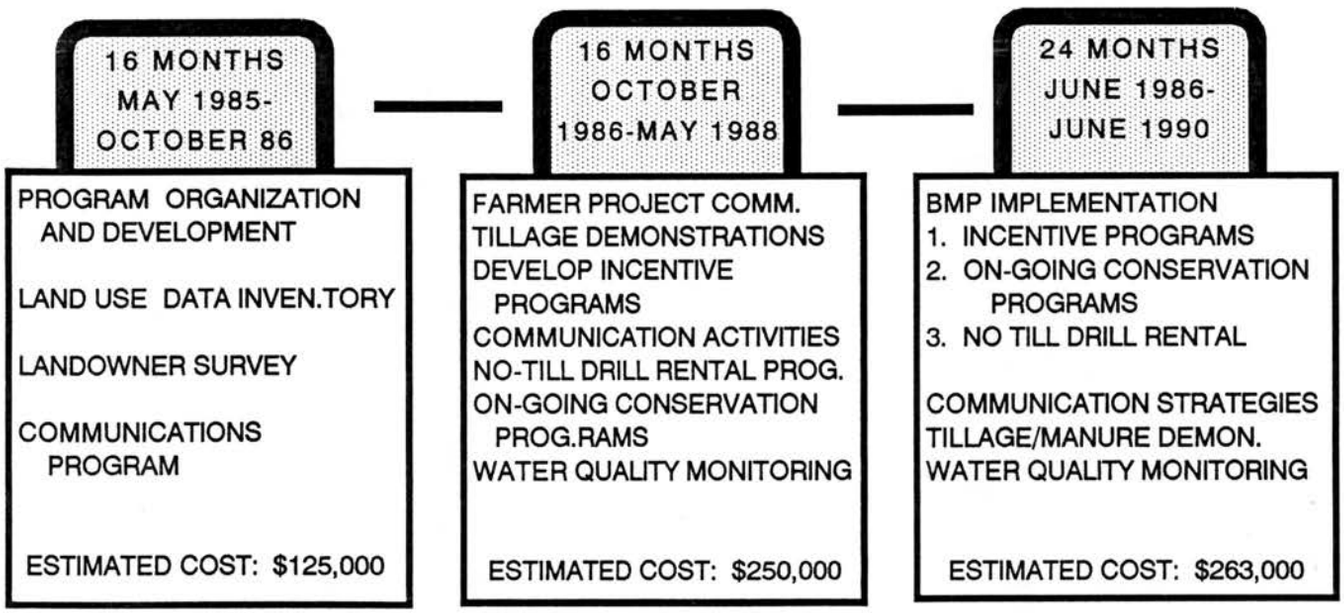
Revised 1988

Clearwater River Watershed District
Box 481
Annandale, Minnesota 55302
Phone 612/274-3935

TCCP TIME FRAME

FIVE YEAR PROJECT
1985-1990

TOTAL PROJECT COST
$638,000



SOURCES OF FUNDS	CASH	INKIND
EPA CLEAN LAKES GRANT	260,000	
LCMR LAKE RESTORATION GRANT	20,000	
CMIF COMMUNICATIONS GRANTS	5,000	
CRWD	80,000	
LOCAL CONTRIBUTIONS	8,000	
BWSR/LCMR COMMUNICATIONS GRANT		39,000
STATE COST-SHARE FUNDS		39,000
STATE RIM FUNDS		81,000
U OF M RESEARCH/DEMONSTRATION		6,000
SWCD SUPPORT/STAFF		64,000
FARMER INPUT		36,000
TOTALS	$ 372,000	$ 265,000

TOTAL PROJECT CONTRIBUTIONS = $ 638,000

CLEARWATER RIVER NPS LAKE RESTORATION PROJECT

EPA CLEAN LAKES PROGRAM GRANT

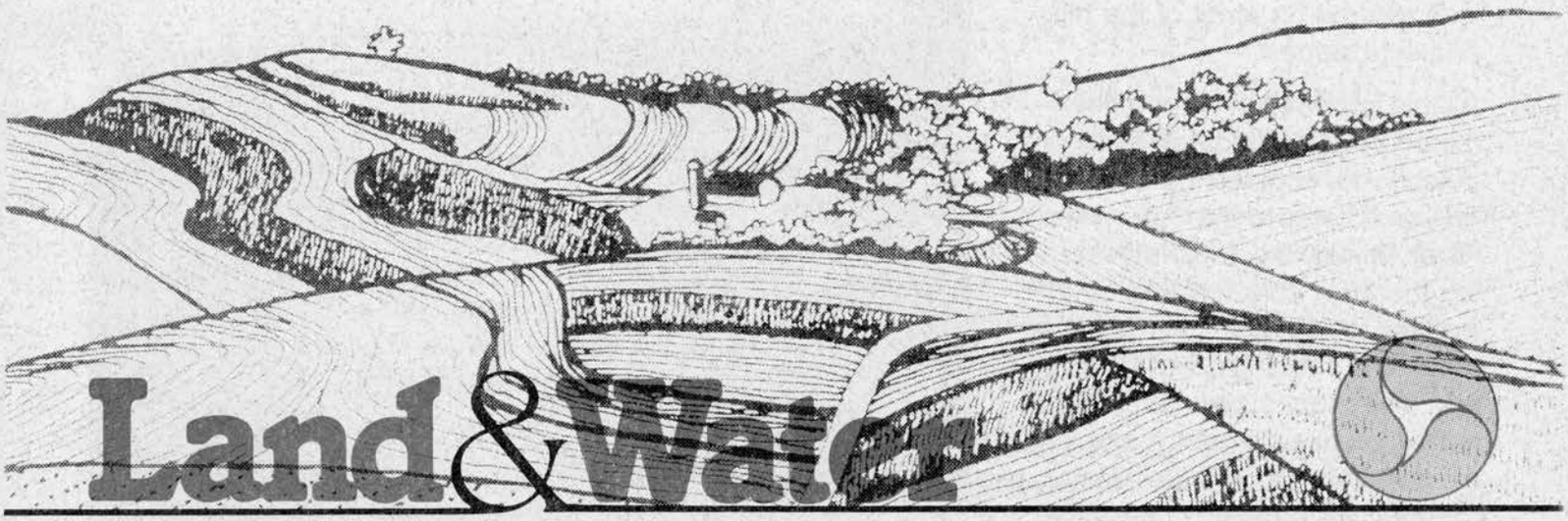
JULY 1, 1990 TO JUNE 30, 1993

INCENTIVE PROGRAM	GOAL		TO DATE	
Minimum Till Program	15	Operators	9	Operators
Ridge Till Program	3	Operators	0	Operators
Field Strips	750	Acres	35	Acres
Nutrient Management	13	Operators	3	Operators
RIM Incenrtive	200	Acres	250	Acres
Animal Waste Control & Management Systems	10	Systems	4	Systems

Implementation Grant Funds Totals $191,500

SOURCES	GRANT	ELIGIBLE MATCH	INELIGIBLE MATCH
EPA Clean Lakes Program	399,400		
CRWD Cash Funds		36,600	
SWCD Cash Funds		21,000	
Local Contributions		500	
SWCD Assistance/Support		43,000	
State Cost-Share		30,000	
State RIM Funds		100,000	
U of M Faculty/Assistance		46,000	
Farmer Input		196,300	
USDA SCS Assistance			32,600
ASCS ACP Cost-Share			194,000
Totals	$ 399,400	$ 473,400	$ 226,600

Total Project Cost = $ 1,099,400



Land & Water

Tri-County Conservation Project Newsletter Winter 1992

Mick Adams Restores Wetland Through the RIM Program

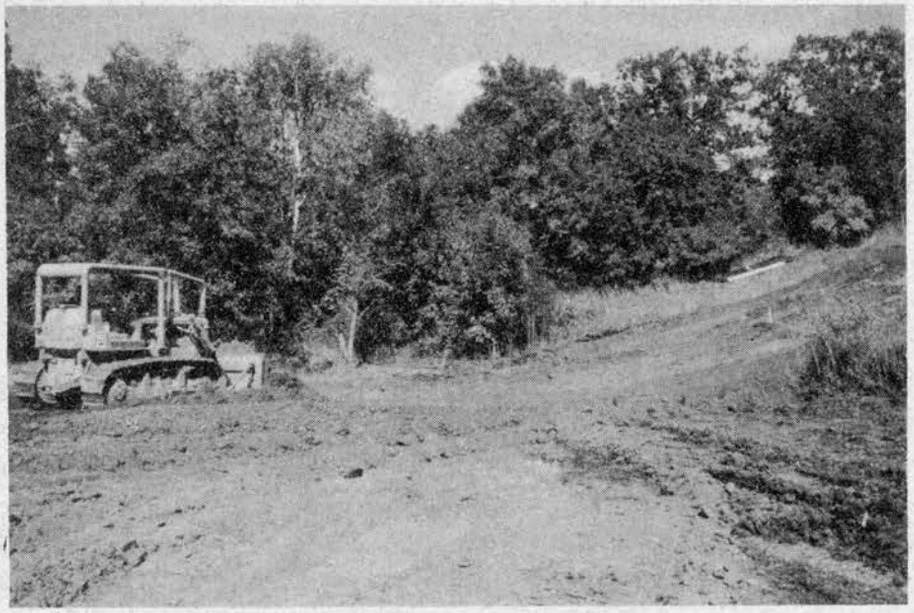
By Mark Lindhorst, TCCP Technician

The Wright County Soil and Water Conservation District's (SWCD) top priority 1990 RIM application was with Mick Adams. Adams owns land in the Clearwater River Watershed District and is in the trucking business. "I became interested after reading a news article in the paper about the RIM program and the added incentive", Adams explained.

RIM (Reinvest In Minnesota) is a land retirement program to reestablish wetland and wildlife areas throughout the state to help improve habitat and water quality. The Tri-County Conservation Project developed a local incentive bonus payment of $250/acre in addition to the regular RIM Reserve Easement payment to encourage watershed landowners to restore drained wetlands or seed down lands adjacent to water. The first RIM sign up to offer this local incentive payment was in 1990 and it resulted in two Wright County easements in the watershed.

Adams visited the Wright County SWCD office in Buffalo during the RIM signup period to determine if the land he thought would make a good wildlife area would be eligible for this program. He had a 27 acre field which consisted of highly erodible cropland and a ditched wetland that drained into the Clearwater River upstream from Wiegand Lake.

Jeff Berg, Engineering Technician from the Wright County SWCD, proceeded with an onsite investigation using DNR protected water maps and the SCS soil survey. Berg discovered that the area was surrounded by DNR protected wetlands, the soils have a potential for being sensitive to ground water contamination, and sheet and rill erosion



Contractor, Darrel Strecker, first lays a solid foundation of clay fill in constructing the Earthen Dam on Milton Adam's wetland restoration project.

was evident on most of the hills and side slopes.

All this information helped determined that the field had a major potential for contributing nutrients and sediments to the Clearwater River. It was decided that restoring the 10.8 acre wetland by installing an 80' dam across the outlet and seeding down the hills and side slopes permanently to native grasses would make an excellent area for wildlife habitat. "This will also enhance the water quality of the Clearwater River and its chain of lakes" Berg explains.



This is the finished product, Earthen Dam, after topsoiling and seeding. The pipe shown in the upper left corner was later installed as a trickle tube around the end of the Dam.

The native grasses were seeded in the spring of 1991 with the Clearwater River Watershed District (CRWD) no-till drill and the wetland project was completed in late summer, 1991. The earth work was done by Strecker Excavating with the tile being installed by Purcell Excavating both of Annandale.

Adams was very pleased with how helpful the Wright SWCD was throughout the RIM process. "Their expertise in providing me with information on native grass seedings and how to restore the wetland the most economical and beneficial way was much appreciated," Adams explained.

This is an excellent site for showing the benefits and capabilities of the RIM Program to participating agencies, wildlife and environmental groups, watershed residents, and other individuals from the county and statewide.

"Time will tell whether this area will be utilized by the wildlife for which it was intended" explains Berg, "but for all those who have been involved in this project the future looks very promising".

Residue Management Helpful Hints

Were you hit hard by the Mega storm and unable to complete your fall tillage on corn ground? Well here are a few helpful hints that you may want to consider to maintain residue cover and yields on that corn ground.

If you are considering chisel plowing or disking this spring, it is very important that you plow shallow (3-4 inches). This will prepare a good seedbed and help prevent soil clumping and air pockets from forming that can cause planting problems and lower yields.

If you do not have a chisel plow or disk, field cultivating is also a good idea. Depending on the amount of residue cover you have, one or two trips back to back before planting will prepare a good seedbed without disturbing too much of the soil.

STEWARDSHIP INCENTIVE PROGRAM

A new program, for landowners consideration, will be announced soon, by the Minnesota Department of Natural Resources Forestry Division and Agricultural Stabilization and Conservation Service. The program is called Stewardship Incentive Program (SIP).

This program will provide assistance (technical & financial) to land owners committed to developing a plan to protect and develop the quality of natural resources of the land., A plan will be developed for managing soil, water, trees, wildlife and other plants. A stewardship plan describes individual land ownership goals, natural resources and recommends management possibilities. These ideas might include planting trees, fencing, installing wildlife nest boxes, clearing trails, harvesting timber, maintaining firebreaks, thinning dense trees, protecting a unique natural resource, protecting endangered species or other alternatives. All aspects, including development of the plan are cost-shareable.

Watch for DNR & ASCS announcement of signup periods.

1981 - 1990 FINAL EVALUATION REPORT INDICATES WATER QUALITY IMPROVEMENT IN CLEARWATER RIVER CHAIN OF LAKES

Between 1981 and 1990, the surface water quality has improved throughout the Clearwater River Chain of Lakes. Ten years of monitoring data, taken as part of the Clearwater River Chain of Lakes Restoration Project, was analyzed for Lakes Louisa, Marie, Augusta, and the East and West basins of Clearwater Lake. The above lake stations are indicated on the Monitoring Station Location Map.

The results indicate a decrease in phosphorus concentrations in each of the above lakes. Over the course of the project, the reduction in average summertime total phosphorus concentrations ranged from approximately 50-70 percent in the upper lakes to 25 percent in Clearwater Lake. Annual phosphorus concentrations are depicted graphically for each of the five lake stations.

Phosphorus is the critical nutrient in terms of water quality in the Chain of Lakes. This is because phosphorus is the limiting nutrient needed for algae growth. By reducing the input of phosphorus into the Chain of Lakes, the concentrations of phosphorus within the lakes is lowered, thus allowing for less algae growth and in turn improved water quality.

The 1981-1990 Final Evaluation Report provided an overall summary of the monitoring and lake restoration activities for the ten year project. It also evaluated the various lake restoration activities designed to reduce phosphorus loading into the Chain of Lakes.

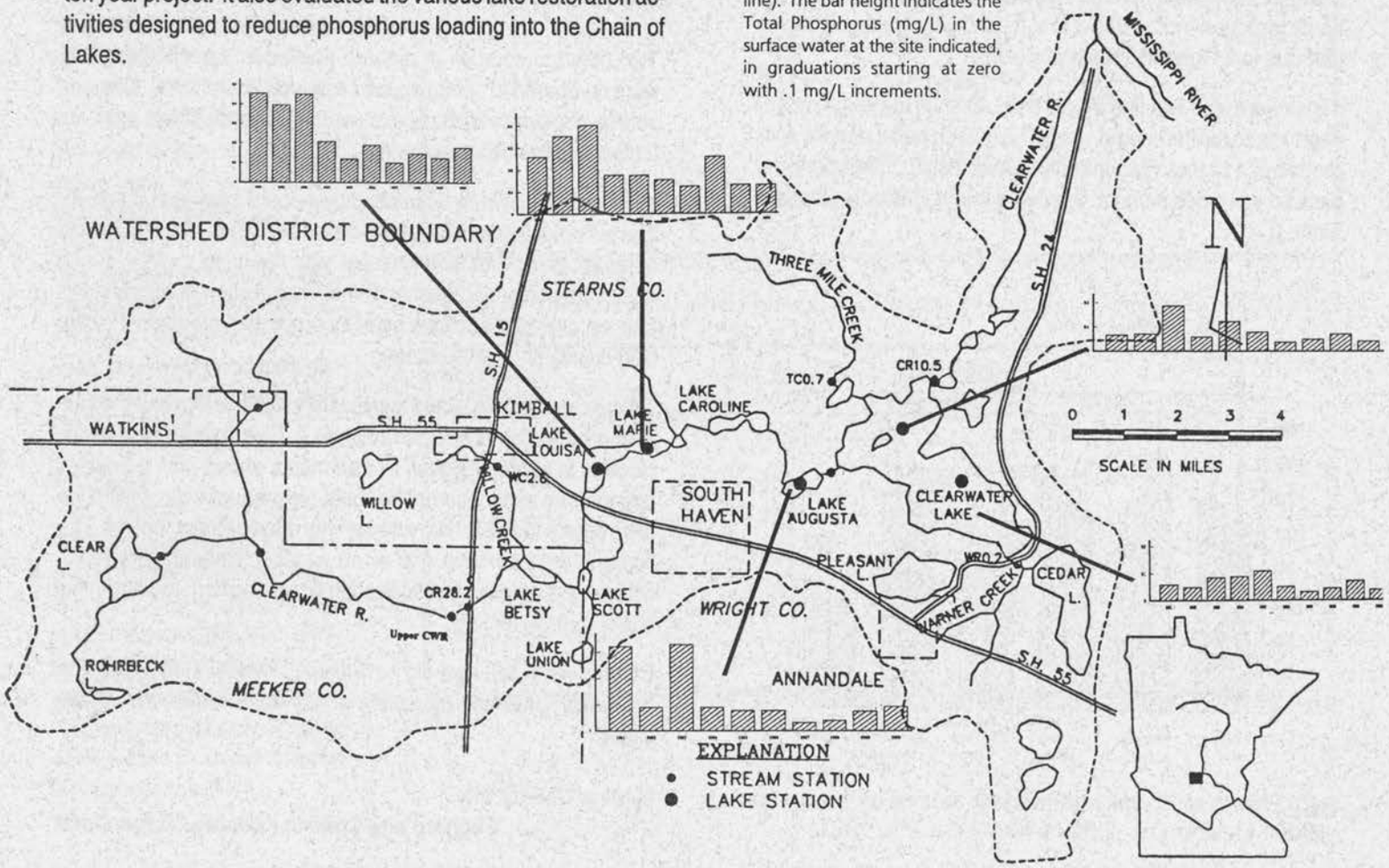
Lake restoration activities included: construction of three wetland treatment systems, the isolation of the Upper Watkins Wetland, the hypolimnetic aeration of three of the upper lakes, a rough fish removal program, the Lake Augusta erosion control project, and the nonpoint source pollution abatement project (Tri-County Conservation Project (TCCP).

The Final Evaluation Report also summarized the TCCP and its programs designed to reduce non-point source pollution. Under this project, best management practices (BMP) were implemented on more than 4,000 acres of critical lands within the watershed.

Despite overall water quality improvement in the Chain of Lakes, it is apparent that phosphorus loading to the Chain of Lakes is still high in years with high precipitation. It is also apparent that a majority of the phosphorus loading is now coming from watershed wide non-point sources. Therefore, to further improve the water quality in the Chain of Lakes, non-point source pollution abatement practices need to become the watershed norm rather than the exception.

Source: Wenck Associates

The bar graphs (5) represent the years 1981 through 1990 (base line). The bar height indicates the Total Phosphorus (mg/L) in the surface water at the site indicated, in graduations starting at zero with .1 mg/L increments.



Tillage and Manure Demonstration - Corn Yields For 1991

A sincere Thank You to Richard Eckman, Richard and Dory Ecker, and Richard and Colleen Kuechle for their continued support in making these demonstrations possible. Since 1986 these partnerships have enable us to gain new knowledge in how best management practices can affect production costs/returns and the environment.

The demonstration/research sites are under the direction of John Moncrief, U of M Soil Scientist. The yield and treatment results for the 1991 growing season have been tabulated and the following summary has been provided by Dr. Moncrief.

Stearns County Site

(Richard Eckman-Cooperator)

At this site spring applied solid dairy manure from a manure pack around a pole barn and side dress anhydrous ammonia were evaluated as Nitrogen sources within moldboard, chisel, and ridge till tillage systems. Corn grain yields were estimated for each of the three soil types found at this site. The soils vary in thickness and are underlain by coarse sand and gravel. The Fairhaven loam is the deepest with 22 to 48 inches of loam textured material, the Esterville sandy loam has 11 to 22 inches of sandy loam material, the Hawick sandy loam is the thinnest with less than 10 inches of sandy loam material.

Ridge tillage, chisel and moldboard plowing statistically resulted in similar corn yields. Tillage influenced corn grain yields on the no-till system which resulted in a much lower yield and was in part due to a Russian Thistle problem.

Yields were also affected by soil type. Even in the wet year, soil depth made a difference in yields (Fairhaven and Esterville soils produced a higher yield than the Hawick soil). Yield performance on soil types found at the demonstration sites is shown in Table 2.

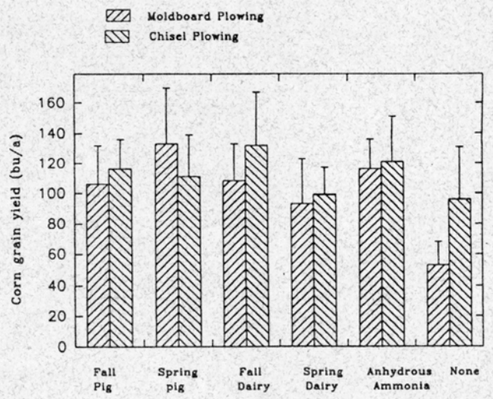


Fig.2 Effects of tillage and nutrient source on corn grain yield at Meeker Co. (Ecker's farm). Oct. 10, 1991.

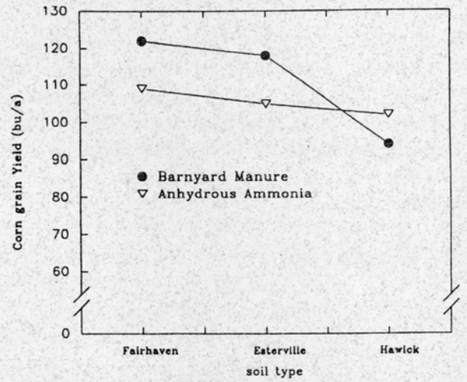


Fig.1 Nutrient source and soil type interaction on corn grain yield at Stearns Co., Oct. 2, 1991.

On average there was no difference in nitrogen source (manure and anhydrous ammonia) although effects were not consistent for all soil types found at the Stearns County site. As depicted in Figure 1, the two deeper soils with more water holding capacity resulted in a 13 bu/ac higher yield with the manure N source. On the Hawick soil there was an 8 bu/ac advantage with the anhydrous ammonia N Source. Anhydrous ammonia has consistently been a good performing nitrogen source on sandy, shallow soils.

Meeker County Site

(Richard and Dory Ecker-Cooperators)

Two different sources of manure applied in the fall and spring were compared to spring applied anhydrous ammonia. Nitrogen source comparisons were evaluated within two tillage systems (chisel and moldboard plowing).

Yield was significantly influenced by manure treatment (Table 3). The spring dairy manure resulted in a lower yield. Most available nutrients in manure is associated with the urine and the spring dairy was comprised mainly of the fecal portion of the manure. The manure may not have been incorporated adequately by the field cultivator prior to planting.

Tillage systems interacted significantly with manure and the time of application as illustrated in Figure 2. Chisel plow consistently resulted in higher yields in all treatments except with the spring hog manure application. The liquid pig manure was applied ten days before the secondary tillage was done before planting. The timing of incorporation and warm weather probably resulted in nitrogen being loss by volatilization due to the corn residue in the chisel plow treatment.

Differences in soil type did not influence yields. Soil types, Kornis sandy loam and Marcellon sandy loam resulted in similar yields.

Meeker County Site

(Richard and Colleen Kuechle-Cooperators)

At the Kuechle farm the method of phosphorus application was evaluated with four tillage systems. Phosphorus was either spring broadcast or planter applied in a 2" by 2" band. The broadcast rate was 80 lbs P 0 per acre and the planter applied rate was 40 P 0 per acre. The soil test was about 30 lbs/acre.

The method of phosphorus application had a significant influence on grain yield. Row applied phosphorus at one half the rate of the broadcast treatment resulted in a 12 bushel per acre higher yield (12% increase).

Tillage did not affect corn yields (Table 1). There was a significant difference in corn yield for the different soil types. Corn yield was reduced as soil drainage decreased. The highest corn yield (112 bu/ac) was obtained on a Koronis fine sandy loam and the lowest was obtained on the Delft clay loam. The yield of corn on the Marcellon loam was intermediate at 106 bu/ac. (Table 2)

This site was very wet in 1991. Yields were likely reduced due to severe anhydrous ammonia burn as result of poor soil sealing under wet conditions during application.

Summary

There was very little influence of conservation tillage systems on corn grain yields in 1991. Several types of manure and anhydrous ammonia were similar in their performance. Phosphorus applied with planter at reduced rates achieved higher corn yields. Corn yields were influenced by soil type.

Tables

Table 1. Corn grain yield by tillage at Stearns and Meeker counties in 1991[1].

Soil Type	Stearns Eckman's	Meeker		Average
		Ecker's	Kuechle's	
	bu/a			
No Till	77b	---	92a	85
Ridge Till	97a	---	98a	98
Chisel Plowing	105a	116a	105a	109
Moldboard plowing	114a	111a	106a	110

1. Means within the same column with the same letter are not significantly different.

Table 2. Corn grain yield by soil type at Stearns and Meeker Counties[1].

Soil Type	Stearns County Eckman	Meeker County			Average
		Ecker	Kuechle		
	bu/a				
Fairhaven	116a	---	---	---	116
Esterville	110a	---	---	---	110
Hawick	98b	---	---	---	98
Koronis	---	111ab	112b	---	112
Marcellon	---	117a	107b	---	112
Cordova	---	90b	---	---	90
Delft	---	---	92a	---	92
Average	108	102	104		

1. Means within the same column with the same letter are not significantly different.

Table 3. Effects of tillage system and nutrient source on corn grain yields at Meeker County (Ecker Farm), 1991[1].

Nutrient Sources	Moldboard Plowing	Chisel Plowing	average
	bu/a		
Fall Pig	106	116	111ab
Spring Pig	133	111	121a
Fall Dairy	108	132	121a
Spring Dairy	93	99	96b
Anhydrous Ammonia	116	121	118a
None	53	96	74c

1. The p value of nutrient source: 0.001 and the tillage x manure interaction: 0.107. Means within the same column with the same letter are not significantly different.

Water Sampling Continues Through 1992 Season

The Clearwater River Watershed District has continued to monitor the lakes and streams in the watershed on a scaled down proportion during the 1991 lake season. Plans are to gear up for more extensive water monitoring in the watershed starting in 1992 to assess the impact the completed Lake Restoration Projects and the Best Management Practices being implemented by landowners have on the water quality of the River and it's Chain of Lakes. 1992 will include four lake monitoring sites sampled twice monthly and six stream monitoring sites sampled monthly.

At the completion of the EPA Clean Lakes Grant in 1993 a final evaluation will be completed to determine the overall success of this joint partnership to improve the water quality in the watershed.

Mark Lindhorst, TCCP Technician, and Kevin Wittrock, from Annandale, took water samples from various depths in the lakes and recorded lake conditions monthly during 1990. Samples are then analyzed for total phosphorus, orthophosphorus, pH, conductivity, total alkalinity, total suspended solids, chlorophyll-a, and phytoplankton.



Local Farmers Incorporate Nutrient Management Techniques

Richard Kuechle, Gerald Rice, and Richard Streit, south of Watkins demonstrated nutrient management techniques that saved them money during the 1991 growing season. They reduced commercial fertilizer rates on their corn demonstration fields and still out yielded the control area where the rates were not changed.

These farmers participated in the TCCP Nutrient Management Incentive Program which consists of taking soil samples to find out what level of nutrients were available for the growing season and, in the case of Sreit, a manure sample was also taken to be analyzed for its available nutrients for crop production. Fertilizer recommendations were followed in 1991 on the demonstration fields based on these soil and manure analysis, crop history, yield goal, soil type and field conditions.

Richard Kuechle reduced his nitrogen application by 32 lbs./acre and his potassium by 64 lbs./acre for a total savings of $11.60/acre. The certified yield tests on the 40 acre demonstration field documented a 7 bushels/acre increase over the control area (146 bu/ac versus 139 bu/ac.). Based on $2.00 corn this resulted in a total savings of $1,024 on the 40 acres that were enrolled in the TCCP incentive program.

Gerald Rice reduced his potassium application by 40 lbs./ac for a total savings of $2.00/acre. The yield tests resulted in the demonstration yielding 128 bu./acre and the control area 127 bu/ac. Based on $2.00 corn this totaled a savings of $160 on the 40 acres enrolled.

Richard Streit's corn field was the first demonstration in this program that involved manure application. In addition to soil tests, a liquid manure sample was taken from a storage lagoon after agitation and sent to the Lab for analysis. Richard applied 5,000 gallons/acre of liquid manure for the nitrogen, but by doing so he overapplied on the Phosphorus and Potassium. The field consisted mainly of a Grogan soil which is a very light sandy loam soil with a slope of 2-6%. Therefore, managing his manure for the nitrogen was more important for water quality than over applying phosphorus and potassium. on half of the field, Richard injected the manure and the other half he broadcasted and incorporated it within one day to prevent volatilization (No yield differences were realized between these two methods of application).

The manure application resulted in taking credit for 100 lbs. of N/acre and as a result less commercial nitrogen was needed. The recommended rate of nitrogen based on a yield goal of 145 bu/ac. for this field was 180 lbs/acre. An additional 80 lbs. of nitrogen was then applied in the form of anhydrous.

The reduction in purchased fertilizers was the big money saver in Streit's demonstration. The demonstration field out yielded the control field by 23 bu/ac. (144 bu/ac. versus 121 bu/ac. respectively), however, there was a proso millet weed problem on the control field due to ineffective herbicide control that could have affected the yield by 10 to 15 bu/ac. If we just look at the savings in input costs and not the difference in yield, a savings of $27.00/acre was realized by taking credit for the nutrients in the manure. This is a total savings of $1,107 in production costs for Richard streit's 41 acre demonstration field.

If you would like to participate in a nutrient management demonstration during the 1992 season there is still time to sign up for the TCCP incentive program. Watershed farmers are eligible for incentive payments of $10 to $14 per acre for experimenting with nutrient management techniques. All you have to do is call the TCCP office at #251-0206 and we will provide technical and financial assistance for your demonstration.

Watershed Has High Potential Sites For Restoring Wetlands To Improve Water Quality

By: Jim McCollough, Wright County SWCD.

Increasing demand from landowners within Wright County to restore wetland sites prompted the Minnesota Waterfowl Association (MWA) and the Wright Soil and Water Conservation District (SWCD) to enter into a cooperative agreement unique to both organizations. The pilot project was developed in order to streamline and speed-up efforts to restore and create shallow marshes throughout Wright County by funding a staff position who would focus full time on wetland restorations. The third participant in this partnership, the U.S. Fish and Wildlife Service-Litchfield Wetland District, assists in the payment of the actual construction and earthwork.

Wetlands and marshes are being recognized increasingly for their critical role in improving water quality by providing for sediment, nutrient and pesticide traps (for downstream lake and rivers), flood control, and more obscurely -groundwater recharge. one glance at the Wright County Soil Survey reveals numerous soil mapping symbols that have water holding potential, and depending on the rainfall amounts, these sites are seasonal or permanent wetlands in an undrained condition. Thousands of these glacial formed, small basins speckled the county at the turn of the century. However, as the extensive tile and ditch network spread throughout the county from the early 1900's roughly 75 percent of these supporting basins have disappeared or have been altered useless to waterfowl.

One promising factor, is that although many drained basins are currently under crop production, there are still hundreds of sites that were drained regardless of their cropping potential. If the adjacent cropland raises out of the basin significantly, then a restoration effort holds promise. In Wright county, such sites hold great potential with re-flooding of 15 to 24 inches of water. These are areas we are focusing our restoration efforts on.

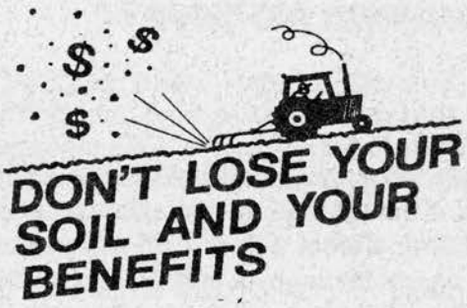
Another area that holds promise are sites that historically were not a wetland, but by damming off the drainage path and designing a higher elevation outlet, we actually create small isolated wetlands (the soils in these areas need to be water holding in order to be effective). This is especially valuable on land that is in retirement, i.e., the 10 year Conservation Reserve Program (CRP) and Waterbank Contracts or the Reinvest In Minnesota (RIM) lands. Small basins on these lands provide needed, isolated courtship and feeding sites which attract the hens early in the spring. Combine this with the attractiveness of secure nesting cover nearby, and these temporary, shallow wetlands (which thaw first, and teem with protein rich insects nesting hens need) become a critical part of the wetland complex.

Most of the projects completed have drainage areas or watersheds less than 50 acres. This guideline was developed by the Soil Conservation Service for this specific area of the state, and was targeted for projects on CRP and Waterbank program land. With a maximum of 50 acre size watershed, a vegetated spillway set lower than the top of the dam is constructed around one or both ends of the dam. This is the most common method of completing a restoration, and is the most cost effective. The most critical element in these projects is getting a good stand of vegetation on the spillway and on the dike.

In the summer of 1991, the Wright SWCD completed an inventory of wetland restoration potential in the Clearwater River Watershed area of the county. The inventory rated certain project/sites as high, medium or low in regards to water quality. In Clearwater and Southside townships restorable wetlands are more complex and harder to restore because of the larger drainage areas and bigger pool areas. Corinna and Albion townships harbor more "feasible" sites with smaller pool areas and drainage areas. In Corinna township there is a large potential to improve water quality of major recreational lakes if wetland restoration projects were implemented. To date 18 wetlands have been restored through this program in these townships covering 39 acres of ponded water. In addition, 33 wetlands covering 54 acres of ponded water has been restored within Meeker and Stearns county parts of the Clearwater River Watershed District.



If you have areas similar to the ones described or want someone to stop by your farm to assess wetland restoration potential contact the Wright SWCD office, Litchfield USFW office or the TCCP office.



TCCP Luncheon Will Focus On Tillage And Your Eligibility For Program Benefits

Plans are underway for sponsoring an information luncheon for watershed landowners on Friday, February 28, 1992 at the Playland Ballroom in Kimball, MN. The luncheon will begin at 11:30 a.m. and will conclude at 2:00 p.m.

Following the noon meal Dr. John Moncrief, U of M, will discuss the results of the local conservation tillage/animal waste management demonstration plots and address your questions on specific management practices.

Dave Breitbach, SCS State Agronomist, will present information on how the new rule changes of the 1990 Farm Bill could affect your eligibility for farm program benefits. Breitbach will also discuss residue management options for conservation compliance plans.

Results of the minimum till demonstrations from 40+ farmers participating in the TCCP minimum till incentive program will be available at this meeting. Awards will be presented and door prizes will be given away to those attending.

Make sure you mark your calendar for the 28th. You won't want to miss it! You will need to preregister with the TCCP office by calling #251-0206 or send in the RSVP form below to reserve your place at the table. Hope to see you there!

— — — — — — — — — — — — cut off and return — — — — — — — — — — — —

PREREGISTRATION FORM

Yes, I will be attending the TCCP Information Luncheon on Friday, February 28, 1992.

Names: _____

_____

_____

Please return by Tuesday, February 25, 1992:

TCCP
110 2nd St. S.
Suite 128
Waite Park, MN 56387

Or Call:
Mary Kells
Project Coordinator
(612) 251-0206

TCCP Committee Members

Don Markwardt, Chairman
CRWD
Kimball, MN 55353
398-7125

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Meeker SWCD
Grove City, MN 56234
693-3040

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685-3213

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543-3394

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St. Cloud, MN 56301
251-0206

Tri-County Conservation Project

110 2nd Street South, Suite 128
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Grants awarded to help fund the activities of the Tri-County Conservation Project were received from the EPA Clean Lakes Program, administered by the MN Pollution Control Agency and the Agriculture Energy Savings Program, administered by the Agricultural Utilization Research Institute.

This newsletter is published by the Tri-County Conservation Project (TCCP), a joint project between the Clearwater River Watershed District and the Meeker, Stearns, and Wright County Soil and Water Conservation Districts and Soil Conservation Service.

Printed On Recycled Paper

RIM RESERVE STRATEGIC PLAN COMMITTEE

Members: John Boulton; John Brooks, Jr., and Loren Harste

Purpose:
(1) clarify relationship of program to BWSR Strategic Plan;
(2) discuss and clarify principles of program;
(3) identify future initiatives and priorities; and
(4) identify program needs.

Issues Identified:
(1) eligible lands and enrollment goals
  (a) "marginal" vs. "productive" lands
  (b) public benefits and goals
  (c) application prioritization
  (d) easement duration
(2) local administration
  (a) application prioritization
  (b) application periods
  (c) property issues
    1) enrollment payment rates
    2) post-enrollment property tax assessments
    3) potential for tax forfeiture
  (d) technical assistance
(3) marketing
  (a) develop strategies in a plan
  (b) general public as audience
  (c) landowners as audience
  (d) legislature as audience
  (e) contributors as audience
(4) stable funding
  (a) develop strategies in a plan
  (b) identify sources of base and support levels of funding
  (c) coalition of supporters

Past meetings:
(1) October 22
(2) December 17
(3) January 9

Future meetings:
(4) early February
(5) February 25
(6) early March

Outcome: Preparation of a program plan for the RIM Reserve Program as a guide for the next five years.

Staff Contact: Dave Behm, RIM Reserve Coordinator 612-296-0880

RIM Resolution to BWSR

Tri-County
Conservation Project
Office Phone (612) 251-0206

Mary Kells
Project Coordinator
SCS/SWCD Office-MARKETPLACE
110 2nd St. S., Suite 128
Waite Park, MN 56387

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Jerome Bechtold
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24353 125th Ave.
St. Cloud, MN 56301

Willard Kreitlow
Wright SWCD
Route 1, Box 103
Howard Lake, MN 55349

January 13, 1992

James Nielsen, Chairman
MN Board of Water and Soil Resources
Southbridge Office Building
155 South Wabasha St. Suite 104
St. Paul, MN 55107

Dear Chairman Nielsen:

The Tri-County Conservation Committee (TCCC) is in support of continuing the promotion and implementation of wetland restoration within the Clearwater River Watershed District (CRWD). We have recommended to the CRWD Board of Managers that a transfer within the existing EPA Clean Lakes Grant be approved in order to fund an additional 100 acres of the RIM Incentive Program during the next wetland restoration sign-up.

We ask that the Board of Water and Soil Resources continue our RIM partnership and set aside state funds to support the RIM easement payments of these 100 acres of wetland restoration under the RIM Incentive Program.

We want to thank you for your involvement in the RIM Incentive Program and for your time in considering your continuation of our partnership.

Sincerely,

Donald Markwardt
Donald Markwardt, Chairman
CRWD

Delbert Carlson
Delbert Carlson
Meeker SWCD

cc

Jerome Bechtold
Jerome Bechtold
Stearns SWCD

Willard Kreitlow
Willard Kreitlow
Wright SWCD

1/22/92
04-92

Brd Mtg

Tri-County Conservation Project
Office Phone (612) 251-0206

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November 22, 1991

RECEIVED
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BC
& SC

Jim Nielson, Chairman
Board of Water and Soil Resources
Southbridge Office Building
155 South Wabasha St. Suite 104
St. Paul, MN 55107

Dear Mr. Nielson:

On behalf of the Tri-County Conservation Project (TCCP) I want to thank the board members and staff for the cooperation and support we received in promoting RIM in the Clearwater River Watershed District. I would also like to report the results of our joint effort and request the Board of Water and Soil Resources to join us in a continued partnership to encourage additional wetland restoration easements in this targeted watershed area.

In November of 1989 I attended your board meeting to request the BWSR's support and commitment of State RIM funds to implement a RIM Incentive Program in partnership with the Clearwater River Watershed District's EPA Clean Lakes Grant. At that time the BWSR elected to become a partner in this pilot program. Many changes have occurred in BWSR membership and leadership since I last presented that proposal so I would like to recap some highlights and provide you with some background information on the TCCP and the TCCP RIM Incentive Program.

The Tri-County Conservation Project is a nonpoint source pollution abatement demonstration project. Initiated in 1985 with EPA grant funds, the project's overall goal is to reduce sediment and nutrient loadings to the Clearwater River and its Chain of Lakes. The TCCP is a cooperative effort between the Meeker, Stearns and Wright Soil and Water Conservation Districts and Soil Conservation Service, the Clearwater River Watershed District, state and federal resource agencies and local landowners.

The RIM Incentive Program was developed in June of 1990 by district and project personnel. This program was developed to provide an added incentive for watershed landowners to restore drained wetlands and

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seed down riparian lands in targeted areas. In addition to the regular RIM payments, EPA funds were allocated to provide an added incentive of $250/acre payment to landowners for these types of easements

Through our cooperative efforts the TCCP have already encumbered incentive funds for 184.4 acres of wetland restoration and riparian cropland easement signups in the watershed. In addition, RIM requests have been received for 90.0 acres in other categories not eligible for TCCP incentive payments. This renewed interest from watershed landowners has resulted in our goal of 200 acres being nearly met 1 1/2 years earlier than planned.

The Tri-County Conservation Committee has proposed to allocate funds for an additional 100 acres of wetland restoration within the watershed critical areas. If there is support and interest from BWSR to continue our RIM partnership, the TCCC would request that EPA grant funds awarded to the Clearwater River Watershed District be rebudgeted to support the $250/acre incentive payment for these 100 acres.

I have enclosed several items relating to the RIM Incentive Program for your information and review. I would be more than happy to attend your January board meeting to further discuss this proposal with the board.

Thank you for your time and consideration. I look forward to hearing from you.

Sincerely,

Mary Kells

Mary Kells
Project Coordinator

Enclosures:
1. TCCP RIM Incentive Program guidelines
2. Special flyer mailed to landowners
3. Status report on acres and encumbered funds

cc: Ron Harnack, Executive Director
Dave Behm, RIM Coordinator
TCCC Members
Meeker, Wright and Stearns SWCDs

Program NPS-7

REINVEST IN MINNESOTA INCENTIVE PROGRAM

A. The Purpose of this program is to encourage landowners to seed down riparian (adjacent to protected waters) land and restore drained wetlands in targeted areas within the Clearwater River Watershed District (CRWD) that will:

1. Improve water quality
2. Provide erosion and sediment control
3. Improve wildlife habitat
4. Provide flood control and runoff retention

B. Incentive

1. This program provides a one time incentive payment of $250.00 per acre to accepted CRWD landowners who enter into a riparian land perpetual easement and/or wetland restoration perpetual easement under the ReInvest In Minnesota Reserve Program criteria.

C. Policies

1. The landowner must sign a RIM Reserve Application (Form WR-01002-02) for a perpetual wetland restoration and/or riparian land easement and a TCCP Landowner Application during the RIM Reserve Program Sign Up period.
2. Upon recommendation of the RIM Incentive Committee and the County RIM Screening Committee the applications will be prioritized and sent to the MN Board of Water and Soil Resources (BWSR) for prioritizing and approval.
3. Upon BWSR approval to encumber RIM funds, the TCCP Landowner Application will be brought to the Tri-County Conservation Committee and the Clearwater River Watershed District for approval to encumber TCCP funds amounting to $250 per eligible acre.

C. Policies (Continued)

4. The landowner will develop a conservation plan with the county Soil and Water Conservation District technical personnel that meets the RIM guidelines under the wetland restoration and/or riparian lands criteria.

5. The SWCD in the landowner's county is responsible for providing technical assistance and certification of practice completion.

6. The landowner must follow the requirements and procedures necessary for developing a perpetual easement as set forth in the RIM Reserve Program.

7. The CRWD will make payment to the landowner upon receiving a copy of the BWSR letter notifying the local SWCD that payment will be made on the recorded easement.

TCCP RIM INCENTIVE PROGRAM CRITERIA:



"Conservation does produce clear streams"

RIPARIAN LAND EASEMENTS

GOALS:

- Improved water quality
- Sediment control
- Improved wildlife habitat
- Erosion control
- Runoff retention

GENERAL CRITERIA:

1) Must be riparian (adjacent) to DNR protected waters. (Refer to DNR Protected Waters and Wetlands Inventory)

2) Riparian or adjacent means the edge of the field begins within 100 feet of the protected water.

3) Eligible cropland is limited to 300 feet from the ordinary high water mark of the protected water or the 100-year floodplain, whichever is greater.

4) Any existing buffer area (without qualifying cropping history) must be donated to the easement.

5) Allow one to one match of ineligible cropland to eligible cropland to allow reasonable enrollment boundaries.

PAYMENT RATE:

Based on township market value (refer to other side).

WETLAND RESTORATION EASEMENTS



"...undisturbed marsh, a perfect place for a honeymoon!"

GOALS:

- Restore wildlife habitat
- Flood control
- Improved water quality

GENERAL CRITERIA:

1. Consists of a drained or altered wetland that is restorable and adjacent land - up to four acres of adjacent cropland and one acre of non-cropland for each acre of wetland restored.
2. Eligible wetlands may be non-cropland. Wetlands or adjacent land without a qualifying crop history receive a lower payment rate.
3. The restored wetland must be at least one acre in size and with the total enrollment at least 5 acres in size.
4. The wetland must have been drained or altered by any of the following methods prior to December 23, 1985: ditching, dredging, filling, leveling, pumping, or tiling.

PAYMENT RATE:

For drained wetlands with a cropping history: Refer to other side.

For drained wetlands without a cropping history: The rate is 60% of the perpetual rate.

RIM GENERAL CRITERIA

THE FOLLOWING CRITERIA APPLY TO ALL ELIGIBLE CATEGORIES

1) The land has been in agricultural crop production for at least two years during the period 1981 to 1985, (except drained wetlands or pastured hillsides). Agricultural crops are defined as annually cultivated crops or managed hayland.

2) The land has been owned by the landowner or a parent or other blood relative of the landowner, for at least one year before the date of application.

3) The land must be at least five acres in size, or must be a whole field as defined by the Agricultural Stabilization and Conservation Service (ASCS).

4) The land must be physically possible to crop, (except for drained wetlands and pastured hillsides).

ANNOUNCING
REINVEST IN MINNESOTA (RIM) SIGN-UP
AUGUST 5 - AUGUST 16, 1991
SPECIAL INCENTIVE PROGRAM FOR LANDOWNERS IN THE CLEARWATER RIVER WATERSHED DISTRICT
through the
TRI-COUNTY CONSERVATION PROJECT
and
MEEKER, STEARNS, AND WRIGHT SOIL AND WATER CONSERVATION DISTRICTS

RIM is a land retirement program to reduce erosion, protect water quality and to develop and enhance wildlife habitat. A perpetual easement will be developed on the eligible acres. The easement will be recorded on the land title at the county courthouse. Payment rates vary by township. RIM also provides cost-share to establish grass cover, trees and/or wetland restoration.

RIM PAYMENT RATES (based on township market value)

Stearns County	$356-$628/acre
Meeker County	$555-$611/acre
Wright County	$591-$817/acre

PLUS $250/acre. . .

...incentive payments for perpetual wetland restoration and riparian land easements. These payment rates are one-time-payments - - not an annual payment rate. The incentive payment is funded by a grant from the Environmental Protection Agency (EPA) Clean Lakes Program.

There are other eligible categories for the RIM sign-up, however, only riparian lands and wetland restoration are eligible for the Tri-County Conservation Project (TCCP) incentive payment. The other categories are: sensitive groundwater areas and marginal agricultural land. Only requests for perpetual easements will be accepted this sign-up due to limited RIM funding.

Stop in or call your local Soil and Water Conservation District Office for more information.

Stearns SWCD 251-6718
Meeker SWCD 693-7287
Wright SWCD 682-1970

The Tri-County Conservation Project (TCCP), is a joint project between the Clearwater River Watershed District and the Meeker, Stearns, and Wright Soil and Water Conservation Districts.

Tri-County Conservation Project
Reinvest In Minnesota Pilot Incentive Program
Status Report Of Acres and Funds Encumbered
November 1991

Landowner Contract Number	Category	Name	TCCP Eligible Acres	TCCP RIM Incentive Payment	RIM Reserve Eligible Match Paymt.	RIM Veg/Const. Cost
01-EPA2	Wetl.Rest	Milton Adams	27.2	6,800.00	15,012.46	4,368.51
02-EPA2	Riparian	Nickolas Degross	15.0	3,750.00	11,218.35	2,700.00
22-EPA2	Riparian	Harold Kielty	36.5	9,125.00	21,007.58	3,650.00
23-EPA2	Riparian	Paul Keymer	5.2	1,300.00	2,992.86	520.00
	Wetl.Rest	Paul Keymer	40.1	10,025.00	23,079.55	4,980.00
24-EPA2	Wetl.Rest	Merle Evenson	6.0	1,500.00	5,020.04	840.00
	Riparian	Merle Evenson	11.2	2,800.00	9,370.37	1,600.00
25-EPA2	Wetl.Rest	Mark Carrigan	32.2	8,050.00	18,801.26	3,900.00
26-EPA2	Wetl.Rest	Larry Bowman	11.0	2,750.00	6,331.05	2,037.50
		Totals	184.4	46,100.00	112,833.52	24,596.01

* In addition to the 184.4 acres, watershed signups were taken for 90.0 acres in other categories not eligible for TCCP Incentive Programs.

Clearwater River Watershed District
Box 481
Annandale, Minnesota 55302
Phone (612) 274-3935

Resolution of the Clearwater River Watershed District (CRWD)
January 8, 1992

WHEREAS, further promotion and implementation of wetland restoration will enhance the water quality of the Clearwater River Chain of Lakes, and

WHEREAS, the RIM partnership of the Board of Water and Soil Resources (BWSR), Soil and Water Conservation Districts (SWCDs) and the CRWD has successfully fulfilled the original goal of enrolling 200 acres of RIM perpetual easements for restoring drained wetlands and seeding down riparian lands on priority lands in the watershed, and

WHEREAS, the completion date of the existing EPA Clean Lakes Grant awarded to the CRWD is June 30, 1993 giving Tri-County Conservation Project (TCCP) sponsors time to further encourage RIM easements in targeted watershed areas through the RIM Incentive Program,

THEREFORE BE IT RESOLVED, that the CRWD support the recommendation from the TCCP steering committee to reallocate existing EPA Implementation Program funds to provide for an additional 100 acres of wetland restoration under the RIM Incentive Program. Total cost to the Project would be $25,000 (100 acres times $250/acre).

BE IT FURTHER RESOLVED, that the CRWD request the BWSR to set aside State RIM Wetland Restoration Funds, presently available, to fund perpetual easements that would be enrolled under the RIM Incentive Program for wetland restoration within the CRWD. Estimated state RIM funds needed to cover this request would be $60,000 (100 acres times $600/acre).

This resolution was adopted at the January 8, 1992 CRWD board meeting.

Donald Markwardt

Donald Markwardt, CRWD President

STEARNS COUNTY SOIL AND WATER
CONSERVATION DISTRICT

Marketplace of Waite Park
110 2nd Street South, Suite 128
Waite Park, MN 56387
Telephone (612) 251-6718

MINNESOTA
SOIL AND WATER CONSERVATION DISTRICTS

January 14, 1992

Jim Nielsen, Chairman
Board of Water & Soil Resources
Southbridge Office Bldg., Suite 104
155 South Wabasha Street
St. Paul, MN 55107

Dear Chairman Nielsen,

This letter is to offer our support for the RIM Incentive Program in the Clearwater River Watershed District and to encourage the Board of Water and Soil Resources to target an additional $100,000 RIM funds to the Tri-County Conservation Project.

A drained wetland and riparian land inventory was completed in Stearns County in 1991. This inventory revealed significant areas where RIM incentive funds could be used. Meeker and Wright SWCDs also have demonstrated the need for continued funding.

The RIM Incentive Program is a "one of a kind" program that shows what can be done when several units of government cooperate with one another and work together.

Sincerely,

Urban Spanier
Chairman

MEEKER SOIL AND WATER CONSERVATION DISTRICT

62643 U.S. Highway 12
P.O. Box 891
Litchfield, Minnesota 55355-0891
Telephone: (612) 693-7287

MINNESOTA
SOIL AND WATER CONSERVATION DISTRICTS

January 9, 1992

James Nielsen, Chairman
Board of Water & Soil Resources
Room 112 State Capitol
75 Constitution Avenue
St. Paul, MN 55155

Dear Chairman Nielsen,

Meeker SWCD is writing to express their support for enrolling 100 more acres under the Tri-County Conservation Program (TCCP) RIM Incentive Program for wetland restoration easements. This would involve the transfer of funds from other programs within the TCCP to be used for the incentive payment.

Meeker SWCD is also asking the Board of Water & Soil Resources to set aside funds at the state level for funding any additional easements that would be enrolled under this incentive program.

Sincerely,

Delbert Carlson

Delbert Carlson, Chairman
Meeker SWCD

cc: Tri-County Conservation Project

Minnesota Board of Water & Soil Resources

Southbridge Office Building
155 South Wabasha St., Suite 104
St. Paul, Minnesota 55107

(612) 296-3767
Fax (612) 297-5615

January 6, 1991

Mary Kells, Coordinator
Tri-County Conservation Project
110 2nd Street S., Suite 128
Waite Park, Minnesota 56387

Dear Mary:

Thank you for your November 22 letter describing the TCCP and its RIM Incentive Program for the Clearwater River watershed. Initiatives like yours are excellent examples of the local creativity and commitment necessary to successfully implement nonpoint source water pollution control programs in Minnesota. I commend you for your actions and your achievements so far.

While my staff have indicated to me their interest in continuing our partnership for encouraging wetland restorations with your program's support, I feel it is necessary for you to present your findings and make your request before our full board at its January 22 meeting in St. Paul. As you have indicated in your letter, our board membership and its chairman have changed since your presentation in November 1989. Consequently, I request your presence and presentation during the morning of our January agenda. As part of your presentation, I feel it would be appropriate for the TCCP board of directors to present to our board a resolution of your intent. A copy of the agenda will be mailed to you shortly to confirm your presentation time.

I would like for you to also present additional background to our board about your program's requirements and accomplishments as they pertain to your EPA Clean Lakes Program grant.

Thank you for your interest and cooperation in promoting the RIM Reserve Program and for your successful efforts in controlling nonpoint source water pollution.

Sincerely,

Ronald Harnack
Executive Director

cc: Don Markwardt, TCCP Chairman (c/o Clearwater River Watershed District)
Jim Nielsen, BWSR Chair
Dave Behm, RIM Reserve Program Coordinator

Regional Offices

Northwest Region
1106 Paul Bunyan Drive, NE
Bemidji, MN 56601
218-755-3963

Northeast Region
394 South Lake Avenue
Room 403
Duluth, MN 55802
218-723-4752

West Central Region
503 Washington Street
Brainerd, MN 56401
218-828-2604

South Central Region
Box 756
New Ulm, MN 56073
507-359-6074

Southeast Region
Friedell Bldg., Room 100
1200 S. Broadway
Rochester, MN 55904
507-285-7458

Southwest Region
Box 267
1400 E. Lyon Street
Marshall, MN 56258
507-537-6060

East Central Region
Southbridge Office Building
155 South Wabasha St., Suite 104
St. Paul, MN 55107
612-296-3767

An Equal
Opportunity Employer

Tri-County Conservation Project

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Willard Kreitlow
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BOARD OF WATER AND SOIL RESOURCES
RIVERWOOD CONFERENCE CENTER
MONTICELLO, MINNESOTA
FEBRUARY 26, 1992

Appointed Members in Attendance
Jim Nielsen
John Brooks, Jr.
Don Ogaard
Loren Harste
Howard Peterson
Don Warner
Dwain Otte
John Boulton
Jack Graba
Jim Rossman
Warren Rodning
Sharon Clark

Agency Members in Attendance
Kent Lokkesmoe, Department of Natural Resources
Doug Wise, Department of Agriculture
Fred Bergsrud, University of Minnesota/Extension Service
Wayne Anderson, Pollution Control Agency

Others in Attendance
Danny Potter, Minnesota Association of Soil and Water Conservation Districts
Dave Benner, Soil Conservation Service
Marlin Libbesmeier, Minnesota Association of Townships
Pat Wulff, Minnesota Lake Management Federation
John Sumption, Minnesota Association of Conservation District Employees
Helen McLennan, Morrison Soil and Water Conservation District
Scott Wallace, citizen

Staff in Attendance
Ron Harnack
Jim Birkholz
Mel Sinn
Jeff Nielsen
Tom Schwanke
Mary Jo Anderson

Meeting Called to Order - Chairman Nielsen called the meeting to order at 9:07 a.m.

** 92-15 Adopt Agenda - Moved by Ogaard, seconded by Boulton, to adopt the agenda as presented. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Rossman, and Clark. Opposed: None. Carried.

** 92-16 Approval of Minutes of January 22, 1992 - Moved by Warner, seconded by Otte, to approve the minutes of January 22, 1992, as circulated. Howard Peterson stated that he's concerned with the action on page five, motion #07-92, regarding the watershed districts legislation. This will be brought up again later in the meeting today. Chairman Nielsen stated that on page four, motion #05-92, regarding the Andersen Window Corporation land exchange with DNR, the motion should read, "that preliminary approval be granted for releasing marginal land from easement based on the preliminary site plan and the concurrence of DNR, subject to final approval by the BWSR of the site development plan developed by Andersen Window Corporation." Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Rossman, and Clark. Opposed: None. Carried.

Chairman Nielsen introduced Sharon K. Clark, newly appointed board member.

Chairman's Report - Chairman Nielsen reported that the Wetlands Heritage Advisory Committee (WHAC) met on February 13. Joan Miska was appointed chairperson of the wetlands rules working committee.

Chairman Nielsen reported that the two other BWSR appointments have not yet been made by the governor's office, but he suspects those will be in place by the March meeting.

Executive Director's Report - Ron Harnack reported on the wetlands rules working committee. Discussion followed on the public awareness that is needed on federal/state delineation of wetlands.

Ron gave a brief legislative update. Dwain Otte suggested that contacts need to be made with the legislative committee members and not just their staff.

Ron briefly updated the Board on the budget situation. The Board has not heard anything to date on the Governor's budget reduction. The governor's budget comes out March 5.

Ron discussed a wetlands funding option for the interim program. $300,000 from challenge grants could be available to counties who accepted certification of the wetlands program. Ron stated that the management team discussed the issue and supported the option.

** 92-17 Discussion followed. Moved by Boulton, seconded by Rossman, to proceed with the option of counties receiving the allocation for the wetland interim program. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Rossman, and Clark. Opposed: None. Carried.

EQB/Water Resources Committee Report - Mel Sinn stated that the EQB/Water Resources Committee meets on March 5 to discuss LCMR proposals. Ron Harnack stated that LCMR has received 900 LCMR proposals.

BWSR Committee Reports

Education Committee Report - Don Ogaard reported that the Education Committee met on February 21. He will submit written education committee reports to the BWSR in the future. Don stated that there is great interest in the local units of government of wetlands and county water plans. Communication is needed in the local units of government with facilitation by BWSR staff.

Feedlot Advisory Committee Report - Jim Rossman reported that the Feedlot Advisory Committee met on February 12 in Mankato. He stated that some townships are passing ordinances on feedlot issues at the local level. A resolution was proposed but defeated regarding township authorities. One resolution that was passed endorsed counties and local units of government becoming involved in state programs so uniformity exists. Wayne Anderson, MPCA, stated that he and other MPCA staff are willing to make a report to the BWSR at a future meeting regarding the feedlot issues. Jim Rossman suggested MPCA attending the March BWSR meeting to discuss the feedlot issue.

RIM Committee Report - Loren Harste reported that the RIM Strategic Plan Committee met on February 10 in St. Cloud to see how the administration of the program is going, to discuss the successes and roles of the program, and to look at the direction the program is headed. This meeting was the first of a series of meetings. He stated that this meeting was a good opportunity to see how RIM works in different areas of the state.

Wetlands Committee Report - Ron Harnack explained that the Wetlands Heritage Advisory Committee (WHAC) didn't have specific provisions for compensation of expenses and per diem. The WHAC asked the BWSR to consider payment of per diem for the day the WHAC meets. Ron explained that the BWSR has authority to determine this. Chairman Nielsen appointed John Brooks, Jr., Jim Rossman, and Warren Rodning as chair of an ad hoc committee to make a recommendation to the full BWSR at the March meeting.

Allocation of Rollover Funds - Ron Harnack briefly updated the Board on the 1991 roll-over requests for project funding. Staff recommends approval of the allocation proposals totalling $132,727. Discussion followed. Moved by Boulton, seconded by Otte, to approve the 1991 roll-over allocations as recommended by staff. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Clark, and Rossman. Opposed: None. Carried. (Final allocation attached)

** 92-18

Clearwater SWCD Request for Nominating District Boundary Change - Jim Birkholz briefly explained the request for changing the nomination district boundaries. Staff recommends approval of the boundary change. Discussion followed. Moved by Brooks, Jr., seconded by Harste, to approve the Clearwater SWCD request for nominating district boundary change.

** 92-19

Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Clark, and Rossman. Opposed: None. Carried.

Chairman Nielsen called for a break in the meeting at 10:20 a.m. The meeting reconvened at 10:40 a.m.

Reding Bill Review - Mel Sinn briefly reviewed the BWSR guidelines required for Chapter 160, Laws of 1991 with the Board. Chapter 160 directs the following: 1) Local government to require that development projects creating a new impervious surface of one acre or greater provide for water retention (MS103B.3365, Subd. 1). 2) Metropolitan watershed management plans and comprehensive county water plans to specify local controls that utilize the best available technology to properly manage surface water runoff quantity and quality (MS 103B.3365, Subd. 4). 3) The BWSR to develop guidelines to assist local governments in implementing the new water retention policy (MS 103B.3365, Subd. 5). Staff will be reviewing the guidelines and policy with other interests and bringing recommendations to the Board in June. Discussion followed. If anyone has comments or questions, please direct them to Mel.

NACD Annual Convention Report - Jim Birkholz briefed the Board on his trip to Reno, Nevada, February 2-6, 1992, for the National Association of Conservation Districts (NACD) annual convention. Jim briefly highlighted the following issues that were discussed at the meeting: 1) reauthorization of the Clean Water Action, Section 319; 2) National Association of State Conservation Agencies (NASCA) membership dues of $300 per year (BWSR is a member); 3) USDA Agencies/Policies; and 4) Education. Jim asked the Board to consider sending one Board member and one staff person to the NACD annual convention next year in Florida.

Jim Birkholz stated that the Environmental Protection Agency (EPA) plans to expand the the areas of coastal zone management. DNR is working on this. PCA suggested discussing this issue at an upcoming BWSR meeting. There is concern of regulatory issues as well as funding allocations. Discussion followed.

Kandiyohi SWCD Request to be in Minnesota Forestry Improvement Program (MFIP) - Ron Harnack explained that $500 is available in MFIP. The Kandiyohi SWCD is requesting financial assistance to purchase tree tubes for the protection of hardwoods suffering from deer browsing. Staff and DNR/Forestry recommends approval of the request. Discussion followed. Don Warner was concerned that the Aitkin SWCD was not fully funded through the MFIP. It was stated that $500 would not be enough to accomplish the Aitkin SWCD request, but it would be enough to meet the Kandiyohi SWCD request; and DNR was interested in expanding interest in forest stewardship. Moved by Rodning, seconded by Rossman, to approve the Kandiyohi SWCD request for $500 of MFIP funds. This would not be an ongoing practice; precedent is being set with the practice of tree tubes. Affirmative: Nielsen, Ogaard, Boulton, Graba, Brooks, Jr., Harste, Rodning, Peterson, Clark, and Rossman. Opposed: Warner and Otte. Carried.

** 92-20

Advisor Comments

- Minnesota Association of Conservation District Employees (MACDE): John Sumption congratulated Sharon Clark on her appointment and welcomed her. John voiced interest in keeping the RIM services grants allocation the same as present.

- Minnesota Association of Townships (MAT): Marlin Libbesmeier stated that information on wetlands that is being sent out from the BWSR is appreciated.

- Soil Conservation Service (SCS), Dave Benner stated that Gary Nordstrom is in St. Louis this week attending the Upper Mississippi River Basin meeting. Dave reported that the proposed rules for the wetland reserve program have been published in the Federal Register. Dave invited and recommended that the BWSR staff attend an eight-state meeting to work cooperatively on the wetland program. Dave reported that SCS is involved in a water quality incentive program.

- Minnesota Lake Management Federation (MLMF): Pat Wulff reported that 425 people attended the Lake Management Federation conference last October. Pat reported that twelve countywide lake coalitions have been formed for various reasons. The MLMF proposed legislation has been introduced this session. Pat reported that a possible merger exists between lake association interests.

- Minnesota Association of Soil and Water Conservation Districts (MASWCD): Danny Potter congratulated Sharon Clark on her appointment. Danny reported that wetlands training session are being held statewide. There is great concern and interest in these sessions. Danny reported that the board of directors passed a motion at their February 25 meeting that a new cost-share allocation formula be developed before the MASWCD annual convention so action could be taken at the convention. Danny stated that the board of directors are concerned with the legislative initiative regarding delegation of regulatory authority to soil and water conservation districts. Danny reported on the NACD annual convention in Reno. Danny reported that he appointed four people to the RIM Strategic Committee: Jim Sorlie, Owen Bartels, Jim Schafer and Alvin Dietz.

- Minnesota Association of Watershed Districts (MAWD), Howard Peterson asked if the BWSR's role in the legislation dealing with the appeals process is mediation. Howard stated that no action is needed today, this is an opportunity in the future. Howard reported that Gerry Van Amburg has been appointed to the Wetlands Heritage Advisory Committee.

Field Organization Review - Jim Birkholz updated the Board on the three regions: north, south, and metro. Jim reported that as more staff are added, the work areas will be adjusted. Jeff Nielsen will supervise the southern region, Chris Hofstede will supervise the northern region, and Bruce Sandstrom is acting supervisor of the metro region. Jim explained that the long range goal is to have seven additional staff, with the positions being filled as funding becomes available.

** 92-21 Moved by Warner, seconded by Harste, to adjourn the meeting at 12:15 p.m. Affirmative: Nielsen, Ogaard, Boulton, Warner, Graba, Otte, Brooks, Jr., Harste, Rodning, Peterson, Clark, and Rossman. Opposed: None. Carried.

Respectfully submitted,

D. James Nielsen
Chairman

PESTICIDE APPLICATOR EDUCATION AND EXAMINATION REVIEW BOARD
NOVEMBER 26, 1991

Present: Don Warner, MN Board of Water & Soil Resources
Wayne Anderson, MN Pollution Control Agency
Terry Lahti, MN Department of Natural Resources
Bill Anderl, MN Department of Health
Phil Harein, Stored Product and Structural Management Consulting Service
Gary Martens, MN Farm Bureau Federation
Judy Bellairs, Sierra Club
Leo Holm, MN Department of Transportation
Gary Golla, MN Plant Food and Chemical Assn.
David Nicolai, Cenex/Land O'Lakes

Minnesota Extension Service: Richard Meronuck
Dean Herzfeld

Minnesota Department of Agriculture: Wayne Dally
Rick Hansen
Steven Poncin

Absent: Mike Laughlin, MN Pest Control Assn.
Terry Ambroz, MN Pesticide Information and Education
Lisa Holmquist, MN Plant Food and Chemical Assn.

The Pesticide Applicator Education and Examination Review Board met on Tuesday, November 26, at the Minnesota Department of Agriculture (MDA). The meeting was called to order by Rick Hansen, board chair.

Board members were asked to introduce themselves. The minutes of the August 20th board meeting were reviewed. One correction was made to the minutes. To include in the discussion on Continuing Education Credits (CEU's) a statement include that it was not the consensus of the board to support CEU's. A motion was moved, seconded and approved to accept the minutes as amended.

A roster of the board members was distributed. The board reviewed the list and suggested some possibilities for additional members. There was concerned expressed that the board cannot have a representative of all groups as the board would become too large. The comment was made that to achieve a high level of evaluation or review of a program, the board should meet with those being certified. The idea was suggested to have group representatives/spokesmen address the board about their organization, certification needs and trainings. MDA was instructed to draft a letter that could be sent out to promotion councils, environmental groups and those certified in various categories. The draft of the letter is to be available at the next meeting. A sign-up sheet was circulate to acquire the names of contacts from various organizations that could present to the board. The board also agreed to contact someone from the Assn. of

counties or Assn. of townships to fill a seat on the board.

Wayne Dally gave the subcommittee report for initial certification and continuing education units. The subcommittee had met a couple of times but had not reach any consensus. Apparently, MN Plant Food and Chemical Assn. had wanted CEU credit for its safety training course. The CEU's were desired to be a part of the recertification program. Wayne indicated there is a state plan to provide recertification training. The state plan must comply with the 14 standard set forth by EPA. There are two options.

1. Any program provided must meet the standards set forth by EPA. The program must also include Minnesota Extension Service personnel.

2. MDA will work with any group in developing of a program.

The primary area of concern is the Ag Workshops which require attendance once every three years. Gary Golla indicated MPFCA has tabled the idea of asking for approval of safety workshops as part of a CEU component.

Neighboring states were contacted regarding CEU's systems in place. The responses indicated that difficulties were encountered in the administration and maintance of the program. Department of Agriculture administration contacts of other states were provided to the subcommittee members so they could make their own contacts if desired. MN Plant Food and Chemical has developed a survey form to contact neighboring states. They will share the results of their survey when completed.

The subcommittee will continue to meet. Wayne Dally asked to step down as chair but remain a part of the committee. Dick Meronuck was appointed the new chair.

Dean Herzfeld brought up the concept of incorporating hands on learning into the certification training. The concept would use learning stations where each the participants would perform a task and then rotate to a different station. The concept of hands on learning was forwarded to the initial certification and continuing education subcommittee for further investigation.

The fumigation subcommittee report was given by Phil Harein. The subcommittee has been slow to incorporate their plan as they are waiting to see what EPA will approve in their pending revisions. Nothing has been finalized to date. The progress of the parts of the subcommittee plan are as follows:

1. send poster to dealers - on hold

2. list sources of protective equipment - in process

3. develop a list of commercial applicators - in process

There is a question of the need to do anything a the present time. There is only one product, aluminum phosphide, that private applicators use. The number of farmers fumigating their own grain is in question. A survey by county agents in Northwest Minnesota may provide a handle on the number of farmer fumigators in that part of the state. The subcommittee will meet January 14.

The chair, Rick Hansen, ask the chairs of the subcommittees to provide written reports at future board meetings. The nitrogen subcommittee report was given by Rick Hansen. The subcommittee has failed to meet since it was organized 6 months ago. After lengthy discussion the board felt the inclusion of Nitrogen Best Management Practices into the pesticide applicator training was an important issue. The board suggested George Rehm or Mike Schmitt be invited to give a presentation at the next board meeting. The subcommittee will not meet prior to the next meeting.

The evaluation subcommittee report was given by Dean Herzfeld. The committee hasn't meet. The board reaffirmed the mission of the subcommittee to develop a priority of evaluations and develop a method of attaining the desired information. The bottom line on the evaluation of the entire certification program is how to evaluate the farmer in the field. Are they using protective clothing? Are they handling pesticides more carefully? Are they calibrating equipment more accurately.

The board agreed to look at the evaluation results form currently evaluated workshop. A request was made that workshop evaluations be summarized to one page for disbursement to the board.

Dean Herzfeld handed out the evaluation form being used with the private pesticide applicator training. The survey goes to all '92 participates and is included with the certification tests used for certification. Dean also reviewed the procedures farmers go through to become certified. It was noted the farmers do not have to attend a workshop but more than 50% of them do. The test is open book and is scored by computer at the University of Minnesota. The evaluation will also be scored through the same process, however, the option of correlation between questions is not available.

Dick Meronuck reviewed the program for the Ag recertification workshop. MDA has a larger portion of the program than in previous years. This is to allow for more information being provided on MDA programs such as endangered species, waste pesticide and pesticide containers recycling. The Ag update provided by the Extension Specialists has been dropped from the program.

The state of Minnesota has a reciprocity agreement with the state of Iowa. However, in recent years there has been some difficulty with Minnesota applicators being allowed a reciprocal license. The problem stems from Iowa changing requirements. No action was taken by the board.

Phil Harein reported on the food processors, stored grain and the upcoming PCO workshop. Workshop programs and the stored grain manual were passed around for the board to review.

Wayne Dally passed out a draft of the flyer that list the bulk of the recertification opportunities for 1992. The board was invited to attend any workshop. To do so notify Wayne or Steve when you arrive. (Expenses incurrened to attend a workshop can be covered by the Review Board)

Wayne also updated the board on the relicensing of applicators for 1992. There was about a two week delay in getting forms printed so as a result the renewal applications will be going out about two weeks later than normal. A copy of the new license form was distributed to the board. The new license was made of paper instead of plastic as they were in previous years. Several board members raised some concern about the longevity of a paper license. The recertification unit will be able to print plastic licenses on a limited basis.

Gary Martens expressed the concern that to expect a farmer to carry all the permits and licenses needed is unrealistic. A farmers wallet gets too big and bulky to carrying and tends to get in the way of the work. The comment was noted with no action taken.

Rick Hansen gave a few comments regarding the budget shortfall the Pesticide Regulatory Account (MDA) is facing. The result being that staff travel is being limited and the number of staff speaking at workshops is being reduced. MDA will also reduce its attendance an participation at many of the winter farm show. A suggest was made that MDA staff expenses be covered by the registration fees from the workshops. The board felt this should probably not be pursued but could be discussed at a later time if budget problems become more severe.

The next meeting was set for February 18, 1992, 9:00 a.m. - 12:00 noon, conference room 1 at MDA.

2/26/92 92-20

KANDIYOHI COUNTY SOIL AND WATER
CONSERVATION DISTRICT

409-19th Ave. S.W.,
Willmar, Minnesota 56201
Telephone (612) 235-3906

MINNESOTA
SOIL AND WATER CONSERVATION DISTRICTS

RECEIVED
FEB 2 4 1992
BWSR
& SCD

February 21, 1992

Ron Harnack, Executive Director
Board of Water and Soil Resources
Soughbridge Office Bldg., Suite 104
155 S. Wabasha St.
St. Paul, MN 55107

RE: MFIP FY92 Slippage Funds

Dear Ron,

Kandiyohi County has a 39.5 acre multi-purpose tree planting on highly erodible land, enrolled in the Conservation Reserve Program, that was designed to provide timeber production, wildlife habitat and erosion control. There are also water quality benefits, since the planting is adjacent to Solomon Lake.

Trees were planted in 1989 and the hardwoods are suffering extensive damage from deer browsing. Other chemical repellants have not been effective in controlling the deer browsing, so tubes are needed to protect the viability of the planting. Also, since the trees were planted, the landowner has provided excellent weed control.

Minnesota Forest Improvement Program (MFIP) funds, MFSP-Special Practice, would provide assistance to purchase and install tree tubes and stakes to protect this tree planting. DNR Forester Dave Anderson, has designed a PFM Brief Plan for Steve Rietema, and will also supervise the installation of the tubes and stakes as outlined in the attached PFM Brief Plan.

At the Kandiyohi SWCD Regular Board Meeting on 2/18/92 the Board of Supervisors discussed the plan, and would like inclusion for FY92 MFIP slippage funds in the amount of $500 for MFSP-Special Practice, tubes and stakes, for Steve Rietema.

If you need any additional information, feel free to contact me.

Sincerely,

Mary Oslund

Mary Oslund
Office Coordinator

Attachments: PFM Brief Plan
MFIP Program Sign-up Results, FY92

cc Chuck Niska, Grants Coordinator
Jeff Nielsen, Regional Conservation Supervisor
Larry Himanga, DNR, Divsion of Forestry
Dave Anderson, DNR Forester

An Equal Opportunity Employer

2/26/92
92-18

1991 ROLL-OVER REQUESTS FOR PROJECT FUNDING

DISTRICT	PROJECT	REQUEST AMOUNT	RECOMMEND
Aitkin	Critical Area Stabilization on Big Sandy Lake	$ 3,000	F
Anoka	Rice Creek Watershed Streambank Stabilization	$ 24,000	F
Blue Earth	Animal Waste Control System	$ 11,846	F
Blue Earth	Terrace Installation	$ 1,675	F
Carver	Stormwater Control System	$ 65,696	N
Goodhue	Grade Stabilization Structure	$ 4,125	F
Goodhue	Grade Stabilization Structure and Diversion	$ 6,563	F
Lake	Streambank/Roadside Stabilization	$ 2,460	F
Olmsted	Terrace Installation	$ 5,000	F
Olmsted	Terrace Installation	$ 10,200	F
Olmsted	Terrace Installation	$ 10,275	F
Ramsey	Gully Erosion Control	$ 7,500	F
Red Lake	Erosion Control Structure	$ 1,350	F
Rice	Stormwater Control System	$ 1,988	F
Rice	Stormwater Control Structure	$ 1,613	F
So. St. Louis	Pionk Drive Erosion Control	$ 22,500	F
So. St. Louis	Lester Park Golf Course Erosion Control	$ 29,288	P
Stearns	Lake Koronis Erosion Control	$100,000	N
Watonwan	Terrace Installation	$ 2,703	F
	TOTALS	$311,782	$132,727

RECOMMENDATIONS: F= FULLY FUND
P= PARTIALLY FUND
N= DO NOT FUND AT THIS TIME

1991 ROLL-OVER FUNDING: PROJECT SYNOPSES

DISTRICT	PROJECT	REQUEST AMOUNT
Aitkin	Critical Area Stabilization on Big Sandy Lake	$3,000

Project to redirect runoff (now flowing through a septic system) from directly reaching Big Sandy Lake by carrying it underground to an area where the intercepted sediment and nutrients can settle out before reaching the lake. Big Sandy is a priority lake, referenced as such in Aitkin's Comprehensive Local Water Plan (CLWP). This project may help to serve as a demonstration site for the information/education efforts of the SWCD as it implements the county comprehensive local water plan.

Anoka	Rice Creek Watershed Streambank Stabilization	$24,000

Rock riprap to be placed along the banks of the creek after the area proposed to be treated (375 feet of streambank) is reshaped. Cost-sharing is also to be made available through the Rice Creek Watershed District. The City of Fridley is also expected to contribute to the project through the repair of a storm drain outlet along the banks of the creek.

Blue Earth	Animal Waste Control System	$11,486

A farmer restarting a once-failed farming operation on this site has requested funding to be able to both repair an existing animal waste control system (through funding from the Ag Stabilization & Conservation Service's Ag Conservation Program, as well as applying for funds from the BWSR) to expand the feedlot. The importance of this project is that it will prevent surficial overland flow carrying nutrients in animal waste from entering the Maple River, directly down-slope from where the existing operation is located.

Blue Earth	Terrace Installation	$1,675

Erosion and sedimentation on a 6-12% slope is of great concern to a landowner who is also interested in also improving the existing farming operation at this site. The project is also being cost-shared with ASCS-ACP funding.

Carver	Stormwater Control System	$65,696

The City of Waconia plans to repair a grass waterway draining to a creek in order to control a drainage/flow problem in a developed part of the community. Apparently, upstream overland flow that is carried into this creek is augmented by the addition of agricultural runoff carried to it via ag drain tiles also located upstream of the project site. The conservation practices to be installed along with the waterway have not been identified in the proposal submitted to the BWSR by the SWCD. Therefore, it is recommended

that this project not be funded at this time, but be considered for SLR funding once a complete application, with additional information is received.

Goodhue Grade Stabilization Structure $4,125

Highly erodible land adjacent to a feedlot needs protection through conservation practice installation so as to lessen the contribution of sediment and nutrients reaching protected waters downstream from this site.

Goodhue Grade Stabilization Structure and Diversion $6,563

Runoff currently causing erosion in the proposed Cannon Falls Elementary School Nature Area will be diverted through installation of both a structure and a drop pipe. The development of the Nature Area will tie in with an existing recreational trail, reduce erosion and sedimentation into the Cannon River, and help to provide the school system with an educational opportunity in conservation. While the overall cost of the stabilization is estimated to be over $80,000, the SWCD is requesting cost-share funding only for the installation of the diversion, grade stabilization structure, drop pipe and outlet.

Lake Streambank/Roadside Stabilization $2,460

The Knife River streambank immediately adjacent to Highway 61 was inundated by a late June storm event believed to approach a 100 year storm's velocity, causing unexpectedly high river flow intensity. The result was that a 270 foot stretch of streambank once stabilized using state Cost-Share Program funds (ten years earlier) washed out to within four feet of the highway. With the assistance of the SWCD, the County Highway Department will re-design and re-install riprap, using blast rock from the Silver Cliff tunnel project. The new protective armor will be capable of withstanding the higher intensity storm/flow events, such as those experienced in June.

Olmsted Terrace Installation ((s):3)) $25,475

Two large terrace/tile installations are parts of ASCS Long Term Agreements (LTAs), and the third terrace is another large-scale installation. All are designed to reduce soil losses on their respective sites down to T (i.e., "Tolerable" limits), as required by an Olmsted County Soil Loss Ordinance. These are shown in priority of their importance in the above project listings.

Ramsey Gully Erosion Control $7,500

Installation of new water and sediment basins, as well as critical area stabilization measures will reduce the erosion taking place on this site. Now part of the Ramsey County Work Farm, it's anticipated that this site will become part of a recreational park in the future.

Red Lake	Erosion Control Structure	$1,350

Two side-inlet structures are proposed to be installed in a public ditch draining into the Lost River, inside the Red Lake Watershed District. These will be installed to control gully erosion that is currently taking place.

Rice	Stormwater Control System	$1,988

Ephemeral gully erosion is occurring on non-highly erodible land. A stormwater control system will be installed to alleviate erosion problems on this site.

Rice	Stormwater Control Structure	$1,613

Highly erodible land in the Little Cannon River watershed is contributing large amounts of sediment to the river through concentrated flow. A stormwater conrol system will be installed to reduce runoff velocity, as well as reducing erosion and sedimentation flowing into the river.

So. St. Louis	Pionk Drive Erosion Control	$22,500

Roadside erosion and resultant sedimentation of a public ditch draining into Kingsbury Creek within the City of Proctor is adversely impacting this designated trout stream. Sediments are ultimately reaching the St. Louis Bay of Lake Superior. Also, public safety is being adversely impacted, as a curve in Pionk Drive is being narrowed due to the erosion of the ditch and the roadway leading into to the Proctor Regional Recreational Center. This project would treat the erosion of the ditch through the installation of rock riprap, as well as installing a new outlet pipe which would carry stormwater away from the critical stretch of roadway, which could then be properly widened to accommodate traffic to the recreational center. Proctor will be contributing half of the project dollars that are needed to complete this project.

So. St. Louis	Lester Park Golf Course Erosion Control	$29,288

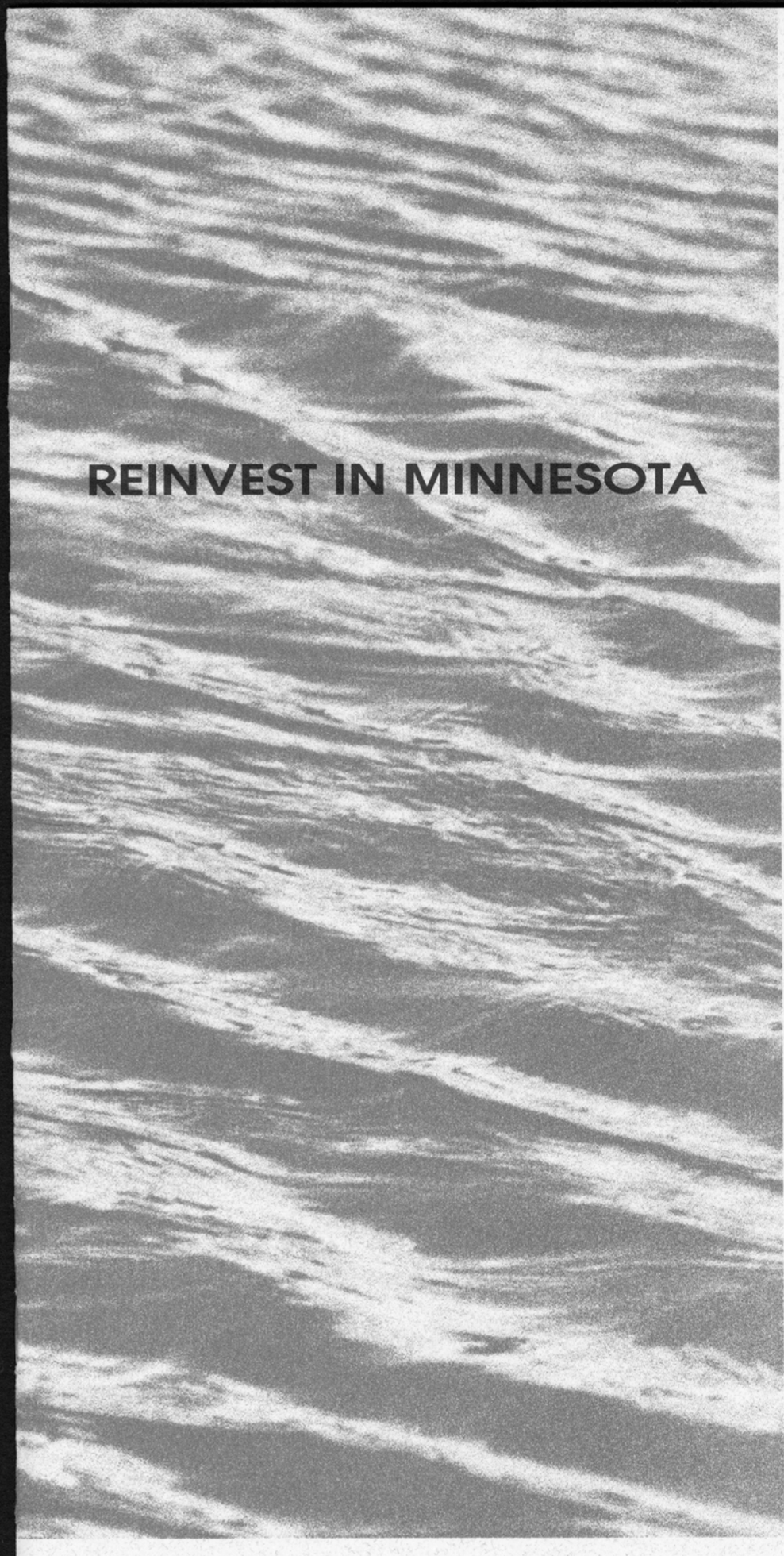
The Lester Park Golf Course expansion is being negatively impacted by erosion which is occurring as a result of terrain, soils, and the presence of a number of underground springs on the site. Much of the sediment being carried from the golf course is being deposited into the Brighton Beach area on Lake Superior. The steps to control the erosion/sedimentation now experienced include a) installing a drainage system, and b) critical area stabilization of the areas to be reshaped (i.e., where the greatest amount of erosion is now taking place). Partial funding of component portions of this project is recommended at this time, with the SWCD to reapply for additional project funding through the SLR/Special Projects allocations for FY92.

Stearns Lake Koronis Erosion Control $100,000

The North Fork Crow River Watershed District has requested that the Stearns SWCD work with landowners on Lake Koronis to solve their erosion and sedimentation problems. Vertical soil banks up to 50 feet high are being eroded into Lake Koronis; this problem was accelerated by a severe rainstorm in September. Four landowners would like Cost-Share funding to be able to reshape and stabilize their lakeshore banks. No information was given as to where matching funding will be gained (i.e., landowners? lake association?), but a second set of owners is also interested in getting such assistance in the future. Private engineering will be sought to assist with this project. Due to the size, scope and nature of this project, it is recommended that this project also be considered for funding through the Special Projects portion of Cost-Share Program funds, to be dispensed after the beginning of FY 1993.

Watonwan Terrace Installation $2,703

Runoff flowing into the North Fork of the Watonwan River is causing severe erosion to occur at the project site. Installation of a terrace system would slow and reduce the runoff entering the river at this point, reducing erosion, sedimentation and degradation of walleye habitat in the river.



REINVEST IN MINNESOTA



RIM

PAYS MINNESOTA THESE DIVIDENDS:

- Protecting and restoring wetlands
- Cleaner water
- Saving rare species
- Better fishing
- More wildlife
- Natural flood control
- Soil protection
- Enhancing tourism
- More local involvement
- More public/private partnerships

ANNUAL REPORT
JANUARY, 1991

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Each year, the Board of Soil and Water Resources and the Department of Natural Resources is required by state statute to report on the projects undertaken and funds encumbered in the fiscal year just ended (FY 1990). The agencies are also required to present a work plan for the expenditure of money from the Reinvest in Minnesota fund for the next fiscal year (FY 1992). The Annual RIM Report is to be submitted to the Senate and House Environment and Agriculture Committees for their review and comments and made available to the public.

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Appendix of Projects Completed in FY 1990
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APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
AITKIN	BRUSHLAND BURN	90-71	92
AITKIN	BRUSHLAND BURN	90-71	25
AITKIN	CRITICAL HABITAT IMPROVEMENT	HOLYWATER WILDLIFE OPENINGS	8
AITKIN	CRITICAL HABITAT IMPROVEMENT	RICE L. WILDLIFE OPENINGS	11
AITKIN	CRITICAL HABITAT IMPROVEMENT	TAMARACK WETLAND ENHANCEMENT	2
AITKIN	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	136
AITKIN	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	3
AITKIN	FISHERIES ACQUISITION	LONG LAKE CREEK TROUT	.7 MI
AITKIN	FOREST WILDLIFE MGMT		111
AITKIN	FOREST WILDLIFE MGMT	90-38	7
AITKIN	FOREST WILDLIFE MGMT	90-38/B	45
AITKIN	FOREST WILDLIFE MGMT	90-38/B	30
AITKIN	FOREST WILDLIFE MGMT	90-38/C	13
AITKIN	FOREST WILDLIFE MGMT	90-38/D	7
AITKIN	FOREST WILDLIFE MGMT	90-38/E	9
AITKIN	FOREST WILDLIFE MGMT	90-38/E	18
AITKIN	FOREST WILDLIFE MGMT	90-38/F	26
AITKIN	WILDLIFE ENHANCEMENT	DEHAVEN ROAD AND TRAIL DEVELOP	.2 MI
AITKIN	WILDLIFE ENHANCEMENT	GRAYLING WMA INLET AND OUTLET IMPROV	1.5 MI
AITKIN	WILDLIFE ENHANCEMENT	HAYPOINT WMA ROAD AND TRAIL DEVELOP	1 MI
AITKIN	WILDLIFE ENHANCEMENT	RICE LAKE HABITAT IMPROVEMENT	1594
			2137
ANOKA	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	15
ANOKA	WILDLIFE ENHANCEMENT	CARLOS AVERY WMA ACCESS DEVELOP	NA
ANOKA	WILDLIFE ENHANCEMENT	CARLOS AVERY WMA CANALS	2.2 MI
ANOKA	WILDLIFE ENHANCEMENT	CARLOS AVERY WMA IMPOUNDMENT	0
			15
BECKER	BRUSHLAND BURN	33101	50
BECKER	BRUSHLAND BURN	33132	70
BECKER	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	10
BECKER	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	3
BECKER	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	11
BECKER	WETLAND RESTORATION WO HIST	HOLMESVILLE	15
BECKER	WILDLIFE ACQUISITION	HUBBEL POND WMA	115
BECKER	WILDLIFE ACQUISITION	HUBBEL POND WMA	120
BECKER	WILDLIFE ENHANCEMENT	LOWE WMA FOREST REGENERATION	35
			428
BELTRAMI	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	20
BELTRAMI	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	3
BELTRAMI	SENSITIVE GROUND WATER - 20 YR	SUMMIT	31
BELTRAMI	WILDLIFE ACQUISITION	WOODROW PEDIOCETES WMA	70
BELTRAMI	WILDLIFE ENHANCEMENT	BELTRAMI IS SF REGENERATION	364
BELTRAMI	WILDLIFE ENHANCEMENT	MECHANICAL REGENERATION	460
BELTRAMI	WILDLIFE ENHANCEMENT	MOOSE R WMA FOEREST REGENERATION	447
BELTRAMI	WILDLIFE ENHANCEMENT	RED L WMA BURN REGENERATION	57
BELTRAMI	WILDLIFE ENHANCEMENT	RED L WMA SH GROUSE BURN ENHANCMNT	48
BELTRAMI	WILDLIFE ENHANCEMENT	RED LAKE WMA FOREST REGENERATION	691
BELTRAMI	WILDLIFE ENHANCEMENT	SHARPTAIL FOREST REGENERATION	190
			2381
BENTON	FISHERIES ACQUISITION	LITTLE ROCK CREEK TROUT	2 MI
BENTON	MARGINAL AG LAND - 20 YR	GLENDORADO	43
BENTON	SENSITIVE GROUND WATER - 20 YR	E. LANGOLA	8
BENTON	WETLAND RESTORATION	MAYHEW LAKE	65
BENTON	WETLAND RESTORATION	MAYHEW LAKE	41
			157
BIG STONE	PRAIRIE BANK	JOHNSON PRAIRIE	177
BROWN	CRITICAL HABITAT ACQUISITION	SOUTHEAST HANSKA WMA	39
BROWN	FISHERIES ENHANCEMENT	LAKE HANSKA REHABILITATION	1844
BROWN	LAND DONATION	SOUTHEAST HANSKA WMA	39
BROWN	RIPARIAN LANDS - PERP.	N. MILFORD	33
BROWN	RIPARIAN LANDS - PERP.	SIGEL	32
BROWN	RIPARIAN LANDS - PERP.	STATELY	47
			2035
CARLTON	BRUSHLAND BURN	230873	450
CARLTON	BRUSHLAND BURN	32194	367
CARLTON	BRUSHLAND BURN	32529	12
CARLTON	BRUSHLAND BURN	FON DU LAC SF	745
CARLTON	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	37
CARLTON	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-FIREBREAK	1
CARLTON	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	3
CARLTON	FOREST WILDLIFE MGMT	230897	975
CARLTON	FOREST WILDLIFE MGMT	230897	808
CARLTON	WILDLIFE ACQUISITION	BLACKHOOF R. WMA	80
CARLTON	WILDLIFE ENHANCEMENT	FON DU LAC ST FOREST FIREBREAKS	10 MI
CARLTON	WILDLIFE ENHANCEMENT	FOND DU LAC SF REGENERATION	975
CARLTON	WILDLIFE ENHANCEMENT	LITTLE FOX FOREST OPENING IMPROVEMNT	28
			4480
CARVER	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	6
CARVER	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING SCHNEEWND WMA	2
			8

APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
CASS	CRITICAL HABITAT IMPROVEMENT	TASHER ISLAND DEER YARD OPENINGS	20
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	135
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	6
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	11
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	23
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	2
CASS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	10
CASS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	12
CASS	FISH CULTURE	SPIRE VALLEY HATCHERY	NA
CASS	FOREST WILDLIFE MGMT	90-FB-12	7
CASS	FOREST WILDLIFE MGMT	90-WBR-1	5
CASS	WILDLIFE ENHANCEMENT	BULL MOOSE DEER YD REGENERATION	15
CASS	WILDLIFE ENHANCEMENT	CHIPPEWA FOREST OPEN DEVELOPMENT	51
CASS	WILDLIFE ENHANCEMENT	ROTARY-AX CASS L REGEN.	50
			346
CHIPPEWA	MARGINAL AG LAND - PERP.	BIG BEND	9
CHIPPEWA	PRAIRIE BURN	CUKA WMA	41
CHIPPEWA	PRAIRIE BURN	LAC QUI PARLE WMA	316
CHIPPEWA	WETLAND RESTORATION	LONE TREE	69
CHIPPEWA	WETLAND RESTORATION	LONE TREE	102
CHIPPEWA	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT LAC Q PARLE	70
CHIPPEWA	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING LQP WMA	5
			611
CHISAGO	MARGINAL AG LAND - 20 YR	AMADOR	10
CHISAGO	WETLAND RESTORATION	AMADOR	11
CHISAGO	WILDLIFE ACQUISITION	CARLOS AVERY WMA	4
CHISAGO	WILDLIFE ENHANCEMENT	CARLOS AVERY WMA SUNRISE ACCESS	2.5 MI
			25
CLAY	BRUSHLAND BURN	33193	90
CLAY	MARGINAL AG LAND - 20 YR	TANSEM	5
CLAY	MARGINAL AG LAND - PERP.	GLYNDON	19
CLAY	PRAIRIE BANK	STRAND PRAIRIE	200
CLAY	WETLAND RESTORATION	HAWLEY	117
CLAY	WETLAND RESTORATION	HAWLEY	117
CLAY	WILDLIFE ENHANCEMENT	BJORNSON ROAD DEVELOP	.2 MI
			598
CLEARWATER	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	2
COOK	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	7
COOK	WILDLIFE ENHANCEMENT	AREA WIDE FOREST OPENING DEVELOP	65
COOK	WILDLIFE ENHANCEMENT	LAKE SUPERIOR FOREST OPENING DEVELOP	189
COOK	WILDLIFE ENHANCEMENT	PAT BAYLE ST FOREST OPENING DEVELOP	15
COOK	WILDLIFE ENHANCEMENT	REGENERATION MISC DNR LANDS	37
			313
COTTONWOOD	LIVING SNOW FENCE - PERP	GERMANTOWN	7
COTTONWOOD	MARGINAL AG LAND - PERP.	DELTON	11
COTTONWOOD	MARGINAL AG LAND - PERP.	GERMANTOWN	26
COTTONWOOD	MARGINAL AG LAND - PERP.	MT. LAKE	14
COTTONWOOD	MARGINAL AG LAND - PERP.	WESTBROOK	19
COTTONWOOD	PASTURED HILLSIDES - PERP.	GERMANTOWN	15
COTTONWOOD	PASTURED HILLSIDES - PERP.	LAKESIDE	23
COTTONWOOD	PASTURED HILLSIDES - PERP.	ROSEHILL	26
COTTONWOOD	RIPARIAN LANDS - PERP.	STORDEN	4
COTTONWOOD	SENSITIVE GROUND WATER - PERP.	STORDEN	25
COTTONWOOD	WETLAND RESTORATION	SOUTHBROOK	42
COTTONWOOD	WILDLIFE ACQUISITION	LITTLE SWAN WMA	25
COTTONWOOD	WILDLIFE ENHANCEMENT	BENNETT WMA ACCESS	.5 MI
COTTONWOOD	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING DELFT WMA	9
COTTONWOOD	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING BANKS WMA	5
COTTONWOOD	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING EXPANDERE WMA	12
COTTONWOOD	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING L SWAN WMA	7
			270
CROW WING	CRITICAL HABITAT IMPROVEMENT	HESITATION STRUCTURE	22
CROW WING	FOREST WILDLIFE MGMT	90-F-12	4
			26
DAKOTA	MARGINAL AG LAND - 20 YR	WATERFORD	2
DODGE	CRITICAL HABITAT ACQUISITION	PHEASANTS FOREVER WMA	36
DODGE	CRITICAL HABITAT ACQUISITION	PHEASANTS FOREVER WMA	25
DODGE	LAND DONATION	PHEASANTS FOREVER WMA	36
DODGE	LAND DONATION	PHEASANTS FOREVER WMA	25
DODGE	PRAIRIE BURN	HYTHECKER SNA	25
DODGE	PRAIRIE BURN	IRON HORSE SNA	8
DODGE	RIPARIAN LANDS - PERP.	CANISTEO	15
			170
DOUGLAS	MARGINAL AG LAND - PERP.	HOLMES CITY	6
DOUGLAS	WETLAND RESTORATION	ALEXANDRIA	54
DOUGLAS	WETLAND RESTORATION	BELLE RIVER	32
DOUGLAS	WETLAND RESTORATION	BRANDON	54
DOUGLAS	WETLAND RESTORATION	CARLOS	12
DOUGLAS	WETLAND RESTORATION	MILTONA	3
DOUGLAS	WETLAND RESTORATION	ORANGE	54
DOUGLAS	WETLAND RESTORATION	ORANGE	26
DOUGLAS	WETLAND RESTORATION	SPRUCE HILL	54
			295

APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
FARIBAULT	MARGINAL AG LAND - PERP.	DELAVAN	6
FARIBAULT	SENSITIVE GROUND WATER - 20 YR	WINNEBAGO	27
FARIBAULT	SENSITIVE GROUND WATER - PERP.	FOSTER	27
FARIBAULT	WETLAND RESTORATION	JO DAVIESS	54
			489
FILLMORE	FISH CULTURE	PETERSON HATCHERY	NA
FILLMORE	PRAIRIE BURN	AREA WIDE WMA'S	34
FILLMORE	PRAIRIE BURN	AREA WIDE WMA'S	35
FILLMORE	WILDLIFE ENHANCEMENT	GOETHITE WMA FENCING	NA
FILLMORE	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	8
			679
FREEBORN	WETLAND RESTORATION	BATH	10
GOODHUE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	1
GOODHUE	MARGINAL AG LAND - PERP.	LEON	5
GOODHUE	PASTURED HILLSIDES - 20 YR	BELVIDERE	17
GOODHUE	PASTURED HILLSIDES - PERP.	GOODHUE	24
GOODHUE	PASTURED HILLSIDES - PERP.	LEON	10
GOODHUE	SENSITIVE GROUND WATER - 20 YR	CANNON FALLS	8
			65
HENNEPIN	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	10
HENNEPIN	FISHERIES ENHANCEMENT	RILEY CREEK BARRIER	300
			310
HOUSTON	PASTURED HILLSIDES - PERP.	CROOKED CREEK	56
HOUSTON	PASTURED HILLSIDES - PERP.	WINNEBAGO	43
			99
HUBBARD	BRUSHLAND BURN	32979	81
HUBBARD	BRUSHLAND BURN	33009	219
HUBBARD	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-FIREBREAK	1
HUBBARD	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	18
HUBBARD	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	27
HUBBARD	PRAIRIE BURN	COUNTY FOREST LANDS	650
			996
ISANTI	CRITICAL HABITAT IMPROVEMENT	MARGET L. CONTROL	250
ISANTI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	5
ISANTI	WETLAND RESTORATION	NORTH BRANCH	5
ISANTI	WETLAND RESTORATION	SPENCER BROOK	6
			266
ITASCA	CRITICAL HABITAT IMPROVEMENT	FIGURE 8 RUFFED GROUSE	2 MI
ITASCA	CRITICAL HABITAT IMPROVEMENT	JINGO L. PROJECT	40
ITASCA	CRITICAL HABITAT IMPROVEMENT	THIRD R. RUFFED GROUSE UNIT	15
ITASCA	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	23
ITASCA	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	13
ITASCA	WILDLIFE ENHANCEMENT	GATE INSTALLATION - 8	NA
ITASCA	WILDLIFE ENHANCEMENT	WATER LEVEL MANAGEMENT PUBL WATERS	4000
			4090
JACKSON	PASTURED HILLSIDES - 20 YR	CHRISTIANIA	32
JACKSON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING SANGL WMA	20
JACKSON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING VALLEAU WMA	22
JACKSON	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING ILLINOIS WMA	3
			77
KANABEC	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	120
KANABEC	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-TREE PLANT	1
KANABEC	FISHERIES ENHANCEMENT	KNIFE LAKE REHABILITATION	1200
			1321
KANDIYOHI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	20
KANDIYOHI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	11
KANDIYOHI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	7
KANDIYOHI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	9
KANDIYOHI	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	41
KANDIYOHI	WETLAND RESTORATION	EDWARDS	17
KANDIYOHI	WETLAND RESTORATION	WILLMAR	17
KANDIYOHI	WETLAND RESTORATION	WILLMAR	57
KANDIYOHI	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	19
KANDIYOHI	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING ON WMAS	5
			203
KITTSON	BRUSHLAND BURN	28-12-90	900
KITTSON	BRUSHLAND BURN	29-12-90	110
KITTSON	PRAIRIE BURN	BEACHES WMA	900
KITTSON	PRAIRIE BURN	TWIN LAKES WMA	110
KITTSON	WILDLIFE ACQUISITION	HALMA SWAMP WMA	307
KITTSON	WILDLIFE ENHANCEMENT	TWIN LAKES WMA ROAD IMPROVEMENT	1 MI
			2327
KOOCHICHING	CRITICAL HABITAT IMPROVEMENT	BEAVER BROOK OPENINGS	35
KOOCHICHING	CRITICAL HABITAT IMPROVEMENT	FLOWING WELL OPENINGS	48
KOOCHICHING	CRITICAL HABITAT IMPROVEMENT	LITTLE L. OPENINGS	42
KOOCHICHING	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	36
KOOCHICHING	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	6
KOOCHICHING	FOREST WILDLIFE MGMT	201398	213
KOOCHICHING	FOREST WILDLIFE MGMT	32994	5MI
KOOCHICHING	WILDLIFE ENHANCEMENT	FLOWING WELL FOREST OPEN DEVELOP	48
KOOCHICHING	WILDLIFE ENHANCEMENT	LITTLE BEAVER FOR OPENING DEVELOP	78
			506

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COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
LAC QUI PARLE	MARGINAL AG LAND - PERP.	MCHURIN	5
LAC QUI PARLE	MARGINAL AG LAND - PERP.	MEHURIN	23
LAC QUI PARLE	PRAIRIE BURN	AREA WIDE WMAS	37
LAC QUI PARLE	PRAIRIE BURN	AREA WIDE WMAS	22
LAC QUI PARLE	WILDLIFE ENHANCEMENT	AREA WIDE GRASS SEEDING	21
LAC QUI PARLE	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	126
LAC QUI PARLE	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	18
LAC QUI PARLE	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING ON WMAS	2
			254
LAKE	CRITICAL HABITAT IMPROVEMENT	FERMAN L. BROWSE #2	45
LAKE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	23
LAKE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	6
LAKE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-TREE PLANT	1
LAKE	FOREST WILDLIFE MGMT ASP	225-908	125
LAKE	WILDLIFE ENHANCEMENT	AREA WIDE FOREST OPENING DEVELOP	9
LAKE	WILDLIFE ENHANCEMENT	FINLAND SF GRASS SEEDING	11
LAKE	WILDLIFE ENHANCEMENT	OSIER LAKE REGENERATION	23
LAKE	WILDLIFE ENHANCEMENT	OSIER LAKE REGENERATION SUPERIOR NF	21
LAKE	WILDLIFE ENHANCEMENT	REGENERATION DNR LANDS	94
LAKE	WILDLIFE ENHANCEMENT	REGENERATION SUPERIOR NF	48
			406
LAKE OF THE WOODS	BRUSHLAND BURN	32886	18
LAKE OF THE WOODS	BRUSHLAND BURN	32917	40
LAKE OF THE WOODS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	29
LAKE OF THE WOODS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	45
LAKE OF THE WOODS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-FIREBREAK	2
LAKE OF THE WOODS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	16
LAKE OF THE WOODS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	23
LAKE OF THE WOODS	FOREST WILDLIFE MGMT	32690	28
LAKE OF THE WOODS	FOREST WILDLIFE MGMT	38-89	21
LAKE OF THE WOODS	FOREST WILDLIFE MGMT	41-89	11
LAKE OF THE WOODS	FOREST WILDLIFE MGMT	51-88	6
LAKE OF THE WOODS	FOREST WILDLIFE MGMT	51-88-2	6
LAKE OF THE WOODS	FOREST WILDLIFE MGMT ASP	15-89	14
LAKE OF THE WOODS	FOREST WILDLIFE MGMT ASP	34-87	16
LAKE OF THE WOODS	WILDLIFE ENHANCEMENT	FOR WILD DEMONSTRATION	60
LAKE OF THE WOODS	WILDLIFE ENHANCEMENT	MECHANICAL REGENERATION	263
			597
LE SUEUR	CRITICAL HABITAT ACQUISITION	DOVE LAKE WMA	104
LE SUEUR	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	12
LE SUEUR	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	7
LE SUEUR	LAND DONATION	DOVE LAKE WMA	104
LE SUEUR	MARGINAL AG LAND - 20 YR	MONTGOMERY	10
			237
LINCOLN	WETLAND RESTORATION	MARSHFIELD	13
LINCOLN	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING TYLER WMA	18
LINCOLN	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING SALIX WMA	2
			33
LYON	CRITICAL HABITAT IMPROVEMENT	COON CREEK STRUCTURE	95
LYON	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	21
LYON	MARGINAL AG LAND - PERP.	LAKE MARSHALL	12
LYON	PRAIRIE BURN	SODUS WMA	6
LYON	PRAIRIE BURN	VALLERS WMA	80
LYON	WILDLIFE ACQUISITION	GREEN VALLEY WMA	188
LYON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING LINES WMA	20
LYON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING LODUS WMA	9
LYON	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING GRANDVIEW WMA	14
			445
MARSHALL	BRUSHLAND BURN	22-12-90	200
MARSHALL	BRUSHLAND BURN	34-12-90	250
MARSHALL	BRUSHLAND BURN	45-12-90	158
MARSHALL	BRUSHLAND BURN	46-12-90	35
MARSHALL	BRUSHLAND BURN	54-12-90	380
MARSHALL	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	76
MARSHALL	PRAIRIE BURN	EAST PARK WMA	520
MARSHALL	PRAIRIE BURN	ELM LAKE WMA	250
MARSHALL	WILDLIFE ENHANCEMENT	ELM L WMA	120
MARSHALL	WILDLIFE ENHANCEMENT	FOREST REGENERATION THEIF LAKE WMA	729
MARSHALL	WILDLIFE ENHANCEMENT	FOREST REGENERATION WAPITI WMA	670
			3388
MARTIN	RIPARIAN LANDS - PERP.	GALENA	22
MARTIN	SENSITIVE GROUND WATER - 20 YR	LAKE BELT	6
MARTIN	WETLAND RESTORATION	FOX LAKE	70
MARTIN	WETLAND RESTORATION	TENHASSEN	46
			143
MCLEOD	CRITICAL HABITAT ACQUISITION	DEUTSCH WMA	40
MCLEOD	LAND DONATION	DEUTSCH WMA	40
MCLEOD	MARGINAL AG LAND - PERP.	SUMTER	21
MCLEOD	WETLAND RESTORATION	ACOMA	44
MCLEOD	WETLAND RESTORATION	ACOMA	42
MCLEOD	WETLAND RESTORATION	PENN	14
			200

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COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
MEEKER	MARGINAL AG LAND - PERP.	SWEDE GROVE	3
MEEKER	RIPARIAN LANDS - PERP.	FOREST CITY	16
MEEKER	WETLAND RESTORATION	MANANNAH	56
MEEKER	WETLAND RESTORATION WO HIST	CEDAR MILLS	56
MEEKER	WETLAND RESTORATION WO HIST	DANIELSON	30
			161
MILLE LACS	MARGINAL AG LAND - 20 YR		43
MILLE LACS	WETLAND RESTORATION	PRINCETON	12
MILLE LACS	WETLAND RESTORATION WO HIST	PAGE	43
MILLE LACS	WILDLIFE ENHANCEMENT	MILLE LACS WMA GRASS SEEDING	15
MILLE LACS	WILDLIFE ENHANCEMENT	MILLE LACS WMA OPEN WATER DEVELOP	6
MILLE LACS	WILDLIFE ENHANCEMENT	RUM R. SF ROAD DEVELOP	2 MI
			119
MORRISON	MARGINAL AG LAND - PERP.	N. BUCKMAN	6
MORRISON	PASTURED HILLSIDES - PERP.	BELLE PRAIRIE	10
MORRISON	PASTURED HILLSIDES - PERP.	GRANITE	51
MORRISON	SENSITIVE GROUND WATER - 20 YR	BELLEVUE	8
MORRISON	SENSITIVE GROUND WATER - 20 YR	TWO RIVERS	47
MORRISON	WETLAND RESTORATION	N. BUCKMAN	18
MORRISON	WETLAND RESTORATION WO HIST	ELMDALE	51
			190
MOWER	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	1
MOWER	PRAIRIE BURN	RACINE PRAIRIE SNA	6
MOWER	PRAIRIE BURN	WILD INDIGO SNA	10
MOWER	RIPARIAN LANDS - 20 YR	LODI	38
MOWER	RIPARIAN LANDS - 20 YR	LYLE	6
MOWER	RIPARIAN LANDS - PERP.	AUSTIN	15
MOWER	RIPARIAN LANDS - PERP.	LYLE	5
MOWER	RIPARIAN LANDS - PERP.	SARGEANT	29
MOWER	WILDLIFE ENHANCEMENT	NELSON FEN WMA GATE INSTALLATION	NA
			111
MURRAY	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	2
MURRAY	PASTURED HILLSIDES - PERP.	DOURAY	54
MURRAY	PRAIRIE BURN	KLINKER WMA	11
MURRAY	PRAIRIE BURN	PETERS WMA	27
MURRAY	PRAIRIE BURN	TALCOT LAKE WMA	50
MURRAY	PRAIRIE BURN	TALCOT LAKE WMA	200
MURRAY	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING BUDOFSON WMA	17
MURRAY	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING WAJER WMA	11
MURRAY	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	10
			382
NICOLLET	CRITICAL HABITAT ACQUISITION	SWAN L.-TRIISLAND SUPPLE.	4
NICOLLET	CRITICAL HABITAT ACQUISITION	SWAN L.-TRIISLAND SUPPLE.	33
NICOLLET	CRITICAL HABITAT IMPROVEMENT	ROADSIDE SEEDING-HIGHWAY 15	70
NICOLLET	LAND DONATION	SWAN L.-TRIISLAND SUPPLE.	4
NICOLLET	LAND DONATION	SWAN L.-TRIISLAND SUPPLE.	33
NICOLLET	MARGINAL AG LAND - 20 YR	COURTLAND	5
			148
NOBLES	CRITICAL HABITAT ACQUISITION	LAKE BELLA WMA	53
NOBLES	LAND DONATION	LAKE BELLA WMA	53
NOBLES	PRAIRIE BURN	FULDA WMA	15
NOBLES	WILDLIFE ENHANCEMENT	HERLEIN BOOTE WMA ACCESS DEVELOP	.6 MI
NOBLES	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING ERICKSON WMA	6
NOBLES	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING FULDA WMA	14
NOBLES	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING LAKE BELLA WMA	35
NOBLES	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING WAJER WMA	4
			180
NORMAN	RIPARIAN LANDS - PERP.	FLOM	5
OLMSTED	MARGINAL AG LAND - PERP.	HAVERHILL	5
OLMSTED	PASTURED HILLSIDES - 20 YR	ROCK DELL	25
OLMSTED	PRAIRIE BURN	FUGLE'S MILL	10
OLMSTED	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING AREA WIDE WMAS	10
			50
OTTER TAIL	BRUSHLAND BURN	13-16-90	16
OTTER TAIL	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	11
OTTERTAIL	WILDLIFE ENHANCEMENT	AREA WIDE GRASS SEEDING	14
OTTERTAIL	WILDLIFE ENHANCEMENT	ORWELL ROAD DEVELOP	NA
			41
PINE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	397
PINE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	3
PINE	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-SEEDINGS	75
PINE	FISH CULTURE	HINCKLEY HATCHERY	NA
PINE	FISH CULTURE	HINCKLEY MUSKY PONDS	NA
			475
PIPESTONE	CRITICAL HABITAT ACQUISITION	RINGNECK RIDGE WMA	40
PIPESTONE	LAND DONATION	RINGNECK RIDGE WMA	40
PIPESTONE	PRAIRIE BURN	AREA WIDE SNAS	13
PIPESTONE	PRAIRIE BURN	PIPESTONE WMA	26
PIPESTONE	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING RINGNECK RIDGE WM	13
			132

APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
POLK	CRITICAL HABITAT ACQUISITION	DUGDALE WMA	54
POLK	CRITICAL HABITAT ACQUISITION	DUGDALE WMA	106
POLK	LAND DONATION	DUGDALE WMA	54
POLK	LAND DONATION	DUGDALE WMA	106
POLK	PRAIRIE BURN	BURNHAM WMA	41
POLK	PRAIRIE BURN	CHICOG WMA	478
POLK	PRAIRIE BURN	DUGDALE WMA	199
POLK	PRAIRIE BURN	FOXBORO WMA	68
POLK	PRAIRIE BURN	KERTSONVILLE WMA	135
POLK	PRAIRIE BURN	STIPA WMA	22
POLK	WILDLIFE ENHANCEMENT	BURNHAM WMA - MDHA COOP SHEARING	7
POLK	WILDLIFE ENHANCEMENT	LIBERTY WMA - MDHA COOP SHEARING	36
POLK	WILDLIFE ENHANCEMENT	MAPLE MEADOWS - MDHA COOP SHEARING	2
POLK	WILDLIFE ENHANCEMENT	TRAIL WMA - MDHA COOP SHEARING	2
			1310
POPE	MARGINAL AG LAND - PERP.	BLUE MOUNDS	15
POPE	RIPARIAN LANDS - PERP.	BLUE MOUNDS	14
POPE	WETLAND RESTORATION	WHITE BEAR LAKE	69
POPE	WETLAND RESTORATION	WHITE BEAR LAKE	40
POPE	WETLAND RESTORATION	WHITE BEAR LAKE	69
			207
RAMSEY	CRITICAL HABITAT IMPROVEMENT	ECHO CAVE BAT GATE	1
RED LAKE	MARGINAL AG LAND - PERP.	TERREBONNE	5
REDWOOD	MARGINAL AG LAND - PERP.	DELHI	39
REDWOOD	RIPARIAN LANDS - PERP.	SHERIDAN	58
REDWOOD	RIPARIAN LANDS - PERP.	SHERMAN	24
REDWOOD	RIPARIAN LANDS - PERP.	VESTA	4
REDWOOD	WILDLIFE ENHANCEMENT	KLABUNDE PRAIRIE GRASS SEEDING	14
			143
RENVILLE	CRITICAL HABITAT ACQUISITION	BOON L. SLOUGH WMA	58
RENVILLE	LAND DONATION	BOON L. SLOUGH WMA	58
RENVILLE	MARGINAL AG LAND - PERP.	BEAVER FALLS	3
RENVILLE	MARGINAL AG LAND - PERP.	BIRCH COOLEY	14
RENVILLE	MARGINAL AG LAND - PERP.	ERICSON	13
RENVILLE	MARGINAL AG LAND - PERP.	TROY	9
RENVILLE	MARGINAL AG LAND - PERP.	TROY	26
RENVILLE	RIPARIAN LANDS - PERP.	BIRCH COOLEY	25
RENVILLE	RIPARIAN LANDS - PERP.	LOWER BIRCH COOLEY	43
RENVILLE	RIPARIAN LANDS - PERP.	LOWER BIRCH COOLEY	6
RENVILLE	RIPARIAN LANDS - PERP.	TROY	17
RENVILLE	RIPARIAN LANDS - PERP.	WANG	24
RENVILLE	RIPARIAN LANDS - PERP.	WANG	12
RENVILLE	WETLAND RESTORATION	BOON LAKE	80
RENVILLE	WETLAND RESTORATION	ERICSON	35
RENVILLE	WETLAND RESTORATION WO HIST	ERICSON	37
RENVILLE	WILDLIFE ENHANCEMENT	BOON LAKE WMA WETLAND RESTORATION	1
RENVILLE	WILDLIFE ENHANCEMENT	BOON LAKE WMA WOODY COVER PLANTING	3
			465
RICE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	1
RICE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	9
RICE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	1
RICE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	5
RICE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	15
RICE	PRAIRIE BURN	SAKATAH LAKE SP	13
			44
ROCK	MARGINAL AG LAND - 20 YR	LUVERNE	7
ROSEAU	BRUSHLAND BURN	32916	20
ROSEAU	BRUSHLAND BURN	32944	5
ROSEAU	BRUSHLAND BURN	32975	10
ROSEAU	BRUSHLAND BURN	33005	55
ROSEAU	BRUSHLAND BURN	33066	15
ROSEAU	CRITICAL HABITAT ACQUISITION	ROSEAU LAKE WMA	158
ROSEAU	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	10
ROSEAU	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	45
ROSEAU	LAND DONATION	ROSEAU LAKE WMA	158
ROSEAU	WILDLIFE ENHANCEMENT	BELTRAMI IS SF REGENERATION	96
ROSEAU	WILDLIFE ENHANCEMENT	MECHANICAL REGENERATION	223
ROSEAU	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING ROSEAU R WMA	80
ROSEAU	WILDLIFE ENHANCEMENT	ROSEAU R WMA FIREBREAK DEVELOPMENT	1 MI
ROSEAU	WILDLIFE ENHANCEMENT	ROSEAU R WMA FOOD/COVER PLANTINGS	300
			1176
SCOTT	CRITICAL HABITAT ACQUISITION	SAVAGE FEN SNA	3
SCOTT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	8
SCOTT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	3
SCOTT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	2
SCOTT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	4
SCOTT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	4
SCOTT	FISHERIES ENHANCEMENT	CARLS LAKE NPSA	140
SCOTT	LAND DONATION	SAVAGE FEN SNA	3
SCOTT	MARGINAL AG LAND - PERP.	BELLE PLAINE	5
SCOTT	WILDLIFE ENHANCEMENT	BRADSHAW LAKE WMA ACCESS DEVELOP	.1 MI
SCOTT	WILDLIFE ENHANCEMENT	BRADSHAW LAKE WMA TRAIL DEVELOP	.2 MI

APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
SCOTT	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING BRADSHAW LAKE	2
SCOTT	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING MICHEL WMA	2
			174
SHERBURNE	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	3
SIBLEY	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	6
SIBLEY	MARGINAL AG LAND - PERP.	GREEN ISLE	6
SIBLEY	MARGINAL AG LAND - PERP.	HENDERSON	12
SIBLEY	WETLAND RESTORATION	GREEN ISLE	10
SIBLEY	WETLAND RESTORATION	JESSENLAND	35
SIBLEY	WETLAND RESTORATION	WASHINGTON LAKE	5
SIBLEY	WETLAND RESTORATION	WASHINGTON LAKE	4
SIBLEY	WETLAND RESTORATION WO HIST	ARLINGTON	40
			117
ST LOUIS	BRUSHLAND BURN	FON DU LAC SF	53
ST. LOUIS	CRITICAL HABITAT IMPROVEMENT	BUCK FEVER	93
ST. LOUIS	CRITICAL HABITAT IMPROVEMENT	BUCK SNORT	75
ST. LOUIS	CRITICAL HABITAT IMPROVEMENT	FLOODWOOD R. TRAIL OPENINGS	32
ST. LOUIS	CRITICAL HABITAT IMPROVEMENT	HALEY 73 MOOSELINE	28
ST. LOUIS	CRITICAL HABITAT IMPROVEMENT	RADIO ROAD WILDLIFE OPENINGS	44
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BRUSHLAND	112
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-FIREBREAK	8
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-OPENINGS	20
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-TIMBER MGMT	3
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-TREE PLANT	1
ST. LOUIS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	2
ST. LOUIS	FOREST WILDLIFE MGMT		80
ST. LOUIS	PRAIRIE BURN	OWENS WMA	23
ST. LOUIS	WILDLIFE ENHANCEMENT	BUCK SNORT FOREST OPENING DEVELOP	60
ST. LOUIS	WILDLIFE ENHANCEMENT	CANOSIA WMA E.DIKE OUTLET STRUCTURE	20
ST. LOUIS	WILDLIFE ENHANCEMENT	DEER TRACKER HAB DEVELOP SUPERIOR NF	15
ST. LOUIS	WILDLIFE ENHANCEMENT	DEER TRACKER HABITAT DEVEL	270
ST. LOUIS	WILDLIFE ENHANCEMENT	DEER TRACKER HABITAT DEVELOP	27
ST. LOUIS	WILDLIFE ENHANCEMENT	ECHO LK WMA HABITAT DEVELOPMENT	4
ST. LOUIS	WILDLIFE ENHANCEMENT	FRENCH TWP FOREST OPEN DEVELOP	31
ST. LOUIS	WILDLIFE ENHANCEMENT	GREAT SCOTT WMA TRAIL DEVELOP	11 MI
ST. LOUIS	WILDLIFE ENHANCEMENT	KOZ ROAD FOREST REGENERATION	8
ST. LOUIS	WILDLIFE ENHANCEMENT	KOZ ROAD AND TRAIL DEVELOP	1 MI
ST. LOUIS	WILDLIFE ENHANCEMENT	OWENS WMA HABITAT DEVELOP	75
ST. LOUIS	WILDLIFE ENHANCEMENT	SACS WETLAND RESTORATION	2555
ST. LOUIS	WILDLIFE ENHANCEMENT	SIDE LK DIST FOREST OPEN IMPROVMENT	91
ST. LOUIS	WILDLIFE ENHANCEMENT	ST. LOUIS CO FOREST REGENERATION	207
			3937
STEARNS	CRITICAL HABITAT ACQUISITION	WINTER WMA	160
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	20
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	30
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	5
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	25
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	12
STEARNS	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	2
STEARNS	FISHERIES ACQUISITION	LUXEMBORG CREEK TROUT	.3 MI
STEARNS	LAND DONATION	WINTER WMA	160
STEARNS	WETLAND RESTORATION	LAKE HENRY	33
STEARNS	WILDLIFE ENHANCEMENT	AREA WIDE WMA GATE INSTALLATION - 5	NA
STEARNS	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	65
			512
STEELE	MARGINAL AG LAND - 20 YR	HAVANNA	4
STEELE	MARGINAL AG LAND - PERP.	BERLIN	13
STEELE	PRAIRIE BURN	RICE LAKE SP	50
			68
STEVENS	MARGINAL AG LAND - PERP.	EVERGLADE	11
STEVENS	MARGINAL AG LAND - PERP.	STEVENS	22
STEVENS	PASTURED HILLSIDES - 20 YR	HORTON	42
STEVENS	RIPARIAN LANDS - 20 YR	STEVENS	15
STEVENS	SENSITIVE GROUND WATER - PERP.	SWAN LAKE	80
			170
SWIFT	CRITICAL HABITAT ACQUISITION	CLAIR ROLLINGS WMA	180
SWIFT	DNR-PRIVATE LAND HABITAT PROJ	WETLAND RESTORATION	54
SWIFT	LAND DONATION	CLAIR ROLLINGS WMA	180
SWIFT	MARGINAL AG LAND - PERP.	FAIRFIELD	20
SWIFT	MARGINAL AG LAND - PERP.	KERKHOVEN	36
SWIFT	MARGINAL AG LAND - PERP.	SWENODA	41
SWIFT	RIPARIAN LANDS - PERP.	FAIRFIELD	21
SWIFT	WETLAND RESTORATION	SWENODA	12
			544
TODD	WILDLIFE ENHANCEMENT	ELGIN WOODS WMA NEST STRUCTURES - 6	NA
TODD	WILDLIFE ENHANCEMENT	L PRAIRIE R WMA NEST STRUCTURES - 50	NA
TODD	WILDLIFE ENHANCEMENT	LAWRENCE WMA NESTING STRUCTURES -7	NA
TODD	WILDLIFE ENHANCEMENT	STAPLES WMA NESTING STRUCTURES - 6	NA
			0
TRAVERSE	MARGINAL AG LAND - PERP.	WALLS	16
TRAVERSE	WETLAND RESTORATION	WALLS	31
TRAVERSE	WETLAND RESTORATION	WALLS	27
			74

APPENDIX TO 1991 ANNUAL RIM REPORT - PROJECTS COMPLETED FY 1990

COUNTY	RIM ACTIVITY	PROJECT	ACRES/MI
WABASHA	FISHERIES ACQUISITION	GILBERT CREEK TROUT	.9 MI
WABASHA	FISHERIES ACQUISITION	TROUT CREEK TROUT	.7 MI
WABASHA	MARGINAL AG LAND - PERP.	HIGHLAND	6
WABASHA	MARGINAL AG LAND - PERP.	HYDE PARK	5
WABASHA	PASTURED HILLSIDES - PERP.	GLASGLOW	42
WABASHA	PASTURED HILLSIDES - PERP.	GLASGOW	54
WABASHA	PASTURED HILLSIDES - PERP.	HIGHLAND	51
WABASHA	PASTURED HILLSIDES - PERP.	OAKWOOD	33
WABASHA	PASTURED HILLSIDES - PERP.	PLAINVIEW	54
WABASHA	PRAIRIE BURN	AREA WIDE WMA'S	0
WABASHA	PRAIRIE BURN	KELLOG/ WEAVER SNA	101
WABASHA	RIPARIAN LANDS - PERP.	ELGIN	22
WABASHA	WILDLIFE ENHANCEMENT	MC CARTHY WMA FENCING	NA
WABASHA	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	4
WABASHA	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING MC CARTHY WMA	4
			376
WADENA	DNR-PRIVATE LAND HABITAT PROJ	FWHIP-BROWSE MGMT	10
WADENA	DNR-PRIVATE LAND HABITAT PROJ	WETLAND DEVELOPMENT	6
			16
WASECA	MARGINAL AG LAND - 20 YR	WILTON	15
WASECA	PASTURED HILLSIDES - 20 YR	ALTON	9
			24
WASHINGTON	PRAIRIE BURN	AFTON SP	20
WASHINGTON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING BAYPORT WMA	15
WASHINGTON	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING LAMPREY PASS	10
			45
WINONA	CRITICAL HABITAT IMPROVEMENT	MELCHER TIMBER ACCESS	2 MI
WINONA	FISH CULTURE	CRYSTAL SPRINGS HATCHERY	NA
WINONA	FISHERIES ACQUISITION	PINE CREEK TROUT	.8 MI
WINONA	MARGINAL AG LAND - 20 YR	NORTON	10
WINONA	PRAIRIE BURN	O L KIPP SP	29
WINONA	PRAIRIE BURN	QUEENS BLUFF SNA	8
WINONA	PRAIRIE BURN	WHITEWATER SP	28
WINONA	PRAIRIE BURN	WHITEWATER WMA	260
WINONA	WILDLIFE ACQUISITION	WHITEWATER WMA	25
WINONA	WILDLIFE ENHANCEMENT	WOODY COVER PLANTING WHITEWATR WMA	1205
			1565
WRIGHT	CRITICAL HABITAT ACQUISITION	KELLY-MEYER WMA	52
WRIGHT	FISHERIES ENHANCEMENT	BUFFALO LAKE NPSA	1510
WRIGHT	FISHERIES ENHANCEMENT	MAPLE LAKE NPSA	1013
WRIGHT	LAND DONATION	KELLY - MEYER WMA	52
WRIGHT	PASTURED HILLSIDES - PERP.	OTSEGO	8
WRIGHT	SENSITIVE GROUND WATER - PERP.	SILVER CREEK	5
WRIGHT	WILDLIFE ENHANCEMENT	PRAIRIE SEEDING KELLY-MEYER WMA	65
WRIGHT	WILDLIFE ENHANCEMENT	WETLAND RESTORATION	10
			2714
YELLOW MEDICINE	CRITICAL HABITAT ACQUISITION	POSEN WMA	68
YELLOW MEDICINE	LAND DONATION	POSEN WMA	68
YELLOW MEDICINE	PRAIRIE BURN	AREA WIDE WMAS	214
YELLOW MEDICINE	WETLAND RESTORATION	FRIENDSHIP	92
YELLOW MEDICINE	WILDLIFE ENHANCEMENT	AREA WIDE GRASS SEEDING	10
YELLOW MEDICINE	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	24
YELLOW MEDICINE	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	6
			482
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	1700
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	30
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	600
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	53
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	125
VARIOUS	PRAIRIE BURN	AREA WIDE WMAS	55
VARIOUS	PRAIRIE BURN	AREA WIDE WMA'S	50
VARIOUS	PRAIRIE BURN	AREA WIDE WMA'S	162
VARIOUS	WILDLIFE ENHANCEMENT	BRUSHLAND REGENERATION ON DNR LANDS	43
VARIOUS	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	4
VARIOUS	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	20
VARIOUS	WILDLIFE ENHANCEMENT	SIGNING AND POSTING	NA
VARIOUS	WILDLIFE ENHANCEMENT	WALLBILIG SIGN AND POST	NA
VARIOUS	WILDLIFE ENHANCEMENT	WMA GRASS SEEDINGS	235
VARIOUS	WILDLIFE ENHANCEMENT	PRAIRIE GRASS SEEDING AREA WIDE WMAS	80
VARIOUS	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	20
VARIOUS	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	43
VARIOUS	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	55
VARIOUS	WILDLIFE ENHANCEMENT	WOODY COVER IMPROVEMENT ON WMAS	58

ABBREVIATIONS

ASP - ASPEN DEVELOP - DEVELOPMENT FWHIP - FOREST WILDLIFE HABITAT IMPROVEMENT
MGNT - MANAGEMENT NPSA - NORTHERN PIKE SPAWNING AREA PERP - PERPETUAL
SF - STATE FOREST SNA - SCIENTIFIC AND NATURAL AREA SP - STATE PARK TWP - TOWNSHIP
WMA - WILDLIFE MANAGEMENT AREA YR - YEAR

Reinvest in Minnesta (RIM) is administered under the Board of Water and Soil Resources, Southbridge Office Building, Suite 104, 155 South Wabasha Street, St. Paul, MN 55107; (612) 296-3767; Wayne Edgerton, Coordinator; and the Department of Natural Resources, Division of Fish and Wildlife, 500 Lafayette Road, St. Paul, MN 55155-4020; (612) 297-1308; Jay Rendall, Coordinator.

INTRO

This report explains what RIM does, how it works, and how it benefits the lives of all Minnesotans. It begins by introducing the program, then moves on to show how RIM is spread throughout the entire state, how it improves the natural resources in a sample county, and details citizen involvement with two specific projects.

The second half of this report describes how RIM activities help the land, the accomplishments of the program during fiscal year 1990 (July 1, 1989–June 30, 1990), and the fiscal 1992 spending plan. Finally, the report details the continued decline in the RIM fund over the past five years.

RIM in a nutshell

Reinvest in Minnesota, or RIM, is a state conservation program that protects and restore's the health of the state's natural resources. How? By improving water quality, controlling soil erosion, increasing fish and wildlife habitat, and protecting unique ecosystems.

RIM began in 1986 after a coalition of environmental, conservation, and agricultural groups urged the state Legislature to reinvest tax dollars into Minnesota's deteriorating natural environment.

RIM is basically a reinvestment of tax dollars and private donations into Minnesota's priceless natural resources and its billion dollar plus fish and wildlife-based recreation industry. The goal of the RIM program is to strengthen this reinvestment by both the public and private sectors.

How does it work?

On private land, RIM helps landowners become better land stewards by providing financial incentives to convert poor agricultural land to wildlife habitat. On public land, it improves fish and wildlife habitat—the places where animals live and raise their young—to create more recreation for the state's steadily increasing number of anglers and wildlife enthusiasts.

RIM is manged by two state agencies. The Department of Natural Resources (DNR) carries out RIM's **public land** programs: (Wildlife Enhancement, Fisheries Enhancement, Critical Habitat Match, Prairie Bank, and Forest Wildlife Management). Each public land program provides funding for projects to improve existing state land or to aquire new outdoor recreation areas. For example, the Fish Enhancement program pays to improve fish populations and water quality on public lakes and streams, and the Critical Habitat Match Program matches private funds donated to buy and improve important wildlife and fish habitat.

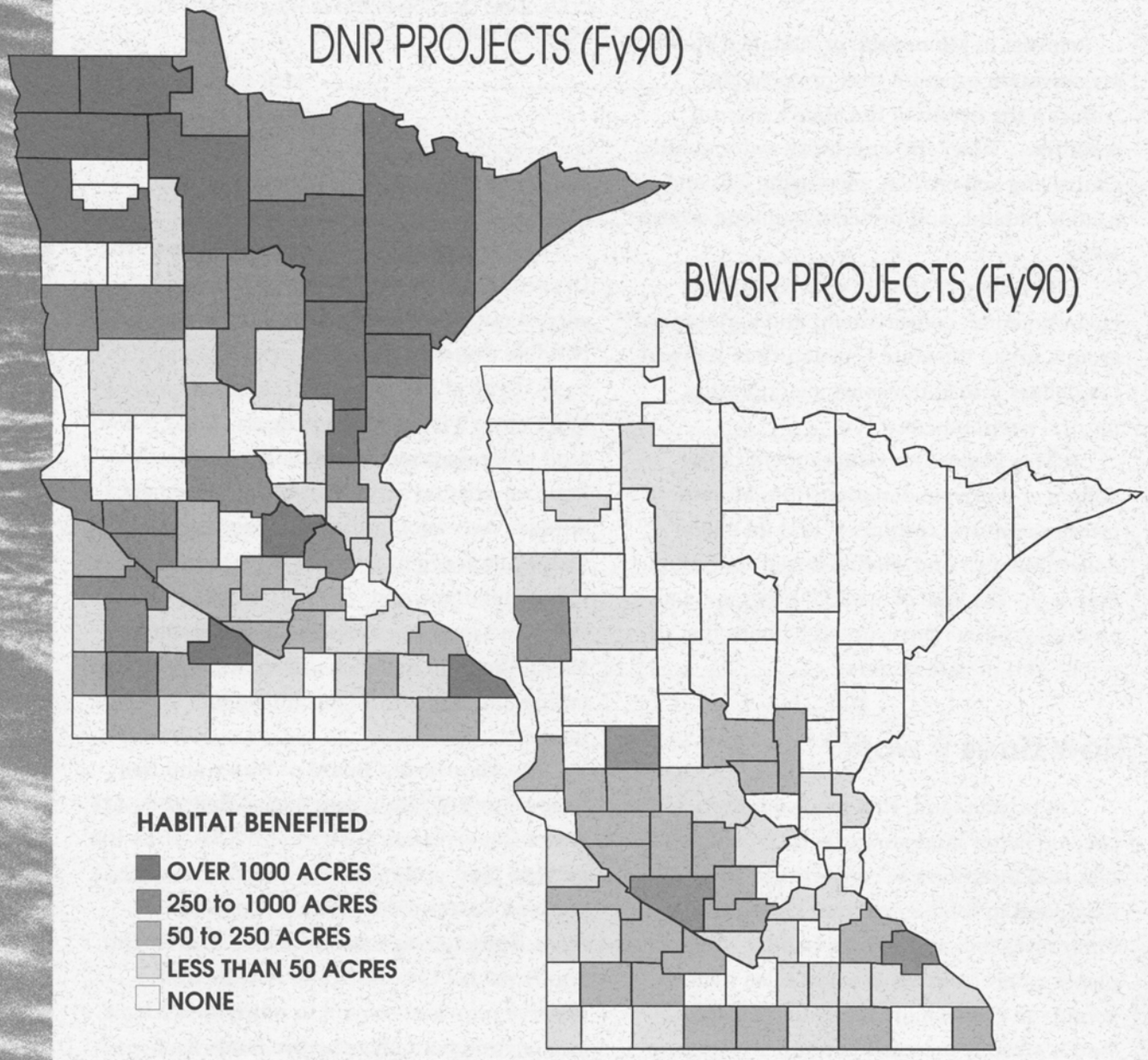
The Minnesoata Board of Water and Soil Resources (BWSR), through local Soil and Water Conservation Districts (SWCD), runs the **private land** programs (called RIM-Reserve): Wetland Restoration, Riparian Land Retirement, Marginal Agricultural Land Retirement, and Sensitive Ground Water Areas. RIM-Reserve pays landowners to retire their fragile and environmentally sensitive lands from agricultural production to enhance wildlife habitat, improve water quality, and reduce erosion and sedimentation.

STATE

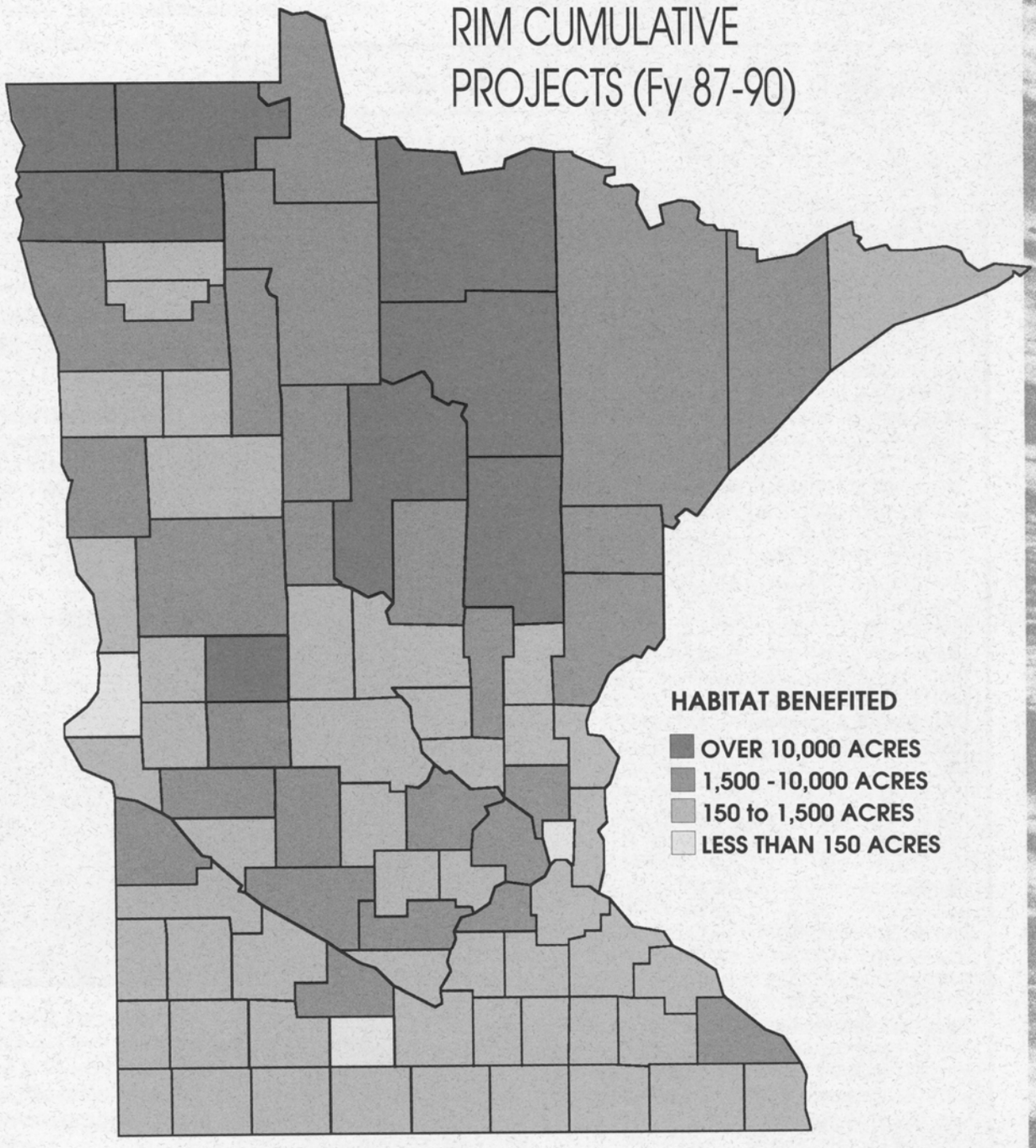
RIM is Minnesota's most comprehensive conservation program. One of its strongest features is a wide range of projects improving the environment and recreation for Minnesotans across the state. These maps show how RIM's DNR projects (primarily public lands) and BWSR projects (private lands) combine to protect and improve soil, water, fish, wildlife, and native plants in every one of Minnesota's 87 counties.

DNR PROJECTS (Fy90)

BWSR PROJECTS (Fy90)



Each workday, for four years, RIM has enhanced or protected an average of 290 acres of land or water.


RIM CUMULATIVE
PROJECTS (Fy 87-90)
HABITAT BENEFITED
OVER 10,000 ACRES
1,500 -10,000 ACRES
150 to 1,500 ACRES
LESS THAN 150 ACRES

COUNTY Perspective

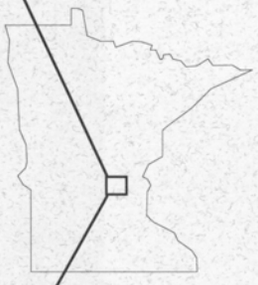
RIM's benefits reach out to the citizens in every one of Minnesota's 87 counties. This example shows the number and diversity of RIM's public and private land projects over the past four years in just one county. Many of the projects on this list result from RIM's private partnerships—Minnesotans working with state and local agencies and conservation groups to protect and maintain Minnesota's resources for future generations.

Wright County

RIM ACTIVITY	LOCATION	ACRES
CRITICAL HABITAT ACQUISITION	A SHAU VALLEY WMA	101
CRITICAL HABITAT ACQUISITION	KELLY - MEYER WMA	52
CRITICAL HABITAT LAND DONATION	KELLY - MEYER WMA	52
DNR-PRIVATE LAND WETLAND RESTORATION	TWP STOCKHOLM	22
FISHERIES ENHANCEMENT	BUFFALO LAKE NPSA	1510
FISHERIES ENHANCEMENT	MAPLE LAKE NPSA	1013
RIM RESERVE MARGINAL AG LAND - 10 YR	ALBION TWP	13
RIM RESERVE MARGINAL AG LAND - 10 YR	ALBION TWP	23
RIM RESERVE MARGINAL AG LAND - 10 YR	CLEARWATER TWP	11
RIM RESERVE MARGINAL AG LAND - 10 YR	CLEARWATER TWP	9
RIM RESERVE MARGINAL AG LAND - 10 YR	CLEARWATER TWP	23
RIM RESERVE MARGINAL AG LAND - 10 YR	COKATO TWP	29
RIM RESERVE MARGINAL AG LAND - 10 YR	FRENCH LAKE TWP	20
RIM RESERVE MARGINAL AG LAND - 10 YR	MARYSVILLE TWP	18
RIM RESERVE MARGINAL AG LAND - 10 YR	MIDDLEVILLE TWP	7
RIM RESERVE MARGINAL AG LAND - 10 YR	MONTICELLO TWP	32
RIM RESERVE MARGINAL AG LAND - 10 YR	ROCKFORD TWP	10
RIM RESERVE MARGINAL AG LAND - 10 YR	SILVER CREEK TWP	10
RIM RESERVE MARGINAL AG LAND - 10 YR	SILVER CREEK TWP	8
RIM RESERVE MARGINAL AG LAND - 10 YR	SOUTH SIDE TWP	10
RIM RESERVE MARGINAL AG LAND - 10 YR	SOUTH SIDE TWP	8
RIM RESERVE MARGINAL AG LAND - 20 YR	COKATO TWP	26
RIM RESERVE MARGINAL AG LAND - 20 YR	FRENCH LAKE TWP	14
RIM RESERVE MARGINAL AG LAND - 20 YR	OTSEGO TWP	19
RIM RESERVE MARGINAL AG LAND - PERP.	BUFFALO TWP	33
RIM RESERVE MARGINAL AG LAND - PERP.	BUFFALO TWP	17
RIM RESERVE MARGINAL AG LAND - PERP.	COKATO TWP	6
RIM RESERVE MARGINAL AG LAND - PERP.	COKATO TWP	13
RIM RESERVE MARGINAL AG LAND - PERP.	MIDDLEVILLE TWP	17
RIM RESERVE MARGINAL AG LAND - PERP.	SILVER CREEK TWP	11
RIM RESERVE MARGINAL AG LAND - PERP.	SOUTHSIDE TWP	41
RIM RESERVE MARGINAL AG LAND - PERP.	STOCKHOLM TWP	44
RIM RESERVE MARGINAL AG LAND - PERP.	STOCKHOLM TWP	5
RIM RESERVE MARGINAL AG LAND - PERP.	VICTOR TWP	23
RIM RESERVE MARGINAL AG LAND - PERP.	WOODLAND TWP	38
RIM RESERVE PASTURED HILLSIDES - PERP.	OTSEGO TWP	8
RIM RESERVE SENSITIVE GRND. WATER - PERP.	SILVER CREEK TWP	5
RIM RESERVE WETLAND RESTORATION	STOCKHOLM TWP	21
RIM RESERVE WETLAND RESTORATION	WOODLAND TWP	25
WILDLIFE ENHANCEMENT - WETLAND DEVELOP	KNAPP WMA	30
WILDLIFE ENHANCEMENT - WOODY COVER	SUCCONIX WMA	195
WILDLIFE ENHANCEMENT - WOODY COVER	WILDLIFE MGMT. AREA	2
WILDLIFE ENHANCEMENT - PRAIRIE SEEDING	KELLY-MEYER WMA	65
WILDLIFE ENHANCEMENT - WETLAND REST.	AREA WIDE WMAs	10

In nearly 3,000 projects spread throughout all of Minnesota's 87 counties, RIM funds a variety of activities to protect and enhance soil, water, fish, wildlife, and native plants.

Take Wright County, for example. As you can see from the list (left), RIM has completed 44 projects and improved a total of 3,645 acres of land and water in Wright County since 1986.



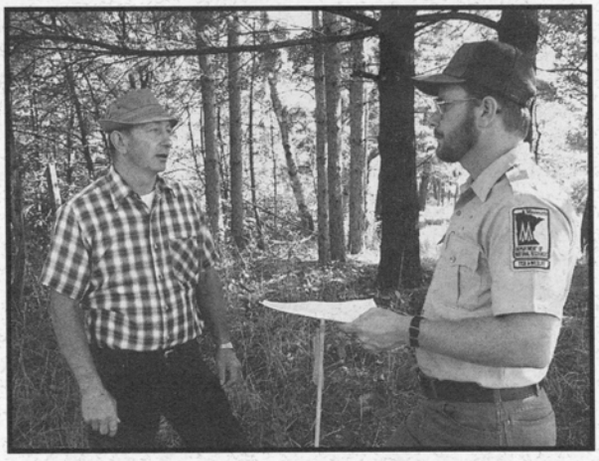
CITIZEN Perspective

These three pages show how regular citizens form partnerships with RIM to take care of the state's soil, water, fish, wildlife, and native plants.

Although RIM is statewide in its scope, its true achievement is at the local level, where citizens, conservation groups, and local communities have taken an active part in RIM projects.

Citizen involvement ranges from hundreds of conservationists joining forces to return Lake Christina to its former glory as a waterfowl paradise, to single landowners restoring their wetlands through the RIM Reserve.

The acquisition of A Shau Valley Wildlife Area is a prime example. Located along the Clearwater River between Stearns and Wright counties, this 220-acre public wildlife area exists because local businesses, conservation groups, and citizens worked hand in hand with the area DNR wildlife manager to raise money that would be matched with RIM funding.



In 1990, Lucy and Melvin Pfaffendorf gave the DNR a 3.5-acre perpetual easement through the RIM program so that a new 160-acre wildlife management area surrounded by private property could be opened up to public access.

"We're not rich people," said Melvin Pfaffendorf, "but we're willing to do what we can to help out."



Robert and Virginia Anderson enrolled 18 acres of erodible Cottonwood County farmland into a perpetual RIM Reserve easement to help restore wildlife.

Another way citizens work with the state as partners in conservation is through the RIM Reserve. Citizens apply for conservation easements to improve the stewardship on their land and local screening committees help select the best projects in each county.

Citizens also work with RIM through their involvement with groups such as Pheasants Forever, Minnesota Deer Hunters Association, Minnesota Waterfowl Association, Ducks Unlimited, The Nature Conservancy, and Rice Area Sportsman's Club. These and many other conservation organizations work closely with RIM on selecting important local projects and raising matching funds for critical habitat acquistitions or money for improving RIM Reserve lands.

A willingness to lend a hand to protect and improve wild lands is typical of the sentiment found in citizens working on RIM projects throughout the state. Their concern for the health of soil, water, fish, wildlife, and native plants is overwhelming. RIM helps translate that sentiment into actions that make Minnesota such a healthy and naturally diverse place to live.

CITIZEN Perspective

Citizen support for RIM comes from individuals, families, and local and state conservation groups. These two example show how RIM works with citizens on a local level. Both demonstrate different ways Minnesotans use RIM to help the environment and protect and improve the state's renowned quality of life.

RIM's Unique Donation-Doubler

Donations of land or money from Minnesota citizens are a key element of RIM's Critical Habitat Match program.

The match account doubles private-sector donations of land or cash to buy or improve important wildlife habitat. Since 1986, Minnesotans conerned about soil, water, and fish and wildlife conservation have donated and pledged $2.2 million in cash and over $5.7 million in land to this program

Two Minnesotans who took advantage of RIM's donation-doubling offer are Horace and Esther Chamberlain, of Le Sueur, who in 1988 donated a tract of unusual floodplain forest valued at about $200,000. The DNR made the land into a Scientific and Natural Area (SNA) to manage and preserve the woods for their unique native plants and habitats. Now anyone can visit this mile and a half long stretch of mature hardwoods and look for the warblers, Lincoln's sparrows, ruffed grouse, white-tailed deer, wood ducks, and other creatures that live there.

The Chamberlain Woods SNA is one of only a few protected pieces of floodplain forest remaining along the Minnesota River. Unlike most of the forest in the valley that has been cut and turned into farmfields, the Chamberlain Woods SNA still has a mix of elms, maples, ash, butternut, and huge cottonwoods.



Through RIM's Critical Habitat Match, Horace and Esther Chamberlain gave their fellow Minnesotans a unique tract of hardwood forest valued at $200,000.

"The first time I saw this woods I knew it should be saved for posterity," said Horace. That was in 1959, when he visited the area for the first time. Over the next 25 years, the Chamberlains acquired many small tracts until they owned a large undisturbed woods.

Thanks to RIM, and the Chamberlain's generousity, Chamberlain Woods SNA will be tended as a natural treasure and preserved forever for all Minnesotans.

Stewardship for Private Land





Before Tim Erhart's RIM restoration these 6 acres were poor cropland (far left). After RIM paid to remove the tiles, install a dike, and build an island (above left), this area has become a wetland wildlife haven.

"I've dreamed of restoring this drained wetland since we bought the dairy farm in 1980. I wanted to make it into a nesting pond," said Tim Erhart, a part-time farmer and president of an electronics company in Chanhassen. "I guess I just like to look at geese and ducks."

In 1988, Erhart enrolled the 6-acre area on his 120-acre farm in Carver County in the perpetual RIM Reserve Wetland Restoration Program. RIM paid to remove the tile system, build a nesting island, and install a dike, and Erhart added some improvements of his own. The poor agricultural land had been difficult to farm. Now, returned to a 5-foot-deep, 6-acre wetland, it's naturally producing abundant numbers of geese, ducks, and other forms of wildlife, according to Erhart.

Erhart's RIM project is part of a personal plan to restore eight wetlands, some in cooperation with his neighbors.

"In this area of Minnesota, there is a tremendous opportunity to restore wetlands, if people only knew how simple it was," said. His RIM restoration was fairly complex, because the basin had been tiled. However, it wouldn't take much to restore many drained wetlands, he said.

"I'm definitely glad I did it and would certainly encourage other people to consider it as an option," Erhart said.

RIM Reserve improves privately owned land, which makes up over three fourths of Minnesota's land area.

RIM ACTIVITIES

How they improve these resources:

Water Quality

Drinking water is purified and rivers and lakes are cleaned thanks to RIM Reserve's different easement projects. **Sensitive Groundwater Area easements,** for example, reduce erosion and sedimentation, improve groundwater recharge, and reduce the amount of pesticides that enter groundwater, lakes, and streams. Many of the DNR's RIM projects help water quality, too. Easements along trout streams allow native vegetation to grow on stream banks to filter sediment and pollutants from surrounding fields. Wetlands donated by citizens through **RIM's Critical Habitat Match** act as settling basins for polluted water, sending clean, filtered water downstream to lakes and rivers.

MN Office of Tourism



RIM helps water quality by improving land stewardship.

Wildlife

What RIM does for wildlife is give them more places to live and raise their young. **RIM Reserve's easements**, for example, restore private habitat for ducks, herons, pheasants, songbirds, and other critters of grassland and wetland areas. **RIM's Wildlife Enhancement** improves and maintains wildlife habitat on public land, such as sharp-tailed grouse and moose habitat on state wildlife management areas. **Forest wildlife coodinators**, funded with RIM dollars, help ensure forests remain healthy homes for ruffed grouse, woodpeckers, deer, and other woodland creatures. RIM has also helped improve bear, deer, and waterfowl management by accelerating **wildlife research.**

Rare Species and Rare Habitat

One way RIM protects rare plants and animals is by partially funding the **Minnesota County Biological Survey**, which identifies critical habitats and wildlife. Bald eagle nests and the rare trout lily are protected using **Critical Habitat Match** funds. RIM preserves rare native prairie and prairie species on private land with the **Prairie Bank**, and on public prairies with prescribed burning.

Soil

Some land should never have been cleared or drained for farming. Lands that are steep, subject to drought, or allow contaminants easy access to groundwater are considered eligible for the **RIM Reserve Program**. Under this easement program, these sensitive lands are replanted and protected as wildlife habitat.

RIM consists of 15 different types of activities. RIM Reserve, for example, is soley for private land conservation. Wildlife Enhancement, on the other hand, works primarily on public land. Critical Habitat Match is sort of a combination of the two, taking private donations of land and cash and using them for fish and wildlife habitat on public land. The other RIM activities protect or improve water quality, soil, or fish and wildlife habitat on a variety of land types.

Fishing

Healthier fish and happier anglers are two goals of RIM projects that improve water quality, such as **RIM-Reserve's Riparian Lands** easements, which keep erosion from muddying lakes and streams. The **Fisheries Enhancement** projects improve trout streams, protect spawning areas for many warmwater species, and increase the number of fish raised in hatcheries. Carp barriers, installed with RIM funds, keep this exotic species from muddying game fish waters. **RIM's Fish Contaminants Monitoring** project tests fish for chemicals that could endanger fish populations and human health. **RIM's Critical Habitat Match** gives private conservation groups a funding boost to improve the fishing on local waters. RIM is also funding research to determine what stream flow levels are sufficient to support recreation and aquatic life, and it also partially funds the **Aquatic Education** program that uses fishing to teach Minnesotans about their aquatic environment.



Landowners and DNR managers develop a plan to improve private land for sharptailed grouse.

Wetlands

Recently, the public has become more aware of the importance of wetlands. Wetlands filter out pollutants in water, naturally control floods, and provide habitat for fish and other wildlife, including rare species. The **RIM Reserve Wetlands Restoration** Program pays landowners to put their land under perpetual easement and restore the previously drained wetlands. The DNR's **Wildlife Habitat Improvement Program** (WHIP) cost shares on wetland restorations with private landowners.

RIM unites citizens and state government in partnerships that create the kind of environment all Minnesotans deserve.

Fiscal 1990

The accomplishments during FY 1990 and for the history of RIM are compliled by activity on this page. A complete listing of all FY 1990 projects can be found in the appendix of this report.

Minnesotans have shown their support for RIM and the conservation of the state's natural resources by pledging or donating $7.9 million in land or cash since 1986.

RIM ACTIVITY	FISCAL YEAR 1990		CUMULATIVE (FY 87-90)	
	No. Projects	Acres	No. Projects	Acres
DNR				
Brushland Burn	27	4,466	117	22,814
Critical Habitat Acquisition	18	1,213	46	4,144
Critical Habitat Improvement	22	975	65	17,747
Critical Habitat Land Donation	18	1,213	62	7,359
Fish Culture	5	na	18	na
Fisheries Acquisition	7	5.3 (mi)	7	5.3 (mi)
Fisheries Enhancement - Lakes	8	6,007	46	34,166
Fisheries Enhancement - Streams	0	na	13	92 (mi)
Forest Wildlife Management	22	2,430	24	2,444
Forest Wildlife Management Asp	3	155	275	7,926
Prairie Bank	2	377	10	1122
Prairie Burn	50	7,866	161	15,976
Private Land Habitat	85	1,975	242	6,295
Water Access	0	na	14	na
Wildlife Acquisition	9	934	22	4,970
Wildlife Enhancement	147	18,233	340	131,926
RIM Reserve				
Living Snowfence - Perpetual	1	7	7	82
Marginal Ag. Land - 10 year	0	0	737	16,712
Marginal Ag. Land - 20 year	11	153	157	2,692
Marginal Ag. Land - Perpetual	37	505	332	7,031
Riparian Lands - 20 years	3	59	3	59
Riparian Lands - Perpetual	23	492	23	492
Sensitive Ground Water - 20 year	7	135	7	135
Sensitive Ground Water - Perpetual	4	137	4	137
Pastured Hillsides - 20 year	5	125	5	125
Pastured Hillsides - Perpetual	16	554	16	554
Wetland Restoration - Perpetual	53	2,145	114	3,778
Totals	583	50,156	2867	288,686

Fiscal 1992 Plan

Board of Water and Soil Resources

The primary focus of RIM Reserve in FY 1992 will continue to be enrolling high-priority land into perpetual easements to enhance fish and wildlife habitat, reduce soil erosion and improve water quality.

The 1990 Minnesota Legislature indicated that, beginning in 1992, the RIM Reserve Program must give high priority to easements for wetlands restoration.

General Fund Base

The Board of Water and Soil Resources and the local Soil and Water Conservation Districts (SWCDs) will continue to use the general fund base level funding to administer the RIM Reserve program.

SWCD Implementation	$750,000
BWSR Coordination	$150,000

Environment and Natural Resouces Trust Fund

For the first time, funds for the RIM Reserve program will come from Minnesota's Environment and Natural Resources Trust Fund rather than entirely from the proceeds of bonds. The Legislative Commission on Minnesota's Resources (LCMR) recommended $1 million for RIM Reserve wetland restorations from the ETF. The BWSR will make that appropriation available for perpetual easements for wetland restorations in FY 1992.

Bond Proceeds

In the past, bond proceeds have been the funding source for RIM Reserve easements and the associated conservation practices. As this report went to press, all past bond proceeds are committed and there were no bond proceeds available for either Fiscal 1992 or 1993.

Department of Natural Resources

The DNR's RIM funding in FY 1992 will be used for projects and activities in addition to those possible with the Game and Fish fund. Plans for using RIM funds are described by funding sources below:

General Fund Base

RIM's $1.6 million general fund base level funding for the Division of Fish and Wildlife will be used for:

Forest Wildlife Coordination	$100,000
Fish Contaminants Monitoring	$200,000
County Biological Survey	$85,000
Regional Environmental Review	$150,000
Private Lands Habitat Cost Share	$240,000
Wildlife Research	$135,000
Aquatic Education	$75,000
Program Coordination	$62,000

Environment and Natural Resouces Trust Fund

The LCMR has recommended that $1 million be appropriated to the Critical Habitat Match account in the RIM Fund. This funding will be used to match private sector donations of land and money for critical habitat acquisition and development projects. The DNR's process of reviewing pledges toward this appropriation has already begun and will continue until July 1991.

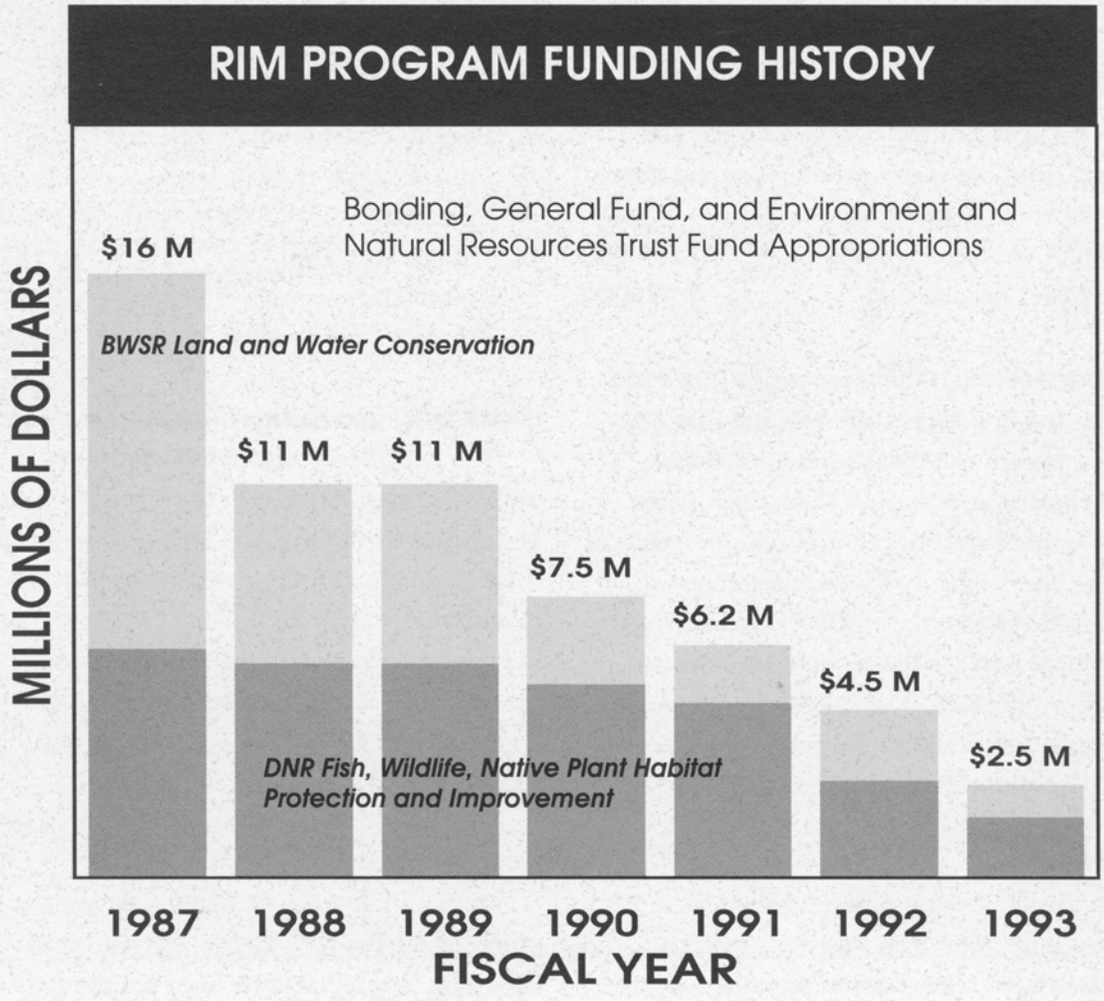
Bond Proceeds

At this time the outlook for new bond proceeds for the RIM fund is unclear. Past DNR RIM appropriations from bonding are all committed to projects initiated in FY1991 or before.

Reinvest in Minnesota Fund

The Reinvest in Minnesota (RIM) fund has been financing badly needed conservation projects since 1986. Initial funding for the fiscal year 1987 was $16 million. Each year the funding has declined, translating into less and less protection and enhancement of the state's fish, wildlife, soil, water and native plants.

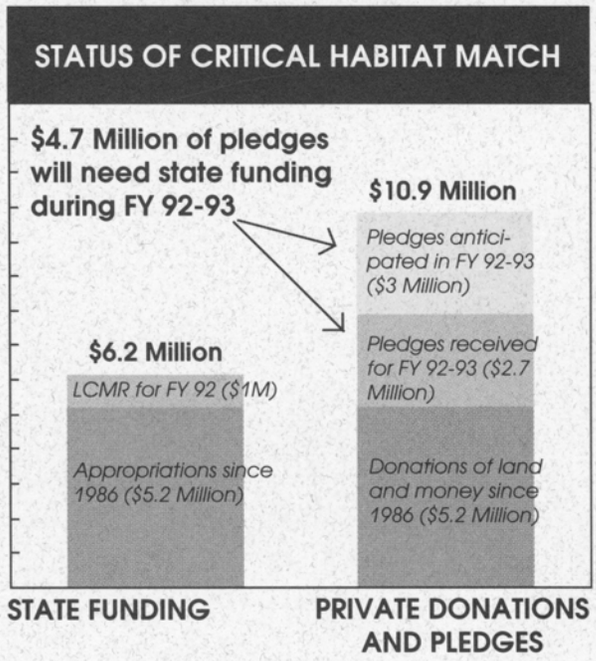
The RIM fund is now threatened with red ink. **RIM programs such as Prairie Bank, Critical Habitat Match, RIM Reserve, and Fish and Wildlife Enhancement activities will essentially stop during fiscal years 1992 and 1993 if no new money is appropriated to the RIM fund.**

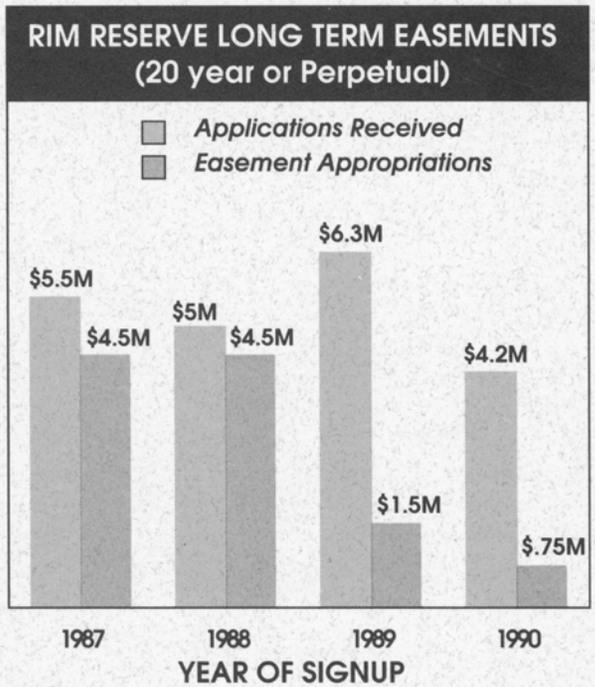


For example, the Critical Habitat Match Program, which encourages and matches private sector donations, is now $1.7 million dollars behind private donations. During the next biennium we estimate an aditional $4 million will be pledged from the private sector, however, failure to provide adequate funding for this popular program will seriously hinder future donations and pledges already received.

RIM Reserve is another RIM program popular with state citizens. Applications for long-term conservation easements and the associated habitat restoration have always exceeded the funding available for the RIM Reserve. **Even in 1990, when signups were limited to perpetual easements only, landowners applied for $4.2 million in RIM Reserve easements.** Many applicants were disappointed to learn they had been denied because available funding would satisfy only about half of the applications.

The Environment and Natural Resources Trust Fund may eventually provide a more stable and higher level of funding for RIM programs and other important environmental programs. For at least the coming biennium, however, the ongoing RIM Programs need supplemental funding from bonding or other sources to meet resource and citizen needs.





RIM protects and enhances Minnesota's outdoors for present and future generations.



Minnesota Board of Water & Soil Resources

Minnesota DEPARTMENT OF NATURAL RESOURCES

Equal Opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, national origin, sex, age or disability.

Discrimination inquiries should be sent to MN-DNR, 500 Lafayette Road, St. Paul, MN 55155-4031 or the Equal Opportunity Office, Department of the Interior, Washington, D.C. 20240

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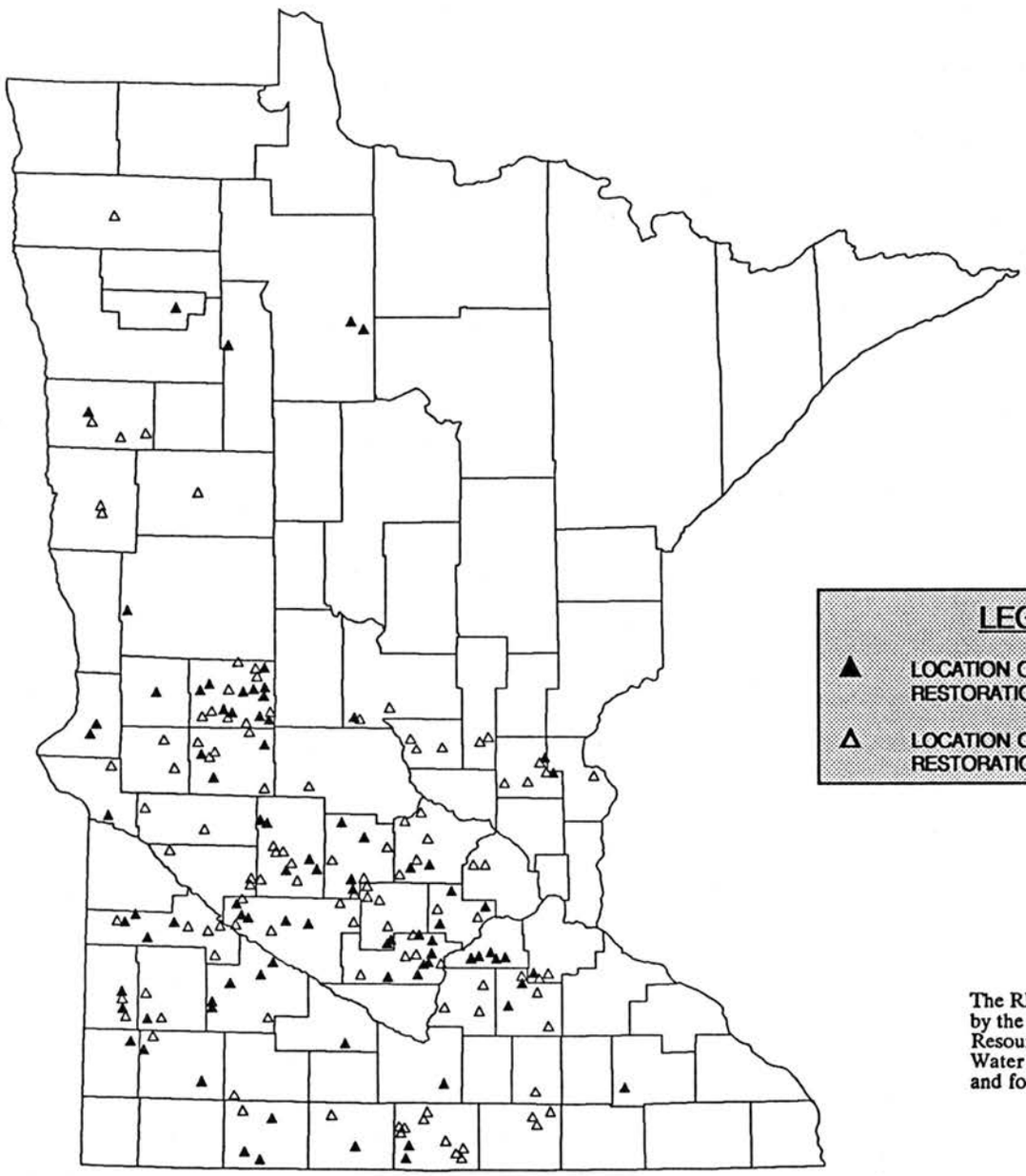
Reinvest in Minnesta (RIM) is administered under the Board of Water and Soil Resources, Southbridge Office Building, Suite 104, 155 South Wabasha Street, St. Paul, MN 55107; (612) 296-3767; Wayne Edgerton, Coordinator; and the Department of Natural Resources, Division of Fish and Wildlife, 500 Lafayette Road, St. Paul, MN 55155-4020; (612) 297-1308; Jay Rendall, Coordinator.

© Minnesota Department of Natural Resources

REINVEST IN MINNESOTA (RIM) RESERVE WETLANDS RESTORATION PROGRAM

STATUS OF 1986 THROUGH 1990 SIGN-UPS

TOTALS	
EASEMENTS	220
TOTAL EASEMENT ACRES	7228
WETLAND ACRES	3337
UPLAND ACRES	3891
NUMBER OF RESTORED WETLANDS	271



LEGEND

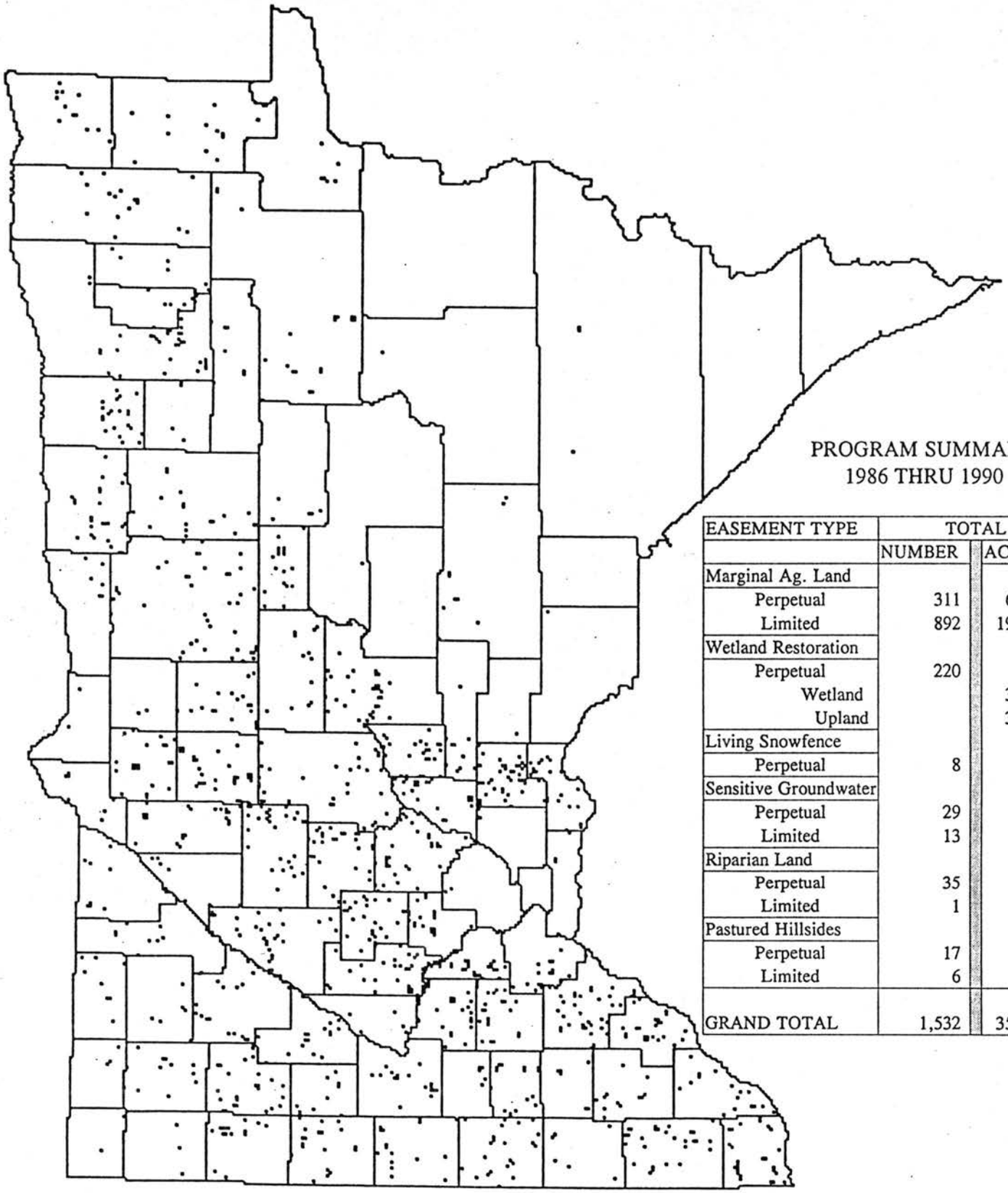
▲ LOCATION OF EASEMENTS WITH RESTORATION WORK COMPLETED

△ LOCATION OF EASEMENTS WITH RESTORATION WORK INCOMPLETE

The RIM Reserve Program is administered by the Minnesota Board of Water and Soil Resources (BWSR) through local Soil and Water Conservation Districts (SWCDs), and focuses on private lands.

MNBWSR 1/91

RIM RESERVE LANDS 10/1/90



PROGRAM SUMMARY
1986 THRU 1990

EASEMENT TYPE	TOTAL	
	NUMBER	ACRES
Marginal Ag. Land		
Perpetual	311	6,710
Limited	892	19,444
Wetland Restoration		
Perpetual	220	
Wetland		3,337
Upland		3,891
Living Snowfence		
Perpetual	8	72
Sensitive Groundwater		
Perpetual	29	730
Limited	13	287
Riparian Land		
Perpetual	35	784
Limited	1	6
Pastured Hillsides		
Perpetual	17	553
Limited	6	143
GRAND TOTAL	1,532	35,957

THIS MAP SHOWS ALL SECTIONS
CONTAINING ANY RIM RESERVE LAND.

PREPARED BY
LAND MANAGEMENT INFORMATION CENTER
STATE PLANNING AGENCY

RESPONSIBLE FARM MANAGEMENT



A guidebook for.....

Nutrient Management,

Pasture Management,

and

Farmstead Windbreaks.

NUTRIENT MANAGEMENT

FARMSTEAD WINDBREAK

PASTURE MANAGEMENT

NUTRIENT MANAGEMENT

FARMSTEAD WINDBREAK

PASTURE MANAGEMENT

NUTRIENT MANAGEMENT

Nutrient management involves careful management of all aspects of soil fertility so that crop needs are met while minimizing losses to surface or ground water. This includes management of nutrients applied to the soil as well as in-place nutrients. Nutrient management practices provide the correct quantity of nutrients at the best time and location possible so they are used efficiently. This limits fertilizer loss and maximizes profits.

Nutrient management practices are some of the most important practices available, because they can have tremendous benefits to water quality, are relatively easy to implement, and can increase profits.

SOIL TESTING

When carefully collected, soil test data from your farmland can provide an accurate picture of available nutrients and help determine strategies for fertilization.

A soil test to determine nutrient levels is essential to nutrient management. Soil tests are required to determine proper fertilizer and lime requirements.

Soil tests help determine the "nutrient mix" in your soil. Test results, however, can be no better than the actual sample. If the soil sample is not representative of the entire field from which it was taken, the recommendations based on that sample may be misleading.

Timing

Soil samples may be taken any time of year when moisture conditions and temperatures (lack of frost) permit. Sampling of frozen ground, although not highly recommended, can be accomplished during open winters with power probes. It is not necessary to wait until planting time to get your soils tested. In fact, sample collection is more convenient in the late summer or fall, because spring soils are often extremely wet. Also, recommendations for fertilization are returned early enough for you to plan ahead and invest your money to the best advantage in fertilzer. Where legume seeding is planned for next spring, sample collection and testing ahead of time permits ordering and applying lime in the fall. Remember, too, that road restrictions do not allow transportation of heavy lime loads in the spring.

Samples for nitrate-nitrogen test should be collected between September 1 and two weeks before planting.

We recommend that you perform your soil sampling procedure every three to five years. You can actually perform the

work yourself. Tools you will need include: a pail, soil tube, shovel, soil auger, or spade, and a sample container and information sheet.

The key to getting a good soil analysis is where you collect your soil samples from. We recommend that you begin with a soils map.

Where to sample

With the help of a soils map, divide each field into uniform areas. (see figure a) If you don't have this map, look carefully for differences in slope, erosion, crop growth, and yield. The soil in each area should have the same color and texture; cropping history; and fertilizer, lime and manure treatments.

One sample should not represent more than 20 acres of level, uniform field or 5 acres on hilly or rolling land.

Avoid these areas, or sample them separately:

--dead and back furrows
--terraces, old fence row, and roads
--old manure or straw pile spots
--lime or fertilizer spill areas
--fertilizer bands in row crops
--animal droppings and urine spots
--eroded knolls or low spots
--small saline areas

Dust from gravel roads affects soil pH, so take samples at least 300 feet away from them. As a general rule, any area that is different in slope, texture, color, etc. and is large enough to be fertilized separately should be sampled separately.

Taking the sample

Scrape off all surface litter. On cropland take a core of the surface soil to plow depth (6 to 9 inces). Sample permanent pastures, meadows, and lawns to a depth of only 3 inches. Sample a row crop field between the rows. Samples for nitrate-nitrogen must be taken to a depth of 2 feet (0 to 24 inches). Place the core in a clean pail. Repeat this procedure in 15 to 20 places.

Break clods and mix the soil in the pail thoroughly. Fill a soil container with about 2/3 pint of this mixture. This is a "compostie sample." Label each container with your name, address, and the number of the sample corresponding to the number on the information sheet: for example, "Field A, Sample 21." It is a good practice to prepare a map or sketch of your farm-field layout, showing areas sampled.

This will provide an accurate record of your soil test reports.

Some farmers choose not to soil test. For many, they know that they should, but just never get to the task. Others are simply not convinced of the benefits of soil testing. And still others simply feel that they know what their soils need and don't need to soil test.

How you will benefit

In reality, nutrient management through proper soil testing can yield a variety of dividends. Proper management based on accurate soil test results will:

--save money
--increase production and
--reduce pollution from soluble nutrients

WASTE MANAGEMENT AND UTILIZATION

Once you have established the nutrient content of your soil, you are ready to determine the amount of fertilizer needed for crops to be grown and your yield goal. Setting yield goals that are ten to fifteen per cent higher than the five-year average for your area is realistic. This information can be obtained by contacting your local Agricultural Stabilization and Conservation Service office or the Minnesota Extension Service.

The amounts of nutrient needs for your crops or pastureland and projected yield goal will be determined from the soil test analysis. If you wish, a soil test analysis for your farmland can be made by the University of Minnesota. For more information on this University service, contact your local Minnesota Extension Service office.

The next step in responsible nutrient management is to test livestock wastes (manure). If a commercial lab is not feasible for you, you can get a "ballpark" figure on the nutrient content of manure from this chart.

Kind of animal	Nutrients (lbs/ton) N	P_2O_5	K_2O
Dairy Cattle	11	5	11
Beef Cattle	14	9	11
Hogs	10	7	8
Chicken	20	16	8
Dairy Cattle (liquid)	5 (26)[1]	2(11)	4 (23)
Beef Cattle (liquid)	4 (21)	1(7)	3 (18)
Hogs (liquid)	10 (56)	5(30)	4 (22)
Chicken (liquid)	13 (74)	12(68)	5 (27)

[1]Numbers in parentheses are pounds of nutrients per 1,000 gallons

The types and amounts of nutrients in manure will vary from farm to farm. The levels of nutrients present or absent from livestock feed can alter the concentration of elements and possibly the rate of decomposition of organic matter in the manure.

The type of housing system can also affect nutrient content in manure. Considerable nitrogen is lost when manure is dried by the sun or exposed to air movement, and runoff by rain. In an open lot, 20-40 percent of the Phosphorus and 30-50 percent of the Potassium can be lost due to runoff and leaching. Bedding and water that get into animal manure will dilute its nutrient concentration, thus lessening its fertilizer value. On the other hand, feed spillage or waste will increase its fertilizer value.

Timing and Application

Maximum nutrient benefits can be achieved through incorporating nutrients into the soil immediately after application. This not only minimizes nitrogen loss to air, but also allows soil microorganisms to start decomposing the organic matter in manure, thus making nutrients available to the crop faster. Nitrogen loss from surface applications is greater on dry, warm, and windy days, therefore, loss is generally greater during the spring and summer seasons compared to fall and winter.

Fine-textured soils are not as permeable as coarse-textured soils. Therefore liquid manure applications should be limited to the point that runoff does not occur. The coarse-textured soils have a lower nutrient-holding capacity and may only tolerate several small doses during the growing season to minimize the chance of soluble nutrients entering and polluting the groundwater.

An added advantage of applying animal manure on the land is the fact that it enhances soil structure and increases organic matter content, thus, improving a soil's tilth and its nutrient and water holding capacities.

Here are some suggestions to help insure safe and effective storage and application of animal manure:

* Conduct a soil test to determine nutrient needs
* Apply fertilizer and manure according to soil test results and crop nutrient requirements
* Base application rates on "realistic" yield goals
* Utilize available manure supply
* Unless immediately incorporated into the soil, surface apply manure at reasonable distances from streams, ponds, open ditches, residences, and public buildings to reduce runoff and odor problems.

* During periods of the year when the soil is frozen, apply manure only to relatively level land
* Agitate liquid manures thoroughly in pits to insure removal of settled solids. This is important for uniform application of the nutrients and for obtaining accurate, representative analysis samples.
* Don't spread liquid manure on water-saturated soils where runoff is likely to occur
* Make safety your first priority when removing manure from tanks or pits. Protect yourself by entering storage structures with life-support equipment (oxygen tank and mask) and remove animals or increase ventilation to the maximum. If animals are left in buildings during agitation, carefully monitor their behavior for toxification
* Control runoff from barnyards and feedlots
* Install buffer strips adjacent to surface waters receiving runoff from cropland and pastureland.

Nutrient Removal by the Crop

Animal manure should only be applied to soil according to the growing crop's nutrient needs. This not only insures efficient use of manure nutrients, but also minimizes the chances of nutrients leaching into and polluting the groundwater. Nitrogen is utilized most effectively by grasses and cereal grain crops than by legumes. Thus, for greatest benefit, apply manure to land in corn, sorghum, small grains, and grass for hay or pasture. The following table may be used to approximate nutrient needs of crops.

SEE NEXT PAGE

$N_1P_2O_5$ and K_2O Utilization by Various Crops.[a]

Crop	Expected yield	N	P_2O_5	K_2O
		lb./acre		
Corn	80 bu.	121	42	77
	100 bu.	160	60	120
	150 bu.	185	80	215
	180 bu.	240	100	240
Corn Silage	16 ton	130	45	102
	32 ton	200	80	245
Soybeans	30 bu.	123[b]	32	52
	40 bu.	180[b]	45	80
	50 bu.	257[b]	48	120
	60 bu.	336[b]	65	145
Grain Sorghum	4 ton	250	90	200
Wheat	40 bu.	70	30	50
	60 bu.	125	50	110
	80 bu.	186	54	162
Oats	80 bu.	75	35	95
	100 bu.	150	55	150
Barley	65 bu.	74	32	63
	100 bu.	150	55	150
Alfalfa	4 ton	180[b]	40	180
	8 ton	450[b]	80	480
Orchardgrass	6 ton	300	100	375
Bromegrass	5 ton	166	66	254
Tall fescue	3.5 ton	135	65	185
Bluegrass	3 ton	200	55	180
Clover-grass mixture	4.5 ton	185	60	175
	6 ton	300	90	360
Timothy	4 ton	150	55	250
sorghum-sundan grass	8 ton	319	122	467

[a]Values are from reports by the Potash and Phosphate Institute of America and are for the total aboveground portion of the plants. When only grain is removed, a significant percentage of nutrients is left in the residues; however, these nutrients are temporarily tied up and not readily available for crop use. Thus, for estimating nutrient utilization for any crop year, assume complete crop removal.

[b]Legumes get most of their N from the air; additional N from livestock manure or inorganic N fertilizer is not normally needed.

Most of the nitrogen in animal manure is in ammonium and organic forms. All of the ammonium is potentially available to the crop during the first year after manure application. Generally, 80-90 percent of the phosphorus and 80-100 percent of the potassium in animal manures are available to plants during the year of application. In most cases, we can assume that all of the P and K in manures is plant-available.

SHARING THE COST

Animal waste storage facilities can be quite costly and are very difficult to plan. Technical assistance and information about state cost-share services are available from your local Soil and Water Conservation Districts (SWCD) or the State Board of Water and Soil Resources (BWSR). Information about federal cost-share programs to finance pollution abatement systems, modifications, and expansions, is available from the Agricultural Stabilization and Conservation Service (ASCS).

NUTRIENT MANAGEMENT

FARMSTEAD WINDBREAK

PASTURE MANAGEMENT

F A R M S T E A D W I N D B R E A K

There are a lot of reasons for planting a farmstead windbreak. Windbreaks can:

* cut feed costs up to 30% and winter fuel costs up to 30%, and may also cool your home by moderating the effects of summer winds.

* save on animal feed costs, because animals do not use up as much energy maintaining body temperature. The killing of newborns and the freezing of exposed flesh is reduced. Milk production increases.

* control farm operating expenses such as prolonging the life of exterior paint and stain. Roofing, fencing and landscaping costs also are reduced. A windbreak can break the monotony of a yard and increase the value of the land.

* provide a relatively windless zone, keeping topsoil in place and reducing wind erosion to negligible levels.

* manage snow. Dense windbreaks will catch snow in deep drifts, keeping downwind areas snow free. Snowmelt is prolonged on windbreak-protected areas, thus increasing moisture infiltration.

* help both domestic and wild animals. They protect feedlot animals by reducing the windchill index which lowers stress and feed requirements. They also aid wildlife by providing cover and food.

Planning is the key to begin developing your own windbreak. The first step to planning is to find a suitable location.

LOCATION

Since the prevailing winter winds in Minnesota are from a northwesterly direction, your main shelterbelt should be L-shaped on the north and west side of the farmstead. Do not "box in" your farmstead with trees. The resulting hot stagnant air could make work and play around the farmstead uncomfortable in summer.

Since each farmstead is unique, the exact location of your shelterbelt is determined by:

1) Arrangement of buildings and feedlots requiring protection. For the most efficient protection, the inside row should be 100 feet from the house on both the north and west, however, if the land slopes downhill from the house to the west or north the windbreak should be located closer than 100 feet. The west and north belts should extend at least 50 feet beyond the farthest buildings requiring protection. Planting a windbreak too close to buildings or feedlots will cause hot stagnant air to occur in summer and snowdrifts to accumulate against the buildings and feedlots during the winter.

2) Location of driveways. In most cases, driveways leading to a home or farm have a straight approach from the main public access road. If these approaches are from the west or north, snowdrifts could be expected in the driveways. To partially reduce these snowdrifts, you should consider changing your straight driveway approach to an angle when planting your windbreak.

3) Drainage problems in new shelterbelt area. Two drainage problems may exist in the shelterbelt area: a) low, wet areas on the shelterbelt site; and/or b) feedlot drainage running through the shelterbelt site. If low areas are too wet for any species to survive and grow, the area should be tiled before planting. Feedlot drainage, however, may cause species (especially conifers) to die out because they cannot tolerate high concentrations of salts, such as sodium nitrate, from feedlot drainage.

4) Old tree groves on new shelterbelt site. Often, a new windbreak will be planted where an old site existed. In this case, the best approach is to remove a portion of the old grove (roots and stumps) and plant the first stage of the new grove. The remaining portion of the old grove will provide some protection. Do not plant trees in the shade of the old grove. Planting in the shade means planting in the root area of existing trees. This reduces the amount of sunlight and available moisture necessary to establish newly planted trees and will result in poor survival and growth.

5) Plans for future buildings and feedlots. If plans exist to construct new buildings or feedlots, the location of the shelterbelt should be determined according to those plans.

DESIGN

Choosing the correct design is probably the most important factor. Failure of old shelterbelts to provide maximum long-term protection is usually the result of a faulty shelterbelt design, often because trees were planted too close together or too close to the feedlot area.

SPECIES SELECTION

When selecting trees or shrubs for your shelterbelt, keep this in mind: soil type and climate affect the survival, height growth, rate of growth and length of life of a species, and choosing a tree species adapted to your area and soil is fundamental to the success of your shelterbelt. Information on species adaptability can be obtained by contacting offices of your local Soil and Water Conservation District (SWCD), Soil Conservation Service (SCS), Minnesota Extension Service, or Department of Natural Resources (DNR) Divsion of Forestry.

SITE PREPARATION

Since weeds and grasses compete with trees for sunlight and soil moisture, they must be eliminated or controlled to ensure tree survival and growth. Trees cannot get an early "jump" in height growth when they are competing with weeds and grasses.

Preparing the planting site one year in advance is recommended for most areas. Sites with heavy sod may require two years. Cultivation for weed control just before planting also is recommended. Soil compaction layers or other existing soil problems should be corrected before planting.

If you use chemical treatment, be sure to follow label directions. Tree mats or mulching may also be used to control growth of weeds and grasses or you might consider more conventional methods such as plowing and weed removal.

No matter what, remember to fence out livestock from any new windbreak area. Livestock cause soil compaction.

PLANTING TIME

To increase field survival, planting stock should receive proper care prior to planting and during the actual planting operation. When you receive the planting stock from the nursery, the following steps should be taken:

1. When you receive stock, immediately pour cool water on

the bundle to resaturate the packing (moss, newspaper, or wood shavings).

2. If you cannot plant right away, store bundles in a cool, humid, shady place until planting time. If you do not expect to plant in a few days you must:

* Store bundles in cold storage 35 degrees Farenheit, but not higher than 40 degrees Farenheit. Bundles can be stored in these conditions for 4-5 weeks.

* If storage facilities are not available, bundles of bare root stock should be "heeled in". Find a cool, humid, shady spot and dig or plow a trench deep enough to accommodate the root system. Separate the trees and set trees along the trench wall in a single layer--do not crowd. Fill the trench with soil and pack the soil down with your heels to reduce air pockets around the roots. Then water to help settle the soil around the roots and further reduce air pockets--roots in air pockets will dry out and die.

PLANTING METHODS AND TECHNIQUES

Windbreaks may be planted by hand or machine. Small windbreaks are generally planted by hand, while larger windbreaks are planted by machine. In either case, the following tips will apply:

Keep the roots moist. Dried roots mean dead trees. Planting hole or slit must be deep enough to accommodate the entire root system. It is better to root prune, than to have the roots bundled up in a ball at the bottom.

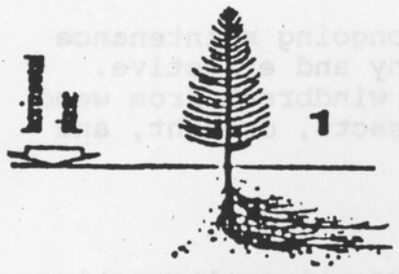
Planting depth should be the same as the tree grew at the nursery. This can be determined by a slight swelling on the main tree stem (root collar)

Pack the soil around tree to eliminate air pockets.

Water the trees thoroughly.

Consult the following planting chart for the correct way to plant and some key things to avoid when planting:

Plant trees in a satisfactory manner. Drawings 1-11 below show how trees should not be planted. The ideal planting is number 12.



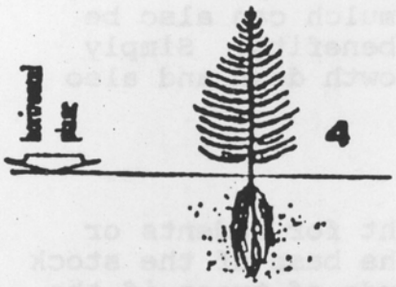
'L' ROOTS
Hole shallow



'U' or 'J' ROOTS
Hole shallow, root ends often exposed to air



JAMMED ROOTS
Hole too narrow and shallow



COMPACTED ROOTS
Hole too narrow



TOO SHALLOW
Roots exposed, hole too shallow



TOO DEEP
Needles buried, hole OK, tree position poor



INADEQUATE TAMPING
Roots drying likely due to depression left



PLANTED IN ROTTEN WOOD
Roots not in damp mineral soil



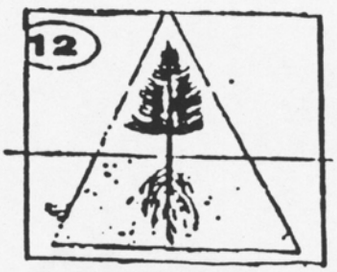
PLANTED ON MOUND
Roots apt to dry out



NOT VERTICAL
Tree not planted vertical to the horizontal plane



AIR POCKET
Showing improper tamping



A SATISFACTORILY PLANTED TREE

MAINTENANCE

Once your windbreak is in place, an ongoing maintenance program is required to keep it healthy and effective. You need to continually protect your windbreak from weed competition, deer, mice, rabbits, insects, drought, and disease.

Weed Control

Tree mats, mowing, or mulching are effective alternatives to using herbicides to protect trees from weed or grass competition. A tree mat is made of geotextile materials that disintegrates from the sun's rays after a few years, but provides protection to the tree in the early phase of tree growth. It allows sun and moisture to pass through while protecting weed growth. Straw mulch can also be applied providing basically the same benefits. Simply mowing around trees will keep weed growth down and also eliminate a nesting habitat for mice.

Rodent or Animal Control

Unprotected trees are a gourmet delight for rodents or animals. Mice will girdle trees at the base of the stock and deer or rabbits will nip at the buds of trees if the trees are not protected. Photodegradable tubes are a good method for preventing browsing or girdling of trees. Regular mowing will help protect your windbreak from rabbits, mice, and other pests. Healthy trees are more resistant to insects and disease.

An effective farmstead windbreak begins with proper planning, careful site preparation and development, and a regular maintenance program. For further planning assistance and information, please contact your local Soil and Water Conservation District or Soil Conservation Service Office.

NUTRIENT MANAGEMENT

FARMSTEAD WINDBREAK

PASTURE MANAGEMENT

PASTURE MANAGEMENT

At best, pastures in Northern Minnesota produce at 30% of their potential. To plan a good forage program, the farmer must consider the amount of available land; land characteristics such as productivity, slope, stoniness, and drainage; vegetative cover; and feasibility of renovating and establishing new plant cover. He/she must also consider his/her livestock's forage needs--the amount of pasture needed each month during the growing season and the amount of stored feed needed for winter.

Four common problems limit pasture productivity:

1) Moisture deficiencies during midsummer
2) Low soil fertility
3) Infestations such as weeds, insects and disease
4) Overgrazing, or grazing at improper times

Pastures should be managed to provide the best use of soil, plant, and animal resources. Good pasture management includes:

1) Determining yield potential
2) Weed control
3) Improving soil fertility
4) Selecting high yield plant species
5) Managing grazing appropriately
6) Good, reliable fencing

Let's consider these principles of good pasture management and pasture productivity one-by-one.

DETERMINING YIELD POTENTIAL

To determine the yield potential of your pasture, you must consider soil type, land capability, fertility level, and potential moisture supply. You'll get more "bang for your buck" by improving pastures with a good resource base than attempting to develop a "poor risk" pasture that is too wet, too dry, too rocky, or otherwise unsuitable. If poor risk pastures are all you have to work with, they may be effectively maintained by grazing with fewer animals, fertilizing to maintain perennial species and by controlling undesirable weeds. A good way to determine the yield that your pasture is capable of producing is through use of an exclosure system.

An exclosure system is a small area that is fenced off within a pasture or paddock area. This area is used not only to estimate plant growth, but also to give you a pretty accurate picture of the amount of forage your animals are consuming.

In planning the forage program, consider seasonal and total production of various grasses and legumes. Many grasses widely used in Minnesota produce much more during the spring and early summer than mid to late summer. These cool season grasses include smooth bromegrass, Kentucky bluegrass, timothy, reed canarygrass, orchard grass, tall fescue, and perennial ryegrass. Warm season grasses start growth later, but they are more productive during warmer parts of the summer. Such grasses are ready to graze about mid-July.

WEED CONTROL

Pastureland weeds are undesirable. They reduce productivity of pastures, threaten the health of livestock and may even lower the quality of livestock products produced. Weed control requires persistent and timely efforts. And, wherever possible, we encourage alternatives to herbicides:

* Use weed free seed to prevent reinfestation. You can determine the amount of weeds found in the seed by looking at the seed tag from the seed bag.

* Mow at the proper time to prevent weed reseeding and to destroy weed root carbohydrate reserves.

* Use timely harvest schedules to control weed seed production.

* Use clean feed supplies for livestock to prevent spreading weed seed.

* Control reinfestation sources on adjacent property such as fencerows, ditch banks, and roadways.

If herbicides must be used, we recommend that you take the following precautions:

* Select herbicides least harmful to the environment...Follow label instructions.

* Consider soil texture, organic matter, and soil pH when determining soil applied herbicide rates and Use spot treatment where possible. For more information on safe herbicide use, contact your local Minnesota Extension Service or your local Soil and Water Conservation District.

IMPROVING SOIL FERTILITY

Pastures are often given less attention for fertility levels than cropland. It is important to realize that the amount of harvested and stored feed supplies needed for feeding animals can be significantly decreased by

maintaining good pastures. Also, it is important to remember that soil tests should be conducted first to determine nutrient and liming needs for your pasture area, just the same as for cropland. (Refer to the segment of this handbook on nutrient management).

Lime

There are a variety of lime sources available to farmers in this area. The chart below gives the approximate composition of the various liming materials.

Material	Composition	Calcium Carbonate equivalent
Limestone, calcitic	95% $CaCO_3$, 2% or less $MgCO_3$	100
Pelletized limestone, Ampel Co., Iowa	same as calcitic limestone	94
Limestone dolomitic	50% $CaCO_3$, 40% $MgCO_3$	85-109
Hydrated Lime	$Ca(OH)_2$	120
Marl	$CaCO_3$, clay, organic matter	60-80
Slags	$CaSlO_3$	60-90
Waste limes: sugarbeet	$CaCO_3$, 48% water	80
water softening	89.5% $CaCO_3$, 3.13% $Mg(OH)_2$ (33% solids, 66% water)	90
Filter cake sewage sludge	48 lb/$CaCO_3$/wet ton	12

Alternative Lime Sources

Testing has been done in this area on using ash from several paper companies as a lime and/or fertilizer source. This practice is not new. Early scientists reported that applying ashes seemed to "enrich and sweeten" the soil. The utilization of ash provides a valuable alternative to farmers in applying lime and also to the paper company and area landfills in storing the ash in already overcrowded landfills. Two of the local paper companies that have this source available are Blandin Paper Company in Grand Rapids, Minnesota, and Potlatch Corporation in Cook, Minnesota. The chemical analysis of ash from the Blandin Paper Company would support these earlier observations. Here is the chemical analysis from the Blandin Paper Company source:

Element	Lb/Ton	Element	Lb/Ton
Phosphorus	4	Zinc	.80
Potassium	36	Copper	.08
Calcium	220	Boron	.50
Magnesium	16	Lead	.02
Iron	3	Nickel	.01
Manganese	2	Cadmium	.01
Sulfate	40	Chromium	.01
Aluminum	20		
Sodium	4		

The Cutler-Magner Company, of Superior Wisconsin, produces up to 150 tons of lime material per day. The material is the fines from the processes by which Cutler-Magner company makes a variety of products. The value of the lime material to the farmer/producer is based on a number of factors:

1) Very quick neutralizing ability in the soil to change the soil pH and free up nutrients such as phosphorus.
2) Alternative to Dolomitic Limestore or Ag Lime.
3) Competitively priced.
4) The calcium carbonate equivalent is 98.6% for this alternative lime source. The high percent of fineness of this material equals 1970 pounds per ton of effective lime.
5) Ag lime has a calcium carbonate equivalent of 55-60% effectiveness which equals about 1100-1200 pounds per ton.

Lime is not generally recommended for grass pastures because grass is tolerant of fairly low pH levels and top-dress application of lime are not very effective. However, in the following situations with grass-legume mixtures, lime application may be desirable:

* Pasture renovation with tillage to establish a legume-grass mixture. Spread lime prior to tillage according to rate recommended for the legume to be seeded.

* Sod seeding of legume into grass pasture without tillage. The effectiveness of lime is limited when it is not incorporated with tillage. However, some benefit can result from lime application on acid soils if it is done early enough. Spread lime at least one year before seeding of the legume at rate recommended for the legume used.

* Non-renovated pastures. Topdressed lime may show some benefit on permanent pastures on low pH soils where native clover is present.

SPECIE SELECTION

Specie selection should be based on soil drainage, soil capability, soil fertility, type of grazing management system used, and desired length of stand life.

Usually, pastures should be seeded with grass-legume mixtures. For well-drained soils where alfalfa is adapted, a mixture of alfalfa (7 lbs. per acre), bromegrass (8 lbs. per acre), and orchardgrass (2 lbs. per acre) is recommended. This mixture should contain enough grass to prevent bloat.

If the pasture contains low, wet spots, Alsike clover at 1 pound per acre or Ladino clover at 1/2 pound per acre should be added to the above mixture. Clover will be the dominant legume in the low spots; alfalfa will dominate on better drained areas.

If alfalfa is not adapted because the land is too acid for economically feasible lime application, or if the land is too wet, a mixture of red clover, 4 pounds; alsike clover, 2 pounds; bromegrass, 5-6 pounds; and timothy or orchardgrass, 2 pounds, may be used.

The amount of seed needed to establish a satisfactory stand depends considerably upon the seedbed. One of the greatest problems is loose seedbeds. This results in seed coverage that is too deep. The seedbed should be firm enough so a man walking on it will sink only about 1/2 inch.

Suggested seeding rates and times are summarized below:

Crop	Pounds/Acre*	Time
Alfalfa		
alone	8-12	Early spring to Aug. 10
with grasses	5-8	
Birdsfoot Trefoil	5-6	Early spring
Clover		
Alsike (in mixtures)	1-4	Early spring
Ladino (in mixtures)	1/2-2	
Red (in mixtures)	4-8	
Bromegrass (in mixtures)	8-15**	Early spring or late summer
Orchardgrass (in mixtures)	2-6	Early spring or late summer
Reed Canarygrass		
alone	6-8	Early spring or late summer
in mixtures	4-6	
Timothy (in mixtures)	2-6	Early spring or late summer
Switchgrass	5-10	May 1 - June 15

*Seeding rate if seed is over 90 percent germination and 95 percent purity. If germination or purity is lower, seeding rate should be increased to compensate.

**Lower amounts should be used if orchardgrass is included in the mixture.

The fast growth rates of these species (orchardgrass, smooth bromegrass, reed canary, and tall fescue) will result in the problem of not being able to graze all forage with a constant herd size. These species require renovation for establishment and may require periodic harvest. We suggest their use on land capable of supporting cropland pasture. Most unimproved pastures in this region will carry one animal unit (a mature 1,000 pound animal at maintenance) on 3 to 5 acres. Improved pastures with two or more pasture systems on 1 to 2 acres.

If you have enough acres to support your livestock with one animal unit on 3-5 acres, no species change is needed. If you want to increase the number of animal units that may be carried, you must follow these four steps:

1) Determine seasonal animal needs

2) Determine carrying capacity of each pasture

3) Match animal needs to plant supply

4) Select species, fertilization, and grazing methods to fill shortages

GRAZING MANAGEMENT

Animal performance, plant persistence, forage yield, and feed waste are all influenced by grazing management. There are three basic grazing systems: Continuous, rotational, and strip grazing. The type of management technique that you choose would depend on the amount of forage your animals consume per day, the number of animals per acre, and the plant growth rate.

Under a **continuous grazing** system, the animals remain on a pasture throughout the grazing season. Heavy, continuous, grazing favors growth of lower growing species such as Kentucky bluegrass or white clover. The disadvantage of this type of grazing system is that grazing is uncontrolled (animals will select what they like best) and certain species will not have a chance for regrowth. Also, if the pasture is poorly drained, treading damage can occur.

Rotational grazing provides for animals alternating among two or more pastures throughout the season. Pastures may also be divided up into smaller plots. This method allows plants periodic rests during the season. Plants are provided a rest during the season when animals are switched to a different area. The efficiency of the nutrient cycle can be increased in rotational grazing, because animal concentration in certain areas can be eliminated. The higher quality forage in a rotational pasture will result in more liquid manure, which will break

down more rapidly than the cowpies seen in most continuously grazed pastures. There is more tear-up of manure accumulations in a more densely stocked area, than in continuous grazed pastures. Where land allows, uniform sized paddocks with parallel sides are most desirable. The shape of the paddock will influence grazing behavior. Paddocks with low lenth:width ratios tend to be grazed more uniformly than long narrow paddocks. It takes cattle about three days to establish a strong grazing pattern.

Strip grazing is the third type of grazing system. It allows the animals to graze on a different strip of pasture each day. This enhances the utilization rate of the pastured area. It allows for better control over weed growth and management of forage species.

FORAGE YIELD

Yields of forage plants from pastures are affected by excessive and untimely grazing. Palatability (acceptability) is an important consideration when grazing. Animals will often reject certain species such as orchardgrass and reed canarygrass when they reach advanced stages of maturity before being grazed. Do not allow the pasture to reach the advanced maturity stage. Clipping should be done, if animals cannot be released into this area for grazing. Selective grazing by animals results in some grasses being grazed too short and others growing to full maturity. Selectivity can be reduced by starting grazing early (at immature stages) and stocking the pasture with enough animals to consume forage close to its growth rate. Grazing too early in the spring, before substantial leaf area develops, severely reduces yield. It may even result in plant death if done continuously.

MANAGEMENT OPTIONS TO FILL SHORTAGES

Several options can be used to extend the grazing season. These are:

* fertilize existing pastures with nitrogen
* utilize regrowth from legume-grass hay fields
* establish a drought tolerant species (alfalfa) or a species with similar peak production to fill summer slumps
* establish another species to extend the grazing system
* Utilize a grazing program in which you can accumulate growth for summer or fall grazing. Any cool season grass except for timothy that is harvested for first cutting and then fertilized with 50-75 pounds per acre

of Nitrogen so regrowth will accumulate or with orchard grass in heavy rainfall areas, two cuttings can be taken before allowing for accumulation

LAYOUT AND PASTURE DESIGN

Once you have selected your system of grazing management, you should carefully consider these factors in order to design and lay out your pasture:

* What type of fence will be the most suitable to your livestock and keeping predators out?

* Is your pasture accessible to water?

* Topographic features

* Soil-site characteristics

* Locating fences in relation to livestock handling facilities

* Make sure all grazing units have equal forage-producing capability

Working with detailed aerial photographs and soil maps will allow the producer to overlay many system designs on his/her landscape before the fence is even built. These are available at your local Soil and Water Conservation District office.

The changing technology in electric fencing is probably the single most important factor responsible for increased interest in grazing management. In the past, a lack of consistent, reliable electric fencing was a major limitation.

Modern fences, however, use energizers that are much more powerful and reliable, especially in adverse conditions. The difference is in the duration of electrical impulse and the force with which energy enters the wire. Previous fencing systems sent a slower moving impulse through the line, an impulse that would short by vegetation and faulty insulators. Present systems use a fast-moving high energy impulse that moves past any vegetation and other "break points" with minimal energy loss.

These systems, known as "high tensile," "New Zealand" type fencing, have stronger wires for greater tightening ability, no barbs for easier working and repair, and galvanized coating for greater life expectancy. And the cost of a high tensile fence will be one-third to one-fourth of a standard barb-wire fence. For further information on high tensile

fencing or conventional fencing, view the video tape segment on pasture management which is produced by the Soil and Water Conservation District, or consult any fencing dealer. And remember, good, reliable fencing is just one of six key components in a successful pasture management system.

S O U R C E S

MN Extension Service Publications:

Liming: Take a Look at Liming Materials
Using Ash as a Lime/Fertilizer Source
Clean Water: Setting Realistic Yield Goals
Manure Management in Minnesota
Using Manure as a Fertilizer
Managing Pastures for Productivity
Utilization of Animal Manure as Fertilizer
Lime Needs in Minnesota
Feedlot Regulations for the Poultry and Livestock Industries

Minnesota Forage and Grassland Council Proceedings:
Forage Crop Sense: Making the Best Decisions

Farmstead Shelterbelts: Harold Scholten

MPCA Publication: Running Your Feedlot

USDA Soil Conservation Service Fact Sheets:

Windbreaks: Function and Effects
Windbreak Economics
Planting a Windbreak

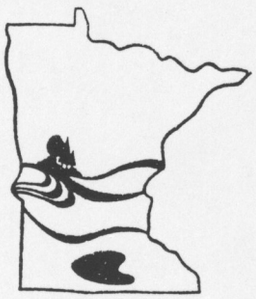
Intensive Grazing Management, Forage, Animals, Men, Profits: by Burt Smith, PingSun Leung, and George Love, 1986

Nutrient and Pesticide Best Management Practices for Wisconsin Farms, prepared by University of Wisconsin-Extension and Wisconsin Department of Agriculture, Trade and Consumer Protection

NUTRIENT MANAGEMENT

FARMSTEAD WINDBREAK

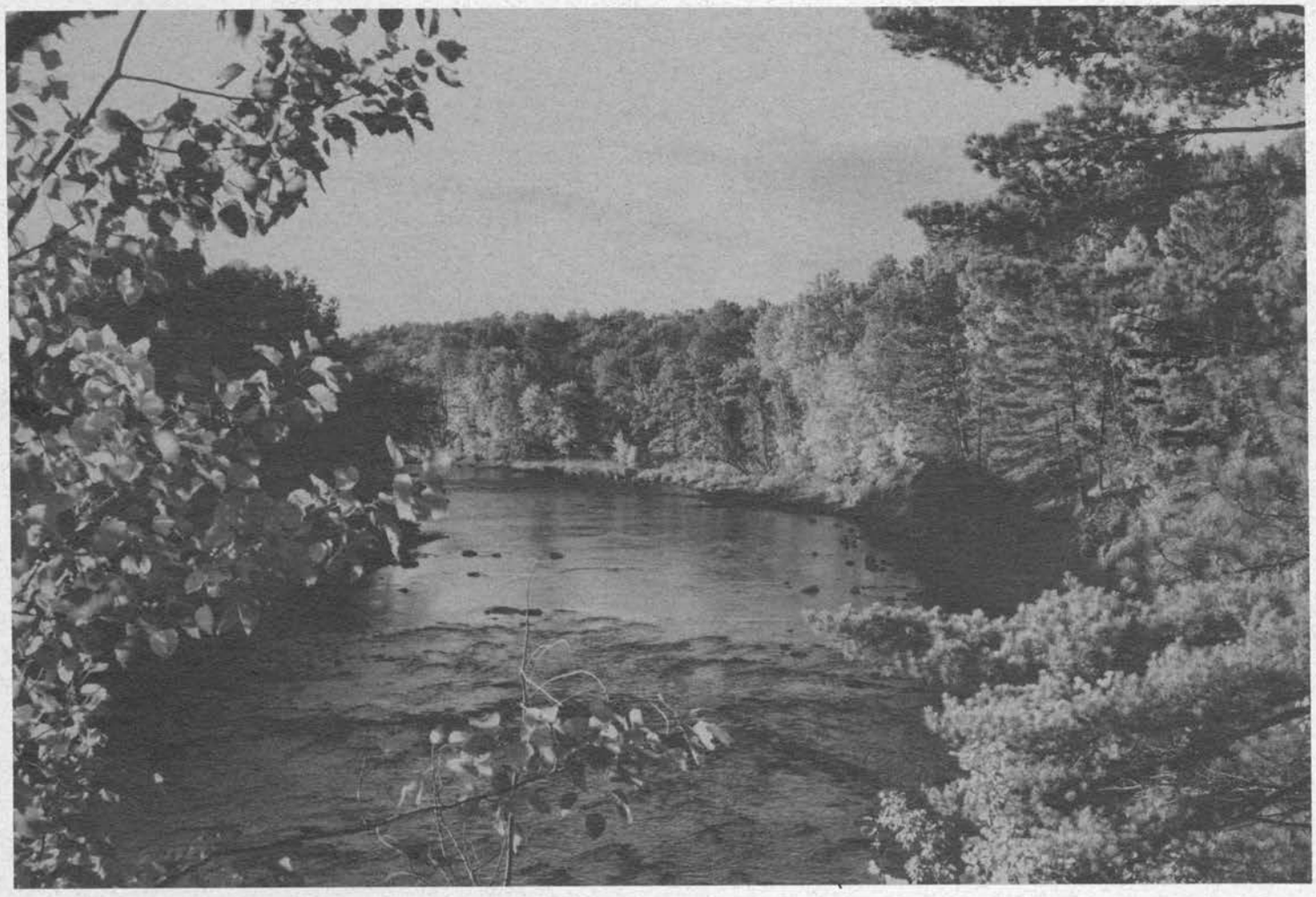
PASTURE MANAGEMENT



NORTH ST. LOUIS SOIL AND WATER
CONSERVATION DISTRICT

401 Sixth Avenue North
Virginia, Minnesota 55792
Telephone (218) 741-3230

Minnesota Water Plan



Minnesota Environmental Quality Board
Water Resources Committee

January 1991

To The People Of Minnesota

Water is precious to Minnesotans. It is a symbol of our state and our people. Protecting and conserving water resources is an investment in Minnesota, not a cost.

The rich outdoor experience that we value, and that so typifies our state, centers on our lakes, wetlands, and streams. Beneath the surface, we also share the hidden treasure of abundant, pure ground water. Most of us get our drinking water from this treasure.

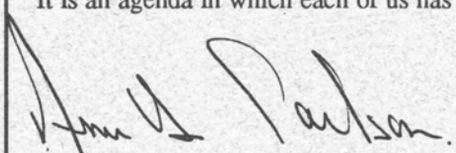
We have come to realize in recent years that our water resources are at risk. We cannot stand pat and maintain the quality of Minnesota's water.

We have also begun to understand a very simple principle — the ecological principle of interdependence. What we do on the land affects water quality and availability. When we seek to protect water quality, we had better understand quantity. When we think to use surface water, we need to realize that ground water may also be affected.

Minnesotans across the state have joined in a unique grassroots campaign called "comprehensive local water planning." The word "comprehensive" signals a recognition of the principle of interdependence; the word "local" means that the people involved are close to the real issues and solutions.

Minnesotans were honored at Earth Day 1990 festivities with the National Environmental Achievement Award for ground water protection. The winners were the initial 52 participating counties and their state partners in comprehensive water planning. Today, local water planning is the foundation of the **Minnesota Water Plan**.

The **Minnesota Water Plan** sets an ambitious agenda for protecting and conserving our water. It is an agenda in which each of us has a part to play.



ARNE CARLSON
Governor

Minnesota Water Plan

Directions for Protecting and Conserving Minnesota's Waters

A Report of the EQB Water Resources Committee
January 1991

Environmental Quality Board
Minnesota State Planning Agency

300 Centennial Office Building
658 Cedar Street
St. Paul, Minnesota 55155
(612) 297-2602

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Executive Summary

The **Minnesota Water Plan (MWP)** sets an ambitious agenda for protecting and conserving water resources in the state. It identifies the principles, policies, and actions needed for managing water in the 1990s and beyond.

Minnesota's water is not evenly distributed. The character of Minnesota's land use, a prime determinant of water quality and use, also varies dramatically across the state. The demands Minnesotans place on water are equally diverse.

The State of Minnesota needs a plan to manage the challenges that arise from water's changing nature and the variable demands Minnesotans place on it. Minnesotans face an increasing and changing population and economy, with changing land use, and even the threat of global warming. Minnesotans cannot stand pat and maintain the quality of their water resources.

It is easy to forget that, only five years ago, there was little indication of the extent of Minnesota's ground water pollution. Monitoring studies have since indicated contamination by volatile organic chemicals and by pesticides. It is also easy to forget that drought has dried up water supplies and crops and altered water quality.

The **Minnesota Water Plan (MWP)** is the state's plan for harnessing the energy and resources needed to protect and conserve Minnesota's water. In it, commitments are made by the key state agencies responsible for water. These commitments embrace the directions that must be pursued to keep what we have and to make it better. The **MWP** also signals the state's commitment to local water planning as a key to managing water in the 1990s. The state's directions are built around local initiative through comprehensive water planning.

The **MWP** stresses the importance of understanding water's interconnections and integrating government efforts to address them. It argues for helping partnerships to address these connections. It recognizes the necessity of making the most out of what we have.

Understanding water's interconnections and integrating government efforts to address them. Water quality cannot be considered without understanding quantity. Availability hinges upon quality, as well as quantity. Surface waters are connected to ground water. Land use affects both quality and quantity of water. Air quality affects water quality. Clearly, the environment must be managed well to protect water, just as water must be well managed to protect the environment.

Government often addresses these interconnections in a fragmented way. The **MWP** makes "integrating water management" a priority for Minnesota agencies. To do this, the plan calls for a renewed "focus on the resource." By focusing on protecting a lake, stream, or aquifer, people may worry less about specific government program "wants" and more about what the resource needs are.

The resource focus is intended to aid program integration across agency lines. For example, a lake may need a combination of steps involving weed harvesting (regulated by DNR) and watershed land treatment (supported by PCA and BWSR).

Helping partnerships address these connections. The state must continue to work closely with local governments involved in comprehensive local water planning. This local / state partnership holds a key to our ability to manage water in the 1990s. Both local and state governments must involve others in partnerships too. The federal government, the academic community, and the private sector, especially nonprofit organizations, offer important opportunities for Minnesota's water.

Making the most out of what we have. Minnesotans must work together to protect and conserve water. We cannot afford to waste efforts on inefficient programs. We need to use the authority we have to protect water. We

Environmental Quality Board membership:

Chair appointed by Governor.

Commissioner of Agriculture.

Commissioner of Health.

Commissioner of Natural Resources.

Commissioner of Pollution Control.

Commissioner of Public Service.

Commissioner of State Planning.

Commissioner of Transportation.

Director of Waste Management.

Chair of Board of Water and Soil Resources.

Five Citizen Members.

Minnesota's WATER GOALS:

- To improve and maintain the high quality and availability of Minnesota's water for future generations and long-term health of the environment.
- To ensure that our uses of water are sustainable, and that in meeting our needs for water, we recognize its limits and interconnections, accept its changing and variable nature, and adjust our demands upon it when necessary to safeguard it for future needs.

Minnesota's WATER PRINCIPLES are that we:

- Manage water's interconnections.
- Focus on the resource.
- Manage hydrologic units.
- Make partnerships work for water.
- Make prevention the focus.
- Put public health and safety first.
- Recognize the importance of information.
- Understand the importance of research.
- Think long-term.
- Accept limits to growth.
- Make those who benefit pay.
- Let citizens make a difference.
- Educate people to change behavior.
- Make government understandable, adaptable, and accountable.

need to target government's efforts toward the most pressing problems. We need a well-coordinated, focused state effort.

MWP Goals and Principles . . . The **MWP** identifies key goals and principles for water management and policy development in Minnesota. These apply to all water activities in Minnesota. They are part of every recommendation made in the plan.

The recommendations . . . The **MWP** identifies objectives for the decade, key recommendations, and "first steps" for carrying them out. These are organized around the themes of integrating water management, focusing on the resource, protecting and conserving water resources, and managing water's interconnections.

A series of objectives define the Environmental Quality Board's targets for Minnesota's water program in the next ten years. The ten-year objectives are ambitious. It will take dedicated efforts to reach them.

The **MWP** presents 28 recommendations for Minnesota's water resources and for its water programs. They are designed to help Minnesota meet the objectives for water management. They are the heart of the **MWP**.

By chapter, the MWP recommendations are:

Integrating Water Management In Minnesota

The Minnesota Coordination Strategy

- Establish, monitor, and refine a Minnesota coordination strategy.
- Make comprehensive local water plans a highly visible element of the coordination strategy.

Communication and Education

- Launch a major environmental education initiative to show people how their actions affect the environment.
- Open up lines of communication among local, state, and federal levels of government, as well as citizens and the private sector.
- Strengthen efforts to meet the ongoing training needs of local and state water managers and policy-makers.

Information and Research

- Build a long-term base of support for the priority research needs identified in the biennial EQB water research needs assessment.
- Improve the state's Geographic Information System so that all users can easily access and integrate data on surface water,

ground water, and related land resources.

- Make the commitment of money and authority necessary to carry out the state Water Resources Monitoring Plan.

Liability and Enforcement

- Enhance the state's environmental compliance strategy.
- Develop a consistent state approach to fairly and equitably assign consequences and liability for water misuse.

Infrastructure

- Upgrade Minnesota's water infrastructure with new technology to better safeguard public health and the environment.
- Take steps to ensure that money is set aside for infrastructure maintenance and improvement.

Financing

- Expand revenue sources and options available to state and local units.
- Tie allocation of funds to priorities identified in the **Minnesota Water Plan** at the state level, and to comprehensive local water plans at the local level.

Focusing on the Resource

Lakes

- Develop a strategy for integrated lake management.

Wetlands

- Establish and operate a state / local "no net loss" program for wetlands.

Rivers

- Address water and related land resource issues from both a major river basin and a smaller watershed perspective.

Ground Water

- Protect and manage aquifers as hydrologic units.
- Gather sufficient hydrogeologic information for making adequate water management and protection decisions.

Protecting and Conserving Water Resources

Reduction of Environmental Pollutants

- Evaluate how state programs should be changed to move toward the Minnesota clean water goals, then begin making the changes.
- Reduce the amounts of polluting materials used, wastes produced, and pollutants entering the environment.
- Ensure that agricultural activities in the state are environmentally sound, and economically and socially viable in both the short and long term.

Water Well Management

- Strengthen enforcement of the well code at the state and local level.
- Develop a system for private well testing that provides a basic level of service across the state while encouraging innovation in meeting regional needs.
- Develop and implement wellhead protection for public and private wells.

Water Conservation

- Develop a water conservation strategy for long-term and seasonal water use throughout Minnesota.

Managing Water's Interconnections

- Identify and remove barriers to managing water's interconnections for a sustainable environment.
- Build consideration of water protection needs into land use decisions.

The **MWP** provides the agenda for managing Minnesota's water in the 1990s and beyond. Working closely together as Minnesota partners in water management, the Legislature, local, regional, state, and federal governmental agencies, the educational community, the private sector, and Minnesota citizens can indeed carry out this agenda.

The Minnesota Pilot Project for Local Water Planning received the National Environmental Achievement Award for Ground Water Protection at the 1990 Earth Day celebrations in Washington, D.C.

SPA received the award on behalf of the 52 participating counties and their state partners.

Introduction

Minnesotans pride themselves on the abundance and quality of their water resources. In our so-called "water-rich" state, we count over 25,000 miles of fishable streams, 12,000 lakes, five million acres of wetlands, and great supplies of ground water. Most western states could only dream of such supplies as we have.

With all this water, one might ask why Minnesotans need a plan for its protection and conservation. Several compelling reasons exist.

For one thing, Minnesota's water is not evenly distributed. Rainfall varies from over thirty inches in the southeast to a semi-arid nineteen inches in the northwest. Lakes are not evenly distributed, either, with most found in the central and northern sections of the state. Wetlands follow similar patterns, except that Minnesota's western prairie lands harbor wetlands of great value. The character of Minnesota's land use, a prime determinant of water quality and use, also varies dramatically across the state.

The demands Minnesotans place on water show equally diverse characteristics. Water use is the greatest in the Metropolitan area, where people and industry are concentrated. The central sand plains are tapped for irrigation. The Iron Range places demands on water through mine dewatering and taconite processing. Electric utilities and pulp and paper mills are major users of water throughout the state.

The State of Minnesota needs a plan to manage the challenges that arise from water's changing nature and the variable demands Minnesotans place on it. Minnesotans face an increasing and changing population and economy, with changing land use, and even the threat of global warming. Minnesotans cannot stand pat and maintain the quality of their water resources.

It is easy to forget that, only five years ago, there was little indication of the extent of Minnesota's ground water pollution. Monitoring studies have since indicated contamination by volatile organic chemicals, like gasoline and solvents, and by pesticides, like atrazine. It is also easy to forget that drought has dried up water supplies and crops and altered water quality.

It is all too easy to assume that people in education and government know all about water. It can be a hard sell to convince people that more research and monitoring are greatly in need, and that smart decisions depend on more and better information. It is difficult to argue how improved teamwork may make a big difference in protecting and conserving water.

It is easy to assume that someone is taking care of all the threats to Minnesota's water, that someone is always in charge, and that they know what to do and when to do it.

But, it is not that easy. Water protection and conservation require a great deal of energy, resources, and commitment. People and programs make a difference when they are supported by good policy, by good information, and by good expertise.

The **Minnesota Water Plan (MWP)** is the state's plan for harnessing the energy and resources needed to protect and conserve Minnesota's water. In it, commitments are made by the key state agencies responsible for water. These commitments embrace the directions that must be pursued "to keep what we have" and to make it better. The **MWP** also signals the state's commitment to local water planning as a key to managing water in the 1990s. The state's directions are built around local initiative through comprehensive water planning.

The **MWP** is authorized by Minnesota Statutes, Section 103B.151. This section requires the Environmental Quality Board (EQB) to develop a "new plan and strategy" by November 15, 1990. The plan is to be updated every five years. The previous plan was developed by the Water Planning Board in 1979.

Like its predecessor, the new **MWP** is not

The Headwaters State.

Minnesota is at the headwaters of three major North American watersheds: the Great Lakes basin to the east, the Souris-Red-Rainy Rivers basin to the north, and the Mississippi River basin to the south. Minnesotans often characterize their state as water rich.

In a very real sense, the state's location at the headwaters of these major basins carries with it a special responsibility to protect the quality and quantity of water leaving the state.

Minnesota Facts.

Population (1990): 4,387,029.

State surface area: 85,447 square miles.

Nine major water basins.

Miles of rivers and streams: 92,000.

Lakes and reservoirs: 12,034 covering 3,411,200 acres.
> 5,000 acres — 62 lakes.
< 5,000 acres — 11,972 lakes

Approximately 5 million acres of wetlands.

Minnesota Water Plan

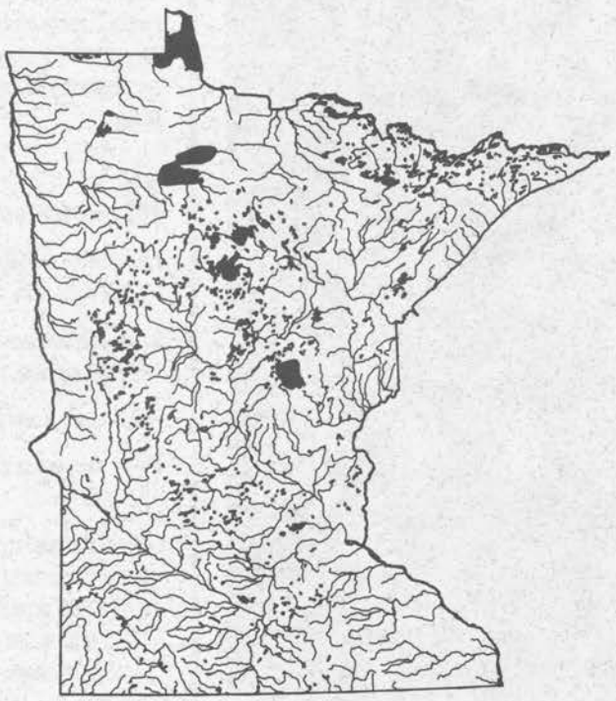
Implementation Leaders

AG	Office of the Attorney General
BWSR	Board of Water and Soil Resources
DNR	Department of Natural Resources
EQB	Environmental Quality Board
FED	Federal Agencies
GOV	Governor of Minnesota
LCMR	Legislative Commission on Minnesota Resources
LCWM	Legislative Commission on Waste Management
LEG	Legislature
LGU	Local Governmental Units
LWC	Legislative Water Commission
MDA	Department of Agriculture
MDE	Department of Education
MDH	Department of Health
MES	Minnesota Extension Service
METC	Metropolitan Council
MGS	Minnesota Geological Survey
NRRI	Natural Resources Research Institute
OEE	Office of Environmental Education (SPA)
OWM	Office of Waste Management
PCA	Pollution Control Agency
SPA	State Planning Agency
SUS	State University System
TED	Department of Trade and Economic Development
UM	University of Minnesota
WRC	EQB Water Resources Committee

The Environmental Quality Board established the Water Resources Committee in 1985 to help coordinate and guide state water management activities.

a regulatory document. It guides by the use citizens, legislators, and agencies make of it. It is up to those who manage water and those who make policy to apply the **MWP** principles and to address the actions recommended. In this way, the **MWP** provides the foundation for Minnesota's efforts to coordinate and integrate water programs. It is a sounding board for evaluation of the new policies needed to protect and conserve Minnesota's water into the 21st century.

Figure 1 Surface Water Resources



Source: SPA Land Management Information Center.

How was the MWP put together?

The EQB assigned the job of developing the **MWP** to its Water Resources Committee (WRC). A preliminary version of the plan was developed by the WRC in the fall of 1989. It was sent to over 100 interest groups and associations.

Many of these leaders participated in a "State Water Plan Kickoff" meeting in December 1989, and follow-up meetings in May and October of 1990. The February 1990 issue of the Water BillBoard, an interagency newsletter coordinated and published by the Board of Water & Soil Resources (BWSR), was devoted to the water plan.

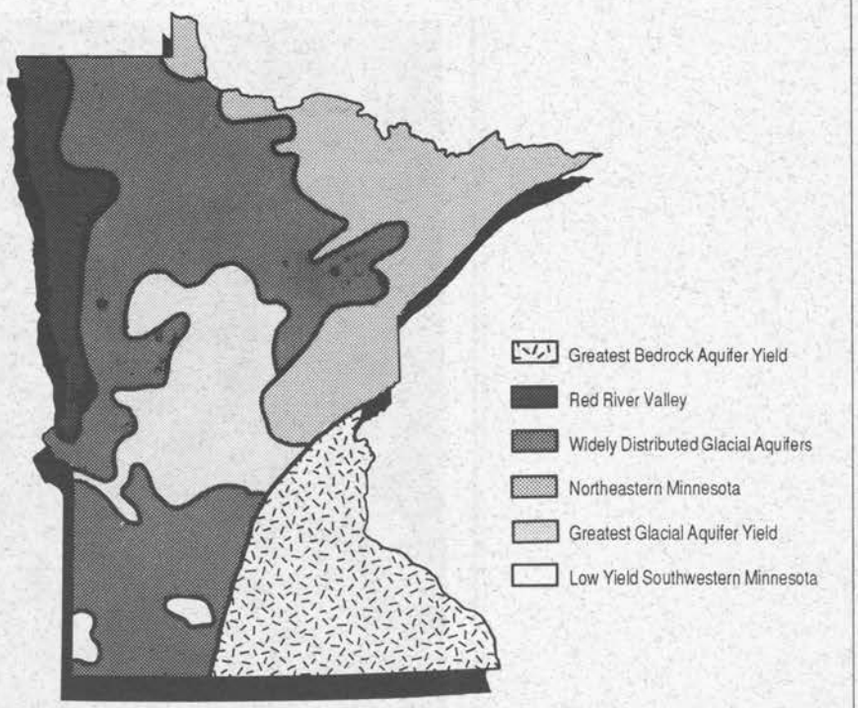
A series of public meetings to discuss the **MWP** was organized by the BWSR in late March and early April, and by local water planning groups in August and September. These gave the WRC the opportunity to hear directly from local water planning groups and other interests.

The meetings provided public input for revision of the various drafts of the **MWP**. The WRC and its staff used many ideas offered by readers and meeting participants. Foremost among these have been ideas from comprehensive local water plans. Local water plans are a major ingredient of the **MWP's** foundation.

Who will carry out recommended actions?

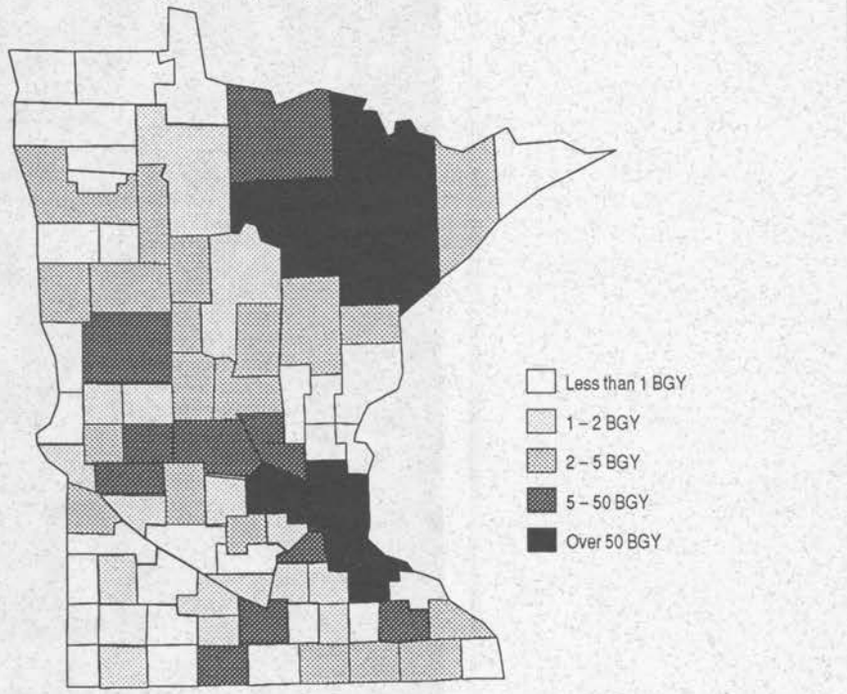
The **MWP** identifies leaders for facilitating implementation of a recommendation's "first steps." These are indicated throughout the plan with an acronym. The references do not identify every agency that may need to get involved in carrying out a first step. They merely identify the lead agency, or agencies, that will take responsibility for getting the step implemented. These agencies are shown on page 2. The Environmental Quality Board will monitor and guide implementation of the **Minnesota Water Plan** through the WRC.

Figure 2 Hydrogeologic Regions



Source: Minnesota Geological Survey.

Figure 3 Minnesota Water Withdrawals
Billions gallons / year (BGY), 1988



Source: Department of Natural Resources / SPA DATANET.



Goals and Principles

The Minnesota Water Plan's goals and principles set the course for water and related resources management in the state. They address both public and resource needs. They are the foundation of every recommendation made in the MWP.

Goals for Minnesota

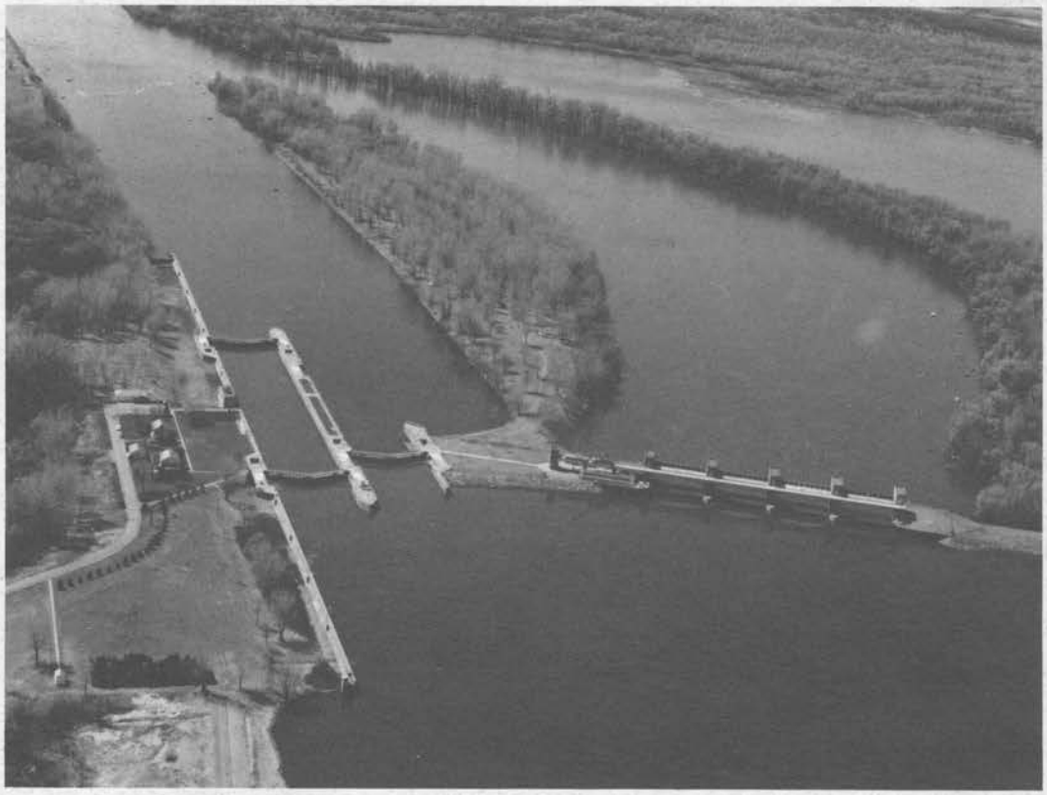
Minnesota's WATER GOALS are:

- To improve and maintain the high quality and availability of Minnesota's water for future generations and long-term health of the environment.
- To ensure that our uses of water are sustainable, and that in meeting our needs for water, we recognize its limits and interconnections, accept its changing and variable nature, and adjust our demands upon it when necessary to safeguard it for future needs.

Principles

Certain principles need to be followed by administrators, lawmakers, and citizens to attain these goals. Minnesota's WATER PRINCIPLES are that we:

- ***Manage water's interconnections.*** These occur between water and ecosystem health, surface and ground water, water quality and quantity, and among air, land, and water resources.
- ***Focus on the resource.*** A wide range of programs must be brought together to protect and manage the lake, wetland, stream, or aquifer in jeopardy.
- ***Manage hydrologic units.*** Minnesotans need to manage the interconnections of streams, lakes, wetlands, and ground water through their watershed, river basin, and "ground-watershed" systems.
- ***Make partnerships work for water.*** Partnerships bring people together to address Minnesota's complex water needs. Local, regional, state, and federal governments, the University community, the nonprofit sector, and interest groups must all take part in Minnesota's water partnerships.
- ***Make prevention the focus.*** Minnesotans must focus efforts on prevention of water degradation and overuse. It costs far less in the long run.
- ***Put public health and safety first.*** Public health and safety must never be compromised in the management of water.
- ***Recognize the importance of information.*** Sound information makes for sound decisions. Minnesotans need water information that accurately describes what is happening to water. They also need data that is accessible, understandable, and interconnected.
- ***Understand the importance of research.*** Research provides the scientific knowledge base essential for making sound water management decisions.
- ***Think long-term.*** The long-term costs and benefits to society, not short-term demands and crises, must guide water decisions.
- ***Accept limits to growth.*** The vulnerability and availability of water resources should limit economic development when environmental quality would otherwise not be sustained.
- ***Make those who benefit pay.*** The public at large should share the cost of government actions where society benefits, but when individuals benefit, they should bear the costs.
- ***Let citizens make a difference.*** Citizens



help to identify, understand, and reconcile the competing demands for water. It is important to involve them in the full range of water activities, from monitoring to policy debate.

- ***Educate people to change behavior.*** People pollute. People waste water. People need to understand the consequences of their behavior. Otherwise, they will be less likely to change habits. Formal and non-formal water education are keys to the success of all water management activities.
- ***Make government understandable, adaptable, and accountable.*** Minnesotans must understand how programs protect resources. Programs must adapt to changing conditions. They must respond to changing needs. Administrators must account for program results.

"Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect. Whatever befalls the Earth, befalls also the children of the Earth."

Chief Seattle

Integrating Water Management

The Minnesota Coordination Strategy

How can state government be made more understandable and responsive to the public?

How can Minnesota governments be unified in pursuit of a common set of goals and principles?

How can we continue to build the partnership between state and local government in comprehensive water planning?

The state has a number of agencies that relate to water. Each administers water-related programs authorized by law. The number of agencies, laws, and programs make the system difficult to understand. Federal requirements and local responsibilities add to the complexity. Yet, citizens need to understand where to go to get information and answers to problems. Government, itself, needs a sharp definition of the duties its agencies and units must carry out. Otherwise, it will not do the job expected by the citizens of Minnesota in protecting and conserving water resources.

No single agency or governmental unit can protect or manage water alone. The federal, state, regional, and local levels of government each have key jobs to do.

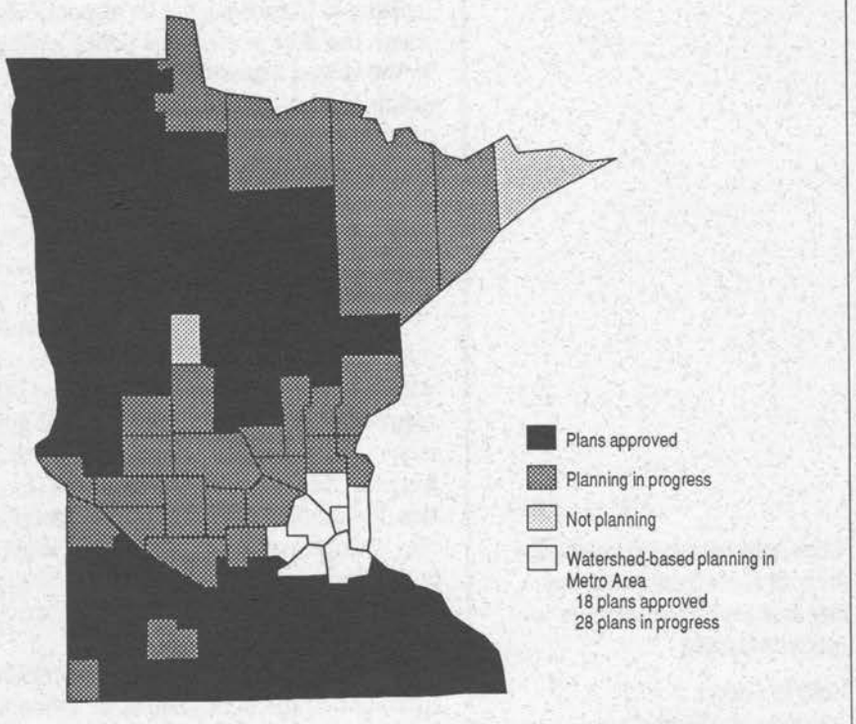
Local government makes crucial day-to-day land and water decisions that directly affect water resources. It has important land use authorities needed to protect water resources. Local water plans provide a focus for local priorities and actions. Local water planning and plan implementation is underway across the state.

The regional, or interlocal, level of government brings local units together for joint protection activities. For a number of reasons, this has greatly aided greater Minnesota counties in developing local water plans. The counties have pooled their resources. They have tapped the resources that various university and state university campuses have to offer. They have tied into state government. Without the regional, multi-county organization much of this would not have been possible. Not incidentally, the regional level is also needed to address problems that cut across local boundaries.

EQB Water Resources Committee (WRC):

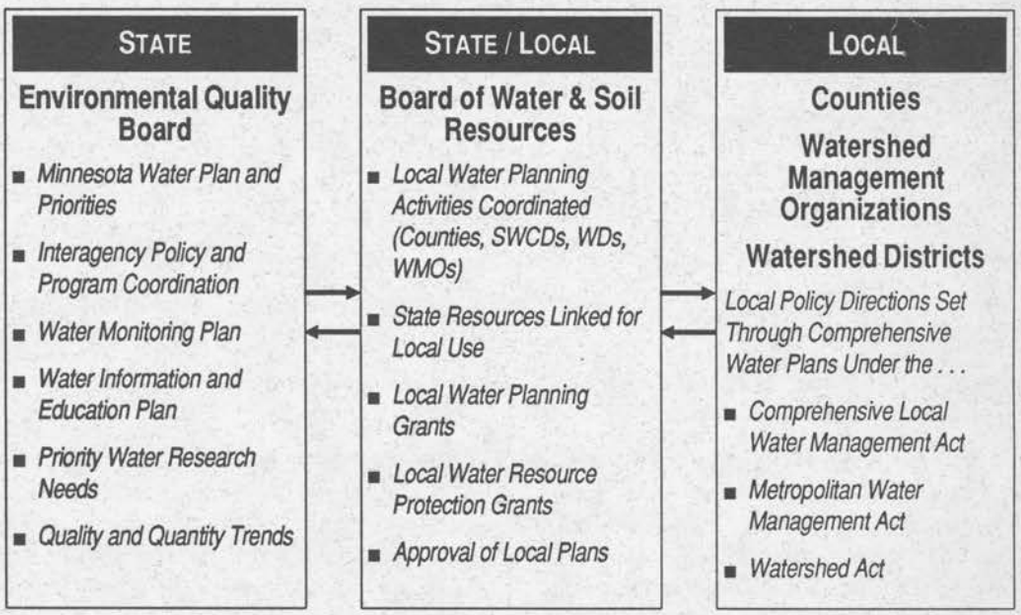
Commissioner of Agriculture,
Commissioner of Health,
Commissioner of Natural Resources,
Commissioner of Pollution Control,
Chair of Board of Water and Soil Resources,
Director of Legislative Water Commission,
Director of Office of Waste Management,
Representative of the University of Minnesota,
EQB Citizen Members (2).

Figure 4 Status of Local Water Planning



Source: Board of Water and Soil Resources.

Figure 5 Water Program Coordination in Minnesota



Water is a major state asset. There is a great state interest in protecting, conserving, and allocating it. In carrying out its responsibility for water, the state implements policy established by the United States Congress and by the Minnesota Legislature. In doing so, it has the job of ensuring that the interests of all Minnesotans are fairly considered. This duty includes those citizens as yet unborn. The **Minnesota Water Plan** provides the framework for tying state water efforts and needs together.

The federal government has a job similar to that of the state, except that its focus is nationwide. Many of Minnesota's water-related regulations originate from the federal government. Air and water quality standards, and wetland "fill" permits are examples. In addition, the Minnesota offices of the federal agencies provide assistance to state and local units and citizens in the form of cost-sharing, technical advice, research, and information and education.

The various federal, state, and local contributions to the management of Minnesota's surface and ground water are described in tables located in the chapter "Focusing on the Resource."

The challenge of our system of government is to recognize the strengths and weaknesses of each level. The State of Minnesota should not defer to the federal level in every instance, because it has a better understanding of Minnesota's needs. For this same reason, the state must recognize that local government may often better understand the local situation. A system that is sensitive to these realities seeks flexibility without sacrificing the public trust.

The 10-Year Objective

To make water management in Minnesota more understandable, efficient, and directed toward meeting state goals.

Recommendation 1

Establish, monitor, and refine a Minnesota coordination strategy.

The strategy must ensure that coordination occurs between agencies, Native American Na-

"Local water planning has evolved to the point where counties now feel they have a meaningful voice in establishing policy."

Molly McGregor
Administrator, Mississippi Headwaters Board

tions, and among local, state, and federal governments.

The coordination strategy should meet the following tests. It must:

1. clearly define the jobs each level of government and each agency should carry out;
2. make government responsive to the mandates given it by the Legislature and Congress;
3. seek coordinated, cooperative, flexible, and innovative approaches to water issues;
4. provide a fair way to avoid and resolve conflicts;
5. keep open lines of communication among all the participants involved in managing Minnesota's water;
6. continually check government's success in carrying out the public trust; and
7. be easily understood and easily followed.

The **Minnesota Water Plan** provides the strategy's framework for guiding policy, funding, and management activities in the State of Minnesota. To fill in this framework, it is necessary to ensure that the plans and strategies of state agencies are consistent with the policies, principles, and priorities of the **MWP**. It is also important to work with federal agencies to ensure that they recognize the guidance function of the **MWP**.

The First Steps

- Establish the coordination strategy in cooperation with representatives of comprehensive local water planning, member agencies of the EQB Water Resources Committee, federal agencies, the Native American community, and the Legislative Water Commission. *(EQB)*
- Assist the Legislative Water Commission in its assessment of the state's water management needs for the year 2000. *(EQB)*
- Cooperate with the Legislature on actions necessary to address the priority issues identified in the **MWP**. *(EQB)*
- As an initial step in using the strategy, examine the issues surrounding distribution of state agency staff in central and regional offices. *(SPA)*

Recommendation 2

Make comprehensive local water plans a highly visible element of the coordination strategy.

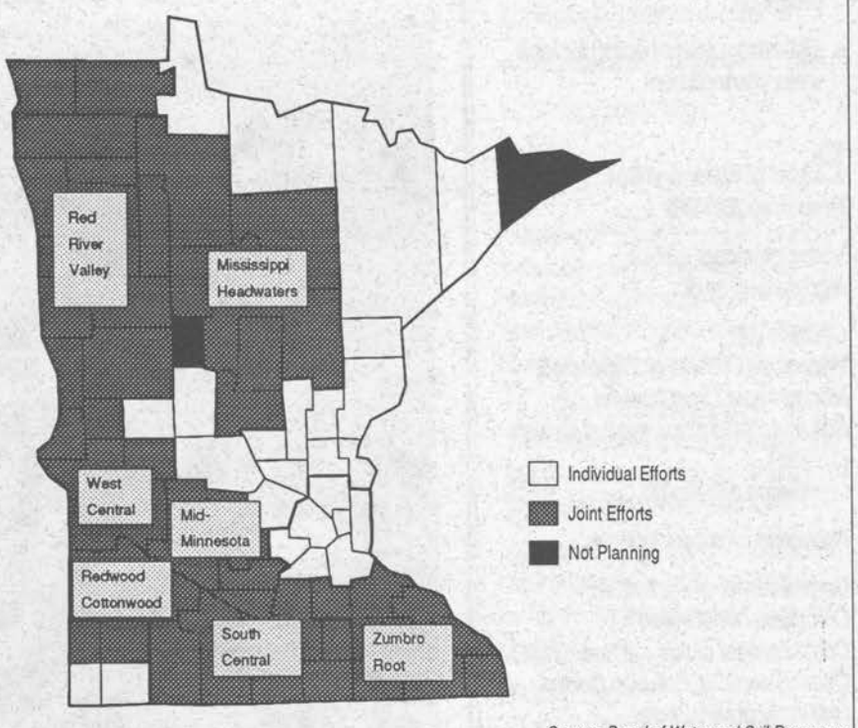
State programs should require existence of, and responsiveness to, approved comprehensive water plans as a condition of eligibility for water-related grants and a factor affecting priorities. The state also needs to consider comprehensive water plan recommendations of local governments in future **MWP** development. Finally, the state should encourage multi-county and, in the metropolitan area, intercommunity efforts to address water problems from a basin, or other regional, perspective.

Local government is often in the best position to understand a problem and its possible solution. Land use controls are a primary responsibility of cities and counties and are a major tool for protection and management of water resources.

Advantages of Intercounty Approaches to Local Water Planning:

- *Manage major watersheds and aquifers as units.*
- *Ensure communication and coordination.*
- *Provide consistent approaches.*
- *Share innovative ideas and information.*
- *Share staff and expertise.*

Figure 6 Joint Water Planning Efforts



Source: Board of Water and Soil Resources.

Legislative Water Commission, Jobs for 1991

Minnesota's Water Management Needs for the Year 2000.

Sustainable Agriculture.

Waste Pesticides and Pesticide Containers.

Wastewater Treatment.

Review Policy/Programs/Reports on:

- Acid Rain.
- Ag Chemical Response Board.
- Aquaculture.
- Environmental Ag Education Contracts.
- Metropolitan Water Management Act.
- Minnesota Water Plan.
- Nitrogen in Ground Water.
- Water Availability Trends.
- Water Quality Trends.
- Water Research Needs.
- Water Resource Protection Requirements.
- Wetlands.

Comprehensive Local Water Plans:

- *Pull together existing information.*
- *Estimate future demands on water and land resources.*
- *Identify problems and opportunities.*
- *Define local goals, objectives, and priorities.*
- *Point out opportunities with state programs.*
- *Establish a plan of action for local water management.*

Board of Water and Soil Resources (BWSR)

Voting members include representatives of:

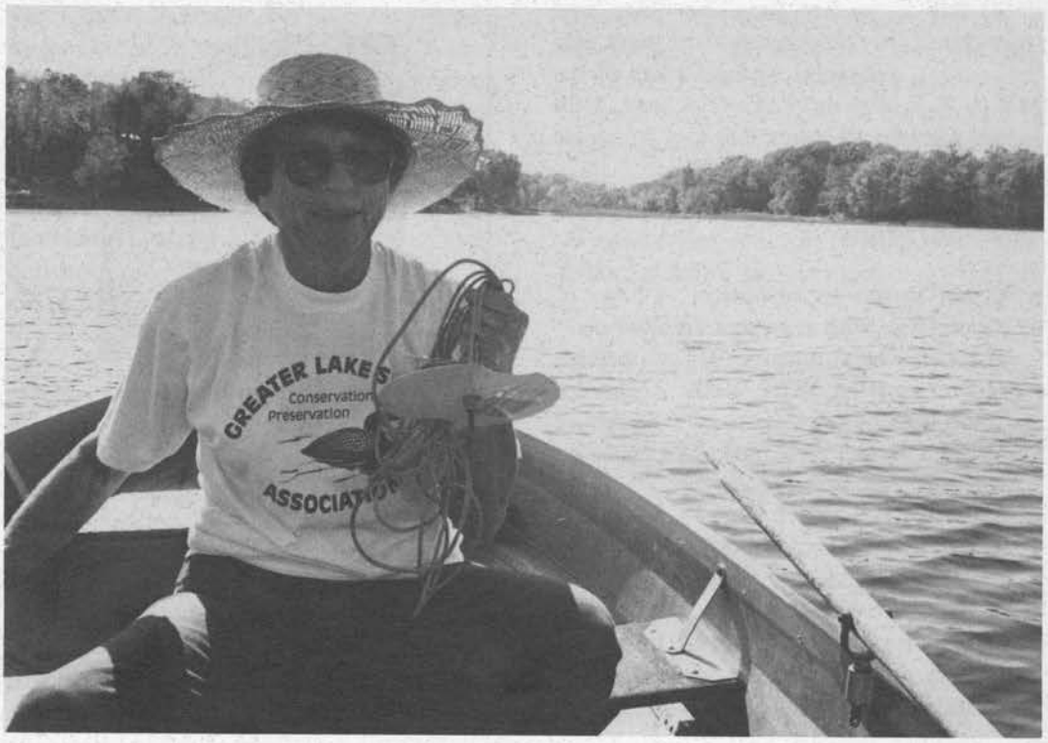
Counties (3);
Watershed Districts or Watershed Management Organizations (3);
Soil And Water Conservation districts (3), and
Unaffiliated citizens (3).

Nonvoting members include:

Commissioner of Agriculture;
Commissioner of Health;
Commissioner of Natural Resources;
Commissioner of Pollution Control
University of Minnesota Representative.

The First Steps

- Identify state water-related grant programs not yet tied to comprehensive local water plans and initiate steps to make appropriate ties. *(BWSR)*
- Set an agenda for strengthening comprehensive local water plans. Many of the plans completed thus far are excellent by any measure. Others represent a good first step. If plans are to become the "building blocks" for water management initiatives, if they are to lead to effective local ordinances, they must be strong. *(BWSR)*
- Expand the state's ability to provide technical assistance to local units involved in comprehensive water planning and plan implementation. *(BWSR, DNR, MDA, MDH, PCA)*



Communication and Education

How can people be better educated about water issues?

How can communication between state and local governments and citizens be strengthened?

Are there better ways to provide the training both local and state staff and officials need?

Environmental education needs to begin early and last a lifetime. It occurs in many places such as in schools, the workplace, at public meetings, and in the media. Continued improvement in water quality and wise management of water depend on individuals and groups voluntarily changing behavior. Yet today, many have lost touch with nature or fail to see how their actions affect water and soil resources.

The 1990 Legislature enacted the Environmental Education (EE) Act. The new law is based on the Strategy for Environmental Education prepared by the former Minnesota Environmental Education Board. A major effort is ahead to get it carried out.

We need to improve communication between the state and others relating to water resources. People need to understand how they can obtain or provide information to the state. Training is needed at both the state and local levels to ensure that policy-makers and staff take a broad view and have the skills needed to manage the resource.

Local government plays a key role in water management. The state needs to unify its delivery of information and assistance to local government to ensure problems are addressed in the broadest context.

The 10-Year Objective

To develop and carry out a statewide water resources information and education strategy as an integral part of the state's new environmental education program.

Recommendation 3

Launch a major environmental education initiative to show people how their actions affect the environment.

The initiative must strengthen the state's existing formal and nonformal water educational efforts. It must ensure that they occur in a coordinated, systematic manner. The new Office of Environmental Education (OEE) must develop into a respected focal point and catalyst for water, as well as environmental education. The Department of Education must expand its formal education efforts to ensure that Minnesota children receive K-12 water-related (as well as the broader environment-related) curriculum.

The First Steps

- Fund the Office of Environmental Education. *(OEE)*
- Develop a water information and education plan that defines the roles and linkages of the OEE, MES, and other water-related interests. *(EQB, OEE)*
- Establish state and regional Environmental Education Resource Centers that serve as clearinghouses for environmental materials. *(OEE)*
- Provide assistance to local government in carrying out the educational efforts recommended in their local water plans. *(OEE, BWSR)*
- Develop a model integrated K-12 curriculum and evaluate it using selected school districts. *(MDE)*
- Support teacher training for water issues and ensure that curricula integrates environmental goals and measurable results. *(MDE)*

Recommendation 4

Open up lines of communication among local, state, and federal levels of government, as well as citizens and the private sector.

Safeguarding Minnesota's water requires greater communication and

1990 Environmental Education (EE) Act calls for:

- *Office of EE in SPA.*
- *Agency and citizen advisory board.*
- *Continuous planning for EE.*
- *Regional resource centers.*
- *EE programs in all public schools.*
- *Biennial conference.*

"One major accomplishment of local water planning is the heightened awareness of local decision-makers and citizens about the importance of natural resource protection."

"A related accomplishment is improved communication among the public, water planning committees, and state and federal agencies."

"A valuable outcome is clarification and appreciation of the variety of water protection programs currently in force."

Robert Finley
Director, Redwood-Cottonwood Rivers Control Area Board

Figure 7 1990 Status of Water Protection Ordinances
Zumbro–Root River Joint Powers Board

County	Sinkhole	Water Well Construction	Water Well Abandonment	Sewage System	Livestock Waste	Erosion Control	Solid Waste	Geologic Atlas
Dodge	EP/I	EP/I	EP/I	●	●	R	●	
Fillmore	●	●	EP/I	●	EP/I	●	●	
Goodhue	EP/I	EP/I	●	●	EP/I	EP	●	
Houston	EP/I	EP/I	EP/I	●	●	EP	●	
Mower	EP/I	EP/I	●	●	EP/I	EP	●	
Olmsted	X	X	●	●	EP/I	●	●	●
Rice	EP/I	EP/I	●	●	●	EP	●	X
Wabasha	EP/I	EP/I	●	●	EP/I	EP		
Winona	●	●	●	●	X	●	●	●

● – Adopted
X – In Progress
R – Revising Old Program
EP – Education Program Only
I – Inventory

cooperation among local, state, regional, and federal governments, the university system, and the private sector. Good communication is essential to the local / state partnership in water planning. That partnership also needs regular communication with post-secondary schools. Communication with citizens is important. Citizens can make a difference, as the **MWP** principle states. But, they need to be informed about programs and policy choices.

The First Steps

- Develop a pilot electronic information system to share water-related information including data bases, water news, and calendars with interested parties. *(SPA)*
- Support and improve the Water Billboard in providing information about water issues and solutions. Expand the use of its calendar for meeting notices. This effort requires the participation of all agencies. *(BWSR)*
- Prepare a citizens guide to state and local water programs and regulations. By informing citizens about the state's programs and policies, the state builds educated participators in the decisions it makes. *(BWSR, EQB)*

Recommendation 5

Strengthen efforts to meet the ongoing training needs of local and state water managers and policy-makers.

All levels of government need to attract and keep highly motivated, well-trained staff. They need up-to-date technical understanding to develop and carry out regulations and programs.

It will be important to ensure that Minnesota schools of higher education provide educational opportunities that enable students to understand the state's complex water resources including its hydrogeology.

An ongoing process is needed to provide training opportunities for resource staff regarding research findings, new technologies, and innovations in resource management. Ongoing internships for state staff at Minnesota educational facilities should be one element of the process. In addition, local governments should be given special training for water and related land resource management including the development and use of official controls.

The First Steps

- Assist local units with water plan development and implementation by providing training opportunities on tools for addressing local water-related problems. *(BWSR, MES, UM, SUS)*
- Assess cross-departmental training needs of state water professionals and develop a joint state-university continuing education program to address priority needs. *(DNR, BWSR, MDA, MDH, PCA, UM, SUS)*

Public support for protecting Minnesota's water:

85% of Minnesotans believe that more needs to be done to solve state ground water pollution problems.

75% support increasing taxes on polluting industries.

75% support banning activities which cause pollution.

Over 90% were in favor of the following measures:

- *Increasing regulation of disposal practices;*
- *Researching ways to minimize the production of industrial waste; and*
- *Requiring the use of processes which minimize the generation of hazardous wastes.*

Survey results from Center for Urban and Regional Affairs, University of Minnesota, January 1989

The 15 counties in northwest Minnesota and the 13 south central counties emphasized the need to develop educational programs. Both groups hired Cluster Water Quality Extension agents to develop and coordinate education and information activities in the region.

Information and Research

How can the state ensure that key research required to meet water management goals receives adequate funding?

How can we make data readily accessible and more useful for those who need it?

How can we get a better long-term understanding of changes in Minnesota's water quality and availability?

Managing water resources wisely requires understanding of the cause and effect of certain actions. This requires good information, as well as an understanding of the natural processes that such information may describe.

Sound decisions are made with sound information and understanding. Too often, neither the information nor the understanding is sufficient to guide those who are asked to make policy and management decisions.

Information is often not complete, or not available at all. Research is needed on a variety of water quantity, quality, and land use issues. There is also an urgent need to organize information so that it is readily available, so that it fits with related information to provide a total picture, and so that it can be analyzed to reveal trends.

Many agencies, units of government, and private organizations monitor water resources. Each party has its own, often unique, reasons for monitoring. Each collects and manages its water and related data to meet those needs. Each stores data in different locations, and in different formats, ranging from file cabinets to main frame computers. So, data collected for one program can be difficult to obtain for use in another. In addition, agencies and organizations often do not have sufficient data to meet their own needs, nor sufficient funding to expand data collection.

Baseline information about our water-related resources and about the effects of pollution on fish and wildlife is often also lacking. Needed baseline and trend information must come from new collections of missing data and from organizing existing data in a way that draws a complete picture.

Local government uses state water-related information and also collects its own data. To continue the partnership between state and local government, information needs to be easily shared between each level.

The 10-Year Objective

To establish the foundation for sound public policy and management decisions through a systematic approach to research and collecting, managing, and using water-related information.

Recommendation 6

Build a long-term base of support for the priority research needs identified in the biennial EQB water research needs assessment.

Ultimately, research must help land and water managers — right down to the individual land user — make good decisions. Today's research challenges, more than ever, require an interdisciplinary systems focus, and a focus on water resource units, like a particular aquifer or river basin.

Water research needs of the public sector often differ from the kinds of research the private sector may want to sponsor. Many research projects, not production- or profit-oriented, may take several years to obtain results. It is difficult to obtain needed funding for long-term research needs due to the short-term nature of governmental funding sources. The Environment and Natural Resources Trust Fund provides a new opportunity to fund vital research. Federal research contributions will continue to play a major role.

Each year, new demands are placed on government to safeguard public health and protect the environment. These demands require the support of research to define the approaches that should be taken. A close give-and-take relationship between the

"How can one buy or sell the air, the warmth of the land? That is difficult for us to imagine. We do not own the sweet air or the sparkle of the water. How then can you buy them from us?"

Chief Seattle
Address to the American President, 1855

Legislative Commission on Minnesota Resources
Selected Projects 1992 – 1993

Information and Research – $4,200,000

Stream and Watershed Information Systems.
Lake Superior Institute for Research.
South Central Surface Water Atlases.
Biological Control of Pests.
Base Maps for 1990s.
Statewide NWI/PWI/Watershed Map Digitization.

Ground Water – $2,169,000

County Geologic Atlas/Sensitivity Mapping.
Ground Water Remedial Actions Assessment.
Aquifer Analyses in Southeast Minnesota.
Effective Nitrogen Management for Sensitive Areas.
Review Levels of Pesticides at Spill Sites.

Surface Water – $4,032,000

Minnesota River Basin Water Quality Monitoring.
Waterwatch–Citizen Monitoring.
Clean Water Partnership Grants.
Mitigating Mercury in Northeast Minnesota Lakes.
Cannon River Watershed Protection Program.
RIM Reserve and Resource Protection.

Education – $1,090,000

Comprehensive Environmental Education Program.
Integrated Resources Training.

Grand Total – $11,491,000

research and management communities is essential. In addition, there is great competition for today's research dollar. Both factors make it vital for research to be targeted to meeting priority needs.

The First Steps

- Establish an EQB research advisory committee. The committee should consist of local, state, and federal government representatives and research experts. The committee should cooperate with the University Water Resources Research Center and other State University Centers. The committee should help update the biennial research needs assessment developed in 1989. A research funding plan should also be prepared with its assistance. *(EQB)*
- Seek agreement with the Legislative Commission on Minnesota Resources and the Legislative Water Commission on water research priorities warranting support through the trust fund and other state funding sources. *(EQB)*
- Develop an extended grant program component for a portion of Trust Fund and Minnesota Future Resources Fund expenditures to address long-term research projects. *(LCMR)*

Recommendation 7

Improve the state's Geographic Information System so that all users can easily access and integrate data on surface water, ground water, and related land resources.

The state's existing geographic information system, developed in the 1970s, is an automated system of land and water resources data. The system is valuable for evaluating information and understanding relationships, but contains outdated information and lacks other key information. Much information is based on 40 acre parcels, which is not sufficiently detailed for today's needs. Still, it offers an excellent template for building an overall system for managing information.

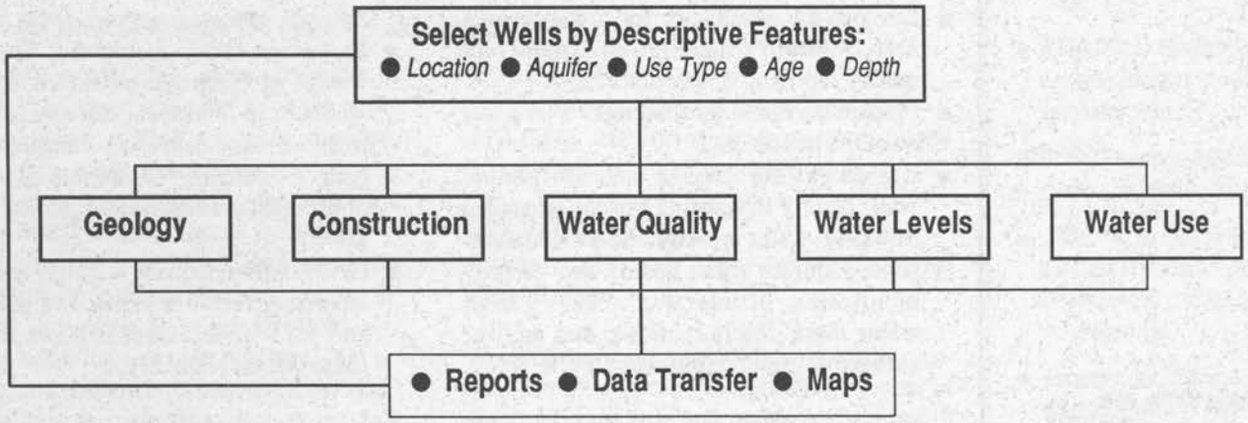
An improved state GIS system must do a better job of integrating ground water, surface water, and related land resources data. New standards and guidelines for data classification, automation, and exchange are a key part of this. A new series of data bases must be added to the system to make it relevant to today's information demands at both the state and local levels of government. Finally, understanding and use of the system, and access to it through data collection and automation standards, must be promoted at both the state and local levels.

The First Steps

- Implement the LMIC Ground Water Clearinghouse and the PCA Integrated Ground Water Information System. This should include long-term funding for automation of new well log records so that an

*Surface water is a high priority for the eight Mississippi Headwaters counties. They established **River Watch** to monitor the Mississippi River's water quality and biotic communities.*

Figure 8 State Planning Agency Ground Water Clearinghouse
Information Retrieval Features



up-to-date automated water well record data base can be maintained. *(SPA, PCA, MGS)*

- Initiate development of an integrated system for retrieving stream, lake, and related watershed information so that data systems reflect resource systems. Ultimately, this system should be linked to ground water information systems. *(SPA)*
- Revise and enforce LMIC compatibility standards for data collection, automation and integration so that more data bases are compatible, comparable, and able to be mapped. Standards should include a list of data depots, an indication of data source or quality, and the specific resource monitored. *(SPA, EQB)*
- Use regional and state water information depots to house information collected by state and local units in an accessible format. *(SPA, EQB)*
- Begin development of a "second-generation" geographic data base. This should have 1:24,000 USGS quad-level detail coverage of land use, soil survey, topography, hydrology, and other information needed for water analysis. *(SPA, LCMR)*

Recommendation 8

Make the commitment of money and authority necessary to carry out the state Water Resources Monitoring Plan.

Minnesota has a long history of water resource monitoring. Yet, much of this monitoring has addressed a particular purpose or project. Most was not designed to give a broad understanding of the environment or changes over time. As a result, the amount of available information varies greatly from one part of the state to another, and from one time to another. In addition, budget constraints have led to cuts in existing systems, further limiting our ability to track trends in water resources.

The state Water Resources Monitoring Plan will define the ground rules for coordinating state and local monitoring programs. It will emphasize the "networking" of information systems. The gathering of baseline resource information and the assessment of trends will be adequately supported, routine activities under the plan. Funding for baseline monitoring efforts will be stabilized through the Environmental and Natural Resource Trust Fund and fees on water use and pollutant sources. The plan is scheduled for adoption by the EQB in early 1991.

The comprehensive approach to monitoring will give us the ability to recognize changes that may be occurring in Minnesota's environment. It will help us rationally decide what

Geographic Information Systems (GIS)

"GIS development in Beltrami County . . . has enhanced water plan implementation by allowing local units of government to target water protection efforts."

Beltrami County uses of GIS:

- *Setting abandoned well priorities;*
- *Evaluating ground water contamination potential;*
- *Developing controls for septic system upgrading; and*
- *Evaluating sedimentation potential from ag uses.*

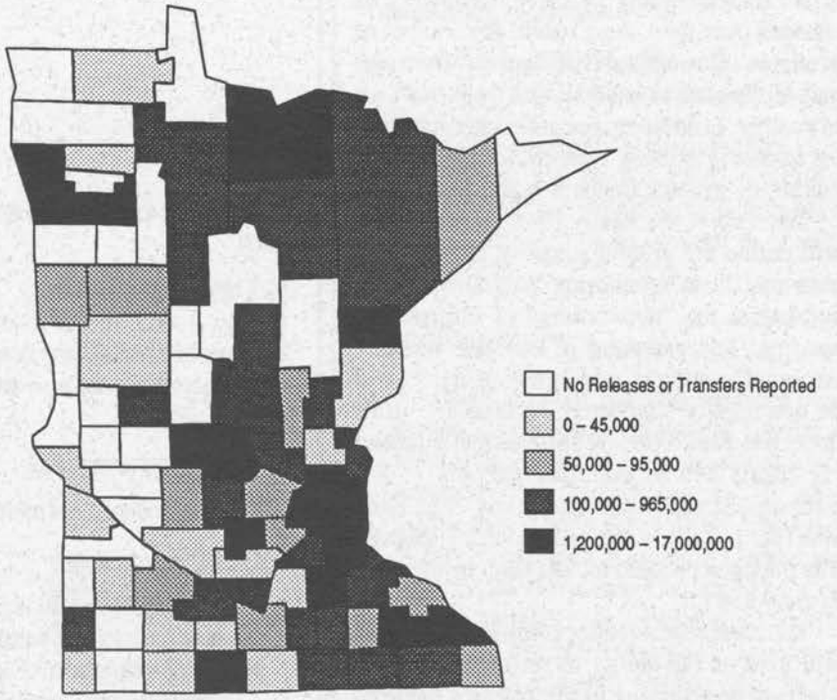
Since the early 1980s, nine southeast counties compiled data from water tests regionally. Now these counties plan to determine conditions in water supply aquifers and identify local sources of contamination.

should be done about them.

The First Steps

- Lay out the framework for a comprehensive, intergovernmental environmental quality monitoring network. *(SPA)*
- Prepare the initial biennial reports on water resource trends. *(EQB)*
- Implement the revised ambient ground water quality monitoring system, expanded drinking water quality monitoring, expanded surface water quality and quantity monitoring, accelerated ordinary high water mark determinations, and aquifer safe yield determinations. *(PCA, DNR, MDA, MDH)*
- Establish regional monitoring cooperatives through local water planning groups, and ensure that data collected is accessible through state data systems. *(PCA, SPA)*
- Encourage citizen monitoring. The "waterwatch" program recommended by LCMR would help fund local efforts and provide technical assistance on interpretation of data. It would also ensure that data is made compatible with state systems. *(PCA, LCMR)*
- Evaluate the adequacy of public and private laboratory facilities at meeting new citizen and local government demand for water tests. *(MDA, MDH, PCA)*

Figure 9 Amount of Toxic Chemicals Released
In pounds, 1988



Source: Department of Public Safety and Emergency Response Commission / SPA DATANET.

Liability and Enforcement

What steps should be taken to ensure a consistent approach to holding people liable for misuse of water?

How can the state do a better job of enforcing its water laws?

Liability is a complicated issue. Someone or some group of people pay the price for water that is polluted. These are paid directly, through such means as remediation costs. They are also paid indirectly, through such means as health costs or loss of aesthetics.

Minnesota law provides liability exemptions for certain groups. The statutes are inconsistent regarding liability questions and may not actually remove liability. As individuals and groups are removed from bearing liability for actions, the costs fall elsewhere. These costs need to be reassigned in a way that protects innocent victims.

A related problem exists with enforcement of existing laws. Whether enforcement has faltered because of budget cuts, or for other reasons, the state must take steps to systematically ensure that its laws are followed.

The 10-Year Objective

To uniformly enforce Minnesota law and fairly assign liability through it so that the environment is fully protected and the burden on people innocently exposed to water misuse is minimized.

Recommendation 9

Ensure a consistent state approach to fairly and equitably assigning liability for water misuse.

This requires assessment of the various statutory and common law approaches to assignment of liability in Minnesota. The assessment will evaluate consistency in these approaches and the degree to which innocent people are protected from bearing the actual costs of water misuse. The circumstances under which the manufacturer of a product should bear liability for its use or misuse must also be considered.

The First Step

- Assess statutory and common law approaches to liability in Minnesota. *(AG)*

Recommendation 10

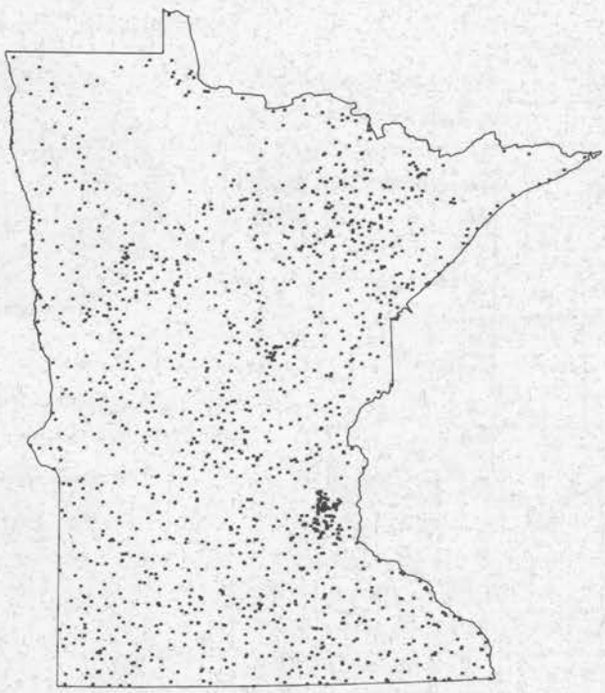
Enhance the state's environmental compliance strategy.

The strategy should enable government to ensure compliance with the growing number of environmental laws and regulated facilities. It should also help to ensure that effective enforcement tools and resources are applied across the board.

Costs of Contamination

- *Over $80 million for clean up at the Twin Cities Army Ammunition plant.*
- *$150,000 to replace seven Lansing residential wells polluted with pesticides.*
- *$90,000 for one year to provide carbon filtration in Long Prairie.*
- *$159,312 for one year for 97 Lakeland residences to receive bottled water and for remedial investigations.*
- *Property valuations reduced by $8,000 apiece in 1989 for Lakeland properties on bottled water.*
- *No FHA and VA mortgage when drinking water standards are exceeded.*

Figure 10 Historical Dumps



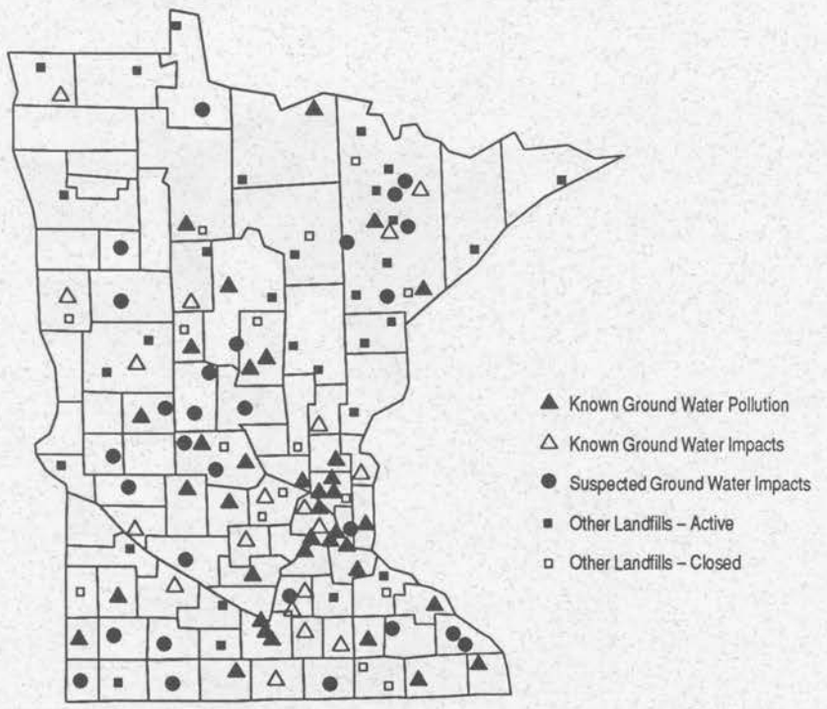
Source: 1980 U.S. EPA / PCA Open Dump Inventory. Digital Data: SPA Ground Water Clearinghouse.

The First Steps

- Encourage agencies to recover all costs resulting from permitting and enforcement activities. *(LEG)*
- Stiffen penalties for persons knowingly discharging toxics into air or water in violation of an emission limit or knowingly creating an unpermitted solid waste disposal site. *(AG, PCA)*
- Evaluate the role of the Environmental Rights Act in meeting today's enforcement needs. *(AG)*

A *July 1987 Twin Cities rainstorm provided enough water to fill Lake Calhoun eighty times, and caused over $39 million in damages.*

Figure 11 Groundwater Pollution at Permitted Mixed Municipal Landfills



Source: Minnesota Pollution Control Agency.

Infrastructure

How can we ensure that water and wastewater treatment systems meet new health and environmental protection needs of the state?

How can we ensure that our water infrastructure is effectively operated and maintained?

The water infrastructure, or "underlying foundation," includes the public works constructed for water management. Examples include water and wastewater treatment and distribution systems, constructed stormwater runoff systems, dams, locks, and navigation channels.

The issues surrounding Minnesota's water infrastructure involve research and financing questions. As with other elements in this chapter, they also require integrated approaches.

Minnesota's water and wastewater treatment systems and dams are aging. New demands are being made for safer, more protective systems. In the face of this, government funds for infrastructure improvements are decreasing. Further, they were never intended for replacement, repair, or maintenance of systems. The ability to pay for these improvements will be of even greater concern in small communities, and as the proportion of those on fixed incomes increases.

The 10-Year Objective

To ensure that Minnesota's water infrastructure is maintained and enhanced to keep pace with new demands for protection of people and the environment.

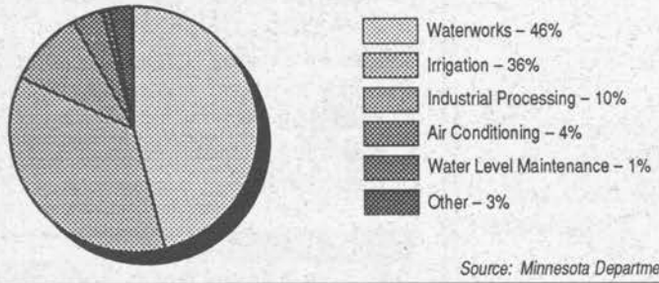
Recommendation 11

Upgrade Minnesota's water infrastructure with new technology to better safeguard public health and the environment.

Research must devise water and wastewater treatment systems that are more effective at removing contaminants, yet still affordable.

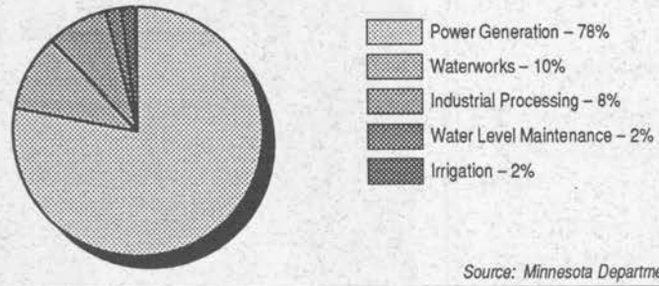
Improvements must also be made by using existing technology in a way that recognizes water's interconnections. Examples include: a) navigation maintenance and improvements that enhance or maintain both the economy and environment; b) stormwater systems designed for water quality protection, as well as runoff management; c) solid waste disposal facilities managed to prevent toxics from contaminating air, as well as water; and d) water and wastewater disinfection processes with reduced use of chlorine to control by-products

Figure 12 Reported Ground Water Use
1988 – 246 billion gallons



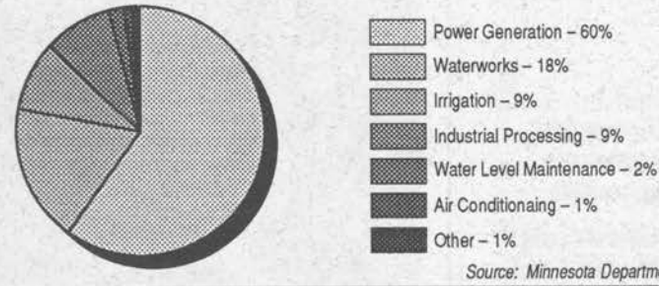
Source: Minnesota Department of Natural Resources.

Figure 13 Reported Surface Water Use
1988 – 856 billion gallons



Source: Minnesota Department of Natural Resources.

Figure 14 Total Reported Water Use
1988 – 1,102 billion gallons



Source: Minnesota Department of Natural Resources.

that are hazardous to human health and the environment.

The First Steps

- Support research on ways to upgrade individual and small community wastewater treatment systems so that — at a reasonable cost — they meet state degradation prevention goals. *(UM, SUS)*
- Support research to develop effective, inexpensive techniques for full scale drinking water treatment plants, as well as point-of-use and point-of-entry systems needed where no alternatives to contaminated supplies exist. *(UM, SUS)*
- Assess existing stormwater management policy to ensure that system improvements needed for water quality protection, as well as runoff management, are made at the time of their expansion or maintenance. *(PCA, LGU)*

Recommendation 12

Take steps to ensure that money is set aside for infrastructure maintenance and improvement.

Development of alternate funding methods for addressing small systems and low income populations will be one key. Requirements of financial assurance from those responsible for waste facilities is another. This will ensure that costs of long-term care of the waste once disposed, including maintenance and replacement of waste disposal facilities, are covered. Establishment of a contingency fund for dealing with actual or potential dam failure will also be necessary.

The First Steps

- Enact requirements for a wastewater treatment facility replacement fund within each public entity with a central treatment system to finance future infrastructure improvements. *(PCA)*
- Inventory future replacement needs of public water supply and wastewater treatment systems, and develop cost estimates for meeting these needs. *(MDH, PCA)*



Minnesota has 27 wastewater facilities that do not comply with federal and state requirements.

Approximately 150 cities will need major improvements by 2010. Early estimates place costs at $780 million.

Financing

How can state and local programs be placed on a sound financial footing?

How can the limited resources devoted to water be targeted to priority needs?

From research, to monitoring, to infrastructure, to state programs whose budgets were cut or duties expanded in the 1980s, to comprehensive local water plan implementation, financing remains one of the major issues in water management. It is clear that the Environment and Natural Resources Trust Fund is not going to supply a one-stop answer. There is too much competition for the fund's money.

Efficient direction of the trust fund toward meeting priority water data, education, and research needs will make a substantial contribution. However, more consistent and expanded use of fees, and development of new revenue sources must be considered. While the cost of water in Minnesota is low, the cost of protecting it is high. The cost of water generally does not reflect its value to the user, nor does it encourage conservation.

Clearly, water program resources must be targeted toward high-priority efforts. Low-priority activities must be reduced or eliminated.

The 10-Year Objective

To place state and local programs on a sound financial footing by targeting limited resources to priority needs and by expanding revenue sources.

Recommendation 13

Expand revenue sources and options available to state and local units.

Local governments need more flexibility and options for raising money to implement comprehensive local water plans. Recognition of this point must be a basic element of a revenue-generation plan. In concert with this, consideration will need to be given to sharing revenues generated by water fees at the state level.

The cost of water supply protection must be more fully recovered in fees. Fees and special taxes should also be designed to influence behavior. This can be done by using fees to underscore the relationship between special activities and problems and benefits.

The First Steps

- Develop a package of funding options upon which local governments may draw for implementation of comprehensive local water plans. *(BWSR, LGU, Revenue)*
- Evaluate the technical feasibility of dedicating new taxes or fees to water programs. *(EQB, Revenue)*
- Quantify the gross cost of water management activities and move toward fee and pricing structures that require users to finance management. *(DNR, PCA, MDH, MDA)*
- Broaden the base of funding for the Superfund program. The intent is to reduce its reliance on the General Fund and to stabilize the fund by making manufacturers whose products are sold in Minnesota contribute to the fund. *(PCA)*

Recommendation 14

Tie allocation of funds to priorities identified in the* Minnesota Water Plan *at the state level and to comprehensive local water plans, at the local level.

The Ground Water Protection Act of 1989 directs the EQB to identify priorities and to devise a funding plan to address these priorities. Comprehensive local water plans should provide a similar function at the local level. Actions related to the local plan function are described under Recommendation 2.

The First Step

- Develop a funding plan for addressing priority recommendations of the **Minnesota Water Plan**, the state water resources monitoring plan, and priority research needs assessment. *(EQB)*

Rice Creek Watershed District is funding a cost share program to help individual landowners fund shoreland erosion projects.

Minnesotan's on paying for water protection:

52% willing to pay higher general taxes.

56% support water use fees.

63% for higher prices for goods and services that cause water quality problems.

Over 75% favor paying higher prices for goods and services that depend on water quality.

Survey results from Center for Urban and Regional Affairs, University of Minnesota, January 1989

Several metro municipalities are instituting a surface water utility to fund water management. It allows a municipality to collect an annual fee based on runoff generated by particular land uses. It provides a stable revenue source.

Focusing on the Resource

Lake Quality Concerns:

- *25% of lakes smaller than 5,000 acres did not meet water quality standards for swimming and fishing.*
- *8% of lakes greater than 5,000 acres did not meet standards.*
- *Poor quality is primarily attributed to nonpoint sources.*

In 1986, 71,000 tons of copper sulfate were applied to Minnesota lakes to control algae and other pests. This is a piecemeal approach to problems that may be caused upstream in the watershed.

Lakes

How can lakes be protected by comprehensive management of the environment?

Minnesotans take pride in their lakes. They are a symbol of Minnesota. Their quality and their abundance reflect the quality of Minnesota's environment and our quality of life.

Lake problems are increasing. The sources of problems include air pollution, waste disposal, aquatic vegetation, and urban and rural runoff. In the past ten years, we have experienced formidable problems from both high and low lake levels.

There are many programs and regulations that address specific aspects of lake problems. A special opportunity exists to unify these efforts to ensure a comprehensive approach. Protecting and managing Lake Superior is a good example of how lake management often requires many disciplines crossing many jurisdictions. It is also a prime example of the need for a unified approach.

The 10-Year Objective

To adopt a coordinated, inter-disciplinary approach to managing the Minnesota lake environment.

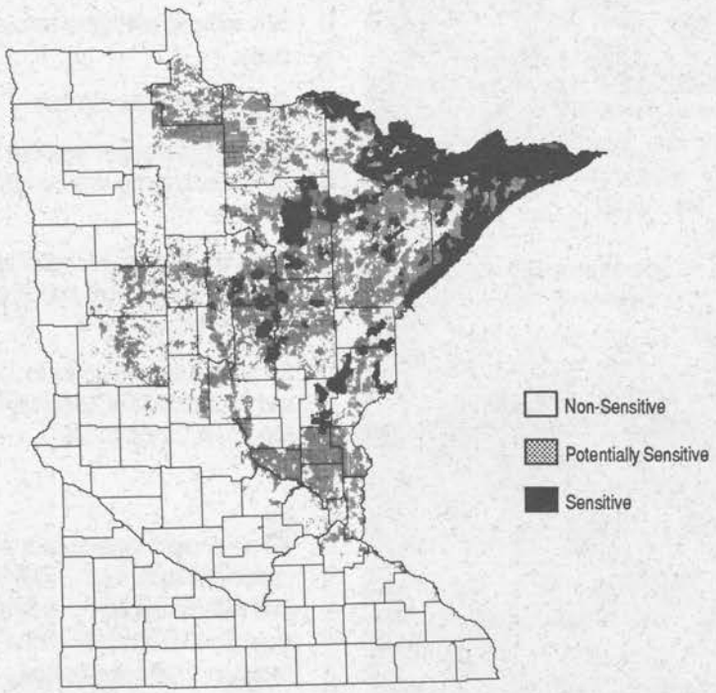
Recommendation 15

Develop a strategy for integrated lake management.

Several state and local agencies have responsibility for lake management. Fisheries, wildlife, aquatic nuisance control, public access, water surface use, and shoreland management programs are administered by the DNR. Lake quality protection and clean-up are handled through the PCA. Other state agencies, including MDH, MDA, and BWSR, have lake-related interests. Watershed districts, soil and water conservation districts, lake improvement districts, lake conservation districts, counties, cities, and towns all get involved in lake management.

A focus on the lake and its watershed as a resource is necessary to bring these disparate interests together. For example, decisions about fisheries management cannot be isolated from watershed protection choices. Neither should they be divorced from local lake use preferences. Both local and state interests must be considered in lake management decisions. In the metropolitan area, surface water management plans should be the vehicle for setting lake protection, lake enhancement, and lake management goals. To date, they have not been.

Figure 15 Acid Rain Sensitivity



Source: Minnesota Pollution Control Agency / SPA Land Management Information Center.

Understanding, managing, and protecting Lake Superior presents unusual challenges that could affect most Minnesotans. The lake demands a comprehensive approach which should consider air, land, and water interactions and inputs. It should bring together local, regional, state, and federal governments with educational and research interests.

The First Steps

- Convene a lake management task force to identify state management problems and priorities, the role of various lake programs, and a state strategy for comprehensive management of lakes. *(DNR, PCA)*
- Evaluate the effect of metropolitan surface water management plans on lake protection, lake enhancement, and lake management. *(METC, BWSR)*
- Adopt requirements in the new state rule for metropolitan water planning to ensure that metropolitan surface water management plans effectively address lake protection, lake enhancement, and lake management. *(BWSR)*
- Expand long-term water quality monitoring and toxics research efforts for Minnesota lakes. *(PCA, UM)*
- Design a research program to develop the understanding of Lake Superior's physical, chemical, and biological limnology needed to protect and manage the lake. *(UM, NRRI)*



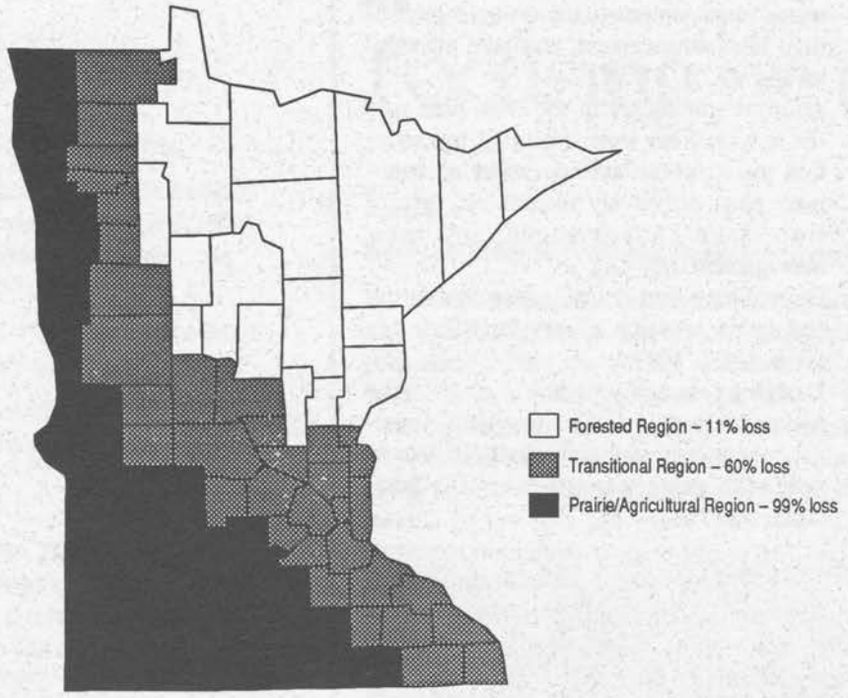
A recent study of mercury in northeastern Minnesota waters indicates that levels have increased from 2-5 percent per year in sediments and fish.

From 1967 to 1984, there was a 74 percent increase in the number of cabins and homes around lakes.

Since 1977, pesticide use water permits increased dramatically due to:

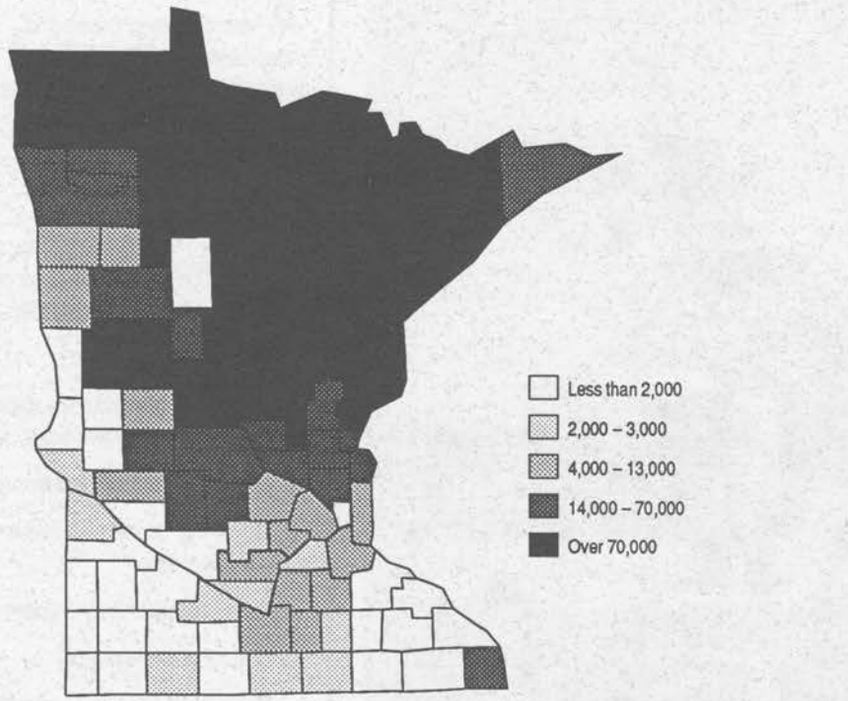
- *Marginal lakeshore development.*
- *Swimming, boating, and water skiing increases.*
- *Permit regulations awareness.*
- *Cultural eutrophication.*
- *Exotic plant species spread (e.g., purple loosestrife).*

Figure 16 Minnesota Wetland Loss by Region
1850 – 1984



Source: Center for Urban and Regional Affairs.

Figure 17 Current Minnesota Wetland Acreage



Source: Center for Urban and Regional Affairs.

Wetlands

What should be done to ensure that we do not lose the values provided by Minnesota's wetlands?

Nine million acres of Minnesota wetlands have been drained. About five million acres remain. Only 262,000 acres of these remaining wetlands are regulated by the state. At the current rate, the state can expect to lose about 5,000 acres each year through the 1990's.

The value of wetlands for wildlife is generally understood. Now, other benefits such as flood attenuation and water quality protection are recognized. Each year, Minnesota experiences about $70 million in direct and $60 million in indirect flood damages. On the average statewide, it costs $300 to replace an acre-foot of water for flood storage purposes. The cost is even greater in the metropolitan area. Minnesota can ill afford to lose the flood storage provided by wetlands.

The loss of wetlands is increasing in both rural and urban areas. The drainage code presents problems when used in urban expansion areas. The exact location, specifications, construction, and maintenance history of all public drainage systems need to be accurately documented.

The 10-Year Objective

To protect and restore wetlands while recognizing their importance in watershed-based management strategies for lakes, rivers, and ground water.

Recommendation 16

Establish and operate a state-local "no net loss" program for wetlands.

The program should be watershed-based. Watershed units would be the basis for wetland loss/gain accounting and banking. A wetland information system, based upon digitized (computerized) wetland boundaries, is necessary for tracking wetlands. Tracking and use of the state's wetland evaluation methodology, a tool for identifying the values of individual

wetlands, should each be elements of a protection program. In addition, local government should complement state wetland legislation by using its authorities to protect wetlands.

Agricultural drainage accounts for most wetland losses. An automated statewide inventory of public drainage systems and their characteristics is needed. An inventory of previously drained but restorable wetlands would provide the basis for wise use of RIM funds in wetland management. These inventories should be included in the wetland information system.

Public participation in the drainage law and the capability of participants to introduce environmental management components into drainage proceedings should be assessed. In addition, a handbook about building environmental concerns into drainage activities would help reduce wetland loss.

The First Steps

- Enact a comprehensive wetland management act that incorporates a wetland protection and enhancement policy and a watershed-based "no net loss" policy to cover wetlands that fall through current regulatory cracks. *(DNR)*
- Provide a consistent definition of wetlands to ensure compatible administration of wetland programs. *(DNR, FED)*
- Incorporate wetland protection provisions in metropolitan water management rules to ensure no net loss of wetland values. *(BWSR)*



Wetland management components:

- *No-net loss policy.*
- *National wetland inventory.*
- *Computerized information.*
- *Minnesota evaluation method.*
- *Wetland mitigation/banking.*
- *Wetland restoration and enhancement.*
- *Compensation.*
- *Local government involvement.*
- *Public-private partnerships.*

Gun Club Lake WMO completed an inventory of wetlands down to 0.5 acres and developed a system to protect water from development.

Minnesota has about 5 million acres of wetlands.

State "Protected Wetlands" total 261,709 acres.

Current losses of wetlands from all activities amount to about 5,000 acres annually.

80 percent of the prairie pothole wetlands existing in 1850 were lost to drainage for improved farmland.

Rivers

How can we tie together various land and water-related programs so that rivers and streams are protected and enhanced?

How can we build on local water plans to address the problems and opportunities found in our major river basins?

Minnesota has nine major river basins and 81 major watersheds. There are 25,000 miles of rivers and streams large enough to sustain significant fish populations and recreational activity. Rivers are a vital source of water for such divergent uses as drinking water, recreation, wildlife, and waste assimilation.

Most programs tend to focus on one facet of a river or stream. For example, Minnesota has programs addressing shorelands, wastewater discharges, and flood plains. However, we know that the quality and quantity of water in rivers are affected by land use activities far from the river's edge. While pollution from point sources is decreasing, storm water continues to be an important pollution source for sediment, fertilizers, pesticides and other wastes. Nonpoint source problems demonstrate the land use connection, but inter-connections between wetlands, ground water levels, and water use are not always obvious.

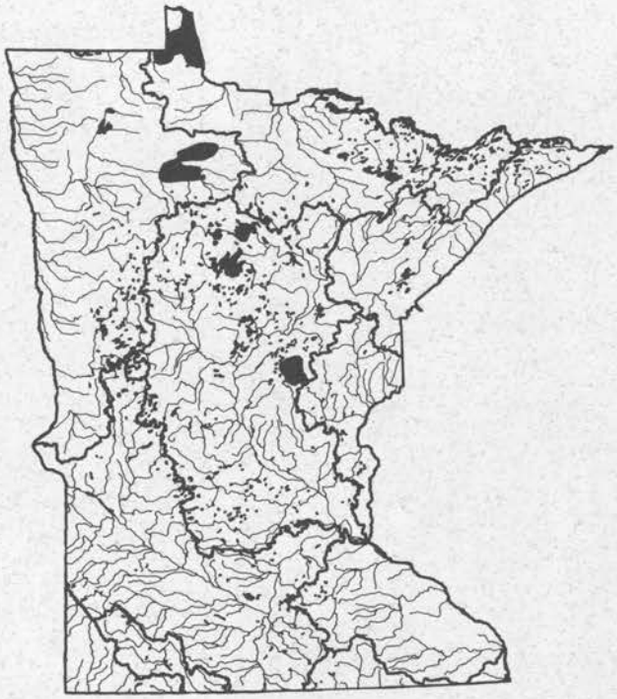
The aquatic ecoregion is a new concept used by the Pollution Control Agency to help people understand natural water quality characteristics and potential. It is based upon land use, soils, land surface forms, and potential natural vegetation.

The nature of Minnesota's rivers varies (as does the nature of many of its lakes) by ecoregion. Since rivers cut across ecoregions, their quality and linkage to the land may vary as one moves downstream. The ecoregion is useful in understanding natural characteristics of river segments. Wise management of a river requires application of this concept as ecoregion changes occur across the basin.

The state must provide leadership for activities and projects to safeguard the quality of Minnesota's rivers. Some cooperative river management programs are underway, such as in the Red River and in the Minnesota River. However, no one has the responsibility for tying all the various local, state, and federal activities together for the river. State agencies and local governments are simply not geared toward comprehensive river management. Because each river has its own unique qualities, this special focus is needed.

The Lower Mississippi River WMO requires the application of floodplain management standards in areas where state and federal law does not mandate them.

Figure 18 Minnesota Major River Basins



Source: SPA Land Management Information Center.

The 10-Year Objective

To manage rivers, both large and small, with their related land resources, as units.

Recommendation 17

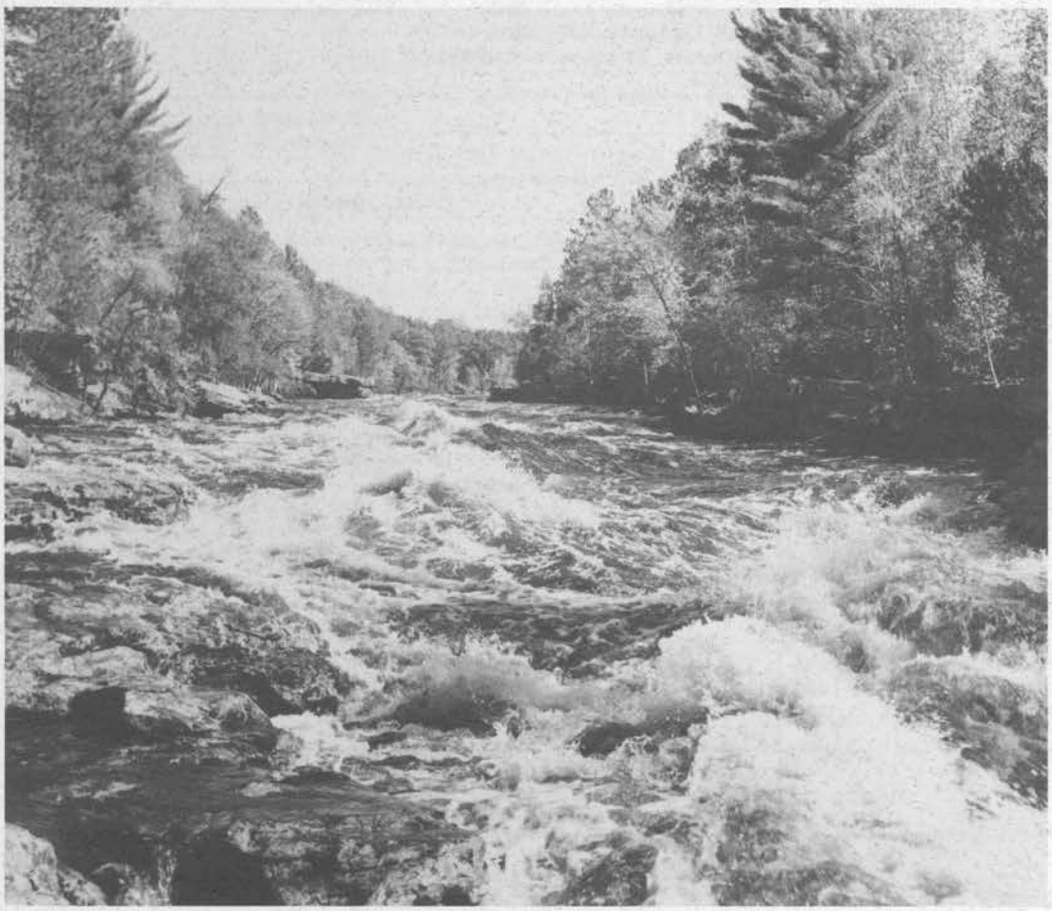
Address water and related land resource issues from both a major river basin and a smaller watershed perspective.

Much of the local water planning effort has focused on smaller watersheds. Multi-county, or in the metropolitan area, multi-watershed management organizations offer an opportunity to bring together smaller watershed plans for a focus on larger watersheds. The state needs to assist local governments in addressing issues associated with the larger watersheds by tying together smaller watershed or county plans.

Beyond the major watershed unit focus, the state must take responsibility for its nine major river basins. No one else is in a position to take the broad perspective necessary to manage the large river basin as a system. The federal government can provide major assistance to the state in this effort. Some of the areas in which this help is needed include spills preparedness, watershed protection, navigation, and reservoir operations planning and policy development.

The First Steps

- Identify priority rivers for comprehensive management based upon resource quality and use, problems and opportunities, and local interest. *(DNR, PCA, BWSR, EQB)*
- Establish private-local-state projects on the priority rivers. These will use comprehensive local water plans as "building blocks" for comprehensive river management strategies. *(DNR, BWSR, EQB, FED, PCA)*
- Give priority to local proposals designed to carry out comprehensive river management strategies. State rules should link state grants to jointly implement comprehensive river strategies. *(DNR, PCA, BWSR, EQB)*
- Establish inter-agency, inter-governmental river basin coordinating teams to advise agencies about river system concerns with the programs they administer. *(DNR, PCA, BWSR, EQB)*



Over 300 lake and river segments have fish consumption advisories due to contamination by mercury, PCBs, or dioxin.

Wetland Values:

- *Floodwater Storage and Rentention.*
- *Nutrient Assimilation.*
- *Sediment Entrapment.*
- *Ground Water Recharge.*
- *Low Flow Augmentation.*
- *Esthetics and Recreation.*
- *Shoreland Anchoring & Erosion Control.*
- *Wildlife & Fisheries Habitat.*

Figure 19 Surface Water Programs

Agency	Information/Technical Assistance	Projects/Incentives	Regulation
FEDERAL			
Agricultural Stabilization and Conservation Service		Agriculture Conservation Program; Conservation Reserve, Federal Waterbank.	Food Security Act.
Corps of Engineers	Floodplain Management; Planning Assistance to State / Local Government.	Construction of Flood Management, Aquatic Plant Control, Fish and Wildlife, Environmental Quality, Emergency Streambank, and Clearing & Snagging Projects; Cost Share.	Navigation Management; Reservoir Management; Section 404 Permits; Section 10 Navigable Waters Permits.
Environmental Protection Agency	STORET Database *(w/MPCA)*; Guidance Documents.	Clean Lakes *(w/MPCA)*.	Safe Drinking Water Act; RCRA; CERLA; FIFRA; Clean Water Act; NPDES Permits (through PCA); State Water Quality Standards Approval.
Farmers Home Administration		Debt Restructuring; Conservation Easement.	
Fish & Wildlife Service	National Wetland Inventory.	Small Wetland Aquisition.	F&W Coordination Act Permit Review.
National Park Service		LAWCON; Purchase.	
Soil Conservation Service	Wetland Restoration; FSA Wetlands Determination Conservation Planning and Application.	Watershed Protection *(PL566)* Cost Share.	Food Security Act.
STATE			
Agriculture	Pesticide & Fertilizer Monitoring; Pesticide Use Survey.	Sustainable Agriculture; Integrated Pest Management; Waste Pesticide Collection; Pilot Pesticide Container Collection.	Fertilizer Regulation; Pesticide Regulation; Applicator Certification; Crop Consultant Certification; Ag Chemical Incident Response.
Board of Water & Soil Resources	Local Water Planning Assistance.	Local Water Resources Protection and Management Grants; Erosion Control & Water Quality Cost Share; RIM Reserve; Wetlands Restoration; Environmental Ag Education Contracts.	Local Water Plan Approval.
Environmental Quality Board	Minnesota Water Plan; Research Priorities Reports; State Monitoring Plan; Quality/Quantity Trends Reports.		Environmental Assessment; Critical Areas; Pipeline Routing; Power Plant Siting.
Department of Health	Health Risk;Public Water Supply Monitoring/ Assistance; Fish Advisories.		Health Risk Limiits; Public Water Supply.
Metropolitan Council*	Metropolitan Water Plan; Water Quality Goals; Water Supply Plan; Wetland Research; Lake Database; Water Quality Monitoring.	Regional Recreation Open Space Grants.	Regional Sewer System.
Natural Resources	Scientific & Natural Area; Wetland Evaluation Methodology; Protected Waters Inventory; Stream Gage Network; Dam Safety; Lake Watershed Mapping; Canoe & Boating Routes; Lake Levels; Instream Flow Needs; Lakes Database.	State Waterbank; RIM Habitat Grants; Shoreland Ordinance Grants; Public Access; Flood Mitigation Grants.	Water Appropriation Permits; Protected Waters Permits; Floodplain & Shoreland Regulations; Wild & Scenic Rivers; Fishing/Boating Enforcement; Protected Flow Levels; Ordinary High Water Mark; Surface Use Management; Aquatic Nuisance Control.
Pollution Control Agency	STORET Database (w/EPA); Water Quality Monitoring; Citizen Lake Monitoring Program; Best Management Practices; Monitoring and Data Management Assistance; Lake Assessment Program; Facility Operator Training / Assistance.	Clean Water Partnership; Clean Lakes Program; Wastewater Treatment Grants and Loans *(w/TED)*; Septic System Upgrade Program; Tanks Program.	Water Quality Standards; Pollution Discharge/ Management Permits; Tanks / Spills Regulations; Animal Waste Mangement; Superfund Program; Solid and Hazardous Waste Management; Lake Attainment Goals; 401 Certification.
State Planning Agency	Lakes Database; Systems for Water Information Management; Land Management Information Center / Geographic Information Systems Support.		
Trade and Economic Development		Small Cities Development Grants; Wastewater Treatment Grants and Loans *(w/PCA)*; Outdoor Recreation Grants.	

** Regional Agency*

Source: Minnesota State Planning Agency.

Figure 20 Ground Water Programs

Agency	Information/Technical Assistance	Projects/Incentives	Regulation
FEDERAL			
Agricultural Stabilization and Conservation Service		Agriculture Conservation Program; Conservation Reserve Program.	
Corps of Engineers	Planning Assistance to State / Local Government.		
Environmental Protection Agency	STORET Database *(w/PCA)*; Guidance Documents.		Safe Drinking Water Act; RCRA; CERCLA; FIFRA; Clean Water Act; Underground Injection Control.
Geological Survey	Cooperative Geological Studies.		
Soil Conservation Service	Water Resource Assessment; Conservation Planning & Application Technical Assistance.	Demonstration Project; Hydrologic Unit Project.	Watershed Protection *(PL-566)* Cost Share.
STATE			
Agriculture	Pesticide & Fertilizer Monitoring; Pesticide Use Survey.	Sustainable Agriculture; Integrated Pest Management; Waste Pesticide Collection; Pilot Pesticide Container Collection.	Fertilizer Regulation; Pesticide Regulation; Applicator Certification; Crop Consultant Certification; Ag Chemical Incident Response.
Board of Water & Soil Resources	Local Water Planning Assistance.	Local Water Resources Protection and Management Grants; RIM Reserve; Environmental Ag Education Contracts; Well Sealing Grants.	Local Water Plan Approval.
Environmental Quality Board	Minnesota Water Plan; Research Priorities Reports; State Monitoring Plan; Quality / QuantityTrends Reports.		Environmental Assessment; Pipeline Routing.
Health	Health Risk; Public Water Supply Monitoring / Assistance; Well Management.	Community Health Service Grants.	Health Risk Limits; Public Water Supply; Water Well Code; Wellhead Protection.
Metropolitan Council*	Metropolitan Water Plan; Water Quality Goals; Water Supply Plan.		
Minnesota Geological Survey	County Geologic Atlas (w/DNR); Regional Hydrogeologic Assessments (w/DNR); Hydrogeologic Mapping.		
Natural Resources	Sensitive Area Mapping; County Geologic Atlas (w/MGS); Aquifer Safe Yields; Regional Studies & Assessments; Observation Well Network; Water Use Database; Well Log Database.		Water Appropriation Permits; Sensitive Area Criteria.
Office of Waste Management	Solid and Hazardous Waste Management Assistance; Waste Education.	Solid and Hazardous Waste Management Grants and Loans.	County Solid Waste Management Plan Approval.
Pollution Control Agency	Ambient Ground Water Monitoring; Best Management Practices; IGWIS Database; Monitoring and Data Management Assistance; Special Ground Water Studies.	Clean Water Partnership; Wastewater Treatment Grants and Loans (w/TED); Septic System Upgrade Program; Tanks Program.	Water Quality Standards; Pollution Discharge / Management Permits; Tanks / Spills Regulations; Animal Waste Management; Superfund Program.
State Planning Agency	Ground Water Data Clearinghouse; Land Management Information Center / Geographic Information Systems Support.		

** Regional Agency*

Source: Minnesota State Planning Agency.

Ground Water

How can we better protect our ground water resources?

How can we better understand the vulnerability of ground water to contamination?

Ground water is important to Minnesotans. It is a major source of water for drinking. It is vital to agriculture for irrigation, livestock watering, and food processing. It is interconnected with our lakes and streams and exchanges water with them.

Ground water is affected by many activities. However, it is often not considered when decisions are made. Ground water is out of sight below the surface of the ground and, consequently, out of mind. Ground water does not follow political boundaries. In addition, it was long believed, incorrectly, that ground waters were naturally protected from the polluting activities of man. These features have translated to a lack of advocacy for ground water.

We now know that ground water is more easily contaminated from land uses in some places than in others. The results of past activities are now seen in ground water quality. It is evident that we must better understand this resource and consider its vulnerability when decisions affecting it are made.

The Ground Water Protection Act of 1989 sets a tough new degradation prevention goal for the state's ground water. State programs must be revised to help Minnesotans move toward meeting this goal.

Many programs and decisions within programs have been developed without considering the possible effects on ground water quality and quantity. Programs and decision-making steps of state and local government may need to change in order to protect ground water.

Government needs to coordinate activities with the ground water unit in mind. To accomplish this, state and federal agencies must link efforts to assist local units in protecting vulnerable aquifers. Local units must adopt land use ordinances to protect aquifers. Comprehensive local water plans must guide local management activities.

"Approximately 4,000 households in the county are using septic systems that have been installed without inspection or soil investigation . . . . Improperly designed, constructed, or operated systems can cause ground and surface waters to be affected by pathogenic bacteria, viruses, parasites, nitrogen, phosphorus, chlorides, sodium, calcium and magnesium from water softeners, toxic chemicals from sewage treatment system additives, and household chemicals."

Olmsted County Comprehensive Water Plan.

"No information whatsoever is available on underground tanks with a capacity of less than 1,100 gallons."

Redwood County Comprehensive Water Plan.

The 10-year Objective

To make protection of ground water quality and quantity a routine consideration in all governmental decisions.

Recommendation 18

Protect and manage aquifers as hydrologic units.

The state has several programs designed to protect ground water. The Water Well Construction Code, water appropriation permit, and pilot well sealing programs are examples. Local government plays a part in many of these programs. Some local units have also adopted, or are thinking about adopting, ordinances to help protect ground water. Plans are also underway to encourage adoption of wellhead protection measures.

What these initiatives lack is a focus on the hydrologic units they are designed, incrementally, to protect. For ground water, this unit is the aquifer. Without looking at all the land and water uses that affect an aquifer, it is unlikely that we will succeed in protecting it.

The First Steps

- Identify priority aquifers for comprehensive management based upon resource quality and use, problems and opportunities, the adequacy of information describing aquifer sensitivity, and local interest. *(DNR, BWSR, EQB, MDA, MDH, PCA)*
- Establish private-local-state projects on the priority aquifers. These will use comprehensive local water plans as "building blocks" for comprehensive aquifer management strategies. *(DNR, BWSR, EQB, FED, MDA, MDH, PCA)*
- Give priority to local proposals designed to carry out comprehensive aquifer management strategies. State rules should link state

grants to jointly implement comprehensive aquifer management strategies. *(DNR, BWSR, EQB, MDA, MDH, PCA)*

- Establish inter-agency, inter-governmental aquifer protection teams to advise agencies about ground water system concerns with the programs they administer. *(DNR, BWSR, EQB, MDA, MDH, PCA)*

Recommendation 19

Gather sufficient hydrogeologic information for making adequate water management and protection decisions.

Understanding the ground water system is much more difficult than understanding the surface water system. This is simply a result of the fact that the resource is hidden. For the most part, ground water is understood only through construction and monitoring of wells. At best, these points of understanding can be pieced together to sketch a general picture of an aquifer. Due to the cost of collecting ground water data, and the variability of aquifers, the state has tremendous gaps in its basic knowledge about this vital source of water.

Efforts better to define our ground water system have begun, but much work remains. These include work on detailed county hydrologic atlases, regional assessments, sensitivity studies, and hydrogeologic modeling. State and local units should strive to complete county geologic atlas studies for one-half the state by the year 2000. These efforts will give state or local officials necessary information for making wise resource management decisions.

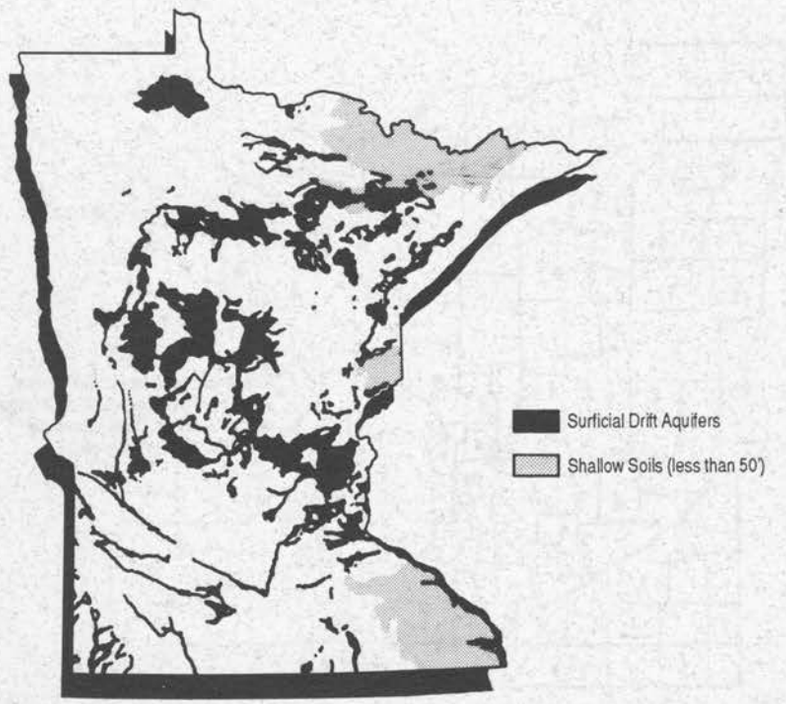
The First Steps

- Accelerate collection of geologic information and its mapping, including the county geologic atlas, regional hydrogeologic assessments, detailed soil surveys, and major ground water recharge areas identification. *(DNR, MGS, LCMR, LGU)*
- Automate information from these efforts as they are completed and merge with the state's geographic information system data base. *(DNR, MGS, LGU, SPA)*
- Complete rules for identifying sensitive ground water areas that incorporate different details of assessment. The assessments may vary from reliance on information about surface materials, only, to use of information about deeper geologic formations. The state also must develop and distribute maps and other materials that show the location of sensitive areas. *(DNR)*
- Develop guidelines for local government and private party preparation of regional assessments and county atlases to accelerate preparation and ensure data quality and compatibility. *(DNR, MGS)*
- Formalize procedures for setting priorities for future regional assessments and county atlases that draw on local water planning recommendations, identified sensitive areas, and state agency expertise. *(DNR)*

Ground water resources of many areas are not well understood. Specific studies dealing with individual aquifers have been prepared, but little is known of the deeper aquifers that may exist beneath them.

Elevated nitrate concentrations are common in the surficial aquifers of areas intensely cropped or heavily used for animal feedlots. These conditions are found in the surficial sand aquifers of southwestern Minnesota and the Mississippi River basin, and the carbonate aquifers in the Karst region of southeastern Minnesota.

Figure 21 Extent of Surficial Quarternary Aquifers



Source: Minnesota Geological Survey, U.S. Geological Survey.

One or more pesticides have been detected in 39 percent of wells sampled in susceptible areas of the state.

42 percent of 199 private wells tested and 7 percent of 395 public wells tested had nitrate levels exceeding the standard for drinking water.

Volatile organics have been found in 8 percent of community water supply wells tested.

About 40,000 large underground storage tanks are located in Minnesota and many are leaking.

178 hazardous waste disposal sites have been identified for priority clean-up activity.

Over 95,000 tons of hazardous wastes are produced annually in Minnesota.

Protecting and Conserving Water Resources

Reduction of Environmental Pollutants

What new steps must be taken to meet state and federal clean water goals?

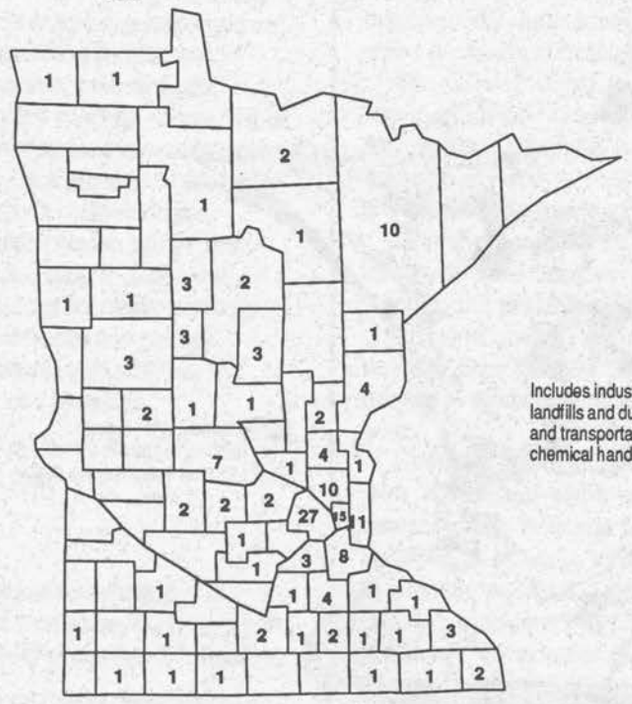
What can be done to reduce the amount and number of pollutants entering the environment?

How can we protect our water and soil resources while ensuring the vitality of the state's agriculture?

Minnesota has made major strides in reducing traditional pollutants from point sources. Yet, water quality problems still exist in both surface and ground waters. Nonpoint sources of pollution and toxic chemicals are the biggest concerns. Pesticides are used on the land and in the water to aid agriculture, silvaculture, and recreation. Fertilizers are used to boost plant growth. Both types of products may leach into Minnesota's waters with unintended effects. Pollutants are also released and transported in the air. Biotechnology, a growing new field, offers both opportunities and threats for water quality. Sources of pollution must be reduced and new cleanup methods found.

It is important, too, that Minnesota's environmental "fixes" consider total effects on the environment. Minnesotans must not spare one part of the environment at the expense of another.

Figure 22 Minnesota's Superfund Sites *1990*



Source: Minnesota Pollution Control Agency.

The 10-Year Objective

To build degradation prevention goals into all Minnesota programs and practices affecting water.

Recommendation 20

Evaluate how state programs should be changed to move toward the Minnesota clean water goals; then begin making the changes.

While there is agreement on the need to prevent pollution, a concerted effort is needed to make this happen. Many programs were developed before there was much recognition either of the significance of non-point pollution or how ground-water pollution occurs. State and local water-related measures are needed that reflect these new understandings.

The Ground Water Protection Act of 1989 required the study of nitrogen compounds in ground water. That study should point the way toward actions that will prevent further nitrate pollution.

The First Steps

- Identify the state programs having the greatest influence on water quality and establish a procedure and timetable for their evaluation. *(EQB)*
- Develop best management practices that address Minnesota's clean water goals. These should include integrated pest and fertilizer management practices for urban areas, roadsides, and public lands. *(MDA, PCA)*
- Accelerate efforts to protect areas sensitive to ground water pollution. Direct Reinvest in Minnesota (RIM) and Conservation Reserve Program (CRP) efforts to these areas. Identify ground water sensitive areas in comprehensive local water plans consistent with DNR rules. *(BWSR, PCA, DNR, LGU)*
- Complete and begin to implement recommendations to reduce nitrogen compounds in ground water. *(MDA, PCA)*

Recommendation 21

Reduce the amounts of polluting materials used, wastes produced, and pollutants entering the environment.

Waste policy issues have implications that are in some ways far broader than the traditional view of the field of "water." Still, it is very appropriate for these issues to be part of the Minnesota Water Plan. Whether the concern is the toxic chemical leaching to an aquifer, or falling into a pristine lake, waste management is very much a water management issue.

The increasing level of environmental pollution is an alarming trend. We now find small quantities of toxic pollutants in remote areas and formerly pristine lakes. Some discharges of toxic pollutants are obvious, like the wastewater discharge into streams and lakes. Others, like spills, leaks, and pollution from land use and land management activities, are more difficult to observe.

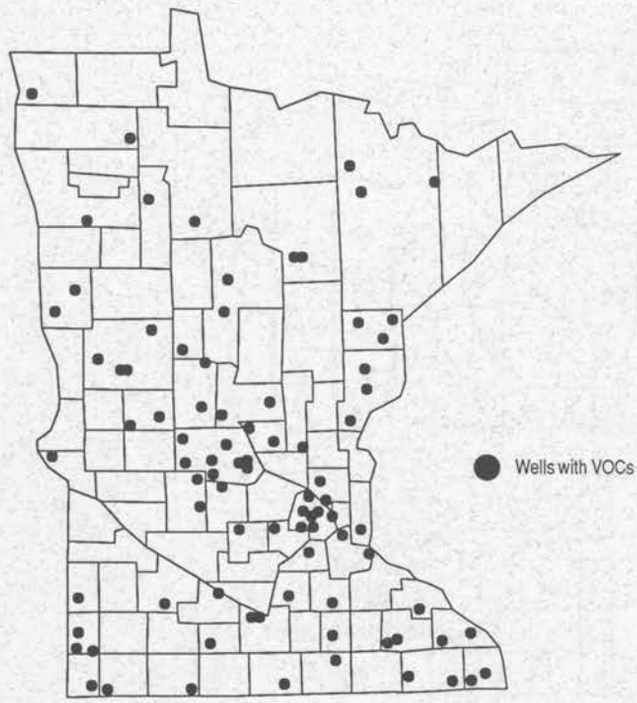
Even more subtle are those pollutants that volatilize from various human activities and are carried by the winds to be deposited in remote areas by rain or dryfall. Since wind carried sources of pollution are many and diffuse, their management requires a multifaceted approach. The approach needs to include education, technical assistance, incentives, and regulation. Government at all levels must make a strong commitment if these pollutant sources are to be controlled.

Solid waste is also a major water quality concern. Expansion of the state's population and economy means that solid waste will grow as a potential contaminant of water. Minnesotans must reduce both the quantity and the toxicity of the wastes they generate. This can be done through reducing sources of wastes, reusing materials, recycling materials into new products, and promoting alternatives to polluting products.

The Pollution Control Agency estimates that 10,000 to 14,000 of the state's feedlots are significant pollution hazards.

The thirteen southcentral counties are now involved in well closings, demonstration farms, wetland inventories, abandoned well inventories, taking over the well code, a series of Clean Water Partnership projects, a major LCMR project, and a survey of Ag drainage wells.

Figure 23 Communities with VOCs Detected *1982 – 1990*



Source: Minnesota Department of Health.

Minnesota Agriculture

More than half of Minnesota's land area is in farms. Since the 1930s, farm size increased while farm numbers decreased.

Minnesota farms sold agricultural products valued at $5.7 billion in 1987.

Minnesota ranked seventh nationally in cash receipts from farm products in 1988. The state was first in sugar beets, second in turkeys, third in soybeans and hogs, fourth in milk production, and fifth in corn.

Land in crops continued to grow through the 1980s to over 21 million acres in 1989.

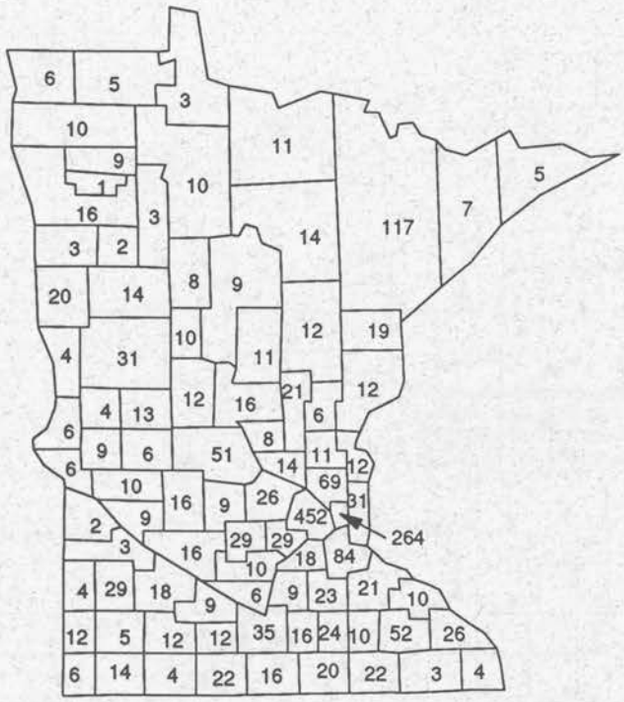
The Legislative Commission on Waste Management has been a leader in developing waste management policy recommendations. The LCWM and the new Legislative Water Commission may need to address many waste and water management concerns jointly.

The State of Minnesota should ensure that all commercial, industrial and municipal dischargers of toxics develop source reduction plans. By the year 2000, dischargers should be required to use the best available technology for reducing toxic inputs, byproducts, and wastes. The state must also make sure that the remaining wastes are disposed of in facilities specifically designed for them. Inadequate facilities should be closed.

The First Steps

- Develop, revise and implement pollution standards so that pollutants are below harmful levels. This should include:
  a) Biological criteria for overall environmental health. *(PCA)*
  b) Water quality criteria to protect wildlife, lakes, and wetlands. *(PCA)*
  c) Standards for discharges of toxics to the air, land, and water. *(PCA)*
  d) Health risk limits for pollution detected in ground water. *(MDH)*
- Promote waste reduction and reuse by:
  a) Expanding educational programs on waste reduction and reuse. These should emphasize cradle-to-grave costs of products, hazards of improper disposal, and reinforcement of good behavior. *(OWM, OEE)*
  b) Exploring opportunities for a Center for Recycling and Waste Management Research and Education at the University of Minnesota. *(UM, OWM)*
  c) Addressing problems associated with packaging and the environment. The report of the Select Committee on Packaging and the Environment provides analysis of the key issues and options. *(OWM)*
  d) Helping industry implement the Battery Disposal and Recycling Law of 1990. The state should also recommend added requirements for reducing the hazardous components of industrial and household batteries and determine approaches for routinely recycling batteries. *(PCA, OWM)*
  e) Expanding solid waste recycling and household hazardous waste collection and drop-off programs. It is important that convenient services are available to all citizens. Citizens need to understand the effects of their buying and product use habits on the environment. *(PCA, OWM)*
  f) Continuing to identify and explore options for waste and toxics reduction. These should include bans, substitutes, and alternate disposal procedures for the most toxic and common constituents in municipal waste. *(PCA, OWM)*
  g) Expanding and continuing technical assistance to industries and local units of government for waste reduction, treatment, and management efforts. *(OWM)*

Figure 24 Number of Known Leaking Underground Storage Tanks *1990*



Source: Minnesota Pollution Control Agency.

- Evaluate the Toxic Pollution Prevention Plan progress reports submitted by facilities through the Minnesota Toxic Pollution Prevention Act. Recommend further actions needed to reduce toxic releases/discharges. *(PCA, OWM)*
- Design approaches for evaluating and managing fuel storage tanks and on-site wastewater treatment systems. These should include monitoring and maintenance procedures and repair or abandonment of nonconforming systems. Comprehensive local water plans should guide approaches developed. *(BWSR, PCA)*
- Study and recommend elements of a systematic program to prevent spills, especially in the Mississippi River. *(PCA)*

Recommendation 22

Ensure that agricultural activities in the state are environmentally sound, and economically and socially viable in both the short and long term.

Agriculture is an important part of Minnesota's economy and way of life. More than half the state's exports come from farm and food products. Also, about one-fourth of Minnesota's employment comes from agriculture and related industries. Minnesota has the second largest farm population in the nation and devotes more than half its land area to agriculture.

Yet, these same activities that contribute to our economy and way of life also pose threats to our water. Stormwater and snowmelt runoff from cropland carry sediment, nutrients, bacteria, and other contaminants into surface waters. Nitrate and pesticides seep from these lands into underlying ground waters.

The Soil Conservation Service estimates that water erodes 58 million tons of soil annually from Minnesota's cropland and wind, an additional 90 million tons. The sediment and attached contaminants harm Minnesota's water resources. Future crop production potential is also jeopardized.

The State of Minnesota must foster agricultural practices that support both a healthy environment and economy. It must develop new and better approaches for dealing with problems as they arise. It must promote an understanding of the connections between practices and problems.

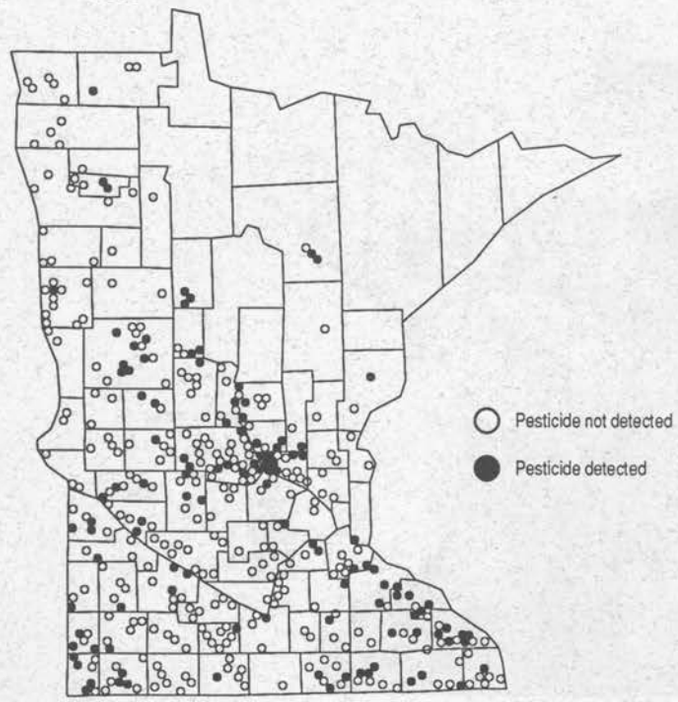
Research, conservation planning, education, and financial and technical assistance must be brought together in priority areas. The state also must continue to influence federal farm legislation and related federal initiatives. It is important to ensure that these are compatible with Minnesota's goals.

The First Steps

- Adopt a state goal of reducing soil erosion on all agricultural lands to tolerable rates by the year 2000. *(BWSR)*
- Make allocation of state erosion control funds a catalyst in pursuit of this goal by linking expenditures to adoption and enforcement of erosion control ordinances. *(BWSR)*
- Encourage an accelerated shift in focus of

In 1988, about 1200 confirmed and possible feedlots existed in Olmsted County. Only 133 had MPCA permits. Olmsted County plans to develop and implement a county feedlot ordinance.

Figure 25 Occurrence of Pesticides in Public Wells
1988



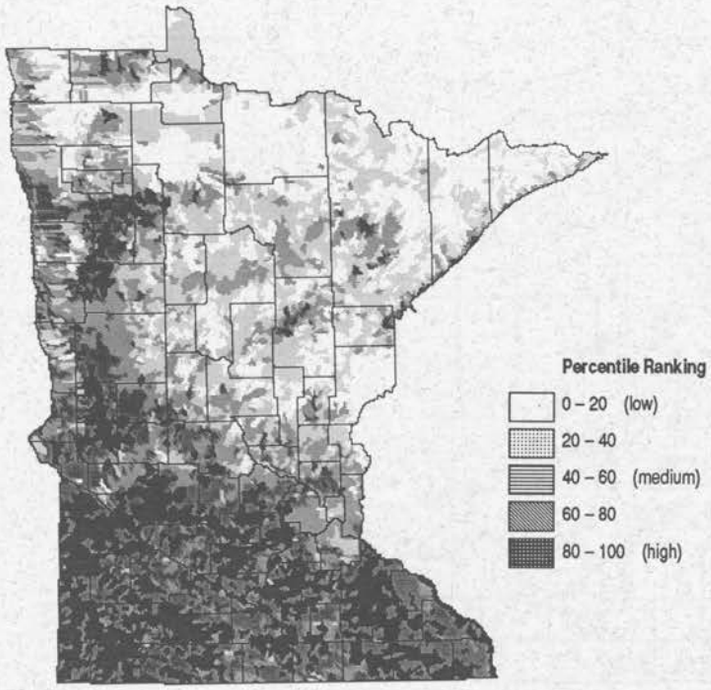
Source: Minnesota Department of Health.

Erosion and sedimentation are significant throughout most of the agricultural portion of the state. Almost 60 million tons of soil are eroded each year due to water and another 90 million tons due to wind.

research at the University toward sustainability rather than production. Enhance basic research on management practices; alternate crops; and alternate, sustainable farming systems. *(UM, MES)*

- Continue to promote wise pest management. Adopt and carry out a state Pesticide Management Plan and an Integrated Pest Management Plan. Complete the pilot pesticide container pickup project and seek needed legislation or rules. Establish the waste pesticide pick-up program. *(MDA)*
- Develop management plans for farms in environmentally sensitive areas. Provide incentives and assistance for transition to alternate practices. These efforts should include strategies for keeping marginal agricultural land now under temporary retirement out of production and for retiring additional priority marginal lands. *(BWSR, LGU)*
- Expand educational efforts to foster an environmental stewardship ethic and to recognize the need for farming systems that can be sustained. *(MES)*
- Expand private and public sustainable agriculture demonstration and assistance programs to illustrate the need for resource conservation and protection and the profitability of practices. *(MDA)*
- Encourage collaborative projects among local, state, and federal governments. Examples include the Northern Cornbelt Sand Plain, the Anoka Sand Plain Water Quality Demonstration, and the St. Peter/Prairie Du Chien projects. *(FED, LGU, MES, PCA, UM)*
- Carry out the state Fertilizer Management Plan and begin management practice promotion, particularly in areas with existing problems or high probability of problems. *(MDA)*

Figure 26 Non-Point Source Pollution Potential



Source: Minnesota Pollution Control Agency / SPA Land Management Information Center.

Water Well Management

What is the best way to ensure that wells are protected and are not pollution hazards?

How can the system for testing private wells be improved?

Two-thirds of all Minnesotans receive their drinking water from wells. Efforts to protect wells from contamination from surrounding areas are crucial in protecting water supplies.

Most of Minnesota's active wells were constructed before well construction rules were developed in 1974. Many unused wells have never been sealed properly. The use of inferior construction materials is causing casings to deteriorate. Improperly constructed, maintained, or abandoned wells offer a direct path for pollutants into ground water.

Recent surveys suggest serious problems from some abandoned wells. About 300,000 to 370,000 have the potential to degrade ground water in the vicinity of municipal water supplies. From 700,000 to over 1.2 million have the potential to endanger ground water quality.

Multi-aquifer wells are of special concern since they pose threats to the deepest, most naturally protected aquifers. Wells used to carry surface, septic, or agricultural drainage water into ground water are another serious concern.

Until the mid 1970s, the Department of Health offered private well owners free water tests for a limited number of parameters. With the onset of state funding for Community Health Services (CHS), the state turned over responsibilities for private water testing to local government. The result is inconsistent service by private water testing programs across the state.

The 10-Year Objective

To strengthen protection and management of water wells at the state and local level.

Recommendation 23

Strengthen enforcement of the well code at the state and local level.

To protect ground water, it is important to identify, and to reconstruct or seal wells that are abandoned or improperly constructed or maintained. The vast number of wells involved makes this a tremendous task. The urgent need is to correct polluting wells and those with a potential to contaminate ground water.

A growing number of local governments are administering the well code. Ultimately, local governments across the state should administer the code. But, to ensure that well records are available for enforcement and geologic analysis, information systems must tie wells to land parcels. State assistance is needed to make this possible.

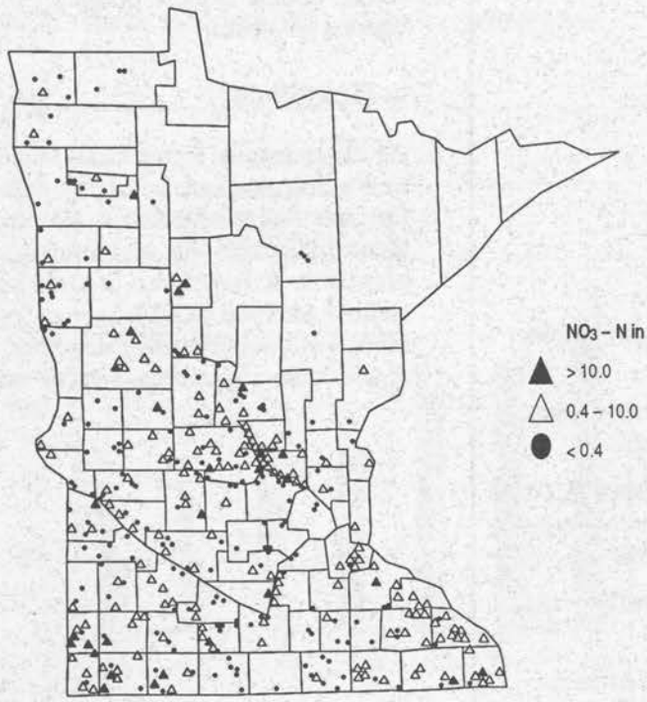
The First Steps

- Establish procedures for identifying and

Multi-aquifer wells at Pine Bend and St. Louis Park brought VOCs to the Mt. Simon Hinckely aquifer. These wells were reconstructed or sealed. The number of wells in use today causing similar problems is unknown.

300,000 to 370,000 abandoned wells have the potential to degrade ground water in the vicinity of municipal water supplies.

Figure 27 Occurence of Nitrate – Nitrogen in Public Drinking Wells *1988*



Source: Minnesota Department of Health.

priorities for sealing unused polluting wells including multi-aquifer, injection, and agricultural drainage wells. *(MDH, BWSR)*
- Develop and implement methods for sealing priority wells. *(MDH, BWSR)*
- Encourage and assist local governments interested in administering the Water Well Construction Code. *(MDH, BWSR)*

Recommendation 24

Develop a system for private well testing that provides a basic level of service across the state, while encouraging innovation in meeting regional needs.

Well owners need information about how to get their water tested, what to test for, and what the results mean. Local government needs to work toward offering well owners a basic water testing program. State technical assistance is essential for this kind of effort, especially regarding what kind of pollutants may exist due to specific local conditions.

- Water tests for many pollutants are expensive. State universities and technical institutes should explore offering tests for selected pollutants.

The First Steps

- Develop minimum requirements for private well testing programs across the state and for associated state technical aid. Recommend incentives for accelerated local programs. A task force of Community Health Service (CHS) agency representatives, comprehensive water planning organizations, representatives of private labs, state agencies, and the university/state university community should advise the state in program development. *(MDH)*
- Evaluate the ability of Community Health Service agencies and alternative systems to deliver private well testing programs. *(MDH)*

Recommendation 25

Develop and implement wellhead protection for public and private wells.

Wellhead protection seeks to reduce the risk of well contamination due to land use in the area surrounding a well. The immense number and types of wells in the state make wellhead protection a challenge. During the decade, Minnesotans should cooperate to protect wellhead zones of the state's community wells. The state should develop and carry out a strategy for protecting noncommunity wells. It should also establish generic guidelines for protection of private wells.

New and revised local water plans should identify ground water sensitive areas consistent with DNR rules and wellhead protection areas consistent with MDH rules.

The First Steps

- Develop and carry out the strategy for wellhead protection controls for public water supply wells. Establish several pilot wellhead protection projects. *(MDH)*
- Conduct studies to support development of wellhead protection policies including the necessary legal and financial needs and resources of local governments. *(MDH)*

Well Facts:

- *2 million people served by public wells.*
- *About 11,000 public water supply systems (17,000 wells).*
- *1,000 community systems (4,000 wells) and 11,000 noncommunity systems (13,000 wells).*
- *1 million people served by private wells.*
- *About 400 water well contractors construct between 7,000 and 12,000 wells each year.*

Water Conservation

How can we ensure that Minnesotans have sufficient water to meet their future needs?

How can the state be better prepared for water emergencies and drought?

Ample, high quality water is and will continue to be important to Minnesota. Threats to our water include drought, demand from water deficient regions, contamination, over use, population growth, and global warming.

The state regulates water appropriations. Still, appropriations occasionally exceed the amount of water available. With demand increasing, problems are expected to mount.

New estimates of metropolitan ground water indicate that less water may be available than previously thought. The competition for water in the seven-county region is expected to strain these supplies.

Statewide, water supply conflicts are increasing. Yet, few meaningful conservation plans are in place, even though conservation may be necessary for the fair allocation of water. The new drought contingency plan for the Mississippi River illustrates how conservation can be the key to fairly managing competing uses of water.

Court decisions have strengthened the federal role in water allocation. Federal courts have interpreted water as an article of commerce, limiting state authority to prohibit water export. They have declared, in some situations, that federal regulations prevail over state regulations. The onus is on the state to clearly document water needs as a prerequisite of state regulation.

10-Year Objective

To develop a coordinated local / state program to ensure that Minnesotans have enough water to meet their long-term needs.

Recommendation 26

Develop a water conservation strategy for long-term and seasonal water use throughout Minnesota.

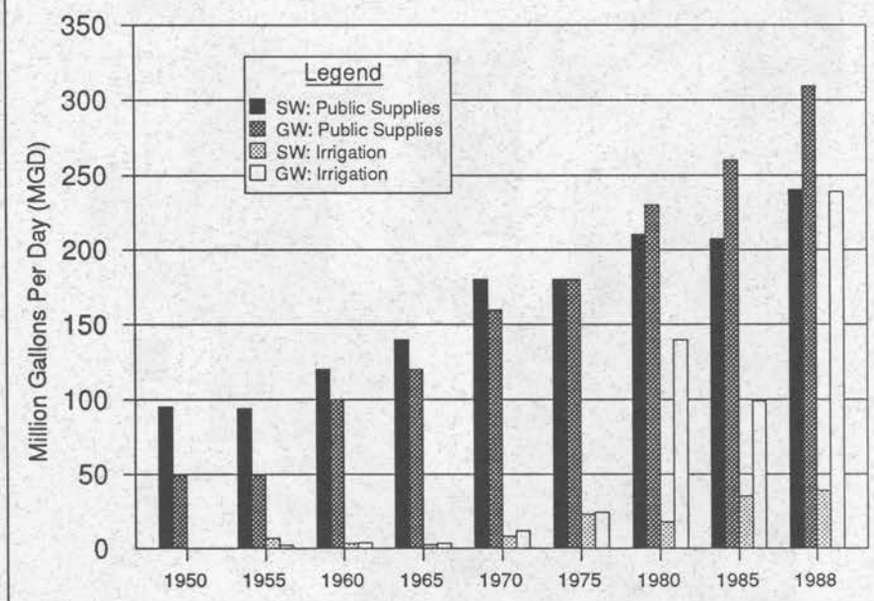
The recent drought illustrates the vulnerability of both ground and surface waters. Some aquifers experienced significant declines in water levels, while even the Mississippi River was shown to have its limits. Renewed efforts are needed to ensure that water use is kept within resource limits, and that water is allocated efficiently and fairly.

To ensure adequate supplies, the state needs to continue steps to implement the drought contingency plan for the Mississippi River. It must work toward restricting nonessential (e.g. lawn watering) use of aquifers, and eliminate use of ground water for "once through" heating and cooling systems. Appropriators need to have contingency plans for emergencies and drought that include water conservation measures. Federal court rulings add to the urgency of the state developing strategies for managing water supplies within a "basin of origin" and within safe yield limits for aquifers.

Effects of the drought:

- *Nearly 200 surface water irrigation permits were suspended along 17 Minnesota Rivers.*
- *40 homes left without water in Sherburne County when wells went dry.*
- *Town of Stephen water supply (Tamarac River) had to be supplemented at a cost of $2.50 per thousand gallons.*
- *Controversy surrounded proposed release of water from the Headwaters Reservoirs.*
- *Minneapolis instituted its first ban on outdoor water use.*
- *White Bear Lake dropped to a new record low and Minnetonka dropped nearly three feet.*

Figure 28 Trends in Surface Water and Ground Water Use



Source: Minnesota Department of Natural Resources.

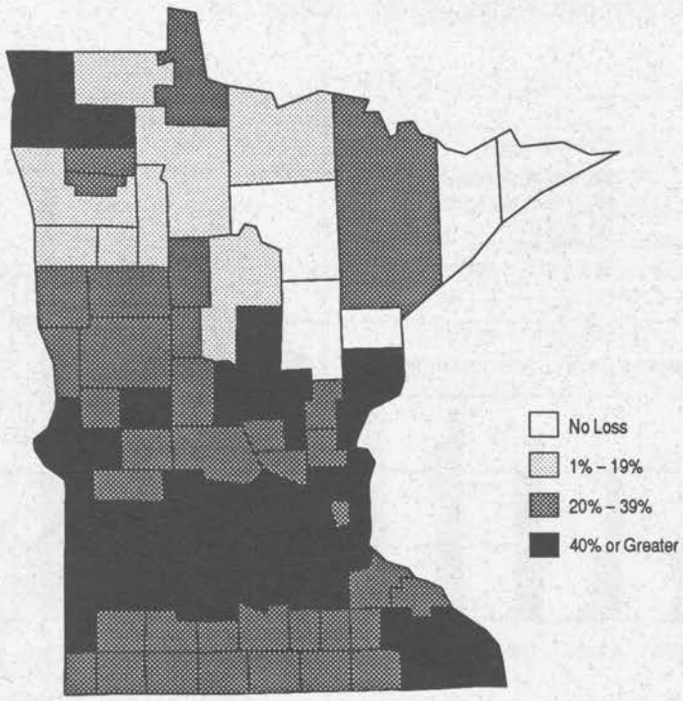
Local governments should explore use of flood storage areas for domestic water supplies, as well as various other uses. They should also consider the advantages of merging water utilities or sharing water supplies. Finally, local governments should adopt land use controls to protect the quality of water supplies.

The First Steps

- Examine rate schedules, what water use should be subject to charges, and what effects charges have on use. *(DNR, MDH)*
- Refine priorities for water use and define essential and nonessential use. *(DNR)*
- Explore the reuse of "gray water" (e.g. water from showers, sinks) for uses such as gardens. *(MDH, PCA)*
- Establish criteria for interbasin transfers to safeguard long-term water quality and quantity. Develop strategies for managing water supply needs within the "basin of origin." *(DNR)*
- Complete the metropolitan area water use and supply plan. In it, evaluate a regionally planned, locally operated, Twin Cities metropolitan water supply system. *(METC)*
- Establish a pricing system that keeps the cost of water treatment from being a barrier to water supply sharing between communities. *(MDH, UM)*

Estimates for the year 2010 show that close to 200 new large-capacity wells will be needed for growth in the Metropolitan area alone.

Figure 29 Percent Loss in Corn Production Due to Drought *1988*



Source: U.S. Department of Agriculture / SPA DATANET.

Managing Water's Interconnections

How can government integrate programs to address water's interconnections?

How can water protection needs proactively influence growth?

How can water be managed to help sustain the quality of Minnesota's environment?

Minnesota has many programs that seek to manage the use of land and water. Programs like the Shoreland Management program and Clean Water Partnership have become national models. Comprehensive local water planning — also nationally recognized — is demonstrating the key job of local government in water management.

Still, the drought of 1988 exposed weaknesses in the way land and water uses are managed. Subdivisions depending on shallow wells ran out of water. Homes built on poor soils developed cracks in their foundations. The City of Minneapolis, depending solely on the Mississippi River for its water supply, sparked debate of both water conservation and river use policy.

Other problems, not drought-related, indicate need for new approaches. Impoundments for flood management raise water quality and land management issues. For example, excess upstream erosion may shorten reservoir life expectancy and degrade reservoir water quality. Yet, erosion control programs often are not linked to project approval. Bluffs along the Mississippi are developed in ways many consider unwise, without effective use of local or state land use controls.

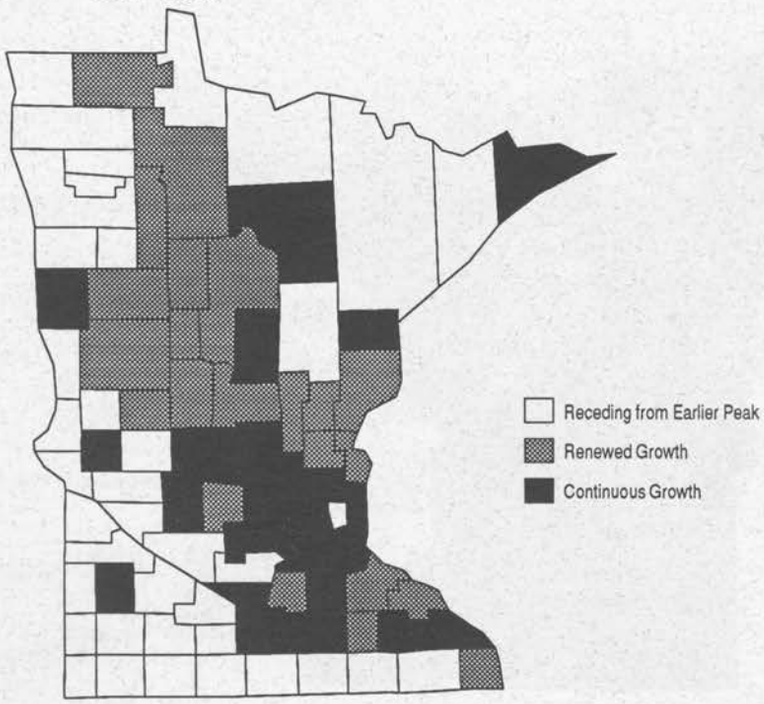
The challenge is to coordinate and concentrate local, state, and federal programs on protecting resources. A river protected from industrial pollution can be degraded by shoddy bluff development. A lake with well-managed shorelands can be made unattractive by polluted runoff from far upstream. Ground water can be the unintentional recipient of the by-products of land uses, or it can place its own limits to growth when supplies are limited.

An integrated approach is needed to avoid or resolve conflicts between the use and protection of land and water. We need to think about land when we manage water. We need to think about water when we manage land. We need to consider water and land when managing air emissions. We need to run state and local programs as if they were administered by one agency. This approach requires the special focus on the resource

"The only alternative is to reverse our dominent attitude toward the earth and in our use of it recognize that man is part of nature."

Sigurd F. Olsen

Figure 30 Minnesota Population Trend Patterns
1910 – 1988



Source: U.S. Census and SPA estimates.

described throughout the **MWP**.

State and local governments must lead the way in removing or avoiding barriers to a sustainable environment policy. These barriers can be complicated. They often include institutional, political, informational, educational, technical, and financial constraints. In leading the way, governments must involve citizens, interest groups, and educational interests in the joint management of water resource units.

The 10-Year Objective

To help sustain the quality of Minnesota's environment by recognizing water's interconnections.

Recommendation 27

Identify and remove barriers to managing water's interconnections for a sustainable environment.

Minnesota's water programs should be reviewed to ensure that they recognize water's interconnections, and that they contribute to sustaining the state's environmental quality.

Historically, linking programs is difficult when they have been independent. It is hard to argue that the benefits of one program be tied to another, especially when this places conditions on the release of money. Yet, the alternative is a fragmented approach to managing the resource. This approach is often inefficient. It leads to unconnected, uncoordinated efforts, despite the best intentions of the people involved.

The First Steps

- Identify program changes needed to recognize interconnections and sustain environmental quality. These should include:
  a) Linking water quality protection and restoration projects to measures such as ordinances and regulations necessary to prevent recurrence of problems; *(PCA)*
  b) Linking a unified program of flood damage reduction grants to land treatment requirements, erosion control regulations, and cost-sharing; *(DNR, BWSR)*
  c) Linking decisions under drainage proceedings to policies of approved comprehensive local water plans; *(LGU)* and,
  d) Tying land treatment cost-sharing, water quality and agricultural chemicals regulation, stormwater management, and land use regulation into wellhead protection requirements by state law and rule and through comprehensive local water plans. *(MDH, BWSR, MDA, PCA)*

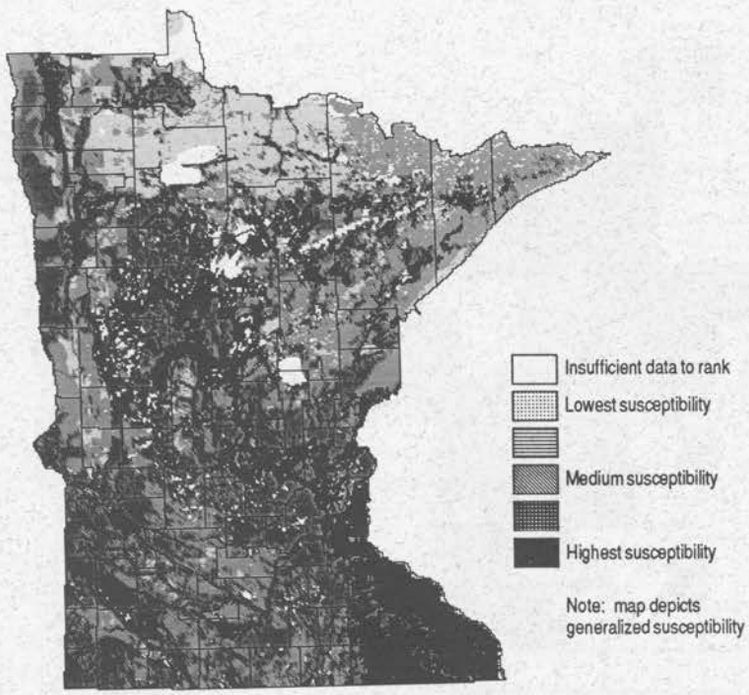
Recommendation 28

Build consideration of water protection needs into land use decisions.

The land use connection is a key to management and protection of water resources. The connection ranges from shoreland and flood plain issues, to both urban and agricultural land management and chemical use issues, to growth management issues. The MWP ap-

Growth is concentrating in areas of the state sensitive to pollution such as the Karst areas of southeast, the sandplains north of the Twin Cities, and the northern lakes region.

Figure 31 Ground Water Contamination Susceptibility in Minnesota



Source: Pollution Control Agency / SPA Land Management Information Center.

proach is to address these issues with a focus on the resource, whether the resource affected is a lake, wetland, river, or aquifer or multiple resources over a large area.

The consequences of economic and population growth raise issues that cut across all disciplines of the water arena. Growth may impact the quality of water resources through the discharge of waste or the runoff (or infiltration) of stormwater. It may expend available water supplies when the demands of growing communities are met. The management of growth presents a real challenge to the **MWP** themes of integrating management of water, focusing on the resource, and recognizing water's interconnections. Making these themes "work" in managing growth may be the litmus test for success of the **MWP**.

Problems are more likely to be prevented when people making growth decisions understand the limits of resources. It is possible to cooperatively manage growth within resource limits. The alternative is to let uncontrolled, unplanned growth determine the quality of Minnesota's water and the quality of life of Minnesotans.

Water programs too often are geared to react to problems growing out of population and economic factors. Flood mitigation efforts, cleanup of superfund sites, and restoration of lakes are examples of management that is reactive to development. Calls for interbasin diversion of water to meet the demands of water short areas are another example.

The state must begin to link approval of out-of-basin diversion proposals to growth and water use projections for basin-of-origin needs. It must also encourage the use of comprehensive plans as well as comprehensive local water plans as vehicles for linking environmental protection concerns to growth management.

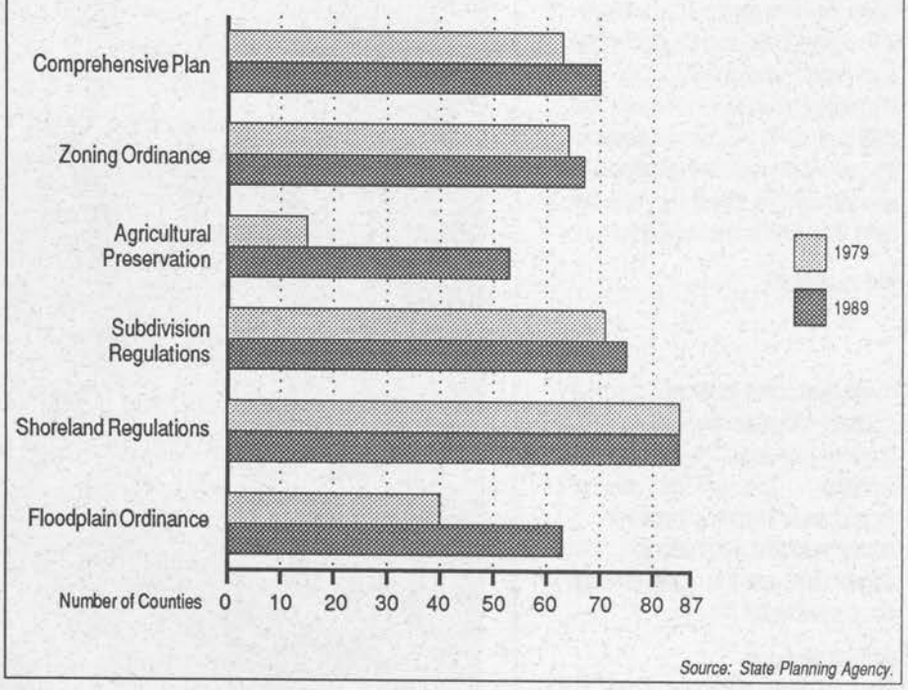
The First Steps

- Address the following land use connections requiring a resource-oriented approach in Minnesota:
  a) Managing the quality, habitat, and bluff-lands of the Mississippi/Minnesota Rivers;
  b) Managing land uses in areas of the state sensitive to ground water contamination; and
  c) Managing gravel pits and the new mining of nonferrous minerals in a way that addresses long-term environmental protection and restoration needs. *(LGU, DNR, MDA, MDH, NRRI, PCA, UM)*
- Assess implications of uncontrolled growth and recommend cooperative local / state approaches to identify and manage areas sensitive to growth. This assessment would include:
  a) Evaluating how to coordinate the management of growth;
  b) Evaluating the effect of ground water clean-up costs on industrial siting decisions;
  c) Identifying disincentives in Minnesota law and administrative policy to a sustainable growth / sustainable environment policy;
  d) Evaluating the need for statewide land use suitability guidelines; and

There are from 3,400 to 6,848 sources of aggregate in Minnesota. Minnesota ranks seventh nationally in nonfuel mineral value which includes sand and gravel. While the state regulates open-pit mines, regulation of sand and gravel operations is left to local government.

Many local water plans expressed the same concern as Norman County — that abandoned gravel pits are used as illegal disposal sites.

Figure 32 County Land Use Controls



Source: State Planning Agency.

e) Evaluating how to change the management of growth by building in consideration of long-term environmental damages associated with growth choices. *(SPA, UM, SUS)*

- Adopt the comprehensive planning and zoning legislation proposed by the Advisory Council on State and Local Relations. The purpose is to coordinate and modernize the planning law governing cities, counties, and towns. Care must be taken to retain the hierarchy of authority that was established under the comprehensive local water management act for managing water. *(SPA)*
- Develop environmental quality standards for subdivision and development of land as authorized by M.S. 83.29. *(EQB)*
- Examine ways to make the Environmental Assessment and Critical Areas programs meaningful tools for management of growth. *(EQB)*



"Harmony with land is like harmony with a friend; you cannot cherish the right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the ranges; you cannot build the forest and mine the farm. The land is one organism."

Aldo Leopold

"It will take some tough policies over the next 100 years to protect our environment and all life that it sustains . . . The next 100 years call for a change in course involving human restraint, international cooperation, and the money to keep our planet livable."

Willard Munger
State Representative

Acknowledgments

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Other Contributions

Local water planning teams made critical contributions to the **Minnesota Water Plan.** The multi-county water planning coordinators contributed in many ways, ranging from setting up public meetings to highlighting the innovative ideas in county plans. Participants in the various interest group meetings made significant contributions of time and thought to the **MWP.**

State Planning Agency

The Minnesota State Planning Agency staffs the Environmental Quality Board and its Water Resources Committee. The **Minnesota Water Plan** was prepared by Marilyn Lundberg, Deborah Pile, and John Wells, WRC Director, as part of this service. Sandy Henry and Pat Ciernia were responsible for technical production of the report.

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