SCOTT COUNTY, MINNESOTA
GROUND WATER PROTECTION PLAN

Adopted
March 23, 1999

THE SCOTT COUNTY BOARD OF COMMISSIONERS
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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Scott County ground water plan was prepared according to MN State statute 103B.255. The resource considerations of the plan are listed in the plan. The issues addressed in section 4.0 are those identified by the Ground Water Advisory Committee (GWAC) as relevant to Scott County residents. A grant from the Board of Water and Soil Resources (BWSR) was received to prepare the plan. The plan was prepared by the GWAC with assistance from county, state, and federal agencies for approval by the Scott County Board of Commissioners.

The plan identifies existing and potential problems as well as opportunities for ground water protection. The increasing population growth of Scott County intensifies land development pressure and also the potential for ground water pollution through land development activity and land use changes.

The Committee and staff realize the integral connection between air, land, surface water and the ground water. The plan developed recognizes that damage to surface water quality may well impact ground water quality.

1.2 PLAN PREPARATION

Plan preparation was directed by the GWAC appointed for that purpose by the County Commissioners. On March 5th, 1991 the Scott County Planning, Inspections and Environmental Health (PIE) with the Scott County Soil and Water Conservation District (SWCD) was directed by County Board resolution to prepare a county wide ground water management plan. Committee nominations were recruited and received with a committee appointed by the commissions on September 28, 1993. The first committee meeting was held on November 4, 1993.

Since the first meeting, the GWAC has been meeting monthly. The GWAC set up a sub-committee to prepare sections for the ground water plan. The intent of having the sub-committee was so that sections could be prepared and then submitted to the GWAC in a more complete version for review, comments, and changes. The sub-committee generally met 1-2 times a month since its formation in May of 1994.

The GWAC will be decommissioned when the plan is complete. Information on the issues listed in Section. 4 was developed under the direction of Olaf Pfankuch and/or

County staff and SWCD staff. The information was then presented to the committee for discussion, policy direction and objective formulation. Each issue section contains background information and inventory data on that issue to characterize its nature and extent in Scott County . Following the background are one or more objectives stating what needs to be done in Scott County to protect and conserve ground water.

The plan adoption process requires a review and comment period for local agencies and departments, Metropolitan Council and State Agencies to review the plan. When complete, plan approval by the BWSR is required. After the review and comment, and approval the plan is submitted to the County Commissioners for adoption in part or in total. Plan updates are required every 5 years.

1.3 PLAN GOAL

The plan goal is to assure County residents access to potable water by protecting existing and future ground water resources.

1.4 PLAN CONTENT

Contained in the plan are objective recommendations intended to protect ground water quality. To support and explain these objectives are two broad categories of subject matter. Section 3 is a general inventory of County resources including information on climate, soils, geology, wetlands, floodplains and major aquifers. It describes the overall resources of Scott County ground water and land use activity. It makes clear the nature of the soils and rocks that contain our ground water and the degree to which this ground water is susceptible to contamination by surface activity.

Section 4 is organized by "ground water issues". Each issue contains an inventory section to describe the nature of the issue in Scott County and an objective section spelling out steps needed to correct or avoid ground water contamination and promote conservation. The objectives have identified participating agencies. The lead agency/ department is always listed first, although the lead agency may not do the actual implementation of the objective, they are responsible to see that the objective is achieved. The actual implementation of the objective can be delegated to another agency listed as a participating agency/department. For quick reference to objectives developed in each issue go to Section 5. This section gathers all the goals and objectives of all the issues in one place. For the background inventory and detail that supports the objective, refer to that issue, in Section 4.

For quick reference to objective priority see Table 6.1.1. Completion of objectives by year and responsible agency are listed in this Table. Implementation follows plan adoption. Section 6 discusses this in detail. The implementation strategy requires the commitment and cooperation of municipalities and other units of government. It also must be accomplished within the constraints of the County's funding and tax base. The implementation plan has prioritized the policy directives and objectives to reflect not only the County's perception of the magnitude and urgency of the issue, but also the ease and cost effectiveness of implementation and a realistic assessment of current and future staff and financial resources.

The County will take two initial implementation steps:

1) Replace the ground water advisory committee with an implementation ground water advisory committee (IGWAC).

2) Appoint a County department or official responsible for coordination of implementation.

The IGWAC will be composed of three members of the GWAC. At least one member from each unit of government, Watershed District representatives and County land and water planners.

The IGWAC's functions include:

1) Develop specific programs to implement the ground water plan;

2) Monitor plan progress;

3) Meet at least annually to review annual progress;

4) Develop an annual work plan;

5) Report to the County Commissioners;

6) Coordinate plan implementation among the cities, townships, and Watershed Districts in Scott County ;

7) Identify new ground water protection concerns, and,

8) Contact and involve special interest groups when needed to help develop implementation strategies.

1.5 CONCLUSION

The plan was prepared by a local citizen group with assistance from local, state and federal agencies. When the draft is completed it undergoes a public review procedure as outlined in MS Statute 103B.255). After the review procedure is complete the plan goes before Scott County Board of Commissioners for plan adoption. After County adoption, the implementation of the plan will be the responsibility of the appointed County department or official with oversight by the IGWAC as noted above.

The plan contains ground water data and issues developed relevant to Scott County residents. It maps an implementation and update strategy to be followed in the years ahead.

2. PLANNING PROCESS

2.1 PLAN OVERVIEW

Scott County has developed the Ground Water Plan in order to provide protection of the ground water resources in the area. By developing the plan now the County can identify existing and potential problems as well as opportunities for the protection of ground water sources. The County has delayed development of this plan by several years while other county plans were developed in order to observe the ground water planning process and possibly avoid costly delays as the County plan was developed.

Scott County is faced with increasing population growth as the Minnesota River Bridge project nears completion. With this projected population growth comes an increased demand on land development. As the land is developed the Count'ys tax base will increase. This increase in tax base will fund programs that will be needed because of the increased development. The County needs to plan for ground water protection now so that in the future ground water will not become contaminated and destroy the County tax base as well as water for future generations.

The ground water plan was developed under careful guidance by agency staff and the advisory committee which consisted of a variety of professionals, agency staff and County citizens. Under the guidance provided by these people a comprehensive plan was developed that was practical and had a high probability of success in being implemented. The advisory committee commented many times that it wanted a plan which would be implemented and not just put on a shelf.

The committee and staff realized that there was an integral relationship between the air, land, surface and ground water. With this relationship in mind the committee developed a plan which recognizes that if damage occurs in one of these environments, it may well affect all or some of the other environments including the ground water system. The plan makes recommendations to manage and protect the common resource used by all people in the area.

2.2 PLAN HISTORY

On May 22, 1989, the Minnesota Legislature passed the Comprehensive Water Resources Act of 1989 which authorized the BWSR to establish a Local Water Resources Protection and Management Grant Program. The BWSR then established a matching grant program so that counties would have financial incentives to prepare a ground water plan. Beginning in July 1990 metropolitan counties with approved ground water plans were eligible for grants to help implement plans.

On March 5, 1991, the Scott County Board passed a resolution directing the PIE, in cooperation with the SWCD, to prepare a county-wide ground water management plan. The PIE office then solicited nominations from various agencies, departments and citizens of the County for the GWAC in April of 1991. In September of 1993, various nominations throughout the County were collected. The commissioners selected 15 members to serve on the committee as required by the statute at the September 28, 1993 board meeting. The first committee meeting was held in November of 1993, organizing the committee and establishing direction for proceeding with the development of the ground water plan. Since that time, monthly meetings have been held with the advisory committee and County staff to discuss plan issues and plan section development.

2.3 PLAN SCOPE

Throughout Minnesota and the country there is a growing concern over the impact of human activities on ground water quality. This concern is experienced in Scott County as well. Responding to the increasing number of ground water contamination and degradation cases, the County is determined to protect ground water quality and the quantity of existing ground water resources, thereby assuring residents access to abundant potable ground water supplies. This plan is intended to be limited to Scott County and the ground water of Scott County.

2.4 PLAN GOAL'S

The plan's goals are:

1) Inventory all ground water resources and delineation of sensitive areas;

2) Evaluation of land use impact on ground water quality and quantity;

3) Identification of existing ground water contamination (point and nonpoint sources);

4) Identification of major issues affecting the County's ground water supply;

5) Anticipation and description of environmental changes attributable to land use and development and its possible affects on ground water quality and quantity;

6) Establishment of goals and objectives used to address those identified issues, and

7) Actions needed to achieve the plan's goals and objectives.

2.5 AGENCY RESPONSIBILITIES

This plan was developed by the PIE Office with cooperation by the SWCD and other local county, state, federal agencies, and organizations. Figure 2.5.1 summarizes the roles of agencies and organizations involved as the plan developed.

Figure 2.5.1

ORGANIZATIONAL STRUCTURE **December 1993**	Ground Water Advisory Committee
PLAN DEVELOPMENT July 1996 Local Organizations and Agencies	* Issue Identification (Implementation Strategies) * Data Collection and Assessment (determine Critical Areas) *Plan Writing (Draft)
LOCAL, PRELIMINARY MET. COUNCIL AND STATE AGENCY REVIEW 45 Days Public Hearing Dec.- March 1997	
METROPOLITAN COUNCIL AND STATE AGENCY FINAL REVIEW 30 Days March - April 1997	
BWSR REVIEW AND APPROVAL September, 1998 - February, 1999 Approved on January 27, 1999	
COUNTY ADOPTS PLAN 120 Days March, 23 1999	
PLAN UPDATE Sept. 2004 (and any other subsequent 5 year increment)	

Figure 2.5.1 Roles of Agencies and Organizations as the Ground Water Plan is developed.

3. RESOURCE INVENTORY

3.1 CLIMATE AND PRECIPITATION

Precipitation (rainfall and snowfall) impacts water quantity and water quality in the County. The long term average annual precipitation from 1936 to 1987 recorded at what is called the Mpls/St. Paul station is 27.4 inches per year. Based on information from this station from 1836 to 1995, rainfall has been above average for the last seven years.. Early records (1936-1870) of monthly and annual precipitation were records from Ft. Snelling. From 1870 to 1938, various locations were used and were attributed to the Minneapolis/St. Paul station. Since 1938, the Minneapolis/St. Paul station has been the Minneapolis/St. Paul Airport. Average annual precipitation records will vary depending on the number of years used for averaging and the station location.

Scott County precipitation data has been gathered at Jordan since 1949 by various volunteer rainfall monitors. The data from this monitoring effort is available from Scott County Scott County has also been participating in a rain gage volunteer program with the state climatologist. Average annual rainfall has been calculated for Scott County based upon the volunteer program. Information on annual average rainfall for Minnesota Counties is available from the Minnesota Department of Natural Resources and a throught a combined effort by several agencies available to the public at the following website: (http://climate.umn.edu)
The Minneapolis/St. Paul station records are referenced because this station has the longest continuous record for the region. However, rainfall occurring within the County can be very uneven. During a major rainstorm event in July, 1987 nearly 10 inches fell in the city of Shakopee and less than 3 inches fell several miles to the south over a 24-hour period.

Although a 100-year 24-hour storm event is based on 6-inches of rainfall over a 24-hour period, this is usually considered to be a regional occurrence and not necessarily a rainfall at a specific point. For an entire watershed to receive 6 inches of rain in 24 hours would be very rare and would cause considerable damage.

Most of the precipitation in Scott County occurs from May through September, with June receiving the highest monthly rainfall. On an average year, the calculated evaporation rate exceeds the precipitation rate by 7.0 inches. The rise and fall of lake levels are more closely related to net precipitation than yearly precipitation.

A typical growing season in Scott County is about 139 days. The average date of the first killing frost is 29 September and the average date of the last killing frost is 13 May (USDA 1959). These averages are based on records up to 1959, but are similar to more recent averages collected at Farmington, Minnesota (about 30 miles from Jordan, Minnesota), listed in the 1983 Soil Survey of Dakota County (USDA 1983).

Sources of information are at the State Climatologists office, located at the St. Paul DNR State Office. Detailed information for Scott County can be found at the SWCD office in Jordan, Minnesota.

3.2 TOPOGRAPHY

The advance and retreat of glacial ice sheets, the remnants of terminal moraines, and subsequent dissection by streams and rivers has left much of the present day topography in Scott County from rolling to strongly rolling and in places, hilly.

Within Scott County, elevations range from a high of about 1210 feet above sea level to a low of about 700 feet above sea level. The high point in Scott County is located in the southeast corner of the County in New Market Township. The low point is at the Minnesota River, north of Savage.

A US Geological Survey 15 minute topographical map of Scott County illustrates topographic contours for the County (the map is available for review at the SWCD). Topographical maps of a larger scale (7.5 minute quadrangle maps) are also available for review at the SWCD in Jordan, and at the Department of Natural Resources (DNR) headquarters. The maps can be purchased at the Minnesota Geological Survey (MGS), St. Paul.

3.3 SOILS

Soil associations represent several soil series having similar characteristics on a county-wide basis. In 1980, a revised soil association map for Scott County was published (USDA 1980) delineating 10 soil associations The general soil association map showing limitations or suitability for construction and other uses is available from SWCD.

A soil series is a more detailed soil classification than a soil association. Individual soil series for Scott County were published in 1959 (USDA 1959) in detailed Soil Surveys. Soil series for Scott County have not been revised. Individual soil series for Scott County are shown on the Soil Map. The soils map is available at the SWCD in Jordan, Minnesota.

3.4 PRIME FARMLAND

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing crops. The soil has acceptable acidity or alkalinity, acceptable salt and sodium content and few or no rocks. The farmlands are not excessively erodible or saturated with water for long time periods, wetlands are an example of excluded land. Examples of soils that qualify are Clarion loam, Webster clay loam, and Lester silty clay loam. In Scott County, there is a total of 76,500 acres of prime farmland which represents 33% of the County acreage. A map of prime farmland in Scott County is available from SWCD.

3.5 LAND USE

At the present time, Scott County is predominantly rural, but development pressure is increasing and land use is changing toward a more urban setting. Originally much of the watershed was forested. A pre-settlement vegetation map, based on the original 1830 surveyor descriptions, has been compiled by the DNR and is available for viewing at SWCD. Much of the original forested vegetation within the County is gone. Areas within the County that are still forested can be obtained in detail in GIS format from the County.

Scott County developed a comprehensive plan with assistance fromMetropolitan Council Environmental Services (MCES). The comprehensive plan was adopted and approved by Scott County in 1996. The comprehensive plan addresses issues on future land use, population projections, and plans for road sewer and other utility extensions. A current land use map is is available in GIS format from the County. Land use is rapidly changing in Scott County and the change is expected to increase as agricultural acreage is converted to residential use.

As development increases, natural areas become more important not only for recreational use but also for reducing storm water runoff, protecting water resources, and wildlife. Some areas within Scott County currently are protected as conservation areas. Recent conservation programs, Conservation Reserve Program (CRP - a federal reserve program) and Reinvest in Minnesota (RIM - a state program) have contributed to set-aside acreage's. Other areas such as wildlife refuges, state parks, regional parks, water banks, etc. serve as conservation areas as well. The current locations of conservation acreage's can be obtained from SWCD

3.6 WATERCOURSES

The watercourses (streams, creeks, ditches) in Scott County generally drain toward the Minnesota River. The DNR protected water courses are incorporated into the County's GIS. A watercourse is a protected water if the watercourse is a natural or altered natural watercourse with a total drainage area greater than two square miles.

Water quality information for a sampling station on the Minnesota River near Savage and for a sampling station of the Credit River near its confluence with the Minnesota River is available from the Minnesota Pollution Control Agency and can be found at the following website (http://www.pca.state.mn.us/water/basins/minnesota.pdf). Other water quality information is available from the MCES on Sand and Credit Rivers. For example, the Minnesota River at Savage is sampled on a yearly basis by the MCES and water quality reports are available from their office in St. Paul, Minn. The Credit River has been monitored by the USGS in cooperation with the MCES and data are found in (Ayers et al. 1985, Runoff and Chemical Loading in Small Watersheds in the Twin Cities Metropolitan Area, Minnesota. USGS Water Resources Invest. 85-4122) and in (Payne et al. 1982, Quality of Runoff from Small Watersheds in the Twin Cities Metropolitan Area, Minnesota--hydrologic data for 1980. USGS Open File Report 82-504).

3.7 LAKES: Maps, Fisheries, Water Chemistry, and Lake Levels

Fifty-two major lakes and numerous water basins are located within Scott County as reported by the County. Various characteristics of lakes are available from the Minnesota Pollution Control Agency (MPCA) and MCES some of the information is available in the MPCA website at (http://blue.pca.state.mn.us/cgi-bin/lkwq95.pl) Based on existing information, the majority of the lakes in Scott County are probably eutrophic. Orchard and Kingsley lakes have been the best studied *, but in general, data is lacking for the major lakes in the County.

*Tornes, W.H. and M.R. Have 1980. Water Quality of Four Lakes in Lakeville, Minnesota. USGS Water Resources Invest. 80-66.

3.8 WETLANDS

DNR protected wetlands and protected waters located within Scott County are shown on the protected wetlands map as defined by DNR. The maps are available from the DNR and available for viewing at the SWCD office. Current laws by Minnesota Department of Agriculture (MDA) and the Wetland Conservation Act of 1991 (WCA) protect various wetlands in Scott County and the map is definitely not all wetlands in the County. Protected waters include all the major lakes in the watershed as well as some smaller water basins. For example, a water basin that is surrounded by publicly owned lands or at a minimum, has shoreland that is publicly owned is a protected water. A basin that is designated as a game lake by the DNR is a protected water. A water basin that is greater than 80 acres and has a shoreland management classification as a natural environment lake is a protected water, but a water basin that is less than 80 acres and is classified as a natural environment lake is a protected wetland.

Most watercourses are also protected waters. All natural and altered natural watercourses with a total drainage area greater than two square miles are protected waters. A majority of a the watercourses discussed in Section 3.5 are protected waters.

A DNR permit is required if a proposed project alters the course, current or cross-section of protected waters, wetlands and watercourses. Any project constructed below the ordinary High Water Mark (OHW), which alters the course, current, or cross-section of protected waters or wetlands, is subject to the regulatory jurisdiction of the Department of Natural Resources.

In addition, the US Army Corps of Engineers (USCOE) may require permits for placing dredged or fill material in any waters or wetlands or for dredging or placing structures in navigable waters of the United States. Wetlands shown on the US Fish and Wildlife Service (USFWS) map may be subject to section 404 regulations. The Minnesota Pollution Control Agency (MPCA) assists in wetland protection. The MPCA requires that anyone who wishes to obtain a federal 404 permit must first obtain a state 401 water quality certification. The MPCA administers this certification process. The USFWS map is available from the USFWS and the map is available at the SWCD in Jordan,

Minnesota, for viewing.

Six types of wetlands are commonly found in Scott County. All six types are protected in the County. The Table below describes wetland types common in Minnesota and Scott County. More information on wetlands and wetland classification can be found on the DNR website at "http://www.dnr.state.mn.us"

TABLE 3.7T

DESCRIPTIONS OF WETLAND TYPES IN MINNESOTA

Source: Minnesota Department of Natural Resources (Division of Waters), January 1997.

TYPE 1	Seasonally flooded basin or flat Soil**:** Usually well-drained during much of the growing season.
TYPE 2	Wet meadow Soil**:** Saturated or nearly saturated during most of the growing season.
TYPE 3	Shallow marsh Soil**:** Usually waterlogged early during growing season. Hydrology: Often covered with 6 inches or more of water.
TYPE 4	Deep marsh Soil: (inundated) Hydrology: Usually covered with 6 inches to 3 feet or more of water during growing season.
TYPE 5	Shallow open water Soil: (inundated) Hydrology: Usually less than 10 feet deep; includes shallow ponds and reservoirs.
TYPE 6	Shrub swamp Soil: Usually waterlogged during growing season. Hydrology: Often covered with as much as 6 inches of water; water table at or near the surface.
TYPE 7	Wooded swamp Soil: Waterlogged within a few inches of surface during growing season. Hydrology: Often covered with as much as 1 foot of water; water table at or near the surface.
TYPE 8	Bog Soil: Usually waterlogged. Hydrology: Water table at or near the surface.

The Swampbuster provisions of the Food Security Act of 1985, is aimed at discouraging the conversion of wetland for agricultural purposes. An inventory of wetlands found in or adjacent to cropland fields has been completed by the USDA, Natural Resources Conservation Service (NRCS). This inventory will be used to protect these wetlands from drainage or filling for crop production purposes. If landowners or operators convert wetlands for cropland use, they will lose certain USDA program benefits. The inventory is available at the NRCS office in Jordan, Minnesota.

Other agencies have compiled or have available wetland maps that are more detailed than the State Protected Wetland Map . Some of these agencies include the following:

Department of Natural Resources (DNR)
Natural Resources Conservation Service (NRCS)
US Fish and Wildlife (USFWS)
US Corps of Engineers (USCOE)
Metropolitan Council Environmental Services (MCES)
Metropolitan Mosquito Control District (MMCD)

Any of these groups can supply additional wetland information. Detailed maps produced by the USFWS are available for review at the NRCS in Jordan. Copies can be obtained from the agency which developed the map. Protected wetlands as well as hydric soils are available on the County's GIS.

3.9 FLOOD PLAINS

The Minnesota River, Sand Creek, Prior Lake, Credit River and each lake as well as along ditches are the primary flooding concerns of Scott County. Other streams and ditches in Scott County have flooding potential but do not have the economic impact of a major flood in the more populated lakes and watercourses. Federal Emergency Management Agency (FEMA) maps showing the 100 year flood prone areas are available on the County GIS system. Other areas in Scott County may experience temporary flooding but a map for these areas has not been prepared. However, hydric soils have been mapped and are alos available in the County GIS system.

3.10 GEOLOGY

The ground water we use is contained in the rocks, soils and minerals of our area. That is, the geology of our County forms the entry points, exit points and pathways of water in the ground water system. The purpose of this section is to convey a general understanding of Scott County geology.

Like other counties of the metropolitan area, Scott County has three basic geologic units, which are as follows from top to bottom:
1) glacial deposits
2) bed rock formed in shallow marine sediments deposited over a time span of about 480 million years beginning approximately 950 million years ago.
3) Underlying the sedimentary bed rock is bedrock of volcanic or metamorphic origin. Their importance for ground water is limited to where they may be in direct contact with water bearing units via fractures or faults.

The properties of these 3 geologic units are determined by the origin of the material in them, how it was deposited and how it was subsequently re-worked. The material within the 3 units may be thought of as water bearing (porous enough to contain water and permeable enough transmit water in pumpable quantities) or as confining (not permeable enough). Porosity can occur as fractures in otherwise solid material, or as sand and gravel deposits, or as a combination of these.

The combined characteristics of the water bearing and confining geologic materials determine the location and flow of ground water aquifers. Ground water flow may be thought of as having a vertical component and a horizontal component.

Vertical water movement characteristics are determined by the percolation pathways available to water in the geologic structure and the time necessary for water to move downward to a zone of saturation.

Geological structure also defines the horizontal movement of ground water and the size of the ground water units. The rate of horizontal movement reflects the rate of potential contaminant spread in an aquifer system once the contaminant has found its way down to the aquifer.

The re-working of geologic material over time creates factors important to infiltration and recharge and therefore to ground water vulnerability.

For example: Today's topography and drainage network are the result of long acting forces that have produced the location of features such as lakes, wetlands, streams and rivers.

Also, today's soil properties are a combination of the properties of the material as originally deposited and as subsequently modified by weathering forces. The affect of the weathering factors on the soil vary with the soil's location in the topography, (e.g.: ridge top, slope toe, basin, etc.). See also the sections on soil, 3.2 and 3.3.

Infiltration characteristics at the land surface and of the shallow subsurface depend on the soil characteristics, geology and the surface drainage characteristics among other things. These first layers of soil (weathered geologic material), and the topography on which they lay, are the gateway to our ground water. Once water has found its way into the subsurface, it's movement is governed by the confining or water bearing materials it encounters.

3.11 SURFICIAL GEOLOGY

Approximately 2 million years the topography of Scott County was formed in sedimentary rock and consisted of broad, rolling plateaus divided by sharply cut valleys. An artist's sketch of that pre-glacial landscape is shown in the County's Geologic Atlas. Today, that landscape is buried and referred to, informally, as bedrock. It is covered by material deposited by glaciers, known collectively as glacial drift.

A series of glacial advances and retreats deposited the drift by a combination of ice and water action. Drift deposited by ice action alone is referred to as till. Drift deposited by water action is outwash. Till may also be reworked by water after deposition by ice to become outwash.

Drift thickness varies; being over 300 ft thick in the southern portions of the County to thinnest in the vicinity of Savage. This glacially deposited material is very heterogeneous, ranging from boulders and gravel to clay. Highly porous and permeable drift deposits, such as sand and gravel, near the surface can become surficial aquifers when underlain by less permeable clay rich drift deposits that impede downward water

movement. Below the clay rich deposits more permeable material may again occur. These deposits often contain ground water under confined conditions. The glacial material is highly variable in its water bearing characteristics, even over short distances and small changes in depth.

This variability resulted from several glacial advances and retreats over Scott County and the mixture of till and outwash deposits. Outwash deposits are the result of running water from melting ice and are most usually the porous sands and gravels containing today's glacial drift aquifers.

One of the plates in the Countys Geologic Atlas shows the results of an actual transect taken on a line from east of New Prague to just south of Murphy Lake. The mixture of layers shown and the accompanying description illustrate the complex mixture of material composing the glacial drift of Scott County In spite of this, about 60% of all wells and most private wells obtain drinking water from aquifers buried in this material.

3.12 SEDIMENTARY BEDROCK UNITS

Beneath the glacial deposits lie a series of layered sedimentary rocks. The youngest layers are on top and the oldest at the bottom. Beneath the sedimentary rock is volcanic rock.

One of the plates in the County Geologic Atlas shows astratigraphic section, and describes different layers of bedrock that are found beneath the glacial drift. It also depicts the bedrock found along the same transect The general process that resulted in these bedrock layers is described below.
About 1,100 million years volcanic rock in our area solidified. These lava flows are known as the Chengwatana Volcanic Group. They are believed to be thousands of feet thick and underlie the other sedimentary bedrock formations in the County with one exception; in an area west of Belle Plaine, trending south to north, the sedimentary deposits are worn away and a segment of the volcanic rock is exposed directly to the glacial drift.

Over the next 100 million years or so the Chengwatana Volcanic group was subjected to faulting, uplifting and weathering forces which lead to erosion and subsequent deposition of thick layers of reddish colored muds and sands. The deposits are known as the Solor Church Formation and are the oldest sedimentary layer in the County.

On this formation sits the bedrock of most ground water interest. A very general description of the process that produced it follows.

From 950 million years to 470 million years our area became the bottom of a large inland sea. The portion of this sea that covered Scott County and southern Minnesota is known today as the Hollandale Embayment. Over these millions of years this sea expanded and reduced in size. These changes had profound effects on the nature of the sea bottom sediments deposited.

During periods when the sea was shallow, coarse grained sediments were deposited. These sediments form today's water bearing bedrock aquifers.

In the same time period, when the area of Scott County was further from shore mudstones, siltstones and other fine grained sandstones were deposited. These deposits today form confining layers to aquifers. At times, the inland sea became dry and the sediments deposited to that point were exposed to long periods of weathering. The sea advanced once again and deposited new sediments on the weathered surface..

With the historical chronology of sediment deposition in mind there are a few additional features about this entire layered structure that need to be kept in mind. The top (youngest) 8 layers, deposited after 520 million years have been tilted by subsidence and faulting of the Chengwatana and Solor Church Formations. The bedrock layers run downslope from SW to NE with an overall drop of up to 300 ft. this slope is part of a larger geologic structure called the Twin Cities basin which underlies the 7 county metropolitan area. Scott County lies on the SW flank of this geologic structure.

3.13 MAJOR AQUIFERS

There are four principle aquifers in Scott County. They are the glacial drift aquifer (the newest), the Prairie du Chien-Jordan, the Franconia-Ironton-Galesville, and the Mt. Simon (the oldest).
start here
The County's MGS Atlas series available from the University of Minnesota (http://www.geo.umn.edu/mgs/) shows a glacial drift and bedrock transects as described in the previous section. These cross sections show slices through a buried valley and illustrates how several bedrock aquifers, through contact with glacial drift aquifers could be contaminated if infiltrating water from the surface traveled downward and made contact with the exposed end of a bedrock aquifer. Glacial material is most pervious and thus most likely to allow pollutants to be carried downward to bedrock aquifers.

One of the plates in the Atlas shows the landscape as it looked prior to glaciation, and illustrates the number of now buried valleys that do provide avenues of groundwater travel between glacial drift aquifers and bed rock aquifers.

3.14 FLOW DIRECTION

Ground water flow direction was determined from static water levels that were recorded when wells were installed. Basically, the contours shown on the maps in this section (scan) connect static water levels of the same elevation. Ground water flow downhill, or, down a gradient just as surface water would. Therefore, ground water flows from the high static water levels to the low static water levels.

There are two types of static water levels shown in this section. In the first type, the water table is the actual water surface (or static water level) in an unconfined aquifer. Lake levels and wetlands sometimes are expressions of the unconfined water table. The unconfined aquifers in Scott County are usually composed of shallow sand and gravel deposits.

The bedrock aquifers in Scott Co. usually have impermeable rock above them which confines the water in the aquifer. The elevation to which water rises in a well that taps a confined aquifer is called the potentiometric level or the potentiometric head and is the second type of static water level. Water rises up in the well above the top of the confined aquifer due to the internal water pressure

Maps in the Scott Co. Geologic Atlas show transmissivity, potentiometric surface, direction of ground water flow of major aquifers and a general description of water chemistry of County bedrock aquifers. Additional sources of geologic information for Scott County are the MGS, the US Geological Survey (USGS), the MPCA, and the PIE.

4 GROUNDWATER ISSUES

4.1 FEEDLOTS

4.1.1 OVERVIEW

Historically, the major concern with feedlots has been surface water pollution by runoff waters. Further study of this issue has revealed that leaching of feedlot waste into ground water is also a concern. Feedlots located in close proximity to a well can also cause contamination of the aquifer which supplies water to the well and other wells in the aquifer. Surface water that is contaminated with feedlot effluent can also become a ground water hazard if at some point that surface water becomes a drinking water supply.

The Minnesota Polllution Control Agency (MPCA) defines a feedlot as " *... a lot or building or group of lots or buildings intended for the confined feeding, breeding, raising, or holding of animals.*" This definition also includes areas specifically designed for confinement in which manure may accumulate or any area where the concentration of animals is such that a vegetative cover cannot be maintained. Feedlots include poultry operations, mink farms, and any other operations that concentrate animals in a relatively

small area. Pastures are generally not considered feedlots (see glossary for further definitions).

Minnesota Rules, Chapter 7020 required that owners of feedlots with 10 or more animal units complete a feedlot application from the MPCA. Legislation (MN.Statute. 116.07) passed in 1995, changes permitting requirements for some small feedlots. The feedlot officer or the MPCA should be contacted to determine if a feedlot permit is required. An animal unit is defined as the average weight of an animal divided by 1000 pounds. For example, a 1000 pound slaughter steer or a heifer is considered one animal unit. Table 4.1.1 lists animal unit equivalents for several common animals found in Scott County. Applications for a feedlot permit may need to be completed whenever any of the following conditions occur:

- A new feedlot is constructed
- A feedlot is expanded or modified
- An existing feedlot is restocked after being abandoned for more than five years
- An inspection by MPCA staff reveals that the feedlot is creating a potential pollution hazard
- A change in ownership has taken place or will take place since 1971 (this includes sales of farmsteads from parents to children).

Table 4.1.1 Animal Unit Equivalent

Animal	Equivalent
Slaughter Steer	1.0 AU
Heifer	1.0 AU
Horse	1.0 AU
Mature Dairy Cow	1.4 AU
Swine under 55 Pounds	0.05 AU
Swine over 55 Pounds	0.40 AU
Sheep	0.10 AU
Duck	0.20 AU
Turkey	0.018 AU
Chicken	0.01 AU
For animals not listed, the number of animals units is defined as the average weight of the animal divided by 1000.	

Source: MPCA

Without proper management, feedlots can be a major source of nitrogen, phosphorus, and organic pollution to both surface and ground water. Pollution from feedlots can leach into near surface aquifers or enter deeper aquifers through wells. Additionally, this pollution can enter the ground water through sink holes, cracks and fissures common in karst areas.

Seepage and runoff can increase the levels of nitrates and fecal coliform bacteria found in ground water. Nitrates are of concern because they can cause methemoglobinemia, also known as blue baby. This condition is potentially deadly to infants and others with circulatory or respiratory problems. Additionally, high nitrate water can pose problems for some livestock. Fecal coliform bacteria, while not

dangerous itself, generally indicates the presence of more hazardous organisms that can cause diarrheal diseases, hepatitis, parasites, dysentery salmonella, and typhoid fever in animals and humans.

There are a number of practices that can reduce the potential of ground water and surface water contamination associated with feedlots. The SWCD and the Minnesota Extension Service (MES) are available to assist feedlot operators in the design and operation of feedlots that are best suited to the site. MES recommendations for proper feedlot management include:

- Divert clean runoff which originates outside the feedlot away from manure collection and storage areas;
- Use down-spouts and gutters on buildings surrounding feedlots to divert clean water away from the feedlots and storage areas;
- Seal the feedlots and manure storage area floors, paving may be necessary in areas where limestone is close to the surface (the MPCA recommends that paving materials other than asphalt be used since asphalt tends to break up easily);
- Animal traffic can compact unpaved lot floors, care should taken when removing manure to avoid removing the compacted soil and manure during scraping operations if floor is not paved;
- Manure and/or runoff from open lots can be stored in reinforced concrete tanks, glass lined above ground slurry stores, or lined earthen basins; and,
- Locate lots away from sinkholes, streams, and shallow sandy soils.

The MPCA estimates that there are 45,000 to 50,000 feedlots in the state, but only 16,000 have been registered and of those only 8,200 are currently logged in the MPCA database. There are 112 feedlots in Scott County which are currently logged in the MPCA database. The MPCA database is not a complete list of all MPCA permitted feedlots in Scott County.

Some cost share money is available from state and federal funds and low interest loans are being organized to finance feedlot pollution control systems. Federal programs are administered by the Farm Services Agency (FSA) and state programs by the SWCD's.

4.1.2 POLICY

No feedlot effluent beyond the states allowable standards **(**see MN Rules Chapter 7020 and MN Rules 7050.0211**)** shall be allowed to flow to surface and ground water in Scott

County. The PIE shall be responsible for annual inspection of feedlots and enforcement of the feedlot ordinance to be developed. Violation of the ordinance shall be the same as current state laws allow.

4.1.3 OBJECTIVES

Feedlots have the potential to contaminate ground water regardless of where they are located in the County. Not all feedlot locations are known and many operate sporadically, depending on market conditions. It is recommended that an inventory be completed and all unpermitted feedlots apply for MPCA feedlot permits. It is further recommended that the SWCD identify and prioritize those feedlots in need of repair and work with the landowners to bring the feedlots into compliance with current standards. For more information on application of manure and sludge reference Sections 4.3 and 4.8.

Many of the measures which will protect the ground water from contamination are the same measures used to protect surface water. The objectives described in this section would then reflect surface water protection as well as ground water protection.

Table 4.1.1 Inventory all feedlots in Scott County with 10 A.U. or greater.	
Target Start Date:	Rank
Completed in 1996	1
continued spot checking to assure accurate information	
Funding:	
In kind	
Participating Agencies/Departments	
SWCD	

Table 4.1.2 Utilize the sensitivity map for permitting of new feedlots in geologically sensitive areas .	
Target Start Date:	Rank:
1998	6
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD	

Permits in these areas require special attention. All feedlot runoff should be contained and spread according to an approved manure management to prevent contamination of ground water and surface water.

Table 4.1.3 Initiate and enforce a feedlot zoning ordinance that is in conformance with the MPCA's feedlot permitting process.	
Target Start Date:	Rank:
1999	7
Funding:	
MPCA/County	
Participating Agencies/ Departments:	
PIE	

This will relieve the MPCA of their responsibility and allow the County to take control of the feedlot permitting program (reference Section 4.3 for more information). The ordinance should be written with a provisional time period to bring all feedlots in the County into compliance or allow phasing out or face criminal charges.

Table 4.1.4 Provide educational programs that teach owners and operators of the potential problems and solutions associated with feedlots.	
Target Start Date:	Rank:
1997 and thereafter	4
Funding:	
In kind	
Participating Agencies/ Departments:	
AES, SWCD	

Table 4.1.5 Identify and prioritize feedlots that are currently pollution sources.	
Target Start Date:	Rank:
1997 and thereafter	2
Funding:	
In kind	
Participating Agencies/ Departments:	
SWCD	

Table 4.1.6 Continued assistance in design and problem solution for feedlots for County cooperators.	
Target Start Date:	Rank:

1997 and thereafter	3
Funding:	
In kind	
Participating Agencies/ Departments:	
SWCD, NRCS, AES	

Table 4.1.7. The priority for cost share for upgrading feedlots and manure management systems in sensitive areas is to be increased.	
Target Start Date:	Rank:
1997 and thereafter	5
Funding:	
In kind	
Participating Agencies/ Departments:	
SWCD, FSA	

Cost Sharing programs through the BWSR and FSA are to continue publicizing programs for installing and upgrading feedlots and manure management systems

4.2 LAWN AND GARDEN CHEMICALS

4.2.1 OVERVIEW

Scott County is beginning to have extreme pressure to urbanize. Because of this trend, the potential for contamination from lawn and garden chemicals is as important an issue as contamination from agricultural chemicals. Fertilizers and pesticides are used by homeowners throughout Scott County to maintain and improve landscape beauty and quality. Unlike commercial agricultural application of chemicals, most homeowners generally do not test their soil to determine minimum application rates of fertilizer nor do they necessarily apply minimum or recommended amounts of pesticides. The University of Minnesota offers a soil test to individuals for a nominal cost. The test results are sent back to the individual with recommendations for nutrient needs. The individual then applies the recommended nutrients with very little reaching the environment.

Landowners may not realize impact of the fertilizers and chemicals that they individually apply to their lawns and gardens. Arguably, the behavior of these chemicals in the turf is different than that in a cultivated field; however, there still is a significant potential for

ground water and surface water pollution from these chemicals. Because urban areas are generally well drained and route untreated storm water into holding ponds, rivers and streams, the additional nutrient load caused by lawn and garden chemicals can accelerate the aging process of lakes and is believed to be one of the important factors in the eutrophication of lakes in the Metropolitan Area.

As the suburbs in Scott County become more developed, professional and unlicensed lawn care companies will grow accordingly. Lawn care companies that apply restricted use chemicals are required to attend annual classes on pesticide management and must be certified by the MDA. It is believed that most reputable lawn care companies try to be environmentally responsible. However, uncertified or less reputable companies may not follow appropriate nutrient and pesticide application guidelines. The MDA can take enforcement actions where violations have been determined. Penalties may then be assessed through enforcement in the form of administrative, civil, or criminal actions.

4.2.2 OBJECTIVES:

Landowners should be aware of water related concerns associated with the chemicals they use on their lawns and gardens. As always, they should consider the mobility, persistence, and toxicity of the pesticides applied. Ground water protection requires cooperation between homeowners, agricultural applicators, commercial users. The importance of ground water protection should be viewed equivalently in urban and agricultural settings.

Table 4.2.1 Develop and implement an education program directed to homeowners outlining proper use and disposal of lawn and garden chemicals as well as alternatives to chemical use (utilize ground water sensitivity map and other existing agency info.)	
Target Start Date:	Rank:
1998	1
Funding:	
Board of Water and Soil Resources Challenge Grants, sponsorship from lawn and garden chemical companies and retailers	
Participating Agencies/ Departments:	
SWCD, AES, PIE, MDA Metropolitan Council and Municipalities.	

Table 4.2.2 Encourage soil testing prior to the application of lawn and garden chemicals

Target Start Date:	Rank:
1998	3

Funding:
In kind, sponsorship from lawn and garden chemical companies and retailers

Participating Agencies/ Departments:
SWCD, AES, PIE, MDA, and Municipalities

Although professional lawn care companies are required to maintain a spill response plan (M.S. 18B.37), most do not have application plans that consider the vulnerability of an area to contamination. The vulnerability of an area to contamination from fertilizer and pesticides is relative to soil type, local hydrology, and chemical properties of the pesticide and/or nutrient applied. Chemical applicators should be allowed to use pesticides and/or fertilizer as necessary (within state and federal guidelines) as long as it can be demonstrated that the chemicals used and the amount applied will not contaminate surface water or ground water.

A land use that often accompanies suburban growth is golf courses. Currently there are 7 golf courses in the County. Golf courses apply considerable amounts of nutrients and pesticides especially on greens and tees. A key point to keep in mind is the fact that many times the courses are located along streams and rivers as well as in floodplains. This is important to remember because nutrients and fertilizers could contribute directly to surface water contamination.

The first comprehensive field investigation of the effects of fertilizer and pesticide use on golf courses was completed in 1990 on a golf course in Cape Cod, Maryland. Undoubtedly, the type of vegetation, soils, and climatic factors in Cape Cod differ from those in Scott County, but this study can provide some understanding of the impact on ground water from chemicals used to maintain turf grass. The pesticide parameters used in this study were:

- Mobility - soil/water distribution component; water solubility; volatility.
- Persistence - aerobic and anaerobic soil metabolism; hydrolysis; photolysis.
- Human toxicity - chronic health advisory levels.
- Ecological toxicity - acute lethality data for various aquatic species and birds.

The site parameters assessed in the study included:

- Hydrogeology - soil type, depth to ground water, net aquifer recharge resulting from irrigation and precipitation, and aquifer permeability (transmissivity).
- Nearest drinking well capture zones.

The results of this study showed that, although traces of pesticides and pesticide metabolites were found, only one, chlordane/heptachlor, a banned pesticide, was found in toxicologically significant concentrations. The last time chlordane/heptachlor was used in the golf course was believed to have been in the late 1960's for pest control. Overall the study found that the use of common turf pesticides in the project had minimal impact on ground water quality.

The study also indicated that turf management practices are closely related to nitrate concentrations in ground water. Rate and frequency of fertilizer application as well as type of fertilizer used appeared to be significant factors in ground water nitrate concentrations beneath managed areas. It was demonstrated, in one area, that reduced fertilizer application or slow-release nitrogen or both correlated with a decline in ground water nitrate concentrations.

The results illustrate that reasonable changes in management practices can minimize surface and ground water contamination by nitrates in golf courses. Furthermore, this study shows that although the movement of fertilizers and pesticides into the ground water is limited by turf and soil factors, these factors do not alone limit the potential for contamination. It is necessary that golf course superintendents, just as homeowners and those involved in commercial agriculture, implement best management practices to limit ground water contamination.

Table 4.2.3 *As part of the Conditional Use Permit process, require golf courses to develop a water resources protection plan following state MPCA or MDA guidelines that describes chemical use and application rates, runoff protection measures, hazardous waste storage, spill response plan, anticipated changes, and other information pertinent to ground water and surface water protection. Updates to this plan will be requested based on local sensitivity and changes in turf management or use. The County should encourage cities to do the same.*	
Target Start Date: 1998	Rank: 5
Funding: None necessary.	

Participating Agencies/ Departments:
PIE, SWCD, Golf Courses Superintendents Association, MDA, MPCA

Table 4.2.4. ***As part of the Conditional Use Permit process require all new golf courses to include a County approved ground water and surface water protection plans as part of their building application. The County should encourage cities to do the same***	
Target Start Date: 1998	Rank: 4
Funding: None necessary	
Participating Agencies/ Departments: PIE, SWCD	

Table 4.2.5. ***Adopt a County policy to reduce the use of fertilizers and pesticides on County property including but not limited to: land adjacent to government buildings, County parks, road ditches and right of ways. Soil testing will aid in reduction of fertilizer use. The County should encourage cities to do the same.***	
Target Start Date: 1998	Rank: 2
Funding: In kind	
Participating Agencies/ Departments: SWCD, MES, PIE, MDA	

4.3 PESTICIDE AND NUTRIENT APPLICATION

4.3.1 OVERVIEW:

According to the annual survey conducted by Conservation Technology Information Center for 1994, crops were raised on 104,453 acres (48 percent) of Scott County in 1994. In 1991 an agricultural chemical use survey was conducted by the US Department of Agriculture (USDA). This survey pointed out that fertilizer of some type was used on 97, 12, and 96 percent of the respective acreage of corn, soybeans, and spring wheat. Total fertilizer consumption in Minnesota was 2,132,596 tons in 1992. Any future decrease in fertilizer and pesticide use in the County could be attributed to the loss of

land to urban development and better chemical management by commercial agriculture (see glossary for the definition of pesticide).

Herbicides were used on 96, 95, and 97 percent of the respective acreage of corn, soybeans, and spring wheat. The commonly used brands were Atrazine, Pursuit, and MCPA. Insecticides were used on 13, less than 1, and 6 percent of the respective acreage of corn, soybean and spring wheat. The most commonly used brands were Lorsban and Banner. The Belle Plaine Coop reports that they supply fertilizer and pesticide to approximately 66 percent of Scott County. They sell approximately 80 different kinds of agricultural chemicals. According to the Belle Plaine Coop the ten most widely used products in Scott County based upon acreage are Pursuit, Bladex, Lasso, Eradicane, Prowl, Marksman, Pinnacle, Treflan, Accent, Bucktril. The application rates for each chemical are listed on the product label and the rates vary based upon soil type.

Methods have been developed that evaluate the environmental impacts of the most common agricultural herbicides, insecticides, and fungicides. One method, developed by J. Kovach et.al., evaluates the interactions between pesticide properties such as; solubility, adsorption and half-life; and soil properties. The pesticides are then classified into risk groups according to their toxicity and potential for leaching and surface loss. An environmental impact quotient (EIQ) is then assigned to each pesticide. To accurately compare pesticides and pest management strategies, the dose, the percent of active ingredient of the product, and the frequency of application for each pesticide must be combined with the EIQ rating. Using this approach, the most environmentally sensitive pest management approach can be determined for each crop type. Another method used to determine environmental risks estimates for ground water contamination can be found in the MES Bulletin AG-BU-3911 (available from the MES).. Using the criteria developed by MES and the Scott County Geographic Information System (GIS), soils types that are most susceptible to ground water contamination from pesticides can be maped. Such maps will assist planners in reducing ground water contamination risks when land applying chemicals.

Improved management of the amount, timing, and type of chemicals, taking into consideration the needs of the soil and plant, can minimize the potential for ground water contamination. More efficient use of fertilizers/pesticides can be realized through the use of voluntary best management practices (BMP's), integrated pest management, and sustainable agriculture. Pest management and chemical handling practices coupled with identifying and protecting points and areas of potential vulnerability can reduce the potential for contamination. However, as indicated by the Minnesota Departments of

Health and Agriculture in their 1988 report ("Pesticides and Ground Water: Surveys of Selected Minnesota Wells,") the factors that determine the potential for ground water contamination from pesticides .vary considerably from area to area and farm to farm. The contamination potential is increased in areas where there are frequent heavy applications, extremely permeable soils, or high water tables. Irrigated areas are especially problematical because irrigated lands are generally well drained soils with high infiltration rates. Because sensitivity is relative to physical conditions as well as land use, to truly protect water resources, ground water protection must be developed on a site by site basis.

The complexities associated with the behavior of agricultural chemicals in the environment are compounded with economic and political issues. A survey sent out by the Dakota County Extension Service to all irrigators in the County indicated that although most farmers are concerned about water quality and their well being, most found fertilizer and pesticide regulations unfavorable. This survey also indicated, a willingness by most farmers to reduce the amount of fertilizers and pesticides where ground water quality may be effected. Land owners have a vested interest in protecting water resources. In Scott County there are very few irrigators, but they feel the same way about the issues discussed above as the Dakota County irrigators. It is likely that a land owner's water supply will be the first affected if improper land use practices lead to ground or surface water contamination.

A couple of approaches could be used in dealing with pesticide use. Two viable approaches are:

- to provide agricultural chemical dealers with consistent information so that they could advise farmers on proper pesticide use, and
- to develop a voluntary program with land owners to develop individual water resource protection plans with help from area land and water managers.

The benefits of the first alternative includes:

- Less enforcement because land owners will have identified and signed off on protection measures that best meet their needs based on information from a source that farmers generally trust.
- Plans will be created that are site specific.
- It may work as an education tool that would encourage land owners to explore alternative methods and develop innovative ways to protect water resources.
- Land owners will likely be more willing to implement plans they had input in developing.

- Less cost to public agencies.

The second approach would have land owners and local land and water managers work together to develop guidelines and an easy to complete form, which will be the means to develop individual plans, that will help landowners to identify what land uses are sensitive in which areas and what measures can be taken to protect those areas. Guidelines should include, but not be limited to:

- A description of existing rules and regulations relative to water resource protection,
- Well head protection measures,
- Recommended applications rates based on soil and chemical type,
- How to deal with left over chemicals and containers,
- What water quality test results mean,
- Cost versus benefit analysis,
- Possible alternatives to chemical use, and
- A log of the types and amounts of pesticides and nutrients applied.

Land owners generally do not knowingly contaminate their water resources and are increasingly realizing their role as stewards or caretakers of the land. It is likely that most would voluntarily cooperate if they understood there is a defense to liability if an approved individual on-site water protection plan is implemented. If the first approach fails and if the second approach is implemented (voluntary plans by landowners), cooperation will be needed from all land owners.

Regardless of which approach is taken, the MES and the SWCD has a considerable amount of information that can help land owners and ag-chemical dealers outline the best approach to applying pesticides and nutrients in a given area. MES has a computer program called Manure Application Planner System (MAPS) which helps the planner determine fertilizer value of manure and use of this information with soil test data. Additionally, the University of Minnesota is currently developing computer programs that can identify practices that may cause contamination and that can simulate the flow and transport of these contaminants in the ground water, PLANETOR and Subsurface Flow and Solute Transport (SFST), respectively. The PLANETOR program assesses leaching potential of common pesticides and nitrates, as well as, erosion rates on a field by field basis. The SFST program is designed to be a companion to the better known Agricultural Non-Point Source Pollution Model (AGNPS). SFST is a model for simulating the flow of water and chemicals in the subsurface environment on a watershed (subwatershed) basis. Several state agencies, including the Minnesota Department of

Agriculture (MDA), the Minnesota Department of Health (MDH), and the MPCA have educational programs and can provide technical assistance to residents, local agencies, and agricultural chemical dealers to help identify water resource protection measures.

Scott County Environmental Health has been tracking well testing for nitrate levels and has indicated that nitrates are showing up in some Scott County wells. The County should view the nitrate concentrations as indicators of potential problems and enact an action plan if increasing levels of nitrates are detected. The County has up to this point not been tracking pesticide levels in the Scott County but should consider a system to begin tracking for contamination. To determine if pesticide concentrations are present or increasing, it is recommended that the County test for pesticides in monitoring and test wells and encourage property owners and municipalities to do likewise. Additionally, the County should request that copies of test results be sent to Environmental Management to determine if any trends are developing.

4.3.2 OBJECTIVES:

Selecting sensitive areas relative to pesticide type would require that the County's detailed soil survey be computerized. Because not all pesticides act the same in a given soil environment maps can be created that will show where sensitive areas are located relative to soil and pesticide type. These maps will show land owners, pesticide dealers, and local land and water managers where alternative pesticides or practices should be used. By targeting problem areas, cost effective practices that protect the environment can be adopted. These maps will show where pesticide contamination is likely to occur and can be used to select areas for closer monitoring and can be provided to agriculturalchemical dealers and applicators so that they can recommend appropriate pesticides to use in sensitive areas. Controls that generalize all pesticides as bad for the environment in all areas do not take into consideration that different pesticides react differently in different environments. Implementing programs that generalize pesticide use are likely to fail and if implemented, can put undue financial hardship on producers.

Table 4.3.1 ***Update the County Soil Survey and digitize the County soil survey to be added to the County GIS that is being developed. The sensitivity map can then be utilized in conjunction with the use of pesticides and fertilizers and the soil survey***	
Target Start Date: 1999 Funding: NRCS, County	Rank: 4

Participating Agencies/ Departments: County's Surveyor's Office, NRCS, SWCD, PIE

Not all of the wells in Scott County have the same potential vulnerability to contamination due to differences in their construction, geological setting, and local rates of aquifer recharge. The MDH has developed a methodology to assess well vulnerability to contamination. It is recommended that wells in selected areas continue to be tested for pesticides and nitrates. If the tests indicate an upward trend in levels of nitrates and/or pesticides, when this plan is updated in five years, the County should consider adopting the second recommended approach (to establish a baseline see MDA - Water Quality Monitoring - Biennial Report, 1990 and MDH - Pesticides and Ground Water: Surveys of Selected Minnesota Wells, 1988 and 1989.)

Table 4.3.2 ***Initiate a program to assist and insure the proper calibration of pesticide and nutrient application equipment used in the County.***	
Target Start Date: 2000	Rank: 3
Funding: In kind	
Participating Agencies/ Departments: AES, SWCD, MDA.	

As indicated by the PIE, nitrate contamination in ground water is becoming increasingly evident in the Scott County. The NRCS, SWCD and the MES are available to assist land owners to find ways to reduce the amount of nitrogen needed for crop production and get more benefit out of the nitrogen applied. Additionally, nitrification inhibitors can be used to reduce the amount of nitrates developed. The SWCD and MES is also available to help landowners develop fertilizer application plans. This planning effort includes plans to take credit for nutrients in manure. Many of the County landowners are becoming aware that the manure which they had in years past applied on land, could reduce the fertilizer needed throughout their operation. Planning is available with the NRCS, SWCD and MES to account for manure application nutrients as well as appropriate methods to apply manure to maximize nutrient availability to plants.

Table 4.3.3 ***Annually test for pesticide at selected community and other existing monitoring wells. Request that the MDH send copies of test results on wells tested in Scott County to the PIE. This objective is to be accomplished in three parts.***
• ***Collect all well tests done on all public and private wells to start a data base and***

have baseline data.

- ***If wells in a specific area are showing high nitrates then tests for other chemicals as discussed above are warranted.***
- ***If an area has a problem with greater concentrations of chemicals (above acceptable limits) in the wells, the County is to research what is causing the problem and implement a plan of action such as the plan called for in state statute section 103H.111***

Target Start Date: Rank:

1999 or when funds are available 5

Funding:

Legislative Commission on Minnesota Resources (LCMR), County and MDH

Participating Agencies/ Departments:

PIE, Municipalities, SWCD, County and other Watershed Districts

Table 4.3.4 ***Develop an education program on pesticides and nutrients to inform the general public and users of pesticides and nutrients on; the impacts of pesticide and nutrient use, proper use, rates for pesticides and nutrients and areas in Scott County that are highly sensitive to contamination. The education program should include alternatives to pesticide and nutrient use***

Target Start Date: Rank:

1999 1

Funding:

In kind

Participating Agencies/ Departments:

MES, NRCS, SWCD, MDA, and PIE

Table 4.3.5 ***Develop a voluntary program to develop plans for land owners for pesticides and nutrients. The plans would include but are not limited to: wellhead protection measures, recommended applications rates based on soil and chemical type, how to deal with left over chemicals and containers, cost vs. benefit analysis and a log of the types and amounts of pesticides and nutrients applied.***

Target Start Date: Rank:

2001 2

Funding:

In kind

Participating Agencies/ Departments:

MES, NRCS, SWCD, MDA and PIE

Pesticides, as with all hazardous materials are especially dangerous in fires. Fire fighters need to know whether or not hazardous materials are present so they can take appropriate measures to control the fire and assure fireman safety. Furthermore, if pesticides are present in a fire, containers could rupture and leach into the ground water or be carried off in water used to control the flames.

The National Fire Prevention Association (NFPA) has developed placards used nationwide that indicate dangerous substances. By placing these placards where pesticides or other hazardous materials are stored, fire fighters will be better able to control a fire and protect themselves and the environment.

Table 4.3.6 ***Request that NFPA 704 placards be displayed on all buildings, tanks, and other storage facilities where pesticides and other hazardous materials are stored***	
Target Start Date:	Rank:
1998 or when funded	6
Funding:	
Townships, Fire departments, Home owners	
Participating Agencies/ Departments:	
PIE, Fire departments, Townships.	

Improperly working septic systems can be a source of nitrates as well as a host of other organic and non-organic ground water contaminants. As mentioned earlier, the increasing amount of development utilizing on-site sewage systems in the County will bring an increased threat of ground water contamination.

Table 4.3.7 ***Require a compliance inspection of all on-site sewage treatment systems for which there is insufficient data to determine compliance before building permits are issued for expansion, accessory buildings or addition of a bedroom. Require failing systems to be upgraded within time periods which reflect the relative risk to the ground water.(see section 4.9 Individual Sewage Treatment Systems for further information).***	
Target Start Date:	Rank:
1998	7
Funding:	
County	
Participating Agencies/ Departments:	
PIE	

4.4 UNDERGROUND STORAGE TANKS

4.4.1 OVERVIEW:

The MPCA Hazardous Waste Division Tanks and Spills Section database is the most current and accurate inventory of Underground Storage Tanks (USTs) in Minnesota. The database inventories only the tanks required to be reported by State rules and which have been reported by tank owners. MPCA reports that there are 45,000 UST's registered in the state. The MPCA estimates that reported UST's represent only 75% of those installed in the state. USTs that contain heating oil and are less than 1,100 gallons and USTs that contain any other petroleum product or any other regulated substance and are less than 110 gallons are not required to be reported. The number of small unreported tanks is unknown (see glossary for definition of UST's).

As of March 1994, the MPCA inventory reported that Scott County has approximately 301 active USTs and 26 inactive USTs. The registered USTs are distributed between 125 sites and are included in the data base of the County GIS.43.7% of all registered USTs are owned and operated by service stations or bulk storage facilities. 49.2% of all registered USTs contain gasoline, 19.0% contain diesel oil, and 15.9% contain fuel oil

Underground storage tanks have been recognized as sources of pollution to both soil and ground water. In the mid-1980's the Environmental Protection Agency (EPA) and the MPCA began programs designed to identify and correct leaking USTs in response to increased awareness of USTs as pollution sources. Regulations controlling the installation of new tanks, tank standards and the operations, management, and monitoring of old tanks have been established both Federally (CFR 40, parts 280 and 281) and by the State. Minnesota has established funding sources to clean up existing Leaking Underground Storage Tanks (LUST) sites. Counties and cities regulate facilities with USTs through land use controls and building codes.

The current Federal and State programs are the most effective means for addressing the leaking underground storage tanks issue by regulating construction and operation of the tanks. The Federal and State programs also require the registration of tanks. A secondary check for the detection of leaking USTs is the requirement by mortgage lenders for an inspection of the tanks prior to property transfer. Units of government with land use control, counties and cities, can limit future problems by directing land uses with the need for tanks to the appropriate areas, requiring aboveground tanks, proper monitoring, and proper management practices.

4.4.2 POLICY:

The County is to prevent the contamination of ground water by existing and proposed UST's. The County is to use existing State and Federal regulations as well as items in the following paragraphs.

4.4.3 OBJECTIVES:

There are several risks involved when materials are stored in underground tanks. These tanks are of concern because if they leak, contaminants are closer to the underlying ground water and can leak unnoticed for several years. Size of the tank is not as important as what is or has been stored in the tank, how it is monitored, and how it is abandoned. A small amount of residue in a small tank is as dangerous as a small amount of residue in a large tank.

Planning officials at county levels currently have little control in locating proposed UST's. The current regulations do not establish different standards for UST design or protection levels on the basis of geological setting. In some cases the location of a proposed UST may be less than sensitive to environmental factors and are placed as a result of economic factors or geographic features in the county.

Table 4.4.1 ***When State or Federal construction standards are adopted that establish different UST placement or construction standards for different geological settings or risk areas the unit of government with land use control should adopt and enforce these standards when they permit installation of USTs.***	
Target Start Date:	Rank:
1998	1
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, Municipalities, MPCA, County and other Watershed Districts,	

Identifying underground storage tanks is important to do before their locations are forgotten. Communities need to know where potential risks to their water supplies are located. Additionally, fire departments, Realtors, lending institutions, and prospective property buyers all have a vested interest in knowing where these tanks exist. The BWSR document "Above and Below Ground Storage Tank Inventory Guidebook, June 1991" contains procedures on inventorying procedures for underground storage tanks. When the location of UST's are identified they should be recorded on the inventory map.

If the UST's integrity is known or suspected to pose a threat to ground water the UST shall be properly removed and remediated.

Not all underground storage tanks pose the same threat to the ground water. The actual hazard potential of storage facilities which are under 110 gallons needs to be determined. Location, construction, age, use, etc. are all factors that determine relative risk. If these factors can be determined, any programs to remove unused tanks can be done in a more cost effective manner. Communities or entities that plan to inventory underground tanks could consider inventorying above ground tanks at the same time. Although risks associated with above ground tanks are less than those of underground tanks, spills and leaks can occur. Knowing where above ground tanks are located can help communities identify possible or existing sources of contamination.

When developing programs to inventory the location and condition of above and below ground storage tanks local units of government should consider use of information from property transfers, contacting petroleum product suppliers and if necessary establishing programs which will ensure access to this information such as licensing petroleum product suppliers or requiring that UST disclosure forms be submitted to the agency that is monitoring UST location.

Table 4.4.2 ***Inventory below ground storage tanks and above ground storage tanks including those less than 1100 gallons and identify what material is (was) stored in the tank, the age of the tank, tank construction (if known), existing and planned land use around the tank, distance from water wells, and whether or not the well is being used.***	
Target Start Date:	Rank:
1999	2
Funding:	
In kind, State and Federal Grants	
Participating Agencies/ Departments:	
PIE, , Municipalities, MPCA Private Fuel Distribution Companies, County and Watershed Districts	

Currently there are State regulations for large tanks, however none currently exist for smaller tanks. Once those standards are developed, the County and municipalities should support the State programs to ensure that smaller tanks that present a threat to the County's ground water are removed, repaired or upgraded as needed to eliminate the potential threat to the ground water. This will likely involve local involvement in a program and funding and support will likely be controlling factors. However, because of the potential risk to the ground water, programs should be initiated as soon as standards and resources are available.

4.5 LANDFILLS

4.5.1 OVERVIEW:

Landfills were often located in "wasteland" areas which were often old gravel mines or quarries. Improper site selection, often in areas of ground water recharge, and use of improper materials to cover the waste, has contributed to ground water contamination in the state. The types and volumes of material deposited in landfills and dumps are extremely variable. Ground water contamination from industrial landfills can be a very significant problem, since these landfills contain many organic compounds, toxic metals, and other inorganic contaminants.

The MPCA considers landfills to be a significant enough problem, that they have closed all township dumps and many municipal landfills. Those that are not closed have a limited duration, and are often monitored by the MPCA for potential ground water contamination. Some landfills are still permitted by the MPCA for demolition debris. Unless these sites are regularly monitored, dumping of illegal materials can occur.

Currently, according to the MPCA since the establishment of the Landfill Cleanup Program in 1994, landfills are no longer listed on the MPCA's Permanent List of Priorities for cleanup through superfund. Instead, cleanup of closed landfills are handled under the new program, including provision for monitoring, cover upgrades, remedial action and long term care. The MPCA has a statewide inventory of historic dump sites, complied in 1980. Many of these sites were discovered prior to the creation of the MPCA and detailed information about them is generally not available. Executive summaries from the MPCA are available on the Louisville Sanitary Landfill and the Shakopee Pay Dump and can be found at the following MPCA website address : http://blue.pca.state.mn.us/plp.html".

As discussed in the executive summary the Louisville site overlies a highly susceptible aquifer and downgradient monitoring wells have shown the presence of organic contaminants. The landfill completed closure in 1991 (still accepting construction demolition materials) and ground water monitoring continues three times per year. The Shakopee Pay Dump was closed in 1979. The site is in the floodplain of the Minnesota River, and is therefore subject to frequent flooding. Based upon the preliminary site investigation site report by the Minnesota Department of Transportation (MNDOT) in 1989, it was concluded that the landfill is most likely influencing the ground water in the area. The ground water below the site most likely discharges to the Minnesota River, thus the likelihood of contaminants reaching public or private wells is low.

The MDH conducted limited monitoring around the Belle Plaine, Clemmer, Elko, Jordan, Louisville, New Prague and Prior Lake sites. The monitoring tested existing domestic wells. The monitoring wells have found detectable levels of contamination around the old Prior Lake dump. Information on ground water monitoring around active and inactive sites is available from the MDH and MPCA.

4.5.2 OBJECTIVES:

Almost every community in Scott County at one time operated a township or city dump. These sites have been located and assessed for potential problems. The Scott County Environmental Health Department, MPCA and MDH all have and maintain records of old dumps. Additionally, gravel pits, gullies, and river banks often are used for illegal, mini dump sites with or without the owners approval. As the cost of disposing of household or wastes increases, the number of illegal dump sites may also increase. Local residents need to work together to prevent illegal dumping on their own or their neighbors property.

Table 4.5.1 ***Maintain an inventory of all existing and past public and private dumps.***	
Target Start Date:	Rank:
Ongoing	1
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, , MPCA, MDH, County and Watershed Districts	

Only a complete geologic, hydrologic, and water quality analysis can determine if there are contamination problems associated with old dumps All of the old municipal dumps

have been evaluated by the MDH and MPCA. In some cases the level of assessment conducted thus far may not have detected a problem. When land surrounding the old dump sites is proposed for development or change in use the need for more information to determine the possible impact to the new use should be considered. At this point it appears that the risk of major contamination from existing dumps is limited. However, upon completion of the County ground water sensitivity study, the priority of investigation of these sites can be better established.

Table 4.5.2. ***The County and municipalities will review MPCA landfill closure plans to determine risks locally associated with landfill closures whenever land surrounding a closed dump is proposed for change in use.***	
Target Start Date:	Rank:
1998	6
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, MPCA, Municipalities	

Table 4.5.3 ***When development of land surrounding old dumps is proposed it should be determined if more monitoring is needed.***	
Target Start Date:	Rank:
1999	2
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, , MPCA, County and Watershed Districts	

Table 4.5.4 ***If monitoring is deemed to be necessary at a site, the extent of contamination will first need to be identified. Then, a plan to stop further contamination should be developed. Finally, a plan to remove the contamination problem should be developed if deemed feasible.***	
Target Start Date:	Rank:
1999	3
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

Mini-dumps are small illegal dump sites generally used by one or more households that are located commonly on river banks, gullies, old gravel pits, etc. The County Environmental Health Department has an on going program to clean up these sites. If these dumps are located in hydrologically sensitive areas, they can pose a threat to surface and/or ground water quality. The Environmental Health Department also maintains a data base inventory of all the dump sites they have encountered in the last 20 years.

Table 4.5.5. ***Maintain the inventory of mini- dumpster for purposes of land use development and identifying sources of ground water contamination that may be discovered as well as for well head protection.***	
Target Start Date:	Rank:
Ongoing	4
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

Table 4.5.6 ***Evaluate mini-dumps when discovered for their potential to contaminate ground water using on-site evaluations and then develop a priority list of the mini-dumps.***	
Target Start Date:	Rank:
Ongoing	5
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

Table 4.5.7. ***Continue to take appropriate action to remove high priority contamination sites from Scott County based upon objective 4.5.6.***	
Target Start Date:	Rank:
Ongoing	7
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

4.6 SALVAGE YARDS

4.6.1 OVERVIEW:

Salvage yards, for the purpose of this plan are defined as a commercial operation accommodating the collection, storage and disposal of equipment and motorized vehicles, for the purpose of recycling, parts removal, and component renovation. Visual site descriptions include but are not limited to any salvaging of equipment and products which results in contamination due to the loss of toxic material through the reclamation of equipment. Pollutants, and characteristics commonly associated with this type of operation are listed in Table 4.6.1 and the compounds associated with the pollutants are listed in Table 4.6.2.

Table 4.6.1 Common sources of pollutants for salvage yards, compounds associated and the areas of the environment affected.

Source	Pollutant Class	Area Of Contamination
Gasoline / Diesel	Metals, Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Drain Oil	Volatiles, Semi-volatiles	Soil, Ground water, Surface Water
Parts Washing Solvent	Metals, Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Antifreeze	Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Chlorofluorocarbons	Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water, Atmosphere
Brake / Transmission Fluids	Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Engine Block Dismantling and Storage Areas	Metals, Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Hull Crushing Areas	Metals, Volatiles, Semi-Volatiles	Soil, Ground water, Surface Water
Battery Storage Areas	Metals	Soil, Ground water, Surface Water
Mercury Switches	Metals	Soil, Ground water, Surface Water
Open Burning	Meals	Soil, Ground water, Surface Water, Atmosphere

Table 4.6.2
Compounds common in Salvage Operations.

Inorganics	Metals	Volatiles	Semi-Volatiles	Semi-Volatiles
& Chlorinated				
Nitrates N	Arsenic	Acetone	Naphthalene	Benzo-(A)Pyrene
Endrine,	Barium	(aldehyde Ketone)	2-Butanone	2-Methyl-Naphthalene
(α,β,γ)Chlordane	Silver	Phenol	Phenanthrene	Benzo-(G,H.I)Perylene
(DDD DDT-DDE)	Cadmium	Benzene	Chrysene	4-Methyl-phenol
EndosulfanII	Chromium	4-Methyl 2-Pentanone	Di-N-Butyl-Naphthalene	Acen-aphthylene
(γ,β) BHC	Lead	2-Hexanone	Fluoranthene	Acen-aphthlene
Heptachlor	Mercury	M-/P-Xylene	Pyrene	Dibenzo-furan
Aldrin	Selenium	Toluene	Butylbenzyl-Phthalate	Fluorine
Dieldrin		Ethylbenzene	Bis(2-Ethyl-Hexyl)-phthalate	Anthracene
Heptachlor Epoxide		Styrene	Benz(A)-Anthracene	Carbazole
		O-Xylene	Di-N-Octyl-phthalate	Ideno-(1,2,3CD)-Pyrene
		Acrolien	Benzo (B)-Fluoranthene	
			Benzo (K)-Fluoranthene	

The effects of these compounds affect both surface and the water table aquifer, but with a majority of the County's first bedrock consisting of porous sandstones and fractured limestones, any avenue for transport will be a consideration for contamination of ground water. Testing for hazardous contaminants in salvage operations should include metals, volatiles and semi volatiles in soil and ground water. This testing should be mandatory.

4.6.1 OBJECTIVES:

Salvage yards in Scott County, due to the fact that to a large extent, lie on geologically sensitive areas need to be studied more closely and should be regulated to a greater degree. The locations of some salvage yards in Scott County are listed in Table 4.6.3 and are designated (A) through (L). Salvage yards (A, B, C, D, E, F, G, H, J), lie adjacent to the river.

Table 4.6.3 Locations of Salvage Yards in Scott County

Company Name Address	Identifier	Township	Range	Section	Sub-Section
Hollander Memorial Dr	A	115 N 23 W	21	DD	13901 Johnson
Highway101 13th Av E	B**	115 N 22 W	2	DAD & DDA	9099
Flood Bros. E	C**	115 N 22 W	2	CCB	7804 Hwy 101
Jerry's D	114 N	24 W	24	AAD	19226 Valley View Dr
R & P E	114 N	24 W	24	AAD	19250 Valley View Dr
Cedar F**	114 N	23 W	18	BDD	1110 Syndicate St
S & L G**	114 N	23 W	17	ADC	4200 185th St W
Sport Wheels II** Johnson Memorial Dr		114 N 23 W	17	AAB	18101
Olson I**	114 N	21 W	15	AC & AD	19386 Judicial Rd.
V & S J W	114 N & 113 N	25 W	36, 1	C & BAB	710 Forest St
Barber K	113 N	23 W	32	BAB	4711 270th St W
Metro L**	113 N	21 W	25	ABA & ABD	11710 263rd St E

** = Has Hazardous Waste License

Additionally, salvage yard (J) lies directly on the flood plain and is inundated with flood waters each spring. Contamination can occur through fluid spills in the various steps of the salvage process, and leaching during storage of the components, if components are improperly stored.

Table 4.6.1 Map location of all salvage yards within Scott County.
Target Start Date: Rank:
Ongoing
Funding:
In kind
Participating Agencies/ Departments:
PIE, SWCD, MPCA, County and Watershed Districts

All salvage yards within the County have been inspected and licensed as hazardous waste generators. New salvage yards within the townships are required to obtain a conditional use permit as well. Salvage yards within municipalities are subject to land use regulation by the municipality. Sites are checked periodically for proper storage and disposal practices and compliance with applicable laws. It is recommended that more frequent inspections be

conducted on salvage yards because of the potential for environmental impact on the areas involved.

Table 4.6.2 ***Conduct more frequent inspections of auto and industrial salvage yards in the County. If needed, increase monitoring and require remediation for those operations which show contamination***	
Target Start Date:	Rank:
2000	1
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

The final recommendation is the completion of a geologic ground water sensitivity study of the County for possible future consolidation and relocation, or for potential locations of new salvage facilities as well as for the development of new environmentally and ecologically sound regulations for salvage yard operation. Salvage yards or unofficial "recycling centers" could threaten the ground water if located in sensitive areas. Often these yards are located in land not suited for development or agriculture. These may be low lying recharge areas or areas of coarse textured soils with high infiltration rates unsuitable for many other land uses. Oils, heavy metals, and other automotive chemicals from junked vehicles, the crushing process, or from disassembly could percolate into the ground water. Additionally, other materials including old appliances, used oil drums, old transformers, and even hazardous wastes may be stored at these locations.

Table 4.6.3 ***Utilize the ground water sensitivity map to analyze current locations of salvage yards and make recommendations for consolidation and relocation of existing salvage yards and for future locations of new salvage yards***	
Target Start Date:	Rank:
2000	2
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, University of Minnesota, SWCD, MPCA, County and Watershed Districts	

4.7 MINING OPERATIONS

4.7.1 OVERVIEW:

Sand and gravel mines often extend into buried drift aquifers. Activity in these mines may affect ground water quality and/or quantity. Once the surface soils and vegetation are stripped away, contaminants can flow with little obstruction into the ground water. Connections to other buried drift aquifers are likely but hard to predict. The geologic atlas of Scott County specifies in its narrative for surficial geologic cross sections that areas where 50 feet or less cover exists great care is needed to safeguard ground water supplies and to monitor effects of any potential source of contamination. These deep gravel deposits are important to protect because they are commonly used for domestic water supplies.

Abandoned quarries and gravel pits are often reclaimed as surface ponds and sometimes used for storm water management. Since most gravel is mined below the seasonally high water table, water levels in these pits are most often directly linked to and are maintained by the ground water. Runoff directed into these pits can carry surface contaminants and will therefore pose a threat to ground water quality. Additionally, abandoned, unreclaimed pits are often used to dispose of old cars, pesticide containers, and other hazardous wastes, therefore also posing a serious threat to ground water quality. See Section 4.15 for a discussion on dewatering in mines regarding water quantity issues.

4.7.2 OBJECTIVES:

Abandoned, unreclaimed gravel pits or quarries are often used for covert dumping or to dispose of old cars and other junk. Some of these old gravel pits or mines, because of their location or past use, are more often used for dumping than others. Any kind of illegal dumping is of serious concern because there is no way to control what is being dumped. Therefore, special efforts should be made to identify those gravel pits that are used as dump sites and, if need be increase enforcement activities at these sites.

Table 4.7.1. ***Continue surveillance of existing or abandoned quarries or gravel pits to ensure they are not being used as dump sites.***	
Target Start Date:	Rank:
Ongoing	1
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, DNR, County and Watershed Districts	

Mining activities involve the use of heavy equipment. This equipment can be in almost any state of repair and can leak oils, diesel fuel, or gas when they are used during mining activities. In many cases fuel is stored in these pits to make refueling more efficient. As a result there is high potential for gasoline or diesel fuels spills. Even a small spill can cause a problem. According to the MPCA, it only takes one gallon of gasoline to contaminate one million gallons of water.

Table 4.7.2 ***Develop standards for the storage of petroleum products and hazardous chemicals in gravel pits. Fueling is to occur in the containment area specifically designed for the storage container size.***	
Target Start Date:	Rank:
1998	2
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

Mining below the seasonally high water table has the potential to damage ground water quality. Problems can result as mentioned earlier because of mining operations or can result if contaminated surface water is permitted to run into the mine. Preventing gravel pit operators from mining below the seasonally high water table would put several gravel pits or quarries out of business. It is felt that if gravel pit or quarry operators use appropriate measures to avoid spills and if they do not allow surface drainage into the gravel pit or quarry, that ground water contamination can be limited.

Reclaimed mines should not be used for storm water management. Both man made and natural lakes throughout the Metropolitan Region used for this purpose all have significant contamination problems. Most man made lakes and gravel pits are directly

connected to the ground water. If reclamation plans include converting the mine into a lake, the plan should contain provisions to route surface water away from the mine, unless that surface water is treated to a quality level that it may be used for beneficial use in the mine.

Table 4.7.3 ***Develop provisions, to be included in reclamation plans, which prevent surface water runoff from being directly routed into gravel mines or quarries, (where surface water discharged to work areas may have potential impact to the ground water, a report is to be prepared to assess potential impacts.***	
Target Start Date:	Rank:
1998	3
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCA, County and Watershed Districts	

4.8 LAND APPLICATION OF BIO-SOLIDS AND OTHER WASTE

4.8.1 OVERVIEW:

Land application (or land treatment) is a recognized and generally environmentally sound method to manage several types of waste by-products. By-products commonly applied to land include bio-solids, animal manures, food processing wastes, water treatment lime sludge, septage (septic tank pumpings), petroleum contaminated soils and pesticide wastes.

Animal Manure

Animal manures, which are commonly applied to land in Scott County, contain substances such as nitrates and may contain antibiotics and other potential ground water contaminants. In addition, animal manures can contain disease causing pathogens such as Salmonella and Cryptosporidium. These pathogens can result in human disease and can contaminate surface and ground water carrying disease organisms with it. Generally soil is a good filter of disease organisms, however problems can be expected in areas where there are tile inlets or that are highly susceptible to ground water contamination where soil thicknesses are insufficient to filter out these organisms problems. Animal manures from large feedlots can be regulated through the Feedlot Management Program.

Bio-solids

Bio-solids from treatment of municipal waste water treatment plants can benefit soil structure and provide some nutrient value. However, they also may contain human pathogens as well as hazardous substances from industrial wastes. When properly treated to significantly reduce human pathogens, and when carefully evaluated for hazardous substances, bio-solids can also be considered beneficial to some agricultural soils. When applied at rates beneficial for agriculture and on fields with appropriate BMPs used in conjunction with tile inlets or surface water drainage problems, this is generally considered an acceptable method of bio-solid waste management.

Land application of bio-solids are currently not regulated by Scott County, however they are regulated by the MPCA. The Metropolitan Council Environmental Services (MCES) land application division also has instituted control measures on both bio-solids contaminants and application procedures that eliminate the major issues associated with land application. Other municipal waste water authorities may lack these controls.

The MPCA and MCES maintain records of the locations of bio-solids land application areas and monitor for cumulative pollutant loadings in soils where there are repeated applications.

4.8.2 OBJECTIVES:

Although it is currently known where most bio-solids have been applied in the County, and the MPCA maintains records of all application sites since 1978, this information is not always available or requested when local units of government make changes to zoning, issue building permits or plan for transition of agricultural land into commercial, industrial or residential land uses. It is important to keep track of cumulative pollutant loadings and site locations from bio-solids applications. Mapping these areas could better show what levels of bio-solids have been applied to a single area and could provide land use planners and potential buyers important information about the past use of the property.

According to the MES, municipal sewage bio-solids can be used effectively as a fertilizer. Bio-solids, like other fertilizers and manures, can result in nitrate leaching or contaminated runoff if it is not applied correctly and should not be applied in amounts that exceed the ability of plants to use its nutrients. Additionally, if bio-solids are applied in large amounts or continually applied to the same area, a build up of some bio-solids residue may occur, creating long term problems in that area. Application rates should

consider any carry-over nitrogen from previous recent applications.. Since land application of bio-solids is essentially a beneficial method of disposal of a waste, and since it is generated almost exclusively by governmentally owned facilities, it is reasonable to expect that biosolid application practices set an example by adhering to BMPs. If it appears that BMPs are not being adhered to by the governmental entities arranging for land application of their waste bio-solids and not being adequately controlled by the MPCA, then Scott County should adopt an ordinance to regulate this practice and enforce MPCA standards.

Should the County ever choose to regulate this practice, programs or ordinances that govern the management, disposal or application of sewage bio-solids must receive approval by the Metropolitan Council and the MPCA as set forth in Minnesota Statutes 473.516, Subd. 3:

> *Counties and local units of government may impose conditions respecting the construction, operation, inspection, monitoring, and maintenance of a waste facility of the (Metropolitan Waste Control) Commission and conditions respecting the sale, gift, delivery, storage, use, and disposal of sewage bio-solids of the commission on private property as a soil conditioner or amendment, but only in the manner and only to the extent authorized and approved by the (Metropolitan) council and the MPCA as being consistent with the establishment and use of the Commission's waste facilities and the disposal of the commission's sewage bio-solids on private property in accordance with the council's plan, adopted under section 473.153, and agency permits and rules. Counties may exercise the enforcement powers granted under section 473.811, subdivision 5c.*

Table 4.8.1 ***Given consideration to the runoff, future development potential, the inability to determine long term effects, the potential for ground water contamination, the potential for heavy metal contamination and the individual leaching characteristics of soils, application of sewage bio-solids in Scott County should be evaluated and if necessary, regulated in accordance with State and Federal Standards..***	
Target Start Date:	Rank:
2000	2
Funding:	
Applicant	
Participating Agencies/ Departments:	
PIE, SWCD, and MPCA	

Other Waste

A commonly used method for waste disposal is thin spreading waste over a large area. Thin spreading is the process of spreading contaminated soils or certain controlled substances (primarily petroleum contaminated soils) over a large area, accelerating the bacterial or photo decomposition of the substance. Other wastes including food products, dairy whey, and fly-ash and water treatment lime sludges are often land spread. The MPCA has developed state guidelines for land spreading, but does not have an inspection/permit type regulatory program. Scott County does have general regulatory control over all types of solid waste disposal including land spreading, however, sewage sludge has been specifically exempted from the State's definition of solid waste. The Legislature has also placed specific restrictions on a local unit of government's authority to regulate this waste, (see below) MCES's bio-solids land application program, however has followed MPCA guidelines and BMPs. In the absence of any demonstrated need, additional regulatory controls by the County would simply place financial and administrative burdens on the beneficial reuse of this material.

Table 4.8.2 ***Prepare a map* showing known areas where waste has been land applied and require waste generators to provide the County with notification of areas where wastes are proposed to be applied.***	
Target Start Date:	Rank:
1999	1
Funding:	
, County License Fees	
Participating Agencies/ Departments:	
County Surveyor, PIE, SWCD, and MPCA	

* The map referred to in objective 4.8.2 refers to a continuously updated map developed on the County GIS system for tracking land application sites.

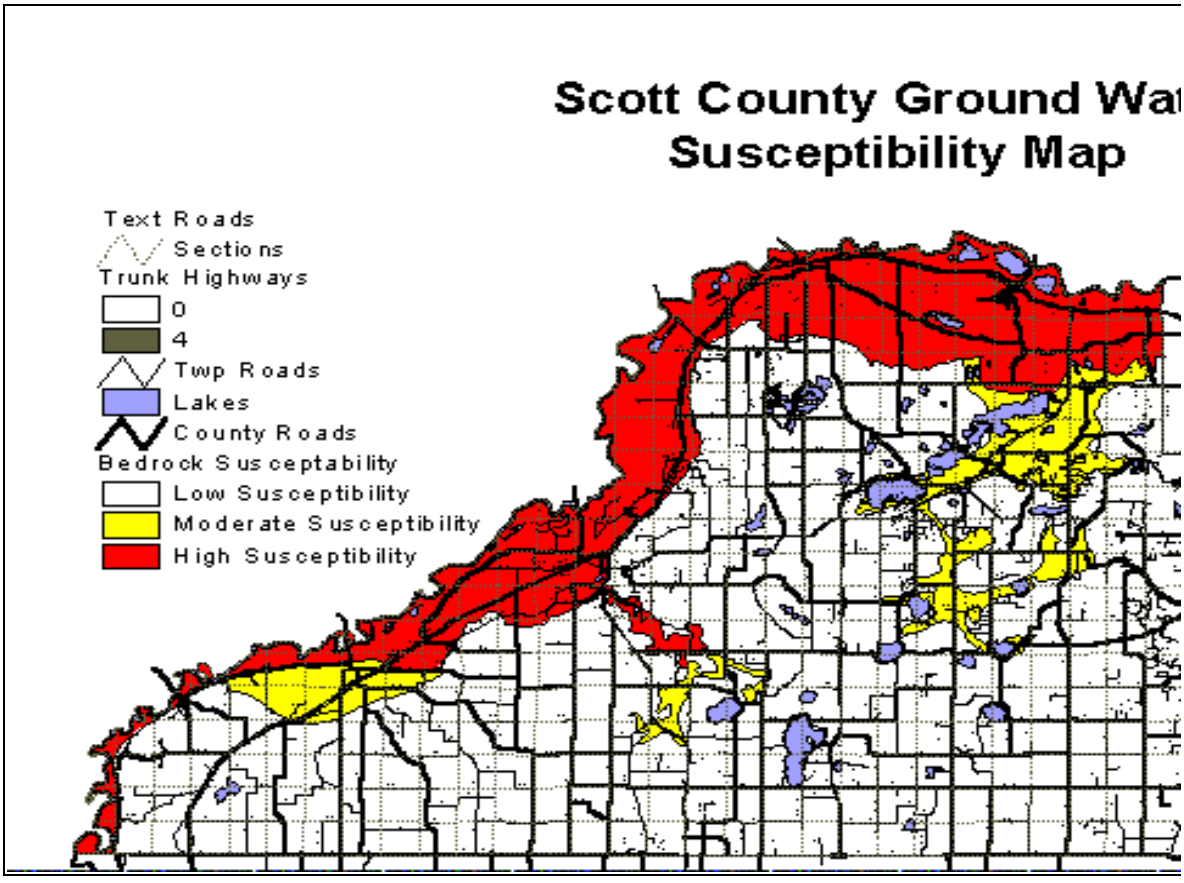
4.9 INDIVIDUAL SEWAGE TREATMENT SYSTEMS

4.9.1 OVERVIEW:

Individual sewage treatment systems (ISTS) serve approximately 5,000 of the 22,000 households in Scott County. In addition, approximately 150 commercial ISTS's serve various commercial establishments within the rural area. Several municipalities also still have ISTS's serving residential and commercial uses. Scott County has been regulating ISTS construction since the early 1970's. In 1981 Scott County adopted the MPCA rules pertaining to ISTS construction. However, MPCA rules have been essentially enforced since 1978. Scott County has adopted the current MPCA standards and will continue to adopt and enforce current standards. Scott County also requires that compliance inspections be performed whenever a building permit is applied for to expand an existing structure or add an accessory building. As a result non complying on-site systems are being brought up to code. It is estimated that less than half of the existing ISTS's would comply with current MPCA standards. Of those which do not comply, probably less than ten percent are actually presenting a contamination threat to an aquifer. Many ISTS's are constructed too close to ground water, however, in most soils within Scott County, saturated soil conditions are perched above regional aquifers. Low infiltration rate soils common within some areas of the County hold seasonal precipitation within the top ten feet of the soil profile. The result is that many of the ISTS's are constructed too close to the perched water table within these saturated soils. There are also areas with highly permeable soils in close proximity to limestone aquifers. Older type ISTS's where deep cesspools had been used are suspected of causing nitrate contamination in these aquifers.

The County's ISTS ordinance specifies that failing ISTS be replaced within specified times that reflect the potential threat to ground water. See the following Table and map.

	Imminent Health Threat*	Less Than Three Foot Separation (2 Ft on existing systems)	Seepage Pits, Leaching Pits, Drywells, Cesspools
Areas highly susceptible to groundwater contamination	10 months	10 months	10 months
Areas moderately susceptible to ground water contamination	10 months	5 years	3 years
Areas with low susceptibility to ground water contamination	10 months	When system becomes an imminent threat to public health	5 years


Scott County Ground Wa
Susceptibility Map
Text Roads
Sections
Trunk Highways
0
4
Twp Roads
Lakes
County Roads
Bedrock Susceptability
Low Susceptibility
Moderate Susceptibility
High Susceptibility

Scott County's ISTS program has been recognized as being one of the best in the state. Program activities currently include: licensing of ISTS installers, designers, site evaluators and pumpers. ISTS permit applications are required for most repairs and all new construction. Inspections include initial site and one or more construction inspections (depending on system type and progress of installation). The site inspection generally includes verification of the soil description, proximity to surface waters, wells and other setback requirements. Every ISTS inspector is certified by the MPCA. In addition to enforcement activities, Scott County's program has included workshops for the installers, designers, and site evaluators. Scott County also has an ongoing public education program.

The MPCA isresponsible for licensing ISTS professionals. Scott County is required by the Metropolitan Council to maintain an ISTS maintenance program. Since 1992, Scott County has been notifying new (since 1989) owners of ISTS's to maintain their ISTS's. That effort has been increased to encompass all ISTS owners within the townships.

The MPCA recently revised the state ISTS rules. Scott County adopted the MPCA's new rules which can be viewed at the MPCA's Web site at: "http://www.revisor.leg.state.mn.us/arule/7080/." The County ISTS Ordinance can be viewed on the County's Web Site and is available from the Scott County Environmental Health Department

4.9.2 POLICY:

Scott County will enforce the MN Rule Chapter 7080 to ensure that proper construction methods are used and thereby reducing the potential for ground and surface water contamination. Scott County will also implement an ISTS maintenance program throughout unincorporated areas of the County to ensure that existing systems are properly maintained.

4.9.3 OBJECTIVES:

The enforcement of ISTS rules has been accomplished at a county and municipal level since 1981. Scott County has adopted the state ISTS rules under statutory authority that encompasses the entire County. Municipalities were subsequently offered the opportunity to administer their own programs if they adopted the same rules and employed state certified ISTS inspectors. Shakopee, Savage and Prior Lake administer

their own ISTS programs. The County administers the program throughout the remainder of the County.

The County's ISTS maintenance program only affects the eleven townships of Scott County, and the Cities of Belle Plaine, Elko, Jordan, New Market, and New Prague . The other Municipalities were excluded from the County's maintenance program since they administered their own ISTS programs at the time that the County ISTS ordinance was amended in early 1997.

Public education on proper ISTS use and maintenance will continue to be an important factor in protection of surface and ground water as well as protection of public health. The County will expand its educational efforts to include more frequent information in the County newsletter "The Scene". Additional opportunities will be explored for cooperative educational programs and efforts between PIE and MES.

Table 4.9.1 ***Continue to enforce the MN Rules Chapter 7080 throughout Scott County. Coordinate enforcement with the municipalities who wish to administer their own programs.***	
Target Start Date:	Rank:
Ongoing	1
Funding:	
Permit Fees	
Participating Agencies/ Departments:	
PIE, Municipalities, MPCA	

Table 4.9.2 ***Expand the current ISTS maintenance program to include all ISTS's within the Townships.***	
Target Start Date:	Rank:
1999	3
Funding:	
Permit Fees	
Participating Agencies/ Departments:	
PIE, Municipalities, Metropolitan Council	

Table 4.9.3 ***Expand the current efforts toward education of ISTS owners to encourage proper system use and maintenance.***	
Target Start Date:	Rank:
Ongoing	2

Funding:
Permit Fee
Participating Agencies/ Departments:
PIE, AES

4.10 HAZARDOUS WASTE HANDLING AND TRANSPORT

4.10.1 OVERVIEW:

Hazardous wastes include solvents, paints, chemicals, acids, oil, lead acid batteries, heavy metals, and many other substances. These products require special handling, transport, and disposal. There are approximately 6,100 identified hazardous waste generators in Minnesota, which account for approximately 98 percent of all hazardous waste generated in the state (Minnesota Environmental Quality Board (EQB) 1988). There are also an estimated 10,000-15,000 small, unidentified waste generators. Minnesota does not have a hazardous waste disposal site or commercial handling facility. The high cost of shipping and processing wastes in other states could encourage improper or illegal dumping. The MPCA maintains a listing of hazardous waste and used oil haulers as a service to Minnesota generators.

Pipeline breaks, road accidents, washing out tanks or railroad cars, poor storage, etc. could cause hazardous materials to be transported into the ground water. Pipelines carry varieties of hazardous and non-hazardous materials. Contamination from hazardous waste can occur by leaching from improper disposal areas but can also occur much more easily by accident than solid waste. For example, the potential for ground water contamination from an overturned garbage truck is minimal, while the threat from an overturned truck of benzene is very real, immediate, and has a high level of danger. Locations where hazardous materials are currently handled or have been handled in the past need to be assessed to determine if they are contaminated and, if they are contaminated, they need to be prioritized for clean-up.

The Federal and State governments have in place extensive programs regarding hazardous waste. Some programs define what is hazardous, level and type of hazard, physical characteristics, and define health risk limits. Other programs set out proper management practices, transportation regulations, and disposal rules and mandate the use of these practices.

The State and Federal programs place part of the responsibility for regulation at the local level on the County. The County is required to license all hazardous waste generators in the County. The County is in the midst of its licensing program. The process results in a license being issued or the generator being declared exempt. The County also enforces the Hazardous Waste Ordinance which addresses licensing and illegal dumping. As part of its programs the County sponsors a household hazardous waste collection day and several educational programs.

4.10.2 POLICY:

The County will give a high priority to the licensing of hazardous waste generators in areas of high ground water sensitivity. Ground water sensitivity will be a major factor in facility sitting processes for hazardous waste facilities. Local units of government shall consider ground water sensitivity in planning and sitting processes involving land uses that will potentially generate hazardous wastes, particularly industrial and similar uses.

4.10.3 OBJECTIVES:

The possibility of spills and leaks exist wherever there are oil and gas pipelines. If these breaks occur on coarse textured soils, in geologically sensitive areas, near rural developments or near municipal well fields, drinking water supplies can be interrupted or completely ruined. Although considerable controls on pipeline design and operation exist on the state and federal levels, pipeline companies could benefit from the considerable database of geologic, hydrologic, demographic, and anticipated land use information available from the County.

Table 4.10.1 ***When permits are required for pipeline installation require pipeline operators to indicate where the materials used to clean the inside of pipelines are to be disposed. The County in their review is to recommend avoidance for placement of pipelines in highly sensitive areas (as defined by the sensitivity map) and wellhead protection areas.***	
Target Start Date:	Rank:
1998	6
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, MPCACounty and Watershed Districts	

Table 4.10.2 ***Where there is no holding capacity in the line in case of a pipeline spill, the highest standard of pipeline shall be utilized through geologically sensitive areas.***	
Target Start Date:	Rank:
1998	2
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, County and Watershed Districts	

Table 4.10.3 ***Require any temporary surface pipeline to be protected with a secondary containment system to contain a potential spill or leak.***	
Target Start Date:	Rank:
1998	4
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, County and Watershed Districts	

Rail yards, transfer stations, and other places where hazardous materials are handled or stored are potential contamination sites. Spills at these sites often go unchecked and water used to wash rail cars and trailers is generally allowed to run onto the ground. This is of special concern if hazardous materials are involved and if wash sites are located in areas where water runs off quickly or is rapidly absorbed into the ground. The County, in conjunction with cities and other appropriate land and water managers, needs to determine if more monitoring is needed at these sites.

Table 4.10.4 ***Determine if monitoring wells are needed at rail yards, transfer stations and other locations where hazardous wastes are handled, stored or used in the past. Agencies involved in determining if monitoring wells are needed, would for example be: PIE, SWCD,*** County and Watershed Districts***, and the MPCA.***	
Target Start Date:	Rank:
2001	5
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, County, Watershed Districts's, MPCA	

The PIE maintains a complete inventory of locations in the County where hazardous waste is generated or handled, however, no complete inventory of where hazardous materials are located exists. "Community Right to Know" legislation makes it possible to inventory locations where hazardous materials are located. Once inventoried, this information should be put into the County's GIS database. This will make it easier to relate where hazardous materials are stored to ground water contamination. It will also be easier to qualify the need for monitoring wells and will help to site monitoring well locations. Additionally, knowing where hazardous materials are located will help fire marshals better manage fires and other emergencies and will reduce the risk to fire fighters and other emergency personnel.

There are already substantial resources committed to programs that are in place. These programs are guided or mandated by State and Federal programs and plans. The Ground water Plan provides a valuable source of information on ground water sensitivity. This information can establish a priority or urgency framework for the other activities. For example, licensing of generators in high sensitivity areas could be given a high priority. Spills or illegal dumping could be given an urgency rating based on the sensitivity of the area.

Table 4.10.5 ***Computerize the County PIE's inventory of hazardous waste locations and continue to update the list in order to develop a database. Identify what wastes are being handled at these locations and identify sensitive areas. Future development of these types of uses are to be guided by the sensitivity map.***	
Target Start Date:	Rank:
1998	1
Funding:	
In kind	
Participating Agencies/ Departments:	
County Surveyor's Office, PIE, SWCD,County and Watershed Districts and MPCA	

Table 4.10.6 ***Assist local fire departments and hazardous waste emergency spill handlers with training and education for protection of ground water aquifers.***	
Target Start Date:	Rank:
2000	3

Funding:
LCMR Funding
Participating Agencies/ Departments:
PIE, SWCD, MPCA, County and Watershed Districts and MDH

4.11 STORM WATER PONDS

4.11.1 OVERVIEW:

Rain falling on urban and rural areas results in both benefits and problems. The benefits range from watering vegetation and crops to recharging aquifers, lakes and streams. The problems associated with storm water runoff (the portion of precipitation which drains across the land surface) include flooding, erosion, and potential water quality degradation. The degradation can include the contamination of ground water supplies.

The historical management of urban and rural runoff focused primarily on flooding. In urban areas, increases in impervious areas (such as roof tops, streets, and sidewalks), generate significantly larger quantities of storm water runoff and associated pollutants. In rural areas, drain tiles and ditches are designed to quickly remove water from prime agricultural areas. In some areas, deep wells or "french drains" have been installed to promote direct transport of surface water into the ground water (see section 4.16 on the use of french drains).

In recent years, however, concern with the quality of runoff has increased. Storm water has been identified as a significant contributor of pollutants to lakes, streams and ground water in some areas. Numerous storm water quality studies have been conducted throughout the nation. The purpose of these studies has been to quantify the types of pollutants in storm water and to determine their source. A study often referenced by water resource professionals is the Nationwide Urban Runoff Program (NURP). The study was conducted in 1983 by the EPA and was a careful review of what was known about urban runoff mechanisms, problems and controls. That study provided a credible information base from which Federal, State and Regional and Local officials can make planning decisions. The EPA is in the process of amending their storm water management regulations, see the Federal Register, January 9, 1998 and anticipates adoption by March of 1999. More information can be obtained on the EPA website "http://www.epa.gov/".

4.11.2 POLICY:

The County and municipalities are to closely examine and review the ponding of water and encourage the reuse of water in the County to protect surface and ground water quality and quantity.

4.11.3 OBJECTIVES:

The management of storm water differs significantly than that of ground water. There are major differences in both the geologic and time scale. The most common form of surface water management is based on the concept of a watershed. Watersheds are typically determined by the height of the land that contribute surface water directly to a lake or stream system. Watersheds can be quite large, such as the Mississippi River watershed, or very small, such as a drainage system and storm water pond serving a parking lot. It is these smaller watersheds and their management which will be of most concern in regards to the County's ground water plan. There are two basic approaches to management of surface water resources which can affect the County's management of ground water, these are:

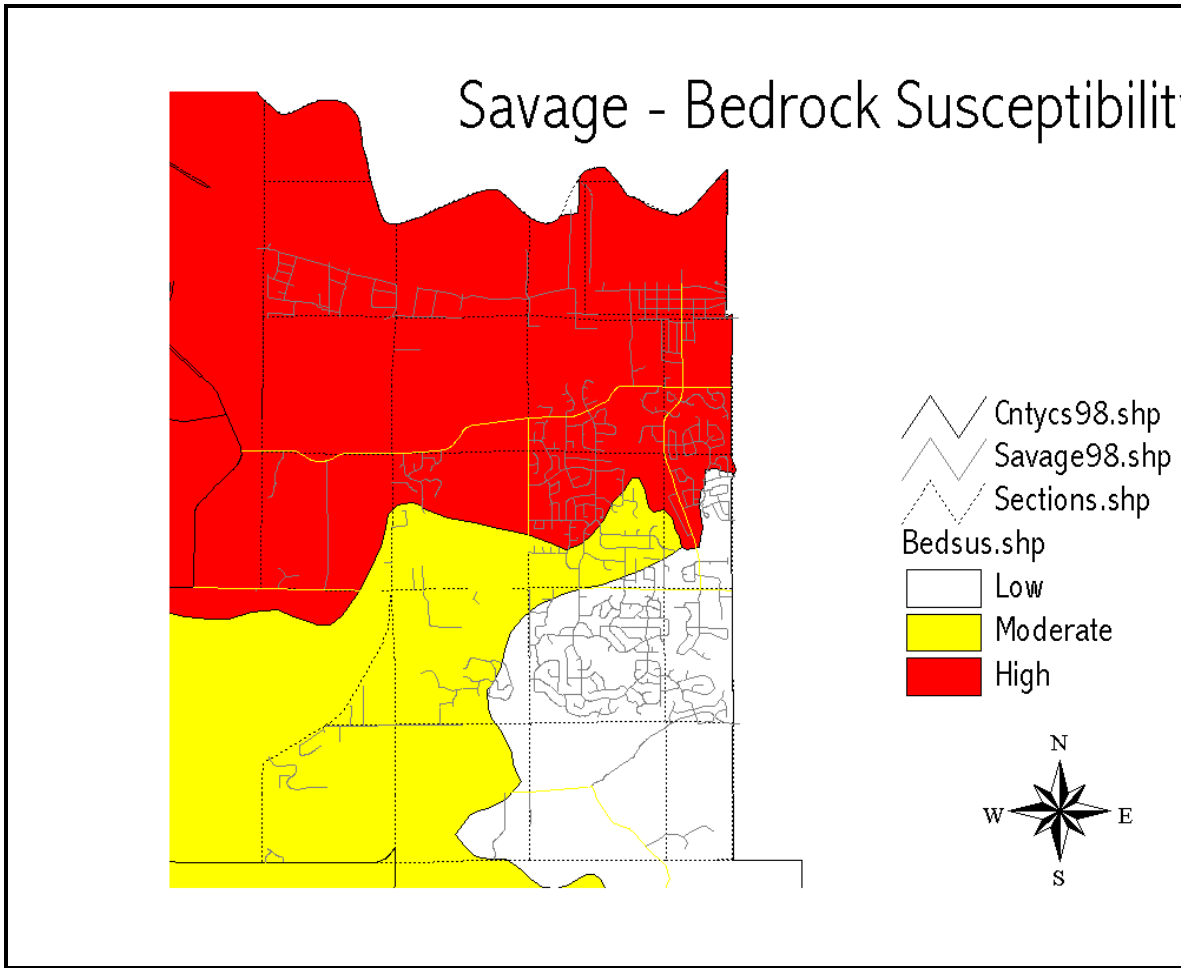
- Management of storm water utilizing a network of regional storm water conveyance and management facilities.
- Management of storm water on a site by site basis through the use of on-site facilities.

It is important for the County's planners to understand how each of these management approaches can affect the protection of ground water quality.

Regional storm water management basically involves the coordinated planning, sighting and construction of strategically located areas for storm water quantity and quality control. Careful planning is essential for regional storm water planning to work. Regional management of storm water is often sponsored by governmental units in order to create storm water holding areas which are under public control, can be easily maintained, and provide the greatest public and private good. Management on a regional basis has significant benefits because it tends to simplify the drainage system by avoiding numerous on-site ponding and private drainage systems. Private drainage systems often are not maintained to the degree of public systems and are difficult to monitor. The problem with the regional approach is that the cost of the system is born by the governmental unit responsible for its management. With proper planning, the cost of installing the regional system can be defrayed fairly by contributing areas as they are developed. Often times

municipalities have previously developed comprehensive water management plans which may or may not employ this comprehensive regional ponding system. The County and Watershed Districts will have to work closely with these municipalities to determine the best storm water plan for the individual municipalities relative to ground water protection.

Some areas within the County are mores susceptible to ground water contamination than others. Figure 4.11.1 identifies the areas described by the Minnesota Geological Survey to be highly and moderately susceptible to ground water contamination in the Savage area. This information is available for the entire County on GIS. Storm water ponds designed to accommodate runoff from residential, commercial and industrial developments where water carried contaminants are likely to be present could result in ground water contamination if storm water retention ponds were exccavated into highly permeable soils, bedrock or the water table. Design of storm water ponds in these areas should be consistent with Federal NURP standards which suggest use of low permeability soil to treat and retard contaminant infiltration. Until the State adopts specific storm water design criteria to protect the ground water Scott County should require that storm water ponds be designed to meet the standards for treatment specified in MPCA rules for on-site sewage systems. These rules require a three foot separation from the water table and bedrock with soils that have a permeability slower than five minutes per inch.


Savage - Bedrock Susceptibilit
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Savage98.shp
Sections.shp
Bedsus.shp
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Figure 4.11.1

Table 4.11.1 *Require* County and Watershed Districts *to utilize the ground water pollution sensitivity area map contained in this plan to identify regional storm water holding ponds. The* County and Watershed Districts *must then assess the ground water contamination potential of those specific sites. The* County and Watershed Districts *should require locations of storm water ponds in which ponding will not cause ground water contamination unless treatment (see definitions) of storm water occurs prior to discharge to the ponding area. In the absence of an alternative site for the pond, the pond is to be designed to meet standards appropriate to the individual situation so the design assures adequate ground water protection*	
Target Start Date:	Rank:
2005	1
Funding:	
Board of Water and Soil Resources Challenge Grants	
Participating Agencies/ Departments:	
County and Watershed Districts, SWCD, AES, PIE, MDA and Municipalities	

On-site management of storm water is attractive to many governmental units because the emphasis is placed on the owner of the property to manage the quantity and quality storm water in manner which protects the public good. Therefore, each housing development, shopping center, etc.. has a individual holding area for treatment and storage of storm water. This type of management results in numerous, small on-site facilities which are often under private management. The approach is attractive because most of the costs associated with management are born by private individuals or a company. However, numerous basins result and maintenance issues are always a problem.

The discussion of these management techniques is important because they greatly affect the number and distribution of storm water holding ponds throughout the County and the County's ability to manage them. The County should encourage governmental units responsible for storm water management to carefully consider the potential impacts to ground water when sighting ponding sites. Sighting of either on-site or regional storm water facilities should carefully consider potential impacts to ground water quality.

The management of surface water in Scott County is the responsibility of the County and Watershed Districts . These County and Watershed Districts are required by law to develop comprehensive surface water management plans. During the preparation of these plans, the County and Watershed Districts must evaluate the goals, policies and plans of

the other agencies listed and develop their own policies that attempt to resolve any issues raised. They must also provide detailed inventories of water resource features in the watershed.

In terms of ground water, the County and Watershed Districts must address concerns raised in Scott County's ground water plan. The County and Watershed Districts then work with the local cities to develop municipal plans which are consistent with the County's Ground Water Plan. It is therefore, very important for the County to determine sensitive areas for ground water contamination and encourage practices which discourage infiltration of ground water in these areas unless storm water pollutants can be removed first.

Table 4.11.2 ***The reuse of storm water runoff from all areas should be encouraged. One example of a re-use method would be to utilize storm water ponds by installing irrigation systems for developments to water lawns during dry periods.***	
Target Start Date:	Rank:
2005	3
Funding:	
In kind	
Participating Agencies/ Departments:	
County, Watershed Districts; PIE, and SWCD	

Table 4.11.3 ***The use of wetlands for flood storage only, not as water quality treatment should be encouraged.***	
Target Start Date:	Rank:
2005	4
Funding:	
In kind	
Participating Agencies/ Departments:	
County, Watershed Districts;, PIE, and SWCD	

The use of abandoned mines for storm water ponds has in the past been a popular end use. There are concerns associated with this end use specifically in the case where the abandoned mine serves as a recharge area to ground water. Mines are often times directly connected to ground water and contaminants from surface water in a storm water ponding situation are directed to the pond. The pollutants in runoff then poses a threat to ground water quality in the situation where the pond is a ground water recharge area.

Table 4.11.4 ***All mine reclamation plans shall include an analysis of surface water/ground water impacts. (refer to section 4.7).***	
Target Start Date:	Rank:
1999	2
Funding:	
Project Developer	
Participating Agencies/ Departments:	
PIE, County, Watershed Districts; and SWCD.	

4.12 REPLACEMENT WETLANDS AND PLACEMENT

4.12.1 OVERVIEW:

Wetlands can provide storm water storage, improve water quality, act as ground water recharge or discharge areas, and provide valuable wildlife habitat. Because wetlands often have a intimate connection to the ground water, they can play and important role in protecting the quality of ground water in Scott County. Classifications of wetlands help define the role that each wetland plays (see references for publications on wetland classification).

The main relationship of these various wetlands to ground water is their hydrogeologic connection to the ground water. In general, wetlands can either be perched above the ground water table be in ground water discharge areas or be in ground water recharge areas.

It is important for County planner's to recognize these differences and work towards policies which incorporate flexibility in the management of wetlands in the County. In particular, it should be noted that improper management of the ground water can also have a negative effect on the quality of wetlands and that the issue is not one sided.

Many times, it is determined that a particular activity cannot avoid impacting wetlands and the wetland is filled or drained. Typically, a new wetland is constructed as replacement. The constructed wetland may or may not function the same as the one its replacing. The destruction/construction of wetland areas can have important impacts on ground water supplies. However, because of the numerous hydrogeologic settings in which numerous types of wetlands exist, it is difficult to give a blanket statement whether the construction of

replacement wetlands will be positive or negative in regards to ground water contamination. The County should encourage the authorities responsible for wetland management and replacement to consider the potential impacts to ground water from their activities.

4.12.2 POLICY:

Current wetland laws are sufficient and should be kept in place and enforced to preserve wetlands for future generations.

4.12.3 OBJECTIVES:

Presently laws regulating wetland loss provide almost complete protection for wetlands. The interaction between wetlands and the ground water is by no means completely understood or predictable. Further investigation of this interaction will be required in the future to determine wetlands role in ground water recharge of aquifers.

Table 4.12.1 The County and Watershed Districts should *complete wetland inventories of all wetlands within their watersheds as a planning tool; including currently drained wetlands for potential future restoration.*	
Target Start Date:	Rank:
2005	1
Funding:	
Board of Water and Soil Resources Challenge Grants	
Participating Agencies/ Departments:	
County, Watershed Districts, SWCD, AES, PIE	

4.13 PUBLIC, PRIVATE AND ABANDONED WATER WELLS

4.13.1 OVERVIEW:

The largest and most readily available source of information on wells, well construction, and subsurface geology is water-well records. Prior to 1974, most drilling contractors kept their own records on wells that they had drilled. In 1974, legislation was enacted requiring that logs for all new water wells be submitted to the MDH. The required information includes location data, owner's name, use, construction information, and

geologic materials description. The information contained on the logs is distributed to SWCDs, MGS, DNR, and other agencies. The MGS County Well Index (CWI) was searched to determine the number of wells, uses, and aquifers utilized in Scott County. Copies of the CWI can be obtained from the MGS. (see the following web site "http://www.geo.umn.edu/mgs/cwi.html".

There were 3,421 well logs on file at the MGS as of October, 1993, 3,099 or 90.6% of these wells are for domestic use. In addition to domestic wells, municipal, commercial, and public supply wells are commonly used in Scott County for drinking water.

The Prairie du Chien is the most common aquifer utilized by domestic and commercial wells and the Jordan is the most common aquifer utilized by municipal wells in Scott County.

There are approximately 210 known multiple aquifer bedrock wells. The majority of these wells are domestic wells (171 wells). The others are commercial, municipal, public supply and industrial wells.

Approximately 400 wells are known to be completed in the surficial aquifer. It is estimated that approximately 75% of the domestic wells for which the aquifer is unknown are also completed in the drift material. Therefore, approximately 1750 drinking water wells are completed in drift material.

The greatest areas of concern related to wells are: proper initial construction of the well (refer to standards set by MDH), multiple aquifer bedrock wells, proper well operation/management, and proper abandoning of wells that are no longer used. Well construction, well operation/management, and abandoned wells are ground water planning issues because an improperly constructed, operated, or abandoned well can directly introduce pollutants into an individual water supply and into the aquifer(s) through which the well passes.

Contamination can occur in an active well by improper construction or by back-siphoning of a contaminant and in an improperly abandoned well by improper sealing around the outside of the casing, by direct introduction of contamination into the well, or by contamination leaking through rusted or corroded casing and/or joints.

The State of Minnesota operates a permitting system for well construction and regulates the well drilling contractors. The program requires water well records and inspection for

proper construction, including proper grouting, to ensure that wells are constructed according to the MDH Water Well Code (Minnesota Rules Chapter 4725). The State of Minnesota regulations no longer allow the construction of open hole wells or a well, screened through multiple aquifers.

The proper maintenance and operation of wells and appropriate housekeeping in the areas surrounding the wells are generally not considered by well owners/operators. Proper management of the well and surrounding area can prevent pollution from the surface even if a well is not properly constructed.

Abandoned wells are a major concern due to the ease with which contaminants can enter the ground water system. Abandoned wells can act as direct channels for surface pollutants to enter ground water; bypassing the natural filtration and degradation processes provided by soil and rock. Old well pits or dug wells have been used for the disposal of chemicals and other hazardous substances. The top of smaller diameter unused wells may be covered over, allowing contaminants to enter the ground water unnoticed. Abandoned wells also constitute a physical danger. Mortgage lenders and the State of Minnesota require disclosure of active, unused, and/or abandoned wells as part of the disclosure statement for property transfers. Unused wells must be properly abandoned at the time of property transfer.

4.13.2 POLICY:

All abandoned wells shall be properly sealed according to state well codes. All unused wells shall be properly capped and maintained to prevent contamination.

4.13.3 POLICY:

An inventory of abandoned wells should be completed for Scott County to determine the extent and magnitude of the impact of unused/improperly abandoned wells on ground water. Areas near municipal water supply wells; right of ways for roads, railroads, and pipelines; floodplains; known sources of contamination; and in annexed municipal areas should be given priority during the inventory process. The BWSR publication, the Abandoned Well Inventory Guidebook (June 1991) should be used as a guide for conducting the inventory.

Table 4.13.1 ***Complete an inventory of abandoned wells in Scott County. The BWSR publication, the Abandoned Well Inventory Guidebook (June 1991)***

should be used as a guide for conducting the inventory.	
Target Start Date:	Rank:
1999	1
Funding:	
BWSR Grant	
Participating Agencies/ Departments:	
PIE, SWCD, County, Watershed Districts, BWSR	

Upon completion of the inventory, an evaluation/assessment of the extent and magnitude of the abandoned well can be completed. The BWSR guidebook suggests a framework for the analysis and evaluation of the abandoned wells. Scott County as well as cities and municipalities where there are abandoned wells resulting from connection to the municipal system should begin a homeowner education program and take steps to ensure that all unused wells are properly sealed. The County as well as cities and municipalities and other owners or operators of multiple aquifer wells are encouraged to abandon and seal those wells as soon as circumstances permit.

Table 4.13.2 ***Upon completion of the abandoned well inventory, a priority will be established for each well with regard to its potential for contamination.***	
Target Start Date:	Rank:
2003	2
Funding:	
BWSR Grant	
Participating Agencies/ Departments:	
PIE, SWCD, County, Watershed Districts, BWSR	

Table 4.13.3 ***The County will apply for well sealing grants in order to provide incentives for voluntary participation in well sealing.***	
Target Start Date:	Rank:
2004	3
Funding:	
BWSR Grant	
Participating Agencies/ Departments:	
PIE, SWCD, County, Watershed Districts, BWSR	

Table 4.13.4 ***The County is to develop an education program on well sealing throughout the County.***	
Target Start Date:	Rank:
2000	4
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, SWCD, BWSR, MDH and DNR	

Table 4.13.5 ***The County is to begin discussion/negotiations with the Shakopee Mdewakanton Community regarding water usage and well construction within the community.***	
Target Start Date:	Rank:
1999	5
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, Shakopee, Prior Lake and DNR	

4.14 WATER SUPPLY: QUALITY, QUANTITY AND USE

4.14.1 OVERVIEW:

Quality:

The chemical composition of water determines its suitability for consumption. Certain standards are required to define its "quality". Chemical composition is one of the principle criteria for the quality of water. Additional criteria which are considered are: biochemical oxygen demand, chemical oxygen demand, specific conductance, hardness, alkalinity, presence of harmful trace metals, organic compounds, and other properties as required for specific uses.

The quality of water is expressed in terms of certain defined parameters and by the concentration of toxic elements or compounds whose presence may constitute a health hazard to humans, domestic animals and wildlife.

Standards for many of the contaminants that effect either the aesthetic quality of drinking water or the safety of water has been established. In 1990, Minnesota standards were amended to indicate standards for 53 toxic pollutants. Minnesota ground water quality can be described as a calcium- magnesium bicarbonate water. The ground water commonly contains concentrations of iron and manganese that frequently exceed secondary drinking water limits and recommended allowable limits.

Testing of wells in Scott County is conducted periodically by the MDH. These tests are done annually for municipal supplies, with other periods being used for other classes of water supplies. Typically, tests are conducted for coliform and nitrate levels, with checks made for volatile organic compounds, radioactive elements, and pesticides on an occasional basis.

Quantity and Usage:

Minnesota is renowned for its surface water, the importance of ground water is reflected in the state's reliance on it for drinking water, industrial production, food processing, and irrigation. State-wide ground water estimates vary from 1.1-2.0 trillion gallons (Kanivetsky 1979) to 330 trillion gallons (Ross 1976). Ground water accounted for 25 percent (254.1 billion gallons) of total state withdrawals in 1988, with most of the ground water withdrawn for high priority uses such as public water supplies and irrigation.

Ninety-four percent of the public water supply systems and 78 percent of all Minnesotan's derive their domestic water supplies from ground water (US Geological Survey, 1986).

Scott County relies almost 100 percent on ground water for its domestic, municipal, and industrial supplies. The percentages of reported ground water usage in the County are in some cases much higher than statewide percentages. The large difference in waterworks usage is due to the amount of urbanization occurring in the County as compared to the rest of the state. Other notable differences are that ground water is not used for water level maintenance and for air conditioning in the County.

The SWCD and DNR have been cooperating on observation well monitoring since 1983. Scott County has had monthly monitoring of 13 wells which are finished in various aquifers available in the County. Monitoring results are available from the SWCD and DNR.

Water usage is directly related to population size and the types of use in a given area. The DNR has required water allocation permits since 1947 for withdrawals of more than 10,000 gallons/day or 1 million gallons/year (except for domestic use for 25 or fewer people). Usage categories identified in DNR permits include waterworks, irrigation, power generation, industrial processing, temporary construction, water level maintenance, air conditioning, and miscellaneous uses.

Water use data for approximately 6,000 active permits are contained in the Minnesota Water Use Data System (SWUDS) and is derived from reporting procedures required by the water appropriation permits. Although SWUDS contains data on large water users it should be noted that small users do not report use, and some permit holders do not report their use. These factors obscure total water use and reported water usage data should be considered a minimum estimate.

Where uses conflict, DNR must allocate water according to the following priorities established by the state legislature in MN .Statutes. 103G.261:

1. Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets the contingency planning provisions of 103G.285, Subd. 6
2. A use of water that involves consumption of less than 10,000 gallons of water per day

3. Agricultural irrigation, and processing of agricultural products involving consumption in excess of 10,000 gallons per day
4. Power production in excess of the use provided for in the contingency plan developed under section 103G.285, subd. 6
5. Uses other than agricultural irrigation, processing of agricultural products, and power production, involving consumption in excess of 10,000 gallons per day
6. Nonessential uses

The DNR Division of Waters is responsible for resolving any situation where pumpage by one or more water users prevents other users from obtaining adequate supplies of water. During the 1970's, ground water use conflicts and well interference created by the 1976-77 drought and the increased use of ground water for irrigation emerged as highly volatile issues.

4.14.2 POLICY:

Scott County is to protect ground water quality and conserve ground water supplies.

4.14.3 OBJECTIVES:

As development in Scott County continues to expand so will the demand for ground water. Although there appears to be enough water to meet any future demands, it is likely that occasional localized shortages will continue to occur. Since most communities cluster their wells near treatment and pumping facilities, short term interruptions in water supply can result as drawdown increases in response to greater demands. Furthermore, since these wells are close to one another, an entire community's water supply could be lost by a single contamination event.

To sustain growth, communities must be able to plan for temporary as well as long term shortages in water. Plans should be unique to the communities they serve and reflect the particular community's priorities and needs. For example, an older, well established community may ban lawn and garden watering during droughts whereas a developing community may want to allow watering so its residents can protect their investment in new sod and shrubbery. Additionally, the plan should include:

- A contamination contingency plan,
- Identify secondary water sources,
- Describe pumping scenarios based on future demand,

- Non-emergency and emergency conservation measures and priorities,
- If needed, cooperative agreement with other communities.

Many municipalities have developed water conservation programs. The City of Minneapolis's plan can be found at the following Web site "http://www.ci.minneapolis.mn.us/citywork/planning.

Table 4.14.1 *The County is to cooperate with the MPCA to develop, implement, and maintain a program for monitoring water quality in wells throughout the County.*	
Target Start Date: 1999	Rank: 2
Funding: LCMR Grants	
Participating Agencies/ Departments: PIE, County, Watershed Districts's, MPCA, and SWCD	

Table 4.12.2 *The County, Watershed Districts, MPCA, SWCD and NRCS are to work in cooperation to develop an education program regarding water quality. The program is to develop or utilize existing brochures and pamphlets concerning water quality and hold water quality workshops.*	
Target Start Date:	Rank:
2002	3
Funding:	
LCMR Grants	
Participating Agencies/ Departments:	
PIE, County, Watershed Districts's, MPCA, NRCS and SWCD	

Because communities in Scott County rely on ground water for their municipal supplies, they are particularly vulnerable to aquifer contamination and aquifer draw down. Development in the County will continue to place more demand on ground water and, in time, may result in aquifer mining (removing more water than can be recharged).

Table 4.14.3 *DNR, MPCA, County and Mdewakanton Dakota community are encouraged to cooperate and work together in order to develop a better accounting system of how much water is actually used and the water quality trends in Scott County. This includes all water users.*	
Target Start Date:	Rank:
1999	7
Funding:	
LCMR Grants	
Participating Agencies/ Departments:	
PIE, DNR, County, Watershed Districts's, MPCA, and SWCD.	

Conservation is undoubtedly the easiest way to reduce the pressures on the County's ground water supply and to avoid any ground water use controls. Conservation can be pro-active or reactive. Pro-active conservation assumes that by cutting out wasteful practices there will be more water available in the future. Reactive conservation results from a water shortage emergency.

Benefits identified by the MCES from conservation (Twin Cities Metropolitan Area Water Supply: A Plan for Action, February 1992) include:

- Preservation of the resource to ensure that good water resources will be available in the future.
- Elimination or postponement of new source development with associated saving of capital investment, operating costs, and energy.
- Improvement of water supply efficiency to maximize the use of the resource.
- Institutionalization of conservation practices that help utilities cope with short term water shortage emergencies.

An additional benefit of conservation is the postponement or elimination of capital improvements for storage, pipe size, handling, and treatment costs.

Conservation can be classified as "demand management" and "supply management" Demand management requires cooperation between public utilities and residents, industry, and other users. Demand management involves personal conservation, public education, regulating use, pricing programs, recycling water used in manufacturing or using spent water for irrigation. Supply management involves the conservation of water within the public utility without involving users. Supply management techniques include: metering, water leak detection and repair, and reducing in line pressures.

Reactive conservation tends to be regulatory. If a water supply crisis exists, communities can enact sprinkling bans, rationing, and other controls on non-essential uses to assure that drinking water supplies are maintained. Communities that take a pro-active approach to water conservation may be able to prevent these water shortages before options are narrowed. Water conservation also saves money. Residents and commercial users obviously save money on their water bill by using conservation techniques but communities as well can save money because less water is introduced into the waste stream, thereby reducing sewage treatment costs.

Planning efforts in the past have traditionally paid particular attention to surface water and its impacts to the County, townships, and municipalities. It is the view of the advisory committee that efforts should be directed in comprehensive planning stages to consider ground water impacts when developing policies and ordinances. The County will have to pay particular attention to the impacts that will be a result of policies on lot sizing, setbacks and future land use zoning.

Table 4.14.4 *The county's comprehensive plan considers ground water impacts.*	
Target Start Date:	Rank:
1998	1

Funding:
County Funding
Participating Agencies/ Departments:
PIE

Table 4.14.5 *County is to implement an education program for commercial and residential sprinkling. The program is to offer information on water conservation and in coordination with the SWCD, NRCS and MES, plan development for lawn watering to eliminate wasteful use of ground water such as watering during a rainstorm and sprinkling on pavement. In particular lawns are to have a schedule of sprinkler operation which water lawns only when needed*	
Target Start Date:	Rank:
2002	4
Funding:	
County Funding	
Participating Agencies/ Departments:	
MES, PIE, County, Watershed Districts's, MPCA, NRCS and SWCD	

Table 4.14.6 ***Scott County is to promote the use of alternative landscaping to reduce water use needs.***	
Target Start Date:	Rank:
1999	5
Funding:	
None Needed	
Participating Agencies/ Departments:	
PIE, Public Utilities, SWCD, MES	

Table 4.14.7 ***Identify industries in the County that can recycle water and provide technical assistance for appropriate ground water conservation goals.***	
Target Start Date:	Rank:
1999	6
Funding:	
None needed	
Participating Agencies/ Departments:	
PIE, Public Utilities, MES, DNR, and MDH	

Table 4.14.8 *The SWCD and County Agricultural Extension Service is to assist agricultural irrigators in Scott County through an education program and develop an irrigating schedule with all irrigators who are willing to cooperate.*	
Target Start Date:	Rank:
1998	8
Funding:	
LCMR	
Participating Agencies/ Departments:	
AES, PIE, County, Watershed Districts's, MPCA, MDH, MDA, SWCD, and DNR	

4.15 WELLHEAD PROTECTION (PUBLIC WATER SUPPLIES)

4.15.1 OVERVIEW:

Wellhead protection of public water supplies is a means of protecting the ground water which will be withdrawn from a given well or well field. Basically, the ground water withdrawn from the aquifer is impacted by the ground water which is near the well. Therefore, it is the activities that are conducted on the ground above in the aquifer recharge area of the aquifer being used, or land surface activities around the wellhead that needs to be carefully regulated. This area must be regulated in order to maintain the quality of the water being extracted.

Ground water tends to flow through the aquifer to areas of lesser gradient. The flow is often times slow, but it tends to travel in a certain direction. The cleansing abilities of the pore structure that the ground water flows through will tend to correct contamination naturally if the distance is great enough. The distances for these corrections depend on

each particular contaminant and how these contaminants degrade. Contaminants degrade with time. There are many factors that determine a wellhead protection area. Two factors that assist in delineating the wellhead protection area are velocity and direction of ground water flow. The wellhead protection area is determined utilizing the time for contaminant degradation. Typical contaminants are examined for their time to degrade and the wellhead protection area is delineated using this determination as well.

The land area around a wellhead is usually the area of concern for wellhead protection because of the carrying abilities of natural ground water flow from the land surface to the aquifer (natural vertical ground water percolation). Other items can also impact the movement of the surface contaminants to the aquifer. For example, if a well casing is not grouted properly, a weakness in the seal of the casing can allow surface water to percolate downward and act as a direct conduit for contaminants to the aquifer.

Manmade contaminants (i.e. chlorinated solvents) that are slow in breaking down naturally tend to exist in the environment for longer time periods and will percolate through the aquifer for longer distances with natural ground water movement. Therefore future installations of wells and new activities around existing wells should have particular attention focused on the allowable activities zoned around the well and it is imperative that efforts be made to insure proper installation of the wells.

The 1986 Amendments to the Federal Safe Drinking Water Act (SDWA) established the Wellhead Protection Program to protect the ground waters of supply wells and well fields that contribute drinking water to public water supply systems. Under the SDWA each state must prepare a Wellhead Protection Program for the EPA. The MDH is under a state legislated mandate from the Minnesota Ground Water Protection Act of 1989 to develop wellhead protection rules and to prepare the State Wellhead Protection Plan for submittal to the EPA.

4.15.2 OBJECTIVES:

To protect the wellheads of wells and well fields the following will have to be incorporated into the Wellhead Protection Plans:

1. Delineate the Wellhead Protection Areas for each well or well field;

2. Identify the potential sources of contamination within the Wellhead Protection Area;

3. Develop management plans to control those source of contamination;

4. Develop contingency plans for each public water supply system to respond to well or well field contamination;

5. Plan for areas of future wells, to site new wells properly to maximize yield and minimize potential contamination.

Table 4.15.1 ***Scott County, townships, municipalities and public water suppliers shall conform to and utilize rules developed by the MDH on Wellhead Protection Plans when developing Wellhead Protection Plans. Scott County is to adopt the ordinance prepared by the MDH on wellhead protection plans.***	
Target Start Date:	Rank:
1999	1
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, County, Watershed Districts's Townships, Municipalities and MDH	

Table 4.15.2 ***Scott County, townships and municipalities shall utilize the sensitivity map included in this plan when developing wellhead protection plans within the County***	
Target Start Date:	Rank:
1999	2
Funding:	
None needed	
Participating Agencies/ Departments:	
PIE, County, Watershed Districts's, Township, Municipalities, and MDH	

The installation of new wells must be planned as the need for additional water resources increases with the expansion of Scott County. Plans must include the wellhead protection criteria in order to maximize the use of the water resource and assure the purest quality.

Table 4.15.3 ***Scott County is to develop a plan for development of new wells needed for the predicted increase in population. Alternatives to new wells are to be analyzed and developed by the County in cooperation with the DNR. A***

source of water that needs to be utilized is water which is currently being wasted that may easily be treated and used as a potable water supply.	
Target Start Date:	Rank:
2000	3
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, County, Watershed Districtss, DNR, Townships, Municipalities and MDH	

Currently MDH is charged with the enforcement of permitting for construction of wells. In the recent past MDH requested additional funding from the state legislature to enforce permitting and provide inspections on construction of wells. Funding was denied and since that time there has been little or no enforcement/inspections of well construction to assure proper well construction. Scott County has had discussions with the MDH to have the permitting process delegated back to the County. The MDH at the time seemed open to the idea and further discussion and delegation should take place. This delegation of permitting authority will help assure proper well construction in Scott County.

Table 4.15.4 ***Scott County is to seek delegation of permit authority for permitting of wells in Scott County. If permit authority is obtained, a permit program is to be established and a percentage of wells are to be inspected, as built, to assure proper construction.***	
Target Start Date:	Rank:
2000	4
Funding:	
Permit Fees from Well Construction	
Participating Agencies/ Departments:	
PIE, DNR, Townships, Municipalities and MDH	

4.16 UNDERGROUND INJECTION OF LIQUID WASTES OTHER THAN DOMESTIC SEWAGE

4.16.1 OVERVIEW

The disposal of liquid wastes other than sewage as defined in the Scott County Individual Sewage Treatment System Ordinance is regulated by the MPCA and the EPA. All underground discharges of wastes other than domestic sewage must be registered with

EPA and some of these may be required to obtain an EPA Underground Injection Control Permit. ISTSs may not be appropriate for the disposal of liquid wastes other than domestic sewage. Scott County PIE has a long standing record of not approving permits for ISTS that are proposed to accommodate commercial or industrial waste unless prior approval has been obtained by a state or federal agency. Review of ISTS permits, Conditional Use Permits and building permit applications allows for the identification of potential problems before they occur. In addition, inspection of all hazardous waste generators helps identify and curtail improper disposal of liquid wastes. Upon identification of a business that is currently disposing of wastes other than domestic sewage into an ISTS, PIE informs the business of the need to obtain permits from the appropriate state or federal agencies. The business is advised of any local ordinances that may apply to their particular circumstance. They are also provided with information regarding alternate methods of managing their liquid wastes.

4.16.2 POLICY

Scott County will enforce the State ISTS rules to insure that only domestic sewage is allowed to be discharged into an ISTS. Persons and businesses found to be disposing of liquid wastes other than domestic sewage in an ISTS will be referred to the MPCA for investigation.

4.16.3 OBJECTIVES

Scott County PIE will assist local, state and federal agencies toward protection of ground water resources. This will be achieved through review of ISTS permits, inspection of hazardous waste generators and through public educational efforts.

Table 4.16.1 ***Continue to enforce the MPCA ISTS (7080) rules throughout Scott County. Coordinate enforcement with the municipalities who wish to administer their own programs.***	
Target Start Date:	Rank:
Ongoing	1
Funding:	
Permit Fees	
Participating Agencies/ Departments:	
PIE, Municipalities, MPCA	

Table 4.16.2 ***Continue to review applications for commercial and industrial facilities for possible non-domestic sewage liquid waste discharge potential.***	
Target Start Date:	Rank:
Ongoing	2
Funding:	
Permit Fees	
Participating Agencies/ Departments:	
PIE, Municipalities, MPCA	

Table 4.16.3 ***Expand the current efforts toward education of ISTS owners to encourage proper system use and maintenance.***	
Target Start Date:	Rank:
Ongoing	3
Funding:	
Permit Fees	
Participating Agencies/ Departments:	
PIE, AES, MPCA	

4.17 INFORMATION MANAGEMENT

4.17.1 OVERVIEW

Many of the objectives in this plan involve gathering additional information about the ground water and the land uses that could impact water quality. To be useful, information must be stored in such a way that anyone involved with land and water management can access it quickly. Furthermore, information should be provided to users

in formats that are compatible with standard systems. Local, regional, and state government need to work together to share information to avoid duplication of efforts and the wasteful spending of public moneys on programs already completed. Use of the Internet and can provide such a tool for facilitating data collection that can be used to implement several of the objectives of this plan. The County is arranging with agencies, local and state governments an information exchange partnership network to keep the GIS current and allow information transfer and use.

Work is underway by the County surveyors office to arrange partnerships for digitizing the remaining portion of Scott County soil survey. All Watershed Districts in the County will be encouraged to have watershed boundaries digitized as well.

Statewide, one of the more difficult aspects of water planning has been establishing what information is available and where. Knowing what is available, how current it is, where it is stored, and in what form it is stored would be valuable to anyone involved in land and water management.

As GIS technology becoming less expensive and easier to use, more non-GIS professionals will be trying to develop applications and will want access to data bases. Training should begin as soon as possible so that the limits and the potential of GIS can be understood by those likely to use the software as well as those that will conceptualize local applications.

4.17.2 OBJECTIVES

The Scott County Survey Department has developed the database up to this point. As more information becomes available for digitization the appropriate agency/local unit of government will obtain funds for entry of information into the GIS system. The County expects to recover costs of completing and maintaining the GIS system by charging fees for maps that are requested by users. Partnerships with local agencies can be developed so maps become more available by allowing GIS access by the local agencies.

Table 4.17.1 ***Develop data exchange programs, where appropriate, with regional, state, county, and municipal land and water management entities (particularly along county boundaries).***	
Target Start Date:	Rank:
1998	2
Funding:	
None needed	
Participating Agencies/ Departments:	
County Survey Department, Local, State and Federal Agencies	

Knowing what data is available can eliminate much duplication. Information is stored in paper files, in computer databases, and, increasingly, in GIS databases. Often those responsible for collecting this information are not aware of all of its uses. A dictionary that describes the information available, in what format its stored in, and how to gain access to it could be especially valuable to planners, consultants, and others involved with natural resource management.

Table 4.17.2 ***Develop a County GIS dictionary that lists all information available to the public officials in a GIS format.***	
Target Start Date:	Rank:
1999	4
Funding:	
In kind	
Participating Agencies/ Departments:	
County Survey Department	

Table 4.17.3 ***Compile a listing of County databases that will identify what is in the database, who maintains them, where it is located, what format it is in, and whether or not its confidential information.***	
Target Start Date:	Rank:
1999	6
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, County Survey Department	

By December 1996, the County is expected to have all property parcels in unincorporated areas entered into its GIS data base. Each parcel will be "tagged" with its property identification numbers (PIN). This will make it possible to link other data bases to the property. If data entry standards are implemented countywide that require PIN numbers to be entered as a separate "field," all information could be linked together and tied into the County GIS parcel map.

Table 4.17.4 ***Develop County standards for data collection and require all data collected that is expected to be entered into a GIS follow existing County GIS standards (such as the use of "PIN" numbers for property ID).***	
Target Start Date:	Rank:
1999	5
Funding:	
None needed.	
Participating Agencies/ Departments:	
County Survey Department, County Data Processing, County, Watershed Districts's, and PIE	

GIS technology can be applied in almost any department in the County. Although GIS prices are coming down and the software is becoming easier to use, not every department or user should spend the time and money to learn how a full function GIS works. There are basically three levels of training needed to run a full function GIS; data conversion and management, application development, program operation. The Survey Department serves as GIS administrators for the County and assures that information is entered correctly. This is the only County department that has the skills and equipment necessary for data conversion. Other departments should be discouraged from taking over this function. However, these departments should learn application development and program operation.

GIS training could be divided into two phases. Phase one would be targeted to planners, city engineers, elected officials, and others involved with administration and program management that do not use GIS but need enough GIS background to conceptualize GIS applications and that plan to use the new generation of simplified PC-based GIS's. Phase one training would include an overview of GIS, describe how GIS can be used in the County, what information is available, and basic GIS functionality.

Phase two would be directed towards more technically oriented land and water managers such as the SWCD, AES, public works staff, natural resource planners, and others that

will actually be operating GIS programs. Phase two training would include: file transfer and conversion training, data base development, an overview of the County GIS system and standards, and ARCINFO training.

Table 4.17.5 ***Prepare a two phase GIS training program for natural resource applications for land and water managers and program administrators within the County.***	
Target Start Date:	Rank:
1999	1
Funding:	
In kind	
Participating Agencies/ Departments:	
County Survey Department, County Data Processing, and PIE.	

Table 4.17.6 ***Develop a system that would permit easy access to GIS data by County, Watershed Districts, municipal and other local land and water planners. Develop GIS capabilities in PIE, the SWCD, and the AES.***	
Target Start Date:	Rank:
1999	3
Funding:	
Affected departments/entities	
Participating Agencies/ Departments:	
County Survey Department, Affected departments/entities	

4.18 SENSITIVE AREAS FOR PLANNING

4.18.1 OVERVIEW

The basis for a sensitivity assessment of Scott County's ground water resource is the Minnesota Ground Water Protection Act of 1989 (Chapter 326 of the Minnesota Session Laws, 1989). It mandated the DNR to develop sensitivity criteria and to map sensitive areas of the state. The law describes a sensitive ground water area as a geographic area defined by natural features where there is a significant risk of ground water degradation from activities conducted at or near the land surface. The DNR subsequently developed guidelines and criteria to identify such areas in the state (Criteria and Guidelines for Assessing Geologic Sensitivity of Ground Water Resources in Minnesota, DNR, June 1991).

Scott County was selected as a pilot project county to test the above mentioned guidelines and criteria. The pilot project was commissioned by the LCMR and supervised by DNR with the University of Minnesota's Professor Hans-Olaf Pffannkuch conducting the project. The pilot project was aimed at carrying out a test run of the methodology developed by the DNR under real life conditions in a representative area of the state. If it was deemed necessary the project was to refine and expand on the methods and criteria by a more rigorous interpretation of subsurface geohydrological data. Another objective of the project was to test the validity of the DNR methodology by comparing the spatial distribution of sensitivity ratings obtained by the empirical method, based upon vertical travel time of contaminants from the land surface to the aquifer of interest. This can be tested using the signatures of the surface impact on the ground water chemistry. These signatures were used as an indication of the degree of interconnection of the aquifer with the land surface, thereby also an indication of the sensitivity of the ground water to surface generated contamination. A third objective was to develop a GIS based procedure for carrying out a sensitivity analysis by the DNR method. The software used for this objective is called EPPL7 (Environmental Planning and Programming Language 7, developed and distributed by Land Management Informatioon Center [LMIC]).

4.18.2 OBJECTIVES

The implementation of the methodology for each of the three physical levels of ground water sensitivity was tested on the pilot area. Refinements and additions were made to all three levels, based on a number of trial approaches. The refinements were aimed at enhancing the logical as well as the geologic and hydrologic rigor of the process, and to increase the ease of implementation. Comparisons were made between the results obtained by incorporating the refinements and modifications with those obtained by implementing the methodology in its original form. The aerial extent of the differences in sensitivity ratings was used to assess the significance of the modifications. Comparisons were then made in the levels to determine the most applicable and useful level of assessment. The final level 2 sensitivity map was recommended as the most useful
and applicable map for planning purposes in Scott County. This map and tha data which was used to develop is hoped to be made available to Scott County for inclusion as a tool in the County's GIS. An independent GIS model of recharge potential was also developed. The recharge potential is not a factor used in the DNR methodology. The recharge potential was compared with the sensitivity levels to see how much a factor that the recharge map would be on sensitivity levels. The ground water chemistry data

gathered from the sampling of 100 wells in the drift ground water system was analyzed to determine the interconnection of the ground water with the land surface. The results of the analysis was compared with the geologic assessment method to assess its correlation to the DNR methods.

Table 4.18.1 ***Submit results of the sensitivity pilot project to the County Survey Department for incorporation of sensitivity map into the County GIS system.***	
Target Start Date:	Rank:
1998	1
Funding:	
In kind	
Participating Agencies/ Departments:	
County Survey Department, Local, State and Federal Agencies.	

Table 4.18.2 ***Utilize the sensitivity study map as discussed throughout the ground water plan for planning purposes.***	
Target Start Date:	Rank:
1998	2
Funding:	
In kind	
Participating Agencies/ Departments:	
PIE, County Survey Department	

Table 4.18.3 ***Require that any information obtained from individual site analysis for sensitivity be submitted to the County for incorporation into the sensitivity map. Individual site analysis is to follow the methodology developed by the DNR and refined by the University of Minnesota in the pilot project sensitivity study.***	
Target Start Date:	Rank:
1999	1
Funding:	
In kind	
Participating Agencies/ Departments:	
County Survey Department, PIE	

Table 4.18.4 ***Update the sensitivity map using individual site analysis as information is received. Update the working GIS map as often as the University of Minnesota deems enough reliable information has been received.***	
Target Start Date:	Rank:
2001	3
Funding:	
In kind	
Participating Agencies/ Departments:	
County Survey Department, PIE, University of Minnesota	

5. POLICY DEVELOPMENT AND POLICY DIRECTIVES

5.1 INDEX OF ISSUE AREAS:

The ground water plan has 9 issues which currently have policies that are developed that address ground water concerns within Scott County. A general index of topic areas included in this section.

Detailed information for each policy can be found in section 5.2 and the related issue in section 4. Policy areas not directly addressed by this plan may be addressed by Federal, State or Local rules and regulations.

Index: As a guide to help locate various types of ground water related information, this index lists topic areas and indicates where the information on that topic can be

found.

TOPIC AREA	WHERE INFORMATION CAN BE FOUND
abandoned wells	section 4.15 and 8th policy
agricultural ditches	section 3.5
agricultural chemicals	section 3.9, 4.1, 4.2, 4.3, and 4.8
agricultural surface water runoff	section 4.1, 4,3, 4.8, 4.11, and 4.13
animal waste storage/feedlots	section 4.1 and 4.3
Best Management Practices	section 4.3
detention ponds	section 4.11
enforcement of policies	section 6, 7 and 8
feedlots	section 4.1
feedlot effluent	section 4.1
fertilizers	section 4.2 and 4.3
filling wetlands, lakes and streams	section 3.7 and 4.12
floodplains	section 3.8
hazardous waste	section 4.10
hazardous waste facilities	section 4.10
geographic information system (GIS)	section 4.17, and 4.18
ground water	section 3.10, 4.13, 4.14, and 4.15
ground water conservation	section 4.13, 4.14, and 4.15
ground water quality	section 4.14
ground water sensitivity	section 4.18
individual sewage treatment system (ISTS)	section 4.9
integrated pest management (IPM)	section 4.3
irrigation	section 4.14
lakes	section 3.6
land use and zoning	section 3.4
lawn and garden chemicals	section 4.2
nitrates	section 4.2 and 4.3
nutrient export	section 4.1, 4.2, 4.3, and 4.8
nutrient management plan	section 4.1, 4.2, 4.3, and 4.8
on-site waste treatment systems	section 4.9
pesticides	section 4.2 and 4.3
public participation/education	section 2, 4.17, 6, 7, and 8
regional detention	section 4.11
rivers	section 3.5, and 4.14

runoff, urban	section 3.4 and 4.11
sanitary sewers	section 4.9
septic tank systems	section 4.9
setbacks	section 3.4
sensitive areas	section 4.18
shoreland management	section 3.6
soil tests	section 4.3
storm sewers	section 4.11
storm water management	section 4.11
stream classification	section 3.5
urban growth	section 3.4
unused wells	section 4.13
wastewater treatment	section 4.8
water levels	section 3.6
water storage	section 4.11
water quality	section 3.10 and 4.14
wetland alteration	section 3.7 and 4.12
wetland conservation act (WCA)	section 4.12
zoning	section 3.4

5.2 DETAILS OF SCOTT COUNTY GROUND WATER POLICIES:

Nine ground water policies are described in this section and are summarized below.

Feedlots (controlling runoff from feedlots and getting enforcement to the County level)
Underground Storage Tanks (prevention of contamination by UST's)
Individual Sewage Treatment Systems (enforces current state rules and a County maintenance program)
Hazardous Materials Handling and Treatment (hazardous waste facility sitting in Scott County)
Storm water Ponding (storm water pond sitting utilizing the sensitivity map)
Replacement Wetlands and Placement (Wetland Conservation Act of 1991)
Water Supply: Quality and Quantity and Use (protecting the county's water supply)
Public, Private and Abandoned Wells (proper sealing and capping of abandoned and unused wells)

Underground Injection of Liquid Waste other than Domestic Sewage
(domestic waste only in ISTS)

POLICY Section 4.1 Feedlots

Goal: To implement a feedlot ordinance policy to contain potential pollution from feedlots within Scott County. The ordinance is to take over enforcement of feedlots according to rules and standards set by the MPCA.

Policy: No feedlot effluent beyond the states allowable standards **(see Chapter 7020 and 7050.0211)** shall be allowed to flow to surface and ground water in Scott County. The County Environmental Health Department shall be responsible for annual inspection of feedlots and enforcement of the feedlot ordinance to be developed. Violation of the ordinance shall be the same as current state laws allow.

POLICY: Section 4.4 Underground Storage Tanks

Goal: To implement a program to reduce the potential for pollution to ground water supplies by underground storage tanks. The program would utilize existing federal and state guidelines as well as implementing objectives at a local level.

Policy: The County is to prevent the contamination of ground water by existing and proposed UST's. The County is to use existing State and Federal regulations as well as items in section 4.4.

POLICY: Section 4.9 Individual Sewage Treatment Systems

Goal: To implement a program to reduce the potential for pollution to ground water supplies by individual sewage treatment systems. The program would utilize existing federal and state guidelines as well as implementing objectives at a local level.

Policy: Scott County will enforce MN Rules Chapter 7080 to ensure that proper construction methods are used and thereby reducing the potential for ground and surface water contamination. Scott County will also implement an ISTS maintenance program throughout unincorporated areas of the County to ensure that existing systems are properly maintained.

POLICY: Section 4.10 Hazardous Materials Handling and Transport

Goal: To implement a program to assist planners and developers in locating hazardous waste facilities in Scott County. The County will utilize the sensitivity map in the sitting process.

Policy: The County will give a high priority to the licensing of hazardous waste generators in areas of high ground water sensitivity. Ground water sensitivity will be a major factor in facility sitting processes for hazardous waste facilities. Local units of government shall consider ground water sensitivity in planning and sitting processes involving land uses that will potentially generate hazardous wastes, particularly industrial and similar uses.

POLICY: Section 4.11 Storm water Ponding

Goal: To implement a program to assist planners and developers in locating suitable sites for storm water ponding facilities in Scott County. The plan encourages the planning byWatershed Districts for regional ponding facilities. The County andWatershed Districts will utilize the sensitivity map in the sitting process.

Policy: The County and municipalities are to closely examine and review the ponding of water and encourage the reuse of water in the County to protect water quality and quantity.

POLICY: Section 4.12 Replacement Wetlands and Placement

Goal: To implement a program to encourage The County and Watershed Districts to inventory wetlands within their boundaries. The plan also supports current wetland laws and makes a recommendation to the state to keep wetland law in place and maintain enforcement. This is recommended since so many wetlands are vital ground water recharge areas.

Policy: Current wetland laws are sufficient and should be kept in place and enforced to preserve wetlands for future generations.

POLICY: Section 4.13 Public, Private and Abandoned Wells

Goal: To implement a program to assure the highest quality well construction within Scott County in order to minimize the potential for pollution to ground water supplies by improper well location and construction.

Policy: All abandoned wells shall be properly sealed according to state well codes. All unused wells shall be properly capped and maintained to prevent contamination.

POLICY: Section 4.14 Water Supply: Quality and Quantity and Use

Goal: The program will implement objectives to monitor water quality, investigate utilization of low quality water for appropriate uses, implement an education program, and cooperate with users within the County. All of these measures are in an effort to achieve a supply of water to last longer into the future and maintain a higher ground water quality for Scott County residents as well as other users within the aquifers below the County.

Policy: It is the policy of the ground water advisory committee that Scott County is to protect ground water quality and conserve ground water supplies.

POLICY: Section 4.16 Underground Injection of Liquid Waste other than Domestic Sewage

Goal: To implement a program to enforce the State ISTS rules to insure that only domestic sewage is allowed to be discharged into an ISTS. This program will minimize potential pollution to ground water supplies by underground injection.

Policy: Scott County will enforce the State ISTS rules to insure that only domestic sewage is allowed to be discharged into an ISTS. Persons and businesses found to be disposing of liquid wastes other than domestic sewage in an ISTS will be referred to the MPCA for investigation.

6. IMPLEMENTATION STRATEGY

6.1 THE ROLE OF THE COUNTY IN PLAN IMPLEMENTATION

Scott County has developed a comprehensive, and achievable implementation program to accomplish objectives outlined in this plan. These strategies identify objectives the County hopes to accomplish directly and these programs require the commitment and cooperation of municipalities and other local units of government. The implementation plan also identifies existing private, state and federal programs available for assistance in identifying and resolving problems, as well as for funding plan implementation. A suggested time table for implementation is included as Table 6.1.1. Of course, implementation will vary from this Table based upon objective priority, ease of implementation, available staff, and financial resources available.

The implementation program is designed to provide the County Board of Commissioners with a realistic framework for protecting the County's water resources, while maintaining the flexibility to operate within the constraints of the county's funding and tax base.

Scott County, by developing this plan, is aware of the importance of ground water planning and recognizes that county, township, and city governments must play a key role in local ground water planning decisions. Scott County also recognizes that future requests for state or federal funding to support water related activities in the County will be reviewed in the context of the county's ground water plan and its initiatives.

The units of government with land use planning responsibility are responsible for the development of local water management plans; therefore they are also responsible for the incorporation of ground water issues into the local water plan. The County has primary

authority and responsibility in the townships while the cities have the responsibility in their jurisdictions. It will be the responsibility of each unit with planning and regulatory authority to include ground water protection in the planning process. This includes Watershed Districts andthe County. A discussion of the progression of the plan approval process and its subsequent implementation follows. Guidelines for implementation of the ground water plan are given as well.

Table 6.1.1 Schedule of ground water plan objectives, organization primarily responsible for implementation of the objective and proposed start date.

Objectives completed:		
4.1.1	Feedlot Inventory	SWCD
4.1.2	Utilize the sensitivity map for location of new feedlots	PIE
4.1.3	Initiate and enforce a feedlot ordinance for the County	PIE
4.1.4	Educational programs for landowners and operators on feedlots	MES
4.1.5	Identification and prioritization of feedlots with potential pollution	SWCD
4.1.6	Continued assistance w/ design and problem solution for feedlots	SWCD
4.1.7	Continued publication of cost sharing programs	SWCD
Objectives to begin in 1998:		
4.10.1	Review disposal location of cleaning material of pipelines and pipeline location	PIE
4.10.2	Highest standard of pipe to be used through geologically sensitive areas	PIE
4.10.3	Temporary surface pipeline required as a secondary containment system	PIE
4.10.5	Digitize the County's PIE hazardous material location map	County Surveyor
4.14.4	Comprehensive plan to consider ground water impacts	PIE
4.14.8	Education program and technical assistance to irrigation users	MES
4.2.1	Educational program on proper use of lawn and garden chemicals	MES
4.2.2	Encourage soil tests prior to lawn and garden chemical application	MES
4.2.3	Ordinance on water resources protection plan for golf courses	PIE
4.2.4	Include ground water and surface water protection plans as part of building permit	PIE
4.2.5	County policy to reduce use of fertilizers and pesticides on County property	PIE
4.3.6	NFPA 704 placards displayed on all storage facilities for pesticides and hazardous materials	PIE
4.3.7	Inspection of ISTS by licensed site evaluator	PIE
4.4.1	Adopt Standards for Location of new UST's to consider sensitivity map	PIE
4.4.2	Identification of UST's which pose ground water threat and problem solution	PIE
4.7.2	Develop standards for storage of petroleum products in mining operations	PIE
4.7.3	Develop provisions to prevent potential contaminants from running into mines	PIE
4.17.1	Develop data exchange programs for GIS	County Surveyor
4.18.1	Incorporate sensitivity map into GIS	County Surveyor
4.18.2	Use the sensitivity study map for planning purposes	County Surveyor
Objectives to begin in 1999:		

4.9.2	Expand ISTS maintenance program to Include all ISTS in townships	PIE
4.11.4	Mine reclamation plan review by PIE	PIE
4.14.1	County is to develop well water quality monitoring program	PIE
4.14.3	Develop better accounting system of actual water use in Scott County	PIE
4.14.6	Promote use of Alternative landscaping to reduce water use	PIE
4.14.7	Identify industries that can recycle water for ground water conservation	PIE
4.13.1	Abandoned well inventory	PIE
4.13.5	Cooperative negotiations with Shakopee Mdewakanton for water usage	PIE
4.15.1	Adopt well head protection ordinance	PIE
4.15.2	Utilize sensitivity map for wellhead protection plans	PIE
4.3.1	Digitize the updated soil survey for the County GIS system	County Surveyor
4.3.3	Annual test for pesticides in public wells	PIE
4.3.4	Education program for public on pesticide and nutrient use	MES
4.4.2	Inventory of small UST's for potential threat	PIE
4.5.1	Inventory of dumps within the County	PIE
4.5.2	Review of all landfill closures for potential threat to ground water	PIE
4.5.3	Determine need for increased monitoring at dump sites	PIE
4.5.4	Develop monitoring and problem solution at sites	PIE
4.7.1	Determine status of quarries and gravel pits relative to dumping	PIE
4.8.1	Determine if a Bio-solid application ordinance is needed	PIE, SWCD
4.8.2	Prepare a Bio-Solids Site Application map	County Surveyor
4.12.1	Complete wetland inventories, include potential restorable wetlands as part of the inventory	County, Watershed Districts's
4.17.2	Develop GIS Dictionary for public officials	County Surveyor
4.17.3	Compile a list of all County Databases	PIE
4.17.4	Publish a document for County standards on data collection for the GIS system	County Surveyor
4.17.5	Prepare a training program on GIS use	County Surveyor
4.17.6	Establish system to use GIS capabilities in Scott County	Local Agencies
4.18.3	Incorporate individual site analysis information into sensitivity map	County Surveyor
Objectives to begin in 2000:		
4.10.6	Assist local fire departments with hazardous waste training	PIE
4.13.4	Education program on well sealing	PIE
4.15.3	Develop a plan for development of new wells within the County	PIE
4.15.4	County is to seek delegation of well permitting authority	PIE
4.3.2	Initiate a program to assist in calibration of pesticide and nutrient application equipment	MES
4.5.5	Inventory of mini-dumps	PIE
4.6.1	Inventory of salvage yards	PIE
4.6.2	Conduct inspections of salvage yards	PIE
4.6.3	Utilize sensitivity map for recommendations on salvage yard site location	PIE
Objectives to begin in 2001:		
4.10.4	Determine need for monitoring wells at strategic locations	PIE
4.3.5	Voluntary program to assist in development of pesticide and nutrient plans	MES
4.18.4	Update the sensitivity map using individual site analysis	County surveyor
Objectives to begin in 2002:		
4.14.2	Develop an education program on ground water quality	PIE

4.14.5	Education program on water conservation	MES
Objectives to begin in 2003:		
4.13.2	Priority on abandoned well sealing	PIE
4.5.6	Evaluation of mini-dump for potential ground water contamination	PIE
Objectives to begin in 2004:		
4.13.3	Well sealing grant application	PIE
4.5.7	Remove potential contamination mini-dump sites	PIE
Objectives to begin in 2005:		
4.11.1	Utilization of Sensitivity map for regional ponding system within the County,	Watershed Districts County, Watershed Districts's
4.11.2	Encourage reuse of storm water runoff to reduce runoff volumes	County, Watershed Districts's
4.11.3	Utilize wetlands as flood storage only not as water quality treatment	County, Watershed Districts's
Objectives which are ongoing:		
4.9.1	Continued enforcement of MPCA ISTS rules	PIE
4.9.3	Expand education program on ISTS use and maintenance	PIE
4.16.1	Continue enforcement of 7080 rules for ISTS	PIE
4.16.2	Continue review applications for possible non-domestic sewage discharge potential	PIE
4.16.3	Expand education program for ISTS owners	PIE

To accomplish the objectives of this plan, Scott County, through the Implementation Ground Water Advisory Committee (IGWAC) in cooperation with the County, townships, cities, watershed districts will:

1) Take the responsibility for developing specific programs to implement the ground water plan.
2) Coordinate efforts by Cities, Townships, Watershed Districts and County to adopt the ground water plan and include implementation of objectives in local water plans
3) Develop an annual work plan to be submitted to the County Board of Commissioners at the beginning of the fiscal year.
4) Take the initiative to regularly review the status of ground water related issues and concerns in the County and to modify objectives, or add new ones, as needed.
5) Take the initiative in working with federal, state, and local agencies and private organizations to assist with implementation.
6) Take the responsibility for identifying and pursuing outside funding resources

or plan implementation.

7) Monitor the progress of plan implementation.
8) Ensure plan updates are completed every 5 years.

Scott County recognizes that every effort must be made to begin plan implementation as soon as possible. Many of the objectives identified in this plan can be implemented at very little cost utilizing local resources. The implementation plan has prioritized the objectives to reflect the advisory committee's perception of the magnitude and urgency of the issue. The priority has been assigned to the objectives in Section 4. The priority rank assigned is only relative to the issue itself. The advisory committee believed that while some issues were more pressing, no issue was more important than any other. The County and IGWAC will implement the objectives based upon the priority assigned as well as the ease and cost effectiveness of implementation and a realistic assessment of staff and financial resources. Table 6.1.1 and Table 6.2.1 identify organizations that are primarily responsible for implementation of the objective. Any other objectives that an organization may be involved in will be contacted by IGWAC.

The County will involve those entities responsible for implementing particular elements of the plan in developing strategies and work plans to achieve identified goals and objectives.

The County, the SWCD, and Watershed Districts have a particularly important role to play in plan implementation. These organizations already have much of the infrastructure and programs in place to implement the plan's objectives. The County realizes the importance in maintaining a direct, on-going relationship with these organizations to optimize plan implementation.

To effectively implement its ground water plan, Scott County will initiate the following actions at the outset of plan implementation:

1) Revise the role of the GWAC to assist with the coordination of the Ground Water Protection Plan.

2) Appoint a County agency to coordinate the implementation of ground water initiatives identified in this plan.

Ground Water Advisory Committee Function

Throughout the planning process, the Ground Water Advisory Committee (GWAC) proved to be an effective mechanism for providing county government with diverse and representative input on local ground water planning issues. This local, citizen based representation must continue through as strategies and work plans are drawn up during plan implementation.

At the completion of the planning process the GWAC will be decommissioned. However, to maintain local input during plan implementation, it is recommended that the County maintain the functions of the Advisory Committee in the form of a smaller member committee which will be referred to as the Implementation Ground Water Advisory Committee (IGWAC). The IGWAC will report to the County Board of Commissioners. County residents are encouraged to contact members of this committee to assure that their concerns are being addressed.

IGWAC will meet at least once a year to discuss ground water protection issues and implementation programs. The purpose of IGWAC is to coordinate ground water protection programs across political boundaries and among government agencies. IGWAC will consist of at least three members from the former GWAC, at least one member from each local unit of government, representatives from the Watershed Districts and County land and water planners. Municipalities have an important role to play in protecting the County's ground water supply. What happens in one city may affect the water supply in another city or what happens in a rural area may affect urban water supplies. Individually, these municipalities are unlikely to be able to provide adequate protection for this resource. Ground water protection necessitates the cooperation and communication among cities and between cities and rural communities. Membership in IGWAC will be voluntary, however, communities and local agencies not participating will not be able to represent their interests and may not find out about funding opportunities for ground water protection efforts.

The County has limited powers to direct local governmental units to participate in IGWAC. However, because Watershed Districts must bring their water management plans into conformance with the County's Ground Water Plan (MN Statutes 103B.231, Subd. 4). IGWAC can request Watershed Districts to utilize their authorities to solicit necessary support from their member communities. Conflicts between local governmental units or between communities and IGWAC will be handled according to procedures set forth on Section 9 of this plan.

The major responsibilities of IGWAC are to:

1) Coordinate the implementation of ground water protection objectives among cities, townships, and Watershed Districts in Scott County.
2) Review yearly priorities and identify new ground water protection concerns.
3) Direct the development of annual workplans.
4) Contact special interest groups when needed to help develop implementation strategies.

Recommendations and workplans developed by IGWAC will be reviewed by the County Planning Commission and approved by the County Board. Any cooperative agreements, workplans, or formal recommendations from IGWAC will be included as an attachment to this plan.

Coordination of Ground Water Plan Implementation

It is recommended that the County appoint an individual or an existing department to coordinate the implementation of the County's ground water plan. By appointing a plan coordinator, the County has the opportunity to assure that the plan is implemented.

This coordinator should work closely withWatershed Districts, municipalities, and other County entities to assure their plans are consistent with this plan. The coordinator should work closely with other governmental agencies at the local, state and federal levels. Additionally, the coordinator must work closely with IGWAC.

6.2 ROLE OF COUNTY ORGANIZATIONS AND DEPARTMENTS

Nineteen organizations have been identified that will be closely involved with plan implementation. Table 6.2.1 shows those that are most likely to be the lead organization or department in charge of implementing the objective(s) indicated.

The entity that will work initially to develop an implementation strategy is also identified in Table 6.2.1. This entity will not necessarily be the same as the one responsible for the implementation of an objective. The program developer and the program implementor will work together to accomplish the objective. The initial program development could involve efforts that go beyond the scope and ability of the implementing organization.

It is hoped that through IGWAC that local governmental units will be able to work together to make items in this plan part of their daily activities. For instance, building inspectors could be trained to identify and report improperly abandoned wells and storage tanks, as well as perform other tasks during the course of their routine business. Local governmental personnel are generally the most familiar with the activities that take place within their jurisdiction. This should give them an advantage in implementing the objectives in this plan.

Table 6.2.1 Schedule of ground water plan objectives, organization primarily responsible for implementation of the objective and Target Start Date.

Scott SWCD

No.	Objective	Target Start Date
4.1.1	Feedlot Inventory	Done
4.1.5	Identification and prioritization of feedlots with potential pollution	Done
4.1.6	Continued assistance w/ design and problem solution for feedlots	Done
4.1.7	Continued publication of cost sharing programs	Done
4.8.2	Prepare inventory maps for locating Bio-solid application sites	1999

Scott County PIE Office

No.	Objective	Target Start Date
4.1.2	Utilize the sensitivity map for location of new feedlots	Done
4.1.3	Initiate and enforce a feedlot ordinance for the County	Done
4.2.3	Ordinance on water resources protection plan for golf courses	1998
4.2.4	Include ground water and surface water protection plans as part of building permit	1998
4.2.5	County policy to reduce use of fertilizers and pesticides on County property	1998
4.3.3	Annual test for pesticides in public wells	1999
4.3.6	NFPA 704 placards displayed on all storage facilities for pesticides and hazardous materials	1998
4.3.7	Inspection of ISTS by licensed site evaluator	1998
4.4.1	Adopt Standards for Location of new UST's to consider sensitivity map	1998
4.4.2	Inventory of small UST's for potential threat	1999
4.5.1	Inventory of dumps within the County	1999
4.5.2	Review of all landfill closures for potential threat to ground water	1999
4.5.3	Determine need for increased monitoring at dump sites	1999
4.5.4	Develop monitoring and problem solution at sites	1999
4.5.5	Inventory of mini-dumps	2000
4.5.6	Evaluation of mini-dump for potential ground water contamination	2003
4.5.7	Remove potential contamination mini-dump sites	2004
4.6.1	Inventory of salvage yards	2000
4.6.2	Conduct inspections of salvage yards	2000
4.6.3	Utilize sensitivity map for recommendations on salvage yard site location	2000
4.7.1	Determine status of quarries and gravel pits relative to dumping	1999
4.7.2	Develop standards for storage of petroleum products in mining operations	1998
4.7.3	Develop provisions to prevent potential contaminants from running into mines	1998
4.8.1	Determine if a Bio-solid application ordinance is needed	2003

4.9.1	Continued enforcement of MPCA ISTS rules	Ongoing
4.9.2	Expand ISTS maintenance program to Include all ISTS in townships	1999
4.9.3	Expand education program on ISTS use and maintenance	Ongoing
4.10.1	Review disposal location of cleaning material of pipelines and pipeline location	1998
4.10.2	Highest standard of pipe to be used through gelogically sensitive areas	1998
4.10.3	Temporary surface pipeline required as a secondary containment system	1998
4.10.4	Determine need for monitoring wells at strategic locations	2001
4.10.6	Assist local fire departments with Haz. Waste Training	2000
4.11.4	Mine reclamation plan review by PIE office	1999
4.13.1	Abandoned well inventory	1999
4.13.2	Priority on abandoned well sealing	2003
4.13.3	Well sealing grant application	2004
4.13.4	Education program on well sealing	2000
4.13.5	Cooperative negotiations with Shakopee Mdewakanton for water usage	1999
4.14.1	County is to develop well water quality monitoring program	1999
4.14.2	Develop an education program on ground water quality	2002
4.14.3	Develop better accounting system of actual water use in Scott County	1999
4.14.4	Comprehensive plan to consider ground water impacts	1998
4.14.6	Promote use of Alternative landscaping to reduce water use	1999
4.14.7	Identify industries that can recycle water for ground water conservation	1999
4.15.1	Adopt well head protection ordinance	1999
4.15.2	Utilize sensitivity map for wellhead protection plans	1999
4.15.3	Develop a plan for development of new wells within the County	2000
4.15.4	County is to seek delegation of well permitting authority	2000
4.16.1	Continue enforcement of 7080 rules for ISTS	Ongoing
4.16.2	Continue review applications for possible non-domestic sewage discharge potential	Ongoing
4.16.3	Expand education program for ISTS owners	Ongoing
4.17.3	Compile a list of all County Databases	1999
4.18.2	Use the sensitivity study map for planning purposes	1998

Minnesota Extension Service, Scott County

No.	Objective	Target Start Date
4.1.4	Educational programs for landowners and operators on feedlots	Done
4.2.1	Educational program on proper use of lawn and garden chemicals	1998
4.2.2	Encourage soil tests prior to lawn and garden chemical application	1998
4.3.2	Initiate a program to assist in calibration of pesticide and nutrient application equipment	2000
4.3.4	Education program for public on pesticide and nutrient use	1999
4.3.5	Voluntary program to assist in development of pesticide and nutrient plans	2001
4.14.5	Education program on water conservation	2002
4.14.8	Education program and technical assistance to irrigation users	1998

Scott County Surveyor's Department

No.	Objective	Target Start Date
4.3.1	Digitize the updated soil survey for the County GIS system	1999
4.8.2	Prepare a Bio-Solids Site Application map	1999
4.10.5	Digitize the County's PIE hazardous material location map	1998
4.17.1	Develop data exchange programs for GIS	1998
4.17.2	Develop GIS Dictionary for public officials	1999
4.17.4	Publish a document for County standards on data collection for the GIS system	1999

4.17.5	Prepare a training program on GIS use	1999
4.17.6	Establish system to use GIS capabilities in Scott County	1999
4.18.1	Incorporate sensitivity map into GIS	1998
4.18.3	Incorporate individual site analysis information into sensitivity map	1999
4.18.4	Update the sensitivity map using individual site analysis	2001

County and Watershed Districts

No.	Objective	Target Start Date
4.11.1	Utilization of Sensitivity map for regional ponding system within the WMO	2005
4.11.2	Encourage reuse of storm water runoff to reduce runoff volumes	2005
4.11.3	Utilize wetlands as flood storage only not as water quality treatment	2005
4.12.1	Complete wetland inventories, include potential restorable wetlands as part of the inventory	1999

6.3 ROLE OF OTHER INSTITUTIONS AND AGENCIES IN PROGRAM IMPLEMENTATION

State and federal agency involvement is critical for a number of objectives identified in the plan. Scott County recognizes that the costs and expertise required to correct many of the problems identified in this plan are beyond the financial resources of the County. The County will develop and maintain ongoing working relationships with all state and federal agencies involved in water planning issues in the County.

There are many agencies in Minnesota at the local, regional, State and Federal levels that are involved with water and land use issues either in a regulatory capacity, or through an education and information development role. Programs administered by local agencies such as SWCD's, Watershed Disricts, MES's, and local school districts, state agencies such as the MDA, the DNR, the Office Strategic and Long Range Planning, MPCA, the University of Minnesota, Office of Environmental Education, MDH, and MGS; and federal agencies such as the USCOE, USGS, and the USFWS, will be helpful during implementation of Scott County's ground water plan.

During development of the issues the GWAC had particular points they wanted to be sure were sent out to the state agencies. The points were what the GWAC referred to as State Recommendations. The following points are the recommendations:

- Current wetland laws are sufficient and should be kept in place and enforced to preserve wetlands for future generations.
- Develop standards which are referenced in MS 103H.111.

The items above need to be addressed by the appropriate state agencies as recommended by the GWAC.

An additional source for state programs and resources is listed in MPCA's "A Directory of Minnesota's Programs and Resources" obtainable from the MPCA.

6.4 IMPLEMENTATION SCHEDULE

An implementation schedule was developed by prioritizing each objective relative to the concern expressed by the GWAC, the perceived ease of implementation, and whether or not programs were already in place. The relationship between individual objectives were then examined to determine which objectives could be implemented together and how much time is needed to complete an objective. This schedule was reviewed by the GWAC and re-adjusted accordingly.

The County hopes to implement all of the objectives outlined in the plan, however, implementation is contingent upon the approval of the County Board and/or available funding.

Some objectives in this plan are dependent on the prior implementation of other objectives. If an objective requires more time to accomplish the objective than expected, implementation of other objectives may have to be postponed. As new concerns or priorities develop, this schedule will have to be re-assessed. Therefore, when each year's accomplishments are examined, a new schedule will be prepared as needed.

Annual Workplans & Funding

Annual workplans will be prepared and presented to the County Board of Commissioners. Workplans will include:

- A status report on the accomplishments of the previous year;
- Identification of the top three to four priority initiatives for the current year;
- An assessment of fiscal needs for those initiatives and funding availability;
- The roles and responsibilities of local government units and local land and water management agencies;
- A summary of anticipated results; and
- An indication of those initiatives that are high priority for the County but unattainable because of lack of available resources.

Annual workplans will be prepared by the appointed department or individual with direction from local, regional, and state agencies, IGWAC and others involved with

implementing the plan. Annual workplans will become an attachment to this plan.

Funding opportunities and local authorities change as federal, state and regional priorities change. Within the next five years, (the time line of this plan) it is likely that some existing sources of funding will be lost and new ones added.

How an objective is funded is largely dependent on the individual objective. Some objectives will be funded through permit fees, general levy, or other existing funding sources. Other objectives may be better funded through outside sources of funding such as state or foundation grants. The County and local units of government may need to consider non-traditional sources of funding to help pay for local programs. These can include: users fees based on water usage, quid pro quos, private-public partnerships, matching funds (subsidies) and intergovernmental partnerships. Although potential funding sources have been identified for each of the objectives in this plan, the actual cost to implement these objectives will be included in the annual workplans. Through annual work plans, the "County Ground Water Protection Plan" provides an effective mechanism to change as new funding opportunities develop and as federal, state, regional, and local conditions vary.

7. GROUND WATER PLAN AMENDMENT PROCEDURE

The Ground Water Management Plan is intended to extend through the year 2010. The plan is intended to be updated at least every five years. The County shall prepare proposed amendments updating the plan and give notice of the proposed plan amendments before the end of any calendar year.

Notice of public hearing on proposed plan amendments and a description of the amendments shall be published by the County in at least one legal newspaper in the County. Publication shall occur at least 10 days before the hearing. Notice shall also be mailed at least 30 days before the hearing to all the SWCD's, towns, and statutory and home rule charter cities having territory within the County, and to the Metropolitan Council, Watershed Districts, DNR, MPCA, MDH, and BWSR. At the hearing the County shall solicit comments on the proposed plan amendments. Any person may submit a request to the BWSR not later than 10 days following the close of the hearing, asking that the proposed plan amendments be reviewed in accordance with the provisions of section 103B.255, subdivisions 8, 9, and 10. The County shall not adopt proposed plan amendments before the BWSR has decided whether review is accordance with provisions of section 103B.255, subdivisions 8, 9, and 10 is necessary. If the BWSR has not made a decision within 45 days of the close of the hearing, unless the County agrees to a time extension, review in accordance with the provisions of section 103B.255, subdivisions 8, 9, and 10 shall not be required.

8. CONFLICT RESOLUTION

At this time, there are no known conflicts between the Scott County Ground Water Protection Plan, and plans of local units of government or other counties. If conflicts should arise in the future, they may be addressed in an informal or formal resolution process.

Informal Resolution Process

The County or other local units of government may request a meeting with the chair of the BWSR to informally resolve disputes before initiating a contested case procedure as covered under Minnesota Statutes 103B.345. An informal hearing can be called to:

1) determine the meaning of any provision of Minnesota Statues Chapter 103B;

2) resolve conflicts between any two ground water protection plans or a ground water protection plan and a surface water management plan or comprehensive water plan; or

3) settle any other dispute relating to the Ground Water Protection Plan.

The informal resolution process is as follows:

A meeting with the chair of the BWSR may be requested in writing by any of the involved parties.

The nature of the provision of omission causing the conflict must be described, whether it is in the Ground Water Protection 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 request for a meeting does 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 in reaching a resolution.

The decision of the chair may be announced at the meeting, or made later. In any case, 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 that time pursuant to Minnesota Statutes, Section 103B.345, subdivision 3, for a contested case hearing under that section.

Formal Resolution Process

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

1) the interpretation and implementation of a ground water protection plan is challenged by a local unit of government aggrieved by the plan;

2) if two or more counties or local governmental units disagree about the apportionment of the costs of a project implemented in a ground water protection plan; or

3) if a county and another local unit of government disagree about a change in a local surface or ground water and related land resources plan or official control recommended by the county under MN Statute 103B.

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

A petition must be filed within 60 days after the date of adoption of approval or the disputed ordinance, or the date a local unit of government receives a recommendation of the county board under MN Statute Section 103B.325.

The petition must be made in writing, addressed to the BWSR, and include the following: the names, phone numbers, and addresses of the parties or their representatives involved in the petition; a request for a hearing; a statement of the allegations or issues to be determined by the hearing; and proof of service of a copy of the petition on all other involved local units of government.

The petition is considered filed with the BWSR when it is received by the Board. The

BWSR shall acknowledge receipt of the petition in writing.

If the aggrieved county or other local unit of government files a petition for a hearing, a hearing must be conducted by the state office of administrative hearings under the contested case procedure of Minnesota Statutes Chapter 14 within 60 days of the request. The subject of the hearing may not extend to questions concerning the need of a ground water protection plan. In the report of the administrative law judge, the fees of the office of administrative hearings 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, BWSR must make a final decision on the issue. All parties will be informed of the decision in writing.

A decision of the board may be appealed to the court of appeals in a manner provided by Sections 14.63 to 14.69

9. REFERENCES

Aherin, Robert A., et al. 1984. Safe use of pesticides on the farm. University of Minnesota Agriculture Office. Educational Package AG-EP-2186.

Baker, Donald G., et al. 1979. Climate of Minnesota. Part XII - The Hydrologic cycle and Soil Water. Agricultural Experiment Station, University of Minnesota Technical Bulletin 322.

Balaban, N.H. and McSwigger, Peter L. 1982. Minnesota Geological Survey. Geologic Atlas Scott County. University of Minnesota.

Becker, R.L., Herzfeld, D., et al. 1989. Pesticides: Surface Runoff, Leaching, and Exposure Concerns.

Brach, John. Agriculture and Water Quality, Best Management Practices for Minnesota. Minnesota Pollution Control Agency.

Bruemmer, Linda B., Thomas P. Clark, and Eric Porcher, 1986. Ground water in Minnesota: a User's Guide to Understanding Minnesota's Ground Water Resource. Minnesota Pollution Control Agency.

Carver County Ground Water Protection Plan. September, 1992.

Cherry, John A. and Freeze, Allan R. 1979. Groundwater.

Christy, Ann D. 1992. Managing agricultural chemical use to protect groundwater. Geo Info systems.

Cohen, Stuart Z., Nickerson, Susan, et al. A Ground Water Monitoring Study for Pesticides and Nitrates Associated with Golf Courses on Cape Cod. Biospherics Incorporated.

Dahlgren, Shardlow, and Uban, Inc. January 3, 1995. 1995 Scott County Comprehensive Plan Update.

Dakota County Ground Water Protection Plan. March 1993.

Dean, Lillian F. and Wyckoff, Mark A., AICP. 1991. Community planning and zoning for groundwater protection in Michigan. A guidebook for local officials. Michigan Minnesota Department of Natural Resources, Office of Water Resources.

Division of Environmental Health, Minnesota Department of Health. April 1991. Wellhead Protection in Minnesota, A Report of Recommendations by the Ad Hoc Wellhead Protection Technical Workgroup.

Division of Water Quality, Minnesota Pollution Control Agency. A Citizens Guide to Minnesota's Water Quality Management Plan.

Driscoll, Fletcher G. 1987. Ground Water and Wells, Second edition.

Egerstrom, Lee, Pioneer Press. Cleanup on the Farm.

Falteisek, Jan, Division of Waters, Minnesota Department of Natural Resources. June 1991. Criteria and Guidelines for Assessing Geologic Sensitivity of Ground Water Resources in Minnesota.

Freshwater Foundation. 1989. Economic Implications of Ground Water Contamination to Cities and Companies in Minnesota.

Ground Water Unit, Minnesota Department of Natural Resources. 1992. Observation well data summaries.

Haag, Ed. 1992. Sludge under suspicion. Farm Journal.

Hallberg, G.R. What is Contaminating Our Groundwater? North Central Region Eight State Groundwater Workshop Proceedings. North Central Regional Center for Rural Development.

Hartsoe, Judith A. and Oberts, Gary L. 1989. Precipitation frequency analysis for the Twin Cities Metro area. Metropolitan Council Publication No. 590-89-015.

Hennepin County Ground Water Plan Executive Guide.

Hines, John W., et al. September 1990. Minnesota Department of Agriculture Water Quality Monitoring, Biennial Report.

Horstmeier, Greg D. June/July, 1992. Farm Journal. Chemical Rates on Urban laws Equal to Farms.

Jordan, Barbara. 1990. Door to door water conservation retrofits: The San Jose Story. Home Energy.

Klaseus, Thomas G., Minnesota Department of Health, et al. 1988. Pesticides and groundwater: Surveys of selected Minnesota Wells. Minnesota Department of Health, Minnesota Department of Agriculture: Prepared for the LCMR.

Kuehnast, Earl L., Donald G. Baker, et al. 1975. Climate of Minnesota; Part IV: Precipitation Patterns in the Minneapolis, St. Paul Metropolitan Area and Surrounding Counties. Minnesota Agricultural Extension Technical Bulletin 301.

Kuehnast, Earl L., et al. 1975. Climate of Minnesota. Part VIII Precipitation patterns in the Minneapolis-St. Paul Metropolitan Area and Surrounding Counties. Agricultural Experiment Station, University of Minnesota Technical Bulletin 301.

Metropolitan Council. 1991. Metropolitan agricultural preserves status report.

Metropolitan Council. 1991. Water supply issues in the metropolitan area: A staff report.

Metropolitan Council. Publication No. 590-92-132. December 30, 1992. The Role of Water Resources in the Metropolitan Development and Investment Framework/Staff Discussion Paper.

Minnesota Board of Water and Soil Resources. 1991. Abandoned well inventory.

Minnesota Board of Water and Soil Resources. 1991. Above and below ground storage tank inventory guidebook.

Minnesota Board of Water and Soil Resources. 1991. Dump and landfill inventory guidebook.

Minnesota Board of Water and Soil Resources. 1991. Feedlot inventory guide.

Minnesota Board of Water and Soil Resources. 1991. Wetland inventory guidebook.

Minnesota Department of Health. Minnesota Agricultural Statistics.

Minnesota Department of Health. June 1987. A guide for Local Professionals Involved in County Comprehensive Water Management Plans.

Minnesota Department of Health. April 1995. Environmental Health Fact Sheet - Prior Lake Pay Dump.

Minnesota Department of Health. January 1991. Release No. 3. Recommended Allowable Limits for Drinking Water Contaminants.

Minnesota Department of Health. November 1988. Release No. 2. Recommended Allowable Limits for Drinking Water Contaminants.

Minnesota Department of Health. Summary of Risk Assessment Methods for Developing Exposure Guidelines for Groundwater Contaminants.

Minnesota Pollution Control Agency. October 1995. Ground Water - A Directory of Minnesota's Programs and Resources.

Olsen, Bruce M., Eric H. Mohring, and Patricia A. Bloomgren. 1987. Using Ground Water Data for Water Planning. Minnesota Geological Survey.

Olsen, Bruce M., et al. 1987. Using ground water data for water planning. Minnesota Geological Survey Education Series 8, ISSN-0544-3083.

Osgood, Richard A. 1990. A 1990 study of the water quality of 21 metropolitan area lakes. Metropolitan Council Publication No. 590-90-182.

Pfannkuch, Hans-Olaf, Hunt, Sean J. and Burman, Sandeep, Department of Geology and Geophysics, University of Minnesota. March 1993. Geographic Information Systems and Water Resources. Pilot Project for Determination of Hydrogeologic Sensitivity of Scott County, Minnesota.

Porcher, Eric. 1988. Ground Water Contamination Susceptibility in Minnesota. Minnesota Pollution Control Agency.

Schoenberg, M.E. 1990. Effects of present and projected Ground-Water withdrawals on the Twin Cities Aquifer System, Minnesota. U.S. Geological Survey. Water-Resources Investigation Report 90.4001.

Scott Soil and Water Conservation District Conservation Program. 1990. Long range program and annual plan.

The Fresh Water Foundation, Minnesota Department of Health, Minnesota Department of Agriculture. 1986. Pesticides and groundwater: A health concern for the Midwest.

The Groundwater Management Planning Task Force. September 1988. Implementation Strategy Report for the Development of a County-Wide Groundwater Management Plan.

USDA Soil Conservation Service. 1959. Soil Survey of Scott County. In cooperation with the Minnesota Experiment Station.

USDA Soil Conservation Service. 1987. Principles of Groundwater for resource management systems. Field level training manual. Pantera Corp. Groundwater Consultants.

USDA Soil Conservation Service. Primer on Ground Water.

Water Resource Resource Center, University of Minnesota Graduate School. November, 1980. Five-year Water Resource Research and Development Plan.

10. HELPFUL LINKS

State Laws: http://www.revisor.leg.state.mn.us/arule/7080
Minnesota Geological Survey: http://www.geo.umn.edu/mgs
Minneapolis Planing Dept: http://www.ci.minneapolis.mn.us/citywork/planning
Minnesota Pollution Control Agency: http://www.pca.state.mn.us
Minnesota Department of Natural Resources: http://www.dnr.state.mn.us
Minnesota Department of Health: http://www.health.state.mn.us
U.S. Environmental Protection Agency: http://www.epa.gov
U.S. Geological Survey: http://www.usgs.gov
Minnesota Department of Agriculture: http://www.mda.state.mn.us
Climate Data: http://climate.umn.edu
GIS free software: http://www.esri.com/company/free.html
Minnesota Planning Agency: http://www.mnplan.state.mn.us