# LE SUEUR COUNTY COMPREHENSIVE LOCAL WATER MANAGEMENT PLAN

## 1997 REVISION

## 1998 - 2003

**Adopted January 13, 1998**

# Le Sueur County Comprehensive Local Water Plan
# 1997 Revision

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# Executive Summary

## Project History

Le Sueur County officially began the comprehensive water planning process in August of 1987 when the Le Sueur County Board of Commissioners authorized the development of a County Comprehensive Water Resources Management Plan pursuant to Minnesota Statutes Chapter 110B and the associated rule MCAR Chapter 9300.

Technical assistance for the county water planning effort was facilitated through a joint powers agreement that Le Sueur County entered into with twelve south-central Minnesota counties. The joint powers agreement formed the basis for the cooperative thirteen county effort with Mankato State University entitled the South Central Minnesota comprehensive County Water Planning Project (SCMCCWPP). The project area is shown in Figure 1.

Funding of project activities to assist the county in its development of the original plan included the Le Sueur County Board of Commissioners, the county boards of the other twelve joint powers counties, the BWSR Natural Resources Block Grant, the Legislative Commission on Minnesota Resources and Mankato State University.

The plan includes surface water, ground water and related land resources within its scope. Water planning activities included gathering information about existing water and related land resources, identifying issues and problems and developing objectives and a plan of action to promote sound management of water and related land resources, effective environmental protection and efficient management.

The original comprehensive local water plan was prepared under the direction of the Le Sueur County Board of Commissioners and the Water Plan Task Force with involvement from Le Sueur County citizens, county organizations, local units of government, adjacent counties, Mankato State University, and state and federal agencies.

Public meetings were held during the original planning process in December 1987 and July 1988 to provide Le Sueur County citizens an opportunity to participate in the identification of water issues and problems. A water resource issues survey sent out during the spring of 1988 throughout the thirteen county joint powers area was aimed at assessing public attitudes about water resource issues. Response to this survey was great enough to satisfy the requirements for a representative sample. The results of the survey indicated that Le Sueur County residents ranked the 25 water resource issues in the following order:

1. Purity of drinking water;
2. Pollution of underground water;
3. Surface pollution entering streams, rivers and lakes;
4. Pollutant effects of waste disposal sites;
5. Changes in industrial practices affecting water resources;
6. Changes in agricultural practices affecting water resources;

7. Inadequate septic and sanitary sewer systems;
8. Improvement of fish and wildlife habitat;
9. Soil erosion;
10. Proper construction, maintenance and abandonment of wells;
11. Management of protected lakes, streams and wetlands;
12. Protection of lake and stream shorelands;
13. Drought and water shortages;
14. Water quality/quantity effects from ditch systems;
15. Protection of unique and scenic areas;
16. Restoration of drained wetlands;
17. Changes in energy production affecting water resources;
18. Changes in recreational development affecting water resources;
19. Development adjacent to lakes and streams;
20. River and lake water levels;
21. Ditching and tiling of land;
22. Flood plain protective measures;
23. Drainage difficulties with rail and high-way beds;
24. Inadequate availability of water-based recreation;
25. Flooding problems.

The Le Sueur County Board of Commissioners formally adopted the original water plan on December 11, 1990. The plan was to be revised and updated in five years.

Water Planning 1991-1996

The following is a list of actions that were identified in the original water plan and accomplished with assistance from water plan funds:

1. The Environmental Services Technician position was created and staffed.
2. Le Sueur County participated in funding a Minnesota Extension Service Cluster Water Quality position.
3. Le Sueur County is a member of the Board of Directors of the Cannon River Watershed Partnership.
4. Le Sueur County participates in the SCMCCWPP through activities of both the policy and technical committees.
5. Le Sueur County is a member of the Minnesota River Basin Joint Powers.
6. Le Sueur County established a rain gage network throughout the county to monitor localized precipitation to better understand surface water flow responses as it impacts surface water quality.
7. Feedlot operators in Le Sueur County were assisted in completion of application of MPCA feedlot permits. A network of Environmental Services staff, MES staff and SWCD/NRCS staff was developed
8. An abandoned well sealing cost-share program was established which accomplished the proper sealing of wells in the county. 199 well sealings were cost-shared through the Le Sueur County Community Health office and an additional 30 well sealings were cost-shared through the Le Sueur County SWCD.
9. The Le Sueur County Geologic Atlas was completed. This document serves as a guide to subsurface geologic conditions and groundwater resources in the

county.

10. The Le Sueur County Surface Water Resources Hydrology Atlas was completed. This document mapped the county ditch system, delineated ditchshed and lakeshed boundaries and updated minor watershed boundaries. Copies of this atlas were placed in local public and school libraries.
11. Le Sueur County Groundwater Susceptibility Report and Maps were completed.
12. Three Clean Water Partnership Phase I, Diagnostic Studies have been conducted. Two of the watersheds have entered Phase II, Implementation Projects.
13. Le Sueur County has completed a revision of its Comprehensive Land Use Plan and all associated ordinances: Zoning, Shoreland, Floodplain and Septic. A new Feedlot and Manure Management Ordinance was adopted.
14. The Le Sueur County SWCD began regularly monitoring two observation wells in the county as part of the DNR's OBWELL program. This program observes groundwater level fluctuations in relation to climatic and land use changes.

1997 Water Plan Revision

As per Minnesota Statutes, Chapter 103B.301, the Le Sueur County Board of Commissioners adopted a resolution on December 27, 1994 indicating the county's intent to revise the original water plan during the year 1995. At this same meeting, the Board approved the reactivation of the Le Sueur County Water Plan Task Force. A survey of Le Sueur County citizen's perceptions of surface and groundwater issues revisited the issues surveyed at the inception of the original water plan. The Le Sueur County Board requested and received two extensions of the revision deadline with a final extension of December 31, 1997.

A public information meeting was held March 2, 1995 to inform Le Sueur County citizens about the update process and to help identify water resource related problems and opportunities for the revised water plan. Results of the new citizen's survey of water resources issues was reviewed at that meeting. These ranked results follow:

1. Purity of drinking water supplies;
2. Improper mixing of sanitary sewer and storm sewer water;
3. Proper development adjacent to lakes and streams;
4. Improvement of fish and wildlife habitat;
5. Adequate septic and sanitary sewer systems;
6. Soil erosion;
7. Management of protected lakes, wetlands and streams;
8. Proper construction, maintenance and abandonment of wells;
9. Protection of unique and scenic areas;
10. Efficient use of sand and salt on roadways and streets;
11. Restoration of drained wetlands;
12. Water quality/quantity effects from ditch systems;
13. River and lake water levels;
14. Flood problems;
15. Storm water management in cities and towns;
16. Availability of water based recreation.

When asked to rank surface water contamination concerns, the sources were ranked as follows:

1. Herbicides and insecticides;
2. Chemical spills and improper storage;
3. Fertilizer;
4. Septic systems;
5. Feedlots and manure;
6. Erosion and sediment.

When asked to rank ground water contamination concerns, the sources were ranked as follows:

1. Herbicides and insecticides;
2. Chemical spills;
3. Leaky underground tanks;
4. Landfill dumps;
5. Fertilizers;
6. Septic systems;
7. Feedlots and manure;
8. Abandoned wells.

Revision of the water plan in 1996 and 1997 followed the same basic sequence as the preparation of the original water plan:

1. Gathering updated information on existing water resources and resource management programs;
2. Assessing the resource data implications;
3. Identifying problems and opportunities which the county wishes to address;
4. Developing goals, objectives, actions and priorities with which to address the identified problems and opportunities.

New legislation required four new components to be incorporated into the water plan revision. These are

1. Public water supply wellhead protection;
2. Sensitive ground water areas;
3. Stormwater management;
4. Designation of priority wetland areas.

The 1997 water plan update will cover the five year period from 1998 to 2003.

Water Plan Format

The comprehensive water plan contains the following major components in sequential order:

1. Summation of water-related inventory information and assessments of that information;
2. Identification of water-related issues, problems and opportunities;

3. Water planning objectives and actions to address problems and opportunities;
4. Description of the water planning implementation program.

This plan was written in a watershed-based context with the various resource information being described in relation to the major watersheds of Le Sueur County: the Cannon River, the Lower Minnesota River and the Middle Minnesota River and the Le Sueur River.

In an effort to make the Comprehensive Water Plan a more concise document and to reduce copying costs, the 1997 revision does not contain an appendix with technical water resource information. The numbers indicated in parenthesis [i.e., (#4), (#28), etc.] on the following pages of the water plan refer to file numbers of water resources inventory information which was gathered by the county during the initial water plan development and consequent water planning activities. This inventory information includes descriptions, lists and maps of the 55 inventory items whose collection was required.

The 55 inventory files and other information used in the development of the water plan can be found on file at the Le Sueur County Environmental Services Office, 88 South Park Avenue, Le Center, Minnesota 56057-1652.

# Water Resource Data and Assessments

Physical Environment, Land Use and Development Summary

Precipitation (#1), (#2) and (#3) (See Map Set 1.)

The SCMCCWPP established a raingage network with a goal of establishing a rain gage at each section corner within the 13 county area. The precipitation data is sent to the SWCD office where it is compiled and forwarded to the state Climatologist's office. The data is also sent to the Water Resources Center at Mankato State University where it is compiled and isopleth depictions of the growing season and total annual precipitation are generated. This precipitation data is also useful in determining hydrologic budgets for surface and groundwater studies being conducted in the 13 County area.

Climate in Le Sueur County is typical of the upper Midwest with warm, humid summers and cold, dry winters. Although precipitation amounts can vary greatly from year to year, the normal annual total precipitation is about 28 inches. The normal growing season precipitation for the county is about 21 inches.

Table 1. Average Growing Season Precipitation (May - September)

| Volunteer | Township/Section | Precipitation in Inches | | | | |
|---|---|---|---|---|---|---|
| Rain Gage Readers | | 1992 | 1993 | 1994 | 1995 | 1996 |
| Pat Murphy | Tyrone / 01 | NA | 30.30 | 19.39 | 19.21 | 14.92 |
| Donald Ney | Tyrone / 06 | NA | 29.38 | 18.16 | 14.35 | NA |
| Don Eilers | Lanesburgh / 06 | NA | NA | 20.72 | 21.55 | 15.42 |
| Mary Miller | Lanesburgh / 12 | NA | 29.25 | NA | NA | NA |
| Alvin Dietz | Lanesburgh / 14 | NA | 30.18 | 20.09 | 21.24 | 15.64 |
| Carl Lehman | Lanesburgh / 25 | 24.19 | 32.28 | 22.49 | 21.39 | 14.73 |
| Roger Schons | Kilkenny / 01 | 19.67 | 29.30 | NA | NA | NA |
| Karen Gibbs | Kilkenny / 06 | 20.47 | 30.19 | 19.95 | 21.81 | 15.95 |
| Unimin (Ottawa) | Ottawa / 34 | NA | NA | 18.80 | NA | 11.53 |
| Unimin (Kasota) | Kasota / 05 | NA | 36.07 | 19.05 | NA | NA |
| Environmental Services Building | Lexington / 32 | NA | 32.74 | 23.07 | 21.40 | 17.75 |
| Curt Urban | Washington / 01 | NA | 32.75 | NA | NA | NA |
| Steve Biehn | Washington / 08 | 19.61 | 39.96 | NA | 19.75 | 18.64 |
| Tom Loeffler | Washington / 17 | NA | 35.89 | 19.35 | 19.48 | 20.34 |
| Mary Wetzel | Waterville / 01 | 18.85 | 26.34 | 19.66 | 21.15 | 18.04 |
| Gary Peach | Waterville / 06 | NA | 26.63 | 19.73 | 25.29 | 20.42 |
| Charles Gregor | Waterville / 23 | NA | 26.77 | 21.85 | 20.40 | 17.63 |
| Robert Cumberland | Elysian / 35 | NA | 33.40 | 22.80 | NA | NA |

Geology and Water Resources

1) Aquifer Systems and Confining Layers (#4) (See Map Set 2.)

Three major bedrock aquifer systems separated on the basis of hydrogeologic properties are present in Le Sueur County. They are the St. Peter-Prairie du Chien-

Jordan aquifer system, the Franconia-Ironton-Galesville aquifer system and the Mt. Simon-Hinckey aquifer system. Well static water level data used in the development of the Geologic Atlas of Le Sueur County (Water Resources Center, Mankato State University, 1991.) is sufficient to demonstrate the regional groundwater movement is toward the northwest and the Minnesota River Valley.

The St. Peter-Prairie du Chien-Jordan aquifer system directly underlies the glacial drift and forms the bedrock surface throughout all but approximately the northern one-third of Le Sueur County. These three bedrock units function as a single aquifer system because all three are sources of groundwater with no regional confining bed separating them. The major bedrock aquifers in this system are the St. Peter and Jordan sandstones which yield water from between individual grains and the Prairie du Chein dolomites which yield water through fractures and crevices. The St. Peter sandstone has generally been eroded away with the exception of the southeastern portion of the county. Low permeability of the rocks of the St. Lawrence Formation which underlay the St. Peter-Prairie du Chien-Jordan aquifer system separates the aquifer system from the underlying Franconia-Ironton-Galesville aquifer system.

The Franconia-Ironton-Galesville aquifer system is overlain by the St. Lawrence confining layer except in the north central portion of the county. The upper bedrock aquifer unit in this system is the Franconia glauconitic sandstone which yields moderate supplies of groundwater. The lower bedrock aquifer unit, the Ironton-Galesville sandstones, is generally a more productive aquifer than the overlying Franconia. Rock of low permeability of the Eau Claire Formation directly underlie the Ironton-Galesville sandstone. The Eau Claire separates the Franconia-Ironton-Galesville aquifer system from the Mt. Simon-Hinckley aquifer system.

The Mt. Simon-Hinckley aquifer system is the deepest of the three bedrock aquifer systems in Le Sueur County. These deep sandstone aquifers are overlain by the confining layer of the Eau Claire formation except in northeastern Tyrone Township. Very little information is available on the geology and hydrogeology of the Mt. Simon-Hinckley aquifer system because it is reached by only a few deep water wells.

The possibility of developing small supplies of groundwater for farm and domestic use from wells finished in the glacial drift of Le Sueur County is generally good. The potential for development of moderate to large groundwater supplies from the glacial drift ranges from poor in the center of the county to favorable in the northwestern and northeastern corners of the county and in the southern tier of townships. The glacial till will generally yield little water over short time intervals thus recharge is slow and low pumping rates are associated with sand and gravel aquifers that are interbedded or enclosed by the relatively impermeable till material. Where sand and gravel deposits extend to the bedrock surface recharge rates are commonly fast and the pumping capacity is large. Occasionally, permeable sand deposits are reported by drillers as occurring just above the bedrock and may signify only the presence of weathered bedrock. In Le Sueur County sand and gravel deposits encountered in the main bedrock channels will provide moderate groundwater supplies. Sand and gravel deposits within the glacial drift are less favorable as aquifers where the bedrock surface elevations are high. (Geologic Atlas of Le Sueur County, Water Resources Center

Mankato State University, 1991.)

2) Ground and Surface Water Interconnections (#5)

Groundwater and surface water are connected through the processes of recharge and discharge. Groundwater may discharge into surface water such as lakes and streams maintaining flow during low-flow times or it may be recharged by stream water percolating through the soil to the aquifer. Areas indicated in the Le Sueur County Soil Survey as coarse textured terraces, floodplains and the sandy till area more readily transmit moisture from surface to aquifer.

Specific sites of either recharge or discharge have not been identified within the counties of Minnesota. There have been, however, regional studies to determine likely areas of recharge and discharge within the major watersheds of the state. These areas are determined by examining several factors: groundwater contribution to stream flow, low flow characteristics of streams and groundwater hydrology.

3) Boundaries and Flow Direction of Watershed Units (#6) (See Map Set 3)

Middle Minnesota River and Le Sueur River Watersheds

The Middle Minnesota watershed, as defined by the Minnesota River Assessment Project and the USGS, covers 1,350 square miles in eight counties; the watershed includes areas drained by streams which flow directly into the Minnesota River. The southwestern portion of Le Sueur County lies primarily within the Middle Minnesota River major watershed. In this area the regional drainage is from east to west toward the Minnesota River and the local drainage is toward Shanaska, Dog and Cherry Creeks. Besides Cherry, Dog and Shanaska Creeks in Le Sueur County, the Middle Minnesota watershed includes parts of Brown, Blue Earth, Cottonwood, Nicollet, Redwood, Renville and Sibley counties.

The percentage of the total area of Le Sueur county directly drained by the Middle Minnesota is 18.75%. This includes all or part of five townships: the western half of Washington, all of South Kasota, almost all of North Kasota, the southern three-fourths of Cleveland and the central third of Cordova. The municipalities of Cleveland and Kasota as well as the developed areas around Lake Washington and Lake Emily are included in this watershed. There are eighteen named and fifteen unnamed lakes in this watershed. All tributary streams other than the three previously named, are unnamed. The majority of these are ditches.

The extreme south central part of Le Sueur County, 0.66% of the county, lies within the Le Sueur River major watershed where local drainage is south across the county line into Waseca County. This area drains to the Middle Minnesota by way of the Le Sueur River. Along the southern edge of Elysian Township, 11.67 acres, drains south to the creek from Madison Lake. The municipality of Elysian straddles the watershed divide between the Le Sueur River and the Cannon River. That portion of Lake Elysian lying in Le Sueur County is also contained in the Le Sueur River Watershed.

Lower Minnesota River Watershed

The Lower Minnesota watershed, as defined by the Minnesota River Assessment Project and the USGS, covers 1,820 square miles in eleven counties. The roughly northern half of Le Sueur County, 50.37% of the county, lies within this major watershed. This includes all or part of eight townships: all of Derrynane, Lanesburgh, Ottawa, Sharon and Tyrone Townships, the northern one-third of Cordova and the northern two-thirds of Lexington and Montgomery Townships. The municipalities of Heidelberg, Le Center, Le Sueur, Montgomery, New Prague and the unincorporated villages of Ottawa, St. Henry and St. Thomas lie within this watershed. Lakes of this watershed include twenty-six named and twelve unnamed basins. The Minnesota River marks the western border for Le Sueur County flowing from south to north. In this area the majority of local drainage is toward artificial and natural drainage channels that flow into Le Sueur and Forest Prairie Creeks which have a common outlet to the Minnesota River. Sand Creek, a subwatershed of the Lower Minnesota River major watershed, drains from northeast Le Sueur County into Scott County.

(Surface Water Hydrology Atlas of Le Sueur County, Water Resources Center Mankato State University, 1993.)

Cannon River Watershed

The southeast portion of the county, 30.22% of the county, lies primarily within the Cannon River major watershed where the local drainage is toward the Cannon and Little Cannon Rivers. This area includes all or part of six townships: all of Kilkenny and Waterville Townships, all but the southwest corner of Elysian Township, the southeast corner of Lexington Township and the southern third of Cordova and Montgomery Townships. The municipalities of Elysian, Kilkenny, and Waterville and the unincorporated village of Cordova lie within this watershed. Lakes of this watershed include thirty-one named and nineteen unnamed basins. The Cannon River begins in the lake region of Rice County, flows west into Le Sueur County then flows back into Rice County before joining the Straight River in the City of Faribault. Approximately 9% of the of 1460 square miles Cannon River watershed is found in Le Sueur County. The Cannon River outlets Le Sueur County through Sakatah Lake.

(Cannon River Watershed Plan, Cannon River Watershed Partnership, January 1996.)

4) State Protected Waters and Public Drainage Ditches (#7) (See Map Set 4)

In order to conserve and protect Minnesota's surface waters, the legislature enacted the Protected Waters and Wetlands Legislation, Minnesota Statutes, Chapter 103G, which states authority and powers of the commissioner and mandates the inventory and classification of public waters. Any work done below the Ordinary High Water Level (OHWL) of public waters and wetlands requires a permit from the DNR.

Le Sueur County has an inventory and designation of protected waters and wetlands, an inventory of waterway control structures and a listing of public ditches in the county. The benefits of protecting the lakes, wetlands and streams are many. Most of the larger lakes in the county are developed for year-round and seasonal dwellings. Water

quality continually ranks high on surveys as does maintenance of fish and wildlife habitat which in turn provide outdoor recreational opportunities. Protected waters inventory maps are available for viewing at the Minnesota DNR and Le Sueur County Environmental Services office and the Le Sueur County Soil and Water Conservation District office.

Minnesota Statues, Chapter 103E, governs public drainage systems. The Le Sueur County Engineer designee, County Surveyors, and the Le Sueur County Auditor's Office have maps showing the location of the approximate 250 miles of open county drainage ditch systems. The 1993 Le Sueur County Surface Water Hydrology Atlas available at the Le Sueur County Environmental Services office contains public drainage systems maps.

Le Sueur County has twelve waterway control structures and four dams. All of the structures are administered by the DNR for either water level control or as fish barriers.

Soils (#8) and (#9) (See Map Set 5)

There are eight soil associations within Le Sueur County which can be arranged into two broad groups. The first group containing four upland soil associations makes up approximately 86% of the county. The second group also contains four soil associations. The presence of these four soil associations in much smaller areas indicates the greater soil diversity and complexity in extreme western and southern Le Sueur County.

The majority of soil erosion in Le Sueur County is occurring in its southern and eastern areas. These areas coincide with the largest acreages of land enrolled in the federal government's Conservation Reserve Program (CRP). It is in these areas where slopes and potential impacts of surface runoff are greatest. It should be noted that the highest erosion potential areas are adjacent to or surrounding the county's major recreational lakes.

Original Vegetation (#10) (See Map 6)

The predominant original vegetation of the county was dense hardwood forest interspersed with areas of wet marshes, sloughs or wet meadows. The sandy or bedrock terraces along the Minnesota River were dominated by prairie grasses.

Topography (#11) (see Map 7)

Le Sueur County lies in an area called the Minnesota River lowland. This topographic trough is an area where several glaciers advanced and retreated during the Pleistocene. This period of glaciation began about 2 million years ago and ended about 10,000 years ago. The most recent glacial advance, the Des Moines lobe of the Late Wisconsin Glaciation, deposited yellowish gray, calcareous, medium textured material across the county.

Recessional moraines in the eastern and southern parts of the county are rolling to

steep. The landscape in the eastern part is generally one of circular, flat-topped hills separated by swales and bogs. In the southern moraine area, the hills are more irregular in shape; the knolls and ridges are separated by swales and drainageways. Most of the lakes in the county are in these moranic regions. The remainder of the upland areas in the county are nearly level to rolling ground moraines.

The Minnesota River forms the western boundary of the county. The flood plain ranges from about one-eighth to two miles wide. Above this flood plain are well defined terraces which rise abruptly above the river. One terrace is about two miles wide and extends south from Kasota to beyond the county line. It is a structural bench of Jordan sandstone capped with Oneota dolomite over which lies a thin mantle of soil. This bedrock bench which rises about 75 feet above the river also crops out near Ottawa. Sandy terraces are at the higher elevations along the Minnesota River. Those near Le Sueur are three to four miles wide. They result from the late and early postglacial erosion and deposition associated with the melting of the Des Moines lobe.

Relief in the county is characteristic of that in a glaciated area. The elevation of the till plain ranges from 940 to about 1,020 feet above sea level. In the moraine area the hills and ridges rise 50 to 150 feet above the swales and drainageways. The highest elevation in the county, about 1,180 feet, is in the southern morainic area. The lowest elevation, about 720 feet, is in an area in the northwest corner where the Minnesota River leaves the county.

Le Sueur County has immature surface drainage networks which are typical of recently glaciated landscapes. Much of the farmland in the county is artificially drained by ditches that eventually empty into natural creeks. The Minnesota River drains about three-fourths of the county. Its principal tributaries are Cherry, Forest Prairie, Le Sueur, Sand and Shanaska Creeks. The remainder of the county, the southeastern part, drains through the Big and Little Cannon Rivers through Tetonka and Sakatah Lakes and empties into the Mississippi River. (Le Sueur County Soil Survey, 1989.)

The Middle Minnesota watershed consists mostly of rolling hills interspersed with swales, bogs, and lakes. The western most portion is dominated by floodplain, sand, and bedrock cored terraces. The Lower Minnesota Watershed is predominately nearly level to rolling ground moraine with flood plain and sand terraces on the west side of the county. Topography in the Cannon River Watershed is generally rolling to steep hills with many areas of peat, sloughs, and lakes interspersed between the hills and the ridges.

Land Use (#12) (See Map 8)

The majority of the county is cultivated for agricultural uses. See Table 2 for a breakdown of land uses in Le Sueur County.

Table 2. Land Use Le Sueur County, 1989.

| Land Use Category | Area (acres) | % Area |
|---|---|---|
| Urban and Industrial | 3085.09 | 1.07% |
| Farmstead and Other Rural Development | 7180.04 | 2.48% |
| Cultivated Land | 202127.21 | 69.78% |
| Transitional or Idle Cultivated Land and Grassland | 32387.10 | 11.18% |
| Deciduous Forest | 23983.82 | 8.28% |
| Gravel, Exposed Soil and Open Mines | 909.12 | 0.31% |
| Wetlands | 5705.44 | 1.97% |
| Water | 14265.48 | 4.93% |
| | 289643.30 | 100.00% |

Public Utilities (#13) and (#14) (See Map 9)

Nine Le Sueur County communities provide a public water system and municipal storm sewers. Eight of these communities provide a sanitary sewer system.

Table 3. Municipal Water Systems

| Municipality | # OF WATER SUPPLY WELLS | GALLONS OF WASTEWATER TREATED - 1994 | RECEIVING WATER - SANITARY | RECEIVING WATER - STORM | MAJOR WATER-SHED |
|---|---|---|---|---|---|
| Cleveland | 2 | 22.0 million | Cherry Creek | Cherry Creek | Mid Minn |
| Elysian | 2 | 17.6 million | Land Irrigation | Lake Elysian | Le Sueur |
| Heidelberg | | no system | NA | E. Brigman. Raven Creek | Low Minn |
| Kasota | 1 | 15.8 million | Minnesota River | Shanaska Creek | Mid Minn |
| Kilkenny | | no system | NA | Little Cannon River | Cannon |
| Le Center | 2 | 89.4 million | County Ditch #51 | JD#23; CD#51,26 | Low Minn |
| Le Sueur | 5 | 265.8 million | Minnesota River | Minnesota River* | Low Minn |
| Montgomery | 4 | 172.0 million | County Ditch #22 | marsh into Cannon River | Cannon |
| New Prague | 4 | 226.0 million | Unnamed creek | Unnamed creek | |
| | | | to Raven Creek | to Raven Creek | Low Minn |
| Waterville | 2 | 119.6 million | Lake Sakatah, | Lake Sakatah | |
| | | | Lake Tetonka, | | |
| | | | Whitewater Creek | | Cannon |

The City of Cleveland recognizes the need to replace a present well and to replace the present water storage system. In addition, they have an on-going project of requesting residents with septic systems to up-grade and connect to the City sanitary sewer system. For the City of Le Center, a site has been acquired for a new well and they also need to replace their present water storage system as it has been in use since 1933.

Land Ownership (#15) See Map 10.)

Le Sueur County has a total of 302,388.18 acres of which 17,891.77 acres are covered by water. The majority of land area in Le Sueur County, 97%, is publicly owned. The remaining land is split into small parcels of primarily state ownership. There are no Indian trust lands in Le Sueur County.

Water Resource Leases and Easements (#16)

Easements with a county assure that a tract of land will remain in a particular land use for a contracted period of time. All counties have permanent easements related to roadbeds and drainage ditch systems. There are other easements affecting water resources that have contract lengths varying from 10 years to perpetuity. For the most part, these easements are set-aside programs administered through conservation agencies. These programs include the Reinvest in Minnesota (RIM) Program, the Conservation Reserve Program (CRP),the assorted programs of the U.S. Fish and Wildlife Service and the Permanent Wetland Preserve program. The total acreage of easement land in Le Sueur County in 1995 was:

| | |
|---|---|
| RIM 10 year easement | 217.2 acres |
| RIM 20 year easement | 81.2 acres |
| RIM perpetual easement | 488.2 acres |
| Permanent Wetland Preserve perpetual easement | 91.3 acres |

The CRP program had approximately 23,441 acres as of February 13, 1997. Considerable energy will continue to be focused on alternative means of treating high priority areas.

## Expected Changes to Physical Environment, Land Use and Development

According to the 1990 Census, the population of Le Sueur County was 23,239; projections for the year 2000 indicate population growth approaching 23,420. The major growth areas in the preceding decade were in the northeast corner of the county in and around the cities of New Prague and Montgomery, in the northwest corner of the county in and around the city of Le Sueur, and in the lakes region through the southern third of the county. These trends are expected to continue. Population growth in Le Sueur County has been a result of growth in the non-farm sector. At the same time, the livestock production portion of the agricultural community has undergone a definite shift towards larger, and in some instances networked, facilities.

A revised Le Sueur County Comprehensive Land Use Plan and the associated Zoning Ordinance and Septic Ordinance and a new Feedlot and Manure Management Ordinance were adopted in June 1996. The goal supported by this land use plan and the associated ordinances include:

1. Preserve prime agricultural land as a resource for long-term agricultural use while protecting agricultural activities from competing land uses;
2. Continue to allow rural housing for farmers and non-farmers in the agricultural land while encouraging in-filling within municipalities and discouraging small pockets of residential use within agricultural uses;
3. Preserve and protect environmentally fragile regions; and
4. Preserve and protect surface and groundwater resources.

The Le Sueur County Zoning Map is included as Map 11.

During the next five years the majority of land use by area in Le Sueur County is expected to remain agricultural. Non-farm residential use expansion is expected to continue. In this same time period, the rural areas of the county will likely see an increase in the amount of cultivated land due to federal farm legislation, CRP acre reduction and possible crop price increases. These trends have important implications for water resources and wildlife habitat especially in areas along surface water features.

# Water Quantity

## Surface Water Quantity

Le Sueur County contains approximately 18,000 acres of surface water. This significant feature, 6 percent of the total land area, is comprised of 75 named lakes, 46 unnamed bodies of water, an extensive artificial drainage system of ditches and tiles and many wetlands. One major river delineates the county's western border while another major river and tributary streams for both rivers are contained within the county's area.

There are no established low, high or mean flows of streams within Le Sueur County. (#17)

Le Sueur County has twenty lakes which have established Ordinary High Water Level (OHWL) determinations.

Table 4. Lake OHWL By Watershed

| Lake Name | ID Number | Major Watershed | OHWL |
|---|---|---|---|
| Bossuot | 40-073 | Cannon | 1018.8 ft |
| Emily | 40-124 | Middle Minnesota | 972.6 ft |
| Fish | 40-051 | Cannon | 1017.5 ft |
| Francis | 40-057 | Cannon | 1023.5 ft |
| German | 40-063 | Cannon | 1018.5 ft |
| Goose | 40-008 | Cannon | 1034.3 ft |
| Goose | 40-072 | Middle Minnesota | 1022.3 ft |
| Gorman | 40-032 | Cannon | 1026.7 ft |
| Mary | 40-078 | Lower Minnesota | 1001.1 ft |
| Pepin | 40-028 | Lower Minnesota | 1025.5 ft |
| Rays | 40-056 | Cannon | 1024.1 ft |
| Rice | 40-114 | Lower Minnesota | 146.8 A.D. |
| Sabre | 40-014 | Cannon | 1014.1 ft |
| Scotch | 40-109 | Middle Minnesota | 1011.8 |
| Sleepy Eye | 40-068 | Middle Minnesota | 144.1 A.D. |
| Spring | 40-123 | Middle Minnesota | 741.5 ft |
| Sunfish | 40-009 | Cannon | 1040.1 ft |
| Tetonka | 40-031 | Cannon | 999.3 ft |
| Tustin | 40-061 | Cannon | 1023.4 ft |
| Upper Sakatah | 40-002 | Cannon | 999.2 ft |
| Unnamed | 40-099 | Middle Minnesota | 1025.8 ft |
| Unnamed | 40-058 | Cannon | 1063.6 ft |
| Washington | 40-117 | Middle Minnesota | 981.5 ft |

* AD = assumed depth

The OHWL is the elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape. Generally, the OHWL is the point where the natural vegetation changes from predominately aquatic to predominantly terrestrial. Any work done below the OHWL is within the beds of public waters or wetlands and therefore is subject to the permit

authority of the Department of Natural Resources. Water levels in lakes do fluctuate naturally as a result of climatic conditions. (#18)

There are currently 39 water appropriation permits in force of which 11 are surface appropriations, 28 are groundwater. Of the surface appropriations, uses include crop irrigation, quarry dewatering, mine dewatering, golf course watering, sand and gravel washing and construction (non-dewatering). Distribution by watershed indicates 2 surface appropriations in the Middle Minnesota, 0 in the Le Sueur, 6 in the Lower Minnesota and 3 in the Cannon River watersheds. (#19)

Protected flows are established on streams by the DNR when there is need due to climatic conditions and public use. None of the streams within Le Sueur County have established levels of flow. (#20)

There have been no surface water use conflicts reported to the DNR since the early 1990s. (#21)

Implications and Assessments

Much information has been gained of surface water quality in Le Sueur County since the initiation of comprehensive local water planning, however, there is still minimal data available on surface water quantity in this county. There is continued need for local agencies to work with the DNR and other sources in gathering useful information such as stream flow data.

Flooding in Le Sueur County occurs along the Minnesota River and its tributaries generally during spring break-up and can be very severe when rainfall occurs prior to frost leaving the ground. Cropland constitutes the greatest percentage of land affected by the most frequent flooding. The lakes fluctuate in response to climatic conditions. This has led to some recreational use problems for lakeshore property owners.

Le Sueur County acknowledges the existence of three watershed-based organizations which have goals and objectives addressing surface water issues: the Blue Earth River Basin Initiative, the Cannon River Watershed Partnership and the Minnesota River Basin Joint Powers Board. Le Sueur County is an active partner in all but the Blue Earth River group.

Surface water quantity, specifically the alterations in timing, intensity, frequency and duration of flood flows, has significant impact on biotic resources. It is an important issue for present and future land use in Le Sueur County.

<u>Ground Water Quantity</u>

The availability of groundwater in Le Sueur County is generally not a problem. In addition to the sand and gravel aquifers in the glacial deposits, there are three major bedrock aquifer systems underlying Le Sueur County which readily supply water. They are the St. Peter - Prairie du Chein aquifer system, the Franconia - Ironton - Galesville aquifer system and the Mt. Simon - Hinckley aquifer system.

There are currently 39 water appropriation permits in force of which 28 are groundwater. Of the groundwater appropriations, uses include municipal water supply, sand and gravel washing, golf course, a fish hatchery, food processing and crop irrigation. Distribution by watershed indicates 4 groundwater appropriations in the Middle Minnesota, 1 in the Le Sueur, 23 in the Lower Minnesota and 0 in the Cannon River watersheds. (#22)

Le Sueur County maintains a close working relationship with those companies involved in natural resource extraction and processing. One such company, UNIMIN, Inc., is currently going through the EAW proceedings as it prepares for opening additional mining acreage. Although occasional complaints are received, no groundwater use water conflicts have been reported since 1981. (#23)

The DNR and U.S. Geological Survey (USGS) have an established observation well network (OBWELL) throughout the state. The goal of this network is to collect sufficient baseline data on groundwater level fluctuations to establish trends. With this data the State can assess the impacts of groundwater use on both the quality and quantity of groundwater. (#24)

There are three observation wells in Le Sueur County which have been monitored monthly by the Le Sueur County SWCD since the summer of 1995:

| Observation Well Location | | Depth | Aquifer |
|---|---|---|---|
| #40005 | T112N, R23W, Section 6, DDD | 153' - 154' | glacial drift |
| #40006 | T111N, R26W, Section 14, ADA | 73' - 74' | glacial drift |
| #40007 | T112N, R23W, Section 2, BAB | 96' - 97 | glacial drift |

All three ob wells are located within the Lower Minnesota Watershed.

Implications and Assessments

Although there is minimal information about groundwater quantity in Le Sueur County , there appears to be a plentiful supply.

Water wells in the county range in depth from shallow, 15 feet in Kasota Township for some rural wells, to over 700 feet deep (Mt. Simon aquifer) for the newest municipal well for the City of Le Sueur. The shallow glacial deposit wells are generally more susceptible to groundwater quality (contamination) and quantity problems.

Le Sueur County residents are dependent on groundwater for residential, commercial, industrial and agricultural uses. Because groundwater is such a precious resource about which we know so little, there is a need to obtain more useful information about groundwater quantities.

Three observation wells have been monitored monthly since early 1995 by the Le Sueur County SWCD staff. This monitoring can provide critical data on how groundwater levels respond to various climatic conditions and land use activities. The

observation well network should be expanded to include more wells of different depths and locations.

The groundwater supplies that are contained in the bedrock aquifers underlying Le Sueur County  appear to be adequate for present and foreseeable needs.  Even though groundwater quantity has not been a limiting factor for present water and land uses in Le Sueur County , there is still a need for individual residents and industry to practice water conservation measures to ensure an adequate supply for future use.

# Water Quality

Surface Water Quality

The MPCA has established use classifications and standards for the protection of the quality and purity of surface waters of the state. Minnesota Rules Chapter 7050 contain narrative and numerical water quality for all waters of the state. The classifications listed below are given to surface waters in accordance with the need for water quality management and considerations of the best use in the interest of the public. (#25)

Water Quality Classifications
1 = domestic consumption
2 = aquatic life and recreation
3 = industrial consumption
4 = agriculture and wildlife
5 = aesthetic enjoyment and navigation
6 = other uses
7 = limited resource value

A letter following the number of each classification indicates the limit or range allowable for various substances and characteristics (i.e., dissolved oxygen, pH, turbidity etc.) with "A" having the most stringent standards and "D" the least stringent.

All wetlands in the state are classified as Class 2D, 3D, 4C, 5 and 6 waters. All surface waters that are not specifically listed in Chapter 7050 and are not wetlands, which includes most lakes in Minnesota, are classified as Class 2B, 3B, 4A, 4B, 5 and 6 waters.

The seven surface waters classified other than 2B (under Minnesota Chapter 115) in Le Sueur County are listed below with their classification.

Table 5. Le Sueur County Chapter 7050 Classified Water Features, 1986

| Major Watershed | Name | Segment | Classification |
|---|---|---|---|
| Middle Minnesota | Cherry Creek | Cleveland | 7 |
| Lower Minnesota | CD #22 | Montgomery/Green Giant | 7 |
| Lower Minnesota | CD#51 | Le Center | 7 |
| Lower Minnesota | CD#54 | Montgomery | 7 |
| Lower Minnesota | Unnamed Ditch | Montgomery | 7 |
| Middle Minnesota | Unnamed Stream | Mankato/Midwest Electric | 7 |
| Cannon | CD #15 | Kilkenny | 7 |
| Cannon | Unnamed Marsh | Kilkenny | 7 |

There are two designated trout streams in Le Sueur County. They are:

| | | |
|---|---|---|
| Paul's Creek | T110N, R26W | Sections 14,15 |
| Unnamed Creek | T110N, R 26W | Sections 10, 11 |

There are a total of 128 lakes recognized in Bulletin 25 ranging in size from 10 to 2,290 acres.

The MPCA produces a biennial report called the 305(b) Report that provides a summary of Minnesota's progress in meeting the goals of the Clean Water Act. The goals of the Clean Water Act are "fish-able and swim-able waters". This report contains assessments of the water quality of lakes and streams in Le Sueur County . The MPCA also maintains an ambient surface water monitoring program as a part of the national database STORET. STORET is the EPA's national computerized system developed for the storage and retrieval of water quality and water related information. (#26) The following stream reaches and lakes have had surface water samples taken and analyzed at some time(s) over the past 40 years as part of MPCA's monitoring program. The primary purpose of this monitoring program is to check for violations of standards.

Table 6. STORET Sites and Most Recent Sampling Date

| Major Watershed | ID | Name |
|---|---|---|
| Middle Minnesota | 40-0104 | Lake Henry |
| Middle Minnesota | 40-0108 | South Goldsmith Lake |
| Middle Minnesota | 40-0109 | Scotch Lake |
| Middle Minnesota | 40-0118 | Lake Emily |
| Middle Minnesota | 40-0120 | North Goldsmith Lake |
| Middle Minnesota | 40-0124 | Emily Lake |
| Middle Minnesota | 27 | Reach of Shanaska Creek |
| Middle Minnesota | 28 | Reach of Shanaska Creek |
| Middle Minnesota | 40-0117 | Lake Washington |
| Lower Minnesota | 40-0016 | Rice Lake |
| Lower Minnesota | 40-0027 | Sanborn Lake |
| Lower Minnesota | 40-0027 | Lake Pepin |
| Lower Minnesota | x19 | Reach of Le Sueur Creek |
| Lower Minnesota | 40-0079 | Clear Lake |
| Lower Minnesota | 25 | Reach of Sand Creek |
| Lower Minnesota | 40-0020 | Greenleaf Lake |
| Cannon | 40-0001 | Horseshoe Lake |
| Cannon | 40-0009 | Sunfish Lake |
| Cannon | 40-0010 | Lake Dora |
| Cannon | 40-0013 | Diamond Lake |
| Cannon | 40-0033 | Lake Volney |
| Cannon | 40-0039 | Roehildts Lake |
| Cannon | 40-0044 | Steele Lake |
| Cannon | 40-0051 | Fish Lake |
| Cannon | 40-0056 | Rays Lake |
| Cannon | 40-0057 | Lake Frances |
| Cannon | 40-0059 | Round Lake |
| Cannon | 40-0061 | Lake Tustin |
| Cannon | 40-0063 | German Lake |
| Cannon | 40-0092-01 | Lake Jefferson |
| Cannon | 40-0092-02 | Lake Jefferson |
| Cannon | 40-0092-03 | Lake Jefferson |
| Cannon | 40-0092-04 | Lake Jefferson |
| Cannon | 40-0002 | Upper Sakatah Lake |
| Cannon | 40-0014 | Sabre Lake |
| Cannon | 40-0031 | Lake Tetonka |
| Cannon | 40-0032 | Gorman Lake |

The MPCA requires all municipal and industrial wastewater generators which discharge to surface waters to obtain a National Pollution Discharge Elimination System Permit (NPDES). Monitoring of compliance of the permit is determined through monthly reports and a yearly inspection. The EPA's STORET data gives statistical testing results from 38 monitored discharge stations in Le Sueur County which have NPDES permits. (#36)

In addition to this monitoring, Le Sueur County has been involved in the Minnesota Pollution Control Agency's Clean Water Partnership Program. This program is divided into two types of projects. The first level, the Diagnostic phase, involves intensive water quality monitoring of a watershed coupled with land use analysis and surveys of

watershed details such as septic systems and fish populations. The focus of such a project is to identify sources of pollutants impacting the water of concern. The second level, Implementation, involves initiating changes within the watershed to correct the issues identified in the first phase. Le Sueur County has conducted three Phase I Clean Water Partnership projects, is currently involved in two Phase II Clean Water Partnership projects and is preparing for the third project to enter the Phase II stage. The county is assisting in a fourth Phase I project and supports a fifth.

Jefferson-German Clean Water Partnership (Cannon River Watershed)
The Jefferson-German project conducted an intensive monitoring and assessment program of the lake complex and associated watershed in 1993 and 1994 through the Minnesota Pollution Control Agency Clean Water Partnership Grant Program. Specific objectives of the monitoring and assessment were:

1. To quantify runoff and nutrient loading from the watershed;
2. To provide water and mass balance for the lake;
3. To assess cause-effect relationships relating watershed land use practices and stream runoff characteristics; and
4. To determine methods to improve water quality of the lake.

The monitoring network covered thirteen subwatersheds representing more than 90 percent of the water flows and more than 69 percent of the total phosphorus loading.

The study defined that the majority of lake phosphorus loading came from three subwatersheds whose flows were found to have concentrations of ammonia nitrogen and soluble phosphorus indicative of “fresh” pollution. Two of the three priority subwatersheds emptied into the Middle Jefferson basin. One of these subwatersheds accounted for 66.5 percent of the loading to Middle Jefferson. Feedlot activity in close proximity to the monitored channel was prioritized for implementation actions. The water quality of the Middle Jefferson basin was identified as the worst in the ecoregion with an average summer total phosphorus in-lake value of 156.7µg/l. Flow monitoring in 1993 and 1994 confirmed that the lake system experiences flow reversals. The impact of Middle Jefferson on the adjoining basins as determined by the direction of flow is probably very significant.

Phase II implementation actions began in 1995 by addressing the three identified subwatersheds. As those sites are being mitigated, implementation actions are focusing more on non-point issues of agricultural best management practices, septic system upgrade, wetland restorations and general land stewardship issues.

Lake Washington Clean Water Partnership Project (Middle Minnesota Watershed)
The Lake Washington project completed the monitoring and assessment program of the lake and its watershed in 1994 and 1995 through the Minnesota Pollution Control Agency Clean Water Partnership Grant Program. The objectives of this project were the same as with the Jefferson-German project. The intensive inflow monitoring effort conducted in twelve subwatersheds represents approximately 95 percent of the contributing watershed and accounted for greater than 90 percent of the phosphorus loading.

The concentration and mass loading data acquired during the 1994 monitoring season

strongly indicates that subwatersheds 4, 5, 9, 10 and 14 dominate the total input of water and nutrients to Lake Washington. Extensive modeling of the Lake Washington watershed indicates a classic illustration of non-point source pollution.

The Phase II project began in 1996 with establishment of a Minnesota River Educational Initiative Demonstration Farm Site and a University of Minnesota On-Site Sewage Treatment Research Site. Wetland restoration, identified as a high priority in the diagnostic study, continues to be a major focus. An aquatic plant management plan is also under development. The remainder of implementation actions are focusing more on non-point issues of agricultural best management practices, septic system upgrade and general land stewardship issues.

Lake Volney Clean Water Partnership (Cannon River Watershed)
Lake Volney has been the subject of several past studies 1) a 1987 Lake Assessment Program; 2) a 1991 AGNPS assessment ; and 3) a 1992 water quality study conducted by MPCA. The results of these studies indicated that the lake was extremely nutrient enriched as a result of annual watershed and sediment loadings. An intensive monitoring and assessment program of the lake and its watershed was conducted in 1995 and 1996 through the Minnesota Pollution Control Agency Clean Water Partnership Grant Program in an attempt to understand the cause-effect relationship between land use and lake water quality by determining watershed nutrient mass loading and the downstream lake response.

A low percentage error in the lake water balance indicated that the majority of the water and mass loadings were accounted for by the sampling effort. The large wetland in subwatershed three dominated the 1995 watershed loading into the lake. The mass loading documentation showed that 76 percent of the phosphorus load was retained within the lake basin. As thermal stratification developed, the lake displayed hypolimnetic oxygen depletion. Proposed implementation actions currently under development will address the wetland in subwatershed three and the in-lake conditions as well as continuing the effort of the other two Clean Water Partnership projects of encouraging the adoption of agricultural best management practices and septic system upgrade.

Middle-Lower Minnesota Basin Study (Middle Minnesota Watershed)
The outflow from Lake Washington, Shanaska Creek is one of the Minnesota River tributaries being monitored as part of the Middle-Lower Minnesota Basin Study (MLMBS). Data from the Lake Washington Clean Water Partnership will supplement the MLMBS by bringing in recreational and large lake components including the impacts of ongoing implementation projects in the watershed. In addition, monitoring at this site will provide comparison to the data collected at the Lake Titlow outflow and with the Swan Lake Outlet Creek. Both of these sites are in Nicollet County. This second project collected data during the 1996 water season.

Le Sueur River Implementation Framework Clean Water Partnership Project
(Middle Minnesota Watershed)
Although not an active participant, Le Sueur County supports the activities of this project.

Implications and Assessments

From the surface water monitoring information available, it is apparent that most of the surface waters in Le Sueur County have been impacted to some degree by land use activities. Causes of surface water degradation include nonpoint sources such as feedlots, soil erosion, fertilizer and pesticides, urban runoff and atmospheric deposition and point sources such as large feedlots and industrial discharges.

An exception to this evaluation is Fish Lake which is located in southeastern Le Sueur County, Cannon River Watershed. This lake has exceptional water quality values and has been found to be the home of endangered species. It is the goal of the county to protect this lake and its watershed.

The existing programs for surface water monitoring and information cataloging should be evaluated so that useful information can be developed to indicate water quality trends in Le Sueur County. Management objectives, i.e., fishable and swimable, etc., for streams or stream reaches should be considered so that there is an overall goal for water quality protection and enhancement efforts. Monitoring and assessment work should be done on a watershed basis to identify trends, problems and opportunities that are specific to a watershed area rather than assuming that the issue or problem is county-wide. By using the watershed approach, the county will be better positioned for future funding, state technical assistance and joint efforts between counties and watershed organizations.

Le Sueur County acknowledges the existence of four watershed-based organizations that have and are continuing to develop goals and objectives addressing surface water quality issues: the Blue Earth River Basin Initiative, the Cannon River Watershed Partnership, the Minnesota River Basin Joint Powers Board and the Sand Creek Watershed Management Organization. In addition, the DNR Blue Earth River Team (BERT) has assisted with BERBI projects.

Ground Water Quality

Since ground water is the primary source of drinking water for Le Sueur County, maintaining and protecting its quality is of primary importance. Public and private well water testing data provide some information about groundwater quality.

The Le Sueur County Environmental Services Department provides a voluntary well water testing program for rural residents with private wells. The Le Sueur County Community Health department analyzes an average of 250 water samples from private water supply wells annually. These samples represent day-care licensees, property transfers and personal use. This department is responsible for sampling 40 non-community water supply wells in 31 licensed establishments. These samples are analyzed by the Minnesota Department of Health.

The data collected through water sample analyses over the period of first generation water plan administration have identified an increasing number of samples having both nitrate/nitrite values of 5 mg/L to 9.9 mg/L and values greater than 10 mg/L in wells located along the Minnesota River and in the sand terraces of the Minnesota River valley.

The Minnesota Department of Health (MDH) data on groundwater quality consists of records from 9 municipal systems (Cleveland, Elysian, Kasota, Kilkenny, Le Center, Le Sueur, Montgomery, New Prague and Waterville), three non-municipal community well systems (Valley Mobile Home Park, Maple Acres Apartments and Lakes and Links Homeowners Association). The routine tests done on these wells indicate levels of chemical parameters to be below Safe Drinking Water Act standards. (#28)

Implications and Assessment

The current water quality data from county and state well water monitoring programs indicates groundwater quality in Le Sueur County to be generally good based on testing for certain parameters.

The Le Sueur County well water testing program has gathered a lot of raw data about groundwater quality and private wells since the program began in 1990. From this data a trend is becoming visible of higher nitrate-nitrogen levels in the sand terrace region of western Le Sueur County. The well and water testing data is cataloged on computer. These records are being prepared for a GIS analysis of location and land use vs. water quality to enable the county staff to determine how best to address this issue.

In addition to this now identified problem area, it is generally known that wells which are shallow, improperly located and/or improperly constructed have the greatest potential for becoming contaminated.

The groundwater susceptibility report and maps for Le Sueur County were completed in 1995. This report will further aid in identifying areas of the county that are more susceptible to groundwater contamination.

In a continued effort to protect groundwater quality, the county needs to ensure the proper construction and location of new wells and to locate and seal abandoned wells.

The county well water testing program monitors only for the presence or absence of coliform bacteria and nitrate-nitrogen. Consideration should be given to offering testing of other parameters.

Human-generated sources of groundwater contamination include land disposal of wastes, spills, sewage sludge disposal, de-icing salt, animal feedlots, fertilizers and pesticides, dumps and landfills, septic systems, underground storage tank leaks, graveyards, drainage wells, water supply wells, and abandoned wells. Best management practices to control or minimize the effects of these sources on groundwater quality must also be implemented.

Wellhead protection is a means of protecting water supply wells from possible contamination due to these human-generated sources. The Minnesota Department of Health has developed a list prioritizing wells into three tiers. First tier means first priority and so forth. Three well sites in Le Sueur County are listed as first tier for wellhead protection plan development. These wells are for the municipalities of Kasota, Kilkenny and the Valley Mobile Home Park. In addition to these three sites, two sites are tier two, one site is tier 3, seven sites are tier five and two sites are tier six. No Wellhead Protection Plans for existing wells are required to be developed within the time period covered by this water plan revision. (Wellhead Protection Phasing List, MDH, 02/02/96.)

## Special Land Uses and Conditions (Pollution)

Eroding Lands

Erosion by water is a problem occurring throughout the county. Four of the eight soil associations in the county are described as having soils with high erosion potential. Three of these are intensively cropped and all four have moderate to very steep slopes. It should be noted that the highest erosion potential areas are adjacent to or surrounding the county's major recreational lakes.

A major problem is the potential of gully erosion and stream bank sloughing along the creeks cutting through the Minnesota River terraces. The Shanaska and Cherry Creeks (Middle Minnesota River Watershed), Forest Prairie and Le Sueur Creeks (Lower Minnesota River Watershed) all make this transition from upland to river. Another area of concern is the southern morainic region of the county (Cannon and Middle Minnesota River Watersheds) where the combination of steep slopes and highly erodible soils lead to high erosion rates. (#29)

Implications and Assessment

Sedimentation caused by soil erosion can result in many thousands of dollars of repairs and cleanups for projects such as dredging rivers and ditches.

Soil erosion and sedimentation are the greatest nonpoint and surface water pollution problems in the county that affect both water quality and quantity. Erosion control practices need to be implemented throughout the county in both rural and urban areas where much of the original cover and vegetation has been replaced with cropland, roads, buildings and other development.

Cropland areas constitute 69.78% of the land use by area in Le Sueur County. This use has replaced much of the hardwood forest, prairie, wet prairie and brush-land which existed prior to extensive settlement. Soil conservation practices must be implemented in row crop areas to prevent water and wind erosion that can have a negative impact on surface water quality. (#30)

A transect survey conducted in 1995 inventoried adoption of increased crop residue management. Results of the survey show 45% of the corn and 77% of the soybeans were planted into > 15% residue with 50% of all cropland meeting residue targets. Another transect survey is scheduled to be conducted in spring 1998.

There are approximately 250 miles of open drainage ditches in the county where ditch bank erosion and sedimentation can lead to increased ditch maintenance costs.

The following practices can be implemented to control water, wind and ditch-bank/ stream-bank erosion:

1) Water erosion control measures:
    a. Conservation practices such as grassed waterways, terraces, conservation tillage, erosion control structures, contour farming, crop rotation and sediment control basins.

b. Conservation Reserve and RIM programs which require permanent cover consisting of grass and trees.
c. Vegetative and structural controls and management measures at construction sites.
d. Wetland restoration.

2. Wind erosion control measures:
   a. Field windbreaks, farmstead windbreaks and conservation tillage.
   b. Conservation Reserve and RIM programs which require permanent cover consisting of grass and trees.
   c. Wetland restoration.

3. Ditch-bank / stream-bank erosion control measures:
   a. Berm seeding, filter strips and erosion control measures.
   b. Bank seeding, erosion control structures, riprapping and control of livestock grazing.

Although roads and urban and industrial development account for only about 3.55% of the total land use by area in Le Sueur County, these areas are predominantly impervious surfaces (i.e., buildings, concrete, bituminous, etc.) and have a major impact on water quality by allowing stormwater runoff to travel quickly and “unfiltered” to surface water bodies.

Development projects which create impervious surfaces should develop plans to maintain post-development stormwater runoff at pre-development rates during the design stage of the development and implement erosion and sediment control practices during construction.

Irrigation

There have been water appropriation permits issued to allow groundwater or surface water to be used for irrigation of crops and golf courses in Le Sueur County. The estimated total acreage for crop irrigation in the county is 2,580 acres; the estimated total acreage for golf course irrigation is 38 acres. (#31)

Ottawa Township in Le Sueur County has 1,381 acres of irrigated land. No water use conflicts were reported during the effective period of the first generation water plan. However, the more rapid infiltration rates of the river terraces' sandy soils make this area vulnerable to groundwater contamination. (#32) (Water Appropriation Permit Index, MN-DNR Hydrology, 1996.)

Drainage

There are approximately 250 miles of open drainage ditches in Le Sueur County. Judicial Ditches account for about 16 of these miles. The length of public tile and other covered drainage systems has not been quantified.

Drainage in Le Sueur County is extensive and very important to the agricultural community. Poorly-drained soils which have a high water table are a problem for crop production. There are approximately 202,127 acres of cropland or about 70 percent of

the land use of the county. Approximately 41 percent of the cropland acres in the county are considered to be wet soils. According to the NRCS office, about 60 - 70 percent of the total cropland in Le Sueur County is tiled.

Middle Minnesota and Le Sueur River Watersheds

The area east of the Minnesota River bluff is extensively drained with agricultural subsurface tiling to facilitate the movement of water ponded on the cropped fields. The three naturally occurring creeks, Cherry, Dog and Shanaska, have been extended by ditching headward. The area west of the Minnesota River bluff does not require tiling for the most part due to sandier soils. Drainage ditches affecting the Middle Minnesota directly and through the Le Sueur River drainage include one judicial ditch (#1), one joint county ditch (#2) and eight county ditches (#4, #37, #47, #58, #61, #64, #65 and #67).

Lower Minnesota Watershed

With the exception of the sand terrace area along the Minnesota River and the bluff region, this region also has an extensive artificial drainage system. The three naturally occurring creeks, Forrest Prairie, Le Sueur and Sand, have been extended by ditching headward. Drainage ditches affecting the Lower Minnesota include one judicial ditch (#4), one joint county ditch (#1) and thirty-two county ditches (#2, #6, #16, #18, #19, #21-23, #26, #28, #29, #31, #34, #35, #41-45, #48-54, #56, #60, #62, #64, #69, #70).

Cannon River Watershed

Two naturally occurring streams, the Cannon River and Little Cannon River drain the southeast third of Le Sueur County. This drainage is supplemented by an drainage ditch network comprised of two judicial ditches (#5, #15) and ten county ditches (#9, #15, #36, #38, #40, #46, #57, #59, #63, #68).
(Surface Water Hydrology Atlas, Le Sueur County, Water Resources Center, Mankato State University, 1993.)

Maintenance for ditches and culverts averaged $115,000 annually for the entire county over the period from 1994 to 1996. (Le Sueur County Auditor's office.) (#33)

Implications and Assessments

The extensive artificial drainage in Le Sueur County alone and as a portion of the drainage occurring in the entire south-central region of the state has a direct effect on water quality and quantity of the receiving lakes and streams. (#34)

Ditching and the associated drainage have added to the large fluctuations in surface water flows, more frequent flooding, stream-bank erosion, sedimentation, reduction in fish and other aquatic species populations and faster pollutant transport into waterways. These have contributed to the loss of recreational and economic opportunities and other benefits derived from fish and wildlife.

Most information available on water quality of drainage ditches in south-central Minnesota is a result of research conducted by Mankato State University on ditches in Blue Earth, Brown, Le Sueur and Nicollet counties. This research concluded that ditches cannot be easily classified into discrete groups because of the variability in characteristics such as length, area drained, population density, present vegetation,

farming practices, precipitation and private drainage. Additional study is needed to identify potential correlations between ditch characteristics and water quality.

Focus of water quality and quantity discussions regarding the function of the ditch system are currently revolving around two topics. One topic is the establishment and maintenance of vegetative filter strips along the sides of the ditch. Minnesota Statutes, Chapter 103E.021, states that for . . . "any work affecting a public drainage system . . . the authority shall order that permanent grass . . . be planted on the banks and a strip 16½ feet in width or to the crown of the leveled spoil bank . . . on each side of the top of the top edge of the channel of the ditch". If this statute were enforced, for every mile of new public drainage ditch or for improvements and repairs that include a redetermination of benefits, four acres would be planted to grass buffer strip. Current research is documenting the reduction in erosion and soil loss and associated water quality benefits through the use of riparian buffer strips. This leads to a reduction in the costs of ditch maintenance.

The second topic regards ditch law and the effects of altering perceptions of water use (to drain or not to drain) vs. the time-honored practice of assessing ditch improvements to all property drained by the ditch. The current drainage network system is approaching one-hundred and fifty years in age.

Pollutant Sources

1) Landfills and Dumps (#35)

The county continues to work with the Tri-County Solid Waste office and has recently hired staff who will facilitate the county's identifying and addressing solid and hazardous waste sites. Le Sueur County, along with Nicollet and Sibley Counties, developed a new five year solid waste plan as required by Minnesota Statutes and Rules. This plan was adopted in January 1995. As a part of this plan, all three counties encourage an integrated solid waste management approach that includes not only recycling, but composting of solid waste and the production of refuse derived fuel (RDF) to produce electricity and minimize the dependence on landfill use. Many cities within Le Sueur County have committed to fifteen year contracts with Minnesota Waste Processing Company of Mankato to manage their residential solid waste in this manner. Solid waste haulers collect the waste in participating cities and deliver it to the Minnesota Waste Processing Company transfer station in Mankato. From there, waste is delivered to the Prairieland Municipal Compost facility in Truman which is operated by Martin and Faribault Counties. Waste is mechanically processed with any glass and metals pulled off for recycling, the compostable fraction kept for composting and the burnable fraction delivered back to the Wilmarth NSP Power Plant in Mankato to generate electricity. The remaining fraction, normally under 5%, is landfilled in its own segregated, lined cell at the Ponderosa Landfill south of Mankato.

Three sanitary landfill sites are listed by the State's Solid Waste Information System (SWIS) in Le Sueur County. All three sites are no longer active.

Minnesota Sanitation sanitary landfill in Kasota Township operated from December 1972 until September 1979. It has qualified under the Landfill Cleanup Program but no binding agreement has been consummated. The State of Minnesota is currently doing

testing quarterly on the monitoring wells and took over full responsibility for this site in 1996. Once an agreement has been reached between MPCA and Le Sueur County further cover work will be accomplished to bring the site up to current closure standards under Minnesota solid waste rules.

The Tellijohn Landfill in Ottawa Township operated from March 1968 to September 30, 1993. It has qualified under the Landfill Cleanup Program but no binding agreement has been consummated. Tellijohn Services continues to test the monitoring wells quarterly. Once a binding agreement has been reached, the Minnesota Pollution Control Agency will take over responsibility for monitoring wells. The State of Minnesota is not proposing any additional closure work at this time.

The Sun Prairie Landfill in Lexington Township operated from September 1972 to late 1991. It has also qualified under the Landfill Cleanup Program but no binding agreement has been consummated. Waste Management of Minnesota continues to test monitoring wells quarterly. Once a binding agreement has been reached, the State will assume monitoring of wells. No additional closure work is proposed or anticipated at this time.

The Old Elysian City dump site was added to the State of Minnesota's Permanent List of Priorities in December of 1990. Le Sueur County has been asked by the MPCA to aid the state in taking remedial action to close the Elysian Dump site. The MPCA and Le Sueur County have negotiated an agreement to permanently close this site. A Response Action Plan (RAP) will be developed and will be implemented. The RAP will contain an engineering plan to cover the site, control erosion during and after placement of fill, revegetate, install monitoring wells for post closure monitoring and restrict future usage of the property. Upon completion of post closure monitoring the MPCA will then de-list this site from the Permanent List Of Priorities. Cooperation between the City of Elysian, Le Sueur County, the MPCA and the DNR in properly closing this site is expediting the cleanup of a state Superfund site. The project is both straightforward and cost effective resulting in greater long term environmental protection to adjacent water bodies.

Very little information exists on the occurrence of private dumps both active and abandoned. Le Sueur County has an active recycling program county-wide to reduce further dependence on landfill use and other solid waste disposal facilities. Every community in the county has either curbside recycling for residents or a weekly drop site is available. The Tri-County Solid Waste Office (Le Sueur, Nicollet and Sibley counties) has a contract with Waste Management - Le Sueur - St. Peter to provide recycling services at no cost to any resident, business, community, township or hauler in the three counties. This contract assures that any recyclables collected will be processed and marketed.

Recyclables accepted under the contract include newsprint, all three colors of glass, food and beverage containers, steel/tin food and beverage containers, aluminum cans, PETE (#1) and HDPE (#2) plastic pourable containers, textiles and corrugated cardboard. Other items accepted for a small fee are automotive batteries, tires and appliances.

Le Sueur County is currently participating in an eight-county regional household

hazardous waste program. The hub of the program is the South Central Regional Household Hazardous Waste Facility owned and operated by Blue Earth County and located in Mankato. From April 1 to November 15 of each year, the facility is open to Le Sueur County residents every Tuesday from noon until 6:00 pm and the second and fourth Saturdays of each month from 9:00 am to 1:00 pm. At no charge, residents can drop off items such as fluorescent light bulbs, button and rechargeable batteries, paints, garden pesticides, pool chemicals, fuels, acids, bases and other household hazardous products. In addition, the Tri-County Solid Waste Office conducts two mobile collections each year in Le Sueur County to make the program more accessible for residents. These are conducted each spring and fall and are rotated yearly from community to community. The county also is involved in a Very Small Quantity Generator Program (VSQG) to assist small businesses in managing their hazardous waste.

Although tires and major appliances are banned from Minnesota landfills, they still can be a problem due to illegal disposal. Le Sueur County promotes a tire and appliance collection yearly at the County Highway garage in Le Center to help minimize illegal disposal and promote environmental management practices. In the first three years of the program, 370 to 425 appliances were collected yearly and 50 to 70 tons of tires were collected yearly. The program has been so successful that the county intends to continue this on a yearly basis.

2) Feedlots (#36)

Agriculture related activities continue as the major land use in Le Sueur County. The livestock production component of these activities has potential surface and ground water quality implications. The SWCD assisted in an informal inventory of feedlot sites during the winter of 1993-94. Approximately 400 current or potential livestock operation sites were identified. These sites were located on topographic sheets. Le Sueur County received a $40,000 BWSR Challenge Grant in 1996 to complete the feedlot inventory and to provide education regarding the implications of the new Feedlot and Manure Management section of the Le Sueur County Zoning Ordinance.

The County Zoning office has provided permit application assistance and has coordinated technical assistance with the SWCD and NRCS. Educational assistance has been coordinated with the MES. Le Sueur County formalized a delegation agreement with MPCA for the feedlot program in 1996. A County Feedlot Officer joined the Le Sueur County Environmental Services staff in early 1997.

The MPCA requires a National Pollution Discharge Elimination System Permit (NPDES) for feedlot sites which have been identified as point source polluters. In addition, the MPCA will require NPDES permitting of all feedlots of 1000 AU or greater, existing, new and expanding feedlots between 300 and 999 animal units, and that have a man-made conveyance which has the potential to discharge to waters of the State.

3) Abandoned Wells (#36)

A series of cost-share well sealing grants were used to seal 229 wells in Le Sueur County from 1991 - 1996. The administration of these sealings was through the Le Sueur County Community Health Department and the SWCD office. Availability of future funding will have a direct impact on the continuation of this endeavor.

An inventory of abandoned wells in the county was conducted in 1992. However, it is difficult to locate wells once the building site has been cleared and such sites may have been missed in the inventory process. Location and proper closure of abandoned wells continue as a priority within Le Sueur County as such wells present a direct conduit by which surface pollutants can enter the groundwater system.

4) Underground and Aboveground Storage Tanks (#36)

Most regulated underground storage tanks (USTs) larger than 1,100 gallons used to contain petroleum products and other regulated substances are required to be registered with the MPCA. Registration with the MPCA as of March 1997 indicate 144 active storage tanks in Le Sueur County. Other figures available include: 6 inactive tanks, 9 which have been abandoned and are recorded as empty, 3 abandoned tanks which have been filled in and 59 which have been removed. Tanks which were not registered and those exempt from such registration would be missing from this total.

Aboveground storage tanks (ASTs) are regulated according to the material they are used to store. MPCA regulates petroleum and hazardous substances, the State Fire Marshal regulates flammable and combustible materials and the MDA regulates pesticides and fertilizers.

Improper releases of substances from storage tanks are most often caused by overfilling, surface spills and tank system failure. The potential health and environmental hazards of both USTs and ASTs include contamination of groundwater and surface water supplies, fire and explosions. During the period 1990-1996, 38 leak sites were reported to the MPCA. In addition, 35 sites reported or previously reported as experiencing leakage are reported as having been closed.

5) Wastewater Dischargers (#36)

The MPCA requires all municipal and industrial facilities which discharge wastewater to surface water to obtain a National Pollution Discharge Elimination System Permit (NPDES). Compliance of the permit is determined through monthly monitoring reports and annual inspections. There are currently 19 NPDES permits issued in Le Sueur County for wastewater discharge.

The EPA's STORET data gives statistical testing results from the 19 monitored NPDES discharge stations. For those stations in Le Sueur County, 11 reported sporadic numeric violations for pollutant discharge limits during the period of 1990 - 1996. The statistical summaries did not indicate any violations for the remaining NPDES permitted facilities.

6) Hazardous Waste Generators (#37)

The MPCA's Hazardous Waste Information Management System (HWIS) lists all county hazardous waste generators that have filed hazardous waste disclosure forms with the MPCA. As of March 1997, there were 132 companies identified on this list as operating in Le Sueur County. The majority of the generators, 105, are located in the Lower Minnesota watershed. Hazardous waste management methods include burning for fuel, recycling, incineration or thermal treatment, sanitary sewering after or without treatment,

land disposal and multiple treatment options. Typical hazardous wastes may include solvents, acids, bases, used oils, PCBs, laboratory chemicals and hospital wastes. A list identifying individual HW generators is available at the Le Sueur County Environmental Services office.

Due to the rural agricultural nature of Le Sueur County, farm chemicals specifically fertilizers, herbicides and pesticides are potential pollutant sources. Education regarding use of agricultural pesticides, container recycling and waste pesticide collections have been available to agricultural producers and other pesticide users in Le Sueur County.

Three hundred farmers are certified as private pesticide applicators. The certification runs for three years and allows farmers to purchase and apply pesticides classified as restricted use. Each year approximately 100 farmers attend a three hour training session to certify for the first time or to recertify. Training sessions cover personal safety, recent regulation and issues related to pesticide use, product use consistent with label and application equipment calibration. All training sessions are planned, advertised and delivered with local pesticide retailers working with the Minnesota Extension Service.

Plastic pesticide container recycling is offered to all pesticide users in Le Sueur County. Single site/single day collections began in 1992. Ongoing collections conducted by pesticide retailers began in 1994 in addition to the single day collection opportunities. In the first two years of the collection program, rejection rates exceeded 30% of all containers delivered to the collection site. Education on proper rinsing and storage procedures through newsletters, news releases and PPAT training has reduced the rejection rate to less than 5%. Currently ninety percent of all containers collected in Le Sueur County are generated through ongoing collection efforts sustained by the pesticide retailers.

Waste pesticide collections are available to Le Sueur County residents every other year. The Minnesota Department of Agriculture visits the southern half of Minnesota in odd years (1993 - 1995 - 1997). The collection and incineration costs are paid by legislative funds with statewide leadership provided by the Minnesota Department of Agriculture.

Participants in organizing container collections and waste pesticide collections in Le Sueur County have been the Minnesota Extension Service, Tri-County Solid Waste, Ag Inspector and pesticide retailers.

Implications and Assessments

Common carriers of all pollutants are stormwater runoff and soil particles both of which can become contaminated with various organic or inorganic compounds. Some of the contaminants that stormwater runoff and soil particles can carry include pesticides, fertilizers, herbicides, automotive components, animal manure, heavy metals and deposited atmospheric nutrients and pollutants. It is also important that wastewater streams be kept separate from stormwater runoff. Addition of stormwater can stretch wastewater treatment plants beyond their capacities.

Several point and non-point pollutant sources have been identified as having the potential to adversely affect surface and ground water quality. Although it is not possible

to prevent all of these pollutants from being generated or used, surface and ground water pollution can be abated and /or controlled through treatment technologies, monitoring and regulation, modification of activities, practices or operations on the land or by changing land use activities.

An inventory of old township dumps and rural clandestine dumps should be conducted to identify and remove potential contamination sources. The SCMCCWPP Groundwater Susceptibility Atlas can be used to identify sensitive areas which should be monitored and assessed for possible contaminate sources.

A comprehensive, level II, inventory of feedlots in Le Sueur County will be completed in 1997. Concurrently an educational program for feedlot operators and private sector agricultural suppliers will provide tools to better address the need for comprehensive nutrient management within a sustainable framework.

The abandoned well inventory needs to be prioritized and continually updated as well sealings occur. Financial assistance for this activity provides the greatest assurance of continued success.

There is a need for counties to receive understandable and useful information regarding monitoring data for wastewater generators so that resource impacts can be identified. Currently this information is on record with the MPCA but not distributed to counties.

Working with state agencies on permit programs for location of storage tanks and hazardous waste generators will help verify the accuracy of records and may identify problems.

Public education and information programs need to be coordinated between and among local and state agencies to inform the local residents of the potential effects that abandoned wells, dumps, feedlots, fertilizers, hazardous wastes, herbicides, pesticides, storage tanks and other pollutants can have on water resources and human health.

Special Geologic Conditions (#38)

1) Karst Areas

Le Sueur County is generally covered by thick glacial drift material and according to the MGS there is no surface expression of karst topography within the county. There is, however, potential for future problems associated with soluble bedrock conditions in areas that have carbonate (limestone) bedrock within 100 feet of the surface. Areas of such concern are found in Kasota and Ottawa Townships on terraces of the Minnesota River. The contamination of bedrock aquifers is more common in areas of fractured bedrock and thin overlying material. If sinkholes occur from the dissolving of underlying limestone, they provide a direct pathway for surface contaminants to enter groundwater. The areas of thin glacial drift overlying carbonate bedrock in these two townships should be considered sensitive to groundwater contamination.

2) Buried Valleys

Buried valleys are the remnants of river valleys carved into the bedrock surface and buried by subsequent glacial activities. There is evidence to indicate the presence of at least three buried valleys in Le Sueur County. The pattern is suggested by the contours on the bedrock topography map. (Geologic Atlas, Le Sueur County, Minnesota, Water Resources Center, Mankato State University, 1991.)

3) Sand Plains

Le Sueur County has no documented sand plain areas. However, the sand terraces along the Minnesota River have similar features as the outwash plains. The same concerns, rapid infiltration rates and impacts on groundwater quality, must be considered here. In addition, the area between Lakes Elysian and Tetonka in the Cannon River Watershed have similar characteristics to an outwash plain.

4) Bluffs

Steep bluffs are common along the Minnesota River and along some of the small creeks flowing into the Minnesota River from Le Sueur County. These valleys were cut by glacial melt-water streams which carried considerably more water than the present day streams. The resulting deep, steep-sided valleys with under-fit streams flowing in them are susceptible to bank sloughing and erosion.

5) Other Geologic Conditions

The bedrock geology map of Hydrologic Atlas 526 indicates a fault running from the NNW to SSE down the center of Le Sueur County from the Scott County border to northern Waterville Township. The Jordan Sandstone aquifer is absent to the east of the fault. In Scott County highly mineralized salty water has occurred in a few deep wells near the fault. It is thought that this is the result of upward flow of groundwater along the fracture from bedrock below the Mt. Simon aquifer. No occurrences of these conditions have been reported in Le Sueur County wells. (Communication with B.M. Phalen, MGS, as recorded in original Le Sueur County Water Plan.)

Implications and Assessments

Detailed maps and studies which identified sensitive geologic conditions have not been generally available. To address this, Le Sueur County along with the other counties of the SCMCCWPP identified this need and developed a Groundwater Susceptibility Report which was completed in 1995. This study will help the county identify areas that may be more sensitive to groundwater contamination. Since land use practices in these areas can have a direct impact on groundwater quality, there is a need to modify or eliminate some practices to protect groundwater supplies.

The Le Sueur County Comprehensive Land Use Plan and associated ordinances acknowledges the river and creek bluffs as environmentally sensitive areas. These areas have been identified as Conservancy zoning districts. Residential and agricultural development in these areas will be strictly monitored. In addition, erosion control measures such as willow-posting, revetment and riprapping should be taken to mitigate erosion on river and creek bluffs where vegetative cover is minimal.

The need for special management in the western edge of the county is identified through a trend showing in well water analysis conducted through the Le Sueur County Community Health water testing program. The data collected through water sample analyses over the period of first generation water plan administration have identified an increasing number of samples having nitrate/nitrite values of 5 mg/L to 9.9 mg/L and in value greater than 10 mg/L in wells located along the Minnesota River and in the sand terraces of the Minnesota River valley walls. Land use practices in this region need to be evaluated to identify possible mitigative measures.

In addition to this special need, shallow hand-dug and sand-point wells are known to be susceptible to contamination. Replacement of these wells and abandonment of the existing wells will provide mitigation.

# Related Land Uses

## Wetlands

The U.S. Fish and Wildlife Service established the National Wetland Inventory (NWI) project to inventory wetlands and determine trends according to standardized environmental characteristics. The NWI project located and classified wetlands using a remote sensing technique with high altitude aerial photography. With this imagery the NWI was able to map wetlands generally ranging in size between one to three acres. The NWI maps became available on 7½ minute USGS topographic map format in 1990. These maps are available to be viewed at the Le Sueur County Environmental Services office as well as the Le Sueur County Soil and Water Conservation District office. (#39)

The USDA in conjunction with the local SWCD and NRCS offices has inventoried wetlands for the purposes of administering the 1985 Food Security Act. These wetlands were located using soil information and cropping history with field verification as needed.

Le Sueur County has one basin with a control structure and associated DNR developed draw-down plan. This is the Sanborn surface water basin, DNR 40-27. (#40)

Under Section 404 of the Federal Clean Water Act, the U.S. Army Corps of Engineers (COE) authorizes permits for disposing of dredged material, side-casting for drainage projects and other filling activities for both private and public projects. In the period from January 1991 to December 1996 no individual, 6 general and 38 nation-wide COE Section 404 permits were issued in Le Sueur County. (#41)

The MPCA is involved in protecting wetlands under the provisions of the Clean Water Act 401 water quality certification process. Anyone who wishes to obtain a federal permit, be it a Coast Guard Section 10 permit, a COE 404 permit or Federal Energy Regulatory Commission permits, must first obtain a State 401 water quality certification from the MPCA. Activities which may require both a 401 and a 404 permit include: construction of boat ramps, riprap for erosion, fill in a wetland, building in a wetland, construction of dams or dikes, stream channelization and stream diversion.

In 1991, the legislature approved the Minnesota Wetland Conservation Act (WCA). The goal of this act is to promote no-net-loss of wetlands and to protect the benefits wetlands provide. The benefits cited in the law include conserving surface waters, providing recreational opportunities, reducing runoff, providing floodwater retention, reducing stream sedimentation, contributing to improved subsurface moisture, helping to moderate climatic change and enhancing the natural beauty of the landscape.

The WCA moves toward its no-net-loss goal by requiring persons proposing to drain or fill a wetland to first try to avoid disturbing the wetland; second, if disturbance is unavoidable, to minimize the impact; and finally, to replace any lost wetland functions and values (MN Statutes 103A.202). Certain wetland activities are exempt from the act allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation.

The WCA took effect through an interim program beginning in 1992 and became fully effective January 1994. The program is administered by local units of government

(LGUs) with oversite provided by BWSR and enforcement provided by DNR Conservation Officers.

Implications and Assessment

Although the functional value of wetlands in the natural environment is becoming widely know through research and educational programs, it is still a controversial topic. Individual wetland functions other than providing fish and wildlife habitat and recreational opportunities are not easily defined nor publicly understood. Wetlands are a complex natural resource that may provide additional beneficial functions dependent on their type, size and location. Some of these other functions include improving water quality by serving as nutrient and sediment traps, serving as reservoirs for holding potential flood waters and recharging water tables during dry periods.

The 1984 Anderson and Craig study indicates that 10.1 percent, or 7000 acres, of the wetlands in Le Sueur County remain when comparing presettlement with current conditions. Le Sueur County is listed in the Prairie-Pothole priority list for the Conservation Reserve Program. Of the existing wetlands, the majority are located in the southern half of the county. Some of these are of relatively high quality due to unimpacted “micro” watersheds indicated by diversity of plants. However, many have been partially impacted due to drainage or lack of drainage. In fact, water quality in some wetlands is poor due to excessive algae growth resulting from runoff from agricultural acreage.

Wetlands are protected to some extent by one of these five regulatory programs: the DNR Protected Waters Program, the COE 404 Program, the MPCA 401 Water Quality Certification Process, the Federal Farm Program and the Minnesota Wetland Conservation Act. Federal and state programs which encourage the preservation and restoration of wetlands include RIM, Wetlands Reserve Program, U. S. Fish and Wildlife programs and the Permanent Wetland Preserve Program. Wetland restoration in Le Sueur County is encouraged in marginal cropland areas (i.e., peat and organic soil areas and partially surface-drained areas with no tile). With the current wetland regulatory programs, further loss of wetland will be minimized. In addition, incentive programs to preserve or restore wetlands provide opportunities for increasing wetland areas.

The WCA requires counties to designate high priority wetland preservation areas in the water plan. Property owners in these high priority areas would be eligible for a tax exemption on existing wetlands or restoration of wetlands on their land. Since Le Sueur County has lost more than 80 percent of its presettlement wetlands and is located in a high priority region under WCA, it has been determined that the entire county should be designated as a high priority wetland preservation area. It is important that a prioritized list of wetlands be developed at the minor watershed level to guide efforts of wetland protection and restoration.

Floodplains

To protect property and structures within floodplains, federal and state governments require floodplain regulations to be adopted by counties and municipalities when areas of anticipated flooding have been identified.

Le Sueur County participates in the regular phase of the National Flood Insurance Program (NFIP) which includes the adoption of a compliant Floodplain Ordinance and the use of the FEMA floodplain maps. The floodplain maps, revised in 1996, are located at the participating governmental offices. Municipalities participating in the regular phase of the NFIP include: Cleveland, Elysian, Kasota, Le Sueur, New Prague, and Waterville. (#42)

Streams, ditches and lakes with known flooding problems are identified by a FEMA 1996 Flood Insurance Study, a 1980 Flood Insurance Rate Map and a 1980 Flood Boundary and Floodway Map. Areas of small stream flooding have generally not been mapped by either the county or state. (#43)

The following waters have been identified on FEMA maps as having a 100-year floodplain and known or potential flood risk. These waters therefore would be regulated by a local floodplain ordinance and zoning permit requirements.

Table 7. Waters of Le Sueur County with 100-Year Floodplain Designations

| Middle Minnesota & Le Sueur | Lower Minnesota | Cannon |
|---|---|---|
| Cherry Creek | Beiser Lake | Cannon River |
| Dog Creek | Borer Lake | County Ditch 9 |
| County Ditch 37 | County Ditch 2 | Diamond Lake |
| County Ditch 53 | County Ditch 30 | German Lake |
| County Ditch 58 | County Ditch 51 | Gorman Lake |
| County Ditch 64 | Dietz Lake | Horseshoe Lake |
| County Ditch 67 | Ely Lake | Lake Dora |
| Goose Lake | Eggert Lake | Lake Francis |
| Lake Henry | Forest Prairie Creek | Lake Jefferson |
| Lake Washington | Graham Lake | Mabel Lake |
| Paul's Creek | Greenleaf Lake | Little Cannon River |
| Minnesota River | Harkridge Lake | Rice Lake |
| Shanaska Creek | Lake Pepin | Sabre Lake |
| Scotch | Lake Sanborn | Sakatah Lake |
| | Le Sueur Creek | Sasse Lake |
| | Mary Lake | Sunfish Lake |
| | Mareks Lake | Tetonka Lake |
| | Minnesota River | Waterville Creek |
| | Sand Creek | |
| | School Lake | |
| | Rice Lake | |
| | Shanghai Lake | |
| | Sheas Lake | |
| | Thomas Lake | |
| | Tributary to Raven Creek | |
| | Tyler Lake | |

The 1992 National Resources Inventory conducted by the NRCS identified 14,200 acres of Le Sueur County as susceptible to annual flooding including 6,100 acres of cropland, 3,000 acres of pasture, 2,600 acres of forest land and 2,500 acres of other uses. The land use category of “other” may include areas of urban and rural development and thus poses the greatest potential for annual or disaster flood damages. Average annual flood damages are not recorded by the county or the state but flood damages are reported by disaster through state emergency services. (#44)

Implications and Assessments

There are important water resource as well as land use issues relative to floodplains. In 1996, Le Sueur County completed an update of its Comprehensive Land Use Plan and all associated ordinances including the Floodplain Ordinance. Municipalities in Le Sueur County having floodplain ordinances with date of adoption are: Kasota, November 1, 1990; Le Sueur, November 27, 1989; New Prague, February 6, 1995; and Waterville, January 8, 1992. The first municipality is in the Middle Minnesota Watershed, the second two are located within the Lower Minnesota Watershed, and the last is in the Cannon River Watershed.

The majority of floodplain areas in Le Sueur County are located in the Middle and Lower Minnesota River watershed.

Shorelands

The 1969 Minnesota Shoreland Act, as amended in 1973 and 1989, provides direction for land use management in shoreland areas of Minnesota. Shoreland, as defined in statute, includes land within 1000 feet of the Ordinary High Water Level (OHWL) of a lake and 300 feet from a streambank. In addition to the Shoreland Management Act, the State of Minnesota regulates shoreland use through the 1969 Floodplain Management Act and the 1973 Minnesota Wild and Scenic Rivers Act. At the local level, Project Riverbend, an attempt was made to develop a cooperative management plan for the Minnesota River from the cities of Franklin to Le Sueur. However, this group which is supposed to meet yearly, hasn't met since 1994 or 1995. (#45)

In 1996, Le Sueur County completed an update of its Comprehensive Land Use Plan and all associated ordinances including the Shoreland Ordinance. The municipalities of Elysian and Waterville have shoreland ordinances adopted September 1990 and June 3, 1997 respectively.

A state classification system of lakes and streams exists to designate land use and compatible activities for unincorporated areas with water basin acreage of 25 acres or more and streams with drainage area of two square miles or greater. In 1976, the rules for municipal shorelands included classification of water basins of 10 acres or greater in incorporated areas. Criteria for classification included development density, lake size and shape, natural characteristics of the waters and shorelands, and county and regional needs. Classification of lakes and streams are as follows:

- Natural Environment - those waters needing significant protection from development;
- Recreational Development - those waters which can support additional development and recreational use;
- General Development - those waters which will support high density development and multiple use and have significant development.

A complete list of protected waters and their shoreland classification is listed in inventory item #46. There are one hundred- twenty-eight lakes on the protected waters list in Le Sueur County. Of these, twenty-six are included in the DNR shoreland development data. (#46)

| | | |
|---|---|---|
| Natural Environment | - | 64 lakes |
| Recreational Development | - | 15 lakes |
| General Development | - | 0 lakes |
| No classification | - | 49 lakes |

Implications and Assessment

Effective enforcement is relative to time and budget constraints of the county. Development in the shoreland areas of the southern third of the county is moderate with several lakes in second tier development and one beginning third tier development. Water level conflicts are common. Septic system upgrade in pre-zoning regulation shoreland subdivisions is a primary concern. Other concerns include: 1) nonpoint source pollution from urban and agricultural runoff, 2) uncontrolled shoreland alterations such as vegetative clearing, rip-rapping and excavation and 3) non-conforming land uses.

Water-Based Recreation Lands (#47) (See Map 12)

Water-based recreation activities generally fall into the following categories: swimming, boating, hunting, fishing, trapping, hiking, wildlife observations and camping.

Information gathered about Le Sueur County's water and non-water related recreational opportunities indicates that the Minnesota River is a recognized canoe and boating route and 25 of 31 referenced county lakes have public access. The following have been identified as Panfish lakes: Clear, Emily, Elysian, Francis, German, Greenleaf, Tetonka, Volney and Washington. The lakes identified as Game-fish lakes include: Dora, Henry, Pepin, Rice, Sanborn and Scotch.

Le Sueur County contains 39 parks. Thirty-three of these are municipal and five are county. One county park, Lake Washington County Park, is located in the Middle Minnesota watershed; three county parks, Clear Lake County Park, Henderson Station County Park and Richter Woods County Park are located in the Lower Minnesota watershed; and one county park, Lake Volney County Park, is located in the Cannon River watershed. One state park, Sakatah Lake State Park, is located along the south shore of Lake Sakatah in the Cannon River watershed in extreme southeast Le Sueur County. The state park includes a public water access located in the Rice County portion of the park.

Two recreational trails in Le Sueur County are the Sakatah Singing Hills State Trail and the Le Sueur Trail. The state trail runs east to west 39 miles from Mankato to Faribault in Rice County. This trail runs through the Le Sueur County municipalies of Elysian and Waterville. After a one-half mile severance, it begins again east of Waterville and continues through Sakatah Lake State Park and enters Rice County. The second trail is a Grant-in-Aid Trail which runs north from Waterville to Kilkenny, west to Gorman Lake then north again. This trail is basically a snowmobile trail while the state trail is open to cross-country skiing, hiking, bicycling, and snowmobiling.

In addition to the State Comprehensive Outdoor Recreation Plan (SCORP), detailed information about the county's recreational facilities is available from the State's Recreational Facility Data Base (REFAC). The DNR's Public Recreation Information Map (PRIM) is available to the public for a minimal charge.

Public Water Access (#48)

There are improved public water access points for each of the following locations:

Middle Minnesota Watershed

| Lake Access | River Access |
|---|---|
| Emily (1) | Minnesota River, Kasota (1) Carry-in |
| Henry (1) | |
| Scotch (1) | |
| Washington (2) | |

Lower Minnesota Watershed

| Lake Access | River Access |
|---|---|
| Clear Lake (1) | Minnesota River, Henderson (1) Carry-in |
| Greenleaf Lake (1) | Minnesota River, Le Sueur (1) |
| Lake Pepin (1) | |
| Lake Sanborn (1) | |
| Rice Lake (1) Carry-in | |

Cannon River Watershed

| Lake Access | River Access |
|---|---|
| Fish Lake (1) | Cannon River, Gorman Lake (1) Carry-in |
| German Lake (2) | Cannon River, Waterville (1) |
| Gorman Lake (1) | |
| Jefferson Lake (1) | |
| Lake Dora (1) | |
| Lake Volney (1) | |
| Lake Francis (1) | |
| Ray's Lake (1) | |
| Roemhildts Lake (1) | |
| Sabre Lake (1) | |
| Sakatah Lake (1) | |
| Steele Lake (1) | |
| Sunfish Lake (1) | |
| Tetonka Lake (1) | |

Le Sueur River Watershed

Lake Access
Lake Elysian (1)
Lily Lake (1)

Canoe Routes (#49)

The Cannon River beginning in the Waterville area in Lake Tetonka and downstream through Lake Sakatah is designated as a State Canoe and Boating route. Upstream of Lake Tetonka recreational uses such as canoeing are generally not possible except for short periods of time during wet springs. The river courses through farmland and in

some areas the stream is channelized. Camping sites are not available in this reach of the river. Camping is available at the Sakatah Lake State Park.

The Minnesota River offers better canoeing opportunities. The entire west boundary of Le Sueur County, as defined by the Minnesota River, is designated as a State Canoe and Boating route. Two of the many access points along this reach are located in Le Sueur County. The remainder are located on the west shore of the river in Nicollet and Sibley counties. Camping sites are also on the west side of the river. Flow in the Minnesota River generally drops considerably after May resulting in steep banks. In addition, shallow areas within the channel and debris from spring flooding make navigating difficult for canoes or motor boats alike.

Stabilization of water levels for recreational purposes would be extremely expensive for either river but especially on the Minnesota River. Likewise, cleaning the debris from the river channel would also be extremely expensive. Presently there are no plans for Le Sueur County to attempt such projects on either the Cannon or Minnesota Rivers.

Implications and Assessment

The many opportunities for water-based recreation activities such as swimming, boating, hunting, fishing, trapping, hiking, wildlife observations and camping are primarily focused in the southern half of the county. Local and out-of-county residents use these resources year-round.

Attempts to quantify the economic impact of continued degradation of the Jefferson-German, Washington and Volney lake basins to their respective watersheds and the local economy were part of Clean Water Partnership project on each of these watersheds. For the Jefferson-German and Washington basins alone, the studies found a five to ten million dollar a year contribution to each of the local economies based on three main areas: 1) lakeshore housing changes from seasonal to year-round use; 2) lakeshore real estate value changes over a five-year period; and 3) estimated jobs and revenues brought to the area's economy through lake-related activities. In addition, a cumulative property tax base of approximately 61 million dollars make these watersheds well worth protecting.

These studies as well as the work of the Minnesota Wetlands Conservation Plan work team, the Minnesota River Basin Joint Powers Board and the Cannon River Watershed Partnership have identified a need for wetland restoration to address the trends of more frequent and severe flooding and siltation of lakes and rivers.

Wildlife Management Areas (#50)

The Wildlife Management Area (WMA) Program was established in 1950 as an attempt to preserve wildlife habitat areas, primarily wetlands, that were being destroyed by development and agricultural land uses. The following is a list of WMA sites in Le Sueur County by watershed.

| Middle Minnesota River Watershed | Twp | Rng | Sec | No. | Acres |
|---|---|---|---|---|---|
| Chadderdon WMA | 110 | 24 | 21 | 162 | 135.50 |
| Ottawa WMA | 110 | 26 | 3 | 534 | 567.80 |
| Paddy WMA | 110 | 24 | 15 | 130 | 189.70 |

| Lower Minnesota River Watershed | | Twp | Rng | Sec | No. | Acres |
|---|---|---|---|---|---|---|
| Bardel's WMA | | 112 | 24 | 25 | 187 | 78.10 |
| Cordova WMA | 111 | 24 | 33 | 1523 | 62.73 | |
| St. Thomas Lake WMA | | 112 | 25 | 24 | 185 | 315.60 |
| Sautter WMA | | 111 | 24 | 27 | 126 | 49.60 |
| Sheas Lake WMA | | 112 | 24 | 28 | 177 | 293.00 |
| Shanghai WMA | | 110 | 24 | 7 | 246 | 111.60 |

| Cannon River Watershed | Twp | Rng | Sec | No. | Acres |
|---|---|---|---|---|---|
| Diamond Lake WMA | 110 | 23 | 21 | 188 | 290.00 |
| Dove Lake WMA | 109 | 24 | 1 | 1378 | 254.34 |
| Earl Swain WMA | 109 | 24 | 22 | 1366 | 111.50 |
| Edward Velshek WMA | 110 | 23 | 12 | 1593 | 80.00 |
| Factor WMA | 110 | 23 | 6 | 158 | 133.50 |
| Frank Breen Memorial WMA | 109 | 25 | 9 | 1241 | 22.40 |
| Murphy WMA | 109 | 23 | 5 | 161 | 141.20 |
| Seha WMA | 109 | 24 | 36 | 1099 | 123.00 |
| Verna Schmidt WMA | 109 | 24 | 4 | 1370 | 48.63 |

The main management goals of these WMAs are water level maintenance and the providing of wildlife food plots.

There is one statutory game refuge, the East Minnesota River Statutory Game Refuge, which is comprised of 7,500 acres in Le Sueur and Blue Earth Counties. Two Nature Conservancy preserves, the Kasota Prairie Preserve and the Ottawa Bluffs Preserve, are also located in Le Sueur County. Chamberlain's Woods is designated as a State Scientific and Natural Area Land. A parcel designated as state Forest land is located in the Middle Minnesota watershed.

There is one designated game management lake in Le Sueur County, Sanborn Lake. This lake is 448 acres with an average depth of 2.5 feet and a maximum depth (1982) of 4 feet. In addition to the listed WMAs, game refuges and nature preserves, twenty lakes in Le Sueur County have been designated for fish management. The following list presents these lakes with their DNR I D number:

| DNR ID No. | Lake Name | DNR ID No. | Lake Name |
|---|---|---|---|
| 40-1 | Horseshoe Lake | 40-44 | Steele Lake |
| 40-2 | Upper Sakatah | 40-51 | Fish Lake |
| 40-9 | Sunfish Lake | 40-56 | Ray's Lake |
| 40-10 | Dora Lake | 40-57 | Lake Francis |
| 40-14 | Sabre Lake | 40-63 | German Lake |
| 40-20 | Greenleaf Lake | 40-79 | Clear Lake |
| 40-31 | Lake Tetonka | 40-92 | Lake Jefferson |
| 40-32 | Lake Gorman | 40-109 | Scotch Lake |
| 40-33 | Lake Volney | 40-117 | Lake Washington |
| 40-39 | Roemhildt's Lake | 40-124 | Lake Emily |

Trout Lakes and Streams (#51)

The DNR designates trout lakes and streams throughout the state. Le Sueur County is not within any identified area of trout lakes or stream concentrations but two designated trout streams are located within the county:

| | |
|---|---|
| Unnamed Creek | Kasota Township, T110N, R26W, Sections 10, 11 |
| Paul's Creek | Kasota Township, T110N, R26W, Sections 14, 15 |

There are currently no designated trout management lakes in Le Sueur County. Reclamation of abandoned mining sites could provide potential recreational resources.

State Ecological and Management Classifications (#52)

The DNR classifies lakes according to fish species that are best adapted to the natural ecological conditions and the most desired species for which a lake could be managed. The ecological classification denote the natural and characteristic fish populations which are best adapted to the physical, chemical and biological features of a lake. The management classification describes the most important species or combination of species on which management options should be directed.

Ecological Classification
(1) Trout
(2) Soft Water Walleye
(3) Hard Water Walleye
(4) Northern Pike - Sucker
(5) Centrarchid - Walleye
(6) Centrarchid
(7) Rough Fish - Game Fish
(8) Bullhead
(9) Non-Classified
(10) Unclassified

Management Classification
(1) Trout
(2) Walleye
(3) Walleye-Centrarchid
(4) Centrarchid
(5) Warm Water Game Fish
(6) Regular Winter Kill

Le Sueur County has twenty lakes so classified.

Le Sueur County Lake Ecological and Management Classifications
(DNR, SWIM Data Base)

| DNR I.D. No. | Lake Name | Ecological Class | Management Class |
|---|---|---|---|
| 40-1 | Horseshoe | (7) | (5) |
| 40-2 | Upper Sakatah | (7) | (5) |
| 40-9 | Sunfish | (6) | (4) |
| 40-10 | Dora | (9) | Rearing Pond |
| 40-14 | Sabre | (7) | (5) |
| 40-20 | Greenleaf | (7) | (5) |
| 40-31 | Tetonka | (7) | (5) |
| 40-32 | Gorman | (7) | (3) |
| 40-33 | Volney | (7) | (3) |
| 40-39 | Roemhildt's | (6) | (4) |
| 40-44 | Steele | (7) | (4) |

| DNR I.D. No. | Lake Name | Ecological Class | Management Class |
|---|---|---|---|
| 40-51 | Fish | (6) | (4) |
| 40-56 | Ray's | (6) | (4) |
| 40-57 | Francis | (6) | (4) |
| 40-63 | German | (7) | (4) |
| 40-79 | Clear | (8) | (4) |
| 40-92 | Jefferson | (7) | (5) |
| 40-109 | Scotch | (9) | Rearing Pond |
| 40-117 | Washington | (7) | (5) |
| 40-124 | Emily | (6) | (4) |

Biological Surveys or Reconnaissance Studies (#53)

Le Sueur County has received notice that the Minnesota County Biological Survey is underway in this county. Results of this survey should be available at the next water plan revision.

A summary listing of biological surveys which have been conducted on forty of the lakes in the county follows:

| DNR I.D. No | Lake Name | Survey Date (Year) & Type |
|---|---|---|
| 40-1 | Horseshoe | 1948 Lake Survey Report |
| | | 1983 Fisheries Lake Survey |
| | | 1988 Lake Survey Report |
| | | 1993 Lake Survey Report |
| 40-2 | Upper Sakatah | 1928 Investigation Report |
| | | 1936 Pollution Investigation |
| | | 1939 Partial Lake Survey |
| | | 1949 Fisheries Resource Report |
| | | 1950 Lake Survey Report |
| | | 1958 Lake Survey Report |
| | | 1959 Lake Survey Report |
| | | 1981 Fisheries Lake Survey |
| | | 1986 Fisheries Lake Survey |
| | | 1989 Lake Survey Report |
| | | 1994 Lake Survey Report |
| 40-9 | Sunfish | 1950 Lake Survey Report |
| | | 1955 Lake Survey Report |
| | | 1983 Fisheries Lake Survey |
| | | 1988 Lake Survey Report |
| | | 1993 Lake Survey Report |
| 40-14 | Sabre | 1935 Dissolved Oxygen Investigation |
| | | 1968 Fisheries Lake Survey |
| | | 1986 Lake Survey Report |
| | | 1989 Lake Survey Report |
| | | 1994 Lake Survey Report |
| 40-16 | Rice | 9-10-47 |
| 40-20 | Greenleaf | 1950 Fisheries Lake Survey |
| | | 1956 Fisheries Lake Survey |
| | | 1971 Fisheries Lake Survey |

| DNR I.D. No | Lake Name | Survey Date (Year) & Type (cont.) |
|---|---|---|
| | | 1984 Fisheries Lake Survey |
| | | 1989 Lake Survey Report |
| 40-26 | Mud | 9-16-47 |
| 40-27 | Sanborn | 9-17-47 |
| 40-29 | Eggert | 10-5-50 |
| 40-31 | Tetonka | 1947 Lake Survey Report |
| | | 1952 Lake Survey Report |
| | | 1955 Lake Survey Report |
| | | 1969 Lake Survey Report |
| | | 1970 Water Quality Investigation |
| | | 1974 Limnological Assessment |
| | | 1979 Limnological Assessment |
| | | 1981 Lake Survey Report |
| | | 1989 Lake Survey Report |
| | | 1994 Lake Survey Report |
| 40-32 | Gorman | |
| 40-33 | Volney | 1986 MPCA Lake Assessment Report |
| | | 1997 MPCA CWP Diagnostic Report |
| 40-39 | Roemhildt's | 1975 Fisheries Lake Survey |
| | | 1983 Fisheries Lake Survey |
| | | 1988 Fisheries Lake Survey |
| | | 1993 Fisheries Lake Survey |
| 40-40 | Sasse | 9-09-47 |
| 40-44 | Steele | 1975 Fisheries Lake Survey |
| | | 1983 Fisheries Lake Survey |
| | | 1988 Lake Survey Report |
| | | 1993 Lake Survey Report |
| 40-55 | Swain's | 6-29-49 |
| 40-56 | Ray's | 1956 Fisheries Lake Survey |
| | | 1981 Fisheries Lake Survey |
| | | 1985 Fisheries Lake Survey |
| | | 1990 Lake Survey Report |
| | | 1995 Lake Survey Report |
| 40-57 | Francis | 1951 Fisheries Lake Survey |
| | | 1969 Fisheries Lake Survey |
| | | 1981 Fisheries Lake Survey |
| | | 1986 Fisheries Lake Survey |
| | | 1991 Lake Survey Report |
| | | 1996 Lake Survey Report |
| 40-62 | Sander's Slough | 8-22-52 |
| 40-63 | German | 1951 Fisheries Lake Survey |
| | | 1956 Fisheries Lake Survey |
| | | 1975 Fisheries Lake Survey |
| | | 1982 Fisheries Lake Survey |
| | | 1987 Fisheries Lake Survey |
| | | 1992 Fisheries Lake Survey |
| | | 1997 Fisheries Lake Survey |
| | | 1994 MPCA CWP Diagnostic Report |
| 40-68/69 | Sleepy Eye Lake and Marsh | 9/12/52 |
| 40-70 | Hecort's Marsh | 8-10-52 |

| DNR I.D. No | Lake Name | Survey Date (Year) & Type (cont.) |
|---|---|---|
| 40-72 | Goose | 9-09-52 |
| 40-73 | Bossuot | 9-12-52 |
| 40-75 | Schmidt's Slough | 8-16-51 |
| 40-79 | Clear | 1950 Lake Survey Report |
| | | 1975 Lake Survey Report |
| | | 1983 Lake Survey Report |
| 40-92 | Jefferson | 1951 Lake Survey Report |
| | | 1956 Lake Survey Report |
| | | 1974 Lake Survey Report |
| | | 1975 Lake Survey Report |
| | | 1982 Lake Survey Report |
| | | 1983 Lake Survey Report |
| | | 1985 Lake Survey Report |
| | | 1986 Lake Survey Report |
| | | 1994 MPCA CWP Diagnostic Report |
| 40-93 | Harrimon's Slough | 8-20/21-52 |
| 40-95 | Thomas | 9-16-47 |
| 40-106 | Wilver | 9-09-47 |
| 40-108 | South Goldsmith | 8-12/13-52 |
| 40-109 | Scotch | 1952 Lake Survey Report |
| | | 1957 Game Lake Survey |
| | | 1990 Lake Survey Report |
| | | 1995 Lake Survey Report |
| 40-110 | Hoey | 9-11-52 |
| 40-111 | Mud | 8-17-51 |
| 40-117 | Washington | 1947 Lake Survey Report |
| | | 1955 Lake Survey Report |
| | | 1969 Lake Survey Report |
| | | 1974 Lake Survey Report |
| | | 1982 Lake Survey Report |
| | | 1987 Lake Survey Report |
| | | 1992 Lake Survey Report |
| | | 1995 MPCA CWP Diagnostic Report |
| | | 1997 Lake Survey Report |
| 40-120 | North Goldsmith | 8-14-52 |
| 40-124 | Emily | 1956 Lake Survey Report |
| | | 1971 Lake Survey Report |
| | | 1985 Lake Survey Report |
| | | 1990 Lake Survey Report |
| | | 1995 Lake Survey Report |

State Fish and Wildlife Habitat Management Plans (#54)

Many of the lakes given ecological and fish management classifications have DNR lake management plans. Management issues include fish rearing and maintaining game fish habitats. Le Sueur County has seventeen lakes with management plans.

| DNR I.D. No. | Lake Name | Date of Most Recent Plan |
|---|---|---|
| 40-01 | Horseshoe | 1993 |
| 40-02 | Upper Sakatah | 1995 |
| 40-04 | Henry | 1996 |
| 40-09 | Sunfish | 1994 |
| 40-10 | Dora | 1990 |
| 40-14 | Sabre | 1995 |
| 40-20 | Greenleaf | 1993 |
| 40-27 | Sanborn | 1991 |
| 40-28 | Pepin | 1996 |
| 40-31 | Tetonka | 1995 |
| 40-32 | Gorman | 1995 |
| 40-33 | Volney | 1996 |
| 40-39 | Roemhildt's | 1994 |
| 40-44 | Steele | 1994 |
| 40-51 | Fish | 1996 |
| 40-56 | Ray's | 1996 |
| 40-57 | Francis | 1993 |
| 40-59 | Round | 1990 |
| 40-63 | German | 1993 |
| 40-79 | Clear | 1993 |
| 40-92-01 | East Jefferson | 1993 |
| 40-92-02 | West Jefferson | 1993 |
| 40-92-03 | Mid Jefferson | 1993 |
| 40-92-04 | Swede's Bay | 1993 |
| 40-107 | Savidge | 1991 |
| 40-109 | Scotch | 1996 |
| 40-117 | Washington | 1992 |
| 40-124 | Emily | 1996 |

Other management issues within lakes are focused on aquatic plant nuisance control permits. The public requests for these permits vary from year to year.

The management plan for Paul's Creek, M55-60, is dated 1992.

Implications and Assessment

Wildlife management is not just a government responsibility, private lands from large woods to small urban lots can provide important wildlife habitat. With past large enrollments of private land in the various state and federal farm and conservation programs, additional wildlife habitat has been created which did not exist prior to 1985. The future availability of these incentive programs is uncertain which could have significant implications for wildlife habitat. These programs need to be continually publicized and explained to private land owners so the programs can be utilized where possible.

There is a potential for increasing aquatic wildlife habitats through wetland and lake restoration and improving water quality. There is also a need to protect and improve habitats in rivers and streams.

The three lake watershed studies have highlighted needs to restore wetlands, to further adoption of agricultural best management practices and to continue focusing major efforts to upgrading individual sewage treatment systems. Benefits of wetland restorations would be multiple and include water quality, hydrologic dampening, fish and wildlife habitat as well as general aesthetic qualities. The agricultural BMPs are needed to reduce the levels of sediment and nutrients leaving the fields where they are valuable and entering the surface waters where they are a detriment. Upgrading ISTS and other residential-use BMPs will also benefit water quality as well as foster ownership of lake issues.

Unique Features and Scenic Areas (#55)

Forty archaeological sites described as either artifact scattering, mound(s), habitation, village or unknown and eight historical sites are included in the inventory data (#55).

The historical sites include:

| | |
|---|---|
| Alexander Fur Trading Post | Ottawa Methodist Church |
| Historic Elysian Public School | Ottawa Village historical district |
| Geldner Mill | Frank Schwartz farm house |
| Ottawa stone buildings | William W. Mayo house. |

The majority of these features, including 35 of the 40 archaeological sites are found in southern Le Sueur County.

The Ney Environmental Learning Center is currently being developed at and on the site of the Wilhelm Ney preemption farm (1857). This farm site was purchased in 1987 under the Preemption Law. This law which was in place preceding the Civil War was used to determine the details of land transactions prior to the enactment of the Federal Land Survey.

Rare Natural Features

A comprehensive survey of sensitive natural habitats and rare plant and animal species is currently underway in Le Sueur County through the Minnesota County Biological Survey program.

The following list of endangered (EN), threatened (TH) and special concern (SC) species that occur in Le Sueur County was supplied by the DNR's Natural Heritage and Nongame Research Program with an effective date of March 1997.

| Plants | Minnesota Status |
|---|---|
| Eleocharis rostellata ( Beaked Spike-Rush) | TH |
| Rhynchospora capillacea (Hair-Like Beak Rush) | TH |
| Scleria verticillata (Whorled Nut-Rush) | TH |
| Caladium mariscoides (Twig-Rush) | SC |
| Carex sterilis (Sterile Sedge) | TH |
| Cypripedium candidum (Small White Lady's Slipper) | SC |
| Eryngium yuccifolium (Rattlesnake-master) | SC |
| Panax quinquefolius (American Ginseng) | SC |

Birds

| | |
|---|---|
| Lanius ludovicianus (Loggerhead Shrike) | TH |
| Haliaeetus leucocephalus (Bald Eagle) | SC |

Amphibians and Reptile

| | |
|---|---|
| Coluber constrictor (Racer) | SC |
| Emydoidea blandingii (Blanding's Turtle) | TH |

Fish

| | |
|---|---|
| Notropis agogenus (Pugnose Shiner) | SC |
| Etheostoma microperca (Least Darter) | SC |

Other Species

| | |
|---|---|
| Actinonaias ligamentina (Mucket Mussel) | TH |

The Natural Heritage Program and the Nongame Wildlife Program of the Minnesota DNR maintain a database of statewide occurrences of all rare species.

Sensitive Natural Communities

Le Sueur County contains examples of the following communities. Ranking is given in state values with S1 indicating areas in greatest need of conservation action and S5 indicating areas which are secure under present conditions. Multiple ranks indicate borderline ranking while the use of the "?" indicates a limited sample.

| Community Type | Status |
|---|---|
| Middle Minnesota River Watershed | |
| Dry Prairie (Southeast) Sand and Gravel Subtype | S2 |
| Floodplain Forest Silver Maple Subtype | S3 |
| Mesic Prairie (Southeast) Carbonate Bedrock Subtype | S1 |
| Lowland Hardwood Forest | S4 |
| | |
| Lower Minnesota River Watershed | |
| Calcareous Seepage Fen (Southeast) Prairie Subtype | S1 |
| Dry Prairie (Southeast) Hill Subtype | S2S3 |
| Wet Meadow | S3S4 |
| Maple-Basswood Forest (Big Woods) | S2 |
| Floodplain Forest | S2 |
| Floodplain Forest Silver Maple Subtype | S3 |
| Oak Forest (Big Woods) Mesic Subtype | S2 |
| Dry Oak Savannah (Southeast) Hill Subtype | S1S2 |
| Oak Forest (Big Woods) | S3 |
| Lowland Hardwood Forest | S4 |
| | |
| Cannon River Watershed | |
| Tamarack Swamp Minerotrophic Subtype | S4S5 |
| Cattail Marsh | S5 |
| Rich Fen (Transition) Floating-Mat Subtype | S3? |
| Maple-Basswood Forest (Big Woods) | S2 |

In addition, seven mussel sampling sites are identified in the list supplied by the DNR's Natural Heritage and Nongame Research Program. Of these sites three occur in the lakes of the Cannon River Watershed and the other four occur along that portion of the Lower Minnesota River bordering the west edge of Le Sueur County.

Le Sueur County also contains the Chamberlain Woods Scientific and Natural Area. SNAs offer the strongest state level protection possible for sites containing habitat critical for endangered species and sensitive plant communities. In this case, the site contains Floodplain Forest and upland plant species.

The Nature Conservancy (TNC), a private non-profit conservation organization, also offers protection to important natural communities through their preserve system. In Le Sueur County, TNC Kasota Prairie and Ottawa Bluffs Preserves protect Dolomite Prairie communities. Both of these sites are within Kasota Township.

Rare plant and animal species are concentrated in Kasota and Ottawa Townships based on the findings of the DNR's Natural Heritage and Nongame Research Program. It is easy to see the importance of preserving and protecting the environmental amenities and ecosystems of the river terraces.

Implications and Assessments

The water related features of the county offer many scenic qualities. However, none of the unique features are specifically water related. Some of the habitats supporting rare species are indirectly water related. These habitats are found predominately in the moraines of south-central Le Sueur County and along the river terraces along the Minnesota River.

Even though unique features and scenic areas are not addressed as a priority in this plan, there is both interest in learning more about programs dedicated to such understanding and a need for inventories and public education relating to rare species, scenic areas and unique features.

The Le Sueur County Comprehensive Land Use Plan and related ordinances also recognize the importance of protecting and preserving the unique and scenic features of this county. Areas adjacent to the Cannon River and the Little Cannon River and tributaries to the Minnesota River have been designated as Conservancy Districts by the Le Sueur County Zoning Ordinance. These areas typically encompass flood plains, steep slopes or bluffs and generally have a permanent ground cover of trees and grasses.

## Expected Changes to Surface Water, Groundwater and Related Land Resources

The population of Le Sueur County is expected to increase over the next five years with the major growth areas being in the northeast and northwest corners of the county where Metropolitan growth is influencing development and in the southwest corner of the county which is readily accessible to the Mankato area. The first region includes the municipalities of Le Sueur, Montgomery and New Prague; the second region includes the housing subdivisions around Lakes Emily, Jefferson and Washington. Approximately 55.76% of the population is located within urban areas that are primarily served by municipal sewer and water systems; the remaining population is located in rural areas that are served by private or community systems. A developing trend is the increase of larger livestock production facilities. Other patterns of development in the county have been scattered.

Le Sueur County lies in four watersheds. The southwestern portion of the county, 18.75% of the land area, lies in the Middle Minnesota River watershed. The municipalities of Cleveland and Kasota as well as the developed areas around Lake Emily and Lake Washington are included in this watershed. Extreme south central Le Sueur County, 0.66% of the land area, lies in the Le Sueur River watershed. The municipality of Elysian straddles the watershed divide between the Le Sueur River and the Cannon River. Roughly the northern half, 50.37% of the land area, lies in the Lower Minnesota River watershed. The municipalities of Le Center, Le Sueur, Montgomery, New Prague, Heidelberg and the unincorporated villages of Ottawa, St. Henry and St. Thomas lie within this watershed. The southeast portion of the county, 30.22% of the area, lies within the Cannon River watershed. The municipalities of Elysian, Kilkenny and Waterville and the incorporated village of Cordova lie within this watershed.

During the next five years the majority of land use in Le Sueur County by area is expected to remain agricultural. However, approximately 50% of the county's economic base in 1996 was due to commercial or industrial production and these activities are expected to continue to expand. Commercial or industrial growth will be focus in areas zoned for that use and in conjunction with the major transportation hubs.

Growth is expected in domestic, business and industrial water use over the next five years. Since groundwater is currently the only source of water for these uses in Le Sueur County, it is imperative that groundwater quality be protected and promotion of groundwater conservation measures be implemented. The state wellhead protection program is intended to identify community water supply well recharge areas and provide protection measures for these areas as well as the area immediately surrounding the well.

Wastewater treatment needs of municipalities need to be assessed to ensure adequate design capacity. In addition, the challenge of keeping stormwater out of sanitary sewer systems will continue to be an important issue for the municipalities dealing with the wastewater treatment issue. There is a need for all local units of government to address stormwater treatment as development occurs in urban and rural areas.

Several federal and state programs, already in effect, will be used to help accomplish the county's objectives to reduce the adverse effects certain land use practices have on surface water resources. Some of these include the CRP, Sodbuster, Swampbuster, Permanent Wetland Preserve, Federal Waterbank and RIM. Continuance of these programs is very important to the protection of surface water quality.

The federal farm program, DNR Protected Waters program and the ACOE regulations have provided some protection for wetlands. With the addition of the Wetland Conservation Act regulations in 1991, wetland loss in Le Sueur County is expected to be minimal. In addition, wetland restoration projects are likely to occur under one of the federal or state incentive programs. This reduction of loss and possible restoration actions will have benefit to surface water and groundwater quality and quantity.

Administrative, technical and financial assistance from the federal and state level will be needed to complete several of the county water plan actions.

## Identification of Water Related Issues, Problems and Opportunities

Public participation in the water planning process is essential to help identify important water issues, problems and opportunities. Le Sueur County held public meetings in December 1987, July 1988 and March 1995 and will continue this process through the completion of the 1997 revision. A citizen's attitude survey on water resources was issued in 1988. A second survey was conducted in the spring of 1995 to reassess these opinions. Local units of government were also notified of the water planning process and encouraged to participate in identifying problems and opportunities. Several issues and problems were identified in this manner.

The County also gathered information about its water resources. The County Water Planning Task Force then assessed this inventory information and the achievements of the first five years of water planning. When compared with the identified issues and problems, these discussions led to the development of goals, objectives and action / implementation plans.

The following is a summary of the water resource issues, problems and opportunities identified along with the federal, state and local programs which are available and regulations which apply to these issues.

### Issues

1. Purity of drinking water supplies;
2. Improper mixing of sanitary sewer and storm sewer water;
3. Proper development adjacent to lakes and streams;
4. Improvement of fish and wildlife habitat;
5. Adequate septic and sanitary sewer systems;
6. Soil erosion;
7. Management of protected lakes, wetlands and streams;
8. Proper construction, maintenance and abandonment of wells;
9. Protection of unique and scenic areas;
10. Efficient use of sand and salt on roadways and streets;
11. Restoration of drained wetlands;
12. Water quality/quantity effects from ditch systems;
13. River and lake water levels;
14. Flood problems;
15. Storm water management in cities and towns;
16. Availability of water based recreation.

### Problems and Opportunities

1. Water well abandonment and construction;
2. Drainage (dry agricultural) wells;
3. Community wellhead protection;
4. Fertilizer and pesticide runoff from farms and urban lawns;
5. Inadequate septic systems in unincorporated areas - rural residences, pre-zoning lakeshore subdivisions, municipal fringe areas;
6. Runoff from feedlots and large commercial/contract grower feedlots;
7. Nonpoint source pollution (i.e., urban stormwater runoff, soil erosion/sedimentation and atmospheric deposition);

8. Quantity of water being used for industry and quality of water being discharged;
9. Industrial development in unincorporated areas without sanitary sewer and municipal water supply;
10. Leaking underground storage tanks;
11. Disposal of household hazardous waste;
12. Solid waste disposal - old dumps, tire dumps;
13. Improper use and disposal of pesticides and fertilizers;
14. Soil erosion and surface/groundwater pollution from fertilizer and other chemical runoff and infiltration;
15. Definition of “pasture” for livestock production especially in the river terrace region of western Le Sueur County;
16. Tillage practices;
17. Lack of economic incentives to promote habitat improvement and wetland restoration;
18. Lake of water quality monitoring data for lakes and streams;
19. Runoff and erosion along surface waters, ditches, wetlands, streams and lakes, which reduce water quality and limit recreational fisheries;
20. Channelization and low-head dams;
21. Loss of natural communities;
22. Construction sites;
23. Loss of wooded areas;
24. Lack of buffer strips protecting ditch systems from erosion and sedimentation;
25. Ditch systems channeling pollutants directly and rapidly to rivers causing rapid fluctuations in water level which leads to bank erosion, sedimentation and flooding; and
26. Education.

## Current Programs and Regulations

1. United States Department of Agriculture (USDA) - The USDA has the primary role in implementing the following conservation provisions of the Food Security Act of 1985 through the local FSA and NRCS offices: Farm Services Agency (FSA) and Natural Resources Conservation Service (NRCS) Administer and enforce provisions of the Food Security Act (i.e. CRP, Conservation Compliance, ACP. etc.) under USDA guidance.

    a. Sodbuster provision - discourages the conversion of highly erodible land for agricultural production; farmers lose eligibility for many USDA farm program benefits if they convert. Also need to develop an approved conservation plan for highly erodible fields.

    b. Swampbuster provision - discourages the conversion of wetlands for agricultural purposes; farmers lose eligibility in certain USDA program benefits if they convert wetlands.

    c. Conservation Reserve Program - purpose is to reduce erosion, protect water quality and develop and enhance wildlife and fish habitat by

encouraging farmers to retire highly erodible and highly eroding cropland.

d. Conservation Compliance - requires farmers to develop and apply a conservation plan on highly erodible cropland by January 1, 1990, in order to be eligible for USDA benefits. Enforced by FSA and NRCS.

e. Agriculture Conservation Program (ACP) - Cost-share program administered by the NRCS to solve soil and water and related resource problems. Cost-share practices include: terraces, diversions, windbreaks, no-till systems, erosion control structures, ponds, waterway systems, animal waste control, tree planting, etc.

2. U.S. Fish and Wildlife Service (USFWS) - administer the private lands program which protects wetlands and adjacent upland acres through lease contracts between USFWS and landowners.

3. Minnesota Department of Health (MDH) - responsible for health related and domestic water supply matters.

   a. Administer Water Well Construction and Abandonment Code; authorized to license well drillers and regulate exploratory borings (Minnesota Statutes 156A).

   b. Insure safe drinking water in all public water supplies according to provisions of Safe Water Drinking Act (Minnesota Statutes 144.381-87).

   c. Administer a Wellhead Protection Program to ensure that community water supply wells are not contaminated by improper land uses in the immediate vicinity of the well (i.e. recharge area).

4. Minnesota Department of Natural Resources (DNR) - Administer many programs that provide technical assistance, habitat preservation and improvement and water resource management including:

   a. Issue water appropriation permits for water usage that is greater than 10,000 gallons/day or 1 million gallons/year.

   b. Flood Hazard Mitigation Grant Assistance Program - DNR cost-shares on flood protection measures (i.e. flood-proofing houses, moving houses, etc.).

   c. Wetland Preserves Program - State compensates private landowners for not draining wetlands.

   d. Dam Safety Program - 50% cost-sharing for repair of existing dams or 100% cost-share for removal of specified dams.

e. Stream maintenance funding - 50% cost-share for removing log jams, etc.

f. A portion of RIM program - provide for preservation and development of critical habitat.

g. Assist local government units in administering and enforcing Shoreland Management and Floodplain Rules.

h. Protected Waters Permit Program - regulatory permitting program.

i. Wildlife Private Lands Agreement - State provides approximately 75% funding for wildlife habitat projects (i.e. native grassland/wildflower establishment, woody cover plantings, etc.).

j. Stream and Lake Surveys - DNR conducts surveys on lakes and streams to assess fish population, pollution sources and a general description of the resource.

k. State Prairie Bank - DNR obtains conservation easements from landowners who own native prairie.

l. Stewardship Incentives Program

m. Fish and Wildlife Habitat Acquisition

n. Roadside Program - Offers cost-share assistance for native grass/wildflower establishment along road right-of-ways.

5. Minnesota Pollution Control Agency (MPCA) - has authority over surface and groundwater quality issues and pollution control requirements.

a. Enforce feedlot regulations and issue feedlot permits.

b. Nonpoint Source Management Program - Manage nonpoint source pollution to protect water quality.

c. Clean Water Partnership Program - Provide funding and technical assistance to local units of government for projects dealing with lakes, streams and aquifers.

d. Develop state individual sewage treatment system standards and administer certification/ license requirements for contractors and inspectors.

e. National Pollutant Discharge Elimination System - Issue permits for surface wastewater discharges to state waters.

f. Administer underground and aboveground storage tank program that

identifies existing tanks, specifies construction standards for new tanks and provides funds for tank cleanup sites.

g. License hazardous waste generators and administer hazardous waste rules.

h. Administer and enforce state solid waste rules.

i. Issue stormwater discharge permits for projects disturbing 5 or more acres.

6. Minnesota Extension Service (MES) - offer research-based educational programs for a wide range of audiences and work with other agencies and citizen groups in cooperative educational programming.

7. Minnesota Board of Water and Soil Resources (BWSR)- BWSR administers water planning grant program to counties and acts as a partner to counties in assisting and reviewing comprehensive local water plans. Also provides cost-sharing through Soil and Water Conservation Districts (SWCD) for a number of resource conservation measures.

   a. Reinvest in Minnesota Reserve Program (RIM) - State funded program that is administered by the SWCD to retire marginal cropland and restore drained wetlands through twenty year or perpetual easements:
      1) Wetland restorations;
      2) Riparian lands;
      3) Marginal agricultural land;
      4) Sensitive groundwater areas; and
      5) Pastured hillsides.

   b. Streambank, Lakeshore and Roadside Program (SLR) - BWSR provides financial assistance to local SWCDs for site specific sediment and erosion control projects along streambanks, lakeshores and roadsides.

   c. State Cost-Share Program - The SWCD with grants from BWSR cost-shares with landowners on systems for erosion control and water quality improvement.

   d. Special Projects Program - Funding for large erosion control projects.

8. Minnesota Department of Agriculture (MDA) - regulates pesticide and fertilizer use in Minnesota through delegation from EPA and also under the State Pesticide Control Law; certify uses of pesticides.

9. Le Sueur County Environmental Services (Planning and Zoning Department, Community Health Department and Le Sueur County Parks Commission)

   a. Administer and enforce the county Zoning Ordinance, Subdivision Ordinance, Sewage and Wastewater Ordinance and Feedlot and

Manure Management Ordinance.

b. Regulate shoreland and floodplain management through ordinances.

c. Conduct a well water testing program for residents with private wells.

d. Develop Solid Waste Ordinances and coordinate control of solid waste disposal and management of solid waste in conjunction with Tri-County Solid Waste.

e. Coordinate water planning activities.

f. Aids-waste pesticide collection programs and pesticide applicators training program.

g. Secures property for future parks and recreational uses.

10. Soil and Water Conservation District (SWCD) - Coordinate assistance on private lands to control erosion, prevent flooding, enhance wildlife habitat and develop recreation. Administer several cost-share programs provided by BWSR (i.e. RIM Reserve, SLR, Riparian Buffers, etc.), assist in manure management planning, administer WCA and assist the county in implementing water planning projects.

11. Other

a. Minnesota Statutes Drainage Law (103E.021) - requires that permanent grass be planted on the bank of ditch and 16 ½ feet on each side of the top edge of the ditch for new construction and improvements and repairs which include a redetermination of benefits.

b. Minnesota Statutes 160.27 - Portions of this statute make it unlawful for private citizens to farm or graze roadsides with the exception of planting and harvesting a perennial hay crop.

# ◆ Surface Water Quality ◆

| | |
|---|---|
| **Goal:** | **To promote resource planning and management on a watershed basis to protect and enhance the quality of surface water within Le Sueur County.** |

| | |
|---|---|
| Objective: | Continue to upgrade inadequate Sewage Treatment Systems. |

Actions:

1) Identify and seek public and private funding for upgrading non-conforming septic systems in unincorporated and rural subdivision areas within the county such as Cordova, Ottawa and numerous rural subdivisions. In addition, unsewered areas within municipalities such as Heidelberg, Kasota and Kilkenny need to be addressed. (1998 – 2003)
2) Identify the extent of septic system contamination of surface waters through sampling and data gathering. (1998 – 2003)
3) Support municipalities as they develop Sewage and Wastewater Ordinances. (1998 – 2003)
4) Amend and update the Le Sueur County Sewage and Wastewater Ordinance as needed. (1998 – 2003)
5) Promote the development of mechanisms to implement and fund alternative sewage treatment options such as clustered ISTS and Subordinate Service Districts. (1998 – 2003)
6) Explore alternate and experimental ISTS technologies at the local, state and federal level.

| | |
|---|---|
| Objective: | Minimize the impacts that industrial and commercial practices have on surface water quality. |

Actions:

1) Encourage industrial development within municipal areas served by municipal sewer through zoning and land use controls. (1998 – 2003)
2) Encourage compatibility with Le Sueur County Comprehensive Plan for development immediately outside of municipal boundaries. (1998 – 2003)
3) Review MPCA discharge permits to ensure compliance. (1998 – 2003)
4) Encourage stormwater control and management. (1998 – 2003)

| Objective: | Secure funding for surface water protection and improvement projects. |
|---|---|

Actions:

1) Seek public and private funding sources for surface water protection and improvement projects. (1998 – 2003)
2) Consider applying for Clean Water Partnership funding for watersheds in the County. (1998 – 2003)
3) Promote Federal, State, and local cost-share and financial assistance programs. (1998 – 2003)

| Objective: | Protect surface waters from non-point source pollution. |
|---|---|

Actions:

1) Cooperate with municipalities in developing standards and criteria for storm water management and mechanisms to administer controls. (1998 – 2003)
2) Promote and publicize practices that reduce impacts of rural and urban and suburban runoff to surface waters. (1998 – 2003)
3) Work with MDA to ensure compliance with regulations concerning pesticides and fertilizers. (1998 – 2003)
4) Promote and publicize practices that reduce soil erosion (i.e. conservation planning, waterways, sediment basins, etc.) (1998 – 2003)
5) Encourage wetland restoration and preservation. (1998 – 2003)
6) Promote and publicize manure management practices to ensure compliance with state and local regulations. (1998 – 2003)

| Objective: | Work cooperatively with other agencies in coordinating and prioritizing surface water monitoring, education, protection and improvement projects. |
|---|---|

Actions:

1) Establish and maintain a monitoring system in the county which indicates conditions and trends of surface water quality. (1998 – 2003)
2) Support the implementation of the Le Sueur County SWCD's Plan and related actions including cost-share programs. (1998 – 2003)
3) Initiate land use incentive programs to reduce surface water pollution. (1998 – 2003)
4) Participate in surface water monitoring, education, protection, and improvement projects that are watershed-based. (1998 – 2003)

## Priority Actions:

1) Upgrade nonconforming sewage treatment systems in unincorporated areas and rural subdivisions.

Coordinating Agencies: Le Sueur County, MPCA, Municipalities
Funding: private, state and local
Time Frame: 1998 – 2003

2) Promote standards and criteria for stormwater management, and mechanisms to administer controls.

Coordinating Agencies: Le Sueur County, Le Sueur County SWCD, Municipalities, BWSR, MPCA
Funding: private, state and local
Time Frame: 1998 – 2003

3) Maintain and expand a monitoring system and establish database in the county which indicates existing conditions and trends of surface water quality.

Coordinating Agencies: Le Sueur County , MPCA, DNR, Municipalities
Funding: CWPs, private, state and local
Time Frame: 1998 – 2003

4) Participate in watershed-based surface water research, education, protection, and improvement projects.

Coordinating Agencies: Le Sueur County, Watershed Projects / Partnerships
Funding: Public, Private, Federal, State and local sources
Time Frame: 1998 – 2003

Budget

| | | |
|---|---|---|
| 1) | upgrade ISTS | 52,824 |
| 2) | stormwater management/administration | 20,000 |
| 3) | trends of surface water quality | 50,000 |
| 4) | watershed based projects - estimate | 500,000 |
| Total | | $622,824 |

# ◆ Groundwater Quality ◆

| **Goal:** | **To protect groundwater quality and provide a safe water supply for residential, commercial, industrial, and agricultural uses.** |
|---|---|

| Objective: | Promote proper construction, maintenance, protection, and abandonment of wells, both county and city. |
|---|---|

Actions:

1) Coordinate a public education program on the importance of wellhead protection and proper well abandonment. (1998 – 2003)
2) Inventory abandoned and active wells in the county. (1998 – 2003)
3) Provide an abandoned well-sealing cost-share program. (1998 – 2003)
4) Inventory class 5 injection wells and seek funding for abandonment. (1998 – 2003)
5) Provide the following wellhead protection plan assistance to public water suppliers (1997-2003).
   a. Advise about county land use regulations that can be used to help manage potential contaminant sources in drinking water supply management areas.
   b. Suggest management strategies for a wellhead protection plan.
   c. Suggest problems that ought to be addressed in each wellhead protection plan.
   d. Provide data (i.e. land use, water resources, soil and geology, and water quality) that has been collected.
   e. Provide permit/inspection information for county-administered programs (i.e. building, septic systems, zoning maps, and parcel descriptions.
   f. Help collect information on potential contaminant sources within the drinking water supply management area.
   g. Help coordinate wellhead protection plan development.

| Objective: | Continue to provide a county groundwater testing and education program. |
|---|---|

Actions:

1) Publicize the current county water testing program and provide incentives for private well owners to regularly test their water. (1998 – 2003)
2) Provide an educational program on groundwater issues. Work with county extension and Community Health offices and other agencies on program coordination. (1998 – 2003)

3) Develop a groundwater-monitoring network in the county and routinely sample and test selected wells to establish aquifer conditions and trends. (1998 – 2003)
4) Provide education and information about susceptible/sensitive groundwater areas. (1998 – 2003)

| Objective: | Compile and utilize information about groundwater quality and hydrogeology to protect groundwater resources. |
|---|---|

Actions:
1) Work with the Minnesota Geological Survey and LMIC in developing a groundwater and well database for tracking groundwater quality. (1998 – 2003)
2) Maintain and update the geographic information system containing the existing county geologic atlas and groundwater sensitivity report date. (1998 – 2003)
3) Use existing regulatory programs and develop new regulations to protect and manage highly sensitive groundwater areas as defined by the Groundwater Sensitivity Report. (1998 – 2003)
4) Consider requesting Minnesota Geological Survey to provide a comprehensive hydrogeological survey of the county. (1998-2003)

| Objective: | Obtain funding for groundwater education testing, information gathering, and protection projects. |
|---|---|

Action:
1) Seek private and public (federal, state and local) funding for groundwater projects. (1998 – 2003)

| Objective: | Work cooperatively with other local, state, and federal agencies in coordinating ground water monitoring, education, protection, and improvement projects. |
|---|---|

Activities:
1) Publicize the current state and federal cost-share programs which include groundwater protection measures. (1998 – 2003)
2) Work with the SWCD and Extension Service on providing education to landowners on conservation planning and measures that will benefit groundwater quality. (1998 – 2003)

## **Priority Actions:**

1) Provide wellhead protection program assistance to public water suppliers.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Cities of Cleveland, Elysian, Heidelberg, Kasota, Kilkenny, Le Center, Le Sueur, Montgomery, New Prague and Waterville, Minnesota Department of Health. |
| Funding: | BWSR Water Planning Grant, Le Sueur County Cities |
| Time Frame: | 1998- (as determined by MDH wellhead protection plan schedule for public water suppliers. |

2) Develop a groundwater-monitoring network in the county and routinely sample and test selected wells to establish aquifer conditions and trends. Maintain records in a groundwater and well database for tracking groundwater quality.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, MDH, MPCA (GWMAP) |
| Funding: | BWSR, Le Sueur County, Private Sector |
| Time Frame: | 1998 – 2003 |

3) Develop regulatory provisions to protect and manage highly sensitive groundwater areas as defined by the Groundwater Sensitivity Assessment Report.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Municipalities |
| Funding: | Le Sueur County, BWSR Water Planning Grant |
| Time Frame: | 1998 – 2003 |

4) Continue the abandoned well sealing cost-share program.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County |
| Funding: | BWSR Water Planning Grant |
| Time Frame: | 1998 – 2003 |

5) Obtain Minnesota Geological Survey

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, MGS |
| Funding: | Le Sueur County |
| Time Frame: | 1998 – 2003 |

Budget

| | | |
|---|---|---|
| 1) | estimated @ $5000/city | 45,000 |
| 2) | $150/site for 5 sites for 5 years | 3,700 |
| 3) | estimated | 5,000 |
| 4) | 25 wells @ $200 max / well for 5 years | 25,000 |
| 5) | county share over a 3 year period | 68,108 |
| Total | | $146,808 |

# ◆ Surface And Groundwater Quantity ◆

| | |
|---|---|
| **Goal:** | **To ensure that an adequate supply of groundwater and surface water is available for residential, agricultural, commercial / industrial, and recreational purposes and to minimize problems caused by excessive flows.** |

| | |
|---|---|
| Objective: | Promote water conservation |

Actions:

1) Provide information and education to rural and municipal residents on the importance of water conservation measures. (1998 – 2003)
2) Seek funding for water conservation projects from private, state, and federal sources. (1998 – 2003)
3) Encourage water conservation research and demonstration projects. (1998 – 2003)

| | |
|---|---|
| Objective: | Gather information about surface and groundwater quantities. |

Actions:

1) Monitor several existing wells as observation wells to measure groundwater levels in conjunction with the DNR OBWELL program. (1998 – 2003)
2) Compile water use reports from DNR water appropriation permits to identify major groundwater users and amounts, and potential water use conflicts. (1998 – 2003)
3) Work with DNR on gathering stream flow data. (1998 – 2003)
4) Determine groundwater aquifer capacities and recharge areas. (1998 – 2003)
5) Maintain and update the geographic information system containing the county surface water resources atlas and database. (1998 – 2003)

| | |
|---|---|
| Objective: | Stabilize surface water flows to lessen streambank peak-flow erosion, siltation, and flooding. |

Actions:

1) Restore wetlands and prevent further wetland loss. (1998 – 2003)
2) Promote tillage and cropping practices that retain water. (1998 – 2003)
3) Encourage permanent vegetative cover be planted and maintained on highly erodible and riparian lands. (1998 – 2003)
4) Manage rural and urban construction sites and resultant increased storm water to control excess runoff. (1998 – 2003)

## Priority Actions:

1) Educate citizens on the benefits and techniques of water conservation.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, DNR, MES |
| Funding: | BWSR Water Planning Grant |
| Time Frame: | 1998 – 2003 |

2) Determine groundwater aquifer capacities and recharge areas.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, MGS, MDH |
| Funding: | BWSR Water Planning Grant |
| Time Frame: | 1998 – 2003 |

3) Promote land use practices that help stabilize surface water flows (i.e. wetland restoration, vegetative cover planting, etc.)

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Watershed Organizations, SWCD, MES |
| Funding: | In-kind |
| Time Frame: | 1998 – 2003 |

Budget

| | | |
|---|---|---|
| 1) | Education | 5,000 |
| 2) | Aquifer capacity and recharge | included in cost of Hydrogeologic Atlas |
| 3) | Promote land use practices | 250,000 |
| Total | | $255,000 |

# ◆ Special Land Uses And Conditions ◆

| **Goal:** | **Prevent pollution from solid and hazardous wastes** |
|---|---|

| Objective: | Implement solid waste abatement programs |
|---|---|

Actions:

1) Continue recycling and yard waste composting programs according to the Le Sueur county Solid Waste Plan. (1998 – 2003)
2) Continue educating the public on the importance of recycling, yard waste composting, and waste reduction. (1998 – 2003)
3) Investigate resource recovery options for solid waste management. (1998 – 2003)
4) Provide information and education on the proper management of problem materials and special wastes. (1998 – 2003)

| Objective: | Maintain official controls that regulate solid waste management. |
|---|---|

Actions:

1) Review and update as necessary the county solid waste ordinance to conform with MPCA rules and Waste Management Act amendments. (1998 – 2003)
2) Investigate and remediate illegal dumping activities. (1998 – 2003)

| Objective: | Provide a household hazardous waste collection and education program. |
|---|---|

Actions:

1) Continue to support Tri-County household hazardous waste management program. (1998 – 2003)
2) Coordinate a household hazardous waste information and education program. (1998 – 2003)

| Objective: | Gather information about waste disposal sites |
|---|---|

Actions:

1) Locate and map old municipal and township dump sites with help from MPCA, township officials, and citizens. (1998 – 2003)
2) Seek funding to develop and implement remediation plans for improperly closed city and township landfills or dumps. (1998 – 2003)
3) Inventory clandestine dumps and provide educational and incentive programs to remove them. (1998 – 2003)

| Objective: | Assist hazardous waste generators on proper waste management methods. |
|---|---|

Actions:

1) Provide information to industries and businesses as to where they can get technical assistance for waste management options (i.e. MPCA, MNTAP, etc.). (1998 – 2003)
2) Investigate very small quantity generator assistance options in conjunction with the household hazardous waste collection program. (1998 – 2003)

| Objective: | Prevent pollution of surface and ground water from leaking and overfilled aboveground and underground storage tanks. |
|---|---|

Actions:

1) Provide an education program on the pollution effects on groundwater from leaking and overfilled storage tanks.
2) Inventory and map aboveground and underground storage tanks on the GIS database.

| **Goal:** | **To reduce the adverse effects of agricultural, industrial and urban practices on ground and surface water.** |
|---|---|

| Objective: | Educate rural and urban residents on the proper use and management of fertilizers and pesticides. |
|---|---|

Actions:

1) Promote implementation of low pesticide and environmentally friendly nutrient application practices through coordinating information and education programs concerning:
   a. Proper fertilizer application and timing there of.
   b. Proper techniques of filling and mixing pesticides and properly rinsing empty containers for recycling.
   c. Pesticide application rates.
   d. Primary mechanisms, mainly soil erosion, for entry of nutrients and chemicals into water resources. (1998 – 2003)
2) Support the MDA's Waste Pesticide and empty pesticide container programs. (1998 – 2003)

| Objective: | Minimize the degradation of water resources from agricultural, industrial and urban practices. |
|---|---|

Actions:

1) Coordinate education and assistance programs on the use of best management practices to improve the quality of water discharged from agricultural, industrial and urban land uses. (1998 – 2003)
2) Promote land use incentive programs to reduce surface water pollution. (1998 – 2003)
3) Inventory feedlot locations (1997- 1998) and other potential pollution sources such as unpermitted earthen basins, abandoned wells and clandestine dumps. (1998 – 2003)

4) Encourage wetland restoration and preservation. (1998 – 2003)
5) Coordinate education and assistance focused on reduction of the severity of storm water runoff events in urban and agricultural areas. (1998 – 2003)

**Goal: To reduce the amount of soil lost through erosion.**

| Objective: | Minimize the effects of agricultural, industrial and urban land uses on water quality. |
|---|---|

Actions:

1) Identify land areas which will provide the most water quality benefit by being enrolled in RIM and CRP. (1998 – 2003)
2) Encourage enrollment in federal and state farm set aside programs that take erodible farmland out of production. (1998 – 2003)
3) Implement an information and education program on erosion prone and eroding lands in the county. (1998 – 2003)
4) Promote conservation farming practices. (1998 – 2003)
5) Promote whole farm planning. (1998 – 2003)
6) Provide education and demonstrations on erosion control practices for construction sites in urban areas. (1998 – 2003)
7) Maintain a computerized soil information system that will assist county staff in conservation and land use planning. (1998 – 2003)
8) Seek funding from federal, state and local agencies for education programs, technical staff and erosion control projects. (1998 – 2003)
9) Incorporate erosion control and sediment control provisions for agricultural, industrial and urban development into local official controls. (1998 – 2003)
10) Conduct crop residue transect surveys to promote crop residue management that will reduce sedimentation and increase infiltration of rainfall into the soil. (1998 – 2003)

| Objective: | Control sedimentation to streams, ditches and lakes |
|---|---|

Actions:

1) Encourage rural and urban landowner to work with the FSA, NRCS and SWCD agencies to prevent and reduce sedimentation through the installation of appropriate BMPs such as gully control structures and sediment control basins. (1998 – 2003)
2) Provide information and education to landowners about the water quality and economic problems associated with sedimentation. (1998 – 2003)
3) Encourage enrollment of riparian lands into CRP and RIM Reserve perpetual easement. (1998 – 2003)
4) Encourage wetland restoration and preservation. (1998 – 2003)
5) Encourage planting of vegetative buffer strips along streams, lakes and ditches and around surface intakes for tile drainage systems. (1998 – 2003)
6) Promote exploration of options to replace surface tile intakes. (1998 – 2003)

## Priority Actions:

1) Review and update as necessary the Le Sueur County Solid Waste Ordinance.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County Environmental Services |
| Funding: | In-kind, state and local funding |
| Time Frame: | 1998 – 2003 |

2) Continue household hazardous waste collection and landfill abatement programs.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Tri-County, MPCA |
| Funding: | SCORE, Waste Management Service Fee |
| Time Frame: | 1998 – 2003 |

3) Provide education and information on proper solid and hazardous waste management, pesticide management, erosion control measures and programs, nutrient management and best management practices to protect water resources

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Le Sueur County MES, Le Sueur County SWCD, MDA, MPCA, BWSR, Cannon River Watershed Partnership, Minnesota River Basin Joint Powers |
| Funding: | BWSR Water Planning Grant and other federal, state, local and private grants, SCORE, Waste Management Service Fee. |
| Timeline: | 1998 - 2003 |

4) Inventory and map feedlot locations and other potential pollution sources.

| | |
|---|---|
| Coordinating Agencies: | Le Sueur County, Mankato State University Water Resources Center |
| Funding: | BWSR Water Planning Grant, Challenge Grants |
| Timeline: | Feedlots 1997 - 1998; other sources 1998 - 2003 |

Budget

| | | |
|---|---|---|
| 1) | Le Sueur County Solid Waste Ordinance | 1,500 |
| 2) | HHW collection and landfill abatement | 50,000 |
| 3) | Education and information | 175,000 |
| 4) | Inventory and mapping | 5,000 |
| Total | | $231,500 |

# ◆ Related Land Resources ◆

| **Goal:** | **To preserve and promote open spaces** |
|---|---|

| Objective: | Inform and promote the development fish and wildlife habitat for recreational enjoyment, education and sustainability of natural functions and processes. |
|---|---|

Actions:

1) Provide information to landowners on DNR and USFWS programs that enhance and protect fish and wildlife habitat (i.e. Wetland Restoration / Partners for Wildlife Land acquisition, Private Lands Agreement Program, etc.) (1998 – 2003)
2) Encourage enrollment in various Federal and State farm and water protection programs such as RIM, Native Prairie Bank, Permanent Wetland Preserve, CRP, Swampbuster, Sodbuster and other conservation easements. (1998 – 2003)
3) Encourage landowners to seek assistance from the SWCD office and local DNR, USFWS ecologists in planting trees, native grasses and food plots for wildlife. (1998 – 2003)
4) Support local conservation organizations that encourage fish and wildlife habitat improvement projects. (1998 – 2003)
5) Restore wetlands and prevent further wetland loss. (1998 – 2003)
6) Encourage development of an integrated roadside management program that acknowledges the multi-faceted role such a management program plays in water quantity and quality issues as well as fish and wildlife habitat. (1998 – 2003)
7) Educate and inform the public in the importance of habitat corridors. (1998 – 2003)

| Objective: | Encourage management practices that do not harm or destroy native plant communities. |
|---|---|

Actions:

1) Encourage the return of marginal cropland to its natural condition for native plants whenever possible. (1998 – 2003)
2) Support a county biological survey to obtain a complete inventory of rare plant and animal habitat. (1998 – 2003)
3) Explore the use of “cluster” or “conservation” residential developments to mitigate impact of such development. (1998 - 2003)

| **Goal:** | **To preserve and improve protected waters, wetlands and shorelands through better land use management.** |
|---|---|

| Objective: | Reduce the effects of point and nonpoint source pollution to lakes, streams and wetlands. |
|---|---|

Actions:

1) Provide education about the adverse effects that point and nonpoint source pollution have on water resources (i.e. chemical and fertilizer applications, feedlot runoff, septic systems, etc.) (1998 - 2003)
2) Encourage the planting of filter strips along protected waters and wetlands. (1998 - 2003)
3) Continue enforcement of zoning and wastewater ordinance provisions as they pertain to shoreland development. (1998 - 2003)
4) Update shoreland regulations as needed. (1998 - 2003)
5) Seek funding for continued point and nonpoint source pollution studies. (1998 - 2003)

| Objective: | Identify the intrinsic values and locations of former and existing wetlands. |
|---|---|

Actions:

1) Inventory and map former and existing wetlands on a GIS database. (1998 - 2003)
2) Determine the water quantity and quality benefits of wetlands and develop a county wetland value methodology. (1998 - 2003)
3) Encourage the enrollment of qualifying areas in state and federal programs (i.e. RIM, CRP, Waterbank, etc.) to restore or preserve wetlands. (1998 - 2003)
4) Educate the general public on the function and value of wetlands. (1998 - 2003)
5) Prioritize existing and former wetlands within minor watersheds that should be protected or restored. (1998 - 2003)
6) Develop initiatives and incentives to protect and restore wetland areas. (1998 - 2003)
7) Use Minnesota Wetland Conservation Plan. (1998 - 2003)

| **Goal:** | **Minimize the adverse effects that flooding and drainage have on land use, property, water quality and quantity** |
|---|---|

| Objective: | Reduce sedimentation and erosion along drainage ditches |
|---|---|

Actions:

1) Encourage landowners to establish and maintain an adequate vegetative filter strip along private ditches according to SWCD recommendations. ( 1998 - 2003 )
2) Require that grass buffer strips be established and maintained along public drainage ditches as per Minnesota Drainage Law, Minnesota Statutes 103E. ( 1998 - 2003 )

3) Encourage berm installation along ditches to control sedimentation according to SWCD recommendations. ( 1998 - 2003 )
4) Continue to offer assistance to landowners for construction of stabilization structures along ditches. ( 1998 - 2003 )
5) Require that appropriate BMPs be implemented for any ditch maintenance or side inlet structure project that receives public technical or financial assistance. ( 1998 - 2003 )

| Objective: | Address drainage and flooding issues in the county as they affect water quantity and quality |
|---|---|

Actions:
1) Preserve existing marshes and wetlands which act as water purifiers and flood reservoirs. ( 1998 - 2003 )
2) Encourage wetland restoration. ( 1998 - 2003 )
3) Revise the Floodplain Ordinance as needed to comply county priorities and with state and federal regulations. ( 1998 - 2003 )
4) Encourage local landowners to seek assistance from the SWCD office on tiling and drainage projects. ( 1998 - 2003 )
5) Seek funding for flood control mitigation. ( 1998 - 2003 )
6) Encourage best management practices to reduce pollution in flood prone areas. ( 1998 - 2003 )
7) Continue enforcement of the County Floodplain Ordinance as it pertains to development in the floodplain areas. ( 1998 - 2003 )
8) Provide education and information on water quality and quantity issues related to artificial surface and subsurface drainage. ( 1998 - 2003 )
9) Seek funding for stormwater control projects. ( 1998 - 2003 )
10) Seek funding to research hydrologic characteristics of artificial drainage in first or second order watersheds. ( 1998 - 2003 )
11) Inventory ditches with buffers and miles of ditches through wetlands. ( 1998 - 2003 )

| **Goal:** | **To provide safe and adequate water related recreation opportunities** |
|---|---|

| Objective: | Determine the need and feasibility of improving water-based recreational opportunities in Le Sueur County |
|---|---|

Actions:
1) Survey county residents to determine the demand for more water-based recreational opportunities. ( 1998 - 2003 )
2) Inventory existing public and private water-based recreation facilities. ( 1998 - 2003 )

| Objective: | Further develop water-based recreation in Le Sueur County. |
|---|---|

Actions:
1) Consider acquiring land adjacent to public waters for developing parks and recreational facilities. ( 1998 - 2003 )
2) Improve and maintain park lands and increase recreational facilities along Minnesota River. ( 1998 - 2003 )

3) Provide and maintain accesses to public recreation areas. ( 1998 - 2003 )

5) Work with other agencies, sportsmen's groups and conservation organizations to acquire water-based recreation areas. ( 1998 - 2003 )

## **Priority Actions:**

1) Provide information to private landowners on existing federal, state and local programs that provide technical and financial assistance for the maintenance, development and enhancement of fish and wildlife habitat; provide information on water quality and quantity issues related to artificial surface and subsurface drainage.

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|---|---|
| Coordinating Agencies: | Le Sueur County, FSA, SWCD, NRCS, DNR, USFWS, MES and CWP |
| Funding: | In-kind |
| Time Frame: | 1998 - 2003 |

2) Encourage wetland restoration.

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|---|---|
| Coordinating Agencies: | Le Sueur County, SWCD, DNR, USFWS, and CWP |
| Funding: | Various cost-share programs |
| Time Frame: | 1998 - 2003 |

3) Continue to enforce and update regulations that protect shorelands, wetlands, floodplains and protected waters.

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| Coordinating Agencies: | Le Sueur County, DNR, SWCD, municipalities |
| Funding: | BWSR Grant, In-kind |
| Time Frame: | 1998 - 2003 |

4) Develop a county wetland value methodology and prioritize existing and former wetlands within minor watersheds that should be protected or restored. Digitized inventory.

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| Coordinating Agencies: | Le Sueur County, DNR, SWCD, and CRWP |
| Funding: | BWSR Grant, In-kind, other available public and private sources |
| Time Frame: | 1998 - 2003 |

5) Monitor public drainage ditches to ensure that a vegetative buffer strip is established and maintained immediately after redeterminations are completed as required by Minnesota Statutes, Chapter 103E.

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| Coordinating Agencies: | Le Sueur County |
| Funding: | Le Sueur County |
| Time Frame: | 1998 - 2003 |

6) Monitor 1st order drainage system to determine volume and velocity of surface water runoff.

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| Coordinating Agencies: | Le Sueur County, DNR, UM, BWSR |
| Funding: | Le Sueur County, Challenge Grants, state and federal agencies |
| Time Frame: | 1998 - 2003 |

7) Inventory existing water-based recreation facilities and survey county residents to determine the need and feasibility of improving water-based recreational opportunities.

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|---|---|
| Coordinating Agencies: | Le Sueur County, DNR, Municipalities, MES |
| Funding: | Le Sueur County, BWSR grants |
| Time Frame: | 1998 - 2003 |

Budget

| | | |
|---|---|---|
| 1) | Information and promotion | 5,000 |
| 2) | Encourage wetland restoration | 5,000 |
| 3) | Enforce and update regulations | 10,000 |
| 4) | Prioritize existing and former wetlands | 25,000 |
| 5) | Vegetative buffer strip monitoring | 5,000 |
| 6) | 1st order drainage system monitoring | 30,000 |
| 7) | Inventory facilities and survey | 5,000 |
| Total | | $85,000 |

# Water Plan Administration

## Implementation Program

Le Sueur County recognizes the importance of all water resources. It is through such an awareness that the Comprehensive Local Water Plan was developed, has been revised and implementation actions have occurred. The goals, objectives and actions listed in the Plan are a comprehensive reflection of the water related concerns in the county.

Role of the County in Implementation

Le Sueur County, by revising this plan, recognizes the importance of comprehensive local water planning. Cooperation between county, township and city governments in water plan development is very important. Future state or federal funding requests to support water related activities in the county will be reviewed in the context of the county's water plan.

The Water Plan Coordinator coordinates the activities that are necessary for implementation of the Annual Work Plan recommended by the Water Plan Task Force and approved by the Le Sueur County Board of Commissioners. The Water Plan Coordinator or a designated alternative represents the County in water related activities which further the goal of protecting and preserving the water resources of the county. Implementation will be based on current needs, funding and availability of staff. Consideration will be given to changes in state initiatives and regulations. The annual work plan provides a detailed strategy by which measurable actions will be carried out.

The county recognizes that completion of all goals and objectives require staff and funds beyond the county budget. It also understands that state funding cannot provide the funding for all goals and objectives for all counties. Le Sueur County will pursue supplemental funding opportunities as sources become available. The county also recognizes the need to continue successful programs, delete unsuccessful programs and develop new programs. Where possible action items are identified which can be implemented at low cost utilizing local resources.

In addition to the previously listed objectives and actions and understood responsibilities, Le Sueur County will continue three actions intended to ensure that adequate organization and administration structure is maintained to support the active and effective implementation of this plan. These three items are:

1.) Maintain the Le Sueur County Water Plan Task Force.

This committee helped revise the county Comprehensive Local Water Plan. It has been an effective mechanism for providing county government with a diverse and representative view on local water planning issues. This group has been schooled in the issues of local water planning and understands the history and evolving issues of local water planning. It is representative of the wide variety of public and local government interests and has become a valuable resource for the county.

Le Sueur County will continue and maintain the functions of the Water Planning Task Force and ask that it serve in an advisory capacity to the Water Plan Coordinator and as needed to the County Board of

Commissioners. It will continue to be composed of the broad based public and private interests that the committee now represents. Replacements to this committee will be appointed by the County Board of Commissioners.

This committee will meet at least twice a year to review plan implementation progress and identify emerging problems, opportunities and issues. In addition, it will serve as the initial body receiving proposed amendments to the county water plan. This function is outlined in the amendment procedure section of this plan.

2.) Maintain the position of Water Plan Coordinator.

This individual will ensure that the actions listed as being the role of the county in implementation are executed. In addition, this position will continue to be responsible for providing the County Board of Commissioners and the State Board of Water and Soil Resources with an annual report on the status of the Water Plan implementation. The Water Plan Coordinator will provide the Water Plan Task Force with the information it needs to act in its advisory capacity; maintain open liaison and communication lines to all agencies and state departments concerned with water planning execution; and will coordinate the efforts on various programs relating to water to minimize duplication of agency action.

3.) Continue development of direct, ongoing liaison programs with federal, state, regional and local agencies and public interest groups to ensure cost-effective and efficient plan implementation.

Many of the goals and objectives of the county water plan directly relate to ongoing plans of various agencies and organizations. Both short-term and long-term implementation will be dependent on open lines of communication and based on the continuation of relationships with local and regional agency staff such as the MES, SWCD, NRCS, DNR, MPCA, local and regional institutions, private associations and organizations. State and federal agency involvement is also critical for a number of action items identified in the plan.

## Conflict Resolution

The County Board of Commissioners realizes that conflicts may arise in the interpretation and implementation of the Comprehensive Local Water Plan. These conflicts may be within the county, between local units of government and the Plan or between neighboring counties or governmental jurisdictions from other counties and the Plan. In the event of such a conflict, they will be addressed in the local, informal or formal resolution process.

Local Resolution Process:

Le Sueur County realizes that the resolution of conflict on the local level will give the county the greatest control over the implementation of the Plan. The County also realizes that cooperation on all fronts will be needed to implement the Water Plan and keep areas of conflict to a minimum. Le Sueur County intends to minimize conflict wherever possible during implementation.

Conflicts which arise will be brought to the attention of the Water Plan Task Force. The Task Force will work with the parties involved to see if a solution to the problem can be found and the conflict resolved. If the Task Force is unable to resolve the conflict, the facts of the case will be presented to the County Board of Commissioners. The Board will determine if the conflict can be resolved. If other counties are involved the information will be presented to the other County Board and/or the appropriate governing board to see if a cooperative solution can be found.

Informal Resolution Process:

The County or other unit of government may request a meeting with the chair of the Board of Water and Soil Resources to informally resolve the following disputes:

- to determine the meaning of any provision of Minnesota Statutes Chapter 103B;
- to resolve conflicts between any two comprehensive water plans; or
- to settle any other dispute relating to a comprehensive water plan.

The informal process is as follows:

A meeting with the chairperson of the State Board of Water and Soil Resources may be requested in writing by any of the involved parties.

The nature of the provision or omission causing the conflict must be described, whether it is in the comprehensive water plan, local plan or other control. All parties in the conflict must be identified.

The chair shall acknowledge the request in writing and request a meeting of all parties. If requests for a meeting do not satisfy the parties, or if there is no response from one of the parties, the chair shall make a reasonable effort to obtain the information needed for resolution in another manner.

The chair shall establish the meeting time and place and inform all parties in writing. A local unit of government may be represented by any person or persons of its choosing, subject to control of the chair.

The chair may consider any relevant and reasonable evidence or argument by a local unit of government on reaching a resolution.

The decision of the chair may be announced at the meeting or made later. The decision shall be submitted in writing to all parties and will be effective 60 days following the decision of the chair.

A petition may be filed within the time pursuant to Minnesota Statues, section 103B.25 subdivision 3, for a contested case hearing under that section.

Formal Resolution Process

If the informal process did not work or could not be used, a local unit of government may petition for a contested case hearing under Chapter 14. Following the hearings and the report of the administrative law judge, BWSR must make a final decision on the issue. A decision of the board may be appealed to the court of appeals.

The process for a formal resolution of a conflict is as follows:

A county or other local unit of government may petition for a contested case hearing if:

- the interpretation and implementation of a comprehensive plan is challenged by a local unit of government aggrieved by the plan;
- if two or more counties disagree about the apportionment of the costs of a project implemented in a comprehensive plan; or
- if a county and another local unit of government disagree about a change in a local water and related land use resources plan or official control recommended by the county under Statute 103B.

The county or other local unit of government must file the petition by 60 days after one of the following dates:

1. The date of adoption or approval of the disrupted ordinance or other decision required to be made to implement the comprehensive water plan; or
2. The date a local unit of government receives a recommendation of the County Board under section 103B.12.

If the aggrieved county or other local unit of government files a petition for hearing, a hearing must be conducted by the state office of Administrative Hearings under the contested case procedures of chapter 14 within 60 days of request. The subject of the hearing may not extend to questions concerning the need for a comprehensive water plan. In the report of the administrative law judge, the fees of the office of administrative hearing and transcript fees must be equally apportioned among the parties to the proceeding. Within 60 days after receiving the report of the administrative law judge, the board shall, by resolution containing findings of fact and conclusions of law, make a final decision with respect to the issue before it.

Any local unit of government or state agency aggrieved by the final decision of the board may appeal the decision to the court of appeals in the manner provided by sections 14.63 to 14.69.

A county or other local unit of government may petition for a contested case hearing by satisfying the requirements of Minnesota Statutes, section 103B.25 subdivisions 2 and 3, and this part.

A petition for a hearing shall be made in writing and addressed to the state board. The petition shall contain:

1. The name of the local unit of government petitioning and the names, addresses and phone numbers of the officers of the local unit or other persons representing the local unit for the purposes of the petition;
2. A request for a hearing;
3. A statement of the allegations or issues to be determined by the hearing; and
4. Proof of service of a copy of the petition on all other involved local units of

government.

Definitions:

Filing a petition - A petition is considered filed with the state board when it is received by the board. Upon receipt of the petition, the board shall acknowledge its receipt in writing.
Request for judge - Within five (5) days of receipt of a sufficient petition for a hearing, the state board shall file a request under part 1400.5300 for assignment of an administrative law judge.
Hearing - Hearings are governed by the contested case procedure of Minnesota Statutes, chapter 14 and by parts 1400.5100 to 1400.8400.
Hearing fees - For the purpose of apportioning the fees of the Office of Administrative Hearings and transcript fees, the state board shall not be considered a party to the proceeding.

## Plan Amendment Procedure

The 1996 revision of the Le Sueur County Comprehensive Local Water Plan is intended to extend through the year 2001. Prior to that date, the County may propose amendments to the Water Plan.

Major Amendment

A major amendment is defined as those amendments that result in the regulation of land and water resources, acquisition of property, assessment of costs and establishing special taxing districts as identified in M.S. 103B.331, Subd. 2, 3 and 4.

The following procedure will be used to deal with proposed major amendments to the Le Sueur County Comprehensive Local Water Plan:

1. When issues are brought to the attention of the county with regard to the need for amendments to its adopted County Comprehensive Local Water Plan, the county will refer that person, group, local unit of government or agency to the County Water Planning Committee (Task Force).

2. The Task Force will review the issue and may if necessary undertake studies or investigations to gather information relating to the issue. After reviewing the issue the Task Force will determine whether the Water Plan should be amended.

3. If the Task Force determines that the Water Plan should be amended, they will make recommendations to the County Board. The County Board shall decide whether or not to proceed with the proposed amendment.

4. Of, during the course of the investigations and studies of the proposed amendment, it is found that no changes are warranted, the investigating body will provide full documentation to the County Board as to the findings for the requested amendment and data supporting the recommendation.

After development, but before final adoption by the County Board, a proposed amendment to the Water Plan must be submitted for local review and comment in the following manner:

1. The County must submit the proposed amendment to all local units of government wholly or partly within the county, the applicable regional development commission, each contiguous county and other counties or watershed management organizations within the same watershed unit and groundwater system that may be affected by the proposed Water Plan amendment.

2. A local unit of government must review the proposed amendment and its existing water and land related land resources plans or official controls and in its comments describe in a general way possible amendments to its existing plans or official controls and an estimate of the fiscal or policy effects that would be associated with those amendments to bring them into conformance with the proposed Plan amendment. A county or watershed management organization within the same watershed unit or groundwater system must review the proposed Plan amendment and describe in its comments possible conflicts with its existing or proposed Comprehensive Water Plan and suggest measures to resolve the conflicts. The regional development commission must review the proposed amendment under Section 462.391, Subdivision 1. Comments from local review must be submitted to the County Board within 60 days after receiving a proposed plan amendment for comment unless the County Board determines that good cause exists for an extension of the period and grants an extension.

3. The County Board must conduct a public hearing on the proposed plan amendment pursuant to Section 375.51 after the 60 day period for local review and comment is completed but before the proposed amendment is submitted to the state.

4. After conducting the public hearing but before final adoption, the County Board must submit the proposed plan amendment, all written comments, a record of the public hearing and a summary of the changes incorporated in the proposed plan amendment as a result of the review process to the Board of Water and Soil Resources (BWSR) for review.

5. The BWSR must complete the review within 90 days after receiving the proposed county Water Plan amendment and supporting documents. BWSR must consult with the Departments of Agriculture, Health and Natural Resources, the Pollution Control Agency, the State Planning Agency, the Environmental Quality Board and any other appropriate state agencies during the review period.

6. The BWSR may disapprove a proposed county Water Plan amendment if it determines that the amendment is not consistent with state law or the principles of sound hydrologic management, effective environmental protection and efficient management. If the amendment is disapproved, the BWSR must provide a written statement of its reasons for disapproval.

7. A disapproved county comprehensive water plan amendment must be revised by the County Board and resubmitted to the BWSR for approval within 120 days after receiving notice of disapproval unless the BWSR extends the period for good cause. The decision of the BWSR to disapprove the amendment may be appealed by the county to district court.

8. A County Board must adopt and begin implementation of its amended water plan

within 120 days after receiving notice of approval of the amendment from the BWSR.

Minor Amendment

If a revision/amendment to the Le Sueur County Comprehensive Local Water Plan is not considered to be a major amendment, it is considered to be minor in nature and the following revision process will be followed:

1. The Le Sueur County Board of Commissioners will receive a recommendation from the Le Sueur County Water Planning Task Force for an amendment to the Water Plan;
2. At the Board of Commissioner's meeting where the amendment is introduced, the County will hold a public hearing to explain the amendment(s) and publish a legal notice of the hearing at least ten (10) days before the date of the hearing; and
3. The County will send copies of the amendment(s) to the BWSR Board Conservationist assigned to Le Sueur County for review and comment.

## Recommended State Program Changes

Success in county-based water planning depends on the continuation of the spirit of cooperation between state agencies and the county staff which developed through the writing and implementation of the first generation water plans. Essential to this is the continuation of funding to the counties for water plan implementation. Other items of importance include:

- Timely notification of program changes and funding availability.
- Support of local efforts through regional offices of the state agencies. Agency staff assigned to specific counties allows those individuals to develop a deeper understanding of the county's issues. On the flip side, working with agency staff assigned to their county allows the county staff to become more familiar with the state programs which effect their county.
- Support of implementation measures focused on prevention rather than just on clean-up.
- Increase in communication to decrease duplication and increase efficiency in program administration.
- Increase in accessibility to data.
- Retention of fees collected at county level to offset costs involved in administration and implementation of water related programs.
- Increase flexibility in the prioritization process for water planning goals, objectives and actions. It is important to review and set priorities on an annual basis. Priorities set with a 5-year comprehensive plan must be vague and cannot help but become obsolete in very short order. Priority setting on an annual basis would allow more effective and efficient use of staff time and available funding.

## General Information

All amendments adopted by Le Sueur County will be printed in the form of replacement pages for the Water Plan. Each page will:

* show deleted text as stricken and new text as underlined;
* be renumbered as appropriate; and
* include the effective date of the amendment.

Le Sueur County maintains a distribution list of agencies and individuals who have received a copy of the Water Plan. The County shall distribute copies of the amendment(s) within 30 days of adoption.

## Glossary

Abandoned well
: A water well that is no longer in use.

Animal Units
: A unit of measure developed to compare differences on the production of animal manure. One animal unit is standardized as the amount of manure produced on a regular basis by a slaughter steer or heifer. (Taken from Running Your Feedlot by the Minnesota Pollution Control Agency.)

Aquifer
: A water bearing layer of sand, gravel or rock at varying depths below the soil surface.

Biomass
: The trees and other plant matter grown as a source of renewable energy, such as those grown on "wood" farms. Considered a low pollution, renewable energy source for generating electric power. Biomass is the use of agricultural related products such as fast growing hybrid trees, switch grass, organic crops, alfalfa or tropical grasses.

CRP
: Conservation Reserve Program is a federal program to restore marginal farmland to its natural state.

Dry Ag Well
: A vertical shaft dug into agricultural fields for the purpose of draining off excessive moisture and preventing flood damage to crops.

Groundwater
: Water existing under ground that serves as a major source of drinking water.

Household Hazardous Waste
: Household quantities of hazardous substances as defined by Minnesota Statutes section 115B.02, Subdivision 8.

Injection Well
: "A well, as defined in Title 40 of the Code of Federal Regulations, is either a dug hole or a bored, drilled or driven shaft whose depth is greater than its largest surface dimension. Injection is defined as the subsurface emplacement of fluids in a well where a fluid is any material that flows or moves whether it is semisolid, liquid, sludge or gas. No injection is authorized without approval from the appropriate regulatory agency". From Class V Well Facts, Office of Drinking Water, United States Environmental Protection Agency.

Log
: A record of acquired information.

Major Amendment
: Those amendments that regulate land and water resources, acquire property and assessments of cost and set up special taxing districts as in M.S. 103B.331,

Subd. 2, 3 and 4.

Minor Amendment

Those amendments that DO NOT regulate land and water resources, acquire property and assessments of cost and set up special taxing districts as in M.S. 103B.331, Subd. 2, 3 and 4.

Ordinary High Water Level

The boundary of public waters and wetlands is defined as the elevations delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Protected (Public) Waters

Waters identified as public waters or wetlands under Minnesota Statutes 103G.005, Subd. 15 and 18 and containing ten (10) acres or more in the basin via the Protected Waters Inventory.

Radial-Water Collector (i.e. Ranney Well)

"Radial-water collectors refers to horizontal casings and screens which are jacked out of a central caisson. This type of well is often referred to by the trade name Ranney well." MN Rules 4725.5850.

Reinvest in Minnesota

A state program encouraging retirement of marginal farmland and wetland restoration.

Sensitive Ground Water Area

A "geographic area defined by natural features where there is significant risk of ground water degradation from activities conducted on the surface." Minnesota Ground Water Protection Act of 1989.

Septic System

A system for onsite sewage treatment, usually consisting of one or more septic tanks and a site specific soil treatment system.

Water Quality

Purity of water supplies, the extent of contaminants or pollutants in the water supply.

Water Well

Vertical shafts bored into the ground for the sole purpose of procuring water.

Wellhead Protection Area

Wellhead protection (WHP) is a means of safeguarding public water supply wells by preventing contaminants from entering the area that contributes water to the well or well field.

## Acronyms

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| ACOE | Army Corp of Engineers |
| BMP | Best Management Practices |
| CLMP | Citizen Lake Monitoring Program |
| CRP | Conservation Reserve Program |
| CWP | Clean Water Partnership |
| DNR | Minnesota Department of Natural Resources |
| DOT | Minnesota Department of Transportation |
| EPA | Environmental Protection Agency |
| EQB | Environmental Quality Board |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| LAP | Lake Assessment Program |
| LCMR | Legislative Commission on Minnesota Resources |
| LISA | Low Impact Sustainable Agriculture |
| LMIC | Land Management Information Center |
| LGU | Local Governmental Unit |
| LSP | Land Stewardship Project |
| MDA | Minnesota Department of Agriculture |
| MDH | Minnesota Department of Health |
| MES | Minnesota Extension Service |
| MGS | Minnesota Geologic Survey |
| MLMBS | Middle-Lower Minnesota Basin Study |
| MPCA | Minnesota Pollution Control Agency |
| MRAP | Minnesota River Assessment Project |
| MRIP | Minnesota River Implementation Project |
| MSU | Mankato State University |
| NRCS | Natural Resources Conservation Service, USDA |
| NWS | National Weather Service |
| OHW | Ordinary High Water |
| OP | Ortho-phosphorus |
| PWI | Public Water Inventory |
| PUC | Public Utilities Commission |
| P&Z | Planning & Zoning (Le Sueur County) |
| RDF | Refuse Derived Fuel |
| RIM | Reinvest in Minnesota |
| SCMCCWPP | South Central Minnesota Counties Comprehensive Water Planning Project |
| SPA | State Planning Agency |
| SRLF | State Revolving Loan Fund |
| SWCD | Soil and Water Conservation District |
| TCSWO | Tri-County Solid Waste Office (Nicollet, Le Sueur and Sibley Counties) |
| TP | Total phosphorous |
| TSS | Total Suspended Solids |
| UofM | University of Minnesota |
| USF&W | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| USDA | United States Department of Agriculture |
| VOC | Volatile Organic Compound |
| WCA | Wetland Conservation Act of 1991 |
| WHP | Wellhead Protection |
| WMA | Wildlife Management Area |

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|---|---|
| WPA | Waterfowl Production Area |
| WPC | Water Plan Coordinator |
| WPTF | Water Plan Task Force |
| WRC | Water Resources Center (Mankato State University) |