Forest Resource Management Plan

East Central Landscape

Minnesota Forest Resources Council
March 2005

Minnesota Forest Resources Council
Landscape Program

Minnesota Forest Resources Council (MFRC)
Document #LP-0305

This document is on the Internet at http://www.frc.state.mn.us/Info/MFRCdocs.html. Information about the Minnesota Forest Resources Council and the Landscape Program can be found at http://www.frc.state.mn.us.

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Section 1
Introduction

A. Sustainable Forest Resources Act

The Minnesota State Legislature enacted the Sustainable Forest Resources Act (Minn. Statutes, Chapter 89A) in 1995, which established the MN Forest Resource Council (MFRC) and formalized the state's policy to:

- pursue the sustainable management, use, and protection of the state's forest resources to achieve the state's economic, environmental, and social goals;
- encourage cooperation and collaboration between public and private sectors in the management of the state's forest resources;
- recognize and consider forest resource issues, concerns, and impacts at the site and landscape levels;
- recognize the broad array of perspectives regarding the management, use, and protection of the state's forest resources and establish processes and mechanisms that seek and incorporate these perspectives in the planning and management of the state's forest resources.

The purpose of the MFRC is to develop recommendations to the Governor and to federal, state, county and local governments with respect to policies that result in sustainable management of forests in the state. The policies must:

- acknowledge the interactions of complex sustainable forest resources, multiple ownership patterns, and local to international economic forces;
- give equal consideration to the long-term economic, ecological, and social needs and limits of the state's resources;
- foster productivity of the state's forests to provide a diversity of sustainable benefits at site and landscape levels;
- enhance the ability of the state's forest resources to provide future benefits and services;
- foster no net loss of forest land;

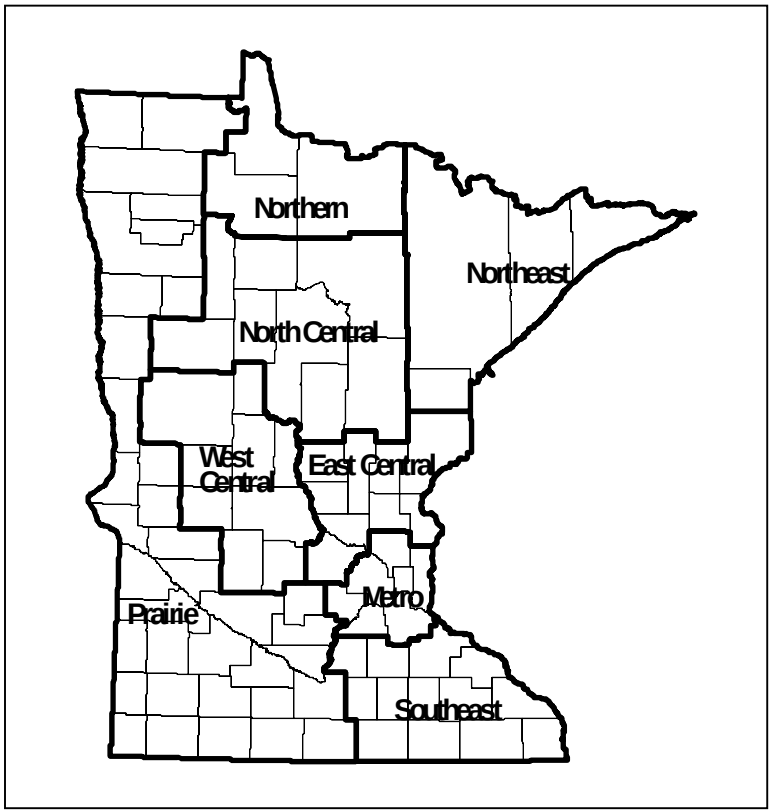
- encourage appropriate mixes of forest cover types and age classes within landscapes to promote biological diversity and viable forest-dependent fish and wildlife habitats;
- encourage collaboration and coordination with multiple constituencies in planning and managing the state's forest resources; and
- address the environmental impacts and implement mitigations as recommended in the *Generic Environmental Impact Statement on Timber Harvesting and Forest Management.*

B. MFRC Landscape Program

The Sustainable Forest Resources Act established a landscape-level forest resources planning and coordination program as a way of assessing and promoting forest resource sustainability across large geographic areas or "**landscapes**".

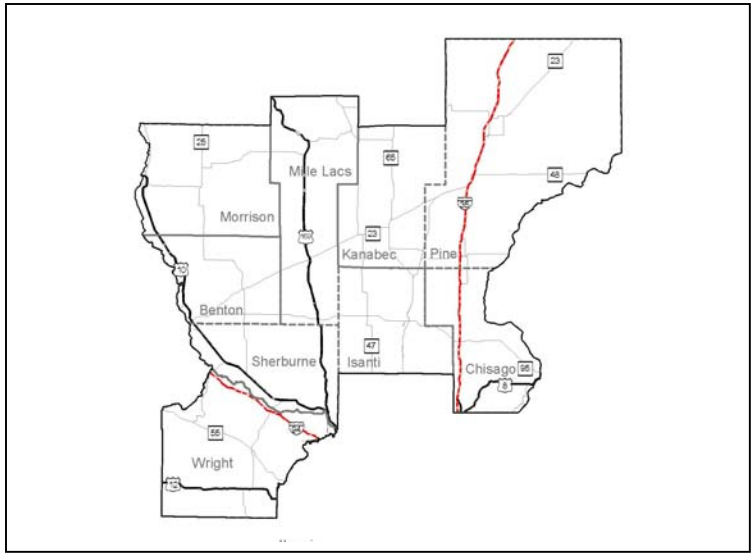
The **MFRC Landscape Program** provides a process that allows landowners and stakeholders to work together over broad regions to address resource issues that generate geographically unique solutions to sustainability challenges. The program implements the state policies described above at the landscape level throughout the state.

The state has been divided into eight regions as shown on the figure to the right. This plan for the East Central landscape, is the sixth landscape-level plan developed by the MFRC.

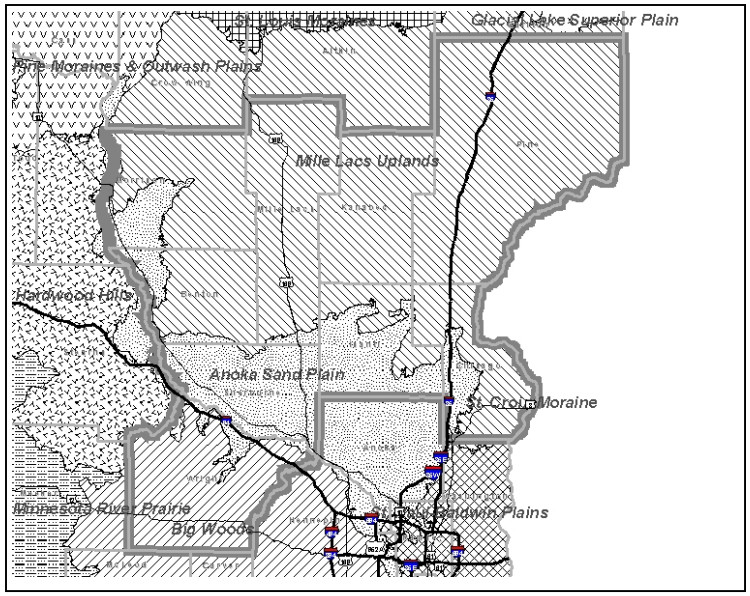


C. Landscape Planning Scales and Contexts

The East Central Landscape Region is defined in two different ways. Administratively, it is based on geopolitical boundaries of counties that include: Benton, Chisago, Isanti, Kanabec, Mille Lacs, Pine, Sherburne, and Wright counties and the eastern half of Morrison east of the Mississippi River. The administrative East Central landscape region covers approximately 5,750 square miles or 3.7 million acres. The map in the upper right margin illustrates the administrative boundaries of the East Central landscape region.



Ecologically, the boundary is based on the Ecological Classification System (ECS), which defines regions that have similar ecological characteristics such as geology, vegetation, soils, etc. There are six ECS subsections within the East Central landscape and they include: Mille Lacs Uplands, Anoka Sand Plains, Big Woods, Hardwood Hills, St. Croix Moraine, and the St. Paul-Baldwin Plains and Moraines. The Mille Lacs Uplands subsection covers the largest portion of the East Central landscape (2.5 million acres). The Anoka Sand Plain covers approximately 740,000 acres and the Big Woods subsection covers 410,000 acres of the landscape. The three other subsections each cover less than 10,000 acres of the landscape. The map to the right illustrates the six ECS subsections in the East Central landscape.



Policies and strategies formulated for this Plan address forest sustainability challenges at both the administrative and ecological scales.

D. Regional Forest Resource Committees

The Sustainable Forest Resources Act authorized the establishment of citizen-based committees to foster and oversee landscape-based forest resource planning and coordination.

These committees provide a forum where forestland owners and stakeholders can collaborate to address forest resource issues over broad regions of Minnesota's forests, enabling long-range forest resources planning and coordination across land ownerships and forest types.

The East Central Landscape Regional Committee (Committee) starting meeting in March of 2004 to began working to find agreement on how best to achieve long-term forest sustainability by determining desired future outcomes and developing goals and strategies to achieve the agreed-upon desired outcomes.

This document summarizes the work of the Committee from March 2004 to February of 2005.

Section 2
Process Summary

This section provides an overview of the process used to develop this Plan as well as a brief description of the resources and documents that support the Committee's conclusions and recommendations.

A. Formation of the East Central Landscape Committee

An informational/organizational meeting was held on March 30, 2005. The purpose of the meeting was to provide an overview of the landscape planning process and to invite interested persons to volunteer to serve on the regional planning committee for the East Central Landscape Plan. Over ninety people representing a broad range of private and public stakeholder groups and interests relating to forestry were invited to this initial meeting.

By July of 2004, the final composition of the Committee was determined with a total of 32 members volunteering to serve. A group of 14 to 20 people regularly attended monthly meetings to develop this Plan.

In addition to the Committee members, over 50 people expressed interest in following the process and remained on a mailing list. An even broader range of organizations and interests were represented in this group. Comments on the policies and strategies recommended in this Plan were solicited from these people as well.

East Central Landscape Committee Members:

Tim Anderson*, Isanti County Planning & Zoning
Dennis Asmussen*, DNR Central Region
John Bathke*, MN Forestry Association
Katie Baxter, Woodline Sawmills
Greg Bennett*, Pine County Board of Commissioners
Chelle Benson*, Benton County Planning & Zoning
Teresa Bearce*, Kanabec County ESD
Bill Clapp*, St. Croix Coalition
Wayne Damerow*, DNR Forestry
Tim Edgeton*, Sherburne County Parks/Zoning
Chuck Forss, Morrison County Planning & Zoning
Clyde Hanson, Sierra Club
Jeanne Holler*, US Fish & Wildlife Service
Don Janes*, Landowner
David Johnson*, DNR Wildlife
Dick Knoll*, East Central Woodland Owners Council
Paul Larson*, Kanabec County SWCD Board
Shelley Larson*, Hayland Woods Native Plant Nursery
Brad Maitland, United Country Real Estate
Marc Mattice, Wright County Parks
Robert Nelson*, DNR Forestry
Steve Nelson*, Consulting Forester/Isanti County Parks
Matt Norton*, MN Center for Env'l Advocacy
Pam Perry*, DNR Non-Game Program
Paul and Sean Petty, Petty & Sons Logging
Craig Prudhomme, Audubon Center of the North
Bob Pulford*, Pine County Planning/Land Dep't
William Saumer, Pine County SWCD Board
Tom Schmidt*, Landowner
Hannah Texler*, DNR Nat. Heritage/Nongame Program
Joe Wood*, MN Deerhunters Association
* - Active participants – attended 3 or more meetings.

B. Planning Process Overview

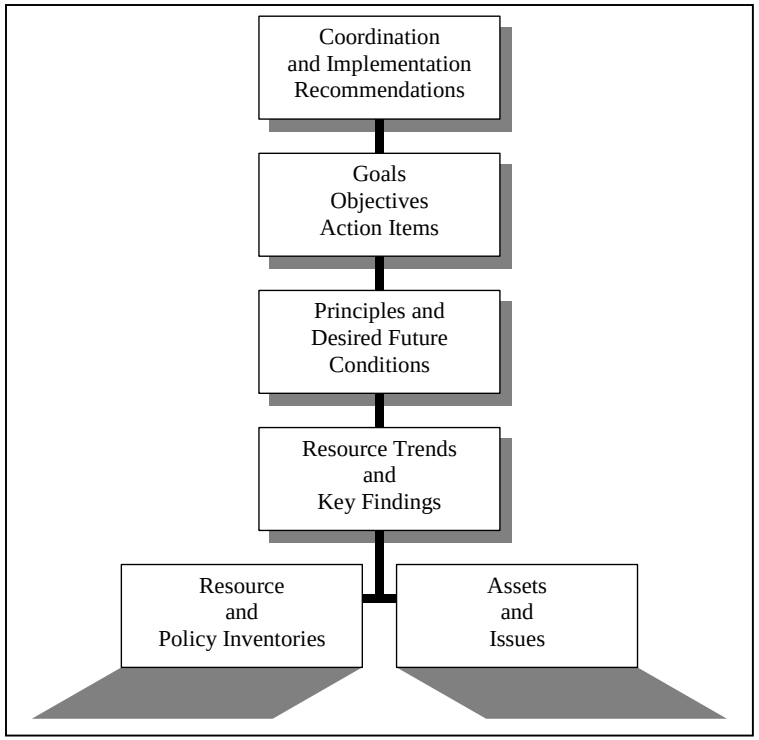
Preliminary Meeting Schedule

At its first meeting, the Committee established a meeting schedule for the planning process. A total of ten meetings were outlined on the schedule. The first meeting focused on distributing background information, identifying major issues, setting the basic ground rules for the Committee, and a discussion on the decision-making process. Meetings 2, 3 and 4 provided Committee members with presentations on ecological, economic and social topics relating to forest resources in the landscape. Meetings 5, 6 and 7 were designed to focus on the development of the desired future conditions and the policy framework for the Plan, which is a series of goals, objectives and action items. Meetings 8, 9 and 10 were designed to review and discuss coordination and implementation aspects as well as a review of the draft plan and comments received from the public. The Committee completed its work within this ten-meeting schedule with the exception of the review of comments from the public, which occurred at an additional meeting.

General Steps in the Planning Process

The general process that was used by the Committee to develop the Plan included the following major steps:

- Gather and inventory existing policies relating to forestry management from plans adopted by local, regional, and state organizations.
- Brainstorm and prioritize forestry assets and issues in the region.
- Identify and synthesize resource trends and key findings.
- Develop guiding principles and define the long-term desired future conditions.
- Establish a comprehensive policy framework of goals, objectives, and action items.
- Begin clarifying the appropriate roles and responsibilities of stakeholders in coordinating the implementation of this Plan.



Decision-Making Process

Early in the planning process, the Committee established a decision-making process for items where a consensus could not be reached. For those items, a simple majority vote of Committee members attending the meeting would decide the matter using the following four options:

1. Decide. Make a decision on the matter at that given meeting.
2. Table. Move the item or matter to the next meeting so that the committee members and staff can do further research.
3. Subcommittee. Create a subcommittee to work on the item further and bring it back to the committee for further discussion.
4. Outside the Scope. Determine that the item or matter is outside the scope of the East Central landscape process.

C. Background Information, Research and Presentations

Sources for Policy Development

The Committee referred to many sources as they created and refined the desired future conditions and policy framework for this Plan. The following is a list of policy documents that they consulted:

- Sustainable Forest Resources Act.
- MFRC organizational vision and goal statements.
- Other MFRC landscape plans (Northeast, North Central, Northern, West Central and Southeast landscapes).
- DNR forestry plans – subsection plans, area plans, etc.
- A Strategic Conservation Agenda 2003 – 2007, DNR.
- Governor's Task Force Report on the Competitiveness of Minnesota's Primary Forest Products Industry.

Documents and Information Prepared Specifically for the East Central Landscape

In addition to the documents listed above, the Committee also reviewed studies, maps, and data as well as a series of presentations on forest management topics prepared specifically for the East Central landscape planning process. The following is a summary of these information resources:

- Forest Resource Management in East Central Minnesota: A Landscape Perspective (MFRC)
- Current Trends and Conditions Report (MFRC).
- Socio-Economic Trends and Implications Report (UMD)
- Presentations to the East Central Landscape Committee.
- GIS Mapping and Data Development for the East Central Landscape (MFRC and MN DNR)

Forest Resource Management in East Central Minnesota: A Landscape Perspective. An Inventory of Policies in Local and Regional Plans

Over twenty local plans were examined in the document Forest Resource Management in East Central Minnesota: A Landscape Perspective (Schesel 2004). The main task in preparing this report was to inventory and highlight the landscape issues, visions, goals, and strategies adopted in local planning documents developed for local units of government and resource agencies in East Central Minnesota. Common themes were identified and goals and strategies were consolidated under each theme. The eight major themes identified in the study included:

1. Balance growth with resource protection.
2. Improve water quality.
3. Coordination of efforts for management and enforcement.
4. Enhance wildlife habitat and wildlife populations.
5. Increase landowner assistance.
6. Promote forest stand improvement and health.
7. Improve forest productivity and regeneration.
8. Encourage diversities of forests, plants and ecosystems.

These eight themes and the corresponding goals and strategies developed by local units of government and resource agencies working in the region provided the Committee with an excellent foundation to build the policy framework in this Plan.

Plans Examined

1. The Forest Legacy Program in Minnesota, Statewide Assessment of Need, 1999
2. The Mille Lacs Uplands, Glacial Lake Superior Plain, and St. Croix Moraines Ecological Classification System Subsections in Minnesota, Subsection Forest Resource Management Plan, Step 3—Draft, 2003
3. Upper Mississippi River Basin Water Quality Plan, Headwaters to the Rum River-Anoka Draft,
4. Nongame Wildlife Program, 10-Year Strategy, June 2002-July 2012
5. Prairie-Forest Border Ecoregion: A Conservation Plan
6. Wetlands Guidance for the Anoka Sand Plain, 2000
7. Camp Ripley Forest Management Plan, 2002
8. A Management Plan for Lake Maria State Park, 1979
9. A Management Plan for Interstate State Park, 1979
10. Isanti County Comprehensive Local Water Plan, 2000
11. Isanti County Comprehensive Plan, 1998
12. Morrison County Water Plan, 2002
13. Kanabec County Comprehensive Local Water Plan, 2001
14. County of Mille Lacs Comprehensive Plan, 1990
15. Benton County Comprehensive Plan, 1999
16. Wright County Land Use Plan, 1988
17. Sherburne County Comprehensive Water Management Plan, 2001
18. Sherburne County Comprehensive Land Use Plan, 1992
19. Chisago County Comprehensive Guide Plan, 1995
20. Plan for the Management of Pine County Tax-Forfeited Lands, 1994
21. Pine County Comprehensive Plan, 1993.

Current Trends and Conditions Report

In 2001, MFRC staff prepared background information reports for each of the landscape regions in the state. The documents were entitled, "Current Trends and Conditions Report". The reports summarized historical conditions, natural resource and ecological conditions and trends, and demographic information.

The natural resource information in the report for the East Central landscape used the ecological boundary for the entire East Central landscape. In contrast, the social and economic data typically was based on the administrative scale and county level.

A copy of the Current Trends and Conditions Report for the East Central Landscape is provided on the MFRC web site (see www.frc.state.mn.us).

Socio-Economic Trends and Implications Report

In 2003, the MFRC contracted with the University of Minnesota Duluth School of Business and Economic Research to prepare a more in-depth review of social and economic data. This report provided an analysis of seven demographic patterns and an assessment of the economic base for each of the counties in the East Central landscape and the overall region. The report provided a series of considerations for policy decisions by the Committee. A presentation summarizing the major conclusions from the study was made at one of the Committee meetings (described in the narrative below).

A copy of the Socio-Economic Trends and Implications Report has also been provided on the MFRC web site (see www.frc.state.mn.us).

Presentations to the East Central Landscape Committee

As a part of the Committee's review of the resource base in the region, guest speakers were invited to give presentations on topics of their expertise. The following is a list of speakers and presentation topics:

- An Ecological Overview of the East Central Landscape, Hannah Texler, DNR Ecological Services.
- Social and Demographic Trends, Bill Fleischman, University of Minnesota Duluth School of Business and Economic Research.
- Recreation Trends, Ingrid Schneider, University of Minnesota, Tourism Center.
- Whitetail Deer Management, Dave Johnson, DNR, Division of Fish and Wildlife.
- Economic/Land Development Trends, Bob Voss, East Central Regional Development Commission.
- Forestland Parcelization, Mike Kilgore, University of Minnesota, College of Natural Resources.

- Managing Growth, Jenna Fletcher, MFRC.
- State Forest Management Planning, Jon Nelson, DNR, Division of Forestry.
- Mille Lacs Subsection Forest Resource Management Plan, Lynn Mizner, DNR, Division of Forestry.
- Local Forest Management Planning – Bob Pulford, Pine County Land Department
- Forest Health, Susan Burks, DNR, Division of Forestry.

These powerpoint presentations may be viewed on the MFRC web site (see www.frc.state.mn.usT).

GIS Mapping and Data Development

The MFRC contracted with the DNR to prepare a series of inventory and assessment maps for the East Central landscape. Section 4 provides an overview of the resource inventory mapping and data developed for this Plan.

Section 3
Definitions and Key Terms

In any cooperative planning process where stakeholders representing a wide variety of interests are involved, it is essential to build a common understanding of the key terms and concepts used. This section along with the Glossary found in Appendix C provides an overview of the key terms used in this Plan and in the landscape planning process. Readers of this Plan are encouraged to briefly review these terms to become familiar with them.

A. Defining Key Terms

Statutory Definitions

Minnesota state laws set in place a number of definitions regarding forest resources and their management. The Committee reviewed these terms early in the planning process. The two primary laws regarding forest resource management include:

- Minnesota Sustainable Forest Resources Act (Chapter 89A)
- Minnesota State Forestry Law (Chapter 89)

Terms Accepted by Reference

The Committee recognized that the terms in the statutes did not address all aspects of sustainable forestry and related forest management practices. To supplement the definition effort, the Committee accepted the definitions in the following two documents as general references for defining terms:

- "Sustaining Minnesota Forest Resources", MFRC. Site Level Program. 1999.
- "The Dictionary of Forestry". Society of American Foresters. 1998. John A. Helms, editor.

Terms Defined by the East Central Landscape Committee

In addition to the statutorily and general forest management practice defined terms, several other key terms and phrases evolved from the Committee through their discussions on developing the policies and strategies contained in this Plan. The Committee determined that these terms needed further clarification. Some of the key forestry and land management terms defined by the Committee included critical forest resources, balanced and managed land development, and a sense of place.

The Committee recognized that through the implementation of this Plan, further evolution on the definition of key terms will occur. All users of the Plan are encouraged to help build a common language of sustainable forestry in the landscape and throughout the state. The Glossary in this Plan is intended to be dynamic and evolving.

B. Forest and Land Management Planning Concepts

In addition to the definitions of key words provided in the Glossary, there are several forest and land management concepts that that need some introduction to assist the reader of this Plan. Some of the key concepts include the following:

Forest Management Terms

- Forestland. Land which is at least ten percent stocked by trees of any size and capable of producing timber, or of exerting an influence on the climate or on the water regime; land from which the trees described above have been removed to less than ten percent stocking and which has not been developed for other use; and afforested areas. (Minnesota Statutes 2003, Chapter 89.)
- Forest Management. The regeneration, management, utilization, and/or conservation of forests to meet specific goals and objectives (excerpt from the Dictionary of Forestry, Helms 1998).
- Sustainable Forest Management. Development, protection, and use of forest resources for achievement of economic and social well being without damaging the forest resource base or compromising the ability of future generations to meet their own needs. (MFRC "Sustaining Minnesota Forest Resources: Voluntary Site Level Guidelines".)
- Critical Forest Resources. Forests that are critical to the ecological, economic, and/or social well-being of a community or group of communities within the landscape as determined by the regional landscape committee. Initial recommendations for the identification and management of critical forest resources in the East Central landscape are provided in this Plan. Through the use of modeling tools such as RSEA, RNV and spatial analysis (described below), the Committee will more clearly identify critical forest resources in the East Central Landscape in the implementation stage.
- Ecological Classification System (ECS). The Ecological Classification System is part of a nationwide mapping initiative developed to improve the ability to manage all natural resources on a sustainable basis. It is a method to identify, describe, and map progressively smaller areas of land of increasingly uniform ecological characteristics. Associations of biotic and environmental factors that directly affect or indirectly express differences in energy, moisture, and nutrient supplies are used.

These factors include climate, geology, soils, hydrology and vegetation. Four levels of mapping have been completed for Minnesota. From the largest to the smallest scale, these include province, section, subsection, and land type association.

- Native Plant Community. A group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plants form recognizable units that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. In 2003, the DNR completed a new classification of native plant communities, Minnesota's Native Plant Community Classification (Version 2.0), published in the book, *Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province*.
- Regionally Significant Ecological Areas (RSEA) modeling. A landscape scale assessment modeling process developed by the DNR to identify regionally significant habitat areas. The RSEA modeling process was designed to identify critical forestlands, wetlands, and grasslands. (DNR)
- Range of Natural Variation (RNV) analysis. The Range of Natural Variation analysis is a method in which current forest age structure and composition are compared with the range of conditions that would exist under natural disturbances regimes. The RNV concept can be used for understanding ecosystems, ecosystem changes, and for assessing the effects of proposed management. (NRRI – studies prepared for the MFRC for the Northeast and North Central landscapes.)
- Forest Spatial Patterns. The size, shape and arrangement of forested landscape patches. Patches may be any feature that can be mapped such as (MN DNR):
  1. Forest types, habitats, and vegetation communities.
  2. Landforms, soils, and aquatic systems.
  3. Disturbances – both natural and human caused.
- Spatial Analysis. The mapping and measuring of spatial patterns in a landscape or given area. (DNR)

Land Management Terms

- Balanced and Managed Land Development. Local land use management where landowners and local officials are working together to make wise decisions about the use of land and natural resources. Balanced and managed land development integrates sustainable forest management in the local comprehensive planning and implementation processes. (East Central Landscape Committee)
- Comprehensive Plan: The official public document adopted by a community as the policy guide for decisions about its future development and redevelopment. It consists of a vision for the community, background data, goals, policy statements, standards and programs for guiding the physical, social and economic development of a community. A comprehensive plan usually includes, but is not limited to, a land use plan, transportation plan, public facilities plan, housing plan, parks and open space plan, environmental protection plan and implementation strategies. The time frame for a plan typically ranges from 15 to 25 years. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)

- Fragmentation. Changes across a landscape that break large continuous areas of a particular land cover (e.g. forest) into smaller isolated patches. (Kilgore)
- Parcelization. An increase in the number of land parcels in a given area (e.g. fragmentation of land ownership). Fragmentation does not necessarily result in parcelization and vice versa. (Kilgore)
- Sense of Place. The common feeling or attitude people share about a community or place they identify with and relate to. A place with a "sense of community" is a place that naturally brings people together as a community. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)

C. Key Planning Process Terms

The Policy Framework developed in this Plan includes four levels or types of statements. They include desired future conditions, goals, objectives and action items. The policy statements have been organized in this Plan in hierarchical format to provide a clear sense of direction (from general to more specific) for coordination and implementation.

- Desired Future Conditions. Desired Future Conditions (DFC) are broad overarching statements that describe preferred or desired conditions that a given geographic area or region will be like at the end of a given timeframe. DFC statements are very general and long range in nature. They are intended to provide an initial starting point for agreement on what forests in the landscape should be like in the future. DFCs are comparable in content to vision statements found in local government plans such as comprehensive plans. The DFC statements for the previously approved MFRC landscape plans have typically used a fifty to one hundred (50 – 100) year horizon when describing the desired future conditions of forests.
- Goals. Goal statements outline the general directions that an organization intended to be attained at some point in the future. Goals are intended to provide general direction for a given resource initiative (ecological, economic, social, and administration/coordination). Words such as ***encourage***, ***increase***, ***preserve***, and ***protect*** are commonly found in goal statements. The goals in the East Central Landscape Plan represent what the Committee wants to pursue over the next ten to twenty (10 – 20) years to promote sustainable forest resources in the landscape.
- Objectives. Statements that provide more specific direction on the efforts or strategies that are needed to implement each goal. Goals usually have more than one objective. Words like ***construct***, ***plant***, ***remove***, and ***monitor*** are used to describe more specific direction in implementing the goals. Often, objectives will include quantifiable ***targets***, as means to provide more specific and measurable parameters for monitoring progress towards the goals. The initial description of programs and projects are usually found in objective statements.
- Action Items. Statements that outline what an organization anticipates will be the major tasks in completing the objectives. Objectives should contain several action item statements to help further clarify efforts needed to complete the objectives.

Section 6 contains the desired future condition statements and Section 7 outlines the framework of goals, objectives and action items.

Section 4
Resource Inventory and Assessment Maps and Data

This section first provides a general overview of the East Central landscape from a land cover perspective. It then provides a review of the resource inventory and assessment work developed by MFRC staff in conjunction with MN DNR GIS staff. The last part of this section provides a review of the vegetation cover analysis prepared for the East Central landscape.

A. Generalized Land Cover

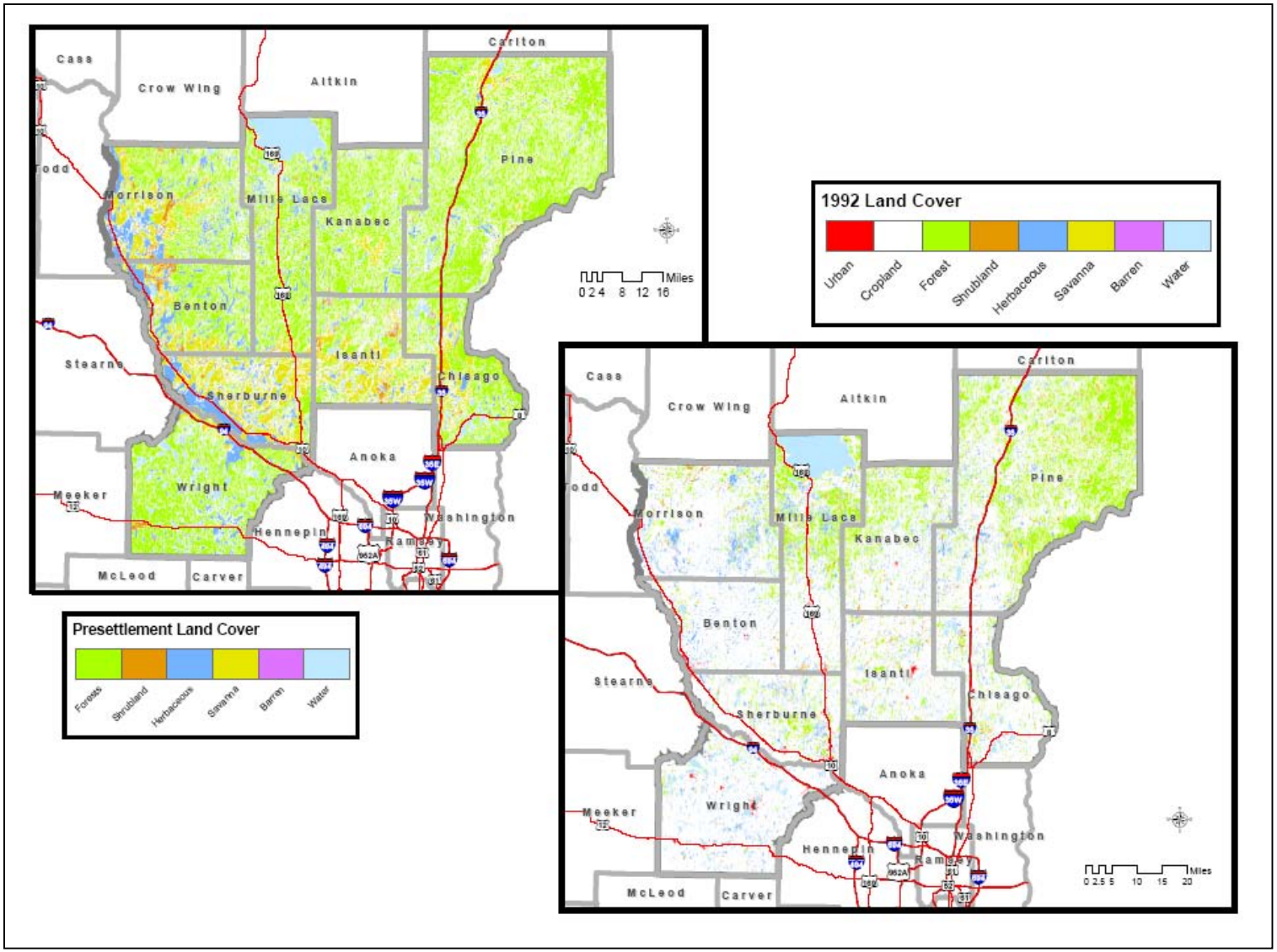
An analysis of the land cover changes over the past 100 years provides a quick numerical and visual introduction to the East Central landscape. The table below is based on data from the Presettlement vegetation (Marschner) and the most recent land cover maps.

Historic Land Cover Comparison – East Central Landscape

Presettlement Land Cover			1992 Land Cover		
Land Cover Category	**Ares Square Miles**	**Percent**	**Land Cover Category**	**Area Square Miles**	**Percent**
Forested / Brushland	3,262	56.7	Forested / Brushland	1,994	34.7
Grassland	1,049	18.2	Hay / Pasture / Grassland	1,293	22.5
*Bog / Marsh / Fen	1,258	21.9	Bog / Marsh / Fen	495	8.6
Water	180	3.1	Water	275	4.8
Cultivated Land	0	0.0	Cultivated Land	1,536	26.7
Urban and Rural Development	0	0.0	Urban and Rural Development	151	2.6
Mining	0	0.0	Mining	7	0.1
Total	**5,750**	100.0		**5,750**	**100.0**

Source: Land Information Management Center. *The bog/fen/marsh category land cover category includes forest cover.

The two maps below illustrate the generalized land cover patterns for the East Central landscape from the Presettlement and 1992 timeframes.



B. Resource Inventory Maps and Data

To assist the Committee in gaining a better understanding of the natural and cultural resource base in the region, An in-depth series of inventory maps and data were prepared. MFRC staff worked with the DNR Metro Office GIS staff to develop this information. The maps were made available to the Committee for their review at meetings as well as on-line. The following is a list of the resource topics that maps and data have been compiled for the East Central landscape as a part of the this planning process:

- Bedrock Geology
- Surficial Geology
- Topography and Shaded Relief
- General Soils
- Landforms
- Wetlands
- Protected Waters
- Watersheds
- Presettlement Land Cover
- 1969 Land Cover
- 1989 Land Cover
- Land Ownership
- GAP – Level 2
- GAP – Level 4
- ECS Subsections
- ECS Land Types
- County Biological Survey
- Wildlife Corridors
- Native Plant Communities

All of these maps and corresponding tables can be viewed on the MFRC website (www.frc.state.mn.us).

C. Resource Assessment Maps and Data

In addition to the inventory mapping efforts described above, effort was directed at developing a series of resource assessment maps to evaluate forest and related resource management issues in the East Central landscape. The following is a list of the assessment maps prepared for the region. Data for these maps was developed at the landscape, ecological subsection and county geographic levels or scales.

- Biodiversity Significance.
- Change in Relative Abundance of White Pine by Land Type Association
- Change in Relative Abundance of Red Oak by Land Type Association
- Change in Relative Abundance of Aspen by Land Type Association
- Change in Relative Abundance of Sugar Maple by Land Type Association
- Ecological assessment maps.

The assessment maps and corresponding tables may be viewed on the MFRC website (www.frc.state.mn.us).

Use of East Central Landscape GIS Products by Others

The GIS data from the resource inventory and assessment maps can be extremely useful for land use planning and implementation efforts by counties, townships, cities, water resource organizations, land mangers and resource agencies. The MFRC encourages these entities consider using this information. For more information, contact the MFRC staff (www.frc.state.mn.us).

D. Development of Vegetation Cover Categories for the East Central Landscape

There are different methods to classify or categorize vegetation cover types. Each method has been developed to meet the needs of the system users. In addition, inventories used by state and federal forest and land resource monitoring programs use varying vegetation categories as well.

Currently, there is no one method or approach for categorizing vegetation covers used for the MFRC landscape program. While the Northeast and North Central each developed varying tree species as a part of the RNV analysis, the West Central and the Southeast committees used the generalized land cover information. The Northern Committee is proposing to develop its own resource information approach. In summary, each landscape has tailored its own approach to meet its needs.

After reviewing a variety of data sets including those described in the inventory and assessment mapping noted above and the forest inventory and analysis (FIA) data from the U.S. Forest Service, the Committee decided to develop a set of general vegetation cover categories. A total of 6 forest vegetation categories and 5 non-forest categories were developed by a subcommittee and accepted by the Committee. The following is a list of the recommended vegetative cover categories:

Forest Vegetation Categories. There are 6 forest vegetation categories in the East Central landscape including:

Upland (3)
- Conifer Forest
- Hardwood Forest
- Mixed Hardwood/Conifer Forest

Wetland (3)
- Floodplain Forest
- Conifer Swamp
- Hardwood Swamp

Non-Forest Vegetation Categories. There are 5 non-forest vegetation categories in the East Central landscape including:

Upland (3)
- Savanna
- Brushland
- Grassland

Wetland (2)
- Marsh/Sedge Meadow/Fen
- Shrub Swamp

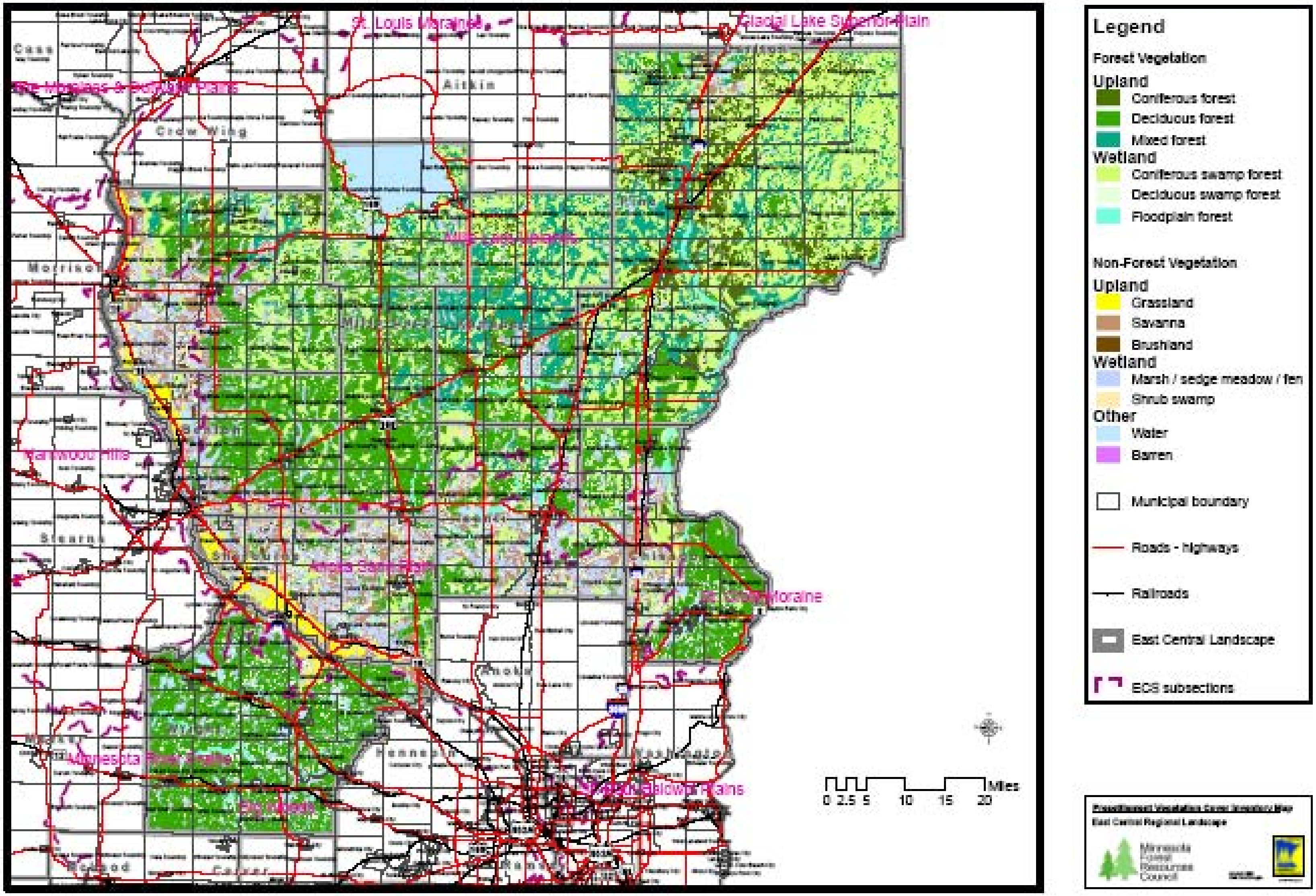
These general categories of vegetation cover types were designed to be broad enough to be used for quantifying vegetation documented by the Public Land Survey in the 1850s as well as by more current surveys, including GAP, the Minnesota County Biological Survey, and DNR Cooperative Stand Assessment data. They were chosen to help the Committee assess broad changes in vegetation over the years and to quantify desired future conditions of vegetation.

Data for the vegetation cover categories has been developed for the following geographic levels: 1) the entire nine-county East Central landscape region, 2) each of the six ECS subsections, and 3) each individual county in the East Central landscape region.

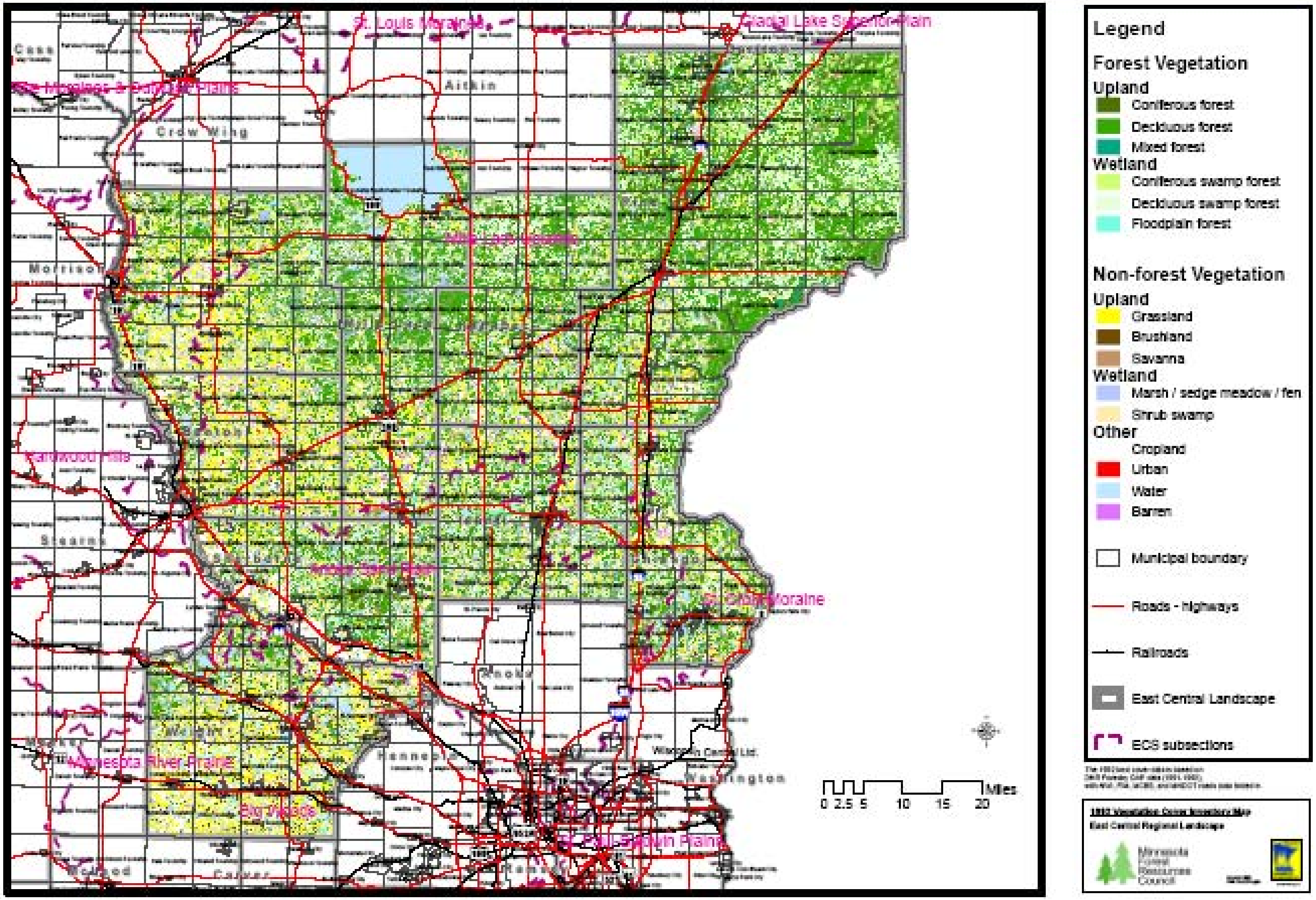
The maps on pages 4 – 6 and 4 – 7 illustrate the Presettlement vegetation cover and 1992 vegetation cover data respectively. The table provided on page 4 – 8 provides vegetation cover data for the Presettlement and 1992 timeframes at the subsection level.

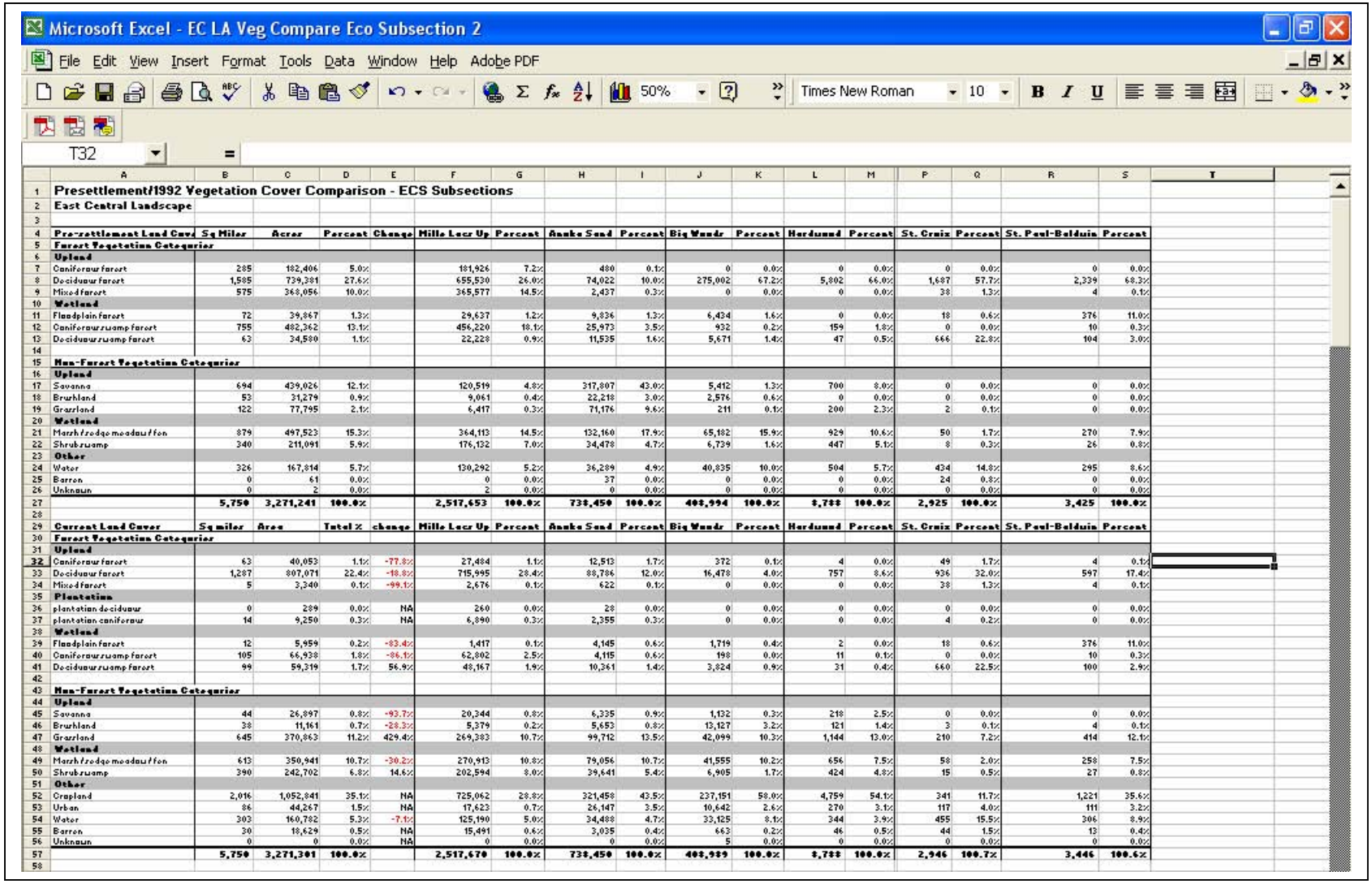
Vegetation cover data for each county in the East Central landscape region is provided in Section 11. To obtain county level vegetation cover GIS data, please contact the MFRC staff (www.frc.state.mn.usT).

Presettlement Vegetation Cover Inventory Map - East Central Landscape



1992 Vegetation Cover Inventory Map - East Central Landscape





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Presettlement/1992 Vegetation Cover Comparison - ECS Subsections

East Central Landscape

Pre-settlement Land Cover	Sq Miles	Acres	Percent	Change	Mille Lacs Up	Percent	Anoka Sand	Percent	Big Woods	Percent	Hardwood	Percent	St. Croix	Percent	St. Paul-Baldwin	Percent
Forest Vegetation Categories																
Upland																
Coniferous forest	285	182,406	5.0%		181,926	7.2%	480	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Deciduous forest	1,585	739,381	27.6%		655,530	26.0%	74,022	10.0%	275,002	67.2%	5,802	66.0%	1,687	57.7%	2,339	68.3%
Mixed forest	575	368,056	10.0%		365,577	14.5%	2,437	0.3%	0	0.0%	0	0.0%	38	1.3%	4	0.1%
Wetland																
Floodplain forest	72	39,867	1.3%		29,637	1.2%	9,836	1.3%	6,434	1.6%	0	0.0%	18	0.6%	376	11.0%
Coniferous swamp forest	755	482,362	13.1%		456,220	18.1%	25,973	3.5%	932	0.2%	159	1.8%	0	0.0%	10	0.3%
Deciduous swamp forest	63	34,580	1.1%		22,228	0.9%	11,535	1.6%	5,671	1.4%	47	0.5%	666	22.8%	104	3.0%
Non-Forest Vegetation Categories																
Upland																
Savanna	694	439,026	12.1%		120,519	4.8%	317,807	43.0%	5,412	1.3%	700	8.0%	0	0.0%	0	0.0%
Brushland	53	31,279	0.9%		9,061	0.4%	22,218	3.0%	2,576	0.6%	0	0.0%	0	0.0%	0	0.0%
Grassland	122	77,795	2.1%		6,417	0.3%	71,176	9.6%	211	0.1%	200	2.3%	2	0.1%	0	0.0%
Wetland																
Marsh/sedge meadow/fen	879	497,523	15.3%		364,113	14.5%	132,160	17.9%	65,182	15.9%	929	10.6%	50	1.7%	270	7.9%
Shrub swamp	340	211,091	5.9%		176,132	7.0%	34,478	4.7%	6,739	1.6%	447	5.1%	8	0.3%	26	0.8%
Other																
Water	326	167,814	5.7%		130,292	5.2%	36,289	4.9%	40,835	10.0%	504	5.7%	434	14.8%	295	8.6%
Barren	0	61	0.0%		0	0.0%	37	0.0%	0	0.0%	0	0.0%	24	0.8%	0	0.0%
Unknown	0	2	0.0%		2	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	5,750	**3,271,241**	**100.0%**		**2,517,653**	**100.0%**	**738,450**	**100.0%**	**408,944**	**100.0%**	**8,788**	**100.0%**	**2,925**	**100.0%**	**3,425**	**100.0%**

Current Land Cover	Sq miles	Area	Total %	change	Mille Lacs Up	Percent	Anoka Sand	Percent	Big Woods	Percent	Hardwood	Percent	St. Croix	Percent	St. Paul-Baldwin	Percent
Forest Vegetation Categories																
Upland																
Coniferous forest	63	40,053	1.1%	-77.8%	27,484	1.1%	12,513	1.7%	372	0.1%	4	0.0%	49	1.7%	4	0.1%
Deciduous forest	1,287	807,071	22.4%	-18.8%	715,995	28.4%	88,786	12.0%	16,478	4.0%	757	8.6%	936	32.0%	597	17.4%
Mixed forest	5	3,340	0.1%	-99.1%	2,676	0.1%	622	0.1%	0	0.0%	0	0.0%	38	1.3%	4	0.1%
Plantation																
plantation deciduous	0	289	0.0%	NA	260	0.0%	28	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
plantation coniferous	14	9,250	0.3%	NA	6,890	0.3%	2,355	0.3%	0	0.0%	0	0.0%	4	0.2%	0	0.0%
Wetland																
Floodplain forest	12	5,959	0.2%	-83.4%	1,417	0.1%	4,145	0.6%	1,719	0.4%	2	0.0%	18	0.6%	376	11.0%
Coniferous swamp forest	105	66,938	1.8%	-86.1%	62,802	2.5%	4,115	0.6%	198	0.0%	11	0.1%	0	0.0%	10	0.3%
Deciduous swamp forest	99	59,319	1.7%	56.9%	48,167	1.9%	10,361	1.4%	3,824	0.9%	31	0.4%	660	22.5%	100	2.9%
Non-Forest Vegetation Categories																
Upland																
Savanna	44	26,897	0.8%	-93.7%	20,344	0.8%	6,335	0.9%	1,132	0.3%	218	2.5%	0	0.0%	0	0.0%
Brushland	38	11,161	0.7%	-28.3%	5,379	0.2%	5,653	0.8%	13,127	3.2%	121	1.4%	3	0.1%	4	0.1%
Grassland	645	370,863	11.2%	429.4%	269,383	10.7%	99,712	13.5%	42,099	10.3%	1,144	13.0%	210	7.2%	414	12.1%
Wetland																
Marsh/sedge meadow/fen	613	350,941	10.7%	-30.2%	270,913	10.8%	79,056	10.7%	41,555	10.2%	656	7.5%	58	2.0%	258	7.5%
Shrub swamp	390	242,702	6.8%	14.6%	202,594	8.0%	39,641	5.4%	6,905	1.7%	424	4.8%	15	0.5%	27	0.8%
Other																
Cropland	2,016	1,052,841	35.1%	NA	725,062	28.8%	321,458	43.5%	237,151	58.0%	4,759	54.1%	341	11.7%	1,221	35.6%
Urban	86	44,267	1.5%	NA	17,623	0.7%	26,147	3.5%	10,642	2.6%	270	3.1%	117	4.0%	111	3.2%
Water	303	160,782	5.3%	-7.1%	125,190	5.0%	34,488	4.7%	33,125	8.1%	344	3.9%	455	15.5%	306	8.9%
Barren	30	18,629	0.5%	NA	15,491	0.6%	3,035	0.4%	663	0.2%	46	0.5%	44	1.5%	13	0.4%
Unknown	0	0	0.0%	NA	0	0.0%	0	0.0%	5	0.0%	0	0.0%	0	0.0%	0	0.0%
	5,750	**3,271,301**	**100.0%**		**2,517,670**	**100.0%**	**738,450**	**100.0%**	**408,939**	**100.0%**	**8,788**	**100.0%**	**2,946**	**100.7%**	**3,446**	**100.6%**

Section 5
Assets and Issues, Resource Trends and Committee Findings

This section provides a summary of the assets and issues, resource trends, and findings made by the East Central Landscape Committee relating to forest resources in the region. It has been organized into four areas or resource initiatives including: 1) Ecological, 2) Economic, 3) Social and 4) Administrative/Coordination/Financial. This section is intended to serve as a foundation for the development of the desired future conditions and policy framework provided in Sections 6 and 7.

Early in the planning process Committee members were asked to individually brainstorm what they considered to be assets and issues relating to ecological, economic, social and administrative aspects of forest management in the region. It should be emphasized that what constituted an asset or an issue was left up to each Committee member at this point in the process. Next, staff compiled input from Committee members into four lists. At a following meeting, committee members were asked to prioritize the lists of assets and issues by selecting the five most important statements in each resource area.

The results from this brainstorming and prioritization process were reviewed and discussed by the Committee at subsequent meeting. In summary, this process was designed to be a starting point for group discussions by the Committee to provide clarity on key issues as well as assets in the region. The process was also used to direct staff on organizing maps and data needed for policy development.

The following narrative starts with the list of assets and issues identified by the Committee. The numbers in parentheses behind each bulleted statement reflects the number of committee members that selected the statement as being one of the five most important assets or issues for that given resource area. A summary of resource trends and committee findings for each of the four resource initiatives follow the prioritized list of assets and issues.

A. Ecological Resource Review: Assets and Issues, Resource Trends and Committee Findings

Assets

- Diverse ecological landscape – variety of forest types. (12)
- State forests, wildlife management areas and county tax forfeit lands – numerous large state and county owned and managed tracts of forestland and wildlife areas. (5)

- Significant water features – Mississippi River, St. Croix River, Mille Lacs Lake, as well regionally and locally significant lakes and rivers. (4)
- Wildlife corridors. (3).
- Two national wildlife refuges – Sherburne and Crane Meadows. (2)
- Large private tracts of land – there are several areas of large privately owned forestlands. (2)
- Wetlands. (1)
- High white pine potential. (1)
- Rare and endangered species – significant populations of red shouldered hawk, Blanding turtle, etc. (1)
- State parks in the region (1).
- U of M Cedar Creek – research land (1).

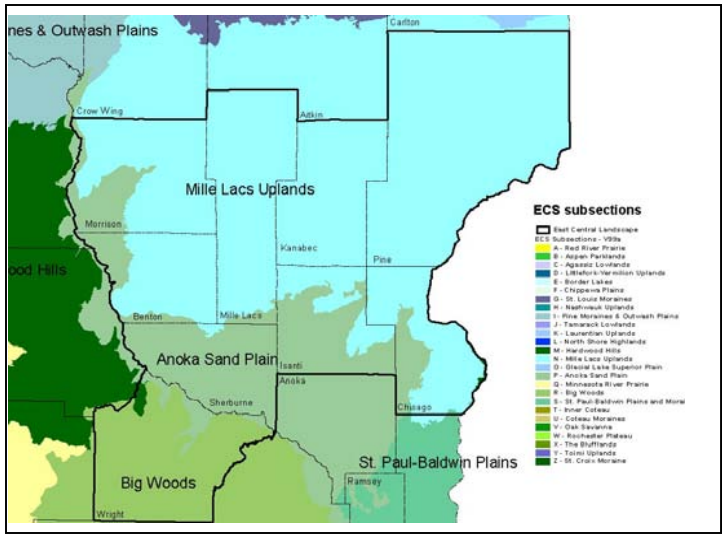
Issues

- Land development pressure – tremendous impacts of development on riparian and upland forests and agricultural lands. (12)
- Habitat fragmentation. (12)
- Disease/forest health – oak wilt, gypsy moth and other diseases and pests. (8)
- Historic land cover changes – the amount of forestland has decreased. (7)
- Deer – increasing deer populations due in part to: a recent series of mild winters increasing over-winter survival, hunting harvest not always able to reduce deer population, and a lack of predation. Current forestry approaches and practices have made it "too" good for the deer causing impacts in tree restoration and under story plant growth. (7)
- Forest quality – the past management of forests in the region has resulted in too much emphasis on aspen. Too much emphasis on trees as crops, not landscape restoration. (6)
- Declining water quality – loss of forestland and riparian buffers affect water quality in the region's lakes, rivers and streams. Land development in the Anoka sand plain can affect a key state groundwater resource. (6)
- Loss of old growth forests – white pine forests, the Big Woods, oak savannas. (5)
- Land cover conversion – prairies and savannas to forests. (5)
- Invasive or exotic species. (3)
- Wetland impacts – the loss of wetlands adjacent to forests and grasslands for wildlife; ditching and tiling. Wetland degradation. Forest harvest on wet soils is causing soil compaction. (2)
- Lack of natural disturbance – especially in pine forests and oak savannas. (2)
- Fire hazards – increasing risks or potential impacts with increasing rural residential development. The fire in a rural residential neighborhood southeast of Princeton in Wednesday, May 5, 2000, is one example. (1)
- ATV impacts. (1)

Key Ecological Resource Trends

Significant Ecological Areas

As one of the guest speakers, Hannah Texler from the DNR Ecological Services gave an ecological overview of the East Central landscape and a summary of the major ecological areas in the landscape and their characteristics (Mille Lacs Uplands, Anoka Sand Plain, the Big Woods, and the Hardwood Hills). The East Central landscape is a very rich region from an ecological standpoint. Within the region there are numerous significant sites of ecologic importance including two national wildlife refuges, six state parks and seven state forests, eight scientific and natural areas, and over ninety wildlife management areas (WMAs) including Carlos Avery and Mille Lacs WMAs. The Cedar Creek Natural History Area is also located in the region. The region also has several nationally significant water features within or traversing its boundaries including the Mississippi River, St. Croix River, and Mille Lacs Lake.



Climate

The 40-degree temperature annual mean growing line bisects through the East Central landscape.

Historical Forestland Cover Analysis

A major reduction in forestland cover has occurred in most of the region over the past 100 years. Based on the presettlement land cover inventory (Marshner), 72 percent or 2.6 million acres of the East Central landscape was in forestland cover type. In 1990, forestland cover amounted to 32 percent or 1.6 million acres of the East Central landscape. The table to the right provides breakdown of this data for each county in the region. As shown on this table, there significant variations in historic forestland cover changes.

County	Presettlement Percent *Forestland	1990 Percent Forestland
Benton	70	12
Chisago	81	28
Isanti	76	27
Kanabec	80	42
Mille Lacs	64	32
Morrison (east part)	66	23
Pine	63	50
Sherburne	28	28
Wright	88	13
East Central Landscape	**72**	**32**

* Excludes Prairie, Wet Prairie, Brush Prairie, Conifer Bogs and Swamps and Lakes.

Wetlands

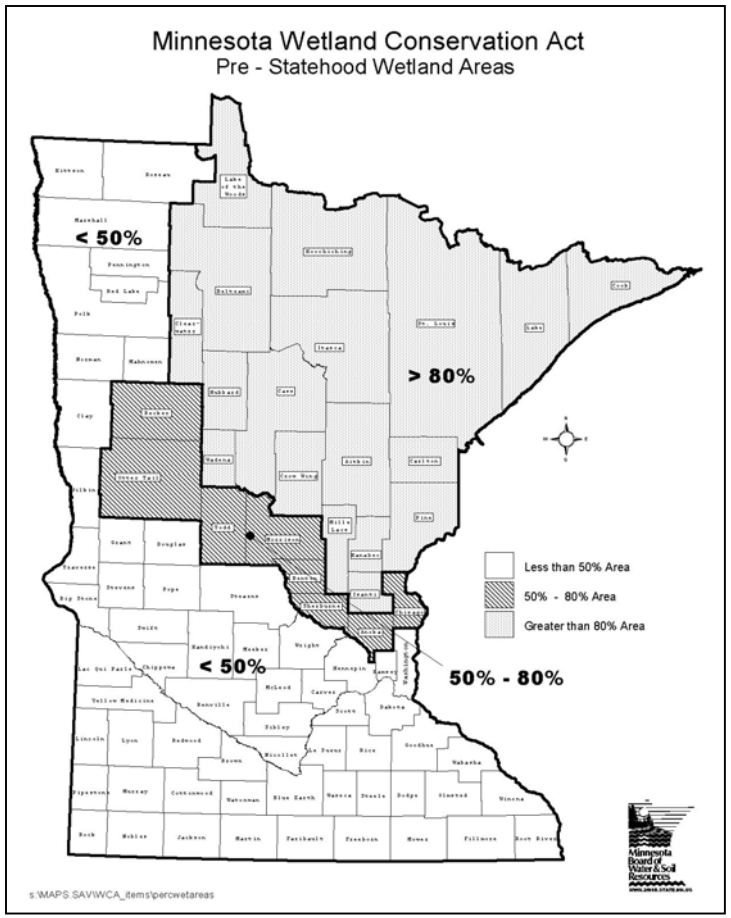
Wetlands, like forestland cover, have also experienced significant reductions in parts of the region over the last 100 years. Almost 25 percent of the landscape was once covered by wetlands (1,350 square miles – Wet Prairie, Brush Prairie, Conifer Bogs and Swamps and Lakes categories from the Marshner data). Today, the amount of wetlands in the region has been reduced to approximately 495 square miles or less than 9 percent of the East Central landscape.

And similar to the varying amounts of changes in forestland at the county level, there are significant variations in the amount of remaining wetlands in the nine counties that make up the East Central landscape.

The map in the right hand margin illustrates the percent of remaining wetlands in Minnesota by county.

Whereas Pine, Kanabec, Mille Lacs and Isanti counties have more than 80 percent of the presettlement wetlands remaining, Morrison, Benton, Sherburne, and Chisago counties have 50 to 80 percent of the original wetlands remaining. In contrast, Wright County has less than 50 percent of its presettlement wetlands. These remaining wetlands categories are important because they determine how the counties are required to administer the Wetlands Conservation Act (WCA).

In comparison to the other MFRC landscapes, the East Central landscape is only region in the state that has counties that fall into all three categories of percent of remaining wetlands. This is reflective of the region's ecological diversity.



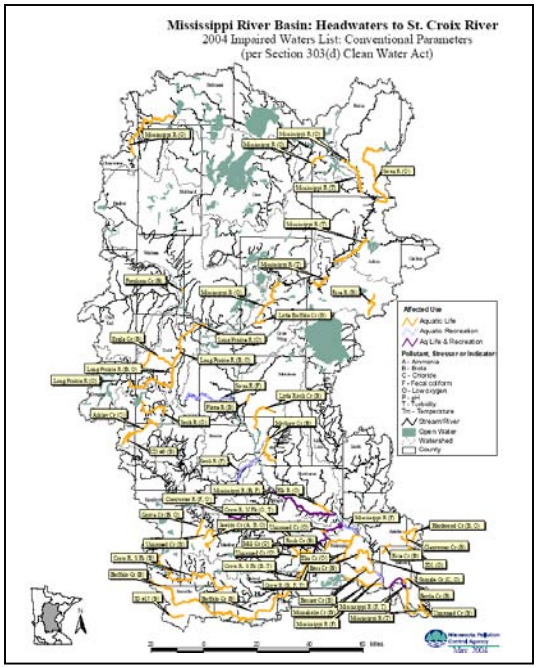
Water Quality

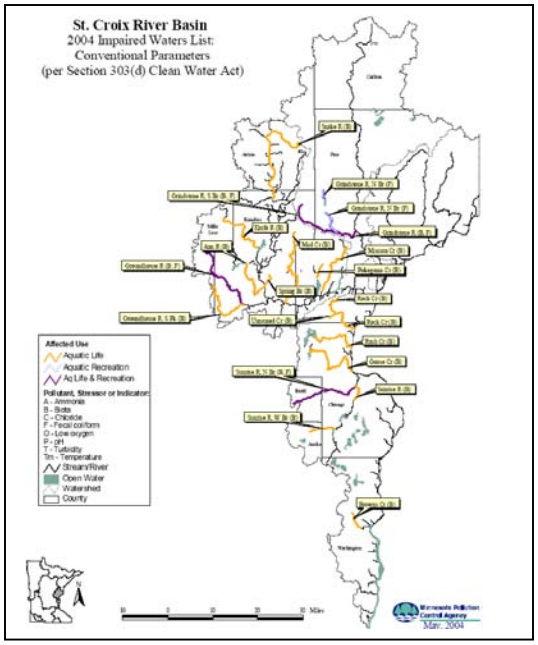
Forestland cover is one of the best filters for treating stormwater runoff over large-scale areas. Removal of forests from a landscape tends to result in degraded water quality.

The Minnesota Pollution Control Agency is the state agency responsible for protecting Minnesota's water quality. A newly invigorated approach to help solve the old problem of water pollution is developing Total Maximum Daily Loads (TMDLs). The federal Clean Water Act requires states to adopt water quality standards to protect the nation's waters. These standards define how much of a pollutant can be in a surface and/or ground water while still allowing it to meet its designated uses, such as for drinking water, fishing, swimming, irrigation or industrial purposes.

The Clean Water Act requires states to publish, every two years, an updated list of streams and lakes that are not meeting their designated uses because of excess pollutants. The list, known as the 303(d) list, is based on violations of water quality standards and is organized by river basin. For each pollutant that causes a water body to fail to meet state water quality standards, the federal Clean Water Act requires the MPCA to conduct a TMDL study. A TMDL study identifies both point and nonpoint sources of each pollutant that fails to meet water quality standards. Water quality sampling and computer modeling determine how much each pollutant source must reduce its contribution to assure the water quality standard is met. Rivers and streams may have several TMDLs, each one determining the limit for a different pollutant.

The two maps in the side bar illustrate the 2004 impaired waters maps for the East Central landscape. One map covers the Upper Mississippi River Basin, which has 12 impaired watercourses in the East Central landscape and the St. Croix Basin, which has 23 impaired watercourses.





Committee Findings On Ecological Resources in the East Central Landscape

- **Diverse and Changing Landscape**. The East Central landscape is the one of the most ecologically diverse landscapes of all the MFRC regions. The forests in this landscape vary from the Big Woods subsection in the southwest portion of the region, to oak savannahs in Anoka Sand Plains in the middle portion, to the mixed conifer and deciduous forests of the Mille Lacs Uplands subsection in northeastern part of the region. The East Central landscape is also one of most dynamic and changing of all the MFRC landscapes in the state. From an historical perspective, over the past 100 or so years, forest harvests and agriculture changed the ecology of the East Central landscape. Today, it is also one of the most rapidly changing landscapes due to land development pressures. Urban, shoreland, and rural residential growth patterns are once again reshaping the landscape and its ecology.
- **Loss of Forestland and Increasing Fragmentation**. Significant reductions in forestland cover have occurred throughout most of the East Central landscape, especially in the counties closest to the Twin Cities Metropolitan Area. Both the historical forest/agriculture land cover conversions and the more recent land development activities have fragmented the size of forested tracts into smaller parcels. There is less deep woods area and more wood fringe.
- **Declining Water Quality**. Both the loss of forestland and more intense use of the land have negatively impacted water quality in the lakes, rivers, streams and wetlands across the landscape. Development around water resources affects both the water resource and the amount and quality of riparian forests.
- **Growing Impacts on Sensitive Lands and Fish and Wildlife Habitat**. Land development and recreational activities are putting increased pressures on sensitive lands (wetlands, steep slopes, soils) including important forestlands in the region. The more intensive recreational activities and land development pressures are also putting pressures on fish and wildlife habitat in the region. Like the forests, wildlife habitat in the region is being fragmented.

B. Economic Resource Review: Assets and Issues, Resource Trends and Committee Findings

Assets

- Private forests – we are beginning to recognize the values of private forests. (5)
- Regional economy – it is growing. Proximity to the Twin Cities. (5)
- Secondary wood products – development of industry, higher value of products, becoming more diversified. (4)
- Regional economic strategy – EC RDC is an approved federal economic development district. The next 5-year plan CEDS, is being developed now. (2)
- Job Opportunity Building Zone – the EC RDC has established 27 JOBZ sites in the 5-county region for business opportunities. (2)
- Economic development partnerships – the EC RDC is open to partnering with the East Central Landscape Committee and the MFRC on forest resource related projects. (2)
- Audubon Center of the North. (1)
- Wild forests – provide "green" paycheck and are a major economic asset. (1)
- State parks – they are local economic drivers. (1)
- Wild and scenic rivers – draw tourists and future residents. (1)

Issues

- Changing land ownership patterns – forestland parcels are decreasing in size. (14)
- Rapidly increasing property values – high land values are encouraging long time landowners to sell their property, this is placing greater economic pressure on forestlands. (12)
- Logger/private landowner interactions – need to inform landowners of the economics of logging, market conditions, changing situations, etc. (8)
- Secondary wood products – the secondary wood products industry is not resource location dependent. (5)
- Local/global economy – the advance of the global economy is affecting businesses in the region. There is less of a dependency on the local economies. (4)
- Primary wood products – need to organize and coordinate public auction timber sales. (2)
- Private consultants – need more interaction with agencies and connection with landowners. (2)
- Income stratification – residents in the region living closer to the Twin Cities have higher the incomes. As you move away from the Twin Cities, incomes tend to be lower. (2)
- Public services – there is an increasing demand on local, county and state public services and recreation facilities. (2)
- Access – there is less access to the forests by individuals as more land develops. (1)
- Liability – liability concerns for landowners are increasing. (1)

Key Economic Resource Trends

Land Ownership

Unlike the MFRC landscape regions to the north, most of the land in the East Central landscape is privately owned. According to the GAP stewardship data shown below, 88 percent of the land in the East Central landscape is privately owned. Less than 1 percent of the landscape is in the private-industrial owned category.

The percent of public lands in each county varies. Generally, the counties located along the western edge of the region and closer to the Twin Cities tended to have lower percentages of publicly owned lands. The counties in the northeastern portion of the landscape had the highest percentages and land area of public lands.

The table below summarizes land ownership data for each county and the East Central landscape overall.

County	Total Area Acres	Public Land	Percent Publicly Owned	Tribal Land	Private Conserv. Land	Private Ind. Land	Private Non-Ind Land	Unknown (private)
Benton	264,243	4,465	1.7	167	0	0	0	259,611
Chisago	283,033	19,878	7.0	0	0	0	0	263,155
Isanti	288,731	10,313	3.6	0	0	1,759	0	276,659
Kanabec	341,293	34,943	10.2	0	10,470	0	0	295,880
Mille Lacs	435,746	68,205	15.7	2,522	9,936	1,182	0	353,901
Morrison (east part)	405,188	27,694	6.8	270	13,742	8,205	0	355,277
Pine	917,106	234,644	25.6	1,116	5,637	7,348	4,419	663,942
Sherburne	288,240	39,325	13.6	0	1,614	6,627	1,130	239,544
Wright	457,188	14,388	3.1	0	2,176	2	0	440,623
East Central Landscape	**3,680,768**	**453,855**	**12.3**	**4,075**	**43,575**	**25,123**	**5,549**	**3,148,592**

Source: GAP Stewardship data.

Private Forestland Management

Statewide, over 147,000 individuals and organizations (excluding industry) own 40 percent of the forests. The DNR Division of Forestry administers the Forest Stewardship Program, which provides technical and financial assistance to non-industrial private forest (NIPF) landowners who own from 20 to 5,000 acres of land. The program has been in operation since 1947 and has

expanded in its service delivery to include sustainable forestry practices and ecosystem management. Over one million acres has been enrolled into this program.

Demand for the Forest Stewardship Program from landowners is higher than the availability of natural resource professionals to prepare plans. Furthermore, budgets for this program over the last four administrations at the state level have all been decreased.

Land Sales and Parcelization

From the presentation by Dr. Mike Kilgore, the **median price per acre** for forestland statewide in 1989 was around $200 an acre. The median value in 2003 increased to $1,000 an acre. The median price per acre for forestland in the East Central landscape closely followed the statewide value with a slightly higher value in 2003 of $1,200 per acre. The value of forestland in the region and most portions of state have skyrocketed over the past decade. In general, the **median parcel size** of forestland sold has decreased in the East Central landscape from approximately 80 acres in 1989 to 68 acres in 2003. Similar trends have happened throughout most of the state.

The study prepared by Dr. Mike Kilgore focused on the sale of forestland and corresponding trends. While more study is needed to identify and establish trends in parcel sizes within each county and the effect of land divisions on forest management, the trend appears that as forestland parcels get smaller, there is less of a desire by landowners to actively manage their forests for harvesting purposes.

Forest Products Industry

The DNR Division of Forestry Utilization and Marketing staff prepares an annual report that summarizes use of forest resources in Minnesota (for more information see the *Minnesota's Forest Resources* report on the DNR website at (www.dnr.state.mn.us/forestry/um/index.html). In 2001, 288 million board feet of sawlogs were harvested and in 2002, there were 2,907,000 cords of pulpwood harvested statewide. An estimated 656,000 cords of fuelwood were cut in 2002 – 2003. The report also summarizes production of veneer, chips, shavings and posts and poles on a statewide basis.

The value of forest products manufacturing shipments made in 2002 was estimated at $6.48 billion. Forest products industries employed approximately 53,200 people in 2001 with an estimated 29,200 in primary processing including logging and 24,000 people employed in secondary manufacturing. The report documented economic trends for several non-traditional industries such as balsam boughs for wreaths (annual sales of $20 million), co-generation energy facilities and others. Presently, there is one large mill in the region, the Liberty Paper Company paper and corrugated recycling plant located in Becker, Minnesota.

In 2002, there were 43 sawmills and primary wood products processors and 64 secondary wood products manufacturers in 2003 located in the East Central landscape. The table to the right provides a breakdown of the primary and secondary wood product industries for each county in the region. The data in this table was gathered by the DNR and reported in two documents: *2002 Minnesota Primary Forest Products Directory* and *Minnesota Secondary Wood Products Manufacturers Directory June 2003*.

County	Sawmills and Primary Processors	Secondary Manufacturers
Benton	5	12
Chisago	7	11
Isanti	3	5
Kanabec	8	2
Mille Lacs	4	5
Morrison (east part)	4	4
Pine	5	6
Sherburne	3	9
Wright	4	10
Total	**43**	**64**

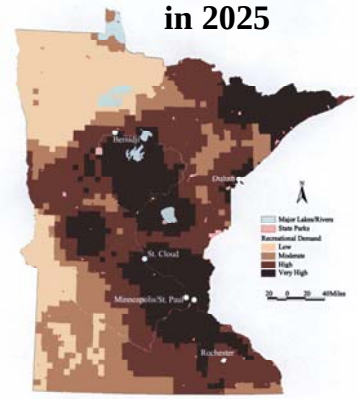
During the planning process, Committee members noted some recent closures of wood products businesses that had been operating in the region. Committee members also expressed concerns about future conditions facing these businesses.

Recreation Demand

In her presentation to the Committee on recreation trends, Dr. Schneider noted that there have been declines in wildlife related recreation particularly in hunting and fishing. She also noted that while snowmobile registrations have leveled off over the last ten years, the number of registered ATVs has increased dramatically from less than 25,000 in 1990 to over 150,000 in 2003. The proximity of the East Central landscape to the Twin Cities metropolitan area and the presence of numerous high amenity areas and natural features make the region very desirable for outdoor enthusiasts.

The map to the right illustrates projected outdoor recreation demand for the year 2025 (DNR). Almost all of the East Central landscape is projected to be in areas of high or very high demand for outdoor recreation in the next twenty years.

Projected Outdoor Recreation Demand in 2025



Source: *Minnesota State Park System Land Study,* Minnesota DNR, Division of Parks & Recreation, April 2000, p. 29

Parkland Inventory

Presently, there is not a comprehensive inventory of all community, county, regional and state parks located in the East Central region nor is there an in depth inventory of forest resources within these parks. As a part of the asset inventory for this planning process, the Committee developed an initial outline of parks in the region as follows:

- Isanti County – over 500 acres on 7-8 units. One of the units is a regional park at 205 acres.
- Chisago County – approximately 700 acres on 10 units. Two of those units are regional at 269 acres.
- Benton County – approximately 400 acres on 3-4 units. One is regional at 289 acres.
- Wright County – over 3,000 acres on 30 + units. Nine of those units are regional at 2,300 acres
- Sherburne County – 400 + acres on 4-5 units. One of those units is regional at 114 acres.

In their discussions regarding the above outline, the Committee noted that the number, acreage, and type of parks varies significantly in the counties. For example, Isanti County is the only county in the region that does not have any state parks or forests. Another matter of discussion by the Committee involved how parks are defined and what public lands should be considered as parks rather than other public lands or uses such as tax forfeit lands or wildlife areas. Each community and county needs to consider what its parks and recreation needs are and what services they should provide for their citizens.

Parks can support a wealth of forest resources and increased opportunities for the public to access woodlands. The Committee felt strongly that parks and the corresponding forests are important to the social and economic well being of residents and visitors alike. The forest resource inventory and assessment maps and data developed for this Plan can be useful to cities, townships and counties as well as state and federal agencies in their efforts to create and/or expand parks and recreation facilities in the East Central landscape.

Committee Findings On Economic Resources in the East Central Landscape

- **Primarily Privately Owned Land**. Most of the land in the East Central landscape is privately owned and managed.
- **Changing Land Use Patterns are Changing Economies**. Land use patterns are changing in the region. Growth and development pressures are expanding from the Twin Cities outward into the nine-county region. Growth pressures are occurring along major corridors and in high amenity areas. Agriculture is declining. The average size of forestland parcels is decreasing. Rural land values are rapidly escalating. The trend for more rural residential development, hobby farms, and other rural land development has generally resulted in less interest by landowners to actively manage their forests for timber production and more towards recreation, leisure, and aesthetics.
- **Budget Cuts to DNR Private Forest Management Programs**. Funding for the Private Forest Management program administered by the DNR Division of Forestry has been cut substantially over the last ten or more years. Committee members repeatedly expressed concerns in this planning process about the lack of technical assistance on forest management to private landowners. More cuts to this program have been proposed for the next biennium. This will only further limit the amount of technical and financial assistance to private landowners.
- **Primary and Secondary Wood Products Industries**. Committee members noted that much of the wood harvested in the region was being shipped to either Wisconsin or to large mills in other parts of the state. The Twin Cities supports a majority of the secondary wood products industry. Committee felt that more efforts are needed to retain and help expand existing wood products industries in the region and support new businesses in the region. The East Central Regional Development Commission in conjunction with the municipalities and the counties are actively promoting economic development opportunities throughout the region. Connecting with their efforts, the Committee could more effectively promote the forest products industry in the region.
- **Niche Markets**. Committee members felt that more efforts should be taken to explore and support niche markets for forest products in the region. The proximity to the Twin Cities market can be an asset to capitalize on.
- **Increasing Demand for Recreation**. Population growth in the region and proximity to the Twin Cities Metro Area are creating more demand for recreation. The forests located throughout the East Central landscape region are attractive recreational destinations. Balancing recreational and aesthetic interests will be increasingly important to forestland managers as well as recreation providers in the region.

C. Social Resource Review: Assets and Issues, Resource Trends and Committee Findings

Assets

- Rural and natural landscape character – there is a strong desire by many landowners in the region to protect open space and rural character. (9)
- Technology – while the effects of technology on people's daily lives have resulted in less time outdoors, technology can create new recreation opportunities. How can we use technology to help get people to enjoy more outdoor activities? (1)
- Time – there still is time. (1)
- Non-profit environmental organizations. (1)
- Master gardeners and volunteer conservationists. (1)

Issues

- Rapid population growth – four of the state's fastest growing counties are located in the East Central landscape. (13)
- Changing recreation demands – increased demands on public forestlands by many groups. Increasing demand on recreation resources and the use of public lands (ATVs, OHV - ORV use and abuse, lack of ATV trails, ATVs and OHVs have created a bad reputation, left a bad taste for landowners. People don't trust the "guy" they don't know anymore). The numbers of hunters and fishermen are going down while the number of wildlife viewers is going up. Increased numbers of retired people are a part of this trend. New landowners are bringing new attitudes toward land ownership and recreation. With the changing population base, access issues to land you don't own, is growing. Loss of a community spirit and sharing of lands for recreation. People and their recreation activities are becoming more detached from the land. There is an increased interest and demand for one-day trips or recreational outings. The number of small resorts is decreasing. (11)
- Changing attitudes – new people are moving into the region. They have non-traditional expectations about the natural resource base, forest, and outdoor recreation. There continues to be an increasing demand for more convenience in our lifestyles. (9)
- Shoreland/riparian development – the continued demand for shoreland development continues to destroy or alter riparian forests, open wetlands, and lakes and stream water quality. (8)
- Lack of awareness – there is a lack of awareness about the importance and benefits of forest resources by the public. The Minnesota mining mentality from the northeast, "all or nothing", has been transferred to how we manage our forests. People want both sides of the management dilemma, more forest products at the same time more protection of the forests. There is a lack of understanding in the history of the forests in Minnesota and their harvest. Need for more education and assistance to private landowners. (8)
- Commuting population – as commuting times in the region have increased, the social capital within the communities in the region has decreased. (6)
- Diverse land ownership goals. (4)

Key Social Resource Trends

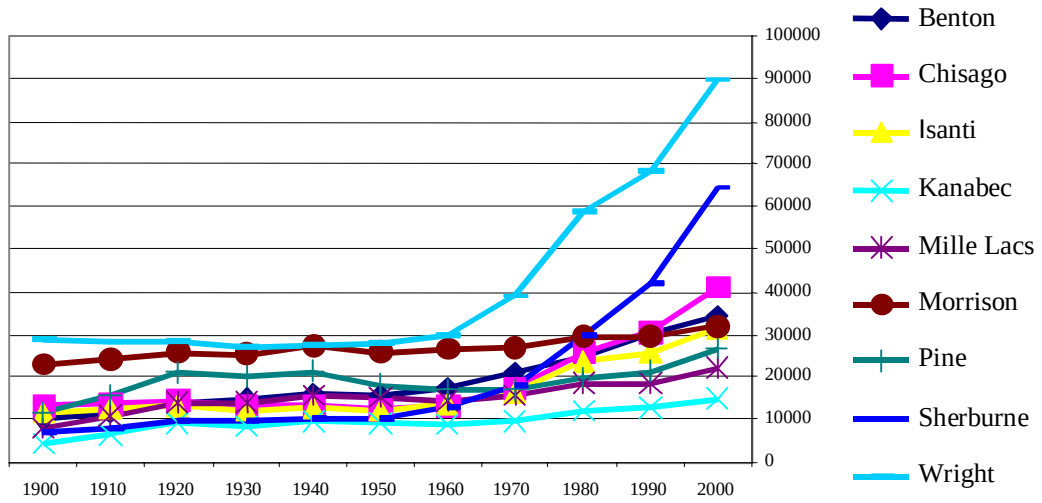
Population Growth Patterns

The U.S. Census Bureau reported in April of 2004 that of the 100 fastest growing counties in the nation over the preceding year, six were located in Minnesota. Four of these six counties are located in the East Central landscape (Wright, Sherburne, Isanti, Chisago).

From a long-term perspective, the counties populations have generally increased modestly but steadily. The table below illustrates this stable growth pattern through 1990. After 1990, population growth rates for most of the counties in the region have increased significantly, with the fastest growth rates in the collar counties of the Twin Cities. Wright and Sherburne counties have had the most rapid growth rates over the past ten and twenty years. More recently, the rate of growth for Benton and Chisago counties has accelerated.

Population Change 1900 to 2000 – Counties in the East Central Landscape

Source: http://www.census.gov/population/cencounts/mn190090.txt



Projected Population Growth

The population of the region is projected to grow over 50 percent by the year 2030 (Minnesota State Demographers Office). The East Central landscape is expected to grow in population by almost 200,000 people by the year 2030.

Over the next two to three decades, Sherburne County is projected to have the greatest rate of population growth (89.3 percent). Morrison County is projected to have the lowest rate of growth (17.2 percent). The table below summarizes population projections for each of the next three decades for all counties in the region. Most counties in the region can expect significant and rapid growth rates over the next ten, twenty and thirty years.

County	2000*	2010	2020	2030	2000 – 2030 % Change
Benton	34,226	39,040	42,590	44,960	31.4
Chisago	41,101	51,660	61,160	69,520	69.1
Isanti	31,287	35,930	39,720	42,370	35.4
Kanabec	14,996	17,850	19,780	21,510	43.4
Mille Lacs	22,330	26,160	30,310	34,160	53.0
Morrison	31,712	33,560	35,580	37,170	17.2
Pine	26,530	30,360	34,370	37,840	42.6
Sherburne	64,417	86,320	105,620	121,920	89.3
Wright	89,986	109,700	126,420	139,020	54.5
Total	**356,585**	**430,580**	**495,550**	**548,470**	**53.8**

Source: LMIC. * 2000 population is from census 2000.

Population Density Trends

An analysis of population density adds the land area component to the demographic assessment for the region and its counties. Since 1970, Sherburne County has increased in population density the greatest of all nine counties. Over the past three decades Morrison County has had the lowest increase in terms of density. The following table documents population densities for each of the nine counties and the region for the years 1970, 1980, 1990 and 2000.

County	1970 Population Per Sq Mile	1980 Population Per Sq Mile	1990 Population Per Sq Mile	2000 Population Per Sq Mile
Benton	51.84	62.65	73.95	83.83
Chisago	41.75	61.38	73.09	98.41
Isanti	37.61	53.88	59.05	71.26
Kanabec	18.65	23.21	24.39	28.57
Mille Lacs	27.50	32.28	32.50	38.87
Morrison	23.91	26.01	26.33	28.20
Pine	11.90	14.05	15.07	18.80
Sherburne	42.56	69.39	96.09	147.64
Wright	57.76	87.06	103.98	136.19

Source: LMIC

Increased Commuting Patterns and Community Fragmentation:
Loss of Social Capital

The average travel times to work in the East Central Region range between just over 20 minutes to almost 35 minutes, compared to the State average of 21.7 minutes. Some of the longest average commute times in Minnesota ranging from 30 to 32 minutes each-occurred in the Greater Minnesota counties of Isanti, Chisago, Kanebec, Pine and Sherburne. These counties are all located between the Twin Cities, Duluth, and St. Cloud.

In his presentation to the East Central Landscape Committee, Dr. William Fleischman from the University of Minnesota Duluth described the increased travel times as one important factor reducing the available social capital to build and maintain good communities and the natural and cultural resources within them.

Table 6 . East Central MN Average Travel Times

	Average travel time to work (minutes)**
Isanti	32.6
Chisago	31.9
Kanabec	31.3
Pine	30.2
Sherburne	29.9
Wright	29.1
Mille Lacs	27.1
Morrison	24.6
Benton	21.1

Source: ** 2000 Census SF3 Profile

Demand for Rural Land for Residential Development

The rural population of counties in the East Central landscape is growing except in Benton and Wright counties where annexations have brought previously rural residential developments into the cities. People that live in the country are increasingly non-farmers. In 1980, the rural farm population for Sherburne County accounted for 10 percent of the rural population base (1,839 people) and the non-farm population was 90 percent or 16,861 persons. In 2000, the non-farm population grew to 35,113 people or 97 percent. The rural farm population declined to 1,217 persons or 3 percent.

County	2000 Total Population	2000 Urban Population	2000 Rural Population	2000 Farm Population	2000 Non-Farm Population
Benton	34,226	20,217	14,009	1,957	12,052
Chisago	41,101	14,611	26,490	1,344	25,146
Isanti	31,287	8,327	22,960	1,570	21,390
Kanabec	14,996	3,084	11,912	1,106	10,806
Mille Lacs	22,330	3,990	18,340	1,290	17,050
Morrison	31,712	9,152	22,560	3,709	18,851
Pine	26,530	3,018	23,512	1,827	21,685
Sherburne	64,417	28,087	36,330	1,217	35,113
Wright	89,986	41,968	48,018	3,286	44,732
East Central Landscape	**356,585**	**132,454**	**224,131**	**17,306**	**206,825**

- Rural Residential Land Demand. Given the projected population increase of 191,885 people and a population per household of 2.5 people per household, a total of 76,754 new housing units will be needed. Where will those new housing units be constructed? What impacts will this growth have on the forests of the East Central landscape?
- An estimated 48,355 new housing units will be built in the rural portions of the East Central landscape by 2030 (assumes the same 63 percent figure rural population divided by the total population in 2000).
- The following land area would be needed assuming average lot sizes (does not include streets, utilities, parks or other community facilities)
  - 1.0 acre lot size – 48,355 acres.
  - 2.5 acre lot size – 120,888 acres.
  - 5.0 acre lot size – 241,775 acres.
  - 10.0 acre lot size – 483,550 acres.
  - 20.0 acre lot size – 967,100 acres.

Generalized Land Use Supply

Forestland covered over 1.1 million acres of the East Central landscape in 1990. Cultivated land covered approximately 1,000,000 acres and pasture/hay/grassland covered over 825,000 acres. These three land covers are the predominant rural land use in the East Central landscape. Combined they cover 83 percent of the region. There were approximately 100,000 acres of urban and rural developed lands in 1990 in the East Central landscape or about 3 percent. Lakes and wetlands cover the remaining portions of the region or about 14 percent. The table below provides the data for the major land use categories at the county level and the region.

County	Forestland	Cultivated Land	Hay/Pasture/ Grass	Urban/Rural Development	Lakes and Wetlands
Benton	32,633	138,321	63,319	9,505	9,925
Chisago	80,524	98,268	57,426	11,514	25,979
Isanti	77,174	103,854	56,889	10,238	18,626
Kanabec	144,910	69,488	67,916	6,432	25,296
Mille Lacs	138,147	42,162	121,710	5,407	126,983
Morrison (east part)	91,426	143,789	99,033	8,869	33,557
Pine	462,545	38,231	227,781	7,378	179,435
Sherburne	81,111	103,157	61,533	12,557	19,902
Wright	58,256	245,886	71,805	24,777	52,171
East Central Landscape	**1,166,726**	**983,156**	**827,412**	**96,677**	**491,874**

Source: 1990 land cover inventory (LMIC)

Obviously, the acres of lakes and wetlands in the region are not available for future development. And while lands within the already developed portions of the urban and rural development will include some redevelopment and consume some of the projected housing units, most of the land for new development, whether for growing cities or rural development, will come from the forestland, cultivated lands and/or hay/pasture/grassland categories. Choices will be made incrementally over the next ten, twenty and thirty years by local land use authorities throughout the East Central landscape as to where and how much land development should occur.

Committee Findings On Social Resources in the East Central Landscape

- **Desire to Maintain Rural Character**. Committee members like many of the citizens in the East Central landscape want to protect the rural character of their communities, forestlands are a primary and critical component to that desired character. Yet citizens, local officials, and resource managers all know that the region is facing rapid population growth. How can a balance between growth and preservation be achieved?
- **Significant Population Growth**. How much growth will there be? The population in all of the counties in the East Central landscape is growing, but not evenly. The counties closest to the Twin Cities are experiencing more rapid growth rates. Counties in the northwestern portion of the region will grow the slowest, but it will still be considerable in comparison to growth experienced in previous decades. Communities along major transportation corridors (Interstate Highways 35 and 94, U.S. Highways 10 and 169, and Minnesota Highways 23, 65 and 95) are growing more rapidly than there neighboring cities.
- **Development Demands on the Forestlands**. Land to support the growing rural, non-farm population base as well as new development in communities across the region will undoubtedly consume forestland as well as other rural land uses in the East Central landscape. There are choices in where and how much land is developed in each county and in each community. Land use decisions made in each jurisdiction will make a difference on the quantity and quality of forests in the region.
- **Better Land Use Planning Through Land Supply and Demand**. Land use decisions for development projects are often politically charged and can be socially divisive matters for many communities. Applying basic land supply and demands planning tools can help local leaders and citizens decide together where and how much development should occur across the landscape can benefit from. Useful information about forests should be a part of these local decision-making processes. Each local unit of government in the East Central landscape should consider the supply of land within its jurisdiction and projected demands as well as an assessment of forests and other natural resources a part of its land use planning efforts.
- **Disconnected Public**. As forestry and natural resource management gets more sophisticated and complex, there becomes more of a gap with lay people on the current science. It appears that there is a declining understanding of natural resources and ecology.
- **Declining Social Capital**. With increased commuting patterns, the social capital of the communities in the region is declining. Citizens in more mobile communities tend to have less time for community service.
- **Declining Community Resources for Good Community Planning**. While local units of government have been managing within their allotted budgets, state budget woes and reductions in local government aid have tightened local budgets. This places added limitations on the willingness of local officials to invest in long range planning. Responding to current needs and dilemmas dictate a more reactive decision-making process. In this social environment, forests across the region and the state will tend to loose out.

D. Administration/Coordination/Financial Resource Review: Assets and Issues, Resource Trends and Committee Findings

Assets

- Extensive research – over the past ten plus years there has been extensive efforts on sustainable forestry and forest management in Minnesota: GEIS, U of MN, NRRI, Extension Service, MN DNR, U.S. Forest Service, Blandin, Governors task forces, etc. (4)
- Legislative framework – there is a legislative mandate to support sustainable forestry (SFRA legislation) and funding. (4)
- Organizational structure – establishment of the MFRC and its staff. (4)
- Voluntary process – the landscape program is a voluntary approach, it has no regulatory authority. (3)
- Landscape committees – broad representation and greater opportunities for dialogue. (2)
- Site level program – the MFRC has adopted an extensive set of site level guidelines. (1)
- Previous landscape plans – five landscape plans have already been completed. (1)
- Good data – natural features, native plant communities and ecologically based forest management is now available. (1)

Issues

- Private lands – the majority of the forests in the East Central landscape are located on privately owned lands. Forestland parcels are decreasing in size. Attitudes toward timber harvest are changing. Different approaches are needed to reach private landowners. Utilization of small lot management. Need to help educate private landowners in managing their forestland. (13)
- Funding – where will funding for projects and programs recommended in the plan come from? How can we make funding more consistent and sustained? (12)
- Commitment – will the state legislature, the MFRC, and the effected stakeholders groups commit to implementing the landscape plan? (11)
- Coordination – Connecting the EC landscape plan with local plans and implementation with regional and state policies and plans. Who is responsible for what, it has not been clear enough in the past? Need better identification of roles and responsibilities (i.e. MN DNR, Feds, county, MFRC, private, etc) (9)
- Awareness – There is a lack of informed citizens and local officials about forest management, sustainability, the landscape program, and the MFRC. NIPF education. (9)
- Restoration efforts/prescribed burning – issues with the administration of burning permits (need to coordinate efforts to avoid loss of work due to confusion with MN DNR and fire marshals over burning permits) to various land use controls to public awareness of the benefits of prescribe burns. (4)
- Fish and wildlife management – how to coordinate with forest management. (3)
- Conflicting goals – within and between agencies and levels of government. (2)

Key Administration/Coordination/Financial Resource Trends

Administration

Since its creation in 1995, the landscape program has been one of the primary programs used by the MFRC to implement the Sustainable Forest Resources Act. And since its creation, the MFRC has made a firm and sustained commitment to the landscape program in the development and approval of the landscape plans.

With the completion of this Plan and the five previously approved MFRC landscape plans, the focus of the landscape program in 2005 and subsequent years is turning to coordination and implementation. Through the budgetary and organizational management process, the MFRC has committed to provide ongoing staff support for the landscape program in the next biennium and beyond.

Coordination

As a part of the landscape planning process, the Committee reviewed and discussed an inventory of existing forest management programs that are provided in the region (see Appendix E). These programs are funded and/or administered by a large number of public agencies and private organizations.

While many of these programs such as the Forest Stewardship Program have had a long tradition of providing service, some programs have been more temporary or short lived in nature. The Committee discussed the need to advocate and help support the delivery of key forest management programs. Further, Committee members noted that many of the programs were not well known by the public or specific stakeholder groups. The Committee identified the need for supporting outreach efforts on an ongoing basis to inform landowners about these programs. The Committee also recognized the changing array of forest programs and that these programs and the available funding will change over the life of this Plan. One of the primary roles of the landscape program is to help coordinate and enhance the delivery of forest programs, most of which are managed by other agencies and organizations.

Financial Resources

During the 2003 – 2004 biennium, $5,000 was budgeted for each of the MFRC landscape regions for coordination and implementation projects. Although relatively small, this budget was designed to be either “seed” money to initiate priority projects or funds to help fill the gaps for projects proposed by stakeholder groups in the regions.

As noted earlier in this section, funding for forestry programs including those administered by the DNR Division of Forestry have experienced repeated budget cuts over the last ten or more years. Committee members expressed concerns about the lack of technical and financial assistance for forest programs in the region.

Committee Findings On Administrative/Coordinative/Financial Resources in the East Central Landscape

- **Declining Public Funding**. Funding levels for many forest management programs in the state have been declining over the last 15 years. Given the long-term nature of forestry, the effects of declining investments into forest resources may not be as readily apparent as cuts in other areas. The Committee believes that more investment into well-conceived and coordinated forest management programs in the region is necessary.
- **Ongoing Need to Facilitate and Enhance Coordination**. The landscape program through its regional committees and interested stakeholder groups can play an increasingly effective role in facilitating and enhancing the coordination and implementation of sustainable forest management programs.
- **Expanding Financial Resources**. Towards the end of the planning process for this Plan, the East Central Woodland Owners Council decided to contribute $1,000 towards coordination and implementation efforts by the Committee. Matched with MFRC funds and other sources, small investments by many groups and organizations can make significant impacts both financially and politically in terms of promoting sustainable forestry in the East Central landscape.

E. Conclusion

Through the resource assessment process described in this section, the Committee has made a direct and intentional effort to give equal consideration to long-term **ecological, economic and social** needs and limits facing the forest resources in the East Central landscape. It has also added consideration to administrative, coordinative and financial aspects.

This work has helped to increase understandings and build a shared perspective on forest resource issues and challenges in the region for the Committee. It should be reviewed by users of the Plan to help them participate more effectively in the implementation of the Plan.

The findings provide a summary of the topics studied by the Committee in this planning process provide a substantial starting point or foundation for developing the policy framework in this Plan. This summary, along with the background studies and research, are intended to provide a logical and rational basis for the policy framework described next, in Sections 6 and 7.

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Section 6
Working Principles and Desired Future Conditions

A. Working Principles

At their meeting in January 2005, the Committee formulated a series of working principles to summarize how they viewed the context of the forests in the East Central landscape over time and how they would recommend interested stakeholders pursue sustainable forest management in the future. The working principles were developed to help provide users of this Plan more perspective as they work with the desired future conditions and the policy framework of goals, objectives and action items. The following summarizes the Committee's working principles:

1. The Committee recognizes that the forests in the East Central landscape in presettlement times were diverse and changing, dependent on climate and natural disturbances along with activities by Native Americans.
2. The Committee recognizes that since the late 1800s, much of the East Central landscape has been significantly altered. The condition and composition of the forests have been changed and often more than once, by a variety of more intensive land use activities from logging to agriculture to urban, shoreland and rural land development. Forestland cover has declined overall in the region but there are varying amounts of reductions of forestland on a county-by-county basis.
3. Although the forests have changed significantly over the past 100 years, the Committee recognizes that there are parts of the landscape in good ecological condition. The remaining native forest types in the region warrant protection while other forests that are not in good condition should be restored.

4. The Committee studied projected growth patterns and realizes that the population of the nine counties in the East Central landscape is going to grow over the next thirty years by over 50 percent. The population growth will generate demand for rural land in one of three general categories: 1) forestland, 2) cropland, or 3) pastures.
5. The Committee recognizes that land use is a matter of local control and that each local unit of government in conjunction with its landowners, works to guide and manage land use activities and land demand or consumption for land development within their jurisdictions. And while land may be developed, the opportunity for forest management will continue to exist. For example, the New England states have both more people and more forests today than at any time in the last 200 years. Community forestry is an important part of the East Central Landscape Plan.
6. The Committee recognizes the continuum of forestry practices and that forest management involves a number of conditions and approaches (old growth forests, success ional forests, extended rotation, plantations, etc.). There are different types of forests for different needs and landowner objectives.
7. The Committee recommends the use of the appropriate modeling tools (land cover, vegetative cover analysis, range of natural variation, etc.) to help make informed decisions about forest management and related natural resource management. While good data is available on public lands, which cover about 12 percent of the landscape, less data is available on forest resources on the private forests that cover almost 90 percent of the nine county region. The availability of data and funding resources will affect the level of modeling detail that can occur within areas of the landscape. The East Central Landscape Committee proposes to enhance resource information across the landscape through a number of coordinated objectives and actions. All stakeholders have roles in enhancing the understanding and knowledge base of the forests in the region.
8. The Committee recommends an ecologically based approach to all land management and development in the region. The Committee recommends the use of the Ecological Classification System (ECS) subsection areas and classifications as a means to guide forest management activities across the landscape. When making recommendations to private landowners or management decisions on public lands, the Committee recommends that all land managers consider presettlement vegetation and the ecological context and promote similar ecological vegetation cover.
9. Through a shared vision and application of these principles, steady progress can be made towards the desired future conditions of forests in the East Central landscape.

B. Desired Future Conditions

The policy framework for the East Central landscape starts with the desired future conditions. These statements are long-range in nature and they are intended to provide an overall sense of direction or perspective in a relatively concise format. A one hundred year horizon was used as the timeframe. The following narrative outlines the desired future condition for the East Central landscape as established by the East Central Landscape Committee.

In approximately one hundred years, the East Central landscape will have:

- *Healthy and Sustained Forests* – forests in the East Central landscape will be healthy and sustained for the long term in an ecologically appropriate manner. The East Central Landscape Committee envisions a forest that 1) moves toward and approximates the historic range of variability for plant communities naturally living and reproducing in east central Minnesota, 2) has spatial patterns including the size and location of openings that are consistent with the ecology of landscape, and 3) provides diverse habitat that maintains natural communities and viable populations for the plant and animal species in east central Minnesota.
- *Improved and Protected Water Quality* – landowners and local units of government will recognize together that healthy forests and wetlands in this landscape are key to protecting good water quality and quantity. Forest and wetland cover will be an integral component to the local or community land use planning process and forest management will be integrated into all water resource initiatives. In one hundred years, there will be no impaired waters in the East Central landscape.
- *Multiple Uses of Forest Resources* – a full range of forest products will be produced in the landscape in a sustainable manner. The landscape will have forests that are attractive to residents, tourists and outdoor enthusiasts for recreational activities. A broad range of recreational opportunities in the forests will be available to the public consistent with the respect for private property rights, the high quality of life enjoyed by residents, and the protection of the natural resource base.

- *Balanced and Managed Land Development* – land use and development across the landscape will be managed in both urban and rural areas so as to respect and sustain healthy forests.
- *Coordinated Collaborative Management* – the planning process for the East Central landscape will have entered into its tenth generation. The coordinated and collaborative management of the forested resources will be thoroughly established. Landowners, local officials, and agency staff will work collaboratively both on the planning and management of the forests to achieve the goals set forth in this plan.
- *High Quality of Life* – people living, working and recreating the East Central landscape will enjoy a high quality of life more closely connected to the forests and the landscape. People will have a greater awareness of the importance of forests from ecological, economic and social perspectives.

As highlighted in Section 4, the amount of land currently in forest cover in each of the six ECS subsections and nine counties varies considerably. So does the amount of forestland land lost or converted to other land uses since Presettlement times. For example, Pine County and the northern portions of Kanabec and Mille Lacs counties have forested lands that are largely intact similar to northern Minnesota. In contrast, significant portions of the Presettlement forests in the southern portions of the region have been cleared for urban or agricultural purposes. These ecological differences across the region will require different forest management approaches in order to achieve the above desired future conditions. The use of analysis tools such as the range of natural variation (RNV) model and other modeling methods will need to consider both the historical and current contexts of the forest resources. Where the RNV model may feasible in the northern portions of the East Central landscape, other modeling tools or approaches will be more applicable in other areas. Furthermore, increasing forestland acreages in the southern portion is more of an immediate goal for the Committee.

The next section of this Plan advances these overarching concepts through a series of goals, objectives, and action items. A set of policy statements has been established for each of the four resource initiatives established by the Committee including:

- Ecological Resource Initiatives.
- Economic Resource Initiatives.
- Social Resource Initiatives.
- Administration/Coordination/Financial Resource Initiatives.

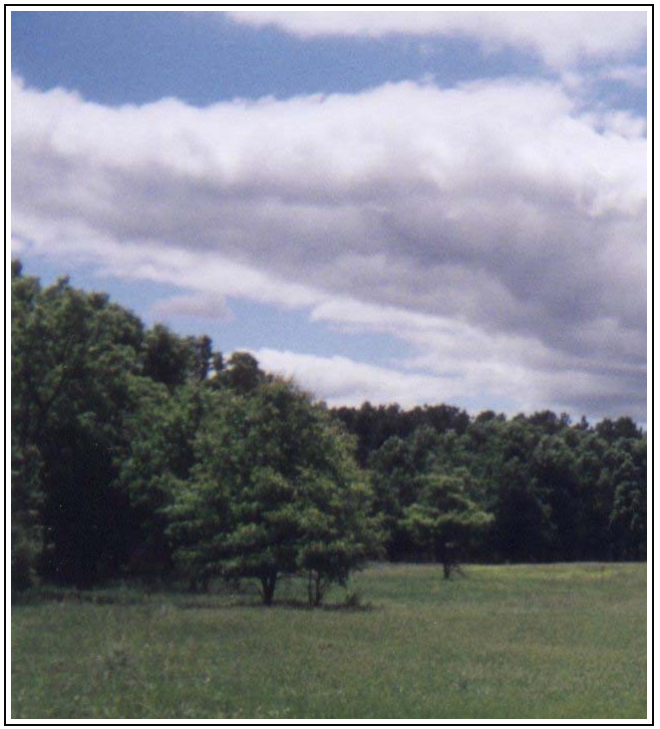
Section 7
Goals, Objectives and Action Items

This section provides a detailed outline on the measures that the Committee proposes to take to promote sustainable forestry throughout the East Central landscape.

A. Ecological Resource Initiatives

From an ecological perspective, the East Central Landscape Committee envisions a landscape that:

- moves toward and approximates the historic range of variability for plant communities naturally living and reproducing in the landscape.
- has spatial patterns (including the size and location of openings) and age class distributions (including old growth) that are consistent with the ecology of the region.
- provides diverse habitat to maintain natural communities and viable populations for forest-related plant and animal species.



Further, the Committee envisions that in the future citizens, landowners and local officials will better understand that healthy forests and wetlands are key to good water quality.

The following ecological goals, objectives, and action items outline the steps the Committee believes are necessary to achieve the desired future conditions:

Goal 1: **Protect Forest Ecosystems**. Protect and maintain the forest ecosystems in the East Central landscape. Make steady progress toward ecologically-based forest management in the East Central landscape.

Rationale:

- Forest harvest, agriculture, and other development activities over the past one hundred years have significantly altered, disrupted, removed and/or destroyed many plant and animal species in the region. For example, less than six (6) percent of the Big Woods deciduous forest cover type that existed in the mid to late 1800s remains today.
- Protecting remaining forest resources before further land development occurs is essential to maintaining biological diversity throughout the region.
- Biological diversity is essential to the ecological and economic health and social well being of the region.

Potential Monitoring Indicators:

- Completion of a regional critical resources inventory.
- Informing the public of the need to protect forest resources.
- Protection of critical sites.

Objective 1: **Identify and Assess Forest Resources**. Identify, assess and document the specific locations of remaining forest resources in the East Central landscape that need protection.

Action Items:

1. CBS. Gather, organize, and map the results from the County Biological Surveys (CBS) for all counties in the landscape. Identify and map old growth forests in the region.
2. RSEA. Complete the Regionally Significant Ecological Areas (RSEA) model for the nine counties in the region.
3. Forest Resources Study. Prepare a study of the forest resources in the landscape based on the CBS and RSEA. Identify and inventory ecologically sensitive areas and existing forests that should be protected in the East Central landscape. Identify the areas in the landscape where the most important high biodiversity sites exits. Organize the results of the study into the following categories: ECS subsections, counties, and municipal levels. Develop specific recommendations for these critical areas to help landowners, local officials and resource agencies implement workable solutions.
4. Distribution. Distribute the report to all counties and municipalities as well as the resource agencies working in the region.
5. Critical Species Lists. Distribute lists of rare and endangered species in the region to local officials for their use and distribution. Identify forest interior species and the habitat needs they have.

Objective 2: **Develop and Implement an Outreach Program**. Develop and implement a targeted communications program to effectively inform the citizens of the region about the importance of protecting forest resources and ways they can protect these resources.

Action Items:

1. Outreach Mailing. Distribute an executive summary of the Forest Resources Report to local groups and organizations representing landowners and businesses in the region.
2. Workshop. Convene a workshop in the region to discuss the results of the RSEA modeling study and the report.
3. Joint Local Government Meetings. Present the highlights of the report and the RSEA to joint local government meetings such as the annual township meetings held in each of the nine counties.
4. Regional Meeting. Convene a regional meeting to bring together local leaders and representatives from conservation organizations to address potential issues relating to conservation protection efforts such as easements, acquisitions, etc.

Objective 3: **Support Private Conservation Projects**. Support efforts to protect critical natural areas, fish and wildlife habitat, and game and non-game populations in forestland areas on **private** lands.

Action Items:

1. Activate Forest Legacy Program. Activate the five Forest Legacy Program (FLP) areas located entirely or partly in the East Central landscape including: 1) Upper St. Croix, 2) Sherburne County, 3) Mille Lacs County, 4) Pine County, and 5) Brainerd Lakes-Walker area.
2. Large Forestland Tracts. Develop an inventory of privately owned large forested tracts in the region.
3. Funding for FLP. Pursue funding to support FLP.
4. Conservation Easement Opportunities. Support efforts to inform non-industrial forest (NIPF) landowners about FLP and other conservation easement programs. Encourage their participation in these programs
5. Land Protection Efforts. Support efforts by local units of government and non profit organizations to accept, administer, enforce, and/or create, conservation easements that contain desirable vegetation types; or find alternative groups or methods that will, where necessary protect the native plant community features regardless of acreage size.

Objective 4: **Support Public Conservation Projects**. Support efforts to protect and enhance critical natural areas, fish and wildlife habitat, and game and non-game populations in forestland areas through **public** acquisition efforts.

Action Items:

1. New WMAs. Work with landowners, local units of government, organizations and the MN DNR to identify and acquire new wildlife management areas where forest resources are high priority.
2. New SNAs. Work with landowners, local units of government, organizations and the MN DNR to identify and acquire new scientific and natural areas where forest resources are high priority.

3. Other Habitat and Conservation Projects. Support efforts and projects by other agencies such as the Minnesota Habitat Partnership, the Metro Wildlife Corridors project, etc. to protect forest resources in the region.

Objective 5: **Support Biological Diversity Projects**. Support and when possible, fund pilot projects and programs that foster native biodiversity in the East Central landscape through the restoration, enhancement, and maintenance of forests and related wetland and grassland ecosystems.

Action Items:

1. East Central Landscape Sustainable Forestry Fund. Explore the creation of a revolving loan fund and/or grant program to help landowners implement unique and highly beneficial pilot projects to promote sustainable forestry practices, biological diversity, and water quality.
2. Project Coordination. Provide coordination services to initiate biological diversity projects and mobilize resources.
3. Technical Assistance. Provide technical assistance to landowners, businesses and interested groups working on biological diversity projects.

Objective 6: **Prevent/Control Non-Native Species**. Support efforts by landowners, the DNR Division of Forestry, Minnesota Department of Agriculture and other agencies to prevent and/or control the spread of non-native plant and animal species.

Action Items:

1. Landowner Awareness. Support efforts by resource agencies to inform landowners in the region of invasive non-native plant and animal species that negatively impact forest resources and ways to prevent and control them.
2. Local Officials. Distribute information to local officials in the region that describe ways to prevent or control the spread invasive plant and animal species that negatively impact forest resources.

Objective 7: **Interconnected Forest Resources**. Promote the interconnection of forests in the region that benefit a full range of wildlife species native to this region. Support the management of healthy and sustained native plant, fish, and wildlife populations in the region's ecosystems.

Action Items:

1. Awareness. Support efforts to increase the awareness of native plant, fish, and animal species in the region and their habitat needs to help promote healthy and sustainable populations.
2. Forest Management Design. Incorporate into the design of forest management practices, strategies that reduce habitat fragmentation and increase underrepresented forest cover types and age classes in the region.
3. Cost Share Programs. Promote programs administered by resource agencies that help private landowners in the region enhance fish and wildlife habitat that support healthy and sustainable populations of native species.

4. Sustainable Management. Assist in the coordination of projects by public land managers to promote healthy and sustained fish and wildlife populations in the region.
5. MCWCS. Support efforts by the DNR and other organizations to develop and implement the Minnesota Comprehensive Wildlife Conservation Strategy (MCWCS) to address species in greatest conservation need.
6. Fish and Wildlife Organizations. Work with groups such as the Trout Unlimited, Minnesota Deer Hunters Association, Minnesota Ornithological Union, Ruffed Grouse Society, National Wild Turkey Federation, Izaak Walton League and others to provide technical and financial assistance that support healthy and sustainable plant, fish and wildlife populations in the region.

Objective 8: **Make Steady Progress**. Make steady and sufficient progress to promoting the use of the Ecological Classification System (ECS) as a management principle and achieving the desired future conditions outlined in this 100-year plan. Assess progress on 10-year intervals.

Action Items:

1. Information. Support efforts by the DNR to distribute information about native plant communities and ECS including documents such as the *Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province*.
2. Monitoring. Support efforts by resource agencies to monitor forestland cover types and compositions in the region on a subsection and county basis.
3. Mapping. Support efforts to maintain and update the mapping of resource inventories and biological surveys.
4. 10-Year Evaluations. Review and evaluate progress made on the desired future conditions and goals established in this Plan.

Goal 2: **Increase Forestland**. Increase the amount of ecologically appropriate forests in the East Central landscape by working with landowners, local units of government, resource agencies and other organizations using the ECS as a guide to forest management activities. Work collaboratively to make steady progress towards achieving this goal.

Rationale:

- Historically, the East Central landscape was 72 percent forested (2,636,160 acres). In the early 1990s, the most current land cover inventory, forested lands covered 32 percent of the landscape or approximately 1.6 million acres of the region.
- The loss of forestland varies in the region with the greatest losses in the Big Woods subsection and in the counties adjacent to the Twin Cities metropolitan area.
- There are many programs already in place that can help increase the amount of sustainable forests in the region.

Potential Monitoring Indicators:

- Mille Lacs Uplands Subsection. Forest vegetation covered over two-thirds of this subsection during Presettlement. Today, the north half is predominately forested, while the southern half is largely covered by cropland and grassland or pasture. The southern half is experiencing more intense land development pressure. There has been a significant loss in mixed forests (from 365,000 acres to 2,700 acres) and large losses of upland conifer forests (from 182,000 acres to 27,000 acres) in the Mille Lacs Uplands subsection. There has been an increase in the amount of deciduous forests since Presettlement (from 656,000 acres to 716,000 acres). Aspen has become a more dominant species. The DNR Mille Lacs Uplands Subsection Forest Resource Management Plan (SFRMP) provides more detailed recommendations for commercial state forested lands in this subsection. The Committee recommends restoration of native forested cover types as follows:
    - Presettlement forest vegetation cover – 68.0 percent (1,711,100 acres).
    - 1992 forest vegetation cover – 34.4 percent (865,700 acres).
    - 2025 forest vegetation cover – 41.1 percent (1,034,700 acres).

Potential Monitoring Indicators (continued):

- Anoka Sand Plain Subsection. Upland deciduous forests along with some red and jack pine fringed the northern edge of this subsection as well as a large block of forestland in the southwestern corner of Isanti County and the eastern part of Sherburne County. White pine grew along rivers and wetlands. The majority of this subsection was covered by oak savanna, wetlands and prairie. In Presettlement times, less than one in five acres was covered by forest vegetation. Today, unlike the other subsections, the area of forestland cover in this subsection is still similar to that in Presettlement times, but the composition of the forests have changed. There has been an increase in conifer cover (from 480 acres to 14,900 acres) and a slight increase in deciduous cover (from 74,000 acres to 88,800 acres). While cropland is the current dominant land use, this subsection is experiencing rapid growth rates and land conversion. The DNR is developing a SFRMP for state managed lands in this subsection. The Committee recognizes the economic and aesthetic decisions by landowners to plant conifers but encourages the planting of ecologically appropriate species as much as possible throughout this subsection. The Committee recommends restoration of native forested cover types as follows:
  - Presettlement forest vegetation cover – 16.8 percent (124,300 acres).
  - 1992 forest vegetation cover – 16.6 percent (122,900 acres).
  - 2025 forest vegetation cover – 16.8 percent (124,300 acres).
- Big Woods Subsection. All of this subsection in the East Central landscape is located in Wright County. The Big Woods subsection is characterized by maple-basswood-elm species. Since Presettlement, there has been a major decrease in deciduous forests in this subsection (from 275,000 acres to 16,500 acres). Today, cropland covers over one-half of the area and like the Anoka Sand Plain, it is experiencing rapid land development. The Committee recommends restoration of native forested cover types as follows:
  - Presettlement forest vegetation cover – 70.4 percent (288,000 acres).
  - 1992 forest vegetation cover – 5.5 percent (22,600 acres).
  - 2025 forest vegetation cover – 18.5 percent (75,680 acres).
- Hardwood Hills Subsection. The portion of this subsection is located in northern Wright County, with the majority of it located to the northwest in the West Central landscape. The land cover transformation since Presettlement for this subsection is similar to that of the Big Woods subsection. It is also experiencing significant pressure from land development. The Committee recommends restoration of native forested cover types as follows:
  - Presettlement forest vegetation cover – 68.3 percent (6,000 acres).
  - 1992 forest vegetation cover – 9.2 percent (800 acres).
  - 2025 forest vegetation cover – 20.9 percent (1,840 acres).

Note: As better data becomes available, the Coordination/Implementation Committee will refine the targets to help achieve the desired future conditions (see Ecological Goal 4, Objective 4).

Objective 1: **Coordinate Reforestation Outreach Programs**. Coordinate and/or support the distribution of information on sustainable forest management and existing forestry programs that can help landowners and managers restore native forests in the East Central landscape. Identify and communicate the economic, ecological and social benefits of healthy and sustained forests to individuals, landowners, businesses, and community leaders in the region. Clarify that the intent of this goal is to stop the permanent loss of forestland in the region. It is not intended to stop the harvest of forest resources or prohibit land development.

Action Items:

1. Landowner Outreach Program. Work with the University of Minnesota Extension Service and College of Natural Resources, DNR, Tree Trust, Minnesota Shade Tree Advisory Committee (MN STAC), Minnesota Logger Education Program (MLEP), Minnesota Forestry Association (MFA) and other organizations to distribute and inform private landowners in the region about sustainable forest management and the variety of programs available to them.
2. Local Officials Program. Periodically distribute information on sustainable forest management to local officials in the region. Work with the Minnesota Association of Townships, League of Minnesota Cities, Association of Minnesota Counties and other similar organizations to maintain a mailing list of local officials in the region.
3. Realtor/Developer Program. Provide information to area, regional and state realtor and developer organizations about the benefits of sustainable forest management and programs currently available.

Objective 2: Support Private Forestland Management. Support the development and implementation of sustainable forest management programs and projects on **all** private lands in the East Central landscape. Support the coordination of existing programs and encourage the development of new programs where gaps exist. Encourage the reforestation of historically forested lands in the region.

Action Items:

1. Forest Stewardship Program. Work with the DNR Division of Forestry on an ongoing basis to encourage NIPF landowners (owning 20 to 1,000 acres) to participate in the Forest Stewardship Program.
2. Small Parcel Land Management Program. Create and implement a program to work with landowners owning up to 20 acres of land and encourage sustainable forest management. Work with counties to develop mailing lists of these types of landowners starting with those owning lands in critical forested areas defined in the modeling efforts (see Ecological Goal 1 – Objective 1). Advocate the sharing of ecologically based management concepts. Ensure that persons providing technical assistance to landowners are knowledgeable about sustainable forest management concepts.
3. Current Stewardship Plan Holders. Support efforts to distribute information about new technical services and financial assistance programs for sustainable forest management to current stewardship plan holders.

4. Forestry Consultants. Support and coordinate the distribution of the East Central Forestry Consultants List that includes agency and private consulting foresters in the region who can prepare stewardship plans for NIPF landowners. Place the list on the MFRC web site.
5. NIPF Landowner/Logger Coordination and Assistance. Work with the DNR Division of Forestry, Minnesota Forestry Association (MFA), Minnesota Logger Education Program (MLEP) and Minnesota Forest Industries (MFI) to assist in the coordination of connecting NIPF landowners and loggers operating in the region.
6. MFI Landowner Handbook. Promote the distribution and use of the Landowner Handbook developed by MFI.
7. Cost Share Programs. Maintain a list of forest cost share programs and contacts for each county in the region. Support the ongoing distribution of the list to local officials in the region and place the information on the MFRC web site.
8. Minnesota SWCD Tree Handbook. Make copies of the handbook published by the Minnesota SWCD Forestry Association on tree planting available to landowners and local officials in the region.
9. Forest Management Courses. Assist in the distribution of information materials that describe courses offered in education programs such as the Woodland Advisors program to NIPF landowners in the region on an ongoing basis (see Administration/Coordination Goal 2).
10. Sustainable Forest Certification Assistance. Support efforts to promote forest certification on NIPF lands in the region.
11. Existing Forestland Property Tax Programs. Distribute information on existing forestland property tax programs such as the Sustainable Forestry Incentives Act (SFIA) to eligible landowners (provides incentives to landowners using stewardship plans to provide a basis for sound management).
12. Recommendations to MFRC for NIPF Landowners. Periodically make recommendations to the MFRC and the Legislature that promote sustainable forest management on NIPF lands (sales tax exemption for certified wood products sold from NIPF lands, property tax and/or income credits for sustainable forestry/water quality projects, etc.).

Objective 3: **Support Public Forestland Management**. Support the development and implementation of sustainable forest management on all public lands. Encourage that all public forestland plans adopt desired future conditions and goals and strategies that are consistent with this Plan. Support efforts by public land managers that make steady progress towards meeting the vegetative and age class goals developed for the East Central landscape. Ensure that the Natural Heritage Database maintained by the DNR Ecological Services is consulted in the development of public forestland management plans and that site level guidelines are followed on all public lands in the region. Encourage the reforestation of historically forested lands. Encourage the long-term reversal of forestland fragmentation and the implementation of patch management practices to increase connectivity starting with public forestlands in the region.

Action Items:

1. DNR Subsection Planning. Work with the DNR Division of Forestry to develop, implement and/or maintain the subsection plans for the ecological subsections in the East Central landscape (Mille Lacs Uplands, Anoka Sand Plain, Big Woods, Hardwood Hills).
2. State Forests, Parks, and Wildlife Management Areas. Work with the appropriate DNR divisions to develop, implement and/or maintain plans for the state forests, parks, and wildlife management areas that are consistent with the sustainable forestry concepts outlined in this Plan.
3. National Wildlife Refuges. Participate in the planning processes for federal lands in the region including the Sherburne and Crane Meadows National Wildlife Refuges, waterfowl production areas and other federal lands.
4. Mille Lacs Band. Support efforts by the Mille Lacs Band to develop, implement and/or maintain forest management plans that incorporate sustainable forest management practices and concepts in this Plan.
5. County Forests. Support efforts by counties in the region to develop, implement and/or maintain forest management plans that incorporate sustainable forest management practices and concepts in this Plan. Support the inventory of state school trust lands in each county and distribute information on state statutes regarding memorial forests to local officials and organizations.
6. Municipal Forests. Encourage cities and townships to manage their public forestlands in ways consistent with this Plan.

Goal 3: **Improve Water Quality**. Improve water quality in the East Central landscape through forest management.

Rationale:

- Forestland cover is one of the best filters for treating stormwater runoff over large-scale areas. Removal of forests from a landscape tends to result in degraded water quality.
- The Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants. The list, known as the 303(d) list, is based on violations of water quality standards and is organized by river basin.
- Within the East Central landscape, the 2004 impaired waters list includes 12 impaired water courses for the Upper Mississippi River Basin and 23 impaired water courses in the St. Croix Basin.

Potential Monitoring Indicators:

- Sustainable forest management policies in county water plans.
- Restoration of forested riparian corridors.
- Number of impaired water features in the East Central landscape.

Objective 1: **Integrate Forest/Watershed Management**. Facilitate and support forest management into water resource management integration on a watershed basis.

Action Items:

1. County Water Planning. Assist counties in integrating sustainable forest management concepts and principles into their water management plans.
2. Water Quality. Provide information to water resource managers representing local units of government, counties, tribes and local organizations on the benefits of forest in relation to water quality.
3. Watershed/Forestry Projects. Support water quality and other watershed based type projects that promote sustainable forest management practices.
4. Water Quality Education Programs. Participate in water quality education programs and share information on the benefits of forests in relation to water quality.
5. Shoreland Restoration/Protection. Support shoreland restoration projects that promote sustainable forest management practices. Provide information on sustainable forestry to existing water resource management programs such as the county water management program, watershed districts, lake management programs, etc. Encourage landowners and local units of government to find ways to protect existing forest resources in shoreland areas.

Objective 2: **Identify Critical Riparian Areas**. Identify important riparian areas in the East Central landscape that are important to water quality and forest management.

Action Items:

1. Inventory. Support the preparation of an inventory of all riparian areas in the landscape and the vegetated conditions they are in.
2. Assessment. Work with water resource managers to assess the quality of the riparian areas.
3. Priority Areas. Identify priority riparian areas where forest management would be beneficial to water quality, fisheries, wildlife, etc.

Objective 3: **Implement Revised Site Level Guidelines**. Support efforts by the MFRC site level program to implement the revised guidelines.

Action Items:

1. Distribute Guidelines. Assist in distributing the revised site level guidelines to resource managers and appropriate local officials working in the landscape.
2. Executive Summary. Distribute the executive summary for the guidelines to interested landowners and organizations in the region.
3. Workshop. Convene a workshop that presents riparian guidelines to resource managers, community leaders and landowners in the region.
4. Riparian Projects. Support forested riparian restoration projects based on priorities established by the Committee.
5. Forest Best Management Practices. Support the distribution of forest best management practices to landowners and local officials working in the region.

Goal 4: **Advance Forest Resource Knowledge**. Increase the knowledge and understanding of forest resources within the East Central landscape to help craft better policies and management strategies in the future.

Rationale:

- Over the past 100 years, the East Central landscape has been changed significantly, first from the timber harvests of the late 1800s and early 1900s, and second from the expansion of agriculture in much of the 20th century. More recently, the region is experiencing rapid population growth. These two waves of social and economic progress have reduced the quality and quantity of forests in the region.
- Describing first, and then getting consensus on, what changes have occurred to the forests is very difficult.
- There are forest models and monitoring programs that can more thoroughly describe the context of past and present forest conditions. Better understanding on the part of private forest landowners, local officials and agency personnel will be needed in the future to properly promote sustainable forest management in the region.

Potential Monitoring Indicators:

- Changes in forest patch size.
- Adoption of county level forest management plans.
- Regular and ongoing monitoring.

Objective 1: **Develop Forest Spatial Analyses**. Develop a detailed assessment of the past and existing spatial patterns of the major forested areas in the East Central landscape on a county-by-county basis.

Action Items:

1. Forest Patterns Spatial Analysis. Coordinate the development of a spatial analysis study of the past and existing forest patterns for each county.
2. Study. Prepare a study that summarizes the results of the forest spatial analyses.
3. Distribution/Review. Distribute the study to local units of government, counties, tribes, and other local organizations in the landscape. Meet with resource managers from these local organizations to review and discuss the results of the spatial analysis.

Objective 2: **Support Cooperative Forest Planning Processes**. Develop a cooperative forest planning program for local units of government, counties, tribes, and other local organizations in the region to develop forest management plans.

Action Items:

1. Initial Coordination Meeting. Meet with representatives from local organizations in the region interested in forest management to introduce the proposed cooperative forest planning effort.

2. Conceptual Model. Prepare a conceptual forest management plan using the Detailed Forest Spatial Analyses and the information prepared for this Plan.
3. Pilot Project. Work with a local organization on a voluntary basis to initiate the cooperative forest planning process.
4. Technical Assistance. Provide technical assistance to local organizations as they prepare their forest management plans. Develop a list of services that the MFRC and other agencies can provide to local organizations interested in sustainable forest management.
5. Vegetation Restoration. Provide information about the benefits of restoring native vegetation to the landscape and ways that local organizations can support sustainable forestry.
6. Financial Assistance. When possible, provide financial assistance to local organizations to help them prepare their plans. Maintain a list of alternative funding sources that local organizations could use to develop forest management plans.

Objective 3: **Forestland Cover Monitoring**. Monitor the amount and extent of public and private forestland in the East Central landscape on a county-by-county basis.

Action Items:

1. Forestland Inventory. Coordinate the inventory of public and private forestland in the East Central landscape on a county-by-county basis. Use FIA, DNR and other sources.
2. Fragmentation and Connectivity Monitoring. Work with DNR Division of Forestry and other resource agencies to monitor forest fragmentation and connectivity trends at each of the three geographic levels.
3. Reports. Prepare a brief outline that that documents forestland land cover for the region, the three subsections and each county on a periodic basis.
4. Report Distribution. Distribute the report to the counties and the resource managers working in the region.

Objective 4: **Vegetation Restoration Acreage and Age Class Targets**. Develop vegetation restoration and age class targets in acres for the following levels: 1) the East Central landscape, 2) the three major subsections (Mille Lacs, Anoka Sand Plains, and Big Woods) and 3) each of the nine counties.

Action Items:

1. Forest Vegetation Categories. Develop acreage and age class targets for each of the forest vegetation categories for the years 2025, 2050, and 2100.
2. Non-forest Vegetation Categories. Develop acreage targets for each of the non-forest vegetation categories for the years 2025, 2050, and 2100.
3. Committee Review. Review the targets with the Implementation Committee.
4. Plan Update. Update this Plan to include these targets when they become available.

B. Economic Resource Initiatives

From an economic perspective, the East Central Landscape Committee envisions a landscape that:

- produces a full range of economically viable forest products which complement the current and future needs of the primary and secondary forest product industries.
- has well planned land development that respects forest resources throughout the landscape, both urban and rural.
- has forests that are attractive to residents, tourists and outdoor recreationalists.
- supports private forest landowners in their efforts to manage forests and other natural resources.

The following economic goals, objectives, and action items outline the steps that the Committee believes are necessary to achieve the desired future conditions:

Goal 1: **Timber Productivity and Utilization**. Promote sustainable timber production that will ensure an adequate supply of timber resources suitable for local, regional and state industries. Encourage the expanded use of forest products harvested from the East Central landscape in a sustainable manner. Foster the increased diversity of forest products harvested and produced in the region including secondary forest products industry and niche markets.

Rationale:

- In 2001, forest product manufacturing in Minnesota accounts for almost $7 billion and employed 55,000 people. One-half of these jobs are located in the Twin Cities metropolitan area.
- The global economy is changing the forest products industry in the state and the East Central region. Since 2000, the state's primary forest-based industries have cut production and over 1,000 jobs due to machine shutdowns and disinvestment.
- As reported in the UMD socio-economic study, forest and wood products industries are well represented in the East Central landscape. These industries are more proportionally represented in the region's economy than elsewhere in the state.

Potential Monitoring Indicators:

- Value of primary forest products produced in the region.
- Value of secondary forest products produced in the region.
- Sustainable inventory of timber products.

Objective 1: **Improve Forest Productivity**. Support efforts by the DNR Division of Forestry and other resource agencies to work with landowners, foresters, loggers, agencies, and others in the wood products industry to improve forest productivity consistent with landowner objectives and ecological goals in this Plan.

Action Items:

1. Site-Level Productivity. Advocate the use of Forest Stewardship plans and the Site Level Guidelines to maximize timber harvests while at the same time minimizing impacts to the site.
2. Road Access Projects. Support efforts to coordinate shared road access to help minimize costs for timber harvests and other forest management activities.
3. Coordinated Timber Harvests. Assist in the coordination of timber harvesting between public resource agencies and private landowners. Review the DNR work plans for timber harvests in the landscape with the East Central Implementation Committee on a periodic basis (see Goal 1 under Administration/Coordination/Financial Resource Initiative).
4. Research Programs for Private Forest Management. Explore and research programs in other states that result in sustainable forest management and forest productivity on private lands.

Objective 2: **Support Forest Health, Stand Improvement, Regeneration and Reforestation**. Support efforts by the DNR Division of Forestry and other resource agencies to work with landowners to maintain and improve forest health, improvement and regeneration and the control invasive species and diseases.

Action Items:

1. Forest Health Education. Support, co-sponsor and/or assist organizing workshops held on a periodic basis to inform landowners on the impacts of forest insects and diseases. Support and promote forest health programs administered by the DNR and other resource agencies.
2. Forest Stand Improvements. Support, co-sponsor and/or assist workshops held on a periodic basis to inform landowners on techniques and methods for improving forest stands. Support and promote forest stand improvement programs administered by the DNR and other resource agencies. Refer to strategies developed in the DNR subsection plans for forest stand improvement and timber productivity.
3. Regeneration/Reforestation Programs. Support, co-sponsor and/or assist workshops that inform landowners on regeneration/reforestation techniques and practices. Support and promote regeneration/reforestation programs administered by the DNR and other resource agencies that are consistent with the goals in this Plan.

Objective 3: **Deer Management**. Work with the DNR Division of Fish and Wildlife, Section of Wildlife, to address the impacts that deer have on forests.

Action Items:

1. Deer Management Education. Educate people about the impacts that too high deer populations have on forest resources.
2. Deer and Wildlife Complaints. Work with DNR Area Wildlife Managers, Conservation Officers, and local public officials to track complaints and concerns regarding deer related impact/damage to forest resources.
3. Deer Browse Protection. Support and advocate methods that minimize or limit the impacts of deer browsing on forests (bud capping, repellants, fencing, wire cages, etc.
4. Deer Populations. Support the appropriate lowering of deer populations where deer browsing is impacting forests. If necessary, support legislative initiatives to enhance the management of deer populations by the DNR Division of Fish and Wildlife.

Objective 4: **Research and Development**. Support research and development projects that can promote sustainable forest management specific to the East Central landscape.

Action Items:

1. Research Projects. Support and coordinate research projects specific to the East Central landscape that promote sustainable forest management.
2. Plantations. Develop an inventory of coniferous and deciduous plantations in the region.

Objective 5: **Develop Markets and Enhance Utilization.** Support efforts to develop and/or expand wood product markets and utilization of forest resources from the East Central landscape. Concentrate economic development efforts on expanding the secondary forest products industry and niche markets.

Action Items:

1. Utilization and Marketing. Work with the DNR Division of Forestry to communicate to forest products businesses in the region, new technologies that apply to lesser-utilized species and identify potential markets.
2. Specialty Forest Products. Support the creation of value added forest product businesses.
3. Regional Coordination and Partnerships. Work with organizations such as the East Central Regional Development Commission, Minnesota Department of Employment and Economic Development (DEED) and other economic development organizations to promote and coordinate forest related economic development opportunities in the East Central landscape.
4. CEDS. Participate in the development and implementation of the Comprehensive Economic Development Strategy (CEDS) administered by the East Central Regional Development Commission (EC RDC), and support the implementation of opportunities for expanding forest products industries in the region.

Objective 6: **Monitor the Regional Forest Economy**. Distribute information regarding the region's forest products economy on a regular and ongoing basis.

Action Items:

1. Annual Landscape Economy Report. Collect and organize regional and state data regarding the forest products industry from the DNR Division of Forestry, Minnesota Department of Employment and Economic Development (DEED), and other organizations. Develop a brief report that summarizes the major forest products economic trends. Include data on stumpage prices at the county level. When available, document information at the county level or areas within counties. Coordinate the landscape level report with annual reporting maintained by the DNR Division of Forestry and other interested agencies.
2. Distribution. Distribute the report to forest landowners, loggers, industry, local officials, and forestland managers working in the region.
3. Market Utilization Studies. Collect and distribute market utilization studies to members of the East Central Implementation Committee.
4. Presentations. Invite economists from DEED, University of Minnesota and other organizations to make presentations on trends and challenges facing the global, state and regional forest products economies. Convene meetings between the speakers with East Central Implementation Committee, local officials, landowners, foresters, loggers, industry representatives and other interested stakeholders.

Goal 2: **Balance and Manage Growth with Resource Protection**. Encourage the integration of sustainable forest management into local land use planning and implementation and local decision-making processes throughout the East Central landscape.

Rationale:

- The region is experiencing tremendous growth and land development pressures.
- Over the next thirty years the region is projected to grow by almost 200,000 people or an increase of over 50 percent.
- With 88 percent of the land in the East Central landscape privately owned, the integration of sustainable forest management concepts into local land use planning and implementation will be critical to the future forests in the landscape.

Potential Monitoring Indicators:

- Forestry elements in county and municipal comprehensive plans.
- Forest protection provisions in local ordinances.
- Number of Forest Stewardship Plans completed, acres covered by plans and percent of recommendations implemented.
- Use of forest best management practices and site level guidelines by landowners in the region.

Objective 1: **County and Community Planning**. Support and advocate sustainable forest management concepts through local land use planning and private land development in the East Central landscape.

Action Items:

1. Forest Resource Maps and Data. Provide forest resource maps and data to the nine counties and communities in the East Central landscape for use in their comprehensive planning processes.
2. Guide to Using Natural Resource Information. Work the DNR Ecological Services to promote the use of the "Guide to Using Natural Resource Information" handbook and CD by local units of government in the region as a part of their land use planning efforts.
3. Natural Heritage Database. Encourage local units of government to work with the DNR Ecological Services to use and interpret data collected for the Natural Heritage Database.
4. Firewise. Support the incorporation of forest fire management concepts developed for the Firewise program in local and county land use planning processes.
5. Example Forest Policy Statements. Distribute sample language relating to sustainable forestry for local governments to consider when developing their long range plans. Encourage policies that discourage forest fragmentation.
6. Forest Land Use Category. Advocate that counties and communities consider creating a forestland use category in their policies and on their land use plans.
7. Conservation Easements Strategy. Encourage local units of government to discuss conservation easements in conjunction with their land use planning as an optional tool for guiding and managing land within their jurisdiction.

Objective 2: **Implementation of County and Community Plans**. Support and advocate sustainable forest management practices through the implementation of local plans and private land development in the East Central landscape. Encourage communities to create incentives and education that promote sustainable forestry in the land development approval process. Promote the use of conservation subdivisions, cluster development and other sustainable land development approaches throughout the region.

Action Items:

1. Site Level Guidelines. Distribute information from the MFRC Site Level Guidelines to local units of government for their use in working with landowners and developers who are developing lands within their jurisdictions.
2. Forestry BMPs. Distribute information regarding forestry best management practices to local officials, developers and landowners.
3. Firewise. Support the distribution of information describing the Firewise program administered by the DNR Division of Forestry including materials for homeowners; developers, landscapers and contractors; and local officials. Include information of yard vegetation maintenance, planting guidelines and other site level considerations.
4. Model Subdivision Regulation Provisions. Develop and distribute portions of model subdivision regulations that guide land development in ways that protect forest resources and encourage the retaining of as many trees as possible. Encourage the adoption of ordinances that allow conservation subdivisions and other resource conservation approaches. Provide examples of incentive-based practices in subdivision regulations to help encourage sustainable forest management.
5. Model Zoning Ordinance Provisions. Develop and distribute portions of model zoning ordinances that guide land use in ways that protect forest resources. Encourage the adoption of ordinances that protect significant or sensitive forest resources (old growth forests, riparian forests, etc.) Provide examples of incentive-based practices in zoning ordinances to help encourage sustainable forest management.
6. Forestry Based Zoning Districts. Encourage local units of government to consider developing zoning districts where forestry and conservation uses are the primary land uses intended for that district. Encourage the consideration of a minimum parcel size of 40 acres or larger. This type of district could be similar to the way some counties have developed agricultural zoning districts and could provide one way to help protect areas of large privately owned forested tracts of land.
7. Site Planning Concepts. Distribute information and documents that illustrate techniques such as planned unit developments, conservation subdivisions, etc. that landowners and developers can use to help protect forest resources on their property while still allowing for development. Collect and organize examples of projects that have incorporated sustainable forestry practices into the site development.

Goal 3: Promote Forestry-Based Recreation/Tourism. Promote forests in the East Central landscape that are attractive to a broad array of recreational and tourism opportunities.

Rationale:

- Forest based tourism and recreation generated over $523 million in 2001 statewide.
- The DNR has projected that much of the region will be in the high to very high categories for recreation demand by the year 2025 due to the close proximity of the East Central landscape to the Twin Cities metropolitan area and the amenities within the region.
- While recreation and tourism provide a substantial part to the region's economy, they also place burdens on natural resources, including forests.

Potential Monitoring Indicators:

- Annual revenues generated in the region from tourism and recreation.
- Use of state forests, state parks, and wildlife management areas, number of visitor days.
- Number and type of complaints generated by off highway vehicles (OHV) relating to forest management.

Objective 1: **Increase Public Awareness**. Develop and/or distribute information about the benefits that forests provide to tourism and recreation in the East Central landscape as well as the impacts users cause. Explore ways to increase the public's awareness of sustainable forestry by connecting with people that are touring and recreating in the region.

Action Items:

1. MFRC Website. Develop statistical information that describes the benefits of recreation and tourism in the East Central landscape for the MFRC web site (landscape program). Organize and develop information that describes the major impacts that recreation activities can cause and ways users can help protect forest resources. Request tourism and recreation service providers to create links to the MFRC web site.
2. State Parks/Forest Visitors. Collect and organize information about the MFRC landscape program, benefits of forests for recreation, and tips on ways for visitors and recreationalists to minimize their impacts on forest resources. Distribute the information resources at state parks and forests in the region.
3. Signage. Support the installation of signage on specific sites managed by tourism and recreation service providers in the region that use sustainable forest management practices.

4. Sportsmen/Hunters/Landowner Groups. Collect, organize and distribute information to sporting, outdoor and landowner organizations in the region about the benefit of forests for recreation activities and ways to minimize impacts on forests.

Objective 2: **Recreation Planning**. Support recreational planning efforts by the DNR, counties and municipalities to plan for future recreation systems in the region. Encourage the integration of sustainable forest management practices in the local, county, regional, and state park planning and implementation programs.

Action Items:

1. Inventory of Public Parklands. Assist in the development of a comprehensive inventory of parklands in the region and the inventory of forest resources within these parks. Make the data and maps from the inventory available to local officials, resource agencies, conservation organizations, and the general public.
2. Inventory of State School Trust Lands. Assist in the development of an inventory of state school trust lands in each county in the East Central landscape. Document the inventory on a township basis. Assist in evaluating forest resources on these lands.
3. County Parks. Support the use of sustainable forest management practices on existing and future county parklands. Encourage counties to consider protecting state school trust lands for forestry and recreation uses.
4. Community Parks. Encourage townships, cities, and tribes to incorporate sustainable forestry in their recreation planning efforts and to support efforts by counties to retain and manage state school trust lands for forestry and recreation uses.
5. State Parks. Assist and coordinate the review and comment by members of the East Central Implementation Committee on forest management activities proposed in the state parks in the East Central landscape.
6. Public Access to Forestlands. Support efforts to provide responsible public access to forestlands in the region.

C. Social Resource Initiatives

From a social perspective, the East Central Landscape Committee envisions a landscape that:

- is home to people who are aware of the importance of forests from ecological, economic and social perspectives.
- has sustainable forests which help to promote and sustain a high quality of life.
- has urban and rural communities with a distinct sense of place created in part by forests.
- enhances the economic conditions of individuals and businesses in the region.

The following social goals, objectives, and action items outline the steps that the Committee believes are necessary to achieve the desired future conditions:

Goal 1: **Increase Public Awareness**. Increase the general public's awareness about the importance of sustainable forest management in the East Central landscape.

Rationale:

- As one of the most diverse landscapes in the state from an ecological perspective, the East Central region is home to a wide variety of plant and animal species.
- The importance of sustainable forest management has limited exposure to the general public.
- The MFRC and the SFRA have limited visibility to the general public.
- There are limited funds to develop an aggressive marketing campaign on sustainable forestry.

Potential Monitoring Indicators:

- Public opinion survey results.
- Number of web site visits by the public to the MFRC Landscape Program.

Objective 1: **General Outreach Program**. Support the distribution of information about the Sustainable Forest Resources Act (SFRA), the Minnesota Forest Resources Council (MFRC), the landscape program, and this Plan.

Action Items:

1. Outreach Mailings. Send letters and informational materials to local officials describing the SFRA, MFRC, landscape planning process and the goals and objectives outlined in this Plan.
2. Local Newspapers. Submit on a regular basis, press releases to local newspapers in the region regarding goals and objectives outlined in this Plan.
3. MFRC Website. Invite readers to participate in projects and programs recommended in this Plan. Consider placing ads for special projects and volunteer opportunities.
4. Youth Education Program. Work with existing youth education programs such as the education programs administered by the DNR Division of Forestry and Extension Service (4-H) and water resource education events sponsored through local water planning initiatives.
5. Woodland Landowner Events. Support and co-sponsor events, banquets and social gatherings for woodland organizations in the region. Distribute materials on sustainable forest management practices and the range of services and resources available to landowners.
6. State Parks Interpretive Centers. Distribute literature regarding the Sustainable Forest Resources Act, the Minnesota Forest Resources Council and the landscape program to visitors at state parks. Include general information about forest management practices, proper timber harvesting, and other land management topics.
7. Billboards, Videos, Shopping Malls, and Other Media. Consider a range of mediums in developing and distributing public relation materials for the landscape program and the efforts in the East Central landscape.

Goal 2: **Quality of Life and Forests**. Promote the wellbeing of the people living and working in the East Central landscape through sustainable forest management.

Rationale:

- Forests in the East Central landscape have long been an important base for the region's quality of life and the wellbeing of individuals and their communities.
- Forested landscapes provide a sense of place for residents and visitors alike. Forests are essential to the quality of life we enjoy. Many people live in the region to be close to outdoor and recreational pursuits such as hiking, hunting, fishing, and/or bird watching.
- The region is experiencing rapid population growth and increased land development pressures. New development has the potential to either enhance or destroy the sense of place, character that many of the small communities in the region have developed over the past 100 years. Forests and significant stands of trees should be considered major form givers to communities as they plan and develop public spaces.

Potential Monitoring Indicators:

- The number of cities participating in community design programs such as the Minnesota Design Team or Tree City USA program.
- The number of local organizations and outdoor/sportsmen organizations that participate and/or support in the management and use of publicly owned forested lands.
- The number miles of scenic drives in each county.
- The amount of forested open space in each community and county in the region.

Objective 1: **Sense of Place**. Support community efforts such as scenic roadway designations and other community design programs that foster sustainable forest management.

Action Items:

1. Minnesota Design Team. Work with local communities, the Minnesota Design Team, and other agencies to incorporate sustainable forest management principles and concepts into their programs.
2. Scenic Byways Program. Work with MN DOT and other agencies to incorporate sustainable forest management principles and concepts into their programs.

Objective 2: **Support Community Forestry**. Support and assist communities in the region develop and implement community forestry programs.

Action Items:

1. DNR Community Forestry. Advocate and support the connecting of communities in the region with the DNR Community Forestry Program.
2. Tree City USA. Support efforts by cities in the region to participate in the Tree City USA program.
3. Forestry Organizations. Encourage local officials and citizens in the region to become members of forestry organizations such as Minnesota Forestry Association, Minnesota Shade Tree Advisory Committee,
4. Technical Assistance. Assist in connecting communities with technical service providers such as the DNR Division of Forestry, Minnesota Tree Care Advisors, University of Minnesota Extension Services and other organizations.
5. ReLeaf and Other Financial Assistance. Distribute information to communities in the region on financial assistance programs such as ReLeaf and other state and federal programs.

Objective 3: **Wild and Natural Areas**. Advocate and assist in connecting local organizations and conservation organizations with state and federal agencies in managing and maintaining wild and natural areas in the East Central landscape.

Action Items:

1. State Owned Lands. Work with DNR staff to encourage local organizations and conservation organizations to support the managing and maintaining of state owned forestlands in the region.
2. Federally Owned Lands. Work with US Fish and Wildlife Service, US National Park Service and other federal agencies to connect local organizations and conservation organizations manage and maintain federally owned forestlands in the region.

D. Administration/Coordination/Financial Initiatives

From an administrative perspective, the East Central Landscape Committee envisions a landscape that:

- regularly convenes landowners, forest industry representatives, local officials, and resource agency staff to work collaboratively on the planning and management of sustainable forests throughout the region.
- has ample opportunities for interested persons and organizations to participate in the sustainable management of forests.
- has greatly benefited from the long term commitment to sustainable forestry by the state legislature, the Governor, the MFRC and most importantly, the people in the East Central landscape. The planning process for the East Central landscape will have entered into its tenth generation with the plan having been updated every ten years or so over the past one hundred years.

The following goals, objectives, and action items outline the steps that the Committee believes are necessary to achieve the desired future conditions:

Goal 1: Increase Coordination. Increase and maintain the coordination of sustainable forest management in the East Central landscape.

Rationale:

- While many organizations and agencies have been managing parts of the forest resource base in the past, this Plan represents the first regional effort to implement a comprehensive series of strategies across all ownerships to promote sustainable forestry as directed by the SFRA.
- All stakeholders will need to make ongoing commitments to the implementation of this Plan for it to be successful.
- It will be imperative that people's time and energies are maximized as they participate in the implementation of this Plan.

Potential Monitoring Indicators:

- Formation of an implementation group and its sustained operations.
- Preparation of an annual work program.
- Completion of tasks in the annual work programs.

Objective 1: **Form an Implementation Committee**. Form the East Central Implementation Committee to oversee the overall coordination and implementation of this Plan.

Action Items:

1. Formation. Work with the members of the East Central Landscape Committee to recruit and form an implementation committee.
2. Regular Meetings. Convene the Implementation Committee on a regular basis (as determined by the group) to oversee the implementation of this Plan.
3. Annual Work Program. Prepare an annual work program that guides efforts to be worked on in the upcoming year. (Coordinate the preparation of the work program with the budget - see Goal 4.)
4. Working Subcommittees. The Implementation Committee should create working teams or subcommittees as they deem appropriate to do much of the legwork.

Objective 2: **Facilitate Agency Coordination**. Facilitate communication and working relationships between the East Central Implementation Committee and stakeholder groups.

Action Items:

1. Resource Agency Meetings. Convene a meeting on an annual basis (or as needed) between the Implementation Committee and resource agencies to review coordination activities needed to implement this Plan.
2. County Meetings. Attend meetings with county commissioners, SWCD supervisors, water plan task forces, and/or staff to review coordination activities needed to implement this Plan.

Goal 2: Increase Public Involvement and Strengthen Local Leadership. Promote broad and increased public involvement in sustainable forest management in the East Central landscape. Encourage the building of leadership capacity at the local level to enhance sustainable forest management in the region.

Rationale:

- The SFRA calls for broad public involvement and participation.
- All politics (and implementation) is local.
- Local leadership is key to successful implementation. Organizations like the Blandin Foundations recognize this and have invested in leadership training programs.

Potential Monitoring Indicators:

- Number of volunteer projects completed.
- Number of volunteer hours donated per year.
- Monetary value of the volunteer time donated each year.
- Number and amount of grants received in the East Central landscape.

Objective 1: **Implementation Outreach**. Develop methods for informing the public about efforts being taken by the East Central Implementation Committee to promote sustainable forest management and ways the public can get involved.

Action Items:

1. Key Contacts. Use the "Key Contact Strategy" developed by the West Central Landscape Committee to identify and increase the number of people involved with implementing this Plan. Maintain an address list of key contacts in the region and distribute it regularly.
2. Committee Member Connections. Develop a list of people that members of the East Central Implementation Committee work with on a regular basis on forestry matters. Ask for their participation and involvement. Invite local officials to attend Committee meetings.
3. Local Meetings and Educational Events. Distribute information about this Plan and the efforts to implement it at local meetings and events being held in the region. Some of the other meetings and events include county and SWCD board meetings, county water plan meetings, city council meetings, Woodland Advisors courses, MLEP sessions, and landowners meetings.
4. MFRC Website. Develop and place informational materials on the MFRC web site that summarize this Plan and ways that people can get involved.
5. East Central Landscape Plan CD. Create and distribute a CD that summarizes this Plan and the implementation activities that are proposed.

Objective 2: **Expand Volunteerism**. Establish approaches for recruiting and organizing volunteers to help implement specific projects and activities as outlined in this plan and as developed by the Implementation Committee and it subcommittees.

Action Items:

1. Local Newspapers. Periodically publish articles in the local newspapers that provide summaries of this Plan and volunteer opportunities to participate in its implementation.
2. Forestry Organization Newsletters. Periodically publish articles about this Plan and volunteer opportunities in newsletters maintained by organizations in the region and state such as MFA and MN STAC.
3. DNR Volunteer Newsletter. Place requests for volunteers in the DNR Volunteer newsletter for appropriate projects and programs listed in this Plan.

Objective 3: **Strengthen Local Leadership**. Work with foundations to support the development of a leadership training program for the East Central landscape that focuses on sustainable forest management.

Action Items:

1. Form Subcommittee. Form a subcommittee group to assess what leadership training programs are available and decide on what approach to take to develop a sustainable forestry leadership program.
2. Foundation Support. Meet with foundations that work in the leadership development arena to review and seek funding for the leadership training program.
3. Implement the Proposal. Support and coordinate the implementation of the leadership training program.

Objective 4: **Public Attitude Surveys**. Periodically, gather public opinions regarding the work being completed by the East Central Implementation Committee, the MFRC, and the resource agencies managing forests in the region.

Action Items:

1. Landowners and Local Officials. Develop and distribute a brief survey for landowners and local officials regarding their interests and needs relating to sustainable forestry and managing forests on their lands or in their communities.
2. Foresters and Loggers. Develop and distribute a brief survey for foresters and loggers regarding their interests and needs relating to sustainable forestry and serving landowners in the region.
3. Surveys by Other Organizations. Collect and review surveys developed by agencies and other organizations and distribute to members of the East Central Implementation Committee.
4. Anoka Sand Plains Plant Materials Evaluation and Demonstration Site. Support and promote the Plant Materials Evaluation and Demonstration Site located in the Anoka Sand Plain Region near Becker, Minnesota, for public use and research purposes. The site is a joint cooperative project with Anoka Sand Plain SWCD's, NRCS, Univ. of MN, and local groups. The site is used to research plant hardiness and species tolerance on soils in the region. Monitoring and evaluation is done regularly to determine what grows best.

Goal 3: Enhance Technical Assistance. Expand and improve the level and quality of technical assistance provided to landowners in the region regarding sustainable forest management.

Rationale:

- Science and our society's views on what is, "the right thing to do", seems to be continually changing. New methods of resource management have all too often left landowners frustrated and angry.
- Successful implementation of sustainable forestry will require resource managers to trained in ecologically based management so they can clearly communicate strategies and methods and the reasons why they should be used.

Potential Monitoring Indicators:

- Amount of technical assistance provided to private forest landowners in the East Central landscape.
- Number of kudos/complaints regarding the delivery of technical services.
- Acres of land with forest stewardship plans prepared.
- Acres of land where projects recommended by forest stewardship plans have been implemented by at least 50 percent.

Objective 1: **NIPF**. Support efforts to enhance the coordination and delivery of technical assistance provided to non-industrial private forest (NIPF) landowners.

Action Items:

1. Increased Funding for the Forest Stewardship Program. Advocate the increased funding for the Forest Stewardship Program at the state and federal levels.
2. Stewardship Program Coordination. Assist in convening meetings between landowners, DNR, agency foresters and consulting foresters to discuss ways to enhance technical services provided through the Forest Stewardship Program.
3. Forestry Consultants. Develop and maintain a list of agency and private consulting foresters in the region who are knowledgeable about ecologically based management practices and can prepare stewardship plans for NIPF landowners. Review evaluations of the projected workloads and the amount of capacity that public and private sector foresters can provide. Make recommendations to the MFRC, DNR, universities and technical colleges, and other appropriate organizations on ways to meet the technical service needs and increase recruitment of future foresters.
4. Small NIPF Landowners. Work with DNR Division of Forestry, BWSR, SWCDs, and local units of government to develop technical services designed for "small" NIPF landowners (ownership of less than 20 acres)
5. Minnesota SWCD Forestry Association. Work with the Minnesota SWCD Forestry Association to implement the NIPF landowner technical assistance and educational goals and objectives in their plan (SWCD Tree Handbook, District needs survey, compiling technical resources, etc.)

Objective 2: **Loggers and Industry**. Support efforts to enhance the coordination and delivery of technical assistance provided to loggers and forest industries operating in the region.

Action Items:

1. MLEP. Support efforts by the Minnesota Logger Education Program (MLEP) to providing technical assistance and training to loggers working in the region.
2. MFI. Maintain a working relationship with MFI on their education programs for loggers and forest products industry.

Objective 3: **Local Land Use Officials**. Support efforts to enhance the coordination and delivery of technical assistance provided to local land use officials in the region.

Action Items:

1. Delivery of Forest Resource Knowledge. Convene meetings between local officials, resource agencies, and members of the East Central Implementation to review and discuss the ways in which forest resource information is made available to local units if government in the region. Explore ways to increase the transfer and benefits of forest resource knowledge into local land use planning efforts.

Goal 4: Expand Financial Resources. Expand the financial resources available to support the implementation of this Plan and to enhance the level and quality of technical assistance provided to landowners in the region on sustainable forest management.

Rationale:
- The MFRC landscape program budget provides an annual allocation of $5,000 per landscape.
- Funding levels will need to be enhanced greatly to accomplish the major items listed in this Plan.
- Funding resources do exist to successfully implement much, if not all, of this plan. Creativity and collaboration are needed.

Potential Monitoring Indicators:
- Amount of technical and financial assistance provided to private forest landowners in the East Central landscape.
- Outside dollars generated each year.

Objective 1: **Develop Additional Funding Sources**. Develop outside funding sources (in addition to the MFRC budget) to finance special projects in the region.

Action Items:
1. Potential Funding Sources. Collect and organize information about potential funding sources for projects and programs listed in this Plan in addition to funding from the MFRC.
2. EC Sustainable Forestry Education Fund. Solicit funding from individuals, private industry, local, regional, state and federal sources to provide funds for high priority education projects listed in this Plan.
3. EC Sustainable Forestry Projects Fund. Solicit funding from individuals, private industry, local, regional, state and federal sources to provide funds for high priority forest management projects listed in this Plan.
4. Grant Writing. Prepare and submit grants for high priority projects recommended by the Implementation Committee.
5. Legislative Recommendations. Develop recommendations to increase the amount of funding for technical assistance for private landowners such as the private forest management program and for managing deer populations. Forward recommendations to the MFRC for inclusion into their recommendations to the Governor and the Legislature.
6. Local Funding Sources. Support efforts by local units of government to explore ways to raise local funds for locally administered forest management programs and initiatives. Money raised locally could be matched by state and federal sources and its allocation be locally determined."

Objective 2: **Prepare Annual Budgets**. Prepare annual budgets to guide use of financial resources to implement the actions outlined in this Plan and as developed by the East Central Implementation Committee.

Action Items:

1. Potential Projects List. Develop a list of potential projects with lead and supporting organizations, completion timeframes and estimated costs.
2. Annual Budget. Prepare an annual budget for the East Central landscape.
3. MFRC Approval. Review the annual budget with the Landscape Committee and the MFRC and obtain their approval.

Section 8
Plan Implementation and Coordination

Perhaps the most critical component of any plan are the sections that describe how it will be implemented. The purpose of this section is to outline the organizational structures and coordinative aspects that the Committee believes are necessary to successfully implement this Plan.

A. How Will this Plan Get Implemented? Cooperation, Coordination and Mutual Collaboration

Listed in Section 7, there are 4 resource initiatives, 13 goals, 43 objectives, and 169 action items. So, how will all the ideas suggested in this Plan get done? Who will do the work? How long will it take?

As with past successes in forest management in the region, the ways things get done is through **cooperation, coordination, and mutual collaboration**. This Plan proposes to increase and enhance the ways that interested person and stakeholder groups work together on sustainable forest management.

It should be emphasized that this plan is a regional plan. While many of the action items recommended are intended to be more specific in nature, it is important to remember the regional context of this document and its primary role is to coordinate and facilitate sustainable forestry by the vested stakeholders. The actual "work on the ground and in the field" will continue to be completed by individual landowners, foresters and loggers, business representatives, local officials, land managers and resource agency staff.

In many ways the landscape committees, such as the East Central Landscape Committee, is much like MFRC, which is a state organization designed to bring diverse interests to the table to work together to make sustainable forestry happen.

While the **planning horizon** for MFRC landscape plans typically span 50 to 100 years, the **implementation horizon** for this Plan is generally considered to be ten to twenty years. After five to ten years, parts of the Plan will need to be reconsidered as changes merit. The MFRC and the Committee should collectively determine the point at which this Plan needs to be either amended or updated as time moves forward.

B. Inventory of Existing Forestry Related Programs

Given the regional and coordinative nature of this Plan, an important step to help advance the coordination and implementation process is to identify and inventory existing forestry related programs. The Committee generated a list of over 50 existing forestry related programs that could be included in the implementation process of this Plan. Please refer to Appendix E for this listing.

C. General Implementation Approaches

In any land or natural resource planning process, it is helpful to list the general or potential approaches that could be used to implement the plan's policy framework. The following is a list of the general implementation approaches that were reviewed by the Committee:

- Administration (support staff).
- Financial Assistance
- Technical Assistance.
- Outreach.
- Education and Information.
- Monitoring and Data Collection.
- Inventory and Mapping.
- Incentive Programs.
- Equipment Rental Programs.
- Public Improvement Projects.
- Detailed Systems Planning.
- Regulations and Ordinances.

Each of the objectives listed in this Plan could be assigned and organized into one of these general approaches for work planning purposes.

D. Coordination/Implementation Committee

The Sustainable Forest Resources Act requires the regional committees to fulfill and/or address many functions and activities in the landscape planning and coordination mission. The following summarizes these functions:

- include representative interests in a particular region that are committed to and involved in landscape planning and coordination activities.
- serve as a forum for landowners, managers, and representative interests to discuss landscape forest resource issues.
- identify and implement an open and public process whereby landscape-based strategic planning of forest resources can occur.
- integrate its report with existing public and private landscape planning efforts in the region.
- identify and facilitate opportunities for public participation in existing landscape planning efforts in this region.
- identify sustainable forest resource goals for the landscape and strategies to achieve those goals.
- provide a regional perspective to the council with respect to council activities.
- facilitate landscape coordination between existing regional landscape planning efforts of land managers, both public and private.

The focus of the MFRC Landscape Program is now turning to the coordination phase given that this is the sixth plan being completed. MFRC staff will work with interested individuals and organizations to convene an implementation/coordination committee for the East Central landscape with similar representation as that on the committee for this Plan.

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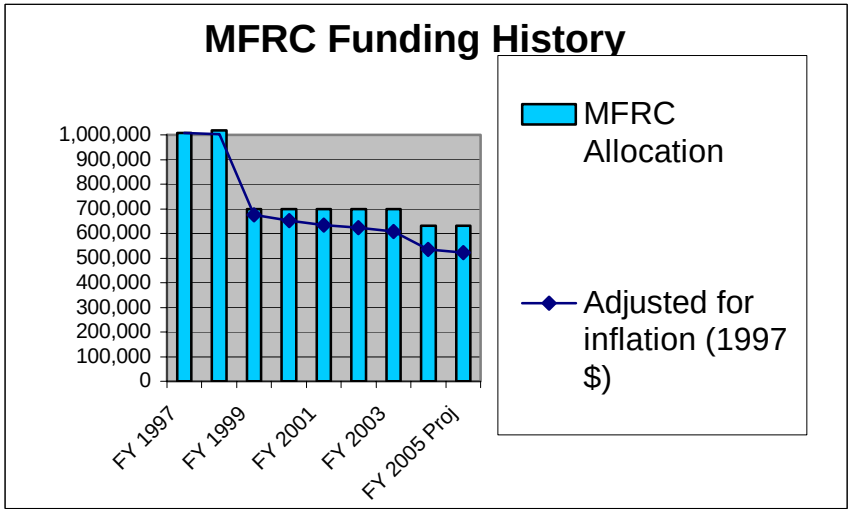
Section 9
Funding Resources

The purpose of this section is to initiate discussion on some of the potential ways that the projects and programs listed in this Plan can be funded. With the focus of the MFRC Landscape Program shifting towards coordination and implementation of the landscape plans, the funding discussion becomes a next logical step.

A. Review of MFRC Funding

After a cut in Fiscal Year 1999, funding for the MFRC has remained stable. Funding for the MFRC and its programs, including the landscape program comes primarily from the state general fund. The MFRC operating budget has and will continue to support staff to support the landscape program. To remain effective, continued funding from the state's general fund for the landscape program and the MFRC overall will be essential.



The MFRC budget for Fiscal Years 2003 and 2004 provided $5,000 per landscape per year. These funds, while relatively small amounts each year, are designed to be seed moneys to help initiate projects in each landscape. The landscape program budget has not been designed to be a primary source of implementation dollars. As the Coordination/Implementation Committee begins its efforts, more dialogue on the budgets will be important and other potential sources will critical to the successful; implementation of this Plan.

B. Potential Funding Sources

One of the first tasks for the Coordination/Implementation Committee from a financial management perspective will be to identify potential funding sources. In general, there are numerous funding sources available to implement the goals, objectives and action items listed in this Plan. The following is a non-exclusive list of potential sources:

Public Sector

- Federal programs.
- Other state agency programs.
- County and local programs.

Non-Profit and Foundations

- Planning and research grants.
- Implementation grants.
- Training and educational grants.

Private Sector

- Organizational contributions – lake associations, sportsmen clubs, environmental organizations, landowner groups, etc.
- Charitable fund raising.
- Donations.

In addition to the funding sources noted above, organizations can support the implementation of this Plan through a number of related actions and efforts including in-kind labor, equipment rentals and donations, supplies, land gifts and other creative endeavors. All interested stakeholders are encouraged to refer to the Plan to identify projects and opportunities to collaborate on.

East Central Woodland Owners Council Cash Contribution

In February 2005, the East Central Woodland Owners Council (ECWOC) decided to contribute $1,000 to support the coordination and implementation of this Plan. The MFRC has agreed to match this contribution and has committed to work cooperatively with the ECWOC and members of the Coordination/Implementation Committee to maximize the use of this donation.

Section 10
Monitoring Framework

The purpose of this section is to begin the process of framing a monitoring program for the implementation of this Plan and the results of sustainable forest management in the East Central landscape. As this Plan was nearing completion, the MFRC in conjunction with its partnering agencies was in the process of expanding monitoring efforts at the landscape level. The Coordination/Implementation Committee should review these efforts and this section prior to finalizing its monitoring program.

A. Background

The Sustainable Forest Resources Act requires that the MFRC must develop recommendations to the Governor and federal, state, county and local governments that result in sustainable management, use, and protection of the state's forests. The policies and practices must:

- Acknowledge **multiple ownerships**.
- Give equal consideration to long-term **ecological, economic and social** needs and limits.
- Foster **no net loss** of forestland.
- Encourage **appropriate mixes** of types and age classes.
- Encourage **collaboration and coordination**.

This outline of broad policies from the Sustainable Forest Resources Act should be integrated into the monitoring framework for this Plan. The Sustainable Forest Resources Act (Minnesota Statute 89A.07) establishes three levels of monitoring at the statewide, landscape and site levels as follows:

1. Forest resource monitoring.
2. Practices and compliance monitoring.
3. Effectiveness monitoring.

B. Initial Outline: The East Central Landscape Monitoring Program

The preliminary monitoring program for the East Central landscape consists of two parts: 1) monitor completed actions and 2) monitor results. It should be noted that each of the goals in Section 7 provide a list of potential monitoring indicators that the Committee can consider as starting points in creating the monitoring program.

Monitoring Actions

Within Section 7, there are a number of programmatic or task related objectives and corresponding action items. The monitoring program should review the status of these items and their level of completion.

Monitoring Outcomes

When considering outcomes over the implementation horizon for this Plan, the Committee should consider fundamental and practical measures that data can be readily obtained. Improvements to the FIA program can provide annual measures towards monitoring progress. Some of the basic monitoring indicators should include the following:

- Acres of forestland in the East Central landscape.
- Acres of forestland in each ecological subsection in the East Central landscape.
- Acres of forestland in each county of the East Central landscape.

The Committee recognized that as implantation and coordination phase gets underway, this monitoring program will need to be reviewed and revised. And as better data and modeling systems evolve, the level of monitoring can be increased to address forestland vegetation cover categories defined in this Plan.

Section 11
County Level Forest Management Recommendations

A. Overview

The nine counties in the East Central landscape will play an important role in guiding the development of land and the subsequent management of the forests. Given the fact that almost 90 percent of the landscape is privately owned and outside of incorporated areas, counties will have a large role in the implementation of land use and natural resource management polices in the region.

The purpose of this section is to provide each of the counties in the East Central landscape with useful information to assist them in promoting sustainable forests. For each county the following is provided:

- Forest inventory map.
- Forestland inventory data.

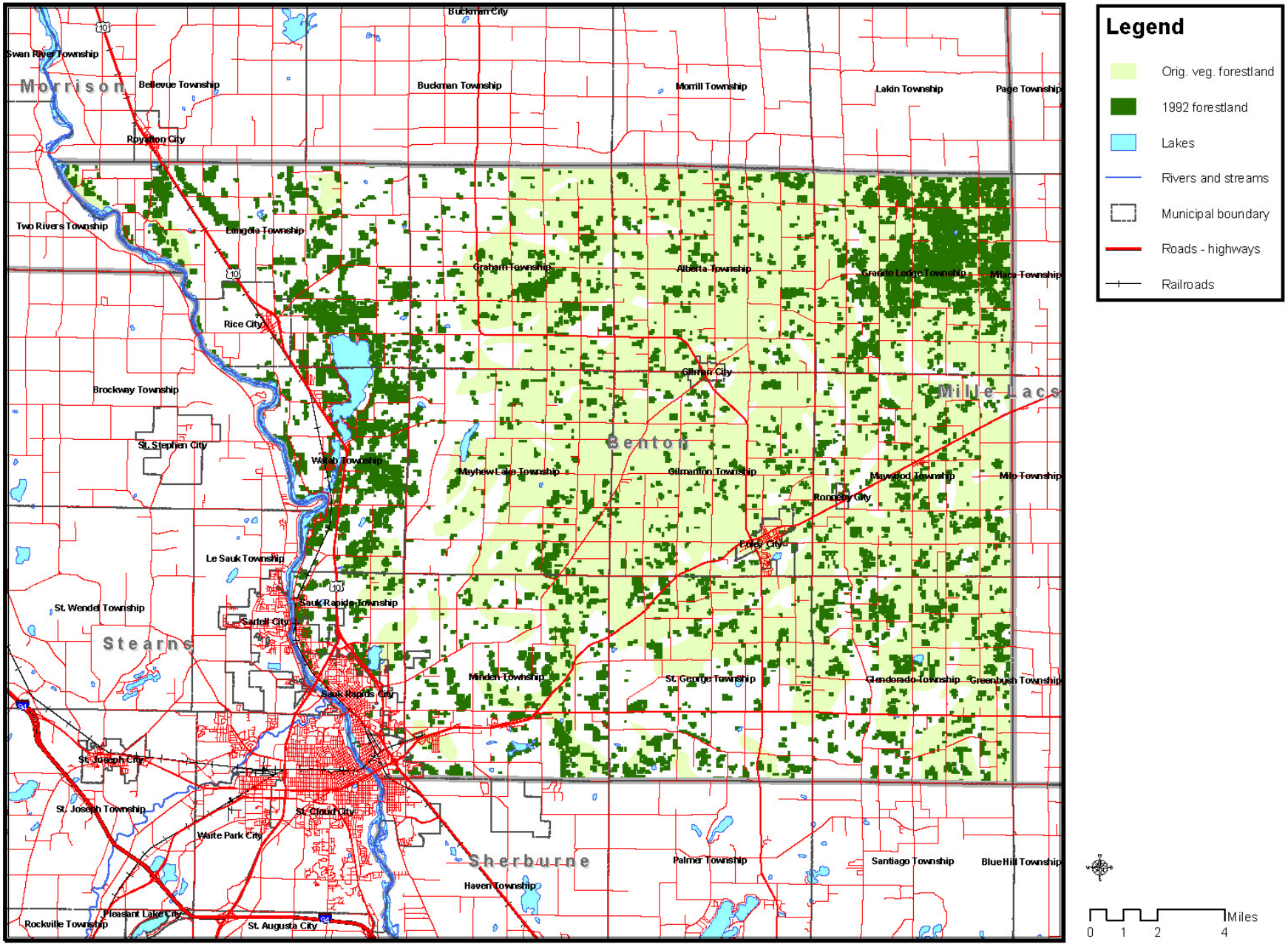
B. County Level Recommendations

The Committee offers the following recommendations to the nine counties in the East Central landscape region:

- Refer to the policy framework developed in this Plan when working on land use planning and economic development matters.
- Consult and use the maps and data developed for this Plan when working on land use planning and land development proposals.
- Advocate the use of the MFRC site level guidelines, the DNR forestry best management practices and other similar reference documents when working with landowners and developers on specific site in their jurisdiction.
- Communicate with members of the East Central Landscape Committee what works well and what does not in regards to this Plan and the goals and strategies outlined herein.

Forest Resource Map

Benton County



Forest Resource Inventory

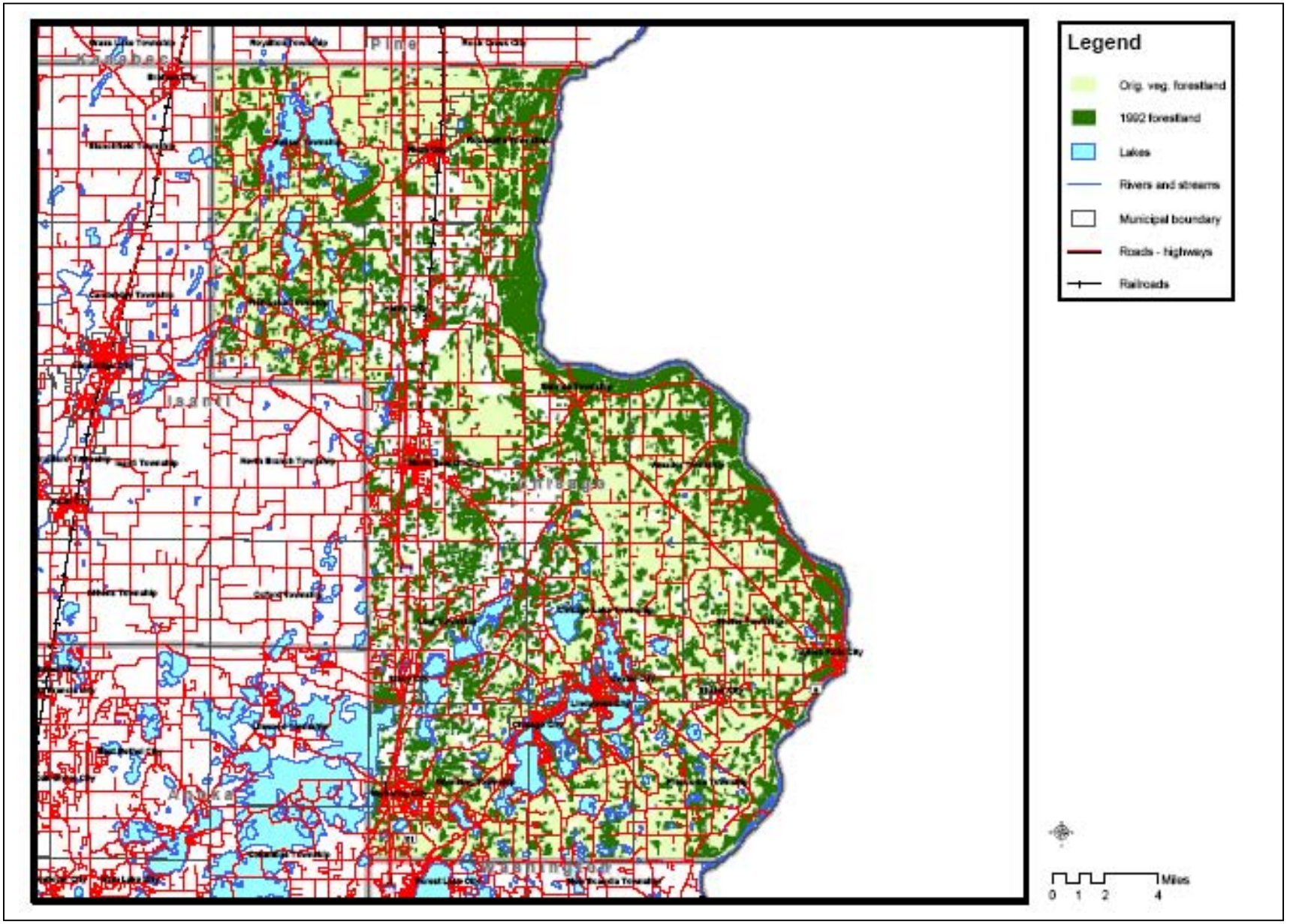
Benton County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	0	0.0
Deciduous forest	105,741	40.0
Mixed forest	38	0.0
Wetland		
Swamp coniferous forest	13,557	5.1
Swamp deciduous forest	954	0.4
Floodplain forest	965	0.4
Total Forested	**121,256**	**45.9**
Non-Forest Vegetation		
Upland		
Grassland	13,229	5.0
Brushland	11,878	4.5
Savanna	47,515	18.0
Wetland		
Marsh / sedge meadow / fen	58,881	22.3
Shrub swamp	6,032	2.3
Other		
Barren	34	0.0
Water	5,417	2.0
Total Non-forested	**142,986**	**54.1**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	1,850	0.0
Deciduous forest	18,436	0.1
Mixed forest	38	0.0
Wetland		
Swamp coniferous forest	203	0.0
Swamp deciduous forest	1,089	0.0
Floodplain forest	38	0.0
Total Forested	**21,652**	**0.1**
Non-Forest Vegetation		
Upland		
Grassland	37,416	0.1
Brushland	711	0.0
Savanna	611	0.0
Wetland		
Marsh / sedge meadow / fen	30,420	0.1
Shrub swamp	6,578	0.0
Other		
Cropland	152,708	0.6
Urban	6,528	0.0
Barren	2,740	0.0
Water	4,877	0.0
Total Non-forested	**242,590**	**0.9**

Forest Resource Map

Chisago County



Forest Resource Inventory

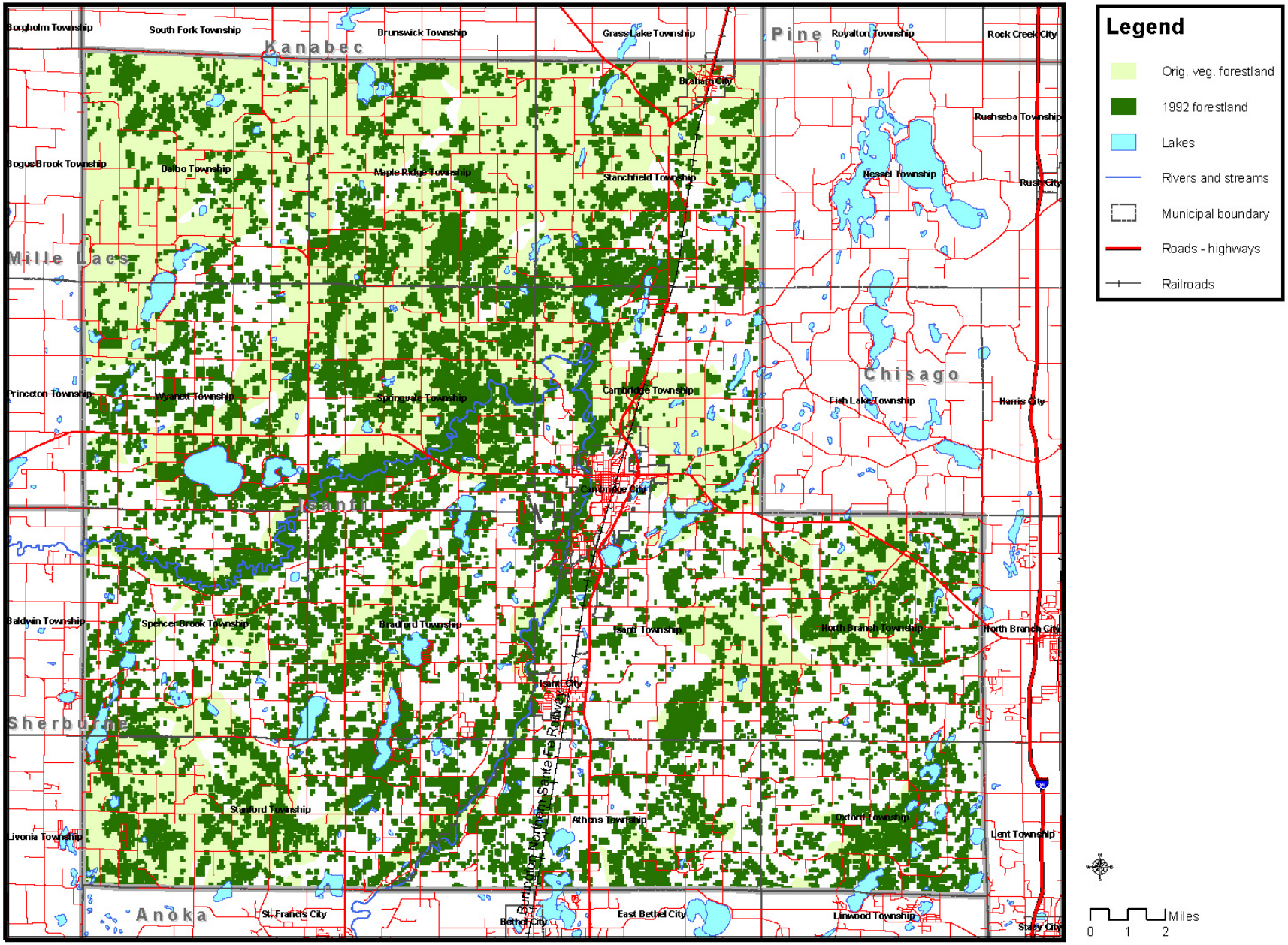
Chisago County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	3,518	1.2
Deciduous forest	124,226	43.9
Mixed forest	576	0.2
Wetland		
Swamp coniferous forest	19,967	7.1
Swamp deciduous forest	10,164	3.6
Floodplain forest	4,510	1.6
Total Forested	**162,962**	**57.6**
Non-Forest Vegetation		
Upland		
Grassland	2,044	0.7
Brushland	327	0.1
Savanna	48,026	17.0
Wetland		
Marsh / sedge meadow / fen	36,407	12.9
Shrub swamp	12,037	4.3
Other		
Barren	24	>0.1
Water	21,029	7.4
Total Non-forested	**119,894**	**42.4**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	2,566	1.0
Deciduous forest	44,293	15.6
Mixed forest	582	0.2
Wetland		
Swamp coniferous forest	4,137	1.5
Swamp deciduous forest	8,812	3.1
Floodplain forest	812	0.3
Total Forested	**61,202**	**21.7**
Non-Forest Vegetation		
Upland		
Grassland	34,272	12.1
Brushland	543	0.2
Savanna	2,852	1.0
Wetland		
Marsh / sedge meadow / fen	22,723	8.0
Shrub swamp	13,469	4.8
Other		
Cropland	120,943	42.7
Urban	6,016	2.1
Barren	2,415	0.9
Water	18,477	6.5
Total Non-forested	**221,711**	**78.3**

Forest Resource Map

Isanti County



Forest Resource Inventory

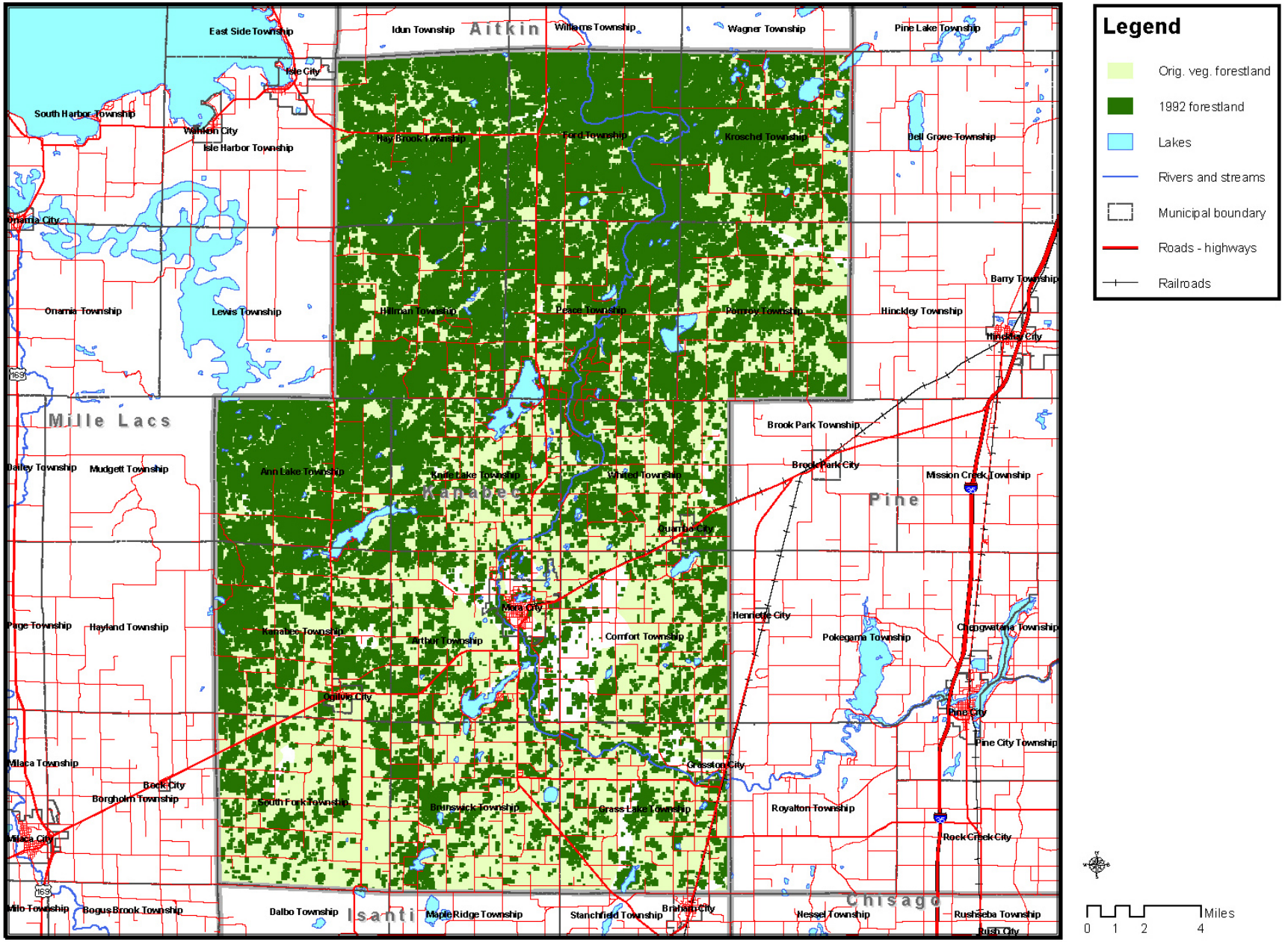
Isanti County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	83	0.0
Deciduous forest	67,471	23.4
Mixed forest	4,267	1.5
Wetland		
Swamp coniferous forest	22,003	7.6
Swamp deciduous forest	5,489	1.9
Floodplain forest	6,258	2.2
Total Forested	**105,571**	**36.6**
Non-Forest Vegetation		
Upland		
Grassland	0	0.0
Brushland	8,503	2.9
Savanna	89,060	30.8
Wetland		
Marsh / sedge meadow / fen	48,184	16.7
Shrub swamp	23,559	8.2
Other		
Barren	3	0.0
Water	13,849	4.8
Total Non-forested	**183,159**	**63.4**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	5,106	2.0
Deciduous forest	33,673	11.7
Mixed forest	693	0.2
Wetland		
Swamp coniferous forest	4,319	1.5
Swamp deciduous forest	4,958	1.7
Floodplain forest	1,945	0.7
Total Forested	**50,695**	**17.8**
Non-Forest Vegetation		
Upland		
Grassland	33,566	11.6
Brushland	1,399	0.5
Savanna	1,289	0.4
Wetland		
Marsh / sedge meadow / fen	32,143	11.1
Shrub swamp	25,624	8.9
Other		
Cropland	128,098	44.4
Urban	3,519	1.2
Barren	1,383	0.5
Water	11,014	3.8
Total Non-forested	**238,035**	**82.4**

Forest Resource Map

Kanabec County



Forest Resource Inventory

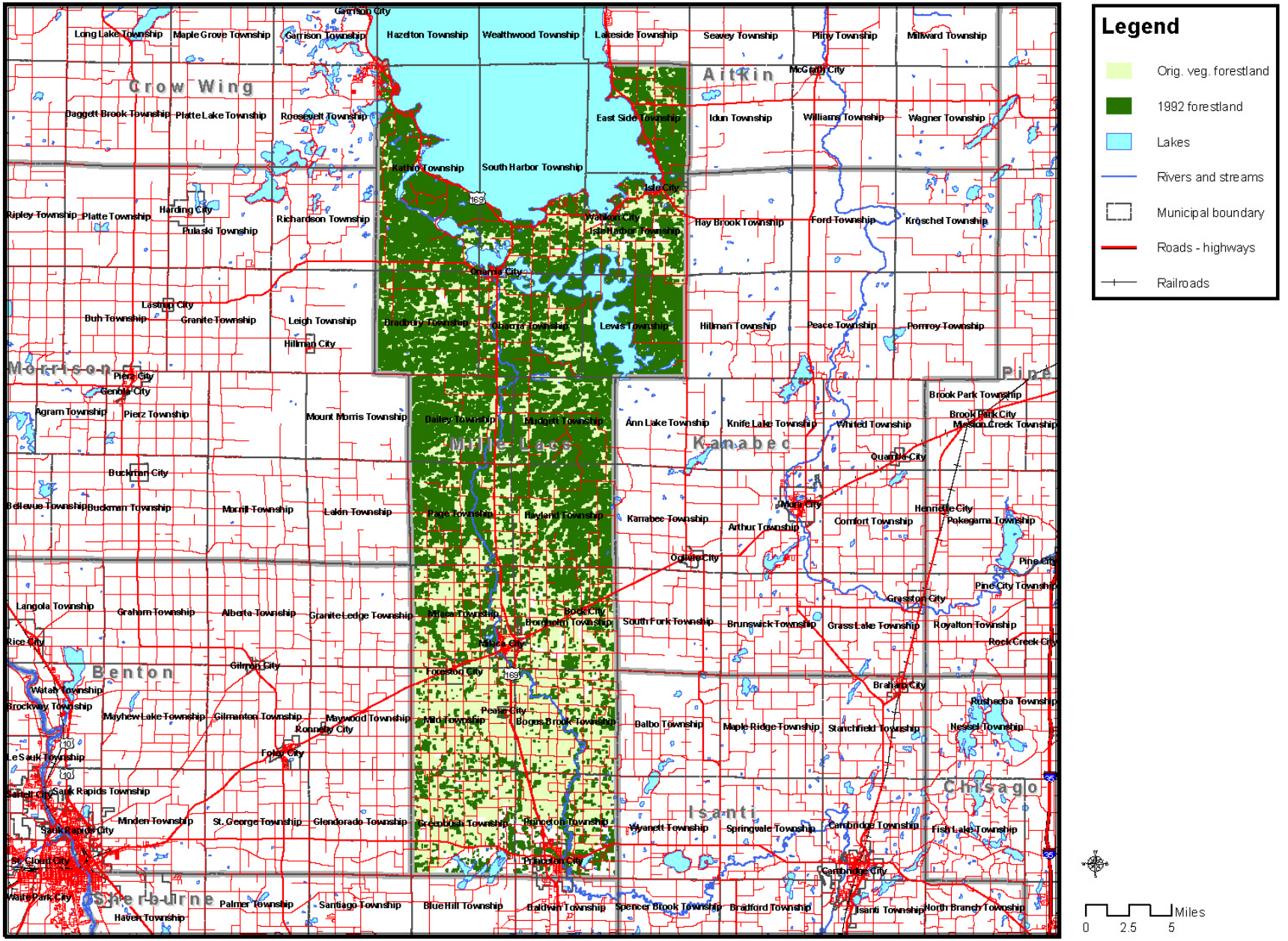
Kanabec County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	13,831	4.1
Deciduous forest	59,937	17.6
Mixed forest	126,923	37.2
Wetland		
Swamp coniferous forest	49,137	14.4
Swamp deciduous forest	995	0.3
Floodplain forest	3,867	1.1
Total Forested	**254,690**	**74.6**
Non-Forest Vegetation		
Upland		
Grassland	0	0.0
Brushland	0	0.0
Savanna	9,326	2.7
Wetland		
Marsh / sedge meadow / fen	46,210	13.5
Shrub swamp	21,691	6.4
Other		
Barren	0	0.0
Water	9,373	2.7
Total Non-forested	**86,600**	**25.4**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	1,800	1.0
Deciduous forest	116,294	34.1
Mixed forest	34	0.0
Wetland		
Swamp coniferous forest	4,649	1.4
Swamp deciduous forest	5,824	1.7
Floodplain forest	210	0.1
Total Forested	**128,811**	**38.2**
Non-Forest Vegetation		
Upland		
Grassland	41,747	12.2
Brushland	243	0.1
Savanna	4,003	1.2
Wetland		
Marsh / sedge meadow / fen	36,544	10.7
Shrub swamp	24,359	7.1
Other		
Cropland	92,211	27.0
Urban	2,021	0.6
Barren	2,139	0.6
Water	9,213	2.7
Total Non-forested	**212,480**	**62.3**

Forest Resource Map

Mille Lacs County



Forest Resource Inventory

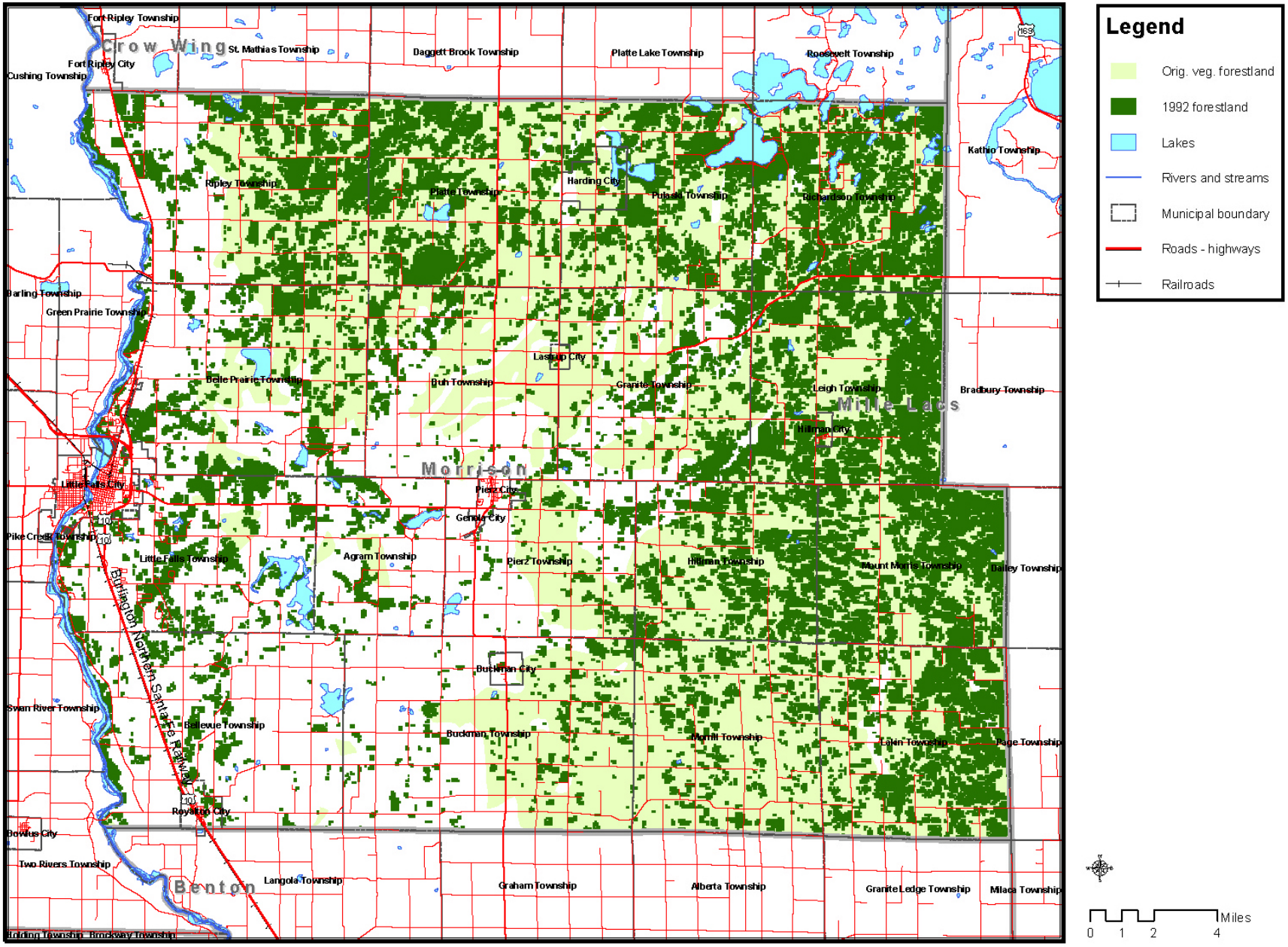
Mille Lacs County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	12,029	2.8
Deciduous forest	172,430	39.6
Mixed forest	28,649	6.6
Wetland		
Swamp coniferous forest	40,560	9.3
Swamp deciduous forest	7,439	1.7
Floodplain forest	940	0.2
Total Forested	**262,046**	**60.1**
Non-Forest Vegetation		
Upland		
Grassland	0	0.0
Brushland	466	0.1
Savanna	8,579	2.0
Wetland		
Marsh / sedge meadow / fen	66,470	15.3
Shrub swamp	26,022	6.0
Other		
Barren	0	0.0
Water	72,141	16.6
Total Non-forested	**173,678**	**39.9**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	1,543	0.0
Deciduous forest	113,843	26.1
Mixed forest	0	0.0
Wetland		
Swamp coniferous forest	5,312	1.2
Swamp deciduous forest	9,079	2.1
Floodplain forest	979	0.2
Total Forested	**130,756**	**29.7**
Non-Forest Vegetation		
Upland		
Grassland	34,805	8.0
Brushland	297	0.1
Savanna	2,033	0.5
Wetland		
Marsh / sedge meadow / fen	53,868	12.4
Shrub swamp	27,187	6.2
Other		
Cropland	108,435	24.9
Urban	4,166	1.0
Barren	2,487	0.6
Water	71,691	16.5
Total Non-forested	**304,969**	**70.0**

Forest Resource Map

Morrison County (East Half)



Forest Resource Inventory

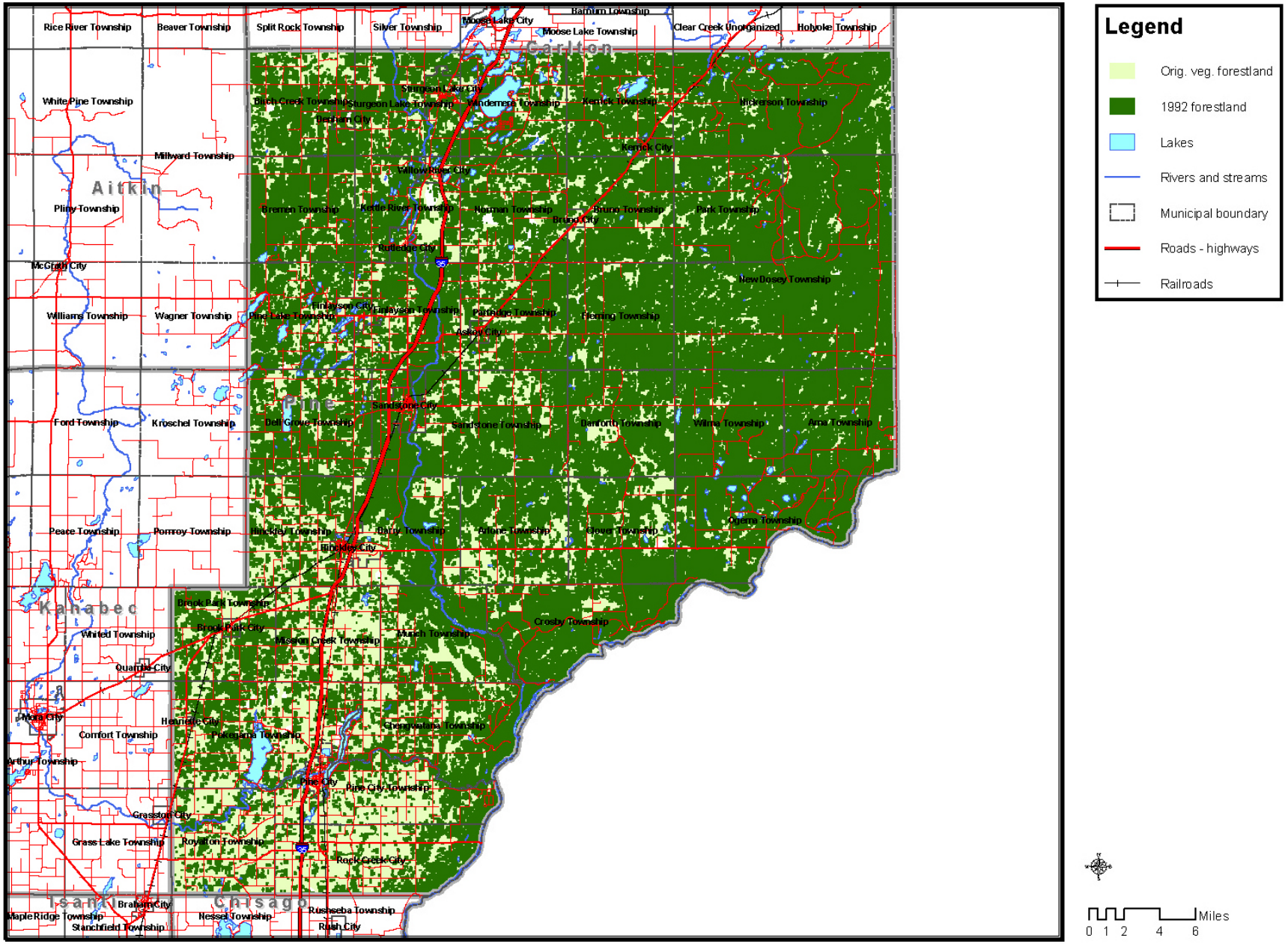
Morrison County (East Half)

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	21,414	5.3
Deciduous forest	83,993	20.7
Mixed forest	25,810	6.4
Wetland		
Swamp coniferous forest	46,634	11.5
Swamp deciduous forest	1,837	0.5
Floodplain forest	41	0.0
Total Forested	**179,729**	**44.4**
Non-Forest Vegetation		
Upland		
Grassland	17,334	4.3
Brushland	8,041	2.0
Savanna	75,602	18.7
Wetland		
Marsh / sedge meadow / fen	91,106	22.5
Shrub swamp	25,540	6.3
Other		
Barren	0	0.0
Water	7,828	1.9
Total Non-forested	**225,451**	**55.6**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	1,424	0.0
Deciduous forest	65,564	16.2
Mixed forest	1	0.0
Wetland		
Swamp coniferous forest	2,657	0.7
Swamp deciduous forest	2,487	0.6
Floodplain forest	68	0.0
Total Forested	**72,202**	**17.5**
Non-Forest Vegetation		
Upland		
Grassland	56,995	14.1
Brushland	834	0.2
Savanna	840	0.2
Wetland		
Marsh / sedge meadow / fen	65,576	16.2
Shrub swamp	26,276	6.5
Other		
Cropland	170,361	42.0
Urban	3,208	0.8
Barren	1,325	0.3
Water	7,565	1.9
Total Non-forested	**332,980**	**82.2**

Forest Resource Map

Pine County



Forest Resource Inventory

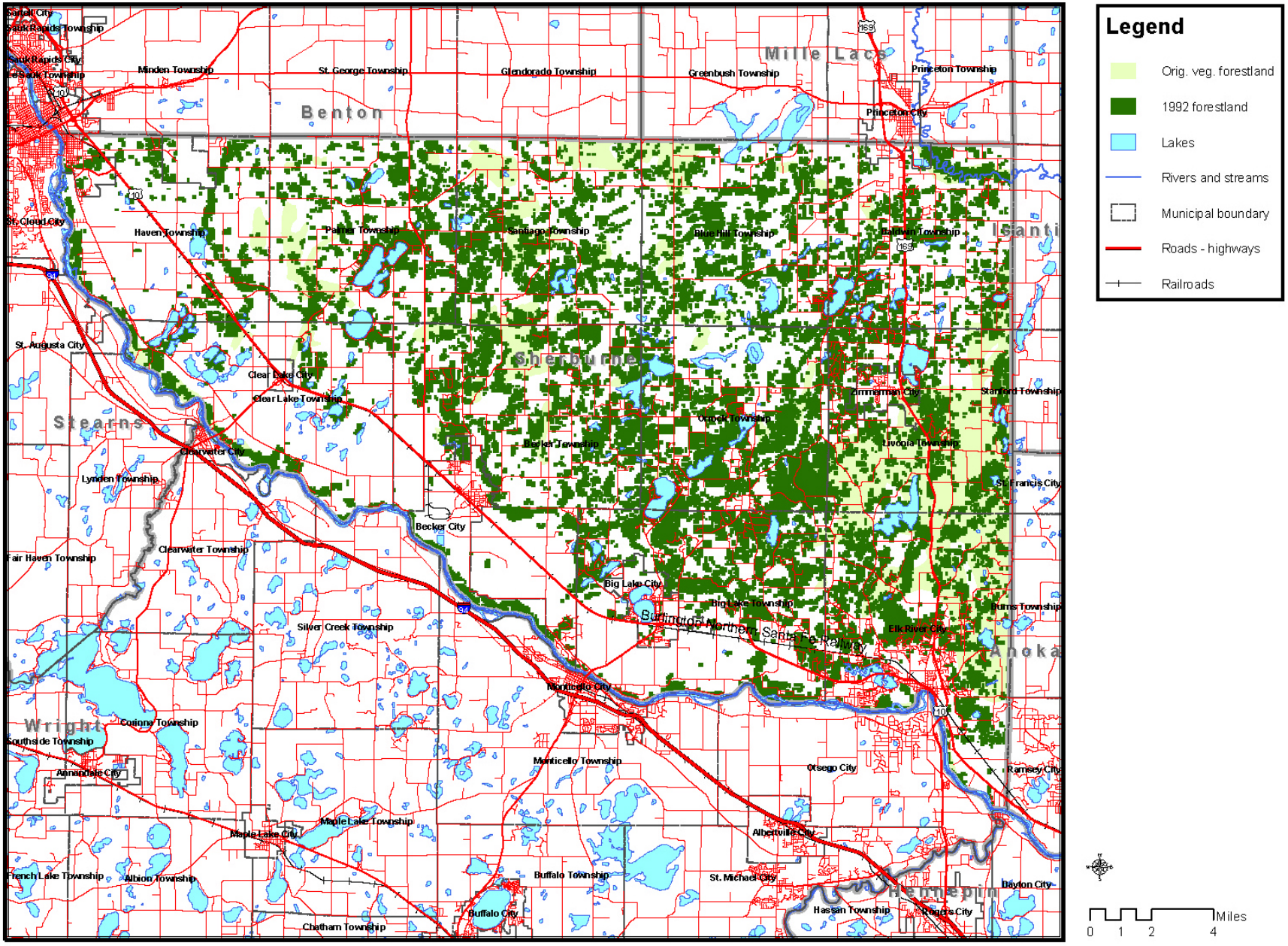
Pine County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	131,531	14.3
Deciduous forest	81,132	8.8
Mixed forest	181,793	19.8
Wetland		
Swamp coniferous forest	282,207	30.8
Swamp deciduous forest	3,540	0.4
Floodplain forest	20,041	2.2
Total Forested	**700,244**	**76.4**
Non-Forest Vegetation		
Upland		
Grassland	0	0.0
Brushland	0	0.0
Savanna	14,388	1.6
Wetland		
Marsh / sedge meadow / fen	95,824	10.4
Shrub swamp	84,469	9.2
Other		
Barren	0	0.0
Water	22,019	2.4
Total Non-forested	**216,700**	**23.6**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	29,387	4.0
Deciduous forest	368,102	40.1
Mixed forest	1,992	0.2
Wetland		
Swamp coniferous forest	45,112	4.9
Swamp deciduous forest	22,859	2.5
Floodplain forest	189	0.0
Total Forested	**467,642**	**51.8**
Non-Forest Vegetation		
Upland		
Grassland	89,401	9.7
Brushland	3,518	0.4
Savanna	12,603	1.4
Wetland		
Marsh / sedge meadow / fen	75,111	8.2
Shrub swamp	105,297	11.5
Other		
Cropland	133,164	14.5
Urban	4,755	0.5
Barren	4,261	0.5
Water	21,241	2.3
Total Non-forested	**449,351**	**49.0**

Forest Resource Map

Sherburne County



Forest Resource Inventory

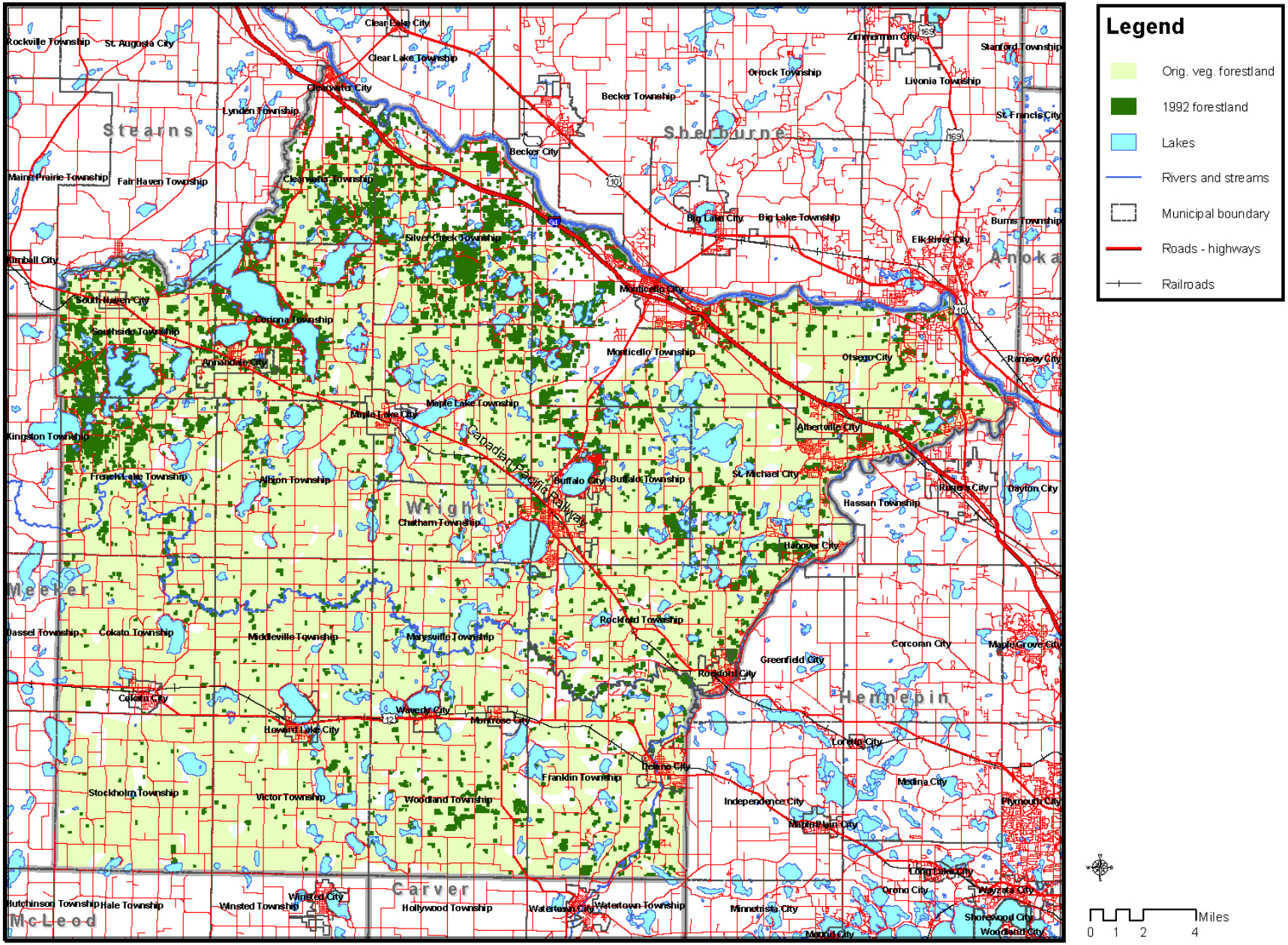
Sherburne County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	0	0.0
Deciduous forest	28,202	9.8
Mixed forest	0	0.0
Wetland		
Swamp coniferous forest	7,961	2.8
Swamp deciduous forest	3,705	1.3
Floodplain forest	2,455	0.9
Total Forested	**42,322**	**14.7**
Non-Forest Vegetation		
Upland		
Grassland	36,442	12.6
Brushland	2,064	0.7
Savanna	133,087	46.2
Wetland		
Marsh / sedge meadow / fen	51,017	17.7
Shrub swamp	10,805	3.7
Other		
Barren	0	0.0
Water	12,437	4.3
Total Non-forested	**245,852**	**85.3**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	5,475	2.0
Deciduous forest	43,986	15.3
Mixed forest	0	0.0
Wetland		
Swamp coniferous forest	546	0.2
Swamp deciduous forest	3,836	1.3
Floodplain forest	1,514	0.5
Total Forested	**55,356**	**19.3**
Non-Forest Vegetation		
Upland		
Grassland	35,306	12.2
Brushland	3,077	1.1
Savanna	2,345	0.8
Wetland		
Marsh / sedge meadow / fen	31,864	11.1
Shrub swamp	12,962	4.5
Other		
Cropland	121,636	42.2
Urban	10,565	3.7
Barren	1,338	0.5
Water	13,725	4.8
Total Non-forested	**232,819**	**80.8**

Forest Resource Map

Wright County



Forest Resource Inventory

Wright County

Presettlement Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	0	0.0
Deciduous forest	291,263	63.7
Mixed forest	0	0.0
Wetland		
Swamp coniferous forest	1,267	0.3
Swamp deciduous forest	6,131	1.3
Floodplain forest	7,224	1.6
Total Forested	**305,885**	**66.9**
Non-Forest Vegetation		
Upland		
Grassland	8,957	2.0
Brushland	2,576	0.6
Savanna	18,855	4.1
Wetland		
Marsh / sedge meadow / fen	68,609	15.0
Shrub swamp	7,675	1.7
Other		
Barren	0	0.0
Water	44,532	9.7
Total Non-forested	**151,205**	**33.1**

1992 Vegetation Cover Inventory		
Vegetation Categories	**Acres**	**Percent**
Forest Vegetation		
Upland		
Coniferous forest	526	0.0
Deciduous forest	19,665	4.3
Mixed forest	0	0.0
Wetland		
Swamp coniferous forest	209	0.0
Swamp deciduous forest	4,200	0.9
Floodplain forest	**1,922**	**0.4**
Total Forested	**26,522**	**5.7**
Non-Forest Vegetation		
Upland		
Grassland	49,453	10.8
Brushland	13,666	3.0
Savanna	1,456	0.3
Wetland		
Marsh / sedge meadow / fen	44,251	9.7
Shrub swamp	7,859	1.7
Other		
Cropland	262,435	57.4
Urban	14,132	3.1
Barren	1,203	0.3
Water	36,108	7.9
Total Non-forested	**430,563**	**94.2**

Additional Data

Additional data on natural resources and land cover has been developed for this Plan at the county and local levels and is available. For more information, please contact the MFRC staff. Please refer to the MFRC website for contact information – www.frc.state.mn.us.

Section 12
Agency and Organization Recommendations

The purpose of this section is to summarize specific recommendations from the Committee to specific agencies and organizations working in the region or the state on sustainable forest management. The intent is to assist people from these entities in finding specific strategies that apply to their organizations or personnel interests.

One overarching recommendation from the Committee was to encourage all organizations and agencies, all landowners and citizens, to use this Plan and the corresponding maps and data and maps in as many ways as possible. As a regional level plan, it is intended to provide a broad context on how forest resources can be enhanced and sustained whether in rural or urbanizing settings.

The following represents an initial list of recommendations developed by the Committee:

A. Recommendations to the MFRC

1. Local Plan Review Process. Work with the legislature to create a review process of local plans (comprehensive plans, park and recreation plans, county water plans, watershed district plans, county tax-forfeit land plans, etc.) to ensure that sustainable forest management concepts as developed by the MFRC and its programs are being incorporated into these plans. Develop tools or documents that will help local officials, resource agencies, foresters, land managers and landowners learn how to use MFRC landscape plans in their long range planning and implementation activities.
2. Sharing and Communications. Support the increased sharing of ideas and experiences between the landscape committees as well as new and successful sustainable forest management activities taking place within the regions. Support the re-establishing of the MFRC newsletter and/or other communications tools to increase awareness about successful sustainable forest management activities throughout the state and in other states.
3. PFM Funding. Find ways to increase funding support for the private forest management program administered by the DNR to effectively serve more landowners.

B. Recommendations to Local Officials

1. Reference Document. Local officials are strongly encouraged to refer to this Plan as a reference document when developing their local plans.
2. Resource-Based Planning. Local officials are encouraged to incorporate a more comprehensive consideration of natural resources into their land use planning processes. Extensive mapping and data regarding forest and other natural resources in the nine-county region have been developed for this Plan. This information can be extremely useful in both local land use planning and implementation efforts. Local officials are strongly encouraged to use resource analysis tools such as the forest resource models described in this Plan and the Natural Resource Inventory and Assessment process available from the DNR in their local planning initiatives. Understanding the natural systems is key to communities with a high quality of life.
3. Consider Forests in Local Land Use Decisions. Local officials are encouraged to consider the values and benefits that forests can bring to their communities. Healthy and sustainable forests promote a high quality of life for citizens and can support increased economic opportunities as well. Forests should be included in the land use decision making process
4. Alternative Development Options. There are alternative ways that land can be developed to provide for both economic growth and the protection of forest resources. Large lot developments are not always desirable or cost effective from the public sector or taxpayers perspectives. Local officials are encouraged to use forestry as a way to improve their communities and their future development.

C. Recommendations to Resource Agencies

1. Service to Landowners. Continue to improve the delivery of technical and financial assistance on forest management to private landowners. Find ways to increase funding for the private forest management program. Continue to promote the Ecological Classification System (ECS) as a guide to developing land management strategies when working with landowners and local officials.
2. Important and Critical Areas. Continue to identify and protect important or critical ecological areas such as the joint effort by the Audubon Society and the DNR to identify and protect important bird areas.
3. Data Gathering. Support the collection, organization and evaluation of data collected relating to forestry at the local level on private lands. Encourage the coordination and sharing of data with other resource agencies and local officials.
4. MCWCS. Support the development and implementation of the Minnesota Comprehensive Wildlife Conservation Strategy (MCWCS).
5. Primary and Secondary Forest Products Industries. Find ways to more effectively support and foster economic development opportunities for the primary and secondary forest products industries in the region.

D. Recommendations to Conservation and Non-governmental Organizations

1. Reference Document. Use this Plan as a reference document when developing plans and strategies.
2. Collaboration. Encourage the partnering of conservation and non-governmental organizations to address major resource management issues. Successful examples include the Wildlife Habitat Corridors Partnership and the Environmental Initiative.
3. Connections. Support the connecting of citizens with elected officials on sustainable forest management topics.

E. Recommendations to Education Groups

1. Connections through Education. Encourage the connection of elected officials with their constituent groups through education programs. Promote and support sustainable forest education programs that connect informed citizens with elected officials.
2. Forestry Plus Focus. Use forestry as a vehicle to get at other large-scale resource issues that society faces. Combine sustainable forest management with other educational areas such as water resource, land use, economic development, etc.
3. Collegial Connections. Colleges and universities throughout the state are encouraged to connect their students and faculty with the MFRC programs. Some successful examples of internships in the region include Isanti County's GIS intern with the Parks Department and Kanabec County's Riverwatch program.

F. Recommendations to Private Landowners and Citizens

1. Become Informed. The MFRC and its partner agencies and organizations have numerous programs and resources to help landowners become more informed about sustainable forestry and the benefits of forests to our communities. All landowners are encouraged to become more knowledgeable about forest resources. Learning about best management practices (BMPs) is one easy way to get started. Recognize that forestry is a long-term endeavor and that changes on the land will generally take several years to become realized.
2. Seek Technical Assistance. While there are numerous sources of information available, landowners are encouraged to seek technical assistance to help manage their forestlands. Often a landowner may need assistance from many technical service providers. Developers can benefit from working with the forest resources on their lands and designing their developments
3. Get Involved. The Committee members contributed over 1,000 hours of time to develop this Plan. While they were not always in agreement, voicing their concerns and sharing their ideas has helped generate many new opportunities to improve forests and the quality of life in the East Central landscape region. They have taken a big first step to get involved. All citizens and landowners are encouraged to get involved in their communities and help promote sustainable forestry.

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Appendix A
List of Acronyms

Economic and Social

CEDS	Comprehensive Economic Development Strategy (EC RDC)
JOBZ	Job Opportunity Building Zone

Ecological

CBS	County Biological Surveys (DNR)
ECS	Ecological Classification System (DNR)
GAP	Gap Analysis Program
RNV	Range of Natural Variation
RSEA	Regionally Significant Ecological Areas (DNR)
SNA	Scientific and Natural Areas

Forest Management

CSA	Cooperative Stand Assessment
DFC	Desired Future Condition
ERF	Extended Rotation Forest
FIA	Forest Inventory and Analysis (U.S. Forest Service)
MLEP	Minnesota Logger Education Program
NIPF	Non-industrial Private Forest
SFRMP	Subsection Forest Resource Management Plan (DNR)

Other

GIS	Geographic Information Systems

Appendix B
List of Agencies and Organizations

BWSR	Minnesota Board of Water and Soil Resources
COE	U.S. Army Corps of Engineers
DEED	Minnesota Department of Employment and Economic Development
DNR	Minnesota Department of Natural Resources
EC RDC	East Central Regional Development Commission
EQB	Minnesota Environmental Quality Board
FSA	Farm Service Agency
LGU	Local government unit
MDA	Minnesota Department of Agriculture
MFA	Minnesota Forestry Association
MFRC	Minnesota Forest Resources Council
MGS	Minnesota Geologic Survey
MNDOT	Minnesota Department of Transportation
MNSTAC	Minnesota Shade Tree Advisory Committee
MPCA	Minnesota Pollution Control Agency
MSA	Minnesota Society of Arboriculture
MTCA	Minnesota Tree Care Advisors
NRCS	Natural Resources Conservation Service
SWCD	Soil and Water Conservation District
TNC	The Nature Conservancy
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
US FWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey

Appendix C
Glossary

Action Items. Statements that outline what an organization anticipates will be the major tasks in completing the objectives. Objectives should contain several action item statements to help further clarify efforts needed to complete the objectives.
All-Aged Management. Maintaining stands of trees that are all ages--young, mature (harvestable), old.
Balanced and Managed Land Development. Local land use management where landowners and local officials are working together to make wise decisions about the use of land and natural resources. Balanced and managed land development integrates sustainable forest management in the local comprehensive planning and implementation processes. (East Central Landscape Committee)
Biological diversity. "Biological diversity" means the variety and abundance of species, their genetic composition, and the communities and landscapes in which they occur, including the ecological structures, functions, and processes occurring at all of these levels.
Clear-Cut. A harvest method that removes essentially all trees in a stand.
Climax Species. A type of tree that is found in a forest that is in its later ecological stage of succession. Climax species are tolerant of shade and include maple, basswood, spruce, and fir.
Cover Type. Classification given to the type of vegetation growing on a particular site (e.g., northern hardwood, pine, maple-basswood).
Comprehensive Plan. The official public document adopted by a community as the policy guide for decisions about its future development and redevelopment. It consists of a vision for the community, background data, goals, policy statements, standards and programs for guiding the physical, social and economic development of a community. A comprehensive plan usually includes, but is not limited to, a land use plan, transportation plan, public facilities plan, housing plan, parks and open space plan, environmental protection plan and implementation strategies. The time frame for a plan typically ranges from 15 to 25 years. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)
Critical Forest Resources. Forests that are critical to the ecological, economic, and/or social well-being of a community or group of communities within the landscape as determined by the regional landscape committee. Initial recommendations for the identification and management of critical forest resources in the East Central landscape are provided in this Plan. Through the use of modeling tools such as RSEA, RNV and spatial analysis (described below), the Committee will more clearly identify critical forest resources in the East Central Landscape in the implementation stage.
Desired Future Conditions. Desired Future Conditions (DFC) are broad overarching statements that describe preferred or desired conditions that a given geographic area or region will be like at the end of a given timeframe. DFC statements are very general and

long range in nature. They are intended to provide an initial starting point for agreement on what forests in the landscape should be like in the future. DFCs are comparable in content to vision statements found in local government plans such as comprehensive plans. The DFC statements for the previously approved MFRC landscape plans have typically used a fifty to one hundred (50 – 100) year horizon when describing the desired future conditions of forests.

Disturbance. Any relatively discrete event in time that disrupts the ecosystem or plant community and changes the physical environment (e.g., fire, pest infestations, drought, logging).

Ecological Classification System (ECS). The Ecological Classification System is part of a nationwide mapping initiative developed to improve the ability to manage all natural resources on a sustainable basis. It is a method to identify, describe, and map progressively smaller areas of land of increasingly uniform ecological characteristics. Associations of biotic and environmental factors that directly affect or indirectly express differences in energy, moisture, and nutrient supplies are used. These factors include climate, geology, soils, hydrology and vegetation. Four levels of mapping have been completed for Minnesota. From the largest to the smallest scale, these include province, section, subsection, and land type association.

Even-Aged Management. Maintaining stands of trees that are all around the same age.

Forestland. Land which is at least ten percent stocked by trees of any size and capable of producing timber, or of exerting an influence on the climate or on the water regime; land from which the trees described above have been removed to less than ten percent stocking and which has not been developed for other use; and afforested areas. (Minnesota Statutes 2003, Chapter 89.)

Forest Products Industry, Primary. Producers of lumber, engineered wood products, and paper products that are typically inputs to other industries.

Forest Products Industry, Secondary. Producers of finished products such as cabinets, windows, doors, and other similar products.

Forest Management. The regeneration, management, utilization, and/or conservation of forests to meet specific goals and objectives (excerpt from the Dictionary of Forestry, Helms 1998).

Forest Resources. "Forest resources" means those natural assets of forest lands, including timber and other forest crops; biological diversity; recreation; fish and wildlife habitat; wilderness; rare and distinctive flora and fauna; air; water; soil; and educational, aesthetic, and historic values.

Forest Spatial Patterns. The size, shape and arrangement of forested landscape patches. Patches may be any feature that can be mapped such as (MN DNR):

- Forest types, habitats, and vegetation communities.
- Landforms, soils, and aquatic systems.
- Disturbances – both natural and human caused.

Fragmentation. Changes across a landscape that break large continuous areas of a particular land cover (e.g. forest) into smaller isolated patches. (Kilgore)

Goals. Goal statements outline the general directions that an organization intended to be attained at some point in the future. Goals are intended to provide general direction for a given resource initiative (ecological, economic, social, and administration/coordination). Words such as ***encourage***, ***increase***, ***preserve***, and ***protect*** are commonly found in goal statements. The

goals in the East Central Landscape Plan represent what the Committee wants to pursue over the next ten to twenty (10 – 20) years to promote sustainable forest resources in the landscape.

Landscape. "Landscape" means a heterogenous land area composed of interacting sustainable forest resources that are defined by natural features and socially defined attributes.

Landscape-level. "Landscape-level" means typically long-term or broad-based efforts that may require extensive analysis or planning over large areas that may involve or require coordination across land ownerships.

Multiple Use. "Multiple use" means the principle of forest management by which forest resources are utilized in the combinations that will best meet the needs of the people of the state; including the harmonious and coordinated management of the forest resources, each with the other, without impairment of the productivity of the land and with consideration of the relative values of the resources, and not necessarily the combination of uses resulting in the greatest economic return or unit output.

Native Plant Community. A group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plants form recognizable units that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. In 2003, the DNR completed a new classification of native plant communities, Minnesota's Native Plant Community Classification (Version 2.0), published in the book, *Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province.*

Objectives. Statements that provide more specific direction on the efforts or strategies that are needed to implement each goal. Goals usually have more than one objective. Words like ***construct***, ***plant***, ***remove***, and ***monitor*** are used to describe more specific direction in implementing the goals. Often, objectives will include quantifiable ***targets***, as means to provide more specific and measurable parameters for monitoring progress towards the goals. The initial description of programs and projects are usually found in objective statements.

Parcelization. An increase in the number of land parcels in a given area (e.g. fragmentation of land ownership). Fragmentation does not necessarily result in parcelization and vice versa. (Kilgore)

Partial Cut. Removal of only part of a tree stand when harvesting.

Pioneer species. A plant capable of invading bare sites (e.g., newly exposed soil) and persisting there or colonizing them until supplanted by successional species.

Prescription. A planned series of treatments designed to change current stand structure to one that meets management goals.

Regional Committee. "Regional committee" means a regional forest resources committee established under section 89A.06.

Regionally Significant Ecological Areas (RSEA) modeling. A landscape scale assessment modeling process developed by the DNR to identify regionally significant habitat areas. The RSEA modeling process was designed to identify critical forestlands, wetlands, and grasslands. (DNR)

Range of Natural Variation (RNV) analysis. The Range of Natural Variation analysis is a method in which current forest age structure and composition are compared with the range of conditions that would exist under natural disturbances regimes. The RNV concept can be used for understanding ecosystems, ecosystem changes, and for assessing the effects of proposed management. (NRRI – studies prepared for the MFRC for the Northeast and North Central landscapes.)

Reproduction. "Reproduction" means young stands of commercial tree species ranging from one foot high to 4.9 inches diameter at 4-1/2 feet above the ground and at least ten percent stocked.

Reforestation. "Reforestation" means the process of natural or artificial forest regeneration, including securing seed, growing seedlings, preparing sites, planting seed, planting trees, removing deleterious growth and underbrush and other activities related to forest regeneration.

Sense of Place. The common feeling or attitude people share about a community or place they identify with and relate to. A place with a "sense of community" is a place that naturally brings people together as a community. (MN Planning. "Under Construction: Tools and Techniques for Local Planning".)

Shelterwood. The cutting of most trees, leaving those needed to produce sufficient shade to protect young seedlings growing beneath them.

Silviculture. The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Spatial Analysis. The mapping and measuring of spatial patterns in a landscape or given area. (DNR)

Stand. A group of trees similar in age, composition, and structure. A pure stand is composed of mostly a single tree species. A mixed stand is composed of a mixture of tree species.

Succession. The gradual replacement of one plant community by another.

Sustainable. "Sustainable" means meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable Forest Management. Development, protection, and use of forest resources for achievement of economic and social well being without damaging the forest resource base or compromising the ability of future generations to meet their own needs. (MFRC "Sustaining Minnesota Forest Resources: Voluntary Site Level Guidelines".)

Sustained Yield. "Sustained yield" means the principle of forest management for the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of forest resources without impairment of the productivity of the land; allowing for periods of intensification of manage

Thinning. Removing certain selected trees from an immature (young) forest stand to reduce the number of trees in the stand and concentrate growth on a fewer, higher quality trees.

Timber. "Timber" means trees that will produce forest products of value, whether standing or down, and including but not limited to logs, bolts, pulpwood, posts, poles, cordwood, lumber and decorative material.

Appendix D
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Appendix E
List of Forest Related Programs

"Voluntary"	"Incentives"	"Regulatory"
Site Level Guidelines (MFRC) • Cultural resources. • Forest soil productivity. • Riparian areas. • Visual quality. • Water quality & wetlands. • Wildlife habitat.	**Property Tax Incentives** (MN Legislature) • Sustainable Forest Incentives Act (SFIA). • Green Acres. • CREP.	**Federal Regulatory Framework** • Endangered Species Act. •
Public Concerns Registration Process – PCRP (MFRC)		
Riparian Science Technical Committee (MFRC) • Updating riparian areas.	**Forest Stewardship Program** (MN DNR, landowners)	**Subdivision Regulations** (LGUs) • Model ordinances.
Continuing Education for Managing Forest Ecosystems (U of M College of NR) • Workshops. • Field trips • Short courses. • Conferences.	**Tree Planting Programs** (County SWCDs)	**Zoning Ordinances** (LGUs) • Model ordinances (MN Planning). • Cluster development concepts. • NEMO.
Woodland Advisor (U of M Extension Service) • Advisors. • Workshops. • Faculty.	**Nursery Tree Stocking/Sales** (MN DNR)	**Water Resource Regulations** (State and LGUs) • Wetland • Shoreland • Floodplain

"Voluntary"	"Incentives"	"Regulatory"
Publications (U of M Extension Service) • Resource Directory for Woodland Owners. • Pubs for Private Woodland Owners. • Urban Forestry Pubs.	**Community Forest Program** (MN DNR, LGUs)	**Recreation Enforcement** (MN DNR, Sheriff offices) ATVs, snowmobiles, bikes, campers, hunters, etc. • Public lands. • Public rights-of-way. • Private lands.
Forestry Research (U of M College of NR) • College Programs • Research Stations. • Outreach Centers.	**Timber Harvest Plans** (MN DNR)	**Right to Practice Forestry** • Legislation not currently in place.
MN Forestry Education (MN DNR Forestry) **Programs** • School Forest Program. • Project Learning Tree • Arbor Month • Big Tree Registry. • Firewise. **Posters** • Forest Ecosystem. • 100 Years and Growing. • MN's Forest Treasures. • State Symbols. • Biomes poster. **Brochures** • NR Education **Student Materials** • Tree Talk 4 and 5. • Logging In. **Teacher's Guides** • Where are all the trees? • Teacher's Guide to Arbor Month. • Dr. Splinter's World.	**Vital Forests/Vital Communities** (Blandin) • Community leadership training.	**Model Ordinances** (MN Planning, APA) • Tree preservation ordinances.

"Voluntary"	"Incentives"	"Regulatory"
Workshops • ECS Training workshops. • See DNR website.		
MN NR Education (MN DNR) Documents • Land Protection Options. • Beyond the Suburbs.	**Fire Management** (MN DNR)	
General Education Documents • Benefits of Urban Trees. • Conservation Design Port.	**Forest Health** (MN DNR) • ReLeaf Program.	**MDA Wood Inspection Program** • Oak wilt. • Other exotic plants.
MN Logger Education Program (MLEP) • Logger education events. • Logger Directory (MFA)	**Forest Legacy Program** (Landowners, MN DNR, US FS) • Upper St. Croix. • Sherburne County. • Mille Lacs County. • Pine County. • Brainerd lakes-Walker.	
MFA • Newsletter. • Web site. • Education events.		
MN STAC • Newsletter. • Web site. • Education events.		
The Right Tree Program (ECE & other utility cos.) • Utility corridor planting recommendations.	**Conservation Easements** (landowners and MLT, TNC, TPL, others)	

"Voluntary"	"Incentives"	"Regulatory"
Best Mgmt Practices • Forestry. • Shoreland. • Urban. • Agricultural.	**MN Habitat Corridors Partnership** (multiple organizations)	
Natural Resource Guide (MN DNR) – How to do. • Inventory & analysis. • Natural area mgmt plans.	**Tree Farmer** (ATFS)	
County Forest Planning - **tax forfeit lands** (counties) • Pine County example.	**MN Forest Resources Partnership** (MFRP)	
Comprehensive Planning (LGUs) • Natural resources. • Land use. • Transportation. • Public infrastructure. • Economic development. • Housing. • Parks and recreation.	**1000 Friends of MN** • Green Corridors project. • Managing Growth project.	
Local Water Planning (LGUs) • Water management	**Great River Greening** • Native planting designs. • Eco inventories. • Plantings. • Volunteers.	
Park & Recreation Planning (LGUs) • Parks, open space, natural areas	**Metro Wildlife Corridors** (MN DNR)	
Recommended Planting Lists (MN DNR)		

Appendix F
Birds, Mammals, Amphibians and Reptiles Species List

The following table has been summarized from efforts of the Minnesota Gap Analysis Project (2004) conducted by the Department of Natural Resources' Division of Fish and Wildlife. MN-GAP's overall mission is to "provide regional assessments on the conservation status of native vertebrate species and natural land cover types and to facilitate the application of this information to land management activities". This table specifically references MN-GAP efforts undertaken to compile a vertrebrate wildlife species list of known breeders (5 of the past 10 years) and their related range/distribution across Minnesota described in a landscape context (ECS subsection level). Information and data used for this effort has been compiled from Minnesota-based species lists, numerous book/literature sources, research articles, professional publications and exhaustive peer review (over 40 people on five technical teams).

The following table provides an inventory of the birds, mammals, amphibians and reptiles in the Mille Lacs Uplands, Anoka Sand Plain, and Big Woods ECS Subsections:

Mille Lacs Uplands, Anoka Sand Plain, and Big Woods ECS Subsections

BIRDS								
Element Code[a]	Common Name[a]	Scientific Name	Resident Status[b]	State Legal Status[c]	Federal Legal Status[d]	Mille Lacs Uplands ECS Subsection[e]	Anoka Sand Plain ECS Subsection[e]	Big Woods ECS Subsection[e]
ABNBA01010	Red-throated Loon	Gavia stellata	R	PB	P	M	M	M
ABNBA01030	Common Loon	Gavia immer	R	PB	P	B	B	B
ABNBA01050	Pacific Loon	Gavia pacifica	R	PB	P	M	M	A
ABNCA02010	Pied-billed Grebe	Podilymbus podiceps	R	PB	P	B	B	B
ABNCA03010	Horned Grebe	Podiceps auritus	R	PB, T	P	M	M	M
ABNCA03020	Red-necked Grebe	Podiceps grisegena	R	PB	P	B	B	B
ABNCA03030	Eared Grebe	Podiceps nigricollis	R	PB	P	M	B	B
ABNCA04010	Western Grebe	Aechmophorus occidentalis	R	PB	P	M	M	B
ABNCA04020	Clark's Grebe	Aechmophorus clarkii	R	PB	P	A	M	M / B (L)
ABNFC01010	American White Pelican	Pelecanus erythrorhynchos	R	PB, SC	P	M/SV	M/SV	B
ABNFD01020	Double-crested Cormorant	Phalacrocorax auritus	R	UB	P	B	B	B
ABNGA01020	American Bittern	Botaurus lentiginosus	R	PB	P	B	B	B
ABNGA02010	Least Bittern	Ixobrychus exilis	R	PB	P	B	B	B
ABNGA04010	Great Blue Heron	Ardea herodias	R	PB	P	B	B	B
ABNGA04040	Great Egret	Ardea albus	R	PB	P	M/SV	B	B
ABNGA06030	Snowy Egret	Egretta thula	R	PB	P	A	M/SV	M/SV
ABNGA06040	Little Blue Heron	Egretta caerulea	R	PB	P	A	M/SV	M/SV
ABNGA07010	Cattle Egret	Bubulcus ibis	R	PB	P	A	M/SV	M/SV
ABNGA08010	Green Heron	Butorides virescens	R	PB	P	B	B	B
ABNGA11010	Black-crowned Night-Heron	Nycticorax nycticorax	R	PB	P	M	B	B
ABNGA13010	Yellow-crowned Night-Heron	Nyctanassa violacea	R	PB	P	A	M	M
ABNJB02010	Tundra Swan	Cygnus columbianus	R	PB, MW	P	M	M	M
ABNJB0201a	Mute Swan	Cygnus olor	R	UB		A	M/SV	A
ABNJB02030	Trumpeter Swan	Cygnus buccinator	R	PB, MW, T	P	B	P	B
ABNJB03040	Greater White-fronted Goose	Anser albifrons	R	PB, MW	P	M	M	M
ABNJB04010	Snow Goose	Chen caerulescens	R	PB, MW	P	M	M	M
ABNJB04020	Ross's Goose	Chen rossii	R	PB, MW	P	A	M	M
ABNJB05030	Canada Goose	Branta canadensis	R	PB, MW	P	B	B	B

BIRDS								
Element Code[a]	Common Name[a]	Scientific Name	Resident Status[b]	State Legal Status[c]	Federal Legal Status[d]	Mille Lacs Uplands ECS Subsection[e]	Anoka Sand Plain ECS Subsection[e]	Big Woods ECS Subsection[e]
ABNJB09010	Wood Duck	Aix sponsa	R	PB, MW	P	B	B	B
ABNJB10010	Green-winged Teal	Anas crecca	R	PB, MW	P	M	B	B
ABNJB10040	American Black Duck	Anas rubripes	R	PB, MW	P	M	WV	M
ABNJB10060	Mallard	Anas platyrhynchos	R	PB, MW	P	B	B	B
ABNJB10110	Northern Pintail	Anas acuta	R	PB, MW	P	M	B	B
ABNJB10130	Blue-winged Teal	Anas discors	R	PB, MW	P	B	B	B
ABNJB10140	Cinnamon Teal	Anas cyanoptera	R	PB, MW	P	A	M	M
ABNJB10150	Northern Shoveler	Anas clypeata	R	PB, MW	P	M	B	B
ABNJB10160	Gadwall	Anas strepera	R	PB, MW	P	M	M	B
ABNJB10180	American Wigeon	Anas americana	R	PB, MW	P	M	M	M
ABNJB11020	Canvasback	Aythya valisineria	R	PB, MW	P	M	B	B
ABNJB11030	Redhead	Aythya americana	R	PB, MW	P	M	B	B
ABNJB11040	Ring-necked Duck	Aythya collaris	R	PB, MW	P	B	B	B
ABNJB11060	Greater Scaup	Aythya marila	R	PB, MW	P	M	M	M
ABNJB11070	Lesser Scaup	Aythya affinis	R	PB, MW	P	M	M	M
ABNJB16010	Long-tailed Duck	Clangula hyemalis	R	PB, MW	P	M	M	M
ABNJB17010	Black Scoter	Melanitta nigra	R	PB, MW	P	M	M	M
ABNJB17020	Surf Scoter	Melanitta perspicillata	R	PB, MW	P	M	M	M
ABNJB17030	White-winged Scoter	Melanitta fusca	R	PB, MW	P	M	M	M
ABNJB18010	Common Goldeneye	Bucephala clangula	R	PB, MW	P	M	WV	M
ABNJB18030	Bufflehead	Bucephala albeola	R	PB, MW	P	M	WV	WV
ABNJB20010	Hooded Merganser	Lophodytes cucullatus	R	PB, MW	P	B	B	B
ABNJB21010	Common Merganser	Mergus merganser	R	PB, MW	P	B	M	M
ABNJB21020	Red-breasted Merganser	Mergus serrator	R	PB, MW	P	M	M	M
ABNJB22010	Ruddy Duck	Oxyura jamaicensis	R	PB, MW	P	M	B	B
ABNKA02010	Turkey Vulture	Cathartes aura	R	PB	P	B	B	B
ABNKC01010	Osprey	Pandion haliaetus	R	PB	P	B	B	B
ABNKC10010	Bald Eagle	Haliaeetus leucocephalus	R	PB, SC	T, P	B	B	B
ABNKC11010	Northern Harrier	Circus cyaneus	R	PB	P	B	B	B
ABNKC12020	Sharp-shinned Hawk	Accipiter striatus	R	PB	P	M	M	M
ABNKC12040	Cooper's Hawk	Accipiter cooperii	R	PB	P	B	B	B

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ABNKC12060	Northern Goshawk	Accipiter gentilis	PR	PB	P	B	WV	WV
ABNKC19030	Red-shouldered Hawk	Buteo lineatus	R	PB, SC	P	B	B	B
ABNKC19050	Broad-winged Hawk	Buteo platypterus	R	PB	P	B	B	B
ABNKC19110	Red-tailed Hawk	Buteo jamaicensis	R	PB	P	B	B	B
ABNKC19130	Rough-legged Hawk	Buteo lagopus	R	PB	P	WV	WV	WV
ABNKC22010	Golden Eagle	Aquila chrysaetos	R	PB	P	M	M	M
ABNKD06020	American Kestrel	Falco sparverius	R	PB	P	B	B	B
ABNKD06030	Merlin	Falco columbarius	R	PB	P	B	M	M
ABNKD06070	Peregrine Falcon	Falco peregrinus	R	PB, T	P	M	B	M
ABNLC1002a	Gray Partridge	Perdix perdix	PR	PB, SG		A	P	P
ABNLC1002b	Ring-necked Pheasant	Phasianus colchicus	PR	PB, SG		P	P	P
ABNLC11010	Ruffed Grouse	Bonasa umbellus	PR	PB, SG		P	P	A
ABNLC13030	Sharp-tailed Grouse	Tympanuchus phasianellus	PR	PB, SG		P	A	A
ABNLC14010	Wild Turkey	Meleagris gallopavo	PR	PB, SG		P	P	P
ABNME01010	Yellow Rail	Coturnicops noveboracensis	R	PB, SC	P	B	M	M
ABNME05030	Virginia Rail	Rallus limicola	R	PB, SG	P	B	B	B
ABNME08020	Sora	Porzana carolina	R	PB, SG	P	B	B	B
ABNME13010	Common Moorhen	Gallinula chloropus	R	PB, SG, SC	P	A	B	B
ABNME14020	American Coot	Fulica americana	R	PB, SG	P	B	B	B
ABNMK01010	Sandhill Crane	Grus canadensis	R	PB	P	B	B	B
ABNNB02010	Black-bellied Plover	Pluvialis squatarola	R	PB	P	M	M	M
ABNNB02030	American Golden-Plover	Pluvialis dominica	R	PB	P	M	M	M
ABNNB03060	Semipalmated Plover	Charadrius semipalmatus	R	PB	P	M	M	M
ABNNB03070	Piping Plover	Charadrius melodus	R	PB, E	P, E&T	M	M	M
ABNNB03090	Killdeer	Charadrius vociferus	R	PB	P	B	B	B
ABNND02010	American Avocet	Recurvirostra americana	R	PB	P	M	M	M
ABNNF01020	Greater Yellowlegs	Tringa melanoleuca	R	PB	P	M	M	M
ABNNF01030	Lesser Yellowlegs	Tringa flavipes	R	PB	P	M	M	M
ABNNF01070	Solitary Sandpiper	Tringa solitaria	R	PB	P	M	M	M
ABNNF02010	Willet	Catoptrophorus semipalmatus	R	PB	P	M	M	M

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ABNNF04020	Spotted Sandpiper	Actitis macularia	R	PB	P	B	B	B
ABNNF06010	Upland Sandpiper	Bartramia longicauda	R	PB	P	B	B	B
ABNNF07020	Whimbrel	Numenius phaeopus	R	PB	P	M	M	M
ABNNF08020	Hudsonian Godwit	Limosa haemastica	R	PB	P	M	M	M
ABNNF08040	Marbled Godwit	Limosa fedoa	R	PB, SC	P	M	M	M
ABNNF09010	Ruddy Turnstone	Arenaria interpres	R	PB	P	M	M	M
ABNNF11020	Red Knot	Calidris canutus	R	PB	P	M	M	M
ABNNF11030	Sanderling	Calidris alba	R	PB	P	M	M	M
ABNNF11040	Semipalmated Sandpiper	Calidris pusilla	R	PB	P	M	M	M
ABNNF11100	Least Sandpiper	Calidris minutilla	R	PB	P	M	M	M
ABNNF11110	White-rumped Sandpiper	Calidris fuscicollis	R	PB	P	M	M	M
ABNNF11120	Baird's Sandpiper	Calidris bairdii	R	PB	P	M	M	M
ABNNF11130	Pectoral Sandpiper	Calidris melanotos	R	PB	P	M	M	M
ABNNF11170	Dunlin	Calidris alpina	R	PB	P	M	M	M
ABNNF11190	Stilt Sandpiper	Calidris himantopus	R	PB	P	M	M	M
ABNNF14010	Buff-breasted Sandpiper	Tryngites subruficollis	R	PB	P	M	M	M
ABNNF16010	Short-billed Dowitcher	Limnodromus griseus	R	PB	P	M	M	M
ABNNF16020	Long-billed Dowitcher	Limnodromus scolopaceus	R	PB	P	M	M	M
ABNNF18030	Wilson's Snipe	Gallinago delicata	R	PB, SG	P	B	B	B
ABNNF19020	American Woodcock	Scolopax minor	R	PB, SG	P	B	B	B
ABNNF20010	Wilson's Phalarope	Phalaropus tricolor	R	PB, T	P	M	B	M
ABNNF20020	Red-necked Phalarope	Phalaropus lobatus	R	PB	P	M	M	M
ABNNM03020	Franklin's Gull	Larus pipixcan	R	PB, SC	P	M	M	M
ABNNM03030	Little Gull	Larus minutus	R	PB	P	M	M	A
ABNNM03050	Bonaparte's Gull	Larus philadelphia	R	PB	P	M	M	M
ABNNM03100	Ring-billed Gull	Larus delawarensis	R	PB	P	B	B	B
ABNNM03120	Herring Gull	Larus argentatus	R	PB	P	B	M	M
ABNNM03130	Thayer's Gull	Larus thayeri	R	PB	P	M	M	M
ABNNM03150	Lesser Black-backed Gull	Larus fuscus	R	PB	P	A	M	M
ABNNM03200	Glaucous Gull	Larus hyperboreus	R	PB	P	A	A	M
ABNNM08020	Caspian Tern	Sterna caspia	R	PB	P	M	M	M

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ABNNM08070	Common Tern	Sterna hirundo	R	PB, T	P	B	M	M
ABNNM08090	Forster's Tern	Sterna forsteri	R	PB, SC	P	M	M	B
ABNNM10020	Black Tern	Chlidonias niger	R	PB	P	B	B	B
ABNPB0401a	Rock Dove	Columba livia	PR	PB		P	P	P
ABNPB04040	Mourning Dove	Zenaida macroura	R	PB	P	B	B	B
ABNRB02010	Black-billed Cuckoo	Coccyzus erythropthalmus	R	PB	P	B	B	B
ABNRB02020	Yellow-billed Cuckoo	Coccyzus americanus	R	PB	P	B	B	B
ABNSB01030	Eastern Screech-Owl	Otus asio	PR	PB	P	P	P	P
ABNXD01020	Belted Kingfisher	Ceryle alcyon	R	PB	P	B	B	B
ABNYF04040	Red-headed Woodpecker	Melanerpes erythrocephalus	R	PB	P	B	B	B
ABNYF04170	Red-bellied Woodpecker	Melanerpes carolinus	PR	PB	P	P	P	P
ABNYF05010	Yellow-bellied Sapsucker	Sphyrapicus varius	R	PB	P	B	B	B
ABNYF07030	Downy Woodpecker	Picoides pubescens	PR	PB	P	P	P	P
ABNYF07040	Hairy Woodpecker	Picoides villosus	PR	PB	P	P	P	P
ABNYF07080	Three-toed Woodpecker	Picoides tridactylus	PR	PB	P	WV	WV	WV
ABNYF07090	Black-backed Woodpecker	Picoides arcticus	PR	PB	P	P	WV	WV
ABNYF10020	Northern Flicker	Colaptes auratus	R	PB	P	B	B	B
ABNYF12020	Pileated Woodpecker	Dryocopus pileatus	PR	PB	P	P	P	P
ABPAE32010	Olive-sided Flycatcher	Contopus cooperi	R	PB	P	B	M	M
ABPAE32060	Eastern Wood-Pewee	Contopus virens	R	PB	P	B	B	B
ABPAZ01020	White-breasted Nuthatch	Sitta carolinensis	PR	PB	P	P	P	P
ABPBA01010	Brown Creeper	Certhia americana	R	PB	P	B	B	B
ABPBG06130	Carolina Wren	Thryothorus ludovicianus	R	PB	P	A	WV	WV
ABPBG09010	House Wren	Troglodytes aedon	R	PB	P	B	B	B
ABPBG09050	Winter Wren	Troglodytes troglodytes	R	PB	P	B	M	M
ABPBG10010	Sedge Wren	Cistothorus platensis	R	PB	P	B	B	B
ABPBG10020	Marsh Wren	Cistothorus palustris	R	PB	P	B	B	B
ABPBJ05010	Golden-crowned Kinglet	Regulus satrapa	R	PB	P	B	M	M
ABPBJ05020	Ruby-crowned Kinglet	Regulus calendula	R	PB	P	M	M	M
ABPBJ08010	Blue-gray Gnatcatcher	Polioptila caerulea	R	PB	P	B	B	B
ABPBJ15010	Eastern Bluebird	Sialia sialis	R	PB	P	B	B	B

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ABNSB05010	Great Horned Owl	Bubo virginianus	PR	UB	P	P	P	P
ABNSB06010	Snowy Owl	Nyctea scandiaca	R	PB	P	WV	WV	WV
ABNSB07010	Northern Hawk Owl	Surnia ulula	PR	PB	P	WV	A	A
ABNSB12020	Barred Owl	Strix varia	PR	PB	P	P	P	P
ABNSB12040	Great Gray Owl	Strix nebulosa	PR	PB	P	WV	WV	WV
ABNSB13010	Long-eared Owl	Asio otus	R	PB	P	B	M	M
ABNSB13040	Short-eared Owl	Asio flammeus	R	PB, SC	P	M	M	M
ABNSB15010	Boreal Owl	Aegolius funereus	PR	PB	P	WV	WV	WV
ABNSB15020	Northern Saw-whet Owl	Aegolius acadicus	R	PB	P	B	M	M
ABNTA02020	Common Nighthawk	Chordeiles minor	R	PB	P	B	B	B
ABNTA07070	Whip-poor-will	Caprimulgus vociferus	R	PB	P	B	B	B
ABNUA03010	Chimney Swift	Chaetura pelagica	R	PB	P	B	B	B
ABNUC45010	Ruby-throated Hummingbird	Archilochus colubris	R	PB	P	B	B	B
ABPAE33010	Yellow-bellied Flycatcher	Empidonax flaviventris	R	PB	P	B	M	M
ABPAE33020	Acadian Flycatcher	Empidonax virescens	R	PB, SC	P	A	A	B
ABPAE33030	Alder Flycatcher	Empidonax alnorum	R	PB	P	B	M	M
ABPAE33040	Willow Flycatcher	Empidonax traillii	R	PB	P	B	B	B
ABPAE33070	Least Flycatcher	Empidonax minimus	R	PB	P	B	B	B
ABPAE35020	Eastern Phoebe	Sayornis phoebe	R	PB	P	B	B	B
ABPAE43070	Great Crested Flycatcher	Myiarchus crinitus	R	PB	P	B	B	B
ABPAE52050	Western Kingbird	Tyrannus verticalis	R	PB	P	M	B	M
ABPAE52060	Eastern Kingbird	Tyrannus tyrannus	R	PB	P	B	B	B
ABPAT02010	Horned Lark	Eremophila alpestris	R	PB	P	B	B	B
ABPAU01010	Purple Martin	Progne subis	R	PB	P	B	B	B
ABPAU03010	Tree Swallow	Tachycineta bicolor	R	PB	P	B	B	B
ABPAU07010	Northern Rough-winged Swallow	Stelgidopteryx serripennis	R	PB	P	B	B	B
ABPAU08010	Bank Swallow	Riparia riparia	R	PB	P	B	B	B
ABPAU09010	Cliff Swallow	Petrochelidon pyrrhonota	R	PB	P	B	B	B
ABPAU09030	Barn Swallow	Hirundo rustica	R	PB	P	B	B	B
ABPAV01010	Gray Jay	Perisoreus canadensis	PR	PB	P	P	WV	WV

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ABPAV02020	Blue Jay	Cyanocitta cristata	PR	PB	P	P	P	P
ABPAV10010	American Crow	Corvus brachyrhynchos	PR	PB	P	P	P	P
ABPAV10110	Common Raven	Corvus corax	PR	PB	P	P	WV	A
ABPAW01010	Black-capped Chickadee	Poecile atricapillus	PR	PB	P	P	P	P
ABPAZ01010	Red-breasted Nuthatch	Sitta canadensis	PR	PB	P	P	P	WV
ABPBJ16010	Townsend's Solitaire	Myadestes townsendi	R	PB	P	WV	WV	WV
ABPBJ18080	Veery	Catharus fuscescens	R	PB	P	B	B	B
ABPBJ18090	Gray-cheeked Thrush	Catharus minimus	R	PB	P	M	M	M
ABPBJ18100	Swainson's Thrush	Catharus ustulatus	R	PB	P	M	M	M
ABPBJ18110	Hermit Thrush	Catharus guttatus	R	PB	P	B	M	M
ABPBJ19010	Wood Thrush	Hylocichla mustelina	R	PB	P	B	B	B
ABPBJ20170	American Robin	Turdus migratorius	R	PB	P	B	B	B
ABPBJ22010	Varied Thrush	Ixoreus naevius	R	PB	P	WV	WV	WV
ABPBK01010	Gray Catbird	Dumetella carolinensis	R	PB	P	B	B	B
ABPBK03010	Northern Mockingbird	Mimus polyglottos	R	PB	P	M	M	M/SV
ABPBK06010	Brown Thrasher	Toxostoma rufum	R	PB	P	B	B	B
ABPBK0607a	European Starling	Sturnus vulgaris	PR	UB		P	P	P
ABPBM02050	American Pipit	Anthus rubescens	R	PB	P	M	M	M
ABPBN01010	Bohemian Waxwing	Bombycilla garrulus	R	PB	P	WV	A	A
ABPBN01020	Cedar Waxwing	Bombycilla cedrorum	R	PB	P	B	B	B
ABPBR01020	Northern Shrike	Lanius excubitor	R	PB	P	WV	WV	WV
ABPBR01030	Loggerhead Shrike	Lanius ludovicianus	R	PB, T	P	A	B	B
ABPBW01160	Blue-headed Vireo	Vireo solitarius	R	PB	P	B	M	M
ABPBW01170	Yellow-throated Vireo	Vireo flavifrons	R	PB	P	B	B	B
ABPBW01210	Warbling Vireo	Vireo gilvus	R	PB	P	B	B	B
ABPBW01230	Philadelphia Vireo	Vireo philadelphicus	R	PB	P	M	M	M
ABPBW01240	Red-eyed Vireo	Vireo olivaceus	R	PB	P	B	B	B
ABPBX01020	Blue-winged Warbler	Vermivora pinus	R	PB	P	M	B	B
ABPBX01030	Golden-winged Warbler	Vermivora chrysoptera	R	PB	P	B	M	M
ABPBX01040	Tennessee Warbler	Vermivora peregrina	R	PB	P	M	M	M
ABPBX01050	Orange-crowned Warbler	Vermivora celata	R	PB	P	M	M	M

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ABPBX01060	Nashville Warbler	Vermivora ruficapilla	R	PB	P	B	B	M
ABPBX02010	Northern Parula	Parula americana	R	PB	P	B	M	M
ABPBX03010	Yellow Warbler	Dendroica petechia	R	PB	P	B	B	B
ABPBX03020	Chestnut-sided Warbler	Dendroica pensylvanica	R	PB	P	B	B	B
ABPBX03030	Magnolia Warbler	Dendroica magnolia	R	PB	P	M	M	M
ABPBX03040	Cape May Warbler	Dendroica tigrina	R	PB	P	M	M	M
ABPBX03050	Black-throated Blue Warbler	Dendroica caerulescens	R	PB	P	M/SV	M	M
ABPBX03060	Yellow-rumped Warbler	Dendroica coronata	R	PB	P	B	M	M
ABPBX03100	Black-throated Green Warbler	Dendroica virens	R	PB	P	B	M	M
ABPBX03120	Blackburnian Warbler	Dendroica fusca	R	PB	P	B	M	M
ABPBX03130	Yellow-throated Warbler	Dendroica dominica	R	PB	P	A	A	SV
ABPBX03170	Pine Warbler	Dendroica pinus	R	PB	P	B	M	M
ABPBX03210	Palm Warbler	Dendroica palmarum	R	PB	P	B	M	M
ABPBX03220	Bay-breasted Warbler	Dendroica castanea	R	PB	P	M	M	M
ABPBX03230	Blackpoll Warbler	Dendroica striata	R	PB	P	M	M	M
ABPBX03240	Cerulean Warbler	Dendroica cerulea	R	PB, SC	P	B	B	B
ABPBX05010	Black-and-white Warbler	Mniotilta varia	R	PB	P	B	B	M
ABPBX06010	American Redstart	Setophaga ruticilla	R	PB	P	B	B	B
ABPBX07010	Prothonotary Warbler	Protonotaria citrea	R	PB	P	M	M	M / B (L)
ABPBX10010	Ovenbird	Seiurus aurocapillus	R	PB	P	B	B	B
ABPBX10020	Northern Waterthrush	Seiurus noveboracensis	R	PB	P	B	B	M
ABPBX10030	Louisiana Waterthrush	Seiurus motacilla	R	PB, SC	P	B	B	M
ABPBX11010	Kentucky Warbler	Oporornis formosus	R	PB	P	A	M	M
ABPBX11020	Connecticut Warbler	Oporornis agilis	R	PB	P	B	M	M
ABPBX11030	Mourning Warbler	Oporornis philadelphia	R	PB	P	B	B	M/SV
ABPBX12010	Common Yellowthroat	Geothlypis trichas	R	PB	P	B	B	B
ABPBX16010	Hooded Warbler	Wilsonia citrina	R	PB, SC	P	A	B	M
ABPBX16020	Wilson's Warbler	Wilsonia pusilla	R	PB	P	M	M	M
ABPBX16030	Canada Warbler	Wilsonia canadensis	R	PB	P	B	M	M
ABPBX24010	Yellow-breasted Chat	Icteria virens	R	PB	P	A	M/SV	M/SV
ABPBX45030	Summer Tanager	Piranga rubra	R	PB	P	M/SV	M/SV	M/SV

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ABPBX45040	Scarlet Tanager	Piranga olivacea	R	PB	P	B	B	B
ABPBX45050	Western Tanager	Piranga ludoviciana	R	PB	P	M	M	M
ABPBX60010	Northern Cardinal	Cardinalis cardinalis	PR	PB	P	P	P	P
ABPBX61030	Rose-breasted Grosbeak	Pheucticus ludovicianus	R	PB	P	B	B	B
ABPBX64030	Indigo Bunting	Passerina cyanea	R	PB	P	B	B	B
ABPBX65010	Dickcissel	Spiza americana	R	PB	P	SV	B	B
ABPBX74030	Eastern Towhee	Pipilo erythrophthalmus	R	PB	P	B	B	B
ABPBX94010	American Tree Sparrow	Spizella arborea	R	PB	P	WV	WV	WV
ABPBX94020	Chipping Sparrow	Spizella passerina	R	PB	P	B	B	B
ABPBX94030	Clay-colored Sparrow	Spizella pallida	R	PB	P	B	B	B
ABPBX94050	Field Sparrow	Spizella pusilla	R	PB	P	B	B	B
ABPBX95010	Vesper Sparrow	Pooecetes gramineus	R	PB	P	B	B	B
ABPBX96010	Lark Sparrow	Chondestes grammacus	R	PB	P	A	B	B
ABPBX99010	Savannah Sparrow	Passerculus sandwichensis	R	PB	P	B	B	B
ABPBXA0020	Grasshopper Sparrow	Ammodramus savannarum	R	PB	P	B	B	B
ABPBXA0030	Henslow's Sparrow	Ammodramus henslowii	R	PB, E	P	SV	SV	B
ABPBXA0040	Le Conte's Sparrow	Ammodramus leconteii	R	PB	P	B	B	M
ABPBXA0070	Nelson's Sharp-tailed sparrow	Ammodramus nelsoni	R	PB, SC	P	B	M	M
ABPBXA2010	Fox Sparrow	Passerella iliaca	R	PB	P	M	M	M
ABPBXA3010	Song Sparrow	Melospiza melodia	R	PB	P	B	B	B
ABPBXA3020	Lincoln's Sparrow	Melospiza lincolnii	R	PB	P	B	M	M
ABPBXA3030	Swamp Sparrow	Melospiza georgiana	R	PB	P	B	B	B
ABPBXA4020	White-throated Sparrow	Zonotrichia albicollis	R	PB	P	B	M	M
ABPBXA4040	White-crowned Sparrow	Zonotrichia leucophrys	R	PB	P	M	M	M
ABPBXA4050	Harris's Sparrow	Zonotrichia querula	R	PB	P	M	M	M
ABPBXA5020	Dark-eyed Junco	Junco hyemalis	R	PB	P	B	WV	WV
ABPBXA6020	Lapland Longspur	Calcarius lapponicus	R	PB	P	WV	WV	WV
ABPBXA8010	Snow Bunting	Plectrophenax nivalis	R	PB	P	WV	WV	WV
ABPBXA9010	Bobolink	Dolichonyx oryzivorus	R	PB	P	B	B	B
ABPBXB0010	Red-winged Blackbird	Agelaius phoeniceus	R	UB	P	B	B	B
ABPBXB2020	Eastern Meadowlark	Sturnella magna	R	PB	P	B	B	B

BIRDS								
Element Code[a]	Common Name[a]	Scientific Name	Resident Status[b]	State Legal Status[c]	Federal Legal Status[d]	Mille Lacs Uplands ECS Subsection[e]	Anoka Sand Plain ECS Subsection[e]	Big Woods ECS Subsection[e]
ABPBXB2030	Western Meadowlark	Sturnella neglecta	R	PB	P	B	B	B
ABPBXB3010	Yellow-headed Blackbird	Xanthocephalus xanthocephalus	R	UB	P	B	B	B
ABPBXB5010	Rusty Blackbird	Euphagus carolinus	R	UB	P	M	M	M
ABPBXB5020	Brewer's Blackbird	Euphagus cyanocephalus	R	UB	P	B	B	B
ABPBXB6070	Common Grackle	Quiscalus quiscula	R	UB	P	B	B	B
ABPBXB7030	Brown-headed Cowbird	Molothrus ater	R	PB	P	B	B	B
ABPBXB9070	Orchard Oriole	Icterus spurius	R	PB	P	M/SV	B	B
ABPBXB9190	Baltimore Oriole	Icterus galbula	R	PB	P	B	B	B
ABPBY03010	Pine Grosbeak	Pinicola enucleator	R	PB	P	WV	WV	WV
ABPBY04020	Purple Finch	Carpodacus purpureus	R	PB	P	B	M	M
ABPBY04040	House Finch	Carpodacus mexicanus	PR	PB	P	P	P	P
ABPBY05010	Red Crossbill	Loxia curvirostra	R	PB	P	WV	A	A
ABPBY05020	White-winged Crossbill	Loxia leucoptera	R	PB	P	WV	WV	WV
ABPBY06010	Common Redpoll	Carduelis flammea	R	PB	P	WV	WV	WV
ABPBY06020	Hoary Redpoll	Carduelis hornemanni	R	PB	P	WV	WV	WV
ABPBY06030	Pine Siskin	Carduelis pinus	PR	PB	P	P	P	P
ABPBY06110	American Goldfinch	Carduelis tristis	R	PB	P	B	B	B
ABPBY09020	Evening Grosbeak	Coccothraustes vespertinus	PR	PB	P	M	M	M
ABPBY0902a	House Sparrow	Passer domesticus	PR	UB		P	P	P

MAMMALS								
Element Code[a]	Common Name[a]	Scientific Name	Resident Status[b]	State Legal Status[c]	Federal Legal Status[d]	Mille Lacs Uplands ECS Subsection[e]	Anoka Sand Plain ECS Subsection[e]	Big Woods ECS Subsection[e]
AMAAA01010	Virginia Opossum	Didelphis virginiana	PR	PWA, SG, F		P	P	P
AMABA01010	Cinereus Shrew	Sorex cinereus	PR			P	P	P
AMABA01150	Water Shrew	Sorex palustris	PR			P	P	A
AMABA01190	Arctic Shrew	Sorex arcticus	PR			P	P	P
AMABA01250	Pygmy Shrew	Sorex hoyi	PR			P	P	P
AMABA03010	Northern Short-tailed Shrew	Blarina brevicauda	PR			P	P	P
AMABB04010	Eastern Mole	Scalopus aquaticus	PR			P	P	P
AMABB05010	Star-nosed Mole	Condylura cristata	PR			P	P	A
AMACC01010	Little Brown Bat	Myotis lucifugus	PR			B	P	P
AMACC01150	Northern Myotis	Myotis septentrionalis	PR	SC		B	P	P
AMACC02010	Silver-haired Bat	Lasionycteris noctivagans	R			B	B	B
AMACC03020	Eastern Pipistrelle	Pipistrellus subflavus	PR	SC		P	P	P
AMACC04010	Big Brown Bat	Eptesicus fuscus	PR			P	P	P
AMACC05010	Eastern Red Bat	Lasiurus borealis	R			B	B	B
AMACC05030	Hoary Bat	Lasiurus cinereus	R			B	B	B
AMAEB01040	Eastern Cottontail	Sylvilagus floridanus	PR	PWA, SG		P	P	P
AMAEB03010	Snowshoe Hare	Lepus americanus	PR	PWA, SG		P	A	A
AMAEB03040	White-tailed Jackrabbit	Lepus townsendii	PR	PWA, SG		P	P	P
AMAFB02230	Eastern Chipmunk	Tamias striatus	PR			P	P	P
AMAFB03010	Woodchuck	Marmota monax	PR			P	P	P
AMAFB05090	Thirteen-lined Ground Squirrel	Spermophilus tridecemlineatus	PR			P	P	P
AMAFB05120	Franklin's Ground Squirrel	Spermophilus franklinii	PR			P	P	P
AMAFB07010	Eastern Gray Squirrel	Sciurus carolinensis	PR	PWA, SG		P	P	P
AMAFB07040	Eastern Fox Squirrel	Sciurus niger	PR	PWA, SG		P	P	P
AMAFB08010	Red Squirrel	Tamiasciurus hudsonicus	PR			P	P	P

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AMAFB09010	Southern Flying Squirrel	Glaucomys volans	PR			P	P	P
AMAFB09020	Northern Flying Squirrel	Glaucomys sabrinus	PR			P	A	A
AMAFC02010	Plains Pocket Gopher	Geomys bursarius	PR	UWA		P	P	P
AMAFD01020	Plains Pocket Mouse	Perognathus flavescens	PR	SC		A	P (L)	P (L)
AMAFE01010	American Beaver	Castor canadensis	PR	PWA, SG, F		P	P	P
AMAFF02030	Western Harvest Mouse	Reithrodontomys megalotis	PR			A	P	P
AMAFF0304a	Woodland Deer Mouse	Peromyscus maniculatus gracilis	PR			P	A	A
AMAFF0304b	Prairie Deer Mouse	Peromyscus maniculatus bairdii	PR			P	P	P
AMAFF03070	White-footed Mouse	Peromyscus leucopus	PR			P	P	P
AMAFF09020	Southern Red-backed Vole	Clethrionomys gapperi	PR			P	P	P
AMAFF11010	Meadow Vole	Microtus pennsylvanicus	PR			P	P	P
AMAFF11140	Prairie Vole	Microtus ochrogaster	PR	SC		A	P	P
AMAFF15010	Muskrat	Ondatra zibethicus	PR	PWA, SG, F		P	P	P
AMAFF17010	Southern Bog Lemming	Synaptomys cooperi	PR			P	A	A
AMAFH01010	Meadow Jumping Mouse	Zapus hudsonius	PR			P	P	P
AMAFH02010	Woodland Jumping Mouse	Napaeozapus insignis	PR			P	A	A
AMAFJ01010	North American Porcupine	Erethizon dorsatum	PR	UWA		P	P	A
AMAJA01010	Coyote	Canis latrans	PR	UWA		P	P	P
AMAJA01030	Gray Wolf	Canis lupus	PR	SC	P, T	P	P	A
AMAJA03010	Red Fox	Vulpes vulpes	PR	PWA, SG, F		P	P	P
AMAJA04010	Gray Fox	Urocyon cinereoargenteus	PR	PWA, SG, F		P	P	P
AMAJB01010	American Black Bear	Ursus americanus	PR	PWA, BG	P,	P	P	A
AMAJE02010	Northern Raccoon	Procyon lotor	PR	PWA, SG, F		P	P	P
AMAJF01010	American Marten	Martes americana	PR	PWA, SG, F		P	A	A

MAMMALS								
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AMAJF01020	Fisher	Martes pennanti	PR	PWA, SG, F		P	A	A
AMAJF02010	Ermine	Mustela erminea	PR	UWA		P	P	P
AMAJF02020	Least Weasel	Mustela nivalis	PR	UWA, SC		P	A	A
AMAJF02030	Long-tailed Weasel	Mustela frenata	PR	UWA		A	P	A
AMAJF02050	American Mink	Mustela vison	PR	PWA, SG, F		P	P	P
AMAJF04010	American Badger	Taxidea taxus	PR	PWA, SG, F		P	P	P
AMAJF05010	Eastern Spotted Skunk	Spilogale putorius	A	T		A	P	P
AMAJF06010	Striped Skunk	Mephitis mephitis	PR	UWA		P	P	P
AMAJF10010	Northern River Otter	Lontra canadensis	PR	PWA, SG, F		P	P	P
AMAJH01020	Puma	Puma concolor	PR	PWA, SG, SC	P,	P	P	P
AMAJH03020	Bobcat	Felis rufus	PR	PWA, SG, F	P,	P	P	A
AMALC02010	Mule Deer	Odocoileus hemionus	C	PWA, BG		A	P	P
AMALC02020	White-tailed Deer	Odocoileus virginianus	PR	PWA, BG		P	P	P

AMPHIBIANS AND REPTILES

Element Code[a]	Common Name[a]	Scientific Name	Resident Status[b]	State Legal Status[c]	Federal Legal Status[d]	Mille Lacs Uplands ECS Subsection[e]	Anoka Sand Plain ECS Subsection[e]	Big Woods ECS Subsection[e]
AAAAA01060	Blue-spotted Salamander	Ambystoma laterale	PR			P	P	P
AAAAA01090	Spotted Salamander	Ambystoma maculatum	PR			P (L)	A	A
AAAAA01140	Tiger Salamander	Ambystoma tigrinum	PR			P	P	P
AAAAD08010	Four-toed Salamander	Hemidactylium scutatum	PR	SC		P	A	A
AAAAD12020	Redback Salamander	Plethodon cinereus	PR			P	A	A
AAAAE01040	Mudpuppy	Necturus maculosus	PR			P	P	P
AAAAF01030	Eastern Newt	Notophthalmus viridescens	PR			P	P	P
AAABB01020	American Toad	Bufo americanus	PR	PWA		P	P	P
AAABC02050	Cope's Gray Treefrog	Hyla chrysoscelis	PR	PWA		P	P	P
AAABC02130	Gray Treefrog	Hyla versicolor	PR	PWA		P	P	P
AAABC05070	Western Chorus Frog	Pseudacris triseriata	PR	PWA		P	P	P
AAABC05090	Spring Peeper	Pseudacris crucifer	PR	PWA		P	P	P
AAABH01090	Green Frog	Rana clamitans	PR	PWA		P	P	P
AAABH01170	Northern Leopard Frog	Rana pipiens	PR	PWA		P	P	P
AAABH01190	Mink Frog	Rana septentrionalis	PR	PWA		P	P	A
AAABH01200	Wood Frog	Rana sylvatica	PR	PWA		P	P	P
ARAAB01010	Snapping Turtle	Chelydra serpentina	PR	PWA, SC		P	P	P
ARAAD01010	Painted Turtle	Chrysemys picta	PR	PWA		P	P	P
ARAAD02020	Wood Turtle	Clemmys insculpta	PR	PWA, T		P	P	P
ARAAD04010	Blanding's Turtle	Emydoidea blandingii	PR	PWA, T		P	P	P
ARAAD05040	Common Map Turtle	Graptemys geographica	PR	PWA		P (L)	P (L)	P (L)
ARAAD05080	False Map Turtle	Graptemys pseudogeographica	PR	PWA		P (L)	P (L)	P (L)
ARAAG01020	Smooth Softshell	Apolone mutica	PR	PWA, SC		A	P (L)	P (L)
ARAAG01030	Spiny Softshell	Trionyx spiniferus	PR	PWA		P	P	P
ARACH01100	Prairie Skink	Eumeces septentrionalis	PR			P	P	P
ARADB07010	Racer	Coluber constrictor	PR	SC		A	A	P (L)
ARADB10010	Ringneck Snake	Diadophis punctatus	PR			P (L)	A	A
ARADB13060	Fox Snake	Elaphe vulpina	PR			A	A	P

AMPHIBIANS AND REPTILES								
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ARADB17010	Western Hognose Snake	Heterodon nasicus	PR	SC		A	P	A
ARADB17020	Eastern Hognose Snake	Heterodon platyrhinos	PR			P	P	P (L)
ARADB19050	Milk Snake	Lampropeltis triangulum	PR			A	A	P (L)
ARADB22060	Northern Water Snake	Nerodia sipedon	PR			P (L)	P	P
ARADB26020	Gopher Snake	Pituophis catenifer	PR	SC		P (L)	P	P
ARADB34010	Brown Snake	Storeria dekayi	PR			P	P	P
ARADB34030	Redbelly Snake	Storeria occipitomaculata	PR			P	P	P
ARADB36100	Plains Garter Snake	Thamnophis radix	PR			P	P	P
ARADB36130	Common Garter Snake	Thamnophis sirtalis	PR			P	P	P
ARADB47010	Smooth Green Snake	Liochlorophis vernalis	PR			P	P	P

[a] **Element Code and Species Common Name:** Are standardized nomenclature for GAP protocol uses through NatureServe and it's related searchable plant, animal and ecological communities database called NatureServe Explorer (2002) located at <www.natureserveexplorer.org>.

[b] **Resident Status: R**=Regular resident as Breeding, Nesting, or Migratory (acceptable record exists in at least eight of the past ten years); **PR=**Permanent Resident (exists year-round).

[c] **State Legal Status: E**=State Endangered; **T**=State Threatened; **SC**=State Species of Special Concern; **BG=**Big Game; **SG=**Small Game; **F**=Furbearer; **MW**=Migratory Waterfowl; **UB**=Unprotected Bird; **PB=**Protected Bird; **PWA**=Protected Wild Animal; **UWA**=Unprotected Wild Animal.

[d] **Federal Legal Status: T**=Federal Threatened; **E**=Federal Endangered; **P**=Federal Protection by Migratory Bird Treaty Act and/or Bald Eagle Protection Act and/or CITES.

[e] **ECS Subsection Resident Status: B**=Minnesota breeding record exists for the species; **P**=Presence known or predicted, as year around resident; **(L)**=Limited distribution within ECS Subsection; **M=**Spring or fall migrant, non-breeder; **SV**= Summer visitor, non-breeder; **WV**=Winter visitor, non-breeder; **A**=Absent.

[A] **MNWRAP Disclaimer**: This species list is a representation of the current occurrence of these species based upon Minnesota Ecological Classification System Subsections. The species may not occur everywhere within the Subsection. Animal distributions are dynamic and occurrence revisions may be made as new information becomes available.