

Chapter 4. Natural Resources and Environmental Management Plan

Introduction

Natural resources provide the framework and support for land use and development choices. Underlying geology and hydrological systems often determine land use choices. Row crop agriculture locates in areas of high quality soils. Grazing occurs on rockier, less productive soils. Agriculture transitions to forestry along the boundary between prairie and woodland ecological regions. Cities spring up where water is abundant. The diversity of Stearns County land use patterns reflects the diversity of its natural resources.

This chapter is organized into the following sections:

- Overview of Existing Natural Resources
- Issues and Challenges
- Goals and Objectives
- Policies and Action Items

It begins with a snapshot of Stearns County's diverse natural resources: geology; topography; soils; woodlands; and water resources. Current green infrastructure planning efforts are then described. Finally, issues and challenges related to natural resources and land use decisions – green and gray infrastructure – are discussed laying the groundwork for the natural resource goals, objectives, policies and action items that follow.

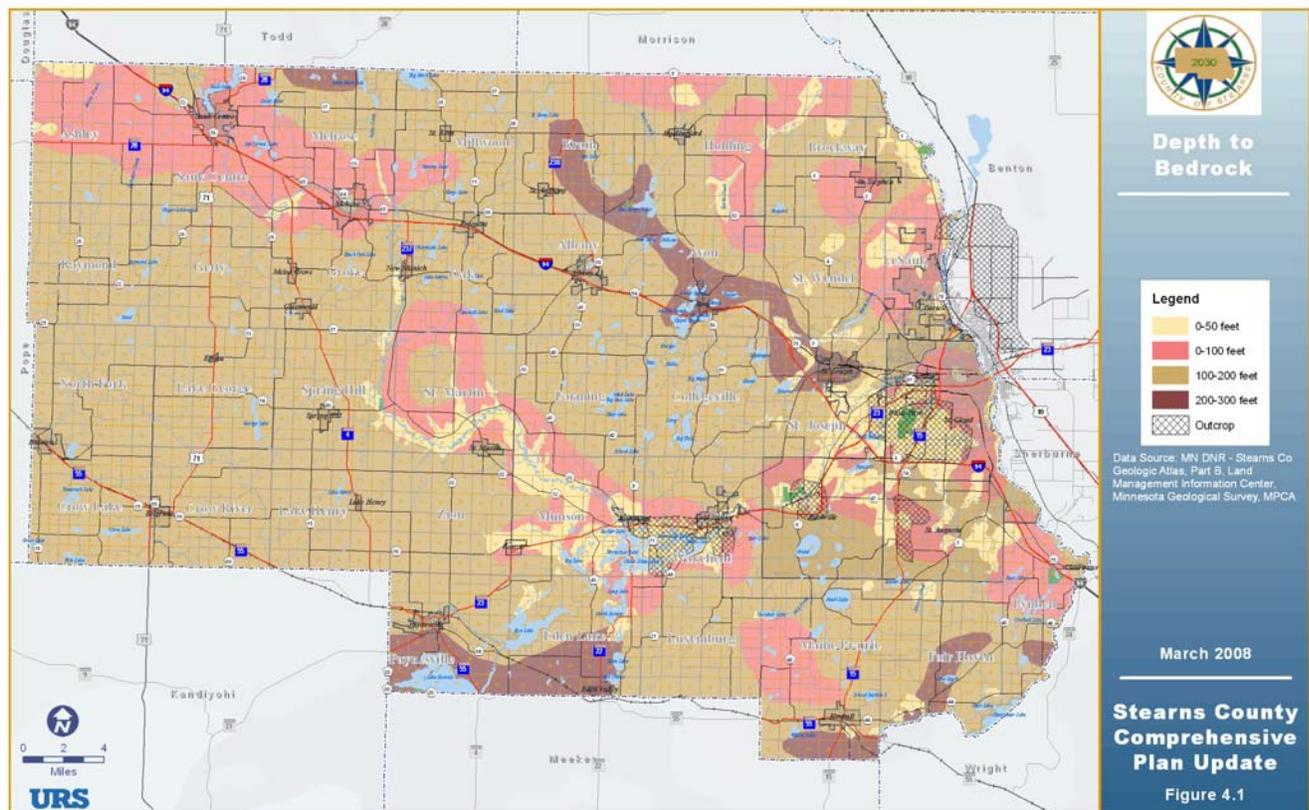
Just as geology and hydrology are closely tied to land use choices, this natural resource section is closely tied to the land use plan. Our understanding of natural resources is reflected in both the natural resource goals in this section as well as the goals of the land use plan section.

The *Stearns County Local Water Management Plan, 2008-2017* establishes and implements goals for surface and ground water management in Stearns County. The 2008-2017 plan updates the 2002 local water management plan and is currently under public review. This comprehensive plan incorporates the goals of the 2008-2017 water plan.

Overview of Existing Natural Resources

Geology

Figure 4.1, *Depth to Bedrock*, illustrates the variation in soil depths throughout Stearns County. Depth to bedrock is an important consideration in land use planning. It indicates areas that will support agriculture and areas that have development constraints such as rock outcroppings and septic challenges. Areas in Stearns County with over 100' of soil depth to bedrock tend to support agricultural land uses. Areas with shallowest depth to bedrock (less than 50') are in proximity to waterways and are likely locations for stone and aggregate mining. Eastern and western Stearns County is underlain with igneous and metamorphic rock. Central Stearns County is underlain with sedimentary rocks. The bedrock is covered by glacial material ranging from about 50 feet in the east to 350 feet in Collegeville Township to 200 feet in western parts of the County. The *Stearns County Comprehensive Water Plan, 2002*, and the *Stearns County Geologic Atlas* describe in detail the geologic history of Stearns County.



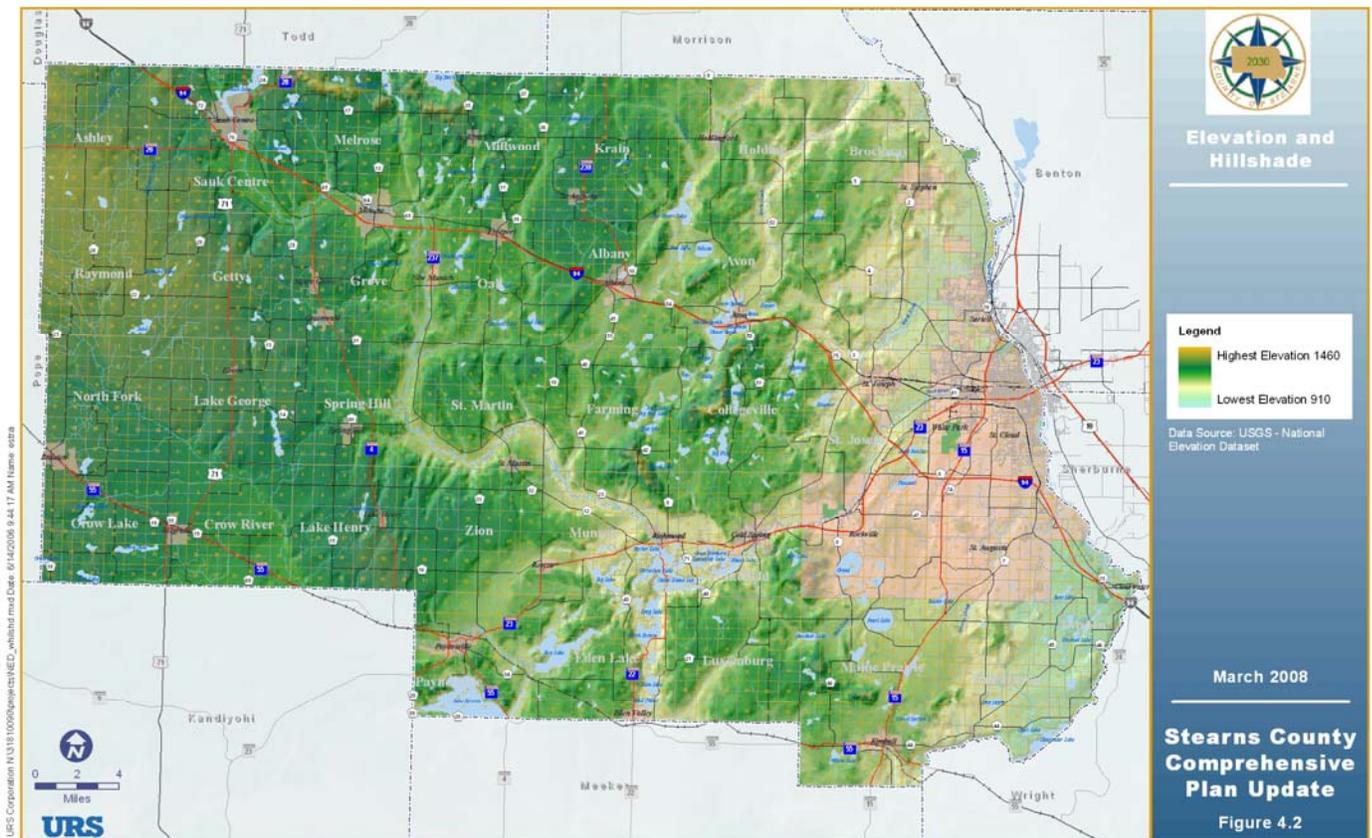
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Mining and Aggregate Resources

The bedrock geology of Stearns County provides opportunities for granite mining and extraction of sand and aggregate. These resources generally lie in areas with shallow depth to bedrock as shown on Figure 4.1 above. The Minnesota Department of Natural Resources' Aggregate Mapping Program provides more precise mapping of sand and gravel resources for long-term natural resource and economic development planning. Mapping of aggregate resources for Stearns County is underway and expected to be completed within the year.

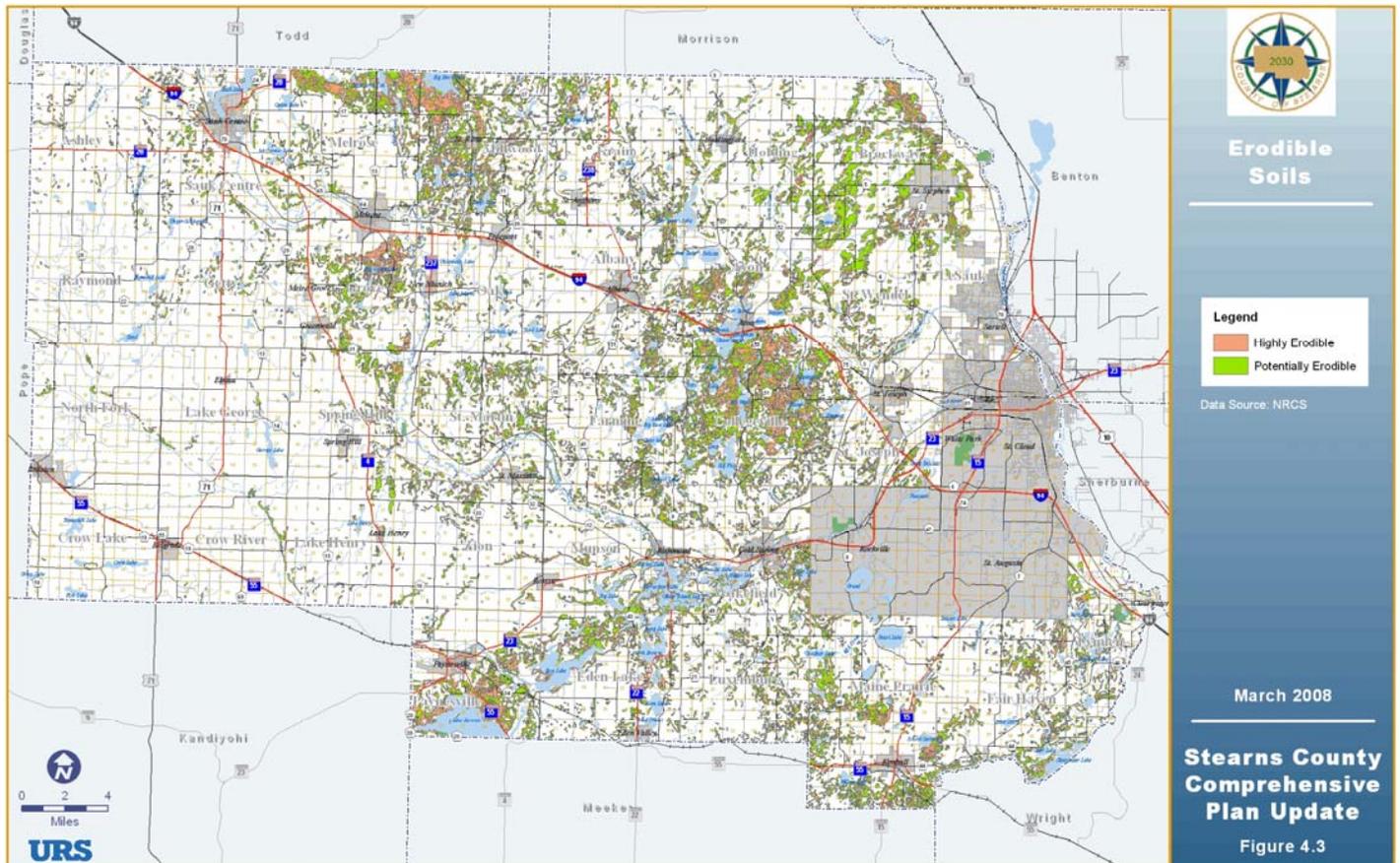
Topography

Figure 4.2, *Elevation and Hillshade*, is a representation of topography throughout Stearns County. Topography is determined in large part by underlying geology and refined by glaciation and stream erosion. Three major landforms in the County are: hilly lake regions or morainic hills; rolling till plains; and relatively flat outwash plains to the west. Lowest elevation areas tend to follow streams and lake complexes while highest elevation flat areas support agriculture. The prominent hills in the northern and eastern part of the County, created by glacial moraines, provide desirable amenities for developing areas. Development in these hills presents water quality challenges such as protecting soils from erosion and keeping wooded areas intact

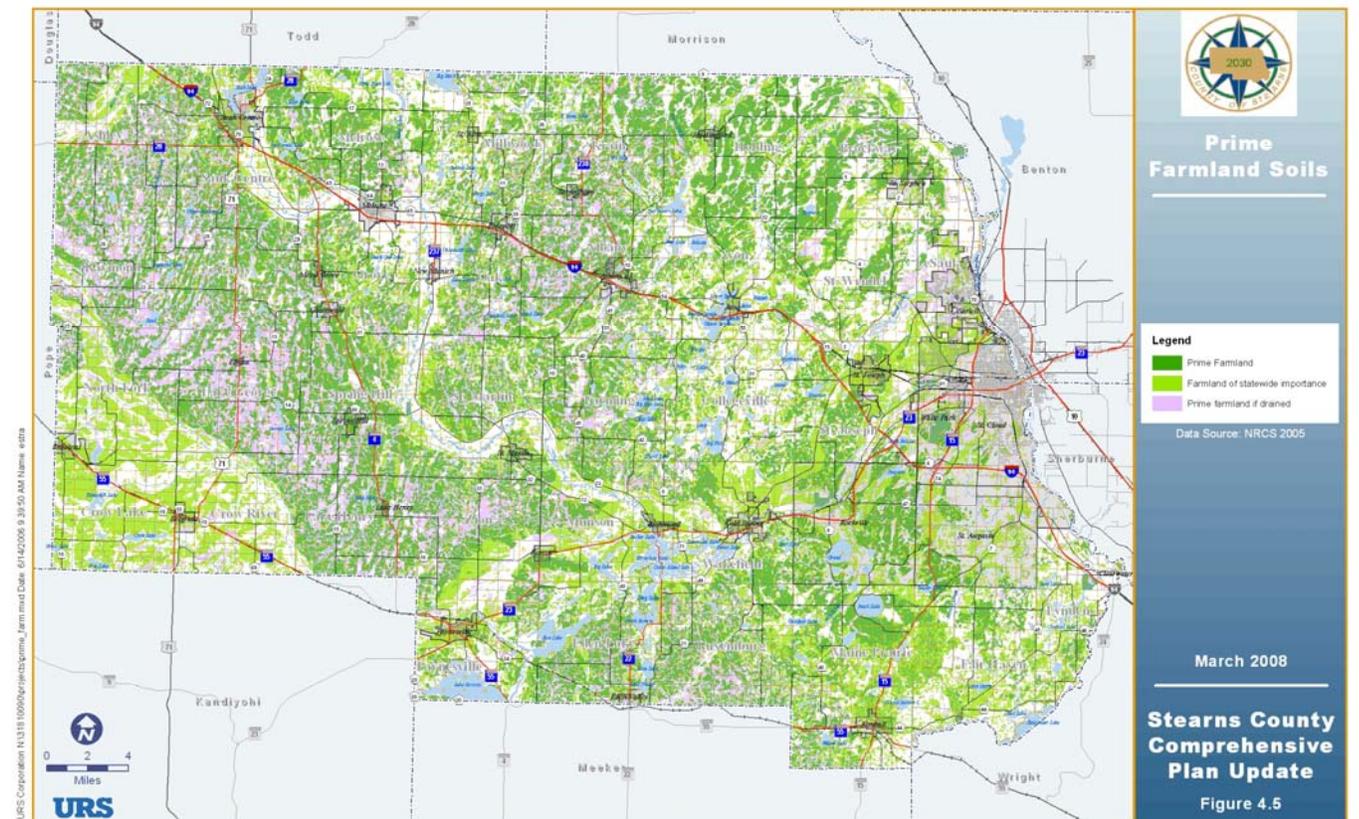
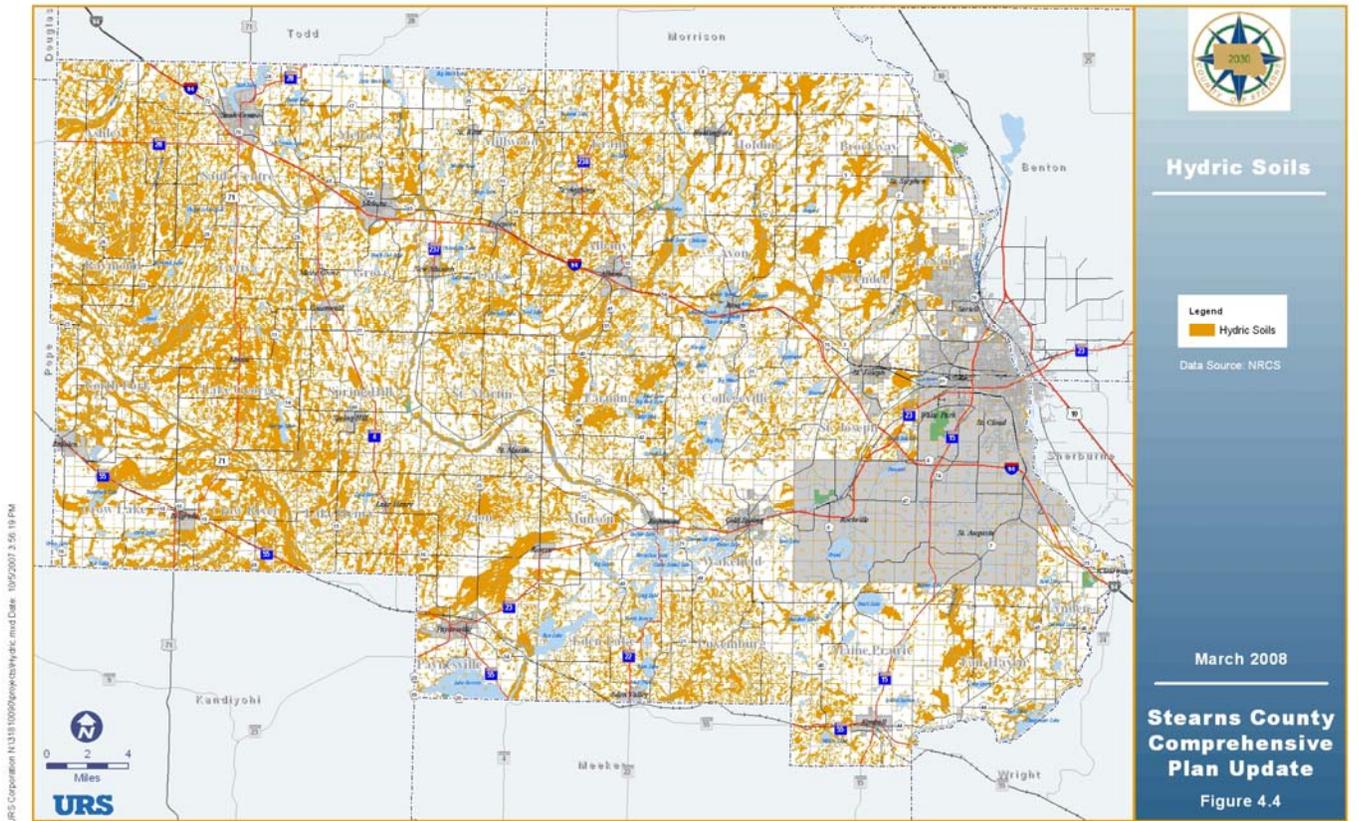


Soils

There are fourteen general soil associations in Stearns County detailed in the *Stearns County Soil Survey*, and grouped generally into outwash plains and glacial till. The outwash plains are associated with shallower depth to bedrock areas while the glacial till is associated with deeper depth to bedrock areas. Soil features that are particularly important to land use planning are erodible and hydric soils. The following two maps, Figures 4.3 and 4.4, show the locations of erodible and hydric soils in Stearns County. Hydric soils are wet soils. These soils are typically drained if put into agricultural use. Wet soils are a constraint to development, particularly for structures with basements. Erodible soils tend to be unstable if disturbed for either agriculture or development. Soil erosion has a direct impact on water quality in streams and lakes.



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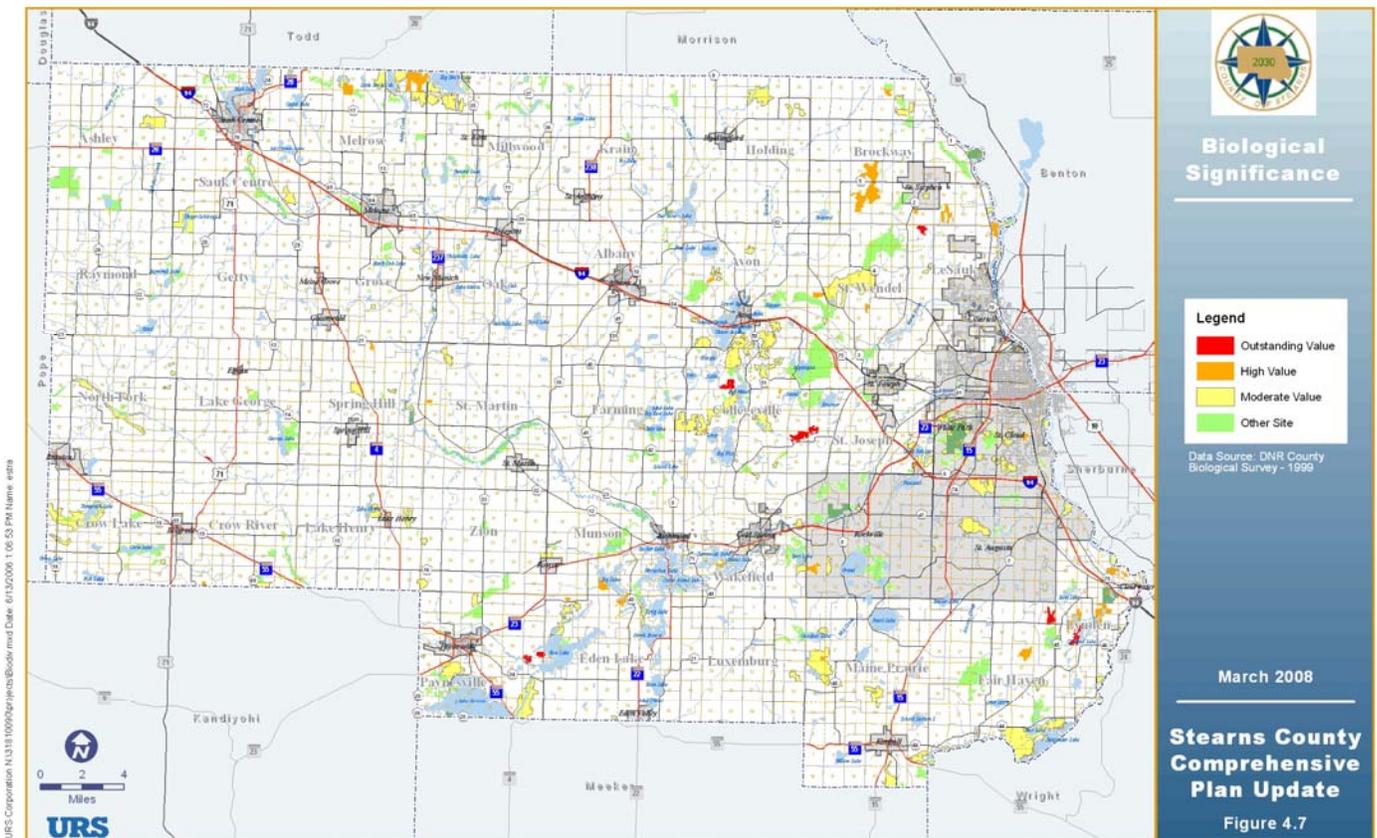
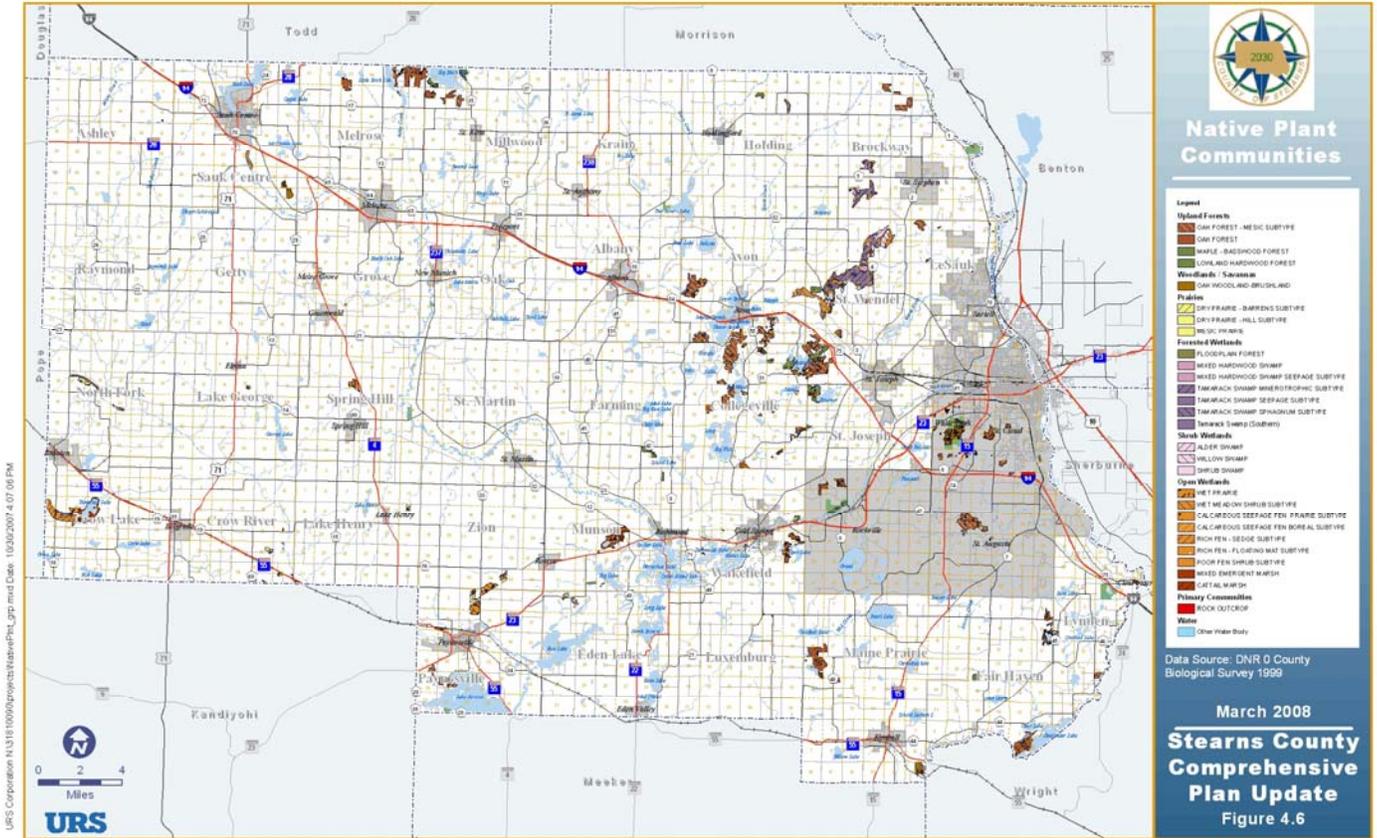
Prime farmland soils, shown in Figure 4.5, are defined by the U.S. Department of Agriculture as “soils that are best suited for producing food, feed, forage, fiber, and oilseed crops.” The Stearns County Soil Survey (1980) also states that “Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.” Within Stearns County, prime farmland soils are predominant in the Sauk River watershed and much of the northeast area of the County. These soils are less common in the southwest, the southeast, and much of the Avon Hills, although much of the farmland in these areas is still of high quality. Prime and other important farmland soils are considered an important natural resource that can be permanently destroyed or damaged by development.

It should be noted that the locations of animal agriculture operations are not necessarily dependent on prime farmland soils, since lands suitable for pasturage may have steeper topography or other less ideal soil conditions. However, the larger “vertically integrated” operations (in which farmers are growing corn for their own feed) can benefit from high quality soils.

Natural Areas

The Minnesota County Biological Survey, conducted by the Minnesota Department of Natural Resources, has identified areas of remaining natural land cover in Stearns County. The following two maps, Figures 4.6 and 4.7, show the location of these areas and the plant association types within the natural areas. The remaining natural areas are often located in areas of wet soils, slopes, or other areas that are somewhat unsuitable for agriculture or development. The *Native Plant Communities* map indicates plant association types while the *Biological Significance* map ranks the importance of the plant communities from a statewide perspective. The relative scarcity of these remaining natural areas elevates their importance as part of a green infrastructure network in the County.

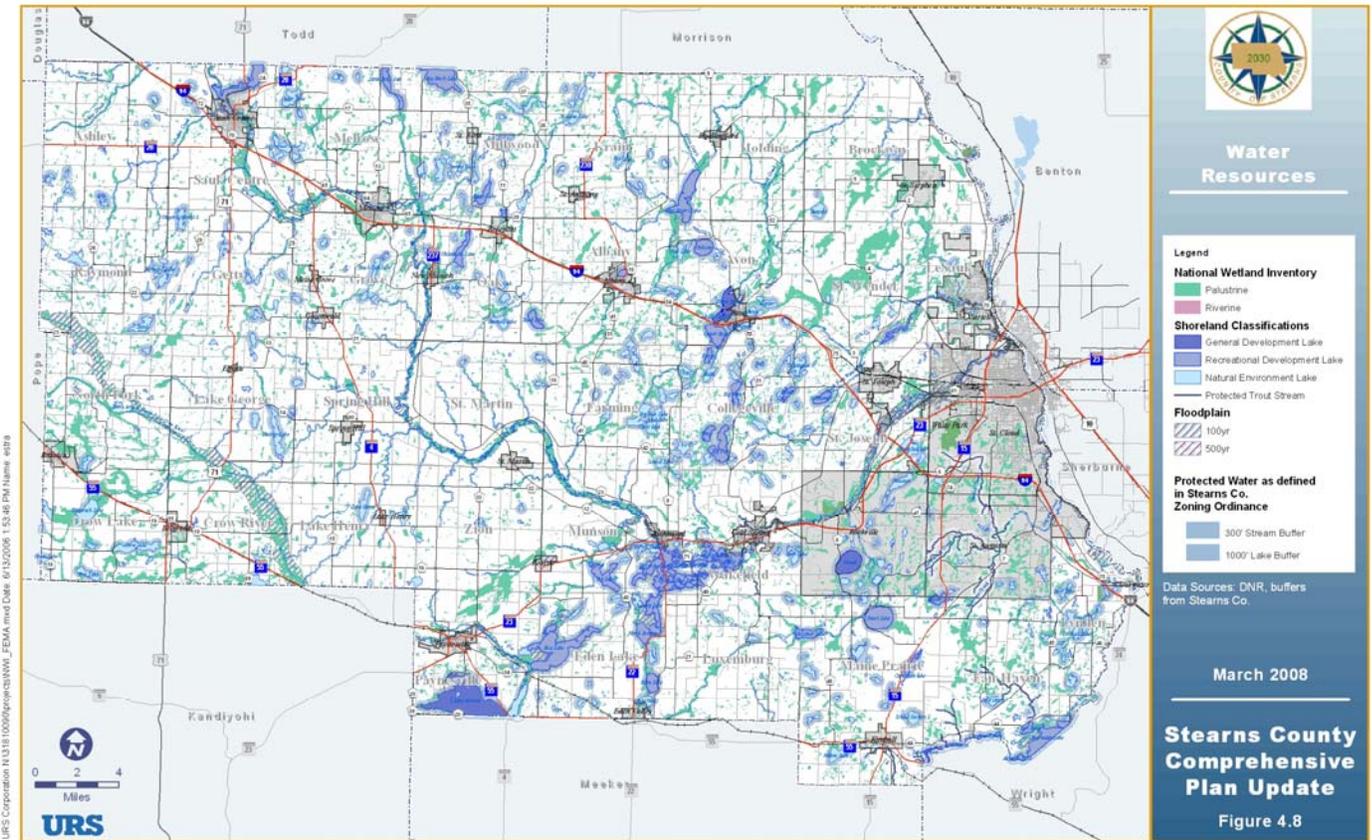
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Water Resources

Determined to a great degree by underlying geology and subsequent glaciation, Stearns County rivers, streams, lakes and wetlands define unique subareas of the County. The land use plan areas reflect the varying distribution of water resources in the County. Figure 4.7 shows the extent of surface water resources in Stearns County. While lakes, rivers and streams provide desirable amenities for development, they are also susceptible to degradation from poorly planned development. The land use plan considers the relationship of development to surface water quality.

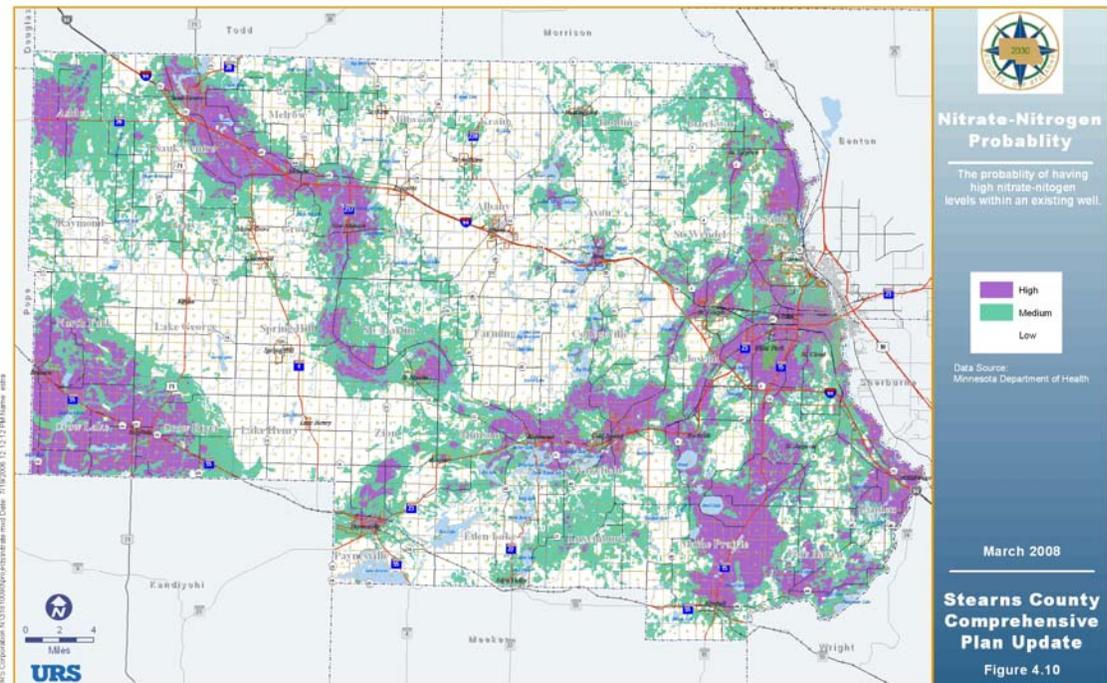
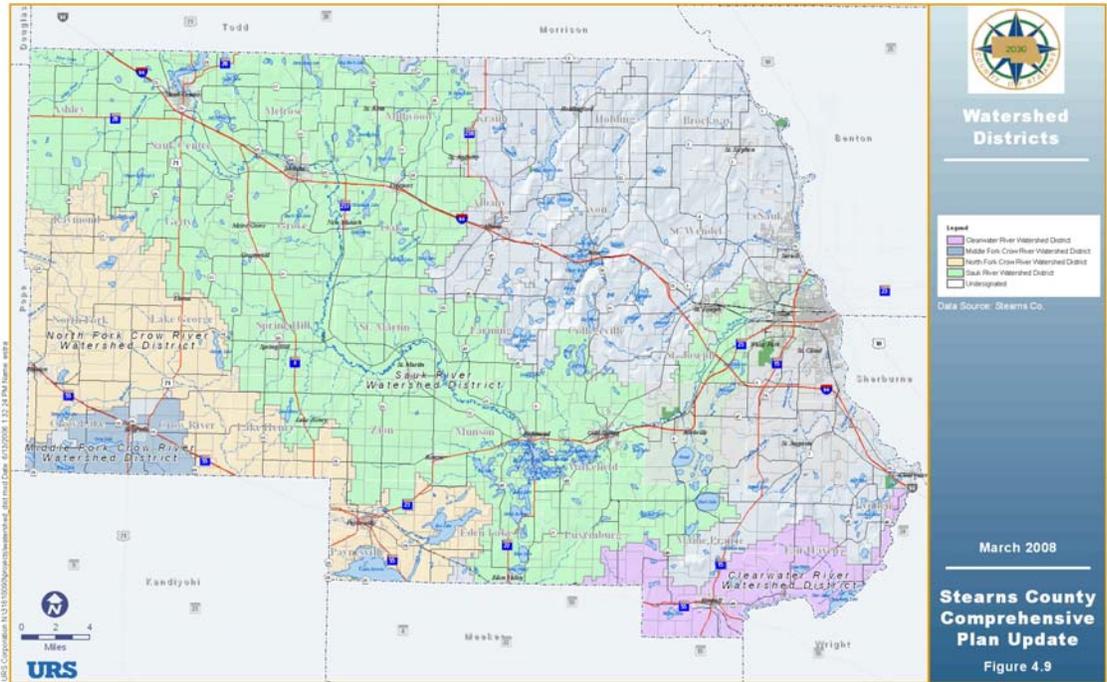
The Mississippi River creates the eastern border of the County and is fed by rivers and streams flowing from northeast to southwest including the Sauk, Crow and Spunk rivers. Figure 4.8, *Watershed Districts*, illustrates the geographic distribution of watersheds in Stearns County as well as the managing watershed districts. Two distinct lakes regions are located in the central and southern areas of the County.



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Groundwater resources are also influenced by land use choices. The Minnesota Department of Natural Resources has created a map of groundwater areas that are susceptible to contamination by nitrates (see map below). Development and agricultural land use practices should be considered when planning for land uses in areas of high nitrate susceptibility.

The *Stearns County Local Water Management Plan 2008-2017* provides greater detail on water resources in Stearns County.



Issues and Challenges

The following issues were identified at numerous meetings of the Citizen Advisory Committee, public open houses, meetings with city and township officials, and input from state agencies and watershed districts. Many issues raised in the County's 1998 Comprehensive Plan remain significant and were also included in this comprehensive plan update.

Recognizing and Planning for Green Infrastructure. A central tenant of comprehensive planning is to identify and preserve the community's green infrastructure, including the hydrologic system, habitat and ecosystem functions, recreational assets, and natural features that embody the community's character.. Stearns County has a diversity of green infrastructure, including several significant watersheds, a lakes region, unique wooded areas with both natural and community value, prairie eco-system areas, regionally-significant recreational trails, and a stretch of the Mississippi River. Coordinating how to preserve the functioning of the County's green infrastructure while also meeting the housing and economic development goals of the County presents a significant challenge. Other entities, including the Department of Natural Resources (DNR), have an interest in maintaining or restoring the green corridor systems that run through the County.

The County needs to consider:

- How to make developed areas function like undeveloped areas, through use of low impact development techniques, conservation design, and selective preservation of critical areas.
- How to consider the carrying capacity of shoreland areas that are under heavy development pressure, and how to restore some carrying capacity to lakes and rivers where water are impaired.
- Methods for integrating agriculture, development, recreation, and natural systems in the unique natural resource areas, including the Avon Hills area; river shorelands such the Sauk, the Clearwater, and the Mississippi; and the County's network of wildlife management areas.
- How to manage the nitrate risk to groundwater that is associated with soils and geologic features, land use decisions, and various management practices.

Consistency with Other Governmental Entities. A wide variety of entities have some regulatory or planning authority for natural resources in Stearns County. DNR is responsible for a number of natural areas and management of natural systems such as public waters and is currently evaluating possible green infrastructure

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corridors through Stearns County. Four watershed organizations conduct planning and manage regulations and programs. Federal entities manage wildlife areas, and the Pollution Control Agency oversees several regulatory areas such as the National Pollution Discharge Elimination System permits for most development activities. Furthermore, the County has statutory responsibility for completing and implementing both a Water Plan and a Solid Waste Management Plan. Ensuring that these differing entities are working in a coordinated fashion and that the County is staying consistent in its own various planning efforts is a substantial challenge.

The County must create a comprehensive plan that acknowledges the variety of regulatory authorities and statutory planning obligations.

Natural Resource Industries and Development. In addition to serving a critical infrastructure function, natural resources also provide critical support for the County's economic and development growth. Agriculture is the primary land use in Stearns County, an industry and a culture completely dependent on natural resources. Such resources include high quality soils for crops and vegetation and water resources well-suited to agricultural practices. Protecting these resources for future generations requires careful management of both agricultural and non-agricultural land uses. Stearns County has existing regulation that considers the presence and quality of agricultural soils in development decisions. Continuing and enhancing this practice to protect agricultural natural resources is a high priority for the CAC. Yet agricultural practices also increase the risk to other sensitive natural resources in the County, including surface waters and some habitat areas.

Aggregate resources are another example of natural resources that need to be protected in order to support development activities. Local sources of aggregate are of prime importance to development activities, from building houses to maintaining the transportation system. Aggregate resource need to be protected so that development does not infringe upon it and prevent extraction. Aggregate extraction also creates significant nuisances and puts at risk other natural systems, if not appropriately managed.

Finally, a significant driver of growth in several areas of the County is the access to lakes and rivers. Lakeshore is enormously valuable as a development amenity, yet shoreland areas and water quality of lakes and rivers is extremely vulnerable to development. Water bodies have limits for how much development can occur without degrading the very resource that makes development attractive. Natural resource tourism is similarly faced with how to take advantage of the amenities that attract people without exceeding the capacity of the lake, river, or other resource for development and use.

The County needs to consider:

- Land use regulation that explicitly recognizes prime agricultural soils in development decisions;
- Encouraging agricultural practices that allow for the co-existence of agriculture practices and sensitive natural resources;
- How to identify and protect local aggregate resources;
- Creating a system to evaluate and then protect or mitigate for impacts to natural systems during the development process.
- How to maximize opportunities and minimize risks for using natural resources in economic, housing, and recreational practices.

Goals and Objectives

The following goals and objectives are general statements of intent that focus on the natural resource issues identified through the planning process and in other required planning efforts such as the Water Plan and the Solid Waste Plan. Goals are broadly worded, while objectives define major themes under each goal. Stearns County set a number of natural resource goals in its 1998 Comprehensive Plan. Many of the 1998 Plan goals are still valid and have been reaffirmed by the Citizens Advisory Committee (CAC). Some goals from 1998 have been modified or simplified, and the CAC has identified some new priorities for natural resources. Additional new goals reflect goal statements in the Water Plan and Solid Waste Plan. Finally, natural resource goals are also included in the Land Use chapter of this Plan, reflecting the significant overlap of land use choices and the functioning of natural systems.

Goal 1. Preserve important natural systems.

- Objective 1. Identify the suitability of natural systems and resources for development or use.
- Objective 2. Develop strong performance standards to preserve sensitive natural features and systems.
- Objective 3. Preserve watershed functions for high-quality surface waters and recreation areas, and provide for restoration of watershed function for impaired waters.
- Objective 4. Recognize natural systems as critical infrastructure, equivalent to other kinds of infrastructure in assuring the health, safety, welfare, and quality of life for County residents, visitors, and businesses.

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Objective 5. Minimize the alteration of wetlands.

Goal 2. Assure the reasonable and responsible use of the County's natural resources, including land, surface and ground water, minerals, open space, wetlands, wildlife, and woodlands.

Objective 1. Provide for the managed, sustainable use of mineral, soil, water, and timber resources

Objective 2. Protect large wooded tracts and special habitats through preservation, conservation development standards, and promoting strong stewardship efforts by individuals and private organizations..

Objective 3. Recognize the carrying capacity of groundwater and surface water in development and use decisions.

Objective 4. Encourage use of renewable energy systems, including wind energy and solar energy, which reduce the footprint of development on local and global natural systems.

Goal 3. Protect the County's agricultural natural resources.

Objective 1. Protect agricultural soils and other agricultural resources by regulating non-agricultural land uses in areas with agricultural soils.

Objective 2. Encourage sustainable agricultural practices that protect agricultural soils and waters for future generations.

Goal 4. Protect the County's aggregate resources and provide for reasonable economic use of aggregate.

Objective 1. Locate the high quality aggregate resources in the County to guide protection and utilization activities

Objective 2. Manage aggregate resources to provide for the extraction of high quality aggregate prior to non-agricultural development on the site.

Objective 3. Adopt regulations to minimize nuisances from aggregate extraction that affect developed areas and that ensure restoration of extraction sites to protect other natural resources and natural functions.

Goal 5. Support the goals of the County Water Plan.

Objective 1. Protect drinking water sources through encouraging sustainable water use and preserving

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the function of wellhead areas and groundwater recharge areas in land use decisions.

- Objective 2. Minimize impacts to water quality from development through use of low impact development techniques, improved management of buffers and natural resources in shoreland areas, and improve stormwater management in existing developed areas.
- Objective 3. Continue to identify impaired waters in the County and work to implement best management practices for restoring surface waters to non-impaired status.

Goal 6. Support the goals of the Stearns County Solid Waste Management Plan.

- Objective 1. Provide a program for handling solid wastes that will anticipate residential, agricultural, commercial and industrial expansion.
- Objective 2. Encourage and educate citizens and businesses on the importance of waste reduction and reuse.
- Objective 3. Encourage energy recovery from solid waste.
- Objective 4. Acknowledge that landfills will be part of the solid waste disposal approach of Stearns County's non-hazardous industrial and demolition debris.
- Objective 5. Promote and encourage private sector participation in the collection, transportation and processing of solid waste and recyclable material.
- Objective 6. Continue compliance with the solid waste management goals and policies set forth by the State Pollution Control Agency.

Policies and Actions

Many of the policies and actions related to natural resources are land and land-use based, and thus addressed in the Land Use Plan chapter. The Land Use Plan chapter includes policy and action recommendations for the following natural resource-based issues:

- Nitrate Risk
- Natural System Functions
- Community Character (viewsheds, open space)
- Economic Resources (natural resource-based industries)

In addition, the Land Use Plan and Implementation sections include detailed discussions of the following action steps.

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- Avon Hills Conservation Area development criteria
- Conservation Design Overlay Policy and development criteria
- Transfer of Development Rights Policy and program
- Purchase of Development Rights program

The Implementation section also discusses regulatory changes that are suggested by the natural resource and land use goals.

Some of this section's natural resource goals are not directly related to land use policies. These include goals for sustaining the County's green infrastructure, protecting surface and ground water quality, and maintaining consistency with the County Solid Waste Plan. Some of the implementation steps suggested by these goals include the following actions.

1. Coordinate natural resource protection efforts with natural resource, land use planning, and development activities of state and federal agencies, cities, and townships:

- Develop routine communication with cities and townships on the County's natural resource goals, creation of implementation strategies, and opportunities for collaboration.
- Work with DNR on its green infrastructure corridors to:
 - Ensure consistency with County land use priorities and park and recreation goals ;
 - Mutually achieve the County's and the State's green infrastructure priorities;
 - Set implementation priorities that integrate agricultural protections with the protection of green infrastructure corridors
- Coordinate natural resource regulations and review processes with the watershed organizations.

2. Protect the carrying capacity of the County's lakes and streams using methods such as the following:

- Consider methods of identifying the carrying capacity of lake and river sub-watersheds to absorb the nutrient, sediment, and pollutant loads associated with stormwater from developed shorelands;
- Identify development, construction, and management practices that allow development to occur without exceeding the carrying capacity of lake and river watersheds;
- Create and promote programs for working with existing land owners in shoreland areas to reduce the impacts of existing

development on lakes and streams, such as shoreland restoration and improving to wastewater systems;

- Continue to work with agricultural producers to proactively limit their exposure to natural resource conflicts through promotion of best management practices and provision of technical assistance.

3. Protect the ability and opportunity to extract aggregate resources from those areas where aggregate resources are known to exist.

- Consider creating an aggregate overlay district that guides how development is staged in areas with high quality aggregate resources.
- Coordinate with DNR on identifying high quality aggregate resource.

4. Identify and protect groundwater recharge areas and wellhead areas. Drinking water is a critical resource to sustaining growth in the County.

- Work with the State Department of Health to identify wellhead protection areas.
- Create an overlay for wellhead protection and groundwater recharge areas.
- Consider programs that encourage sustainable use of water, as described in the Water Plan.

5. Plan for addressing impaired waters in land use and development decisions. The Pollution Control Agency is in the process of identifying impaired waters throughout the state, consistent with federal statutes and rules. A number of water bodies in Stearns County have already been identified as impaired, and additional water bodies will likely be identified in the future. The County should evaluate the risk of such designations to the planned land uses in shoreland areas and in watersheds of water bodies that may be designated as impaired. At a minimum, the County should consider “no-regrets” strategies, such as:

- Requiring new development to utilize low-impact development techniques,
- Staging development such that high-risk areas are developed after low-risk areas,
- Engaging local governments in a discussion about managing land uses and water quality to limit the risk of surface waters being designated as impaired,

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- Following other recommendations in the Water Plan for restoring surface waters to non-impaired status.

Table 4.1. Summary of Implementation Actions

Phasing Priority	Implementation Actions	Lead and Coordinating Agencies
On-going	Coordinate natural resource protection efforts with activities of state and federal agencies, cities, and townships	Environmental Services Planning Commission City and state officials and staff
On-going	Protect the carrying capacity of the County's lakes and streams.	Environmental Services Soil and Water Conservation District Watershed organizations Agricultural producers and organizations City government
Short-term	Protect the ability and opportunity to extract aggregate resources	Environmental Services DNR
On-going	Identify and protect groundwater recharge areas and wellhead areas.	Environmental Services MN Department of Health City government
On-going	Plan for addressing impaired waters in land use and development decisions.	Environmental Services MPCA City government