



A Long Range Plan for the Management of  
Tax-Forfeited Land and Forest Resources of  
Koochiching County



September 2010 Update



# **A Long Range Plan for the Management of Tax-Forfeited Land & Forest Resources of Koochiching County**

**Recommended to County Board by Advisory Committee: July 7, 2010**

**Adopted: September 14, 2010**

## **Koochiching County Board of Commissioners**

### **Motion 2010/09-20 to Adopt Updated Management Plan**

Motion by Hanson, seconded by Lepper to approve the Long Range Plan for the Management of Tax-Forfeited Land and Forest Resources of Koochiching County and its recommendations as presented by the Advisory Committee with the deletion of the cabin lease fee recommendations on page 1 of the plan and to refer to the Plan for guidance in a separate review and decision of cabin lease fees by the County Board.

Voting yes: Adee, McBride, Hanson, Lepper. Voting no: Pavleck. Motion carried.

*This document updates "A Plan for the Management of the Tax-Forfeited Land and Forest Resources of Koochiching County" first adopted in 1992 and updated in 1995, 1998, and 2003.*

## **Koochiching County Board**

District 1: Wade Pavleck

District 2: Kevin Adee

District 3: Brian McBride

District 4: Charles Lepper

District 5: Michael Hanson

## **Advisory Committee**

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John Snyder (ex-officio)

Frank Swendsen

Marc Windsnes

James Yount

Dennis Hummitzsch, Land Commissioner

Tom Morris, Ass't Land Commissioner (ex-officio)

## **Land and Forestry Department Staff**

Land Commissioner: Dennis Hummitzsch

Assistant Land Commissioner: Tom Morris

Deputy Administrator: Lynette Rousseau

Foresters: Tom Hatfield, Erik Lund, Joe Meres

Dan Neary, Nick Ronning, Gary Sanders, Tom Toratti

## **Prepared with assistance from Consultant Team of:**

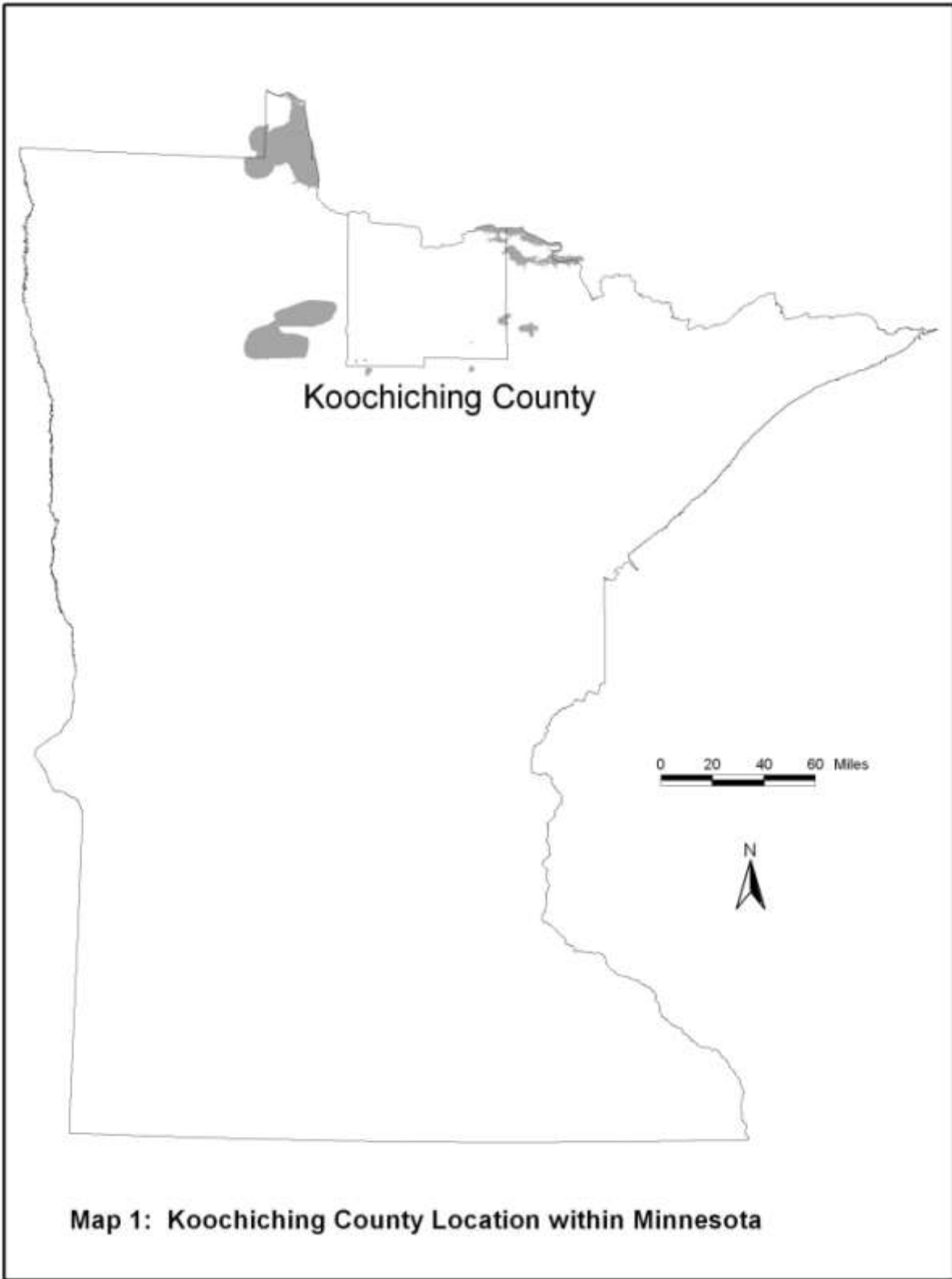
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# 2010 Advisory Committee Recommendations

In addition to the suggested changes in policy contained within the body of this document, the citizens Advisory Committee is forwarding to the Koochiching County Board and Land and Forestry Department a series of recommendations.

## Leases

1. Set new short-term agricultural (hay) lease annual fee on a per acre basis with the fee roughly equaling the current per parcel rate or \$1/acre.

## Access to water bodies

2. The County is encouraged to identify, survey, and sign public lands that provide access to lakes and streams. Further, maps of these lands should be made available to the public.

## Resource Data Inventory

3. The County Board is recommended to seek or provide funding to update tax-forfeited land resource inventory by 2015.

## Monitoring

4. The Land and Forestry Department is recommended to establish a system to monitor compliance with plan progress and various requirements such as those set forth by certification entities.

## Habitat

5. The County is recommended to work with the Minnesota Department of Natural Resources to secure sufficient funding to maintain established habitat plots on county administered land.

## Forest Management Guidance

6. The Forestry Advisory Committee recommended guidance for near-term forest management according to the following general principles and the levels shown in the following table.
  - Relative to current five-year average, accelerate harvest of all cover types over the next ten years.
  - Eliminate all harvestable aspen older than 60 years of age.
  - Variable management of aspen during next ten years after which time goal is 2,313 acres per year, falling to 2,000 acres per year if less than 8% of the aspen acreage has a stand age older than 50 years (including non-harvestable land).

<b>Forest Management for First 10 Years of Management Plan (acres managed per year)</b>							
<b>Year</b>	<b>Aspen</b>	<b>Balm of Gilead</b>	<b>Black Spruce</b>	<b>Balsam Fir</b>	<b>Tamarack</b>	<b>All Other</b>	<b>Total</b>
Current	2,028	228	376	363	50	482	3,527
2010-2011	3,000	289	520	375	264	838	5,286
2012	2,650	289	520	375	264	838	4,936
2013-2014	2,313	289	520	375	264	838	4,599
2015-2019	2,200	289	520	375	264	838	4,486
Average % increase over current level	20%	27%	38%	3%	428%	74%	34%

# Chapter 1.0 Mission

## 1.1 Scope and Purpose

The scope of this plan covers matters related to the use and management of the tax-forfeited lands of Koochiching County. The plan addresses a wide range of topics associated with this management, describes the resource base, and sets forth the County's strategic approach for land and resource management.

The plan serves the following purposes and benefits:

- Provide basic resource data and information regarding the tax-forfeited resource.
- Provide basis for improved management coordination and cooperation with other public agencies and the forest industry.
- Promote continuity of management in the event of personnel changes.
- Identify needs and opportunities associated with management of tax-forfeited land.
- Document Land and Forestry Department responsibilities and policies to provide information for management purposes and facilitate decision-making.
- Set management direction to promote good stewardship of county administered land.
- Provide basis for public commentary on county Land and Forestry Department policy.

## 1.2 Mission

It is the mission of the Koochiching County Land and Forestry Department to:

*“manage tax-forfeited land on a multiple-use, sustained yield basis to provide for the protection, enhancement, and utilization of the various natural resources for the benefit of county residents with consideration for others impacted by its management.”*

## 1.3 Strategic Assumptions

The following assumptions are considered intrinsic to the formulation and execution of this long range resource management plan:

- The tax-forfeited land is held in trust for the citizens of Koochiching County and should be managed in the best interest of those citizens.
- The amount of tax-forfeited land administered by the County will remain essentially unchanged throughout the management period.
- All statutory and regulatory guidelines pertaining to tax-forfeited land will be followed.

- Within the context of managing for multiple uses and values, overall management will generate sustained net income for the County and benefiting local units of government.
- The product of the planning process will be a broad-based resource management plan serving to establish administrative direction and provide a foundation for decision-making.
- Planning is an ongoing process.
- County Board is final authority.

## 1.4 Sustainable Forest Management Policy

A critical component of the Koochiching County Land and Forestry Department's philosophical approach to managing the lands under its care is its adopted Sustainable Forest Management Policy (refer to adopted procedure LP-D1 Sustainable Forest Management Policy).

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As the manager of public lands in the County, the Land and Forestry Department operates on a commercial basis and is required to ensure that an optimal financial return is attained from the use of the forest lands managed by the Land and Forestry Department. At the same time the Land and Forestry Department also has a duty to the people of the county to maintain the recreational and other social values of the forest resource and to protect the long term sustainability of the resource. Sustainable forest management is about striking a balance between economic, social and environmental values in a manner that protects all of these values over time.

The Land and Forestry Department is committed to the principles of sustainable forest management and will manage the lands in our care in accordance with those principles. We will establish a sustainable forest management system (SFMS) that will help us achieve and be environmentally appropriate, socially beneficial and economically viable. Through our SFMS we commit to:

- Protect the integrity and longevity of forest lands under our management;
- Comply with all applicable laws, regulations and voluntary guidelines.
- Acquire and maintain third party certification to the Sustainable Forest Management principles;
- Plan and conduct forest management activities in a manner that:
  - protects and maintains biodiversity across the forest ecosystem;
  - prevents damage and protects forest health and productivity;
  - minimizes chemical use;
  - protects the integrity of riparian areas
  - minimizes aesthetic impact;
  - protects threatened and endangered species and their habitat;
  - conserves areas with special attributes such as cultural, ecological, geological, economic or social attributes; and
  - promotes efficient utilization.
- Promote and incorporate applied research and technology to improve sustainable forest management.

- Enhance public recreation values by providing opportunities for dispersed recreation on County lands.
- Provide public education on forest ecology, sustainable forest management and the economic value of forests.
- Solicit public input on forest management plans, policies and county performance.
- Communicate our performance to the county board, employees, the public and other stakeholders.
- Ensure the capability of our employees and field operators to perform their responsibilities with the highest degree of professionalism.
- Continually improve performance of the SFMS through regular reviews and audits.

### 1.4.1 Economic Development

Another aspect of sustainable forest management is the importance of using the forest resource as the basis for ongoing economic development.

#### Economic Development Policy

1. Minimize or reverse the decline in county population by providing opportunities for new or expanded forest-related jobs.
2. Support increased diversity of forest-related jobs.

## 1.5 Certification

In 2008 Koochiching County's forests were certified under the Sustainable Forest Initiative (SFI) program and in 2009 by the Forest Stewardship Council™ (FSC®). The County sought certification to assure the public and consumers of products from the forest that the lands are managed in an environmentally, economically, and socially sound manner.

Certification may offer an economic advantage to the County and to consumers of its products.

The County intends to manage its forest in a manner that will allow it to retain both certifications.

### FSC® Certification

Under the terms of its certification by FSC® program Koochiching County agrees to adhere, as appropriate to the resource base and area, to the following principles:

1. Compliance with Laws and FSC® Principles  
Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC® Principles and Criteria.
2. Tenure and Use Rights and Responsibilities  
Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
3. Indigenous People's Rights  
The legal and customary rights of indigenous peoples to own, use and

manage their lands, territories, and resources shall be recognized and respected.

4. Community Relations and Worker's Rights  
Forest management operations shall maintain or enhance the long-term social and economic well being of forest workers and local communities.
5. Benefits from the Forest  
Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
6. Environmental Impact  
Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.
7. Management Plan  
A management plan -- appropriate to the scale and intensity of the operations -- shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.
8. Monitoring and Assessment  
Monitoring shall be conducted -- appropriate to the scale and intensity of forest management -- to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.
9. Maintenance of High Conservation Value Forests  
Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.
10. Plantations  
Plantations shall be planned and managed in accordance with Principles 1 - 9, and Principle 10. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

## **SFI Certification**

In keeping with it's responsibilities under certification by the SFI program, Koochiching County agrees to implement and achieve the following principles:

1. Sustainable Forestry

To practice sustainable forestry to meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic that integrates reforestation and the managing, growing, nurturing and harvesting of trees for useful products and ecosystem services such as the conservation of soil, air and water quality, carbon, biological diversity, wildlife and aquatic habitats, recreation, and aesthetics.

2. Forest Productivity and Health

To provide for regeneration after harvest and maintain the productive capacity of the forest land base, and to protect and maintain long-term forest and soil productivity. In addition, to protect forests from economically or environmentally undesirable levels of wildfire, pests, diseases, invasive exotic plants and animals and other damaging agents and thus maintain and improve long-term forest health and productivity.

3. Protection of Water Resources

To protect water bodies and riparian zones, and to conform with best management practices to protect water quality.

4. Protection of Biological Diversity

To manage forests in ways that protect and promote biological diversity, including animal and plant species, wildlife habitats, and ecological or natural community types.

5. Aesthetics and Recreation

To manage the visual impacts of forest operations, and to provide recreational opportunities for the public.

6. Protection of Special Sites

To manage forests and lands of special significance (ecologically, geologically or culturally important) in a manner that protects their integrity and takes into account their unique qualities.

7. Responsible Fiber Sourcing Practices in North America.

To use and promote among other forest landowners sustainable forestry practices that are both scientifically credible and economically, environmentally and socially responsible.

8. Avoidance of Controversial Sources including Illegal Logging in Offshore Fiber Sourcing

To avoid wood fiber from illegally logged forests when procuring fiber outside of North America, and to avoid sourcing fiber from countries without effective social laws.

9. Legal Compliance

To comply with applicable federal, provincial, state, and local forestry and related environmental laws, statutes, and regulations.

10. Research

To support advances in sustainable forest management through forestry research, science and technology.

11. Training and Education

To improve the practice of sustainable forestry through training and education programs.

12. Public Involvement

To broaden the practice of sustainable forestry on public lands through community involvement.

13. Transparency

To broaden the understanding of forest certification to the SFI 2010-2014 Standard by documenting certification audits and making the findings publicly available.

14. Continual Improvement

To continually improve the practice of forest management, and to monitor, measure, and report performance in achieving the commitment to sustainable forestry.

## 1.6 Strategic Management Objectives

Managing public forest lands is a complex balancing act designed to satisfy a wide range of often conflicting objectives and meeting the needs of a broad spectrum of public interests. The following summarizes the strategic objectives that Koochiching County seeks to achieve through its Long Range Resource Management Plan.

### Forest Resource

- Long range age class balance – achieve balanced age class distribution in major cover types.
- Sustain resource base – maintain age stable level of acreage.
- Must meet Sustainable Forestry Policy long range objectives.

### Economic Viability

- Capture of resource growth in sustainable fashion; revenue importance.
- Manage to retain options to provide for existing and future markets of varied products. Retain species mix and species size variation for diverse markets.
- Encourage diversification of forest-related jobs.
- Ensure new and existing forest-related jobs are supported in a way that encourages population growth in the county.

### Multiple Values

- Maintain existing landscape covertypes [plant communities] though objectives to maintain or improve on species mix according to site capability.
- Management of mixed species forests for habitat diversity of wildlife needs.
- Long range management for game species.
- Long range management for recreational/aesthetic values.
- Long range management for habitat type/plant community values.
- Protect water quality, forest hydrology, species diversity sustainably.
- Meet regional landscape needs as is feasible; includes ecological-socio-economic outputs.

## Tactical Management Guidance

- Proportionate distribution of management by forest 'district': to capture all markets, availability to loggers, create wildlife, etc. management across the County.
- Improve forest health and productivity by timely harvest and salvage of problem areas.
- Meet *Voluntary Site-level Forest Management Guideline's for Minnesota* and certification goals and objectives.
- Harvest acres /spatial distribution /age class distribution / landscape management objectives must be tracked for accountability and achievement per district on a quarterly basis.
- Schedule management around seasonal access, infrastructure.
- Prevent any site damage during management; some sites will have seasonal harvest restriction and some may be too wet or remote to ensure regeneration.

## 1.7 Monitoring and Resolution

No plan can anticipate all contingencies.

If the implementation of this management plan becomes problematic due to changing circumstances or unanticipated conflicts, the Koochiching County Land and Forestry Department will recommend changes to the Koochiching Board of Commissioners to make the plan workable. Before making any official changes to the plan the County Board will announce a period of public comment and attempt to contact members of the most recent Forest Advisory Committee directly for their input.

# Chapter 2.0 Plan Context

## 2.1. Economic Context

### Population Trends & Projections

Koochiching County’s population has declined in recent decades and the State Demographers Office projects that the decline will continue over the next few decades although at a lesser rate. The decline between 1990 and 2000 as measured by the US Census was overstated in that a temporary construction workforce present in 1990 subsequently left once the major project was completed.

	US Census		Projections	
	1990	2000	2010	2020
Population	16,299	14,355	13,690	13,400
Change		1,944	665	290
Percent Change		-11.9%	-4.6%	-2.1%

Source: US Census; Minnesota Demographers Office.

As seen in Table 2, the seven-county Arrowhead region has grown and is expected to continue growing in the near future. According to the State Demographers Office’s projections, Koochiching is the only county within the region expected to lose population between now and the year 2020.

	US Census		Projections	
	1990	2000	2010	2020
Population	311,342	322,073	328,360	340,210
Change		10,731	6,287	11,850
Percent Change		3.4%	2.0%	3.6%

\*Includes Aitkin, Carlton, Cook, Itasca, Koochiching, Lake and St. Louis Counties.

Source: US Census; Minnesota Demographers Office

## County Economy

It is no surprise that pulp and paper manufacturing – that is, Boise – is the dominant economic activity in Koochiching County. This dominance is clearly indicated in the following tables.

<b>Economic Sector</b>	<b>No. of Jobs</b>	<b>Percent of County</b>
Government	1,146	17.0%
Manufacturing – pulp/paper	863	12.8%
Retail	779	11.6%
Arts, entertainment, food/drink, lodging	708	10.5%
Medical	591	8.8%
Construction	382	5.7%
Financial, real estate, insurance	369	5.5%
Services	335	5.0%
Transportation	191	2.8%
Timber, logging	188	2.8%
Agriculture	172	2.6%
Manufacturing – other	165	2.5%
Manufacturing – wood products/furniture	144	2.1%
Publishing, information services	106	1.6%
Agriculture/forestry support	49	0.7%
Other	146	2.2%
<b>Totals</b>	<b>6,729</b>	<b>100.0%</b>

Source: MIG 2009<sup>1</sup>

<sup>1</sup> Data and software: Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55802 (www.implan.com).

<b>Economic Sector</b>	<b>Percent of County Total</b>	
	<b>Total Economic Output<sup>1</sup></b>	<b>Value Added<sup>2</sup></b>
Manufacturing – pulp/paper	47.7%	25.5%
Financial, real estate, insurance	10.8%	16.0%
Government	5.9%	13.9%
Construction	4.0%	3.7%
Timber, logging	3.9%	5.7%
Retail	3.8%	6.6%
Medical	3.0%	4.2%
Manufacturing – wood products/furniture	2.7%	1.9%
Arts, entertainment, food/drink, lodging	2.6%	3.0%
Transportation	2.5%	2.9%
Manufacturing – other	2.4%	2.7%
Services	2.1%	2.8%
Publishing, information services	2.1%	1.4%
Agriculture	0.7%	0.6%
Agriculture/forestry support	0.1%	0.3%
Other	5.9%	9.0%

Source: MIG 2009

<sup>1</sup>Total value of goods and services produced by the sector.

<sup>2</sup>Includes employee compensation, proprietary income, other income, indirect business taxes. Often is considered a county's "gross domestic production".

Key observations regarding Koochiching County's economy include:

- Nearly half (47.7%) of total economic output is generated by a single sector, pulp and paper production.
- Over half (55.7%) of the county's output is generated by timber and wood products related industries (this includes half of the transportation sector, which is assumed to be logging related).
- While the government (federal, state, local) sector has the most employment (17.0%), it is exceeded by the combined employment in the timber and wood products sectors (19.8%).
- In terms of value added, which is often considered a county's "gross domestic production", the timber and wood products sectors contribute 34.8% of the county's activity.

In short, wood products dominate the county's economy and thus management of the county's forest resources is critical to the ongoing vitality of the county. Although unlike other northeastern Minnesota counties, Koochiching's tourism sector is relatively under developed, primarily due to a lack of lakes, proper forest management enhances resources that support various aspects of tourism such as hunting, fishing, trails, and general scenic values. Forest management is critical to Koochiching County since the county lies outside the area influenced by ferrous and non-ferrous mining and its remoteness handicaps many other types of manufacturing and economic activity.

## 2.2 Social Context

The social context for viewing forest management in Koochiching County is heavily influenced by the county's size, location on the Canadian border, and reliance on a natural resource based economy.

Koochiching is Minnesota's second largest and second youngest county. It is primarily forested and has a small population and hence low density. The county's remoteness combined with International Falls' reputation as the "Icebox of the Nation" enhances the feeling that this is a frontier community.

The county has experienced a series of economic booms. In the 1890s it had its own short-lived gold rush. This was followed by the logging camp era of timber harvesting. During that same time a system of ditches was developed in an attempt to create extensive tracts of agricultural land.

While those economic endeavors subsided, one business started during that same period has endured. Paper making began at International Falls in 1910 with the help of the simultaneously built power dam on the Rainy River. Now known as Boise, the mill has been the economic backbone of the county ever since.

Supporting the pulp and paper industry is a land base that is primarily publicly owned. The State of Minnesota owns just over half of the land in the county and the County and Forest Capital Partners, a private forest management firm, each own about 14% of the land. There are federal and tribal ownerships and about 15% in non-industrial forest private ownership.

Approximately 18,000 acres of county-administered tax-forfeit land lies inside the boundaries of the Bois Forte Band of Lake Superior Chippewa Reservation. The county manages this land in communication with the Reservation.

The upshot of this history is that residents in the county place great value on the forested landscape for their economic livelihood and sense of place, of who they are. While other forest-based values are important to county residents, the tight, historic connection between the forest and economic survival is the defining characteristic.

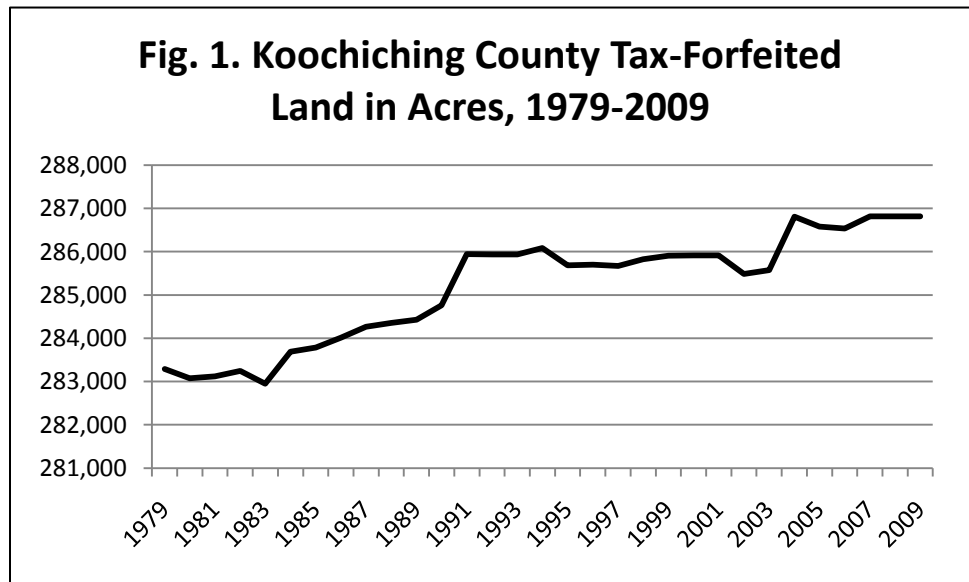
## 2.3 Ecological Context

A description of the characteristics of Koochiching County relative to land form and vegetative cover is provided through the use of National Hierarchical Framework of Ecological Units adopted by various land management entities including Koochiching County. This Ecological Classification System (ECS) is exceptionally well suited to understanding the potential for forest cover and growth and for framing appropriate strategic and tactical management decisions. Appendix A provides details on ECS data and forest dynamics in the county.

# Chapter 3.0 Resource Description

## 3.1. Land Ownership

Over the past 60 years the amount of tax-forfeited land peaked in Koochiching County at just over 300,000 acres. By the early 1970s the amount of tax-forfeited land had decreased slightly to roughly 286,800 acres. Since then, in keeping with County policy to retain and manage these lands for the betterment of the county's economy and for use by residents, the number of acres has remain essentially unchanged. Figure 1 and Table 5 show the pattern of ownership and the nature of the change over the past 30 years.



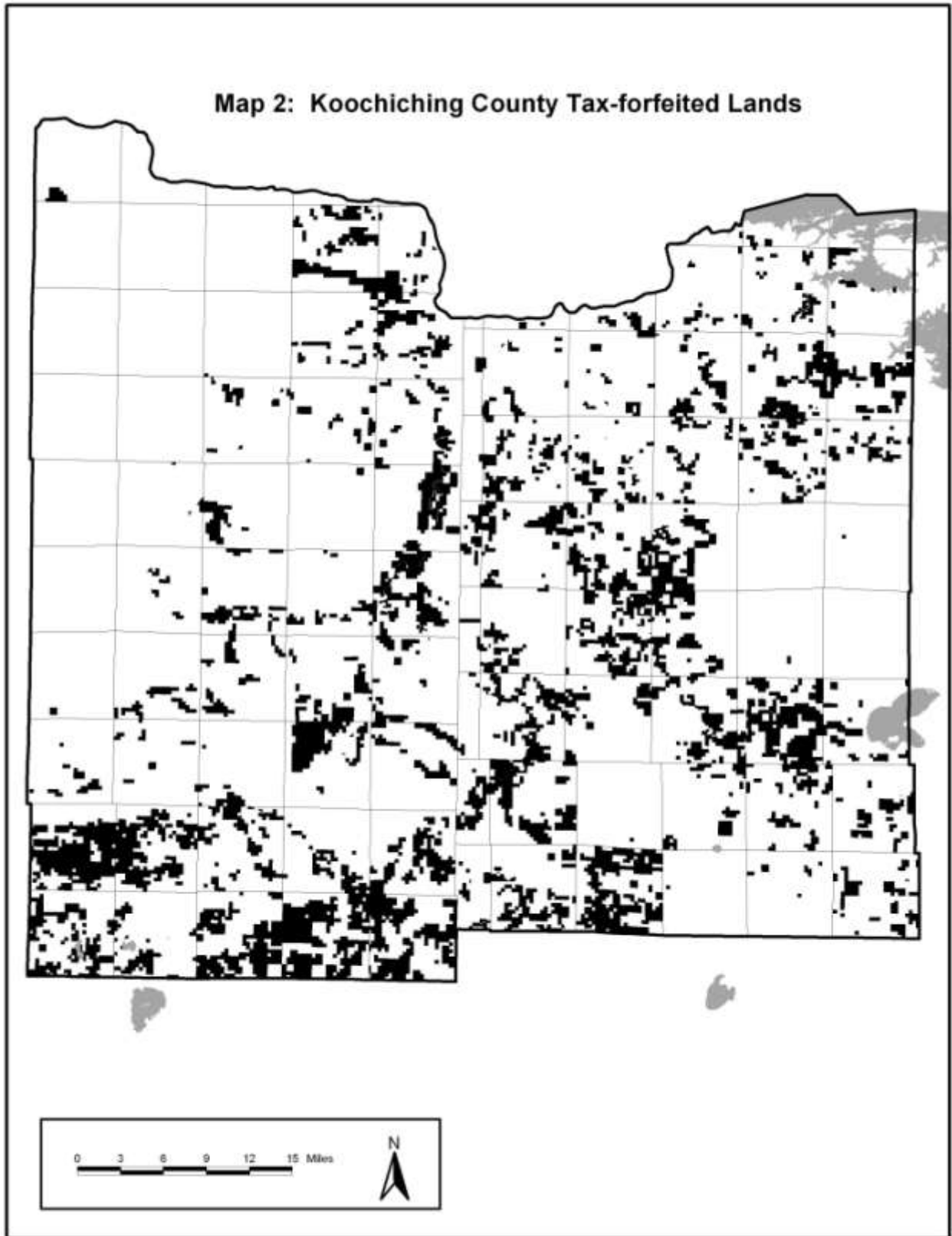
<b>Table 5. Koochiching County Tax-Forfeited Land, Change in Acres 1990-2009</b>			
<b>Year</b>	<b>Newly Forfeited</b>	<b>Disposed</b>	<b>Net Inventory</b>
2009			286,815
2008			286,815
2007			286,815
2006	350	69	286,534
2005	5	49	286,578
2004	35	265	286,808
2003	1,315	80	285,573
2002	90	0	285,483
2001	23	539 <sup>1</sup>	285,918
2000	165	160	285,914
1999	93	89	285,911
1998	487	400	285,823
1997	230	76	285,669
1996	286	287	285,700
1995	11	0	285,689
1994	158 <sup>2</sup>	11	286,082
1993	4	10	285,934
1992	4	11	285,940
1991	1,309 <sup>3</sup>	120	285,947
1990	514	181	284,758

Source: Koochiching County Land and Forestry Department

<sup>1</sup> Includes 175+ acres in land sale and 363+ acres in lease lot exchange.

<sup>2</sup> Includes 145+ acres of peatland.

<sup>3</sup> Includes 1,000 acres of peatland.



Not all tax-forfeited land is forested or, if forested, capable of producing commercial products. Table 6 indicates the number of tax-forfeited acres in basic categories.

<b>Cover</b>	<b>Acres</b>	<b>% of Total</b>
Commercial forest	227,414	80.0%
Stagnant lowland conifer	11,957	4.2%
Lowland grass	2,295	0.8%
Upland grass	399	0.1%
Lowland brush	18,740	6.6%
Upland brush	410	0.1%
Agricultural	179	0.1%
Industrial development	929	0.3%
Roads	474	0.2%
Rock outcrop	460	0.2%
Permanent water	1,009	0.4%
Non-permanent water	18,298	6.4%
Marsh	860	0.3%
Muskeg	579	0.2%
Other	95	<0.1%
<b>Total</b>	<b>284,371</b>	<b>100.0%</b>

### 3.2 Cover Type

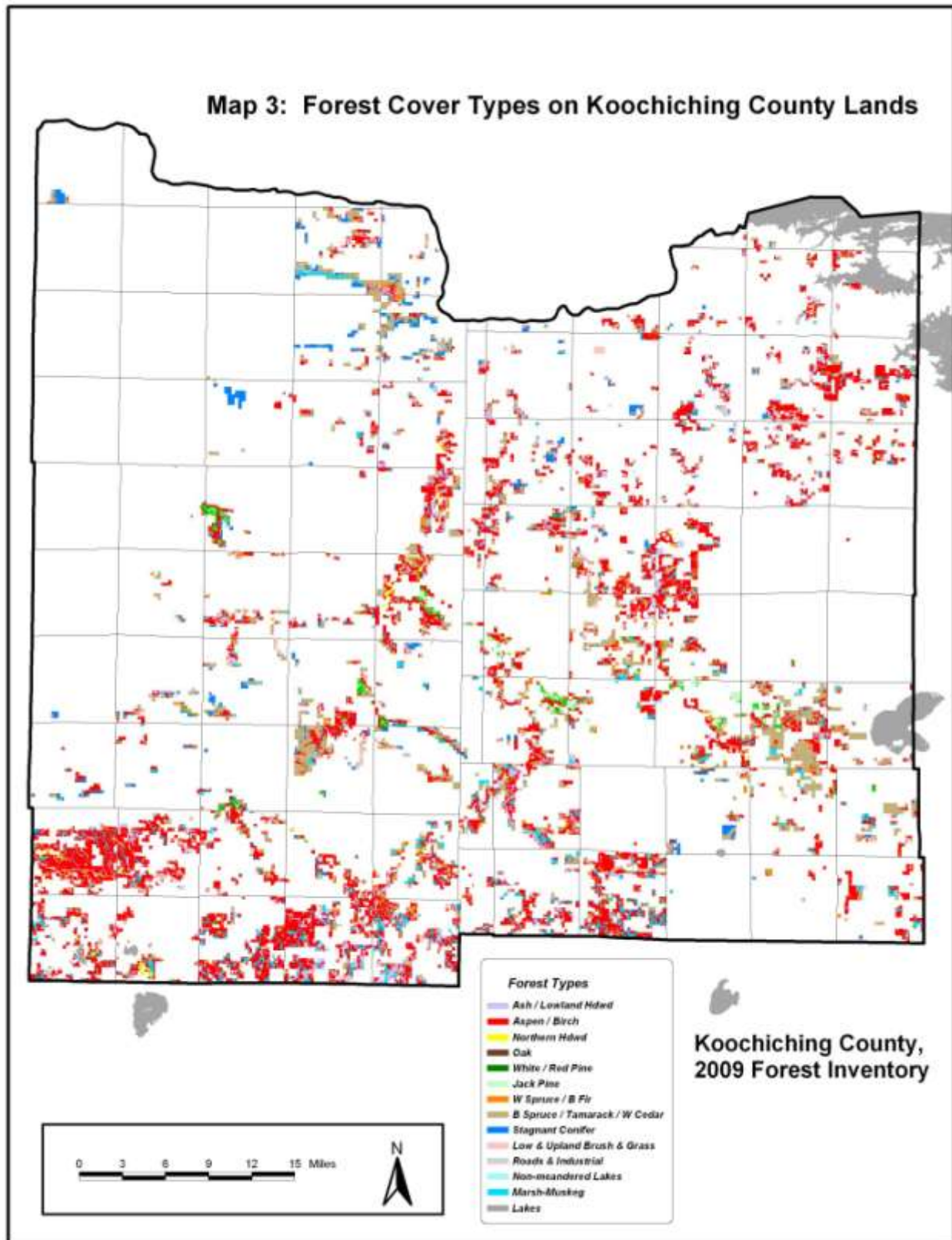
The term “cover type” is used to describe what type of forest (or land use) occupies a given stand. For forested areas, cover type is defined by the dominant overstory tree. However, in most stands there is a mix of species and the dominant, defining species may account for as little as 30% of the trees. Because most trees can occupy a wide variety of ecological sites, cover type does not generally indicate the potential of a given stand to develop into a mature, late-successional forest.

One way to understand forest cover types is to view their distribution by age class (in 10 year increments). Age class distributions can indicate the expected flow of harvestable trees, the character of the forests (young versus old), and stands that may be naturally succeeding into other cover types. Table 7 shows the age class distributions for commercial forestlands on Koochiching County’s tax-forfeited lands in 2009.

Koochiching County Long Range Tax-Forfeited Land & Forest Resource Management Plan

**Table 7. Distribution of Selected Cover Types on Koochiching County Tax-forfeit Lands by 10-year Age Classes, 2009 (acres)**

<b>Cover Type</b>	<b>0-10</b>	<b>11-20</b>	<b>21-30</b>	<b>31-40</b>	<b>41-50</b>	<b>51-60</b>	<b>61-70</b>	<b>71-80</b>	<b>81-90</b>	<b>91-100</b>	<b>101-110</b>	<b>111-120</b>	<b>121+</b>	<b>Total</b>
Ash	72	132	301	677	427	94	1,215	421	771	583	1,010	1,239	4,289	11,230
Lowland Hardwoods	179	16	96	216	531	101	865	1,499	1,036	741	1,878	1,342	3,354	11,855
Aspen	24,553	29,267	20,641	15,772	7,576	4,222	7,764	9,299	3,403	643	52	27	0	123,221
Birch	0	11	10	116	60	65	413	247	377	166	0	24	0	1,491
Balm of Gilead	1,417	428	132	402	191	195	814	1,417	597	126	7	8	0	5,735
Northern Hardwoods	16	0	16	0	70	38	148	420	397	257	133	153	177	1,824
Oak	0	0	0	0	0	0	0	0	0	11	0	9	21	41
White Pine	3	0	0	0	0	3	19	3	0	1	8	22	47	104
Red Pine	117	503	906	577	241	195	245	460	272	180	108	64	88	3,958
Jack Pine	874	1,130	426	367	310	358	599	378	125	14	2	0	0	4,583
White Spruce	50	206	402	443	526	154	71	63	18	37	82	81	26	2,158
Balsam Fir	478	287	235	1,181	970	384	631	1,571	2,066	850	347	107	19	9,125
Black Spruce, lowland	3,974	3,460	1,015	1,800	1,632	615	1,754	4,117	4,094	2,790	2,476	2,178	4,779	34,686
Tamarack	67	104	88	273	708	262	270	172	589	347	339	197	755	4,170
White Cedar	48	40	36	93	153	65	314	489	1,074	1,035	2,290	1,881	5,672	13,191
Black Spruce, upland	104	27	0	0	0	11	0	133	42	17	41	0	0	375
<b>Total</b>	<b>77,384</b>	<b>35,636</b>	<b>24,378</b>	<b>22,102</b>	<b>13,912</b>	<b>7,376</b>	<b>15,679</b>	<b>21,581</b>	<b>15,270</b>	<b>8,532</b>	<b>9,225</b>	<b>8,332</b>	<b>24,974</b>	<b>284,380</b>



### 3.3 Resource Assessment

The potential of the landscape to produce forests is encapsulated in the concept of native plant communities (NPC). The NPCs likely found on Koochiching County tax-forfeited lands were described in Chapter 2. The following table identifies the probable amount of each NPC on tax-forfeited lands.

**Table 8. Estimated Distribution of Native Plant Communities on Koochiching County Tax Forfeited Lands, 2009**

NPC	Name	Acres*	% of Total
APn80	Acid Peatland: Northern Poor Conifer Swamp	5,773	2.0%
FDn33	Fire Dependent: Northern Dry-Mesic Mixed Woodland	10,3742	3.8%
FDn43	Fire Dependent: Northern Mesic Mixed Forest	160,300	56.8%
FPn63	Forested Peatland: Northern Cedar Swamp	31,786	11.3%
FPn71	Forested Peatland: Northern Rich Spruce Swamp	40,164	14.2%
FPn81	Forested Peatland: Northern Rich Tamarack Swamp	17,809	6.3%
MHn35	Mesic Hardwood: Northern Mesic Hardwood Forest	1,683	0.6%
MHn44	Mesic Hardwood: Northern Wet-Mesic Boreal Hardwood-Conifer Forest	2,108	0.7%
MHn46	Mesic Hardwood: Northern Wet-Mesic Hardwood Forest	755	0.3%
MRn83	Northern Mixed Cattail Marsh	124	0.0%
WFn53	Wet Forest: Northern Wet Cedar Forest	390	0.1%
WFn55	Wet Forest: Northern Wet Ash Swamp	3,199	1.1%
WFn64	Wet Forest: Northern Very Wet Ash Swamp	7,023	2.5%
WFn82	Wet Forest:	374	0.1%
Total		282,230	

Source: George Host and Terry Brown.

As noted in the table, Koochiching County's upland forest is dominated by a fire dependent NPC – FDn43 northern mesic mixed forest. More extensive information is available at the MnDNR Division of Forestry website.<sup>2</sup>

Table 9 shows the distribution of forest cover types by NPC on Koochiching County tax-forfeited lands. Some of the NPCs have been grouped due to small amount of acres and/or because management would not likely vary within the type.

<sup>2</sup> For full report see:  
<http://files.dnr.state.mn.us/forestry/ecssilviculture/plantcommunities/FDn43.pdf>.

Cover Type	FDn43	FDn33	MHn	FPn63	FPn71	FPn81	APn80	WFn	Total
Ash	1,895	70	28	2,683	1,607	1,273	115	3,526	11,197
Lowland Hardwoods	9,347		68	1,049	386	195		807	11,852
Aspen	113,556	7,205	2,035				362	47	123,205
Birch	553	122		192	277	140		200	1,484
Balm of Gilead	4,063	758	60	369	144	249	8	80	5,731
Northern Hardwoods	12	18	1,687	74	5			25	1,821
Oak	41								41
White Pine	78	14			6			8	106
Red Pine	3,047	911	11						3,969
Jack Pine	4,065	424	91						4,580
White Spruce	2,020	46	24				20		2,110
Balsam Fir	8,488	397	137				92		9,114
Black Spruce, lowland	1,598	37	18	7,565	15,825	6,584	1,658	1,385	34,670
Tamarack	159			520	1,839	989	134	484	4,125
White Cedar	1,096	188	182	3,254	5,281	1,900		1,297	13,198
Black Spruce, upland	238				130	6			374
<b>Total</b>	<b>150,256</b>	<b>10,190</b>	<b>4,341</b>	<b>15,706</b>	<b>25,500</b>	<b>1,273</b>	<b>2,389</b>	<b>3,526</b>	<b>227,577</b>

\*For ease of summary, the table groups the Mesic Hardwood NPCs (MHn35, 44 and 46) and the Wet Forest NPCs (WFn53, 55, 64, and 85). Also, stands for which no NPC could be assigned are not included in this table.

### 3.4 Lands within Bois Forte Reservation

Approximately 18,000 acres of county-administered tax forfeit land lies within the boundaries of the Bois Forte Band of Lake Superior Chippewa Reservation. A portion of these lands have undivided ownership interest, which are managed by the Bois Forte band and the Bureau of Indian Affairs.

# Chapter 4.0 Department Administration

## 4.1. Assessment

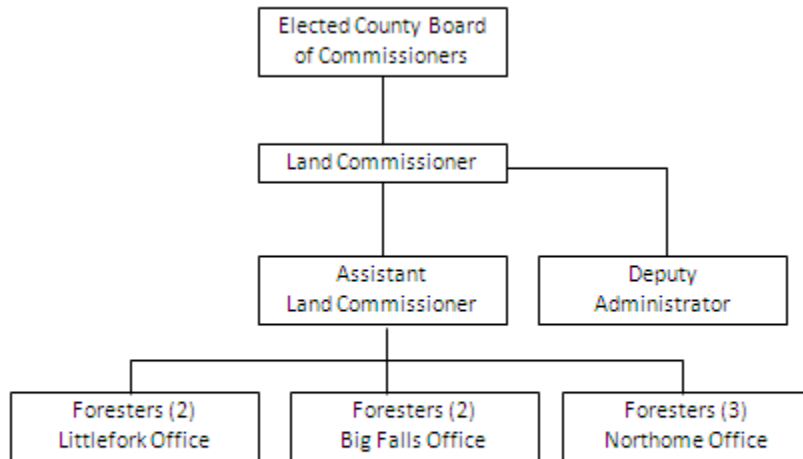
### Department Organization

On behalf of Koochiching County and under the direction of the County Board of Commissioners, the Land and Forestry Department is responsible for administration of roughly 284,000 acres of tax-forfeited land. Areas of activity include land base management (classification, sale, exchanges, easements, and leases), forest management (timber sales, reforestation, stand improvement), forest roads, administration of recreational cabin leases, recreational facilities, and wildlife habitat improvement projects.

Figure 2 shows the department's organizational structure. Map 4 indicates the forester management districts; the area marked "Management Unit" is not assigned to a specific district and is managed by various foresters.

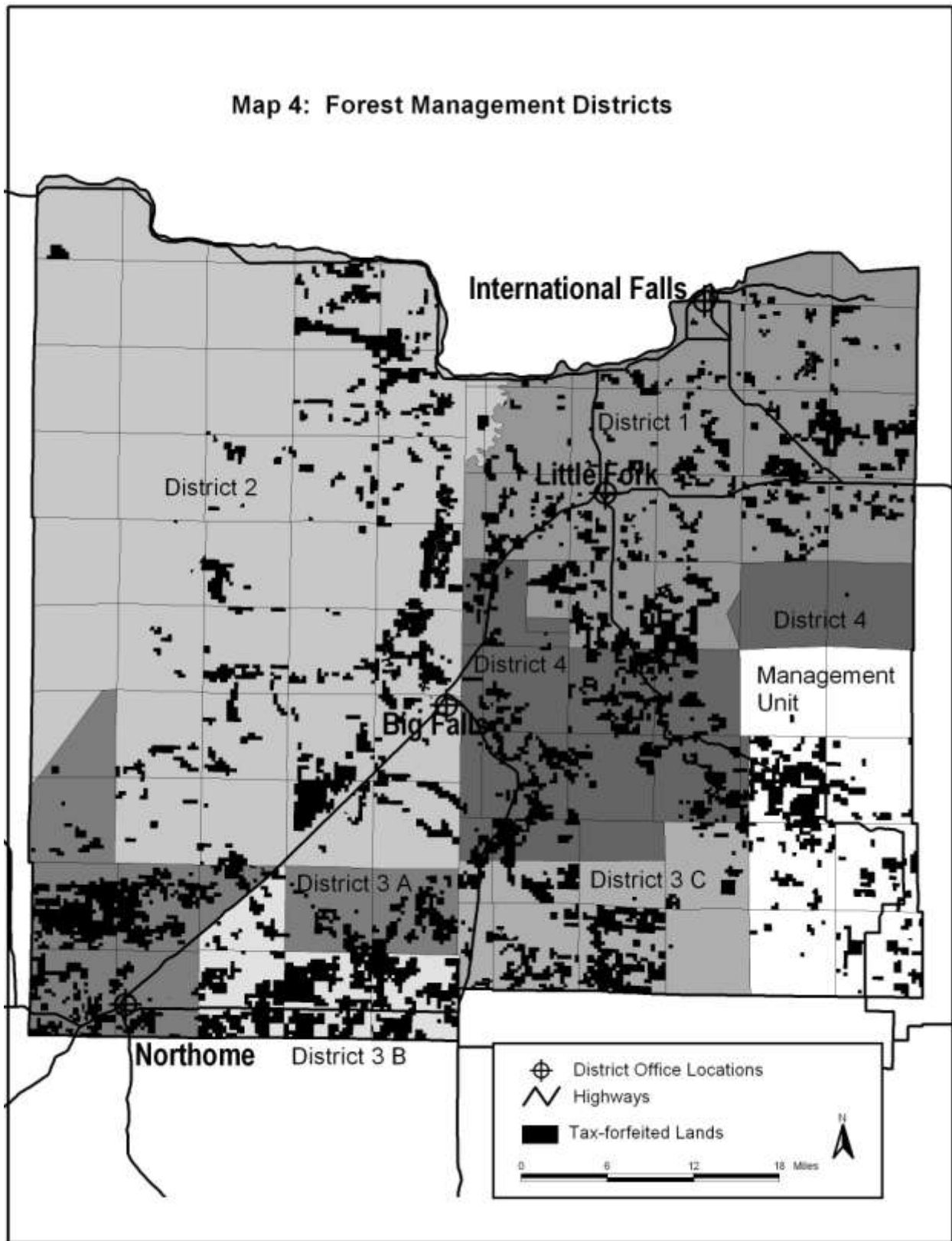
**Figure 2. Koochiching County**

**Land and Forestry Department Organizational Chart**



### Revenue Generation

The Land and Forestry Department receives funding for its program from a variety of sources, but no local property taxes are used to run the department. The department is essentially a financially independent enterprise operation. Management of the stable land base is the primary asset generating revenues for all department activities. As shown in Table 10, the major source of revenue is from the sale of timber.



<b>Year</b>	<b>Timber Sales</b>	<b>Land Sales</b>	<b>Leases / Easements</b>	<b>Gravel</b>	<b>Other</b>	<b>Total</b>	<b>Tax Forfeit Settlement</b>
2009	1,876,768	70,290	32,900	275		1,980,233	1,222,907
2008	2,527,371	10,537	33,260			2,571,168	1,854,301
2007	2,639,104	8,975	35,947	35,947		2,719,972	1,921,100
2006	3,295,535	56,454	32,652	12,693		3,397,334	2,650,860
2005	2,594,913	16,621	32,932	26,272		2,670,738	2,008,130
2004	2,709,902	81,716	33,362	76,550	234	2,901,763	2,253,707
2003	3,180,895	283,919	33,442	5,722	260	3,504,238	2,923,290
2002	3,136,170	23,498	33,122	18,404	719	3,211,913	2,489,319
2001	2,641,188	131,835	36,351	33,873	2,293	2,845,540	2,320,616
2000	2,660,656	18,090	23,247	10,471	3,721	2,716,185	2,163,285
1999	2,511,705	7,863	21,785	17,826	7,256	2,566,434	2,022,388

Department expenses include personnel and costs associated with land management, timber appraisal and sales, administering recreational cabin leases, and maintaining recreational facilities.

The “tax forfeit settlement” is the net funds remaining after expenses are deducted from annual revenues. Distribution of the settlement is determined by state law by which a portion can be retained by the department for reforestation activities and recreational facilities; the remainder is distributed to the County and local taxing jurisdictions. Appendix C shows the apportionment of net receipts since 1999.

In addition to the apportionment of net revenues generated by activities on tax-forfeited land, the county and local jurisdictions receive payments-in-lieu-of-taxes (PILT) from the federal and state governments to help compensate for the large public land holdings within the county. Table 11 shows the PILT paid by the Minnesota DNR and its distribution within the county.

**Table 11. Minnesota DNR Payments-in-lieu-of-taxes (PILT), 2000 - 2009**

Year	General Revenue	Road & Bridge	Social Services	Environmental Services	Land & Forestry Resource Redev.	Total
2009	\$ 712,734	\$ 44,851		\$ 204,693	\$ 183,274	\$1,145,552
2008	790,043	57,613		62,924	172,518	1,093,854
2007	742,174	57,613		64,123	162,480	1,026,390
2006	648,540	139,922		27,550	152,292	968,305
2005	626,544	70,897	\$ 20,000	25,343	143,002	885,786
2004	551,549	117,923		46,613	137,954	854,040
2003	567,598	78,709		45,369	132,792	824,468
2002	438,072	102,165		140,688	130,751	811,676
2001	203,030	303,036		165,419	127,520	799,004
2000					107,218	107,218

### Multi-County Certification Cooperative

In March of 2005, Beltrami, Carlton, Clearwater, Crow Wing and Koochiching Counties began the process of working together to achieve third party certification of their forest management practices. Known as the Minnesota Counties Sustainable Forest Management Certification Co-operative (MN CSFMCC) the group has successfully attained certification by both the Sustainable Forestry Initiative (SFI) and Forest Stewardship Council (FSC®) programs. The County received SFI certification in 2008 and FSC® certification in 2009.

While the certifications are held by the five counties as a group, each county land department is responsible for management of the tax-forfeited lands in its respective county. The counties feel that by working together they are increasing efficiencies, sharing best practices, and reducing costs.

The cooperating counties believe that certification is essential to the long term economic sustainability of the forestry community in the region, insures that forest management will be undertaken with due regard being taken of social and environmental issues, and that certain segments of the retail sector are demanding timber from certified sources and that this demand will only grow over time.

### County Ordinances

Currently there is no ordinance dedicated to governing tax forfeited lands (e.g., recreation travel, camping, etc.) nor is there capacity to enforce one. The County has a shoreland/wetlands ordinance which addresses a limit aspect of use on public lands and the state's timber trespass law focuses on another limited issue. The County's zoning ordinance applies to private structures and uses (e.g., gravel pits, towers) on County administered tax forfeit land.

## Planning and Coordination

Koochiching County has been committed to planning and coordination to guide sound management of its tax-forfeited lands. The initial long range plan was developed in 1992 and was updated in 1995, 1998, and 2003.

Within the context of its long range strategic plans, the Land and Forestry Department develops shorter term tactical plans.

The county participates in a number of regional processes intended to foster coordination. Among these efforts are the five-county management cooperative and multi-jurisdictional landscape level guidance processes.

## Resource Data

The County maintains a detailed inventory of its resources and regularly updates its photo library. However, there is a continual need to enhance the level of information contained in the inventory and keep the data up-to-date. Particular attention must be given to regenerating stands as well as to older stands that may be succeeding into other cover types.

### Administration Policy

Regarding department administration it is the policy of the Koochiching County Land and Forestry Department:

1. The County will actively participate in the Minnesota Counties Sustainable Forest Management Certification Co-operative to insure retention of its third-party certification.
2. By June 1 of each year provide to the County Board an annual review of progress towards achieving the management direction of the Long Range Resource Management Plan.
3. Maintain, enhance, and keep up-to-date the electronic forest inventory database of the County administered tax-forfeited lands.
4. Utilize the inventory database to include information on stand-level management decisions as a means to inform future land managers about current decisions, and, provide the basis for monitoring, evaluating, and modifying management decisions.

## 4.2 Staff Capacity

Implementing the Long Range Resource Management Plan requires an appropriate level of qualified field and office staff. It is the County's intent to maintain such staff capacity throughout the plan period.

## 4.3 Procedures

As part of its participation in the multi-county Sustainable Forestry Cooperative, through which Koochiching County's land receive third-party certification, the Land and Forestry Department may adopt procedures addressing various aspects of its management. Readers are directed to the Land and Forestry Department website for the latest versions [http://www.co.koochiching.mn.us/dept/land\\_&\\_forestry/lafmain.htm](http://www.co.koochiching.mn.us/dept/land_&_forestry/lafmain.htm).

## Chapter 5.0 Land Base Administration: General

### 5.1. Assessment

#### Land Classification

State law (MS 282.01, Subd. 1) requires county boards to classify all tax-forfeited land as either conservation or non-conservation land. Conservation lands are to be retained for county management and non-conservation lands may be sold or transferred.

As guided by statute, classification is to consider such issues as current use of adjacent lands, soil productivity, character of the forest or other growth, access to established roads, schools and public services, and the suitability of the forest resources for management by the county.

As noted in Chapter 3, the county's land base has been relatively stable for the past 30 years with small amounts of land being newly forfeited and equally small amounts being sold or transferred.

Under state law the sale of tax-forfeited lands must be approved by the commissioner of natural resources. Parcels may be sold at public oral auction and for not less than the appraised value, unless the County Board adopts a resolution providing for their sale on terms.

Tax-forfeited land that borders on or is adjacent to meandered lakes and other public waters may be not be sold nor can commercial peatlands (MS 92.461).

The State of Minnesota holds the deed to tax-forfeited lands and owns the mineral rights on county administered lands.

In accord with state law, the county may sell land to adjacent landowners under specific conditions and by County Board resolution. Since 1997, six such sales have been made with five of them occurring in 2000 within the same plat.

#### Land Classification Policy

1. Encourage and facilitate the retention of a stable tax-forfeited land base to provide long-term, multiple-use benefits that meet local needs without compromising overall public benefits.
2. Tax-forfeited land sales should be limited to small tracts, with an emphasis on recent forfeitures and tracts with a higher value use than resource management.
3. Maintain the existing land classification system and update as necessary.
4. The county is to retain appropriate access rights when land is sold or leased.
5. Consider land acquisition on a limited basis primarily for public needs such as land and waterway access sites and recreation areas.
6. Retain county ownership of lands providing public access to lakes, streams, and rivers.

## Limited Use Sales

To encourage growth in the agricultural sector the County has considered making a limited amount of suitable tax-forfeited land available for the expansion of existing successful farm businesses where private land is not available and a lease is not appropriate. Under M.S. 282.03 the County can attach conditions limiting the use of tax forfeit land that it sells. In this way, the County could sell land with the limitation that it be used for long-term agricultural production.

## Agricultural Leases

Long term leases up to 10 years may be issued for farm expansion where there is no prolonged activity to preclude grazing, haying, or other cropping. These leases may be renewed. Currently, there are five such leases covering a total of 140 acres; the oldest lease was executed in 1995 and the most recent one was issued in 2001.

There are also several year-to-year leases of small open fields to farmers to raise hay. These sites tend to be part of other tax-forfeited parcels that provide access to managed areas; thus, these fields cannot be sold or exchanged.

### Agricultural Lease Policy

1. Long-term leases at market rates for farm expansion are to be considered on a limited basis.
2. Short-term leases rates are to be established on a per-acre basis, and, multiple year leases are to be offered to lessees who demonstrate making county approved improvements to the land (e.g., plowing and seeding).

## Land Exchange

The County has the authority to exchange county administered tax-forfeit land for private land. There are many situations in which such exchanges could be considered including exchanging tax-forfeited agricultural land for other land so as to support agricultural activities, gain access to other county land, consolidate land for efficient management, and the like.

County policy has been to ensure that the land being exchanged is of equal value to the degree possible. The land commissioner must determine that value-added status is achieved by the exchange before recommending the action for approval.

Seasonal recreational lease sites are not appropriate as land exchange candidates due their presence in blocks of public land and/or on water ways and the fact that recreational trails and forest management routes run through these areas.

### Land Exchange Policy

1. Equal value land exchanges should be considered where the exchange clearly benefits the county.
2. Tax-forfeited land on which seasonal recreational cabin leases are located shall not be considered for land exchange.

## Leases

Tax-forfeited land may be leased under the authority of the county auditor via the land commissioner upon County Board approval to individuals, corporations, or units of government. Leases may be granted for any number of uses including recreation, agriculture, gravel and sand removal, peat removal, and other temporary uses.

### **Gravel/Sand, Peat and Rock Quarries**

As noted, leases may be granted to private firms or individuals for the purpose of operating gravel/sand pits, removing peat, or quarrying rock. It has been the County's practice to not issue such leases but rather to have the County or an approved unit of government, such as Mn/DOT, operate the pits. In this way, the public resource remains in public control. However, private individuals and firms may purchase such materials through a County-operated pit.

### **Lease Policy**

1. No leases to private entities will be considered or approved for gravel and sand extraction or rock quarrying.
2. Approving requested leases should be considered if the lease generates net income to the county and does not preclude public use of the land.

## Easements

Under terms prescribed by the County Board, easements may be granted for roadway or utility right-of-way. Tax-forfeited land affected by easements may be subsequently sold or leased, but the sale or lease is subject to the easement.

## Special Use Deeds

Tax-forfeited land may be conveyed by deed to any governmental subdivision for any authorized public use. The deed of conveyance is more like a lease in that ownership is transferred for a specific public use and reverts back to the county if no longer used for that purpose. Since 1999 the county has issued nine special use deeds with the most recent one in 2007. The specified uses of these leases are: recreation facilities (3), economic development (3), cemetery, city sign, and street/utility right of way.

# Chapter 6.0 Land Base Administration: Recreational Cabin Leases & Structures

## 6.1. Assessment

### Recreational Cabin Leases

The County can issue leases under which individuals can locate small recreational cabins on tax-forfeited land. These leases only cover the land under the cabins and immediately adjacent to them; the leases do not grant exclusive use to any of the public land around the cabins.

Koochiching County has a long history of issuing leases to individuals or groups of individuals allowing them to place small seasonal recreation cabins, primarily for hunting, on tax-forfeited lands. This practice was common across most northern Minnesota counties.

Currently Koochiching has 246 such leases although new leases are not being issued. Existing leases can be transferred to new owners. The annual lease rate is \$130. The cabins are valued and taxed as personal property.

The number of leases issued by the County has been capped in accordance with a density limitation. The County does not allow recreational cabin leases to be within one mile of another County lease, a Forest Capital cabin lease, or a house or cabin on private property. This effectively caps the number of available leases at the current number.

Forest Capital Partners also offers leases for recreational cabins. The firm has issued 190 leases in Koochiching County for an annual fee of \$350.

Five other counties still offer recreational cabin leases. None are issuing new leases although Itasca County is now offering campsite leases for the temporary placement of removal trailers and campers. The lease rates range from \$150 in Becker County to \$350 in Itasca; for its lakeshore leases St. Louis County charges 2.6% of the cabin's appraised value with a minimum of \$225.

Cabin leases are non-transferrable. When a current leaseholder wishes to terminate his/her lease, the lease is cancelled. The current leaseholder can remove their cabin and other structures or, most usually, sell them as a private transaction to another party, who, in turn, must seek a new lease for that site.

Land and Forestry Department staff irregularly inspects cabins, usually when leases are re-issued, additional name is added, or when harvest operations are in the area.

### Recreational Cabin Lease Policy

1. Existing leases are to be continued and, upon voluntary termination by the lessee, may be re-issued by the county to a new party. The total number of leases is not to be increased.
2. Leases are non-transferable. Terminated or surrendered leases returned to the County, which may re-issue them.

3. Annual lease fees for seasonal recreational cabins is to be approximately 90% of the average fees charged by the two other recreational cabin leasing entities in Koochiching County.
4. The fee to cancel a lease or to add a name to one is to be one-half the annual lease fee but not less than \$75.
5. In addition to the annual lease rate, in accordance with state statute the County Auditor shall assess cabins as personal property.
6. Lessees must affix a Land and Forestry Department issued sign on the cabin. Lessee shall not post no hunting/trespassing signs anywhere on county land, structures, or the lease site cabin.
7. Land and Forestry Department staff must approve the access route to a leased cabin site.
8. Cabins shall be a movable single story structure, not exceeding 576 square feet in area. An additional single story storage structure not exceeding 64 square feet in area may be built. Lessee shall provide a small, outhouse in good sanitary condition. The Land and Forestry Department may establish additional guidelines and restrictions on building design, construction, and condition.
9. Cabins must be used for seasonal recreational purposes and shall not be used for permanent residence or commercial use.
10. The Land and Forestry Department shall establish explicit terms under which leases may be terminated and the procedure for termination.

## **Other Structures**

Long-standing practice in Koochiching County has allowed individuals to erect small structures for the purposes of hunting. Some of these hunting stands are attached to trees while others are free-standing. Currently, there are no guidelines or regulations concerning such stands. Because of the intermingling of properties, the County will work with the Minnesota DNR on a common policy for such structures that would apply to both land bases.

Although the number of occurrences is low, there is the potential for people to leave camping trailers, recreational vehicles and the like on county land. There have been instances where people try to “reserve” hunting areas by positioning an unit on the land weeks before hunting season. While there is no county ordinance prohibiting such practice, the County does not condone it.

### **Unauthorized Structures Policy**

1. The County will coordinate its policy on structures with that of the Minnesota DNR unless circumstances specify differently.

# Chapter 7.0 Recreation Facilities and Trails

## 7.1. Assessment

Recreational use of county-administered tax-forfeit lands is important to residents and visitors. Besides enhancing the area’s quality of life, these uses contribute to the county’s economic vitality.

The county satisfies recreational needs in a variety of ways. One is to maintain a diverse landscape that provides opportunities for dispersed recreational uses such as hunting, hiking, and wildlife observation. The county also owns and operates a number of recreational facilities as noted in Table 12.

<b>Table 12. County Owned and Maintained Recreational Facilities</b>				
<b>Facility</b>	<b>Boat Ramp</b>	<b>Water Access</b>	<b>Camping</b>	<b>Day Use</b>
Black Crappie Campsite		X	X	X
Bobber Bay Campsite		X	X	X
Clear Lake Access	X	X		X
Cormorant Campsite		X	X	X
Dark Lake Access	X	X		
Dentaybow Access		X		
Fish Camp Campsite		X	X	X
Frontier Access	X	X	X	X
Ivan Crawford Access		X		X
Kueffner’s Landing		X		X
Little American Falls			X	X
Loman Park	X	X		X
Nelson Park (Birchdale) Access	X	X	X	X
Rainy River Wayside				X
Rat Root Picnic Site				X
Samuelson Park		X	X	X
Seretha Lake Access	X	X		X
Shelter Rock Campsite		X	X	X
Teufer Lake Access		X		X
Upper Sault Access	X	X		X
Vidas Access	X	X		X
Watson Landing	X	X		

Recreational trails of various types crisscross the county. There is an estimated 300 miles of snowmobile trails, many of which cross tax-forfeited land via easements. In addition, many of the county’s forest management roads are open to recreational trail use, motorized and non-motorized.

It should be noted that other landowners including the State, Voyageurs National Park, and industrial forest managers, allow recreational uses across their lands.

There is concern that a number of dedicated public access lands, many created as the result of approved plats along lakes and streams, are not known or used and in some cases are being improperly privatized by adjoining landowners. Since few of these lands are signed and there is no published map of them, few people are aware they exist. These parcels can provide access to water bodies for boating, fishing, and day uses.

Because of their highly intermingled lands the county and Minnesota DNR conducted a joint process regarding the use of motorized recreational vehicles (OHV, ATV, etc.) across their lands. The two entities agreed on a policy whereby forest roads and trails are open to such use unless specifically posted closed. Off trail travel, except for the purpose of big game hunting, is prohibited.

### **Recreational Facilities and Trails Policy**

Regarding recreation uses on tax-forfeited land it is the policy of the Koochiching County Land and Forestry Department:

1. Provide recreational opportunities for the public on county administered lands including camping, picnicking, boat access areas, and cross-country ski / forest walking trails.
2. Developed recreational facilities will feature a relatively primitive level of development.
3. User fees will not be charged for use of county recreation areas.
4. Forest roads and trails on county administered land is open to use by motorized recreational vehicles (OHV, ATV) unless specifically marked or posted closed to such use.
5. The County is encouraged to identify, survey, and sign public lands that provide access to lakes and streams. Further, maps of these lands should be made available to the public.

## Chapter 8.0 Forest Roads

### 8.1. Assessment

The Land and Forestry Department manages forest roads whose purpose is to provide access to the land for management purposes. While portions of some of the roads also serve as recreational trails, they are distinguished from recreational trails by their forest road designations.

County forest roads are divided into three categories as follows:

- All-season (summer) roads: These are drivable during all seasons. These roads vary in design but usually have a 16-18 foot driving surface, are graveled, and ditched. There are approximately 70 miles of these roads.
- Seasonal – summer roads: These are between summer and winter roads in their level of development. They cost less than summer roads to develop, are generally seasonal in nature, and are useable only during summer when soil conditions are reasonably dry. There are approximately 50 miles of these roads.
- Winter roads: These are useable only after the ground is solidly frozen. They provide access to areas where soil and ground water conditions make the construction of summer roads impractical. They are generally narrowed than all-season roads and are not ditched or graveled. Winter roads are not maintained. There are approximately 110 miles of these roads that are identified as winter access routes (and which may serve as off highway vehicle routes).

In addition to the above roads, there are approximately 100 miles of routes that receive minor use, recreational use, or are winter use routes.

There are also roughly 100 miles of former Township roads whose quality varies, are generally not maintained, and whose season of use varies. The county is working to establish prescriptive easements across key portions of these roads that provide access to public lands for forest management or recreation.

Finally, there are 486 miles of Judicial Ditch Grades, which are under the jurisdiction of the County Board. These routes have variable quality, are minimally maintained, and are used for forestry or winter OHV travel.

In some instances county forest roads provide access to forestlands owned by other parties such as the state or private owners. Conversely, in some instances, the county uses state or private roads to access some of its lands. Cooperative ventures are encouraged wherever practicable to prevent duplication and reduce costs.

Roads may be gated to control access during harvest operations or to prevent damage to the roads or adjacent lands from unauthorized uses.

There are no plans to construct additional summer all-season roads.

#### **Forest Road Policy**

Regarding forest roads it is the policy of the Koochiching County Land and Forestry Department:

1. Pursue all-season, seasonal-summer, and winter forest access road development to meet timber access and recreational use needs.

2. Roads may be gated seasonally as required to prevent damage, to control access, and during times of fire danger.
3. Develop non-motorized use trails and support other recreational trail development.
4. Follow road construction and maintenance guidelines in *Voluntary Site-level Forest Management Guidelines* for Minnesota.
5. Continue cooperative efforts with other landowners regarding road maintenance, protection, and development of summer access.
6. Funds from net Land and Forestry income are to be set aside for forest road development and maintenance.
7. Support snowmobile trail development with non-conflicting easements and limited development within the state grants-in-aid program.

## Chapter 9.0 Habitat

### 9.1. Assessment

Koochiching County has long considered wildlife habitat in its management. While game species have received special attention, general habitat concerns are part of forest management. Recent innovations, such as ecological classification and the ability to define and map native plant communities are increasing the capacity to undertake enhanced habitat management.

#### Species of Concern

Koochiching is one of the few remaining counties for which a Minnesota County Biological Survey by the Minnesota Department of Natural Resources has not yet been conducted. However, the DNR has identified a number of species known to exist in the county with either federal or state status as rare, threatened, endangered or special concern species. Table B-1 in Appendix B lists these species.

*Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife* is a strategic plan focused on managing populations of "species in greatest conservation need" (SGCN), which are defined as animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. There are 292 species in Minnesota that meet this definition.

#### Biodiversity Management Strategy

In 2009 Koochiching County, as part of its multi-county third-party certification program, formally adopted a procedure (LD-PS5) regarding Stand and Landscape – Biodiversity Management strategies. The purpose of that procedure is to:

- Define the landscape which include land department managed lands;
- Set general objectives which promote diversity across the forested landscape at stand and landscape levels;
- Maintain and improve wildlife habitat as an integral part of a comprehensive land management program on land department managed lands; and
- Foster greater understanding of the biophysical and social influences which affect the various landscape components.

In Procedure LD-PS5, the county defined landscape management as "an attempt to maintain forest structures within the landscape as the forest changes over time." It notes that while managing forests at the site level is necessary for operational practicality, "managing solely at the site level without attention to larger scale influences may fail to maintain the multiple ecological, social, and environmental values society expects from its forests over time." The procedure notes that "understanding this balance will promote conservation and ensure availability of these resources through time with a certain regulation of need which does not allow exploitation."

The procedure sets forth two levels of strategy:

- Strategy for Scattered Ownership
  - Apply voluntary site level guidelines to site level activities.
  - Incorporate stand level elements into project plans to preserve and promote wildlife and wildlife habitat.
  - Landscape species objectives.
  - Protect sites with special attributes.
  - Monitor performance.
  - Participation in landscape programs and initiatives.
- Strategy for Contiguous Ownership
  - Include all strategies for scattered ownership.
  - Knowledge of landscape based management objectives.
  - Precautionary approach.

That last strategy is critically important. As stated in the county's procedure, the precautionary approach is: "While knowledge is the foundation of solid landscape management methodologies, the Land and Forestry Department recognizes that it cannot postpone action until all the data and information is in place. There will always be a need for more and better information to act upon. Our actions will be based on experience and the most reliable and complete information available at the time a decision is made and actions are implemented. Therefore, the Land and Forestry Department will take affirmative steps to ensure that forested landscape, species, and genetic diversity are maintained by ensuring sufficient amounts of native habitats are present on Land and Forestry Department Managed Lands."

#### Coarse filter / fine filter approach

Koochiching County has adopted a policy of a dual level "coarse filter / fine filter" approach to habitat. The "coarse filter" aspect is achieved by striving to insure that all major habitats are represented on the landscape; the underlying premise is that if the habitats exist they will be capable of supporting the various species and biotic communities that depend upon them. The "fine filter" level is undertaken through direct management for individual species when such action is required or desired.

Table B-2 in Appendix B presents the definitions of the coarse level habitats applied to Koochiching County. These definitions were originally generated by the US Forest Service for use in northern Minnesota. Table B-3 shows the amount of each coarse level habitat on Koochiching County's tax-forfeited lands. It is followed by a general assessment of habitat distribution.

### **Focused Management for Habitat**

The county specially manages portions of its land base for wildlife habitat. Generally this management is done for game species and is undertaken in conjunction with hunter walking trail areas. The county has a memorandum of understanding with the Ruffed Grouse Society to manage acreage for grouse and woodcock.

In addition, the county incorporates site-specific actions at the stand level to enhance habitat. The following are the habitat elements that may be incorporated into project plans.

- Timing of activity, where timing is beneficial to wildlife;

- Physical spacing of activities, where spacing is beneficial to wildlife;
- Timber reserves within or adjacent to the project area not less than 5% of the area;
- Reserve trees left at the rate of 6-12 trees per acre;
- Food sources reserved;
- Den trees reserved;
- Riparian zones identified with filter strips used;
- Eagle, osprey, heron, goshawk nests buffered;
- Coarse woody debris reserved > 4 leave logs per acre;
- Management on extended rotation
- Establishment of long-lived conifers near streams to provide shade and in-stream structure;
- Retention of 60 basal area within riparian zone for trout streams;
- Re-vegetation of roads and landings to provide forest openings;
- Management of vegetative mixtures to propagate/encourage threatened or endangered species, where such management is documented in the project plan;
- Projects which enhance known populations of threatened or endangered species;
- Other elements which specifically benefit wildlife; and
- Projects designed specifically to enhance wildlife habitat.

### **Habitat Management Policy**

Regarding wildlife habitat it is the policy of the Koochiching County Land and Forestry Department:

1. Integrate wildlife management guidelines into timber sale design and other management activities on county administered lands.
2. Field staff will incorporate at least four wildlife habitat elements into at least 85% of all project plans.

## Chapter 10.0 Forest Management

### 10.1. Assessment

#### Aspen Cover Type

Aspen timber types are a dominant covertype across the county landscape and at one time exhibited a very narrow age structure due to the absence of disturbance. That situation has changed as management has responded to increased market demand and uses for aspen. Forest managers have taken advantage of this commercial interest in aspen, and along with natural events, have made positive strides in balancing aspen age structure to provide for sustained harvest over time. In Koochiching County, more work in balancing the age structure remains. Currently, 28% of aspen timber types are older than 50 years, which for this region is considered mature.

Primarily in response to management the amount of both old and young aspen forest is decreasing as age class balance is being achieved. The goal in Koochiching County is to maintain a mix of ages in order to sustain biodiversity and sound flow of forest products.

For twenty years Koochiching County had accelerated its aspen harvest schedule in order to eliminate the backlog of old stands. This acceleration helped capture mortality, and better balanced the age classes in a shorter time frame to achieve the long term sustainability harvest objectives. Harvest is based on acre control with allowances for some fluctuation to better provide fiber flow.

#### Black Spruce Cover Type

Black spruce is important for fiber supply and for wildlife species, and is one of the most abundant conifers of North America. Black spruce currently occupies nearly 38,000 acres of lowland type, some acres of upland type including white spruce, as well as over 6,000 acres of stagnant black spruce on county Tax Forfeited Lands. It is a species of economic significance for pulp and small sawlog or boltwood.

#### Jack Pine Cover Type

Jack pine timber types are limited in area across the landscape and are an important plant community for wildlife species and provide an important economic benefit. Jack pine is valued for pulp, small sawlog or boltwood. Current inventory suggests that the species occupies just under 5,000 acres. It is difficult to maintain a sustainable acreage harvest in Koochiching due to limited stand acreage and age structure. Some conversion to red pine is an option due to the market demand for its future products.

#### Northern Hardwoods and Birch Cover Types

Management objectives for northern hardwood types have been to attempt to maintain and improve these stands. Northern hardwood types are becoming increasingly more valuable as a pulp species with some limited saw/veneer products. Stands with mature aspen component should be considered for

removal of that component to capture its fiber, while maintaining covertime integrity.

### **Red / White Pine Cover Types**

Red and white pine are still significant economic species for both sawlog and pulp but also for specialty products such as utility poles and cabin poles. These two species provide a significant environmental function in that they are valued for wildlife habitat and aesthetics. They currently occupy approximately 4,000 acres of county managed land, a landscape relationship similar to pre-settlement.

### **Balsam Fir & White Spruce Cover Types**

Balsam fir types are managed as a significant pulp and small sawlog species. Balsam fir also significantly contributes to wildlife habitat in that it provides thermal cover for many species of birds and mammals. Due to poor markets two to three decades ago and to recent sawfly infestation, mature balsam has had significant decadence and loss. Balsam often grows in concert with aspen and management seeks to maintain it as a component in these areas.

White spruce is a significant upland species valued for pulpwood and sawlogs and as a significant wildlife habitat species. Because of these values, white spruce acreage should be maintained if not increased where remnant stands exist. Currently white spruce covertime consists of 2,200 acres.

### **Tamarack and Northern White Cedar Cover Types**

Both tamarack and northern white cedar have not been valued as significant economic species for pulp or sawlogs. Nonetheless, these species are important environmentally and do have markets. The county seeks to increase the quality of these species and their use and to ensure their productive existence across the landscape and ensure that their existing covertime be maintained. Cautious attempts at harvest of cedar will be undertaken to understand reproductive site needs and create young age classes of cedar critical for future deer yard and other wildlife needs. Of 13,200 acres of white cedar covertime only 1,200 acres is under 70 years old and of that, only 100 acres is 30 years or under.

### **Lowland Hardwoods and Ash Cover Types**

Lowland hardwoods are composed mainly of black and green ash, red maple, and elm. These species have been largely ignored due to their sporadic value as a commercial species. However, these species play an important roll in contributing to the ecological health of the lowlands they occupy. When managed, their overall productivity can be economically viable for a wide range of pulp and saw products.

### **Timber Management Policy**

Regarding timber management it is the policy of the Koochiching County Land and Forestry Department:

1. Manage forested peatlands for timber production with consideration of other forest values including wildlife, water quality, and recreation. Other peatland use possibilities will be considered and explored as feasible.
2. Manage county administered land for multiple uses to provide for:

- a. The long-term availability of a sustainable yield of timber to be sold on a fair and equitable basis.
  - b. The availability, protection and enhancement of the many values of forested land, including recreational opportunities, wildlife habitat, soil and water quality, and scenic values.
  - c. Long-term maximum benefit to the tax-forfeited trust fund in the interest of the citizens of Koochiching County by managing county land for its highest productive forest value.
3. Timber sales:
- a. Timber sales are to be by volume sold: 65% Intermediate Auction, 35% Regular Auction, 0-5% Informal-Direct Sales.
  - b. Informal-Direct Sales will be used for management purposes only.
  - c. Minimum of four auctions will be held each year.
  - d. Sale period will be for one to three years from date of purchase.
  - e. Intermediate timber sales permits are non-transferrable but may be extended one year.
4. The protection of the full range of forest ecosystems and other environmental values is fundamental to sustainable forest management. It entails the maintenance of the ecological processes that sustain forest ecosystems, the conservation of the biological diversity associated with forests (particularly endangered and vulnerable species and communities). Conserving biodiversity through forest management has at least three different components:
- Maintaining sufficient amounts of all native habitats across the landscape so that no species becomes endangered. This is referred to as the "coarse filter" approach (Hunter 1990).
  - Addressing specific habitat and other needs of already endangered species-the "fine filter" approach (Hunter 1990).
  - Providing some form of reserve areas (e.g., National Parks, Wilderness Areas) for each forest type.
- The Land and Forestry Department will strive to maintain each of the three components outlined above.
5. Protecting the conservation and commercial values of forests necessitates protecting forest areas from the potentially harmful effects of diseases, weeds, pests (including feral animals), chemicals and wildfire. It also involves preserving the productive capacity of the forest through conservation of nutrients and protecting the soils. The Land and Forestry Department gives high priority to the protection of public forests from damaging agents.
6. For both environmental and commercial reasons the Land and Forestry Department will seek to use the minimum quantities of chemicals in its operations.
7. Balsam bough harvesting will only be allowed through issuance of permits by the Land and Forestry Department.
8. Birch bark harvesting will only be allowed with Land and Forestry Department permission.

## 10.2 General Silvicultural Practices

### Site Level Activities

The County has adopted the *Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers* (February 1999) adopted by the Minnesota Forest Resources Council. These guidelines direct forest management activities across a range of topics including harvest, riparian zones, forest road construction, and more. On a stand by stand basis the County will consider applying extended rotation ages and adjust harvest intensity for any harvesting in or adjacent to riparian zones.

#### Site Level Management Policy

1. Adopt *Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines* as County policy.

### Stand Evaluation

Stands are evaluated as part of the preliminary phase of the timber sale process. Some evaluated stands will not be designated for immediate harvest but will still have the updated information entered into the resource inventory. A revised “green sheet” will be used to record information.

Items to be included in the stand evaluation are: presence of rare, threatened or endangered species; historical and cultural values; ground typing of forest ecological system; required coordination with other landowners; visual management qualities and recreational values; landscape scale management objectives; timing and season of harvest; all Site-Level Guidelines; check for presence of exotic species that should be eliminated; riparian zone, wetlands or similar concerns; status of regeneration.

### Harvest Intensity

The intensity of harvest for a given stand is determined by the cover type, the forest ecological system, patch characteristics, and overall management objectives (e.g., conversion, maintenance of type, etc.). The range of potential intensities is large. In general terms it includes various forms of these approaches: even-aged harvests, clearcuts, seed tree, shelterwood, salvage, two-aged regeneration, uneven-aged regeneration, single tree selection, intermediate harvests, non-timber harvest, management for understory, non-timber products, and stand evaluation visits. The following cover type management summary sheets indicate the likely methods to be used for each cover type.

### Patch Management

In forestry a patch is defined as an area of forest that is relatively homogeneous in structure, primarily in height and density, and differs from the surrounding forest. It may be one stand or a group of stands. Historically patch size dynamics have not been fully considered in forest management across the state. The primary exception to this pattern is areas where game species management, especially ruffed grouse, has been emphasized; in these areas smaller patches with lots of edge have been stressed. Recent years have seen greater

consideration for patch size, particularly to provide more variety with an emphasis on larger patches to emulate natural disturbance regimes.

Beginning with its last long range resource management plan, Koochiching County has taken the strategic tact of promoting a Patch size distribution that tends to favor larger, aggregated patches. The exceptions to this general guidance are areas where management objectives, such as wildlife considerations, support smaller forest patches.

## Riparian Zones

In areas up to 200 feet of lakeshore, streams and wetlands the County will exercise special management practices as directed by the *Site-Level Guidelines* and other County policies. Management will consider ecological and scenic / visual quality issues when managing these lands. Roughly half of this land is in older and half in younger forest. Older forest stands will be considered for old forest management.

## Fire

Primary responsibility for fighting fire lies with the Minnesota Department of Natural Resources.

The County will use prescribed fire for certain management activities. Burns will be contracted with and may be done in coordination with the MnDNR, USFS and others as appropriate. All burns will follow standards and procedures modified from both State and Federal guidelines. Contracts for prescribed burns will follow the current Koochiching County contract policy.

## Pest Control

The County monitors its lands for signs of pest infestations. Because of its greater staff resources primary control of pests lies with the MnDNR.

The County utilizes up-to-date Integrated Pest Management (IPM) strategies to reduce potential for pest infestations. These are updated through workshops and information from the MnDNR and USFS.

Of particular interest to Koochiching County are such pests as emerald ash borer, gypsy moth, eastern larch beetle and spruce bud worm. and perhaps other pests with serious potential to harm county resources.

At the sign of a potential infestation or insect outbreak county staff will contact MnDNR Forest Health Specialists to help assess the situation and devise an appropriate response.

## Exotic Species

The County monitors its lands for signs of undesired exotic species. In general range of species being looked for are trees and upland shrubs. The policy is to remove such species when they occur in situations where they jeopardize stand or area management objectives. The County may confer with MnDNR and USFS specialists when devising appropriate measures to address a particular situation.

## Non-Timber Products

The County will allow gathering of various non-timber resources and products as long as such activity is conducted in a manner not to endanger sustainability of the forest resource. Balsam bough harvesting will be handled through permits. Birch bark gathering will only be allowed on sites at which there are timber harvest permits and then with the permission of the harvest permittee.

## Reforestation

As noted in the cover type summary sheets, reforestation depends upon the cover type / species. Natural regeneration is relied upon whenever possible or viable; this includes monitoring for advanced regeneration prior to harvest.

Artificial regeneration (planting, seeding) will be used when appropriate for the target species. Artificially regenerated stands will have stand specific management objectives. These will address the need for artificial versus natural regeneration, long-term objective for the stand, the use of artificial planting to mimic natural regeneration processes, and the stand's desired characteristics throughout its developmental cycle. Trees chosen to be planted will be indigenous species appropriate to the NPC. Among the possible measures to be used to allow artificially regenerated stands to better achieve the characteristics of a natural forest are:

- Leave areas of natural vegetation untreated by herbicides in the understory;
- Where possible, leave live trees and snags;
- Leave coarse woody debris with general practice being to "lop and scatter" slash. Small piles may be used to create desired micro-habitat.
- Leave select strips or patches untreated to enhance diversity;
- Use herbicides at rates that allow for establishment of the target cover type species yet allow others to regenerate naturally;
- Allow occurring tree species to survive to enhance diversity.
- Use planting and chemical application techniques which focus disturbance and application on just the immediate area of each planted seedling.
- Preserve hardwood tree and shrub components when thinning.
- Release desirable hardwood species with good growth characteristics when thinning.
- Reduce canopy coverage over unique or high diversity areas when thinning.
- Allow non-target pine regeneration to accumulate under target pine trees (ex: white pine within a red pine stand).

Stands will be converted based on the forest ecological system on which they lie. That is, pine will be planted only on sites which are appropriate for pine forests.

Certain species require site preparation for successful regeneration or conversion. The County uses mechanical scarification wherever appropriate and viable. Otherwise, every precaution is taken to avoid damage to the site during harvest.

The use of chemicals to prepare a site or release a regenerating forest is kept to the minimum. All applications are in accord with pertinent instructions and regulations. No aerial applications will be made.

Certain species of significance to Koochiching County are difficult to successfully regenerate. Key among these are jack pine and white pine both of which fall prey to browsing by deer. Koochiching County intends to use a variety of approaches to regenerate these species. These will include: focusing regeneration on ecological systems that best support the species; using physical methods such as bud-capping to prevent browsing; using non-toxic chemical means to discourage browsing; and to work with the DNR on focused culling of the deer herd to give young trees a chance to grow past the high risk browsing stage.

## **Inclusions**

The County has a general objective of retaining and maintaining inclusions in order to enhance species and site diversity and retain mix of merchantable timber. Inclusions to be managed will vary but include upland conifer within deciduous stands and aspen clones within hardwood stands. Among the practices to be considered for inclusion management are:

- Apply crown release or selective thinning to target species where they co-occur in merchantable size classes;
- Apply seedling release, canopy reduction, or over-story removal where target species are well-developed and suitable for release;
- Apply crop tree or seedling release, bud capping, or other non-commercial treatments as resources allow;
- Leave mature inclusions on unique micro-sites unharvested; and
- Identify stands with managed inclusions in the forest inventory.

## **Planned Retention**

The County has the general objective to retain reserve patches within harvest units in order to: retain structure, den sites, and food sources for wildlife; provide refugia for sensitive plants, invertebrates, and micro-organisms allowing quick recovery and recolonization; provide a seed source; and maintain tree species diversity. Among the practices to be considered are:

- Retain roughly 5% of harvest unit in undisturbed clumps, strips, or islands. On harvest units 15 acres or greater in size.
- Favor areas with diverse or intact plant communities and/or unique micro-sites.
- Avoid any equipment operation within retained areas especially in summer harvest.
- Retain equivalent number of scattered leave trees where retaining patch is not feasible.

## **Natural Disturbance**

After a fire or wind event, severe outbreak of disease, or pest infestation, Koochiching County staff evaluates the affected stand(s) according to the following general procedures:

- Assess the stand for immediate and future management actions. This assessment involves consideration of the Forest Ecological System, surviving trees (type, condition, age), and defined management objectives (including recreational activities) for the area. Based on this assessment the County will prepare an action plan that integrates strategic and tactical considerations.
- Salvage merchantable timber. If the action plan determines that salvage is desired and feasible, a salvage timber sale will be designed and implemented.
- Revise inventory and management schedules. As part of the County's annual inventory update, information reflecting the stand's new condition and status (e.g., change in cover type) would be entered into the database. Staff would also re-examine its management schedules (strategic and tactical) to determine if and how they should be revised to reflect the impacts of the natural disturbance and any timber salvage that occurs.

### NPC Management

The native plant community (NPC) of a stand will help guide forester decisions regarding stand-specific management. That is, the NPC of a site may determine that an aspen stand should be managed to foster regeneration of white spruce and balsam fir or that pine should be introduced as a secondary species. NPC will also assist decisions regarding management and harvest techniques.

## 10.3 Forest Management Guidance

The Forestry Advisory Committee recommended guidance for near-term forest management according to the following general principles and the levels shown in Table 13.

- Relative to current five-year average, accelerate harvest of all cover types over the next ten years.
- Eliminate all harvestable aspen older than 60 years of age.
- Variable management of aspen during next ten years after which time goal is 2,313 acres per year, falling to 2,000 acres per year if less than 8% of the aspen acreage has a stand age older than 50 years (including non-harvestable land).

Year	Aspen	Balm of Gilead	Black Spruce	Balsam Fir	Tamarack	All Other	Total
Current	2,028	228	376	363	50	482	3,527
2010-2011	3,000	289	520	375	264	838	5,286
2012	2,650	289	520	375	264	838	4,936
2013-2014	2,313	289	520	375	264	838	4,599
2015-2019	2,200	289	520	375	264	838	4,486
Average % increase over current level	20%	27%	38%	3%	428%	74%	34%

## 10.4 Cover Type Management

The following pages provide key information regarding the County's strategic management direction for each of the major forest cover types. "Cover type" is the term used by foresters to describe individual forest stands. A stand is typed by the dominant tree species but in most stands there are many other tree species.

The information provided for each cover type is:

- **Age Class Distribution:** number of acres within 20-year age classes in the base year.
- **General Landscape Objective:** a short statement of the basic purpose of County management for this cover type.
- **Native Plant Community:** listing of NPCs on which the species is most suited.
- **General Management Direction:** statements indicating overall management for this cover type.
- **Harvest Guidance:** states the standards for harvesting this cover type.
- **Other Management Notes:** additional notes regarding management of the cover type.

**Strategic Timber Management:  
ASH-LOWLAND HARDWOODS**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41- 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Ash	204	978	521	1,636	1,354	2,249	4,289	11,231
Lowland Hardwoods	195	312	632	2,364	1,777	3,220	3,354	11,854

**General Landscape Objective:**  
Maintain the amount of cover type acres.

**Native Plant Community:**  
In Koochiching County, these cover types do best on FPn63 and FPn71. Ash also does well on WFn55.

**General Management Direction:**  
Determine the most productive areas for lowland hardwoods and ash.  
Identify areas which are conducive to quality sawlog and extended rotation silviculture. Establish these areas for long term productive capacity for sawlogs and other higher value products.  
Identify areas for pulpwood rotation production and manage accordingly.  
Increase harvest of aspen/Balm of Gilead components in patches, etc. in stands over 60 years old. Aspen/Balm of Gilead in these stands are decadent and have shorter rotation than hardwoods. Identified acreage having aspen/Balm of Gilead as second or third species will be harvested above current hardwood levels to capture mortality. Hardwood harvest levels will be adjusted in next 10 year planning decade.  
Reforest to same type hardwood or mixed stand as much as possible on those acres. Some sites may be inoperable, especially river corridor 'flats' with steep terrain. Consider some areas for their high conservation value and create management plans accordingly.

**Harvest Guidance:**  
Ash: harvest 50-100 acres per year.  
Lowland hardwoods: harvest 300-350 acres per year.  
Examine all stands over age 50 for potential select tree or other forms of management.  
Harvest at age 100.  
No clearcut harvests.  
Target stands with high aspen / Balm of Gilead component.

**Other Management Notes:**  
Actual annual harvest levels may be irregular, driven by erratic market demand.  
Concern for adverse impacts on water table (i.e., "swamping") may minimize if not eliminate any heavy harvesting in a given stand.  
Ash and lowland hardwood inclusions will be reserved in other cover types.  
The potential future impact of emerald ash borer, which is currently not present within the county, is an unknown factor. Management directions will be amended if and when the insect is found in the county.

**Strategic Timber Management:  
ASPEN - BALM of GILEAD**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Aspen	53,820	36,413	11,798	17,063	4,046	79	0	123,219
Balm of Gilead	1,845	534	386	2,231	723	15	0	5,734

**General Landscape Objective:**  
Maintain existing aspen / Balm of Gilead acres on the landscape with a age class distribution supporting young and early mature forest and some older forest.

**Native Plant Community:**  
In Koochiching County, these cover types do best on FDn43, FDn33, and MHn44.

**General Management Direction:**  
Identify decadent and mature aspen stands, especially those in decline. Determine if the type is suitable for the site using available information. If the type is suited for the site, plan harvest per age class harvest scenario. Use native plant community and Marshner’s pre-settlement vegetation mapping to plan future components to mimic and maintain said vegetation.  
Aspen trending to conifers should emphasize conifer retention within reasonable commercial marketing considerations.  
Aspen trending to hardwoods should retain a mix of hardwoods. Consideration can be given to conifer introduction via spot seeding/planting to encourage conifer presence in stands lacking it.  
Aspen stands showing cedar or having cedar stump remnants should be considered for saving all residual cedar and if possible or feasible re-establish cedar (e.g., aerial seed after limited scarification during harvest).

**Harvest Guidance:**  
Aspen will be harvested between the ages of 45 and 60.  
Goal will be to establish relatively even age-class sizes under age 45 by the year 2060.  
Within 50 years the goal is to have 8% of the total cover type acres over age 50.  
Balm of Gilead will be harvested at age 50 with no concern for even flow of acres or volume.  
For aspen, between 2010 and 2019 harvest levels will be:

- Years 1-2: 3,000 acres
- Year 3: 2,650 acres.
- Years 4-5: 2,313 acres.
- Years 6-10: 2,200 acres.

After 2019 goal is 2,313 acres per year, falling to 2,000 acres per year if less than 8% of the aspen acreage has a stand age older than 50 years (including non-harvestable land).  
For Balm of Gilead, between 2010 and 2019 harvest 289 acres per year. After that, harvest level will be determined by amount of acres reaching harvest age.

**Other Management Notes:**

**Strategic Timber Management:  
BIRCH**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41- 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Birch	11	126	125	660	543	24	0	1,489

**General Landscape Objective:**  
To maintain the amount of birch on the landscape and improve the quality of the stands.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FDn43 and FDn33.

**General Management Direction:**  
Identify areas which are conducive to quality sawlog and extended rotation silviculture. Establish these areas for long term productive capacity for sawlogs and other higher value products.  
Designate some stands for their high conservation value and create management plan accordingly.  
Identify areas for pulpwood production and manage accordingly.  
Look for and evaluate areas in all hardwood types to increase upland northern white cedar as a component.

**Harvest Guidance:**  
Harvest at age 60.  
No concern for even flow of acres or volume.  
Between 2010 and 2019 harvest 125 acres per year. After that, harvest level will be determined by amount of acres reaching harvest age.

**Other Management Notes:**

**Strategic Timber Management:  
NORTHERN HARDWOODS - OAK**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Northern hardwoods	16	16	108	568	654	286	177	1,825
Oak	0	0	0	0	11	9	21	41

**General Landscape Objective:**  
To maintain the amount of northern hardwoods and oak on the landscape and improve the quality of the stands.

**Native Plant Community:**  
In Koochiching County, these cover types do best on MHn35 and FDn33.

**General Management Direction:**  
Identify areas which are conducive to quality sawlog and extended rotation silviculture. Establish these areas for long term productive capacity for sawlogs and other higher value products.  
Designate some stands for their high conservation value and create management plan accordingly.  
Identify areas for pulpwood production and manage accordingly.  
Look for and evaluate areas in all hardwood types to increase upland northern white cedar as a component.

**Harvest Guidance:**  
Harvest northern hardwoods at age 100.  
Harvest oak at age 100.  
Between 2010 and 2019 harvest 75 acres per year. After that, harvest level will be determined by amount of acres reaching harvest age (thins and final harvest).

**Other Management Notes:**  
Seek opportunities to increase oak as a component in other forest types on appropriate NPCs.

**Strategic Timber Management:  
RED/WHITE PINE**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
White Pine	3	0	3	22	1	30	47	106
Red Pine	620	1,483	436	705	452	172	88	3,956

**General Landscape Objective:**  
Maintain amount of red and white pine forest and, when feasible, increase acres of these types.

**Native Plant Community:**  
In Koochiching County, these cover types do best on FDn43 and FDn33.

**General Management Direction:**  
White pine is being allowed to grow without active management. Any harvesting will be on a salvage basis. Intent is to retain the current extent of this forest and explore opportunities to increase white pine either as a type or a component in other types.  
Maintain natural pine stands to oldest silvicultural age reasonable. Thin these stands as needed to maintain full stocking while retaining some natural stand diversity. Identify existing high conservation value stands and identify potential new such stands and create appropriate management plans.  
Identify areas which are conducive for quality pine sawlog production and longer rotation silviculture. Establish these areas for long-term productive capacity for sawlog and other higher value products. Consider converting different and less productive types within these areas to pine.  
Consider areas for pine pulpwood production and manage accordingly.

**Harvest Guidance:**  
White pine is not harvested except on a salvage basis.  
Red pine stands will have multiple thins before a final harvest at age 100-140.

**Other Management Notes:**

**Strategic Timber Management:  
JACK PINE**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Jack Pine	2,004	793	668	977	139	2	0	4,583

**General Landscape Objective:**  
Maintain existing acres of jack pine type and to the extent possible increase acres.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FDn43 and FDn33.

**General Management Direction:**  
Enhance current acreage of jack pine timber types.  
Priority attention will be given to identify areas that have historically grown jack pine, but have converted to other types. Consider restoring some or all of these areas to jack pine (as a type or as a component) using one or more techniques such as planting or seeding.

**Harvest Guidance:**  
Harvest stands at age 60 with the maximum annual acreage not to exceed 80 acres.

**Other Management Notes:**

**Strategic Timber Management:  
WHITE SPRUCE**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41- 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
White Spruce	256	845	680	134	55	163	26	2,159

**General Landscape Objective:**  
Increase the amount of white spruce on the landscape.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FDn43 and MHn44.

**General Management Direction:**  
Determine areas where white spruce can be introduced. Look for white spruce stand component increase opportunities in aspen or hardwood sites and non-stocked upland areas. Opportunity for seeding may exist in aspen harvest areas, or after light scarification, and immediate aerial seeding of spruce.  
Use relevant information to determine most productive sites for white spruce Identify areas best suited for quality sawlog and extended rotation white spruce opportunities.  
Determine those areas best suited for pulpwood management and manage accordingly.

**Harvest Guidance:**  
Harvest will occur between the ages of 60 – 100.

**Other Management Notes:**

**Strategic Timber Management:  
BALSAM FIR**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Balsam Fir	765	1,416	1,354	2,202	2,916	454	19	9,126

**General Landscape Objective:**  
Retain current level of balsam fir as a cover type and enhance it as a component in other types, especially aspen.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FDn43 and FDn33.

**General Management Direction:**  
Determine areas where balsam fir can be grown most productively and areas where it can be best managed in a long term healthy condition.  
Determine what areas will be best suited for small sawlog management or pulpwood rotation management.  
Manage accordingly.  
Make adjustments to allowable harvest figures. Consider a greater emphasis on integrated pest management and intensive silviculture when managing balsam fir resources.

**Harvest Guidance:**  
Harvest will occur at age 60.  
Between 2010 and 2019 harvest 375 acres per year. After that, harvest level will be determined by amount of acres reaching harvest age.

**Other Management Notes:**  
Look for balsam fir component increase opportunities in aspen and non-stocked upland areas. Opportunity for seeding may exist in aspen harvest areas, or after light scarification, and immediate aerial seeding of balsam fir.

**Strategic Timber Management:  
BLACK SPRUCE**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Black Spruce, lowland	7,434	2,815	2,247	5,871	6,884	4,654	4,779	34,684
Black Spruce, upland	131	0	11	133	59	41	0	375

**General Landscape Objective:**  
Maintain existing levels of black spruce cover type.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FPn63, FPn71, and FPn81.

**General Management Direction:**  
Manage black spruce to current harvest acreage recommendations for future long range age class development.  
Look for opportunities in both non-stocked upland and lowland sites to grow more black spruce. Use best available information to determine the most productive sites for this purpose. Pay particular attention to dwarf mistletoe pockets and apply proper silvicultural techniques to halt spread.  
Follow black spruce harvest with aerial seeding to ensure regeneration, unless forester notes during harvest than adequate cone crop is dropping and appropriately scattering seed.

**Harvest Guidance:**  
Harvest age is determined by site index: SI <30 – age 120; SI 30-39 – age 100; SI 40+ -- age 70.  
Between 2010 and 2019 harvest 520 acres per year. After that, harvest levels will fluctuate between 310 and 380 acres per year as goal of even-sized age classes is sought.

**Other Management Notes:**

**Strategic Timber Management:  
TAMARACK**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
Tamarack	171	361	970	442	936	536	755	4,171

**General Landscape Objective:**  
Maintain existing level of tamarack on the landscape.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FPn81 and also FPn71.

**General Management Direction:**  
Determine most productive acreage for growing tamarack using relevant available information.  
Consider certain stands for their high conservation value and create management plans accordingly.  
Determine areas to increase tamarack component particularly on upland sites. Light scarification may be necessary following harvest to create favorable seedbed conditions.  
Adjust allowable harvest and conversion acreage accordingly.  
Develop an integrated pest management program and wildlife model designed to increase success in developing these stands by minimizing impacts of wildlife and insect predation.

**Harvest Guidance:**  
Harvest age is determined by site index: SI <40 – age 90; SI 40+ -- age 60.  
Between 2010 and 2019 harvest 264 acres per year. After that, harvest level will be determined by amount of acres reaching harvest age.

**Other Management Notes:**

**Strategic Timber Management:  
WHITE CEDAR**

<b>Age Class Distribution: 2009</b>	<b>0 - 20</b>	<b>21 - 40</b>	<b>41 - 60</b>	<b>61 - 80</b>	<b>81 - 100</b>	<b>101 - 120</b>	<b>121+</b>	<b>Total</b>
White Cedar	88	129	218	803	2,109	4,171	5,672	13,190

**General Landscape Objective:**  
Maintain existing level of white cedar on the landscape.

**Native Plant Community:**  
In Koochiching County, this cover type does best on FPn63 and can do well on FPn71, FPn81 and WFn64.

**General Management Direction:**  
Determine most productive acreage for growing cedar using relevant available information.  
Consider certain stands for their high conservation value and create management plans accordingly.  
Determine areas to increase northern white cedar component particularly on upland sites. Light scarification may be necessary following harvest to create favorable seedbed conditions.  
Adjust allowable harvest and conversion acreage accordingly.  
Develop an integrated pest management program and wildlife model designed to increase success in developing these stands by minimizing impacts of wildlife and insect predation.

**Harvest Guidance:**  
White cedar is not harvested except on a salvage basis.

**Other Management Notes:**

## 10.5 Overview of Change

This section presents the likely changes to occur to Koochiching County's forested lands over the course of 100 years if this management plan is implemented. Given the wide range of possible unconsidered factors affecting the forest over a century, the most illustrative aspect to evaluate is the direction and magnitude of the trends in forest change.

### Succession / Vegetation Growth Stage

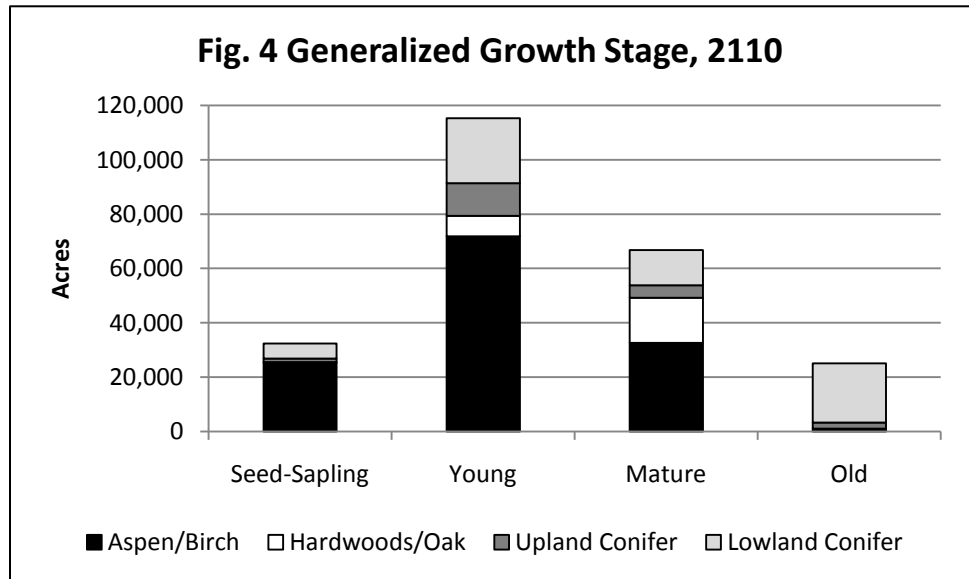
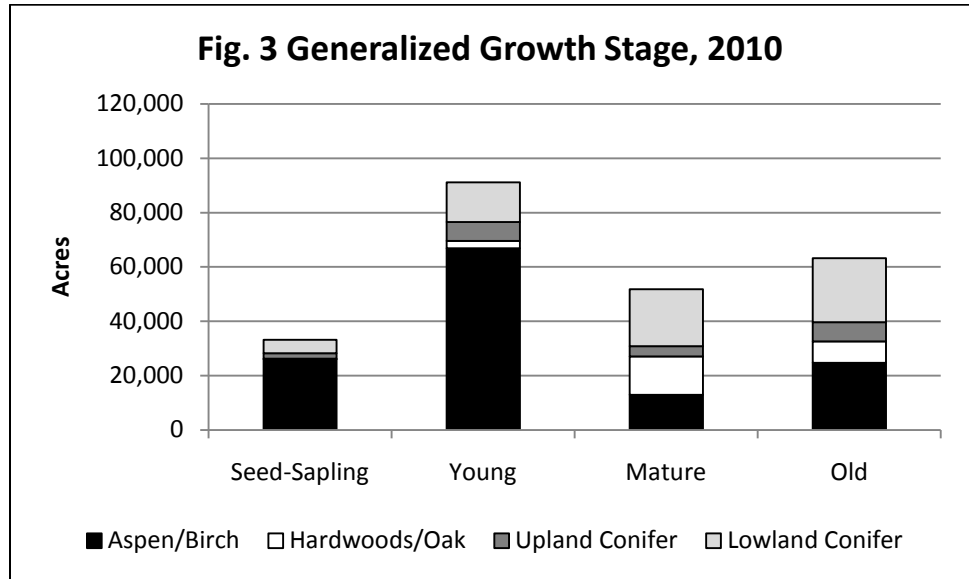
One view of the future forest is gained by analyzing the change in Vegetational Growth Stage (VGS). As forests age they change both in terms of structure and tree species composition. VGS describes the stages of this process.

VGS helps in understanding forests at the broad landscape scale. Applying it to small and disperse ownerships provides useful insights but ones that must be used cautiously. VGS analysis is based on “snapshots” of single years whereas most cover types have significant variability built into their age class structures that can cause substantial swings in VGS within short periods of time.

The intent of this review is to indicate how the plan’s management approach may effect change across the County’s ownership and how that change relates to a generalized characterization of the vegetative growth stages at the beginning and ending dates of the 100-year plan perspective.

Table 14 and Figures 3 and 4 indicate the mix of cover types by growth stage for 2010 and 2110.

<b>2010</b>	<b>Seed-Sapling</b>	<b>Young</b>	<b>Mature</b>	<b>Old</b>	<b>Total</b>
Aspen/Balm of Gilead/Birch	19.9%	51.2%	9.9%	19.0%	100.0%
Hardwoods/Oak	1.1%	10.9%	56.6%	31.4%	100.0%
Upland Conifer	10.1%	35.2%	19.1%	35.5%	100.0%
Lowland Conifer	7.7%	22.8%	32.6%	36.8%	100.0%
Total	13.9%	38.1%	21.6%	26.4%	100.0%
<b>2110</b>					
Aspen/Balm of Gilead/Birch	19.3%	55.0%	25.0%	0.8%	100.0%
Hardwoods/Oak	1.0%	31.0%	68.0%	0.0%	100.0%
Upland Conifer	6.8%	59.0%	23.1%	11.1%	100.0%
Lowland Conifer	8.5%	37.5%	20.1%	33.9%	100.0%
Total	13.5%	48.2%	27.9%	10.4%	100.0%



## Appendix A. Ecological Context

This appendix provides detailed information concerning the ecological context of forest management in Koochiching County.

### Ecological Classification System

A description of the ecological characteristics of Koochiching County relative to land form and vegetative cover is provided through the use of National Hierarchical Framework of Ecological Units adopted by various land management entities including Koochiching County<sup>3</sup>. This Ecological Classification System (ECS) provides a series of increasingly smaller and more detailed levels of description of the landscape. It is exceptionally well suited to understanding the potential for forest cover and growth and for framing appropriate strategic and tactical management decisions.

#### Provinces

As shown in Map A-1, Minnesota is divided into three major ecological provinces each representing distinctive ecological features and processes.<sup>4</sup>

- Laurentian Mixed Forest Province: Minnesota's true forested lands, at the time of settlement this region consisted of extensive conifer, conifer-hardwood mix, or hardwood forest. The topography is variable with landforms ranging from lake plains and outwash plains to ground and end moraines. Extensive peatlands occupy much of this area. Koochiching County is in this province.
- Eastern Deciduous Forest Province: This is the transition zone between the prairie to the south and west and the true forest to the north and east. It is a species-rich area with many species at the edges of their ranges. Variability in soils, moisture, and landform creates opportunities for a wide variety of forest types including maple-basswood hardwoods and fire-dependent pine/oak.
- Prairie Grassland Province: Slicing across western Minnesota is the tall grass prairie, little of which remains in its original condition today. Mainly various forms of prairie, some portions of this province which experienced lower levels of fire saw the formation of a dry oak savanna.

#### Sections

The ecological classification system divides provinces into sections. These are defined mostly by the origin of glacial deposits, regional elevation, floristic regions, and regional climate. Minnesota has ten sections (Map A-2). Most of Koochiching County lies in the Northern Minnesota and Ontario Peatlands Section and a small eastern portion of the county is in the Northern Superior Uplands Section.

- Northern Minnesota and Ontario Peatlands Section: This section is flat and poorly drained with about half of it consisting of clayey deposits from Glacial

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<sup>3</sup> McNab, W. H. and P.E. Avers, 1994, Ecological Subregions of the United States: Section Descriptions, US Forest Service publication WO-WSA-5, Washington, D.C.

<sup>4</sup> The descriptions of Provinces, Sections, and Subsections are from the MDNR's web site [www.dnr.mn.us/ebm/ecs]; 2009.

Lake Agassiz. The lake deposits are covered primarily by bogs, swamps, fens, and other peatland vegetation. At the section's eastern edge the peatlands are acidic, deep, and old (>4,000 years) and support extensive areas of acid peatland communities such as black spruce bogs and poor swamp forests. Some areas, especially along the eastern and southern borders of the section in the Littlefork Vermilion Uplands Subsection, have uplands formed of glacial till that was eroded and flattened by wave action from Glacial Lake Agassiz. Mesic and wet forests of aspen, paper birch, spruce, balsam fir, white cedar, and black ash are typical in these areas. Uplands formed of sandy shoreline deposits that mark recessional stages of Glacial Lake Agassiz are present across the section. These low, sandy uplands are less extensive than either the peatlands or glacial till uplands. They are characterized by fire-dependent forests of jack pine or red pine.

- Northern Superior Uplands Section: A small portion of eastern Koochiching County is in this section that largely coincides with the extent of the Canadian Shield in Minnesota. It is characterized by glacially scoured bedrock terrain with thin and discontinuous deposits of coarse loamy till and numerous lakes. The section has high relief, reflecting the rugged topography of the underlying bedrock. This section receives more of its precipitation as snow than any section in the state, has the longest period of snow cover, and the shortest growing season. The upland vegetation is remarkably uniform consisting mostly of fire-dependent forests and woodlands. Forests with red and white pine were widespread in the past, mixed with aspen, paper birch, spruce, and balsam fir; much of the pine was cut in the late 1800s and early 1900s, leaving forests dominated mostly by aspen and paper birch. Jack pine forests are present on droughty ridges and bedrock exposures, as well as on local sandy outwash deposits.

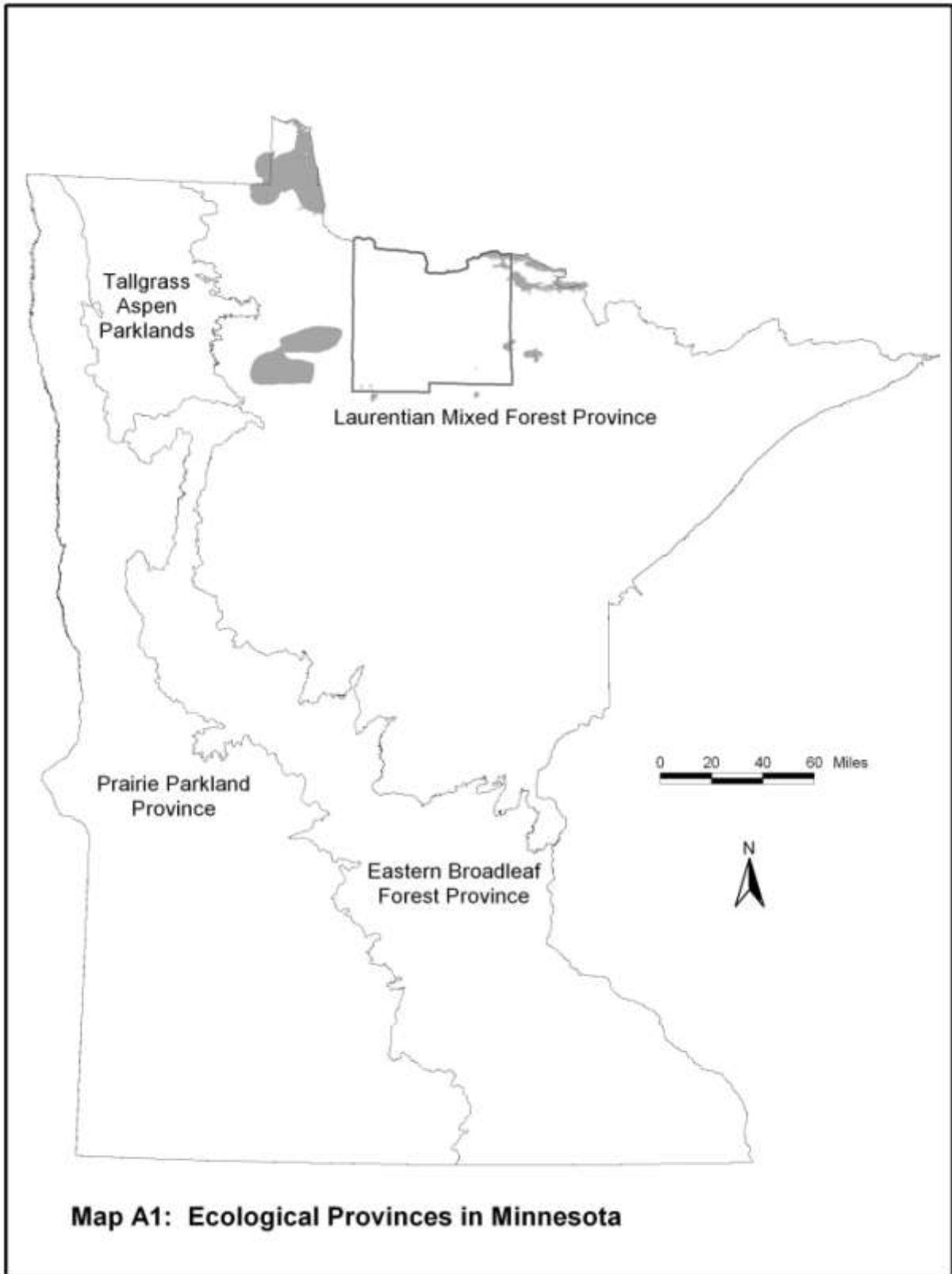
### Subsections

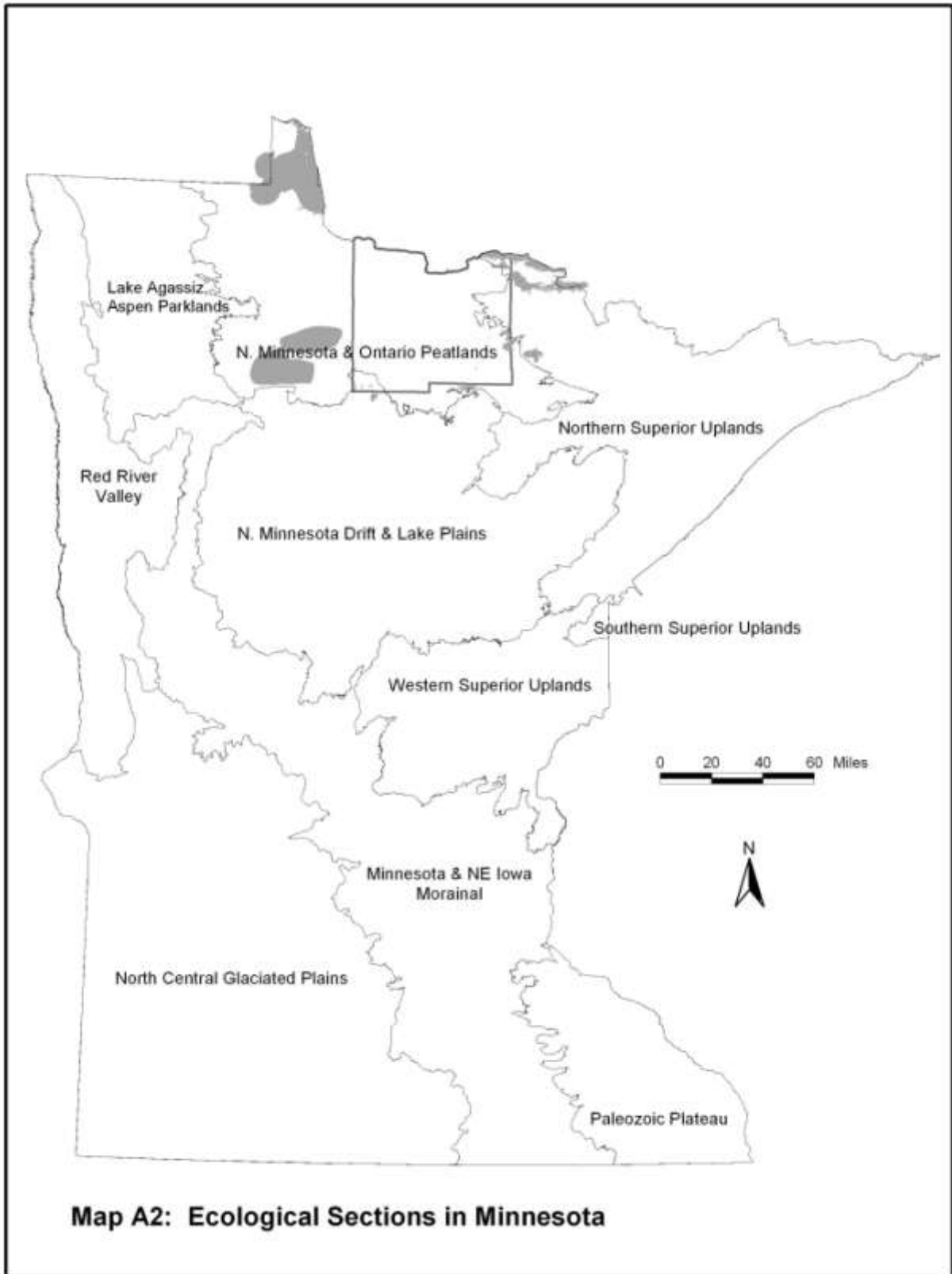
As shown in Map A-3 the ten sections in Minnesota are divided into 26 subsections of which three cover Koochiching County.

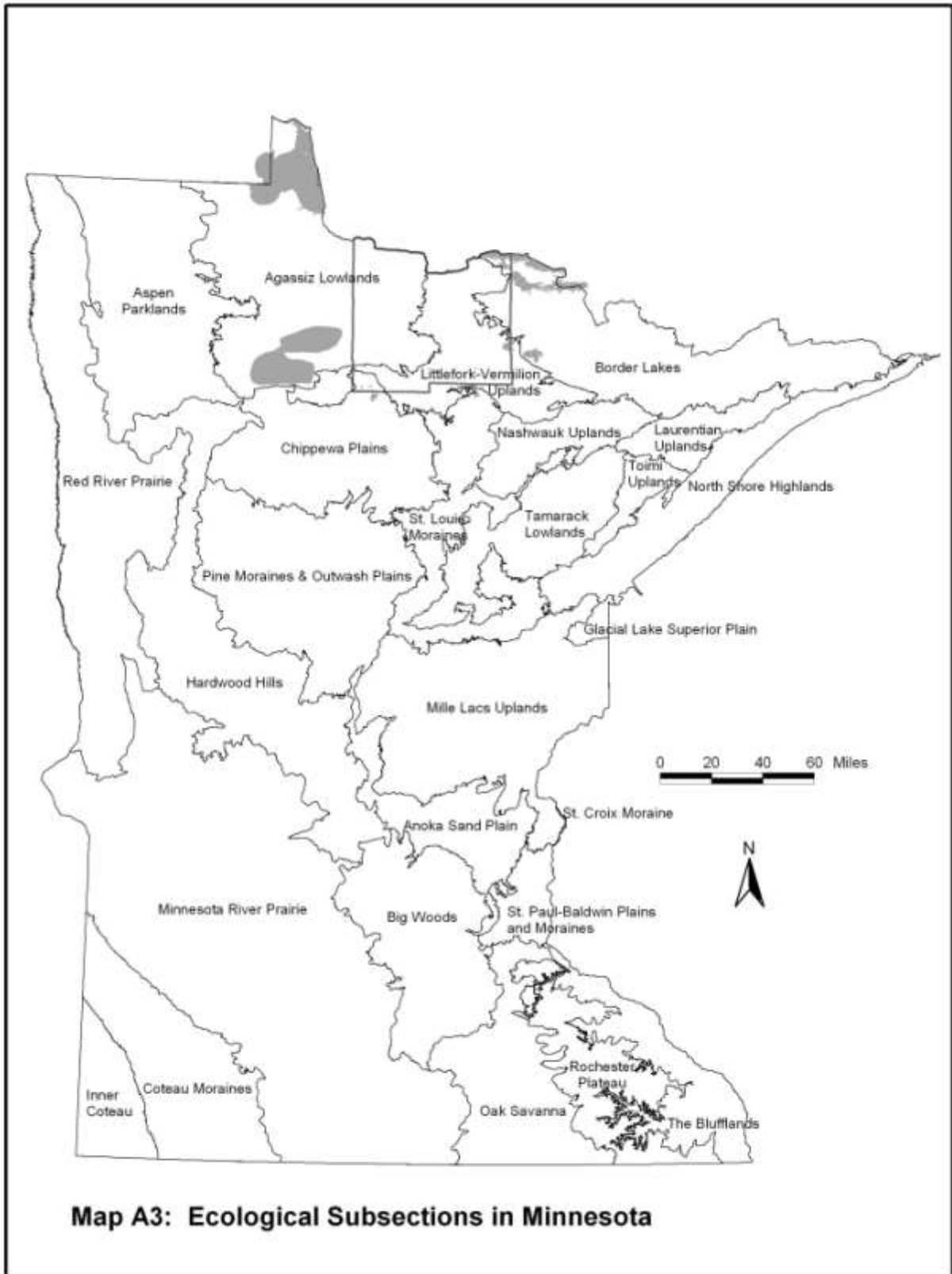
- Border Lakes: The extent of this subsection was determined primarily by the extent of the bedrock controlled landscape. The southern and western boundaries were based on LTA-level boundaries on the Superior National Forest. Lakes and rocky ridges characterize this landscape of glacially-eroded bedrock and poor soils. Historic forest types on uplands were mostly aspen-birch, aspen-birch-conifer, and on dry sites, jack pine barrens. Much of this subsection consists of the BWCA, which is an internationally known wilderness area. Recreation, tourism, and forestry are the major land uses.
- Littlefork-Vermilion: The western edge of the subsection lies just west of the Littlefork River. This river is a natural boundary between the extensive peatlands to the west and predominately clayey till and lake-laid mineral sediments to the east. The southern boundary is the southeastern corner of Glacial Lake Agassiz. To the east, the boundary is the Vermilion River up to the point where it turns east and enters Crane Lake. This boundary marks the division between bedrock-controlled uplands with shallow soils and glacial lake plain with bedrock knobs present but not dominant. This is a level to gently rolling lake plain and transition zone to the Border Lakes region to the east. Soils are clayey to loamy and formed from lake-laid sediments and glacial till. Topographic relief is less than 50 feet on most of the lake plain, becoming greater to the east in the transition zone. The historic forest was predominantly aspen-birch forest that would eventually become conifer dominated (white pine, white spruce, and balsam fir). The eastern portion

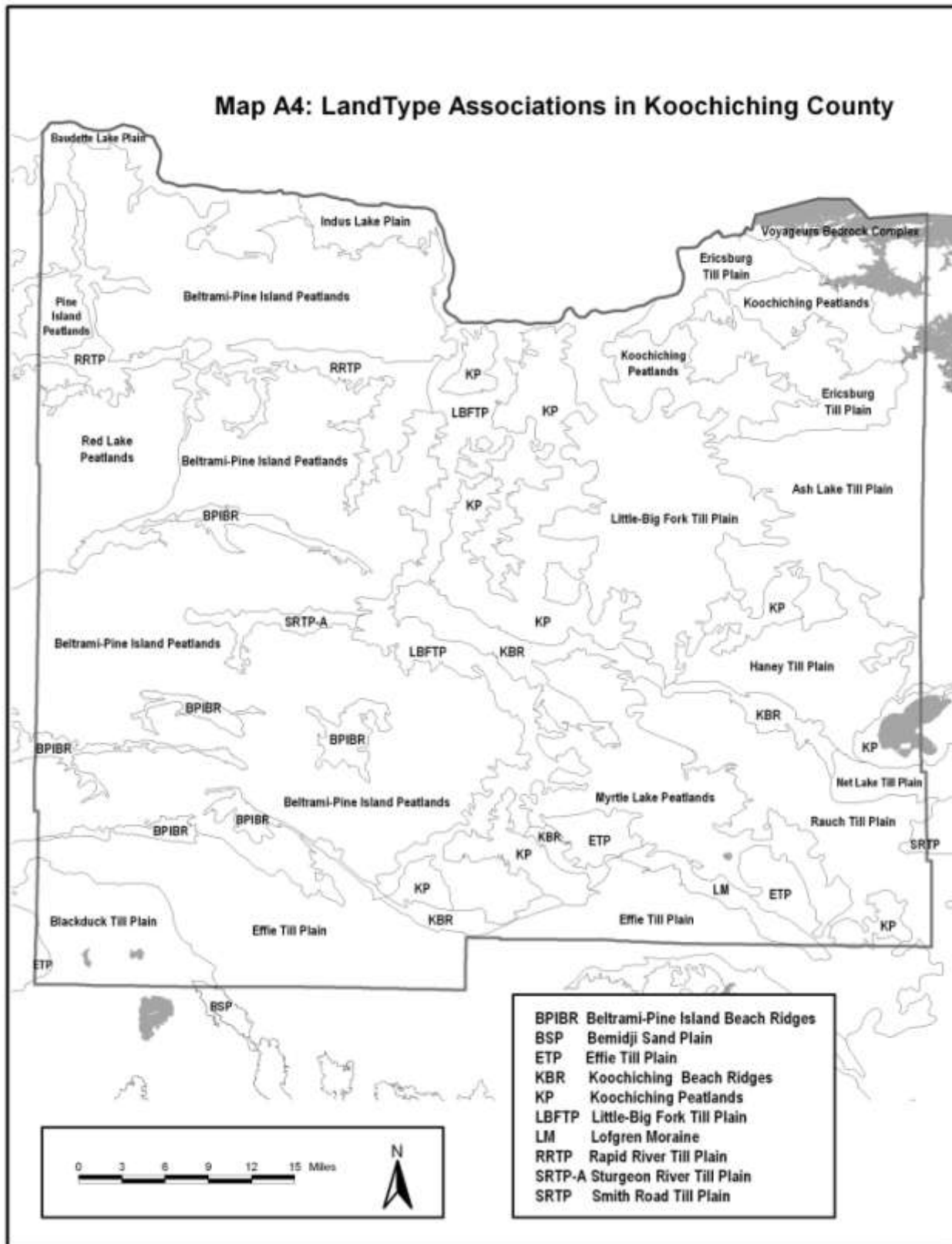
was dominated by white pine, red pine, and jack pine forest. Lowlands were occupied by sedge fen, black spruce-sphagnum bog, and white cedar-black ash swamp. There were also low moraines and beach ridges dominated by jack pine forest or trembling aspen-paper birch forest. Today quaking aspen is the most common species of tree in this subsection. It is found in both pure and mixed stands. Aspen is probably the best developed forest type on the uplands, and it probably was similarly common before settlement.

- Agassiz Lowlands: This subsection encompasses the portion of Glacial Lake Agassiz plain where peatlands are dominant. The southern boundary is the southern edge of the lake plain where it abuts Des Moines Lobe ground moraines and end moraines. The western boundary is based on separation of lands dominated by conifer bog from lands dominated by wet prairie; the eastern boundary separates that portion of the lake plain that is primarily peatland from wet to dry mineral sediments. This subsection is characterized by a flat, poorly drained lake plain. The peatlands are dominated by bog forest species (black spruce and tamarack). Upland sites are commonly vegetated by aspen-birch and jack pine.

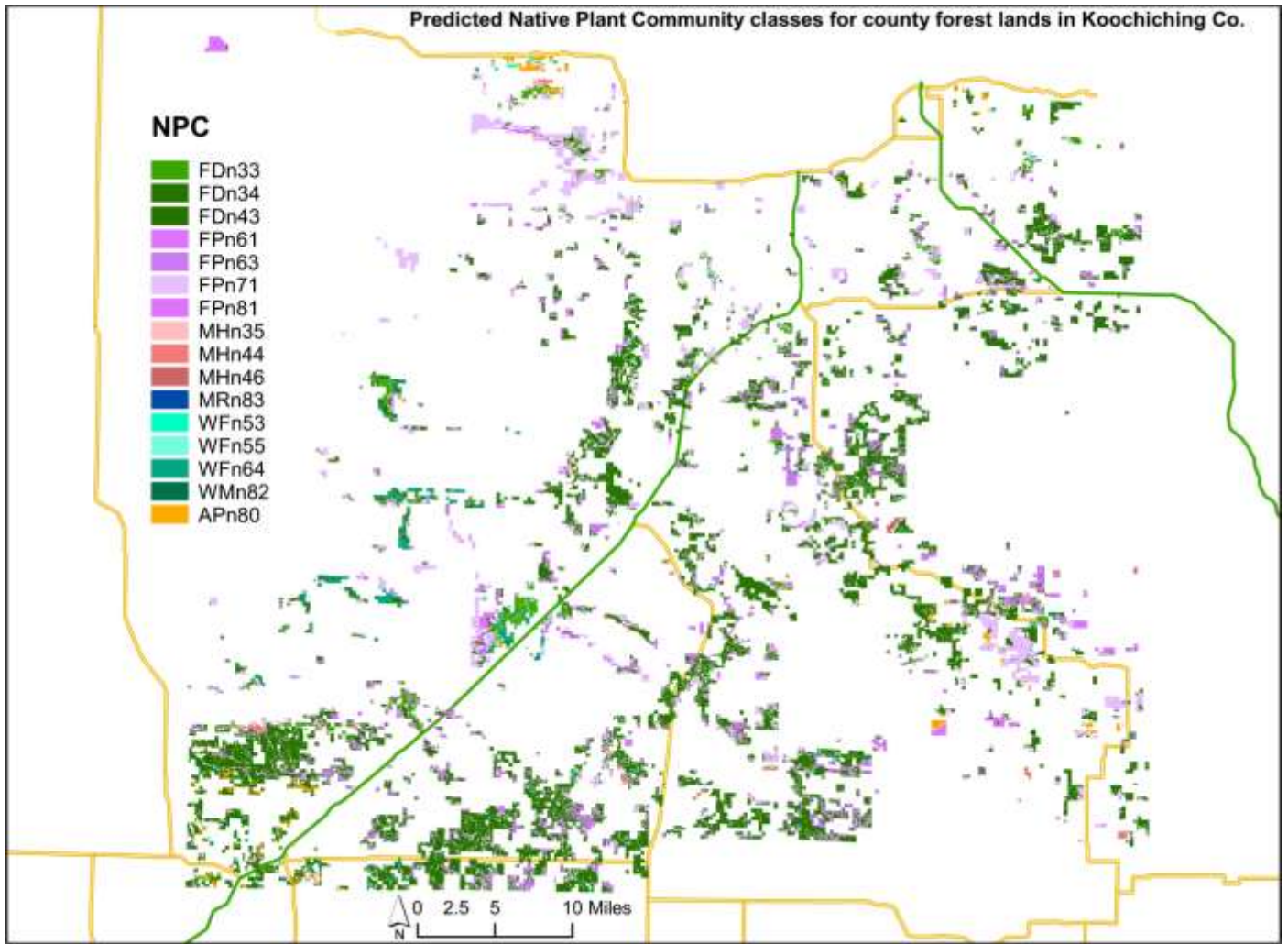








Map A-5. Predicted Native Plant Communities on Koochiching County Tax-Forfeited Land



T.Brown G.Host v. 20100226

### LandType Associations

The smallest ecological class above native plant communities to be mapped is the Land Type Association (LTA). This geographic level is well suited to some levels of strategic forest management planning because of its smaller size (50,000-300,000 acres) and more uniform characteristics. LTAs are generally defined by glacial landforms, bedrock types, topographic roughness, lake and stream distributions and types, wetland patterns, and soil parent material.<sup>5</sup>

- Littlefork-Vermilion Subsection
  - Ma01: Koochiching Peatlands. Large peatlands with minor inclusions of upland mineral soils.
  - Ma02: Ericsburg Till Plain. A rolling till plain formed by the Koochiching lobe and smoothed by wave action from Glacial Lake Agassiz. The majority of the mineral soils in the LTA have clay textures with the remaining mineral soils containing a variety of soil textures ranging from sand, to sandy loam over bedrock. All mineral soils formed under forest vegetation.
  - Ma03: Little-Big Fork Till Plain. A nearly level to rolling till plain dissected by rivers (Big Fork, Bear, lower half of the Little Fork). The presence of rivers and streams create a landscape that has a higher proportion of well drained soils than adjacent LTAs. The majority of the mineral soils in the LTA have clay, sandy, or sand over clay textures. All mineral soils formed under forest vegetation.
  - Ma04: Myrtle Lake Peatlands. A flat landscape that is dominated by large contiguous peatlands with small isolated islands of upland mineral soil
  - Ma10: Lofgren Morain. A rolling moraine of coarse sediments formed by the Rainy Lobe glacier usually covered by a thin blanket of clayey lobe till.
  - Ma13: Haney Till Plain. A complex of rolling till plain and peatlands. The clayey till was formed by the Koochiching Lobe glacier and smoothed by wave action from Glacial Lake Agassiz.
  - Ma15: Net Lake Till Plain. A rolling till plain with clayey till smoothed by wave action from Glacial Lake Agassiz.
  - Ma16: Koochiching Beach Ridges. Beach ridges formed by Glacial Lake Agassiz. The majority of the mineral soils in the LTA have sand textures (main part of the beach ridge), sand over loamy textures (edge of the beach ridge), or clay textures (areas in between beach ridges).
  - Ma18: Effie Till Plain. A nearly level till plain with clayey parent material. The majority of the mineral soils in the LTA have clay, sandy, or sand over loamy textures.
  - Ma19: Rauch Till Plain. A rolling wave-washed till plain that is dissected by the upper portions of the Little Fork River and its tributaries. Ravines associated with post glacial erosion by the streams and rivers are very common.
- Border Lakes Subsection
  - La09: Voyageurs Bedrock Complex. A complex of large lakes and bedrock-controlled uplands with thin soils.

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<sup>5</sup> Information on LTA's provided by Dan Hanson, MN DNR, personal communication, April 8, 2004.

- La17: Ash Lake Till Plain. This LTA is a transition between Lake Agassiz to the west and the bedrock-controlled terrain to the east and is characterized by thick soils on a rolling bedrock-controlled terrain.
- Agassiz Lowlands Subsection
  - Mb01: Pine Island Peatlands. Large peatlands with minor inclusions of upland mineral soils.
  - Mb04; Beltrami-Pine Island Peatlands. A flat landscape dominated by peatland complexes of fens and bogs with isolated small areas of upland mineral soil.
  - Mb05: Red Lake Peatlands. A flat landscape dominated by patterned peatlands; large water tracts, swamp forests, and raised bogs.
  - Mb07: Baudette Lake Plain. A level lake plain with fine silty and clay sediments from Glacial Lake Agassiz.
  - Mb08: Rapid River Till Plain. A level landscape that is a complex of a wave washed till plains and lake plains.
  - Mb11: Indus Lake Plain. A level to gently rolling lake plain with isolated areas of bedrock. The majority of the mineral soils in the LTA have clay textures because they were deposited by the deep water portion of Glacial Lake Agassiz.
  - Mb16: Beltrami-Pine Island Beach Ridges. Beach ridges formed by Glacial Lake Agassiz. Soil parent material is sand and gravel that formed under forest vegetation.
  - Mb17: Sturgeon River Till Plain. Lake-washed till immediately adjacent to the Sturgeon River. A high percentage of the soils are well-drained.

### Native Plant Communities

The smallest geographic unit within the Ecological Classification System is the native plant community (NPC). The MnDNR, which has identified the NPCs within Minnesota, defines NPC as “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 plant species form recognizable units, such as oak savannas, pine forests, or marshes, 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. Examples of natural disturbances include wildfires, severe droughts, windstorms, and floods.”<sup>6</sup>

NPCs have been tentatively mapped for Koochiching County according to a process devised by forest ecologists at the University of Minnesota-Duluth’s Natural Resources Research Institute. The process utilizes a variety of databases to estimate probable NPCs at the forest stand level. Data used include soils, current forest cover, hydrology, and the Public Land Survey.

Map A-5 shows the distribution of NPCs within the county. The following narrative briefly identifies the major NPCs likely found on County-administered tax-forfeit land.<sup>7</sup>

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<sup>6</sup> <http://www.dnr.state.mn.us/npc/index.html>, 2009 Minnesota Department of Natural Resources.

<sup>7</sup> For more information on NPCs see previously cited MnDNR website or “Field Guide to the Native Plant Communities of Minnesota The Laurentian Mixed Forest Province”, MnDNR August 2003.

- FDn33 Fire Dependent: Northern Dry-Mesic Mixed Woodland: Dry-mesic conifer, conifer-hardwood, or hardwood woodlands dominated by red pine, white pine, jack pine, black spruce, quaking aspen, or paper birch. Most common on sandy soils but also present on shallow, loamy soils over bedrock. Crown and surface fires were common historically.
- FDn43 Fire Dependent: Northern Mesic Mixed Forest: Mesic pine, aspen, white cedar, or birch forests on loamy soils over bedrock in scoured bedrock uplands and on loamy, rocky, or sandy soils on glacial moraines, till plains, and outwash plains. Crown and severe surface fires were common historically.
- MHn35 Mesic Hardwood: Northern Mesic Hardwood Forest: Mesic to dry-mesic hardwood forests on well-drained to moderately well-drained loamy soils, most often on stagnation moraines and till plains and less frequently on bedrock hills.
- MHn44 Mesic Hardwood: Northern Wet-Mesic Boreal Hardwood-Conifer Forest: Wet-mesic or mesic hardwood and hardwood-conifer forests, most commonly on level, clayey sites with high local water tables on glacial lake deposits, stagnation moraines, and till plains.
- MHn46: Mesic Hardwood: Northern Wet-Mesic Hardwood Forest: Wet-mesic, lowland hardwood forests on level sites with clayey subsoils or high local water tables.
- WFn53 Wet Forest: Northern Wet Cedar Forest: Wet conifer or conifer-hardwood forests on muck or peat soils. Typically present in settings where saturated soils are present through most of the growing season such as depressions, low level terrain along lakes, rivers, or wetlands, and gently sloping upland drains.
- WFn55 Wet Forest: Northern Wet Ash Swamp: Wet hardwood forests on mucky mineral soils in shallow basins and groundwater seepage areas or on low, level terrain near rivers, lakes, or wetlands. Typically with standing water in the spring but draining by late summer.
- WFn64 Wet Forest: Northern Very Wet Ash Swamp: Wet hardwood or hardwood-conifer forests on peaty soils in small closed depressions or around the edges of large peatlands. Typically with standing water present throughout spring and summer.
- FPn63 Forested Peatland: Northern Cedar Swamp: White cedar-dominated swamps on wet peat soils. Often present in areas influenced by mineral-rich subsurface flow or groundwater seepage along the margins of wetlands and peatlands.
- FPn71 Forested Peatland: Northern Rich Spruce Swamp: Black-spruce-dominated swamps on deep peat in large peatland complexes on the Glacial Lake Agassiz Plain. Typically occurs in settings influenced by lateral flow of mineral-rich groundwater, such as water tracks or spring fen seepage areas.
- FPn81 Forested Peatland: Northern Rich Tamarack Swamp: Tamarack-dominated swamps on deep peat in large peatland complexes on glacial lake plains or large peat-filled basins. Typically occurs in settings influenced by lateral flow of mineral-rich groundwater, such as water tracks.
- APn80: Acid Peatland: Northern Poor Conifer Swamp: Black-spruce-dominated peatlands on deep peat. Canopy is often sparse, with stunted

trees. Understory is dominated by ericaceous shrubs and fine-leaved graminoids on high Sphagnum hummocks.

- WMn82: Northern Wet Meadow/Carr: Open wetlands dominated by dense cover of broad-leaved graminoids or tall shrubs. Present on mineral to sapric peat soils in basins or along streams.
- MRn83: Northern Mixed Cattail Marsh: Emergent marsh communities, typically dominated by cattails. Present on floating mats along shorelines in lakes, ponds, and river backwaters, or rooted in mineral soil in shallow wetland basins.

As noted in Chapter 3, Koochiching County's upland forest is dominated by a fire dependent NPC – FDn43 northern mesic mixed forest. The following narrative, excerpted from material produced by the MnDNR, describes this type's growth stages. More extensive information is available at the MnDNR Division of Forestry website.<sup>8</sup> Forest growth stages for the FDn43 NPC are:

- **Young Growth-stage: approximately 0-35 years.** About 17% of the FDn43 landscape in pre-settlement times was covered by forests estimated to be under 35 years old. Stands in this stage were more often mixed than monotypic, which is typical of fire-dependent communities like FDn43 that occur on rugged topography. Monotypic conditions were represented mostly by survey corners where all bearing trees were quaking aspen. At survey corners with mixed composition, aspen was still the most cited species, but jack pine and paper birch were common as well. In describing young, burned stands the surveyors indicated that in addition to quaking aspen, jack pine, and paper birch, the initial-cohort included white and red pine as well.
- **Transitional Stage: approximately 35-55 years.** About 30% of the historic FDn43 landscape was forest undergoing considerable compositional change as stands approached maturity. Stands in this stage were more often mixed than monotypic. Monotypic conditions were represented mostly by survey corners where all bearing trees were quaking aspen, and much less often by paper birch and balsam fir. At survey corners with mixed composition, quaking aspen was still the most cited species and it was mixed most often with paper birch, balsam fir, and jack pine.
- **Mature Growth-stage: approximately 55-95 years.** About 31% of the historic FDn43 landscape was mature forest where the rate of successional change slowed slightly. Stands in this stage were far more likely to be mixed than monotypic. Patches of pure aspen or pure paper birch were most common, but there were patches of solid red and white pine as well. About 60% of the mixed corners were combinations of quaking aspen, paper birch, balsam fir, or white pine.
- **Second Transition Stage: approximately 95-115 years.** About 6% of the historic FDn43 landscape was forest undergoing considerable compositional change as it approached old age. Stands in this stage were almost always of mixed composition. Monotypic conditions were represented mostly by survey corners where all bearing trees were paper birch, and sometimes white or red pine. At this time, most of the FDn43 trees could occur at mixed survey corners. The combinations included

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<sup>8</sup> For full report see:  
<http://files.dnr.state.mn.us/forestry/ecssilviculture/plantcommunities/FDn43.pdf>.

remaining initial cohort-trees as well as the late-successional species like white spruce, white pine, white cedar, and balsam fir.

- **Old Growth-stage: approximately >115 years.** About 16% of the historic FDn43 landscape was old forest. Because FDn43 is common and widespread in northeastern Minnesota, 16% in the old growth-stage represented extensive acreage. Stands in this stage were rarely monotypic. Monotypic conditions were represented mostly by survey corners where all trees were white pine. Mixtures of paper birch, white pine, and white spruce were most common, but even at this late stage there were still some corners that were mixtures of early-successional trees such as jack pine, quaking aspen, and red pine.

## Forest Dynamics

Relative to the human lifespan, the forest landscape seems unchanging except at the local, easily viewed scale. Yet, along a longer range time scale, the landscape has been and remains in constant change.

As the glaciers melted and retreated 10-12,000 years ago, tundra vegetation dominated the slowly warming landscape.<sup>9</sup> This was followed by a spruce forest which, in turn, was quickly succeeded by a red pine or jack pine forest. Then, about 7000 years ago an oak savannah replaced the pine as a period of warmer, drier climatic conditions dominated the continent. Roughly 4000 years ago, cooler, wetter conditions re-established themselves and, as a result, oak declined, white pine increased, and the region's extensive bogs began forming.

That forest landscape remained in place through historic times. It was modified through deliberate and unintentional human-induced disturbances, most often fire. Later, logging, conversion to agriculture, drainage, deliberate conversion to different forest types, and, in some areas, reversion from agriculture to forest have all wrought significant changes to the forested landscape.

Thus, the forest that exists today is an ever-changing landscape governed by the physical properties of the underlying soils and terrain, the dominant climatic conditions, and the critical processes of forest dynamics. And, all these have or can be altered through human intervention (e.g., drainage, pollution, introduction of exotic species, land use conversion, land management).

In Chapter 3 the potential of the land to grow forests as expressed in native plant communities is defined. The following discussion focuses on understanding key forest dynamics as they relate to forest management.

## Forest Succession

It is deemed important to the health and vitality of the forest, and all that is supported ecologically and economically by it, that the county's forested lands possess the full range of development or growth stages. Forests change or "succeed" from one stage of development to another over time; the agent of change can be natural, such as fire, or human, such as logging and deliberate fire. The basis for a concern to pattern the current forest after the historical forest

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<sup>9</sup> This summary is based on one found in Minnesota Biological Survey. 1998. Cass County biological survey 1992-1995. Biological Report No. 59. Minnesota Department of Natural Resources.

is the “assumption that native species have evolved under these natural disturbance regimes and will be better able to cope with human-induced disturbances such as logging if these are designed to imitate the key characteristics of natural disturbances.”<sup>10</sup>

The basic pattern of forest succession involves four major phases:<sup>11</sup>

Establishment: or stand initiation, is the phase “characterized by establishment of new individuals, release of surviving seedlings and saplings, and vegetative reproduction of injured plants from below ground structures. It is marked by relatively rapid changes in species dominance, environment, structure, and levels of competition and high mortality among small individuals.”

Thinning: is “characterized by the closing together of tree canopies” which “results in steep declines in understory establishment and growth, increases in mortality of many understory plants, and the onset of mortality in the tree layer” due to competition for light and water.

Transition: is “marked by a variety of gradual changes in population, stand structure, and vegetation processes that can last from less than 100 to over 1,000 years depending on the forest type and disturbance history. The original cohort of trees slowly breaks up, tree establishment and release of suppressed understory trees increases, and a new cohort of trees gradually grows into the canopy gaps.”

Mature/Shifting Mosaic: is “characterized by a shifting pattern of relatively small patchy disturbances (death of individual canopy trees or groups of trees forming gaps of various sizes and shapes) which provide resources for new establishment of trees in the understory and increased height growth of individuals in lower and mid-canopy positions.” It is dominated by shade tolerant plants, except on fire-dependent ecological systems which support mature even-aged forests which are partially (e.g., oak) or fully shade intolerant (e.g., pine). Fire-dependent forests had stand altering fire events that would reset the successional regime. The mature/shifting mosaic phase is uncommon in current landscapes where logging and natural disturbances have occurred more frequently than the average life span of the dominant tree species.

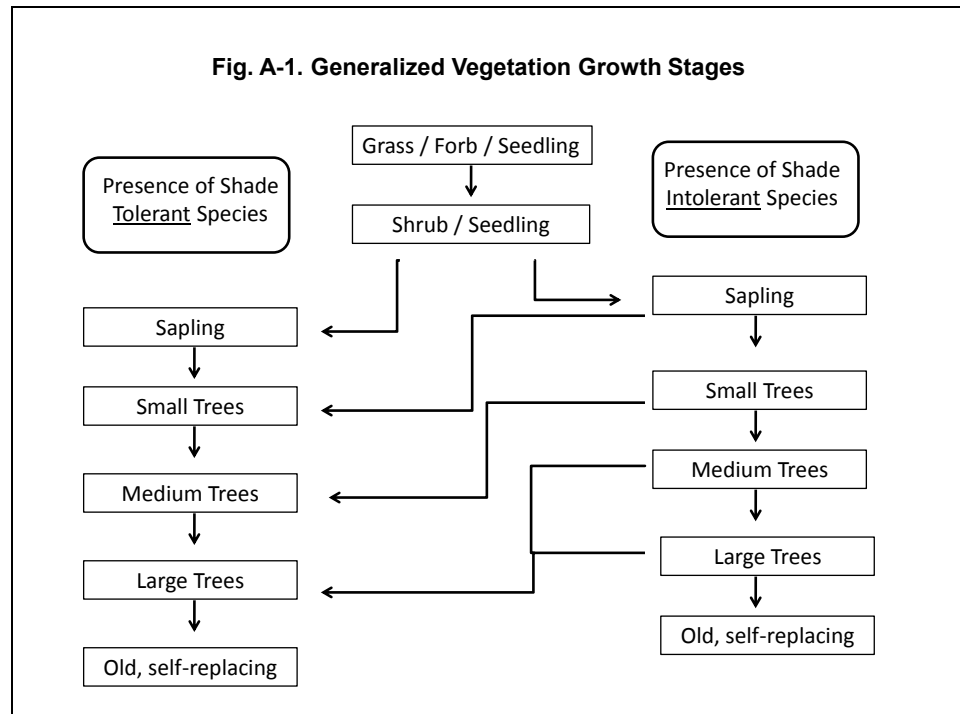
The term **Vegetation Growth Stage (VGS)** is used to describe the current condition of a forest and its potential for change through succession. It combines successional and developmental stages that occur after disturbance, where successional stage refers to changes in species composition over time and developmental stage refers to stand structure over time. The primary growth stages are: grass / forb /seedling; shrub / seedling (seedlings and shrubs now dominate the site); sapling (dense stands of trees less than 2" in diameter); small trees (trees are thinning out in number as size increases to 2-5" in diameter); medium trees (dominant trees are 5-9" in diameter while an understory is developing); large trees (dominant trees are 9-12" in diameter and understory is developed); old, self-replacing (dominant trees exceed 12" in diameter and capable of replacing themselves within the current forest structure). The stages are split between shade intolerant species (e.g., aspen, birch, tamarack) and

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<sup>10</sup> Hunter, Malcolm, Jr. “Principles of Ecological Forestry”, in *Maintaining Biodiversity in Forest Ecosystems*, edited by Malcolm Hunter, Jr., Cambridge University Press, 1999.

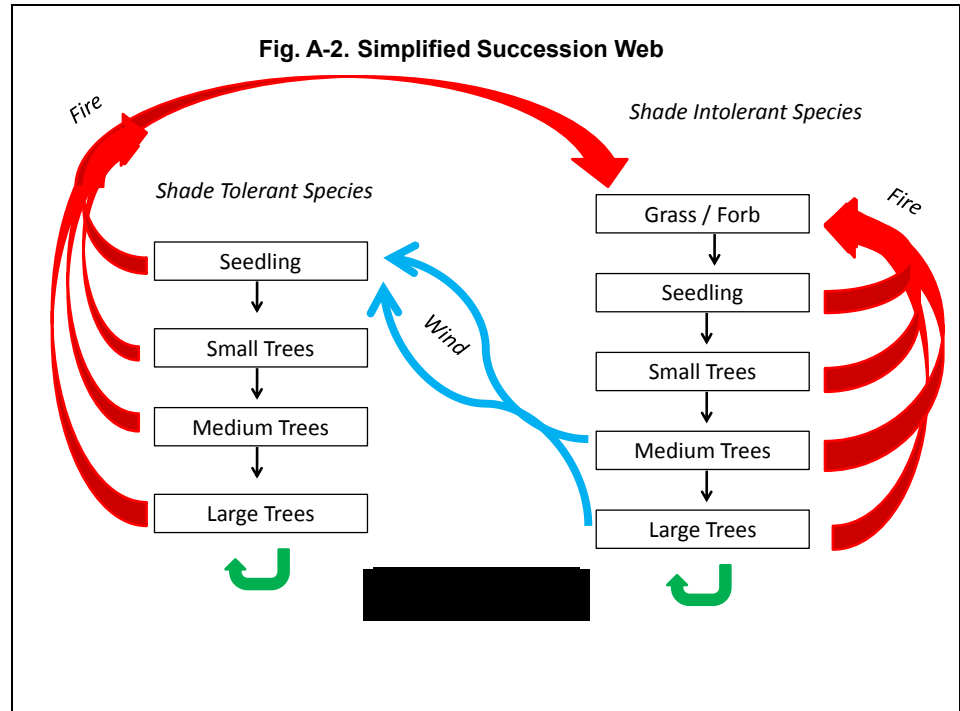
<sup>11</sup> Spies, Thomas, “Forest Stand Structure, Composition, and Function”, in *Creating a Forestry for the 21<sup>st</sup> Century*, edited by Kathryn A. Kohm and Jerry F. Franklin, Island Press, 1997.

shade tolerant ones (e.g., maple, basswood, balsam fir). Sites dominated by shade intolerant species at one stage may succeed to a shade tolerant stand as the under-story trees come to dominate the site. Figure A-1 summarizes the stages and potential direction of change.



## Patterns of Forest Succession

The linear description of succession above does not take into account the impact of disturbance. As shown in Figure A-2 in a natural state absent intervention by humans, fire and wind play the major roles in altering the forest landscape. Any stand can be affected by fire at any time and, in effect, have its successional cycle reset. Stands at the small tree stage or beyond are susceptible to wind damage, which resets succession back to the seedling or sapling stage and favors shade tolerant species if are present on the site.



It is important to remember that VGS refers to “time before disturbance”, that is, the time that has elapsed since the stand was sufficiently disturbed through wind or fire to reset the stand’s successional phase (modern era disturbances include timber harvesting and clearing for agriculture). Precisely speaking, the term refers to the age of the *forest*. However, in practical terms, for most forests, the age of the forest and the age of the dominant trees will be the same. A key exception is older hardwood forests in their multi-aged self-sustaining mature stage at which time the forest age can be considerably older than that of the dominant trees.

In the absence of human intervention, these forces of forest succession create a patchwork of forest across the landscape that reflects how each forest community has adapted over time to the particular disturbance regimes characteristic of the regional landscape. As noted above, fire and windthrow have been the dominant types of disturbance in these forests. The capacity and timing of fire and wind to alter stands range from very short (50-80) years on dry outwash-dominated landscapes to over 1000 years in northern hardwood systems.

Knowing the timing and intensity of stand altering events, statistical models can be devised to estimate the relative proportions of cover types and age classes (i.e., the vegetation growth stages) that would typically occupy the landscape under steady state conditions. These proportions are similar to the "balanced age class acres" that are the general target for regulated forests. It differs however, in that the model accounts for different successional stages, allows age classes to differ in their relative proportion, and allows for the presence of age classes beyond the timber rotation age.

By running the analytical models at the extreme high and low estimates for the fire and wind rotations, the range of proportions in each cover type or age class can be calculated. These calculated **ranges of natural variability** (RNV) can be compared to the actual existing acreages in each ecological type and ownership category.

Given the region's history of logging, agricultural conversion of land, and fire suppression, comparisons between the current forest and the historical RNV will generally show an overabundance of age classes in the 60-80 year age class, sometimes a poor representation and some times an excess in the youngest age classes, and almost always a poor representation in the older age classes.

It is not the intent, nor is it possible, to manage modern forests to replicate the historical RNVs. However, understanding the RNV for a given forest landscape provides meaningful guidance for managing forests in a sustainable manner that emulates the forest conditions that occur under natural disturbance regimes.

## Appendix B. Habitat

### Species of Concern

Koochiching is one of the few remaining counties for which a Minnesota County Biological Survey by the Minnesota Department of Natural Resources has not yet been conducted. However, the DNR has identified a number of species known to exist in the county with either federal or state status as rare, threatened, endangered or special concern species. Table B-1 lists these species.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Group</b>	<b>State Status*</b>
A Caddisfly	<i>Hydroptila novicola</i>	Insect	SC
A Caddisfly	<i>Oxyethira itascae</i>	Insect	SC
A species of Lichen	<i>Cladonia pseudorangiformis</i>	Lichen	SC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Bird	SC
Beaked Spike-rush	<i>Eleocharis rostellata</i>	Vascular plant	Th
Black Sandshell	<i>Ligumia recta</i>	Mussel	SC
Bog Rush	<i>Juncus stygius</i> var. <i>americanus</i>	Vascular plant	SC
Coastal Sedge	<i>Carex exilis</i>	Vascular plant	SC
Creek Heelsplitter	<i>Lasmigona compressa</i>	Mussel	SC
Curved-leaved Golden Moss	<i>Tomenthypnum falcifolium</i>	Moss	SC
English Sundew	<i>Drosera anglica</i>	Vascular plant	SC
Felwort	<i>Gentianella amarella</i> ssp. <i>acuta</i>	Vascular plant	SC
Hair-like Beak-rush	<i>Rhynchospora capillacea</i>	Vascular plant	SC
Lake Sturgeon	<i>Acipenser fulvescens</i>	Fish	SC
Laurentian Tiger Beetle	<i>Cicindela denikei</i>	Vascular plant	SC
Least Moonwort	<i>Botrychium simplex</i>	Vascular plant	SC
Linear-leaved Sundew	<i>Drosera linearis</i>	Vascular plant	SC
McCalla's Willow	<i>Salix maccalliana</i>	Vascular plant	SC
Montane Yellow- eyed Grass	<i>Xyris montana</i>	Vascular plant	SC
Northern Bog	<i>Synaptomys borealis</i>	Mammal	SC

<b>Table B-1. Species of Concern in Koochiching County</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Group</b>	<b>State Status*</b>
Lemming			
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	Fish	SC
Pale Moonwort	<i>Botrychium pallidum</i>	Vascular plant	SC
Ram's-head Lady's-slipper	<i>Cypripedium arietinum</i>	Vascular plant	SC
Sooty-colored Beak-rush	<i>Rhynchospora fusca</i>	Vascular plant	SC
Sterile Sedge	<i>Carex sterilis</i>	Vascular plant	Th
Twig-rush	<i>Cladium mariscoides</i>	Vascular plant	SC
Yellow specklebelly	<i>Pseudocyphellaria crocata</i>	Lichen	SC

Source: MN DNR 2009

\*SC = Special Concern; Th = Threatened; no species had a federal status.

Table B-2 presents the definitions of the coarse level habitats applied to Koochiching County. These definitions were originally generated by the US Forest Service for use in northern Minnesota. Table B-3 shows the amount of each coarse level habitat on Koochiching County's tax-forfeited lands.

<b>Table B-2: Generalized Habitats for Use in Analyzing Wildlife Impacts of Forest Plan</b>		
<b>Habitat Categories</b>		<b>Definitions (age or size: cover types)</b>
Open Habitat Types	Lowland open	Lowland grass, brush, marsh or muskeg
	Upland grass opening	Upland grass
	Shrub-Sapling opening / Regeneration	Upland brush, cutover area, and all regeneration under age 11
Upland Forest: Deciduous Aspen-Birch	Young	11-40 yrs: aspen, Balm of Gilead, off-site aspen 11-50 yrs: birch
	Mature	41-60 yrs: aspen, Balm of Gilead, off-site aspen 51-80 yrs: birch
	Old	61+ yrs: aspen, Balm of Gilead, off-site aspen 81+ yrs: birch
Upland Forest: Deciduous [NoHdwd/Oak]	Young	11-60 yrs: northern hardwoods, oak
	Mature	61-120 yrs: “
	Old	121+ yrs: “
Upland Forest: Coniferous	Young	11-40 yrs: balsam fir 11-30 yrs: jack pine 11-70 yrs: red/white pine, white spruce, upland black spruce
	Mature	41-60 yrs: balsam fir 31-60 yrs: jack pine 71-120 yrs: red/white pine 71-100 yrs: white spruce, upland black spruce
	Old	61+ yrs: balsam fir, jack pine 121+ yrs: red/white pine 101+ yrs: white spruce, upland black spruce
Lowland Forest: Deciduous	Young	11-60 yrs: ash, lowland hardwood
	Mature	61-120 yrs: “
	Old	121+ yrs: “
Lowland Forest: Coniferous	Young	11-70 yrs: blk spruce, tamarack, white cedar, stagnant blk spruce/tam/white cedar
		71-100 yrs: blk spruce, tamarack, stagnant blk spruce/tam/white cedar 71-120 yrs: white cedar
		101+ yrs: blk spruce, tamarack, stagnant blk spruce/tam/white cedar 121+ yrs: white cedar

<b>Table B-3: Distribution of Generalized Habitats on Koochiching County Tax-forfeited Land, 2009</b>			
<b>Habitat Categories</b>		<b>Acres*</b>	<b>Percent of Land</b>
Open Habitat Types	Lowland open	22,345	8.5%
	Upland grass opening	406	0.2%
	Shrub-Sapling opening / Regeneration	33,185	12.6%
Upland Forest: Deciduous Aspen-Birch	Young	66,839	25.4%
	Mature	12,909	4.9%
	Old	24,724	9.4%
Upland Forest: Deciduous [NoHdwd/Oak]	Young	124	0.0%
	Mature	1,528	0.6%
	Old	198	0.1%
Upland Forest: Coniferous	Young	7,788	3.0%
	Mature	3,817	1.5%
	Old	7,074	2.7%
Lowland Forest: Deciduous	Young	2,591	1.0%
	Mature	12,600	4.8%
	Old	7,643	2.9%
Lowland Forest: Coniferous	Young	14,606	5.6%
	Mature	20,914	8.0%
	Old	23,597	9.0%

\*Not included is non-forest or non-vegetated land such as open water, developed, roads, etc.

Among the findings generated by Table B-3 are:

- Roughly a fifth of the vegetated land base is in open land (this obviously fluctuates as the level of regenerating forest varies from year to year).
- Upland aspen/birch forest is weighted to the young habitat range. As management continues the size of the older forest habitat will decrease in the near future and the amount of mature forest will increase somewhat.
- There is not a lot of upland hardwoods/oak forest making this a critical habitat within the county. This forest type will age as management will likely favor intermediate treatments that do not reset stands to regeneration status but develop characteristics of older forest.
- Upland coniferous habitats are relatively evenly distributed today but management will reduce the amount of older habitat in favor of young and mature stages.
- Lowland deciduous forest is dominated by mature phase forest habitats; these will gradually shift to older forest as management will likely be irregular in these woods. The wildcard is the potential impact of emerald ash borer; if

this insect invades ash forests, the ash type could disappear completely and its replacement is unknown at this time.

- Lowland coniferous is relatively evenly distributed at this time. Over time, management of black spruce and tamarack will tend to shift acreage to young and mature phases. On the other hand, the absence of harvesting in white cedar and the presence of considerable amounts of stagnant forest will increase the amount of older phase habitat.

## Appendix C. Apportionment of Net Receipts

### APPORTIONMENT OF NET RECEIPTS

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
School District No. 36	12,665	8,935	10,454	7,957	12,713	21,877	19,046	30,531	12,507	13,532	3,339
School District No. 361	113,970	128,703	129,177	115,277	158,703	136,068	88,450	75,561	70,227	93,544	37,578
School District No. 362	161,677	213,928	208,845	198,474	245,518	308,579	232,264	284,123	182,046	184,791	112,281
School District No. 363	428,136	380,774	445,573	508,186	578,778	328,952	355,880	533,145	385,665	366,138	272,772
School District No. 707	24,384	25,481	34,680	43,701	25,343	12,443	18,451	40,892	35,788	30,294	21,387
School District No. 2142	<u>16,663</u>	<u>41,756</u>	<u>26,869</u>	<u>41,218</u>	<u>66,198</u>	<u>13,989</u>	<u>16,475</u>	<u>30,770</u>	<u>15,465</u>	<u>25,068</u>	<u>12,739</u>
	757,494	799,577	855,597	914,813	1,087,253	821,907	730,566	995,022	701,698	713,365	460,095
Cities:											
International Falls	3,298	1,962	5,942	2,741	9,757	4,451	1,855	3,415	675	1,091	2,632
Littlefork	385	0	626	103	0	454	0	878	0	0	325
Big Falls	56	24	925	360	158	302	0	30	0	0	325
Northome	0	38	1,405	132	1,230	0	0	1,710	0	0	259
Mizpah	0	0	0	0	0	0	0	0	0	0	131
Ranier	<u>286</u>	<u>0</u>	<u>520</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,828</u>	<u>0</u>	<u>0</u>	<u>1,873</u>
	4,025	2,024	9,418	3,336	11,145	5,207	1,855	7,861	675	1,091	5,545
Promotion Accounts:											
Big Falls	3,174	3,174	2,871	2,832	2,832	2,832	2,832	2,832	2,832	3,540	3,540
Littlefork	3,174	3,174	2,871	2,832	2,832	2,832	2,832	2,832	2,832	3,540	3,540
Northome	3,174	3,174	2,871	2,832	2,832	2,832	2,832	2,832	2,832	3,540	3,540
Ranier	3,174	3,174	2,871	2,832	2,832	2,832	2,832	2,832	2,832	3,540	3,540
International Falls	12,694	12,694	11,484	11,328	11,328	11,328	11,328	11,328	11,328	14,160	14,160
KDA	<u>38,083</u>	<u>38,083</u>	<u>34,452</u>	<u>33,984</u>	<u>33,984</u>	<u>33,984</u>	<u>33,984</u>	<u>33,984</u>	<u>33,984</u>	<u>42,480</u>	<u>42,480</u>
	63,472	63,472	57,420	56,640	56,640	56,640	56,640	56,640	56,640	70,800	70,800
County Revenue Fund	757,494	799,577	855,597	914,813	1,087,253	821,907	730,566	995,022	701,698	713,365	460,095
Unorg. Township Fund	<u>374,722</u>	<u>397,764</u>	<u>418,380</u>	<u>454,070</u>	<u>532,481</u>	<u>405,670</u>	<u>363,428</u>	<u>489,650</u>	<u>350,174</u>	<u>355,591</u>	<u>224,503</u>
TOTAL	1,132,217	1,197,341	1,273,977	1,368,883	1,619,734	1,227,577	1,093,993	1,484,671	1,051,872	1,068,956	684,598