

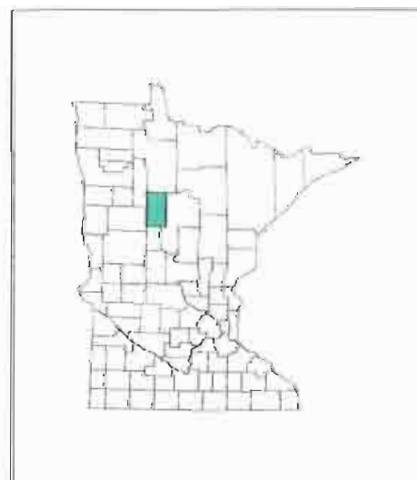


Hubbard County Tax-Forfeited Lands

*** * ***

Forest Resources Management Plan

October 2002



Prepared by the Consultant Team of
Klaers, Powers & Associates *** Pro-West & Associates, Inc. *** Northern Software & Consulting

Hubbard County Forest Resources Management Plan

Adopted: October 2, 2002

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Cover Image

The cover is a mosaic of medium format color infrared aerial photography of Hubbard County, taken in May 2001 by Pro-West & Associates, Inc. The separate images have been georeferenced into a single mosaic to provide an unified view of the county's forests. Color infrared photography is used to delineate tree species as they leaf out in the spring.

CERTIFIED COPY OF RESOLUTION OF COUNTY BOARD
HUBBARD COUNTY, MINNESOTA

Commissioner Dudley moved the following Resolution adopting the Hubbard County Forest Resource Plan for the Management of Tax Forfeited Land and Forest Resources effective October 2, 2002, upon the deletion of the reference to the Gulch Lakes Management Area Memorandum of Understanding with the Department of Natural Resources and the policy prohibiting permanent deer stands constructed in trees:

RESOLUTION NO. 10020201

WHEREAS, the Hubbard County Board of Commissioners are responsible for the administration of the tax forfeited lands and tax forfeited trust accounts, and

WHEREAS, there is a need to maintain continuous direction in the use and development of the renewable resources on the land base, as well as evaluate opportunities related to the use of these lands, and

WHEREAS, the tax forfeited lands, a public asset entrusted by the State, serves as a resource base important to the County's forest related jobs, industries, recreational opportunities and environment

WHEREAS, the objectives of the direction of management of these lands should be communicated to all interested citizens through a public process, and

WHEREAS, this comprehensive plan is the result of a citizens' committee which has analyzed and deliberated upon various issues and opportunities, having taken general public input and comment, has then recommended this plan to the County Board of Commissioners for their review and adoption.

NOW THEREFORE, BE IT RESOLVED, that the County Board of Hubbard County adopts the Forest Resources Management Plan as its official policy for the management of county-administered tax forfeited land.

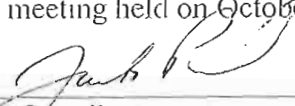
Commissioner Frank seconded the motion for the adoption of the Resolution and it was declared adopted upon the following vote:

Ayes: 5 Nays 0

STATE OF MINNESOTA)
) ss.
County of Hubbard)

Office of the Coordinator

I, Jack Paul, duly appointed Coordinator of the County of Hubbard, do hereby certify that the above is a full, true, and correct copy of a Resolution duly adopted by the Board of County Commissioners of the County of Hubbard at it's regular meeting held on October 2, 2002.



Jack Paul, Coordinator

Hubbard County

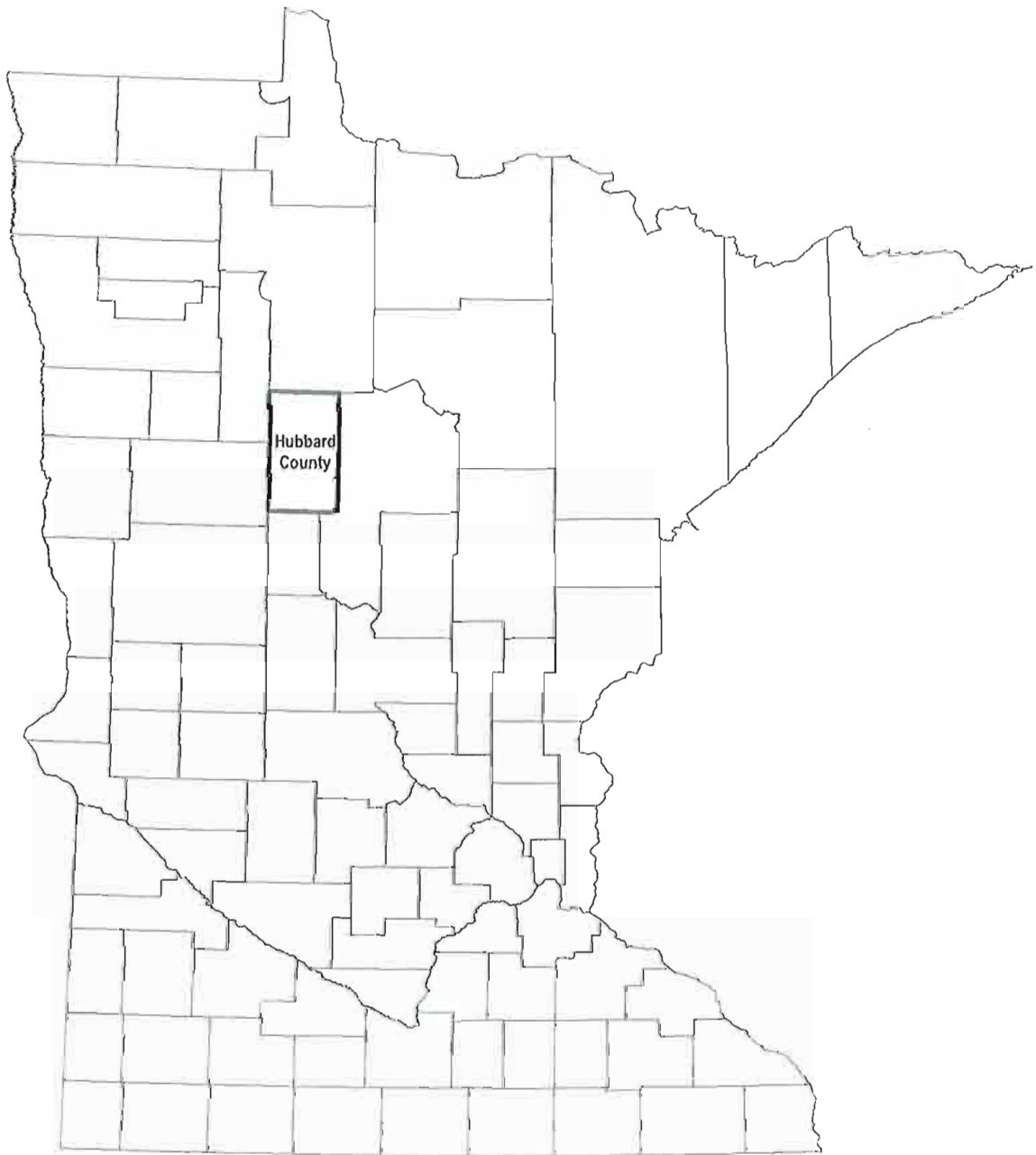
Forest Resources Management Plan

Table of Contents

Executive Summary	1
Mission	7
Mission	7
Management Approach	7
Plan Context	8
Economic Context	8
Social Context	11
Ecological Context	12
Forest Dynamics	23
Resource Description	28
Land Ownership	28
Cover Type	30
Forest Ecological Systems	35
Assessment	39
Strategic Management	40
Assumptions	40
Principles	41
Initiatives	42
Geographic Direction	44
Department Administration	46
Land Administration: General	50
Land Administration: Leases and Easements	53
Habitat	58
Forest Roads	66
Recreation	68
Timber Management: General	77
Timber Management: Ash-Lowland Hardwoods	88
Timber Management: Aspen	89
Timber Management: Balsam Fir	91
Timber Management: Birch	92
Timber Management: Lowland Conifer	93
Timber Management: Jack Pine	94
Timber Management: Northern Hardwoods	96
Timber Management: Oak	97
Timber Management: Red/White Pine	98
Timber Management: White Spruce	99
Assessment of Change: 2000 - 2100	101
Summary	101
Cover Type	102
Ecological Systems and Cover Type	106
Succession / Vegetation Growth Stages	108
Habitat	110
Roads	112
Recreation	112

List of Maps and Figures

County Location Map	i
Map 1: Ecological Provinces in Minnesota	12
Map 2: Ecological Sections in Minnesota	13
Map 3: Ecological Subsections in Hubbard County	14
Map 4: Ecological LTAs in Hubbard County	15
Map 5: Forest Ecological Systems in Hubbard County	21
Map 6: Public Ownership in Hubbard County	29
Map 7: Forest Cover Types	31
Map 8: Large Patches in Hubbard County	37
Map 9: Forest Management Areas	45
Map 10: Cabin Lease Locations on Hubbard County Land	54
Map 11: County Parks and Accesses	69
Map 12: Access to County Forest	71
Fig. 1: Generalized Land Ownership in Hubbard County, 2001	28
Fig. 2: Cover Type on Hubbard TFL, 2001	33
Fig. 3: Aspen Cover Type by Age Class, 2001	34
Fig. 4: Jack Pine Cover Type by Age Class, 2001	34
Fig. 5: Birch Cover Type by Age Class, 2001	34
Fig. 6: Red Pine Cover Type by Age Class, 2001	34
Fig. 7: Oak Cover Type by Age Class, 2001	34
Fig. 8: Black Spruce / Tamarack Cover Type by Age Class, 2001 ..	34
Fig. 9: Cover Type Composition of FES, 2001	36
Fig. 10: Natural Resource Office Revenues, 1990-2001	47
Fig. 11: Timber Sales by Cover Type Group, 1990 - 2001	53
Fig. 12: Aspen Patch Distribution, 2001	80
Fig. 13: Jack Pine Patch Distribution, 2001	80
Fig. 14: Primary Cover Type on Hubbard County Lands, 2001	102
Fig. 15: Primary Cover Type on Hubbard County Lands, 2101	102
Fig. 16: Aspen Cover Type 2001, 2051, 2101	103
Fig. 17: Birch Cover Type 2001, 2051, 2101	103
Fig. 18: Northern Hardwoods Cover Type 2001, 2051, 2101	103
Fig. 19: Jack Pine Cover Type 2001, 2051, 2101	103
Fig. 20: Red Pine Cover Type 2001, 2051, 2101	103
Other Figures	
Vegetation Growth Stages	25
Simplified Succession Web	26
Natural Resource Management Office Structure	46



Hubbard County



Scale: 1 inch = 60 miles

Map prepared by: Pro-West & Assoc.



Hubbard County Forest Resources Management Plan

Executive Summary

This chapter presents an overview of the key components of Hubbard County's strategic management plan for its tax forfeited lands.

General

This document sets forth a strategic vision for the management of tax forfeited lands administered according to Minnesota Statute by Hubbard County.

There are roughly 138,000 acres of tax forfeited land in Hubbard County representing 22% of the total area of the county. It is managed by the Natural Resources Management Office of the County Public Works Department.

Forest planning and management occur at three levels:

- **Strategic** – This presents official policy that covers the entire land base and generally sets forth a long-range vision (in this case 100 years) of what the forest is intended to become.
- **Tactical** – This covers a smaller amount of defined stands or groups of stands, is short-range (generally 2-3 years) in scope, and defines tactics that implement strategic directions and policies.
- **Operational** – This deals with immediate, silvicultural actions for individual stands directed by the staff's professional judgement.

This document is a strategic plan. It provides the "why" that support the "whats" of future tactical and operational actions. Although its long-range vision should be fairly consistent over time, it needs to be revisited periodically so as to monitor progress and inject the ramifications of new information and changes in the ecological, social, and economic landscapes.

This Executive Summary presents a basic overview of the much larger and more detailed plan document.

Principles

The following principles state Hubbard County's core values which are the foundation for strategic management:

- **Long-term forest integrity is the foundation of all management.**
Retaining forest stability, defined as maintenance of forest integrity, is essential to the ongoing health, diversity, and productivity of the forest.

Strategic management is based upon those forest elements which are the most constant and enduring over time.

- **Patch size distribution will tend to favor larger, aggregated patches.**
Except where management objectives, such as wildlife considerations, support smaller forest patches, the general trend of patch size distribution will be toward creation of larger patches.
- **Consistency with Forest Ecological System.**
Stands will be managed so that their forest type, cover type, and related attributes are in accord with the underlying Forest Ecological System.
- **Distribution by Vegetational Growth Stage.**
Management will seek to secure a representative distribution of vegetational growth stages (a.k.a. successional stages or phases) across the aggregated stands for each Forest Ecological System.
- **Management by species age.**
Establish a balance of age class groups as appropriate for each cover type.
- **Modifying considerations.**
Application of strategic principles may be modified to account for such factors as wildlife, recreation, ownership, historical and cultural resources, aesthetics, water quality or quantity, or natural disturbance.

Initiatives

Hubbard County intends to undertake a series of broad strategic initiatives to implement this plan. The following statements highlight these strategies.

- ▲ **Aspen**, which is Hubbard County's primary cover type and revenue producing species, will be managed as follows: retain the most productive sites (roughly two-thirds of the resource) as aspen cover type consisting of balanced age classes across five age classes to provide mature stand habitat, sawtimber size resource, and flexibility in management. The least productive and least densely stocked stands, between 5-10% of the aspen acres, will be converted to conifer (primarily red pine) or oak/hardwood as appropriate to the ecological system and stand characteristics.
- ▲ **Jack Pine** will be managed as follows: roughly three-quarters of the existing cover type will be managed for retention and regeneration; these stands will be on the most appropriate ecological systems for jack pine, primarily in the northern third of the county. The remaining quarter of the existing resource will be converted, as appropriate to the underlying ecological system, to red / white pine or white spruce.
- ▲ **Northern hardwoods / oak** acres will be increased and the resource managed as appropriate to stand quality.
- ▲ In general, management will tend towards the creation of larger **forest patches** (defined by cover type and age). Smaller patch sizes and greater amounts of edge will be encouraged in specific wildlife-oriented management areas.
- ▲ **Wildlife** needs will be met through the provision of a range of habitats utilizing a "coarse filter" approach. That is, the County will strive to provide sufficient amounts of land within each major habitat type.
- ▲ **Recreational opportunities** will focus on providing land for dispersed recreation and motorized and non-motorized trails.

- The current system of parks and accesses will be retained.
- County will work with motorized and non-motorized trail user groups to insure ongoing designation and maintenance of trails for each group.
- There will be no significant changes in the number of parks or swimming areas. The number of cabin leases will remain constant.

Geographic Direction

In general, Hubbard County will manage its forest according to cover type and ecological system regardless of location within the county. However, there are selected places where area-specific objectives will be emphasized and influence stand and landscape level management activities. The following identifies these areas:

▲ Northern Jack Pine Management Area

The heart of the County's jack pine resource lies in Schoolcraft, Fern, and Rockwood townships. This area, especially Schoolcraft, is also well populated with deer which heavily browse on seedling jack pine making it difficult to regenerate jack pine. As a result, the County is adopting a special approach to jack pine management in this area. The overall goal is to retain at least 50% of the current jack pine stands as jack pine; in general the best stands will be selected for retention; various techniques including bud capping and chemical deterrents will be used to prevent or at least reduce deer browse impact. In order to retain upland conifer forest, of the remaining stands currently in jack pine, two-thirds will be converted to red pine and one-third into white spruce.

▲ Badoura Prairie Chicken Management Area

In 1987 the County and Minnesota DNR agreed to establish and jointly manage 16.5 square miles in southeastern Hubbard County to provide habitat for prairie chickens and sandhill cranes. The vegetative objective is to promote grassland and maintain the brushland in an early stage of growth (i.e., keep the brush from getting too tall and rank).

▲ Clover Township Ruffed Grouse Management Area

This area is being managed for ruffed grouse habitat in coordination with the Minnesota DNR and the Ruffed Grouse Society. Habitat will be enhanced through a variety of techniques including smaller cuts, emphasis on edge, aspen stands of various ages close to one another, and seeded trails.

▲ Lake George / Lake Alice Hardwoods Management Area

Two locations of primarily County administered tax forfeited land offer excellent opportunities for encouraging high quality oak / northern hardwood forests. Currently these areas have many smaller patches of oak / hardwoods. The objective is to consolidate these patches into larger ones through conversion of other cover types (primarily aspen with strong oak/hardwood component) to oak/hardwood. This will benefit species that require interior forest habitat and production of hardwood timber.

Goals & Policies

The following lists the goals of this plan. A complete listing of the policies would be too lengthy for this summary. A selection of certain key policies that pertain to critical and/or controversial aspects of public land management is provided under some of the headings.

Department Administration

- ◆ To be a progressive, professional, and publicly sensitive organization at all levels of planning and implementation.

Land Administration: General

- ◆ Ensure a stable land base sufficient in size and character capable of effecting the intent of this management plan and provide long-term multiple use benefits.

Land Administration: Timber Sales, Leases, Easements

- ◆ Meet the need for specific local services and specialized land uses without compromising overall public benefits.

Policy: No additional cabin (hunting shack) leases shall be granted. Existing leases may be transferred.

Habitat

- ◆ Protect fish and wildlife populations by maintaining and improving biological (habitat) diversity in the forest.
- ◆ Protect and/or improve critical plant communities for habitat (e.g., forest openings, deer wintering complexes, nesting areas).
- ◆ Protect significant natural heritage features (e.g., rare flora and fauna, old-growth forest ecosystems).

Policy: Adopt a "coarse filter" approach as the primary means to identify the extent of, landscape orientation, and change in wildlife habitat.

Within the coarse filter framework, adopt a "fine filter" approach to manage for specific species or biotic communities of concern or interest.

Forest Roads

- ◆ Access County forest lands appropriately to protect, manage and utilize forest resources for all programs and multiple uses.
- ◆ Maintain a trunk road system, in cooperation with other road authorities, that will sustain prolonged vehicle use.
- ◆ Minimize conflicts arising from "multiple-use" of forest roads.

Recreation

- ◆ Provide adequately developed, dispersed facilities such as trails.
- ◆ Enhance undeveloped, dispersed recreation opportunities, such as hunting and wildlife viewing, and to provide public access to public waters.
- ◆ Protect the natural aesthetic resources enjoyed by the public.

Policy: Off road motorized travel across County administered tax forfeited lands

is prohibited. All motorized vehicles must stay on official forest roads and trails in accordance with use designations.

The creation of unauthorized roads and trails on County administered tax forfeited lands is prohibited.

All designated forest roads and trails on County administered tax forfeited lands are considered open to use by snowmobiles and ATVs unless posted closed. If the State changes the designation of its forested lands from "managed" to "limited" status, the County will alter this policy to be consistent.

Permanent structures for personal recreational use are prohibited on County administered tax forfeited lands. Such prohibited structures include, but are not limited to, docks and shacks (unless allowed through a specific lease) except that permanent hunting stands whether affixed to trees or free-standing are allowed.

The cutting or felling of live trees regardless of size for the purpose of creating shooting lanes is considered timber trespass and prohibited.

Timber Management General

- ◆ Align forest cover with the potential of the landscape to produce forests in order to provide a healthy, productive, diverse, and viable future timber resource.
- ◆ Protect the county's timber resources from losses due to insects, disease, fire, and similar forces.
- ◆ Regulate timber harvest and regeneration for a sustained-yield, long-term output of wood products to provide income to the tax-forfeited land trust fund and commodities for a strong timber industry economy.
- ◆ Protect and/or improve all forest resources for multiple-use by integrating other program goals with timber management.

Policy: In general, forested lands will be managed within the broader landscape and in a manner consistent with the site's forest ecological system.

The Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers (February 1999) adopted by the Minnesota Forest Resources Council and as may be modified by Hubbard County is included by reference as County policy.

Anticipated Change

Forest Rejuvenation

A major objective of this plan is to redress the negative impacts of forest mismanagement early in the 1900s. Through this plan the forest is better aligned in terms of the landscape's potential, distribution of forest and habitat types, and its ability to satisfy economic and social needs. Not all the desired changes are achieved within the 100-year outlook of this plan. For instance, balancing the jack pine resource and the maturing of the new red and white pine forests will not occur until roughly 20 years later.

Aspen Shift

The aspen resource is reduced by about 11% as selected stands convert to more appropriate types. The current age imbalance is corrected while still providing a significantly large "tail" of older stands.

Jack Pine Shift

Three-quarters of the rapidly degrading jack pine forest is managed for retention in a series of balanced age classes. One-quarter of the stands are converted to other upland conifer types which are easier to regenerate.

Timber Flow

The plan produces a predictable flow of timber resource. The future forest is more diverse in types, allows for a wider production of fiber and sawtimber, and for key species generates an even yield of material.

Habitats Sustained

No habitat niches are lost during this plan period. The mix of habitats is altered with more young and far more mid-age habitats provided. Older types are reduced as the aging current forest is managed, but critical older types such as mature hardwood forests are substantially increased.

Recreation

No major changes in recreation facilities, outside of additional trails, are anticipated. Pressures on public lands for recreational uses will increase.



Hubbard County Forest Resources Management Plan

Mission

This chapter presents the philosophical foundation for this plan in terms of Hubbard County's mission and management approach.

Mission

Regarding the management of the tax forfeited lands within the county, it is the mission of Hubbard County:

To undertake the County's obligation as trustee for the local governmental jurisdictions of Hubbard County by being a responsible steward who applies multiple-use (i.e., consideration of various forms of economic value generated by the land base, social values, and ecological dynamics) and sustained-yield principles to maintain the forest's ecological integrity for future generations, generates income for the County and local governments, and appropriately utilizes the land base and its renewable resources to sustain the county's economic and social well-being.

Management Approach

Hubbard County understands that it is working with a forested landscape that has primarily resulted from human activity over the past 100 years. Logging, conversion to agriculture, urban development, and active fire suppression have significantly altered a landscape that was, in geologic terms, just recently stabilized after glaciation and subsequent revegetation.

Without attempting to restore the forested landscape to what it had been prior to settlement, Hubbard County seeks to work with the existing forest to create a future forest that has a more "natural" character in terms of types, ages, and geographic location of trees and forest types. In particular, there is an intent to mimic the critical natural process — fire — that most dramatically shaped and maintained the pre-settlement landscape.

The core dilemma facing Hubbard County and other public land managers was stated by Malcolm Hunter, Jr as: "...a conservative person must assume that, until proven otherwise, any human manipulation represents a compromise between ecological integrity and society's demand for forest products.... [and] it falls upon the profession of forestry to balance these often-conflicting demands in practice."¹

Hubbard County's management approach recognizes this inherent conflict as it seeks to balance economic viability, social uses of the landscape, and quality of life. In satisfying its management duty, the County adheres to the position that responsible forestry practices requires focusing on long-term, not short-term, goals and objectives. This is a plan with a 100-year outlook even though it will be implemented one year at a time.

¹ Hunter, Malcom, Jr, "Principles of ecological forestry", in *Maintaining Biodiversity in Forest Ecosystems*, edited by Malcolm Hunter, Jr, Cambridge University Press, 1999, p. 52.



Hubbard County Forest Resources Management Plan

Plan Context

This chapter establishes the framework for the strategic plan in terms of three vital, interactive, and often conflicting perspectives of the natural resource – economic, social, and ecological. And, because the plan's primary focus is the management of vegetation – that is, the forest, the chapter concludes with an overview of critical forest processes.

Economic Context

Hubbard County, like the other counties of the Headwaters region, has an economic base "divided between agriculture, tourism, timber-related business, and retail/services."² Three of these sectors center on the area's natural resources – lakes and streams, a mix of forested land, and, in places, productive farm land. The county's forested lands play a critical role in much of its economic enterprise.

Agriculture and agricultural-based industries are a major factor in Hubbard County's economy. Irrigation is vital to much of the agricultural production of potatoes (54% of the region's irrigated lands lie within the county).

Tourism is playing a greater role in the area's economy and especially in Hubbard County. While approximately 9% of the region's total employment results from tourism, the figure is nearly 18% in Hubbard County. The HRDC report notes "lake resorts have traditionally been viewed as the backbone of the tourism industry in the region. The natural resources in the region, particularly its lakes and forests, provide the background in which one can have a beautiful and relaxing vacation with numerous activities." That range of activities includes fishing, boating, hunting, and use of motorized and non-motorized trails.

The HRDC report states that two important trends will affect tourism in the future. One is an increase in winter tourism and the other is the ongoing success of casinos in Mahanomen County and nearby Cass County. In addition, the MnDNR's proposed development of additional off highway vehicle trails in the Paul Bunyan State Forest will augment the area's already strong multi-purpose recreational trail system. Non-motorized use of the Heartland Trail has increased.

The HRDC report states that "the tourism industry in the Headwaters Region is heavily dependent on its unique natural resources, including its forests and lakes. As such, the tourism industry has a strong interest in how these lakes and forests are managed." The report further notes "that preserving the natural resources for tourism as well as using it to its wisest use for economic development are not necessarily mutually exclusive. There currently is a nice coexistence between tourism and environmental quality and further economic development in the region."

These comments on the value of tourism and the relationship of the natural setting to

² This subsection is based upon the *Overall Economic Development Program Report*, prepared by the Headwaters Regional Development Commission (HRDC), September 1998.

the area's strong tourism industry were echoed in a recent survey of tourists.³ For the spring/summer season the survey found: outdoor activities of all types had the highest participation rates of all options except shopping/dining; the most number of comments regarding improvements or new attractions were "no changes, maintain as is" and "maintain environmental beauty". For winter visitors the two highest activities were "relaxing" and shopping/dining with the next two being sightseeing and use of state parks. The highest ranking suggestions for new attractions or activities were "no changes, maintain as is" and "expand and improve existing recreational trail systems." The winter study stated that "the value of the natural beauty [of the area] cannot be ignored."

Retail business activity in the region has grown as has the strength of the overall economy. While Bemidji is the regional center (60% of the entire region's retail activity), Park Rapids is a strong sub-regional trade center with 25% of the region's retail activity. This activity is supported by the fact that Hubbard County lies in one of Minnesota's population growth corridors and has what is arguably the strongest manufacturing base in the region.

The HRDC study states that "Forestry and wood products manufacturing continue to be vital activities in the Headwaters Region and a source of strength for the economy.... In the manufacturing sector alone, 55 percent of all industries and 44 percent of all covered employment are wood product related businesses." While nearly half of this industry's activity is located in Beltrami County, Hubbard County houses its fair share. The county has approximately 10 primary wood products manufacturers including the huge Pottlatch facility in the north. The number of secondary manufacturers is around 11-12. In addition, there are roughly 40 logging establishments.

One trend noted by the MnDNR is the decrease in the number of primary and, probably, secondary forest products manufacturers over the past decade. In Hubbard County the number of primary firms declined from 15 to 10. This has resulted partly from consolidation and the loss of smaller operations that no longer can compete in an increasingly capital-intensive industry.

Currently, timber production generates the income used by the County to manage its forested lands. As a consequence, understanding the economic trends and relationships in this sector is critical to the future of county land management. The following statements are from a recent analysis of the forest products industrial cluster in northeastern Minnesota.⁴ Although it focuses on the entire region, its findings directly relate to Hubbard County.

Factor Conditions

- ❑ Access to the local timber base has been, and remains, the most important reason for the industry's development in the region.
- ❑ An anticipated shortage of mature aspen in the coming decades is forcing the industry to consider a number of alternatives to maintain adequate supply.

³ *Tourism in the Mississippi Headwaters Area*, prepared by Headwaters Regional Development Commission, "Phase I Fall/Winter" (July 1998), "Phase II Spring/Summer" (February 1999).

⁴ *Northeast Minnesota Industry Cluster Study*, prepared by State and Local Policy Program Humphrey Institute of Public Affairs University of Minnesota (Lee W. Munnich, Jr; Nathan Chatfield; Greg Schrock), Bureau of Business and Economic Research University of Minnesota-Duluth (Dr. Richard W. Lichty; Christ McIntosh; Tiana Wittrock), June 2001.

- Substantial recent and ongoing efforts have been made to discern the "sustainable" level of timber harvesting in Minnesota forests.
- The strength of the dollar has harmed the global competitiveness of the American forest products industry, especially in commodity markets.
- The quality of the local timber supply is an important part of the competitiveness of Minnesota's forest products industry, especially for pulp and paper mills.

Demand Conditions

- Demand for Minnesota forest products, like most natural resource-based industries, has traditionally come from outside the region.
- Global demand for forest products appears relatively steady in most segments.
- The ability to produce higher-value products has been a source of competitive advantage and market strategy for Minnesota firms.
- Consumer interest in "sustainably" produced forest products has led companies to pursue certification of forest management practices.

Related and Supporting Firms

- Dense and increasingly specialized supplier networks are most developed between timber producers and mills.
- Local firms have become creative in their attempts to maximize value and minimize wastes from the wood inputs, which has driven the development of local niche markets for these products and services.

Industry Strategy, Structure, and Rivalry

- Primary forest products producers (paper and OSB mills) "drive" the industry cluster, in terms of local economic impact, and impact on timber demand.
- However, ongoing merger and consolidation activity, especially in pulp and paper, poses a great deal of uncertainty for the industry in the region.

Social Context

The relationship between the County-administered tax forfeited forested lands in Hubbard County and the people of the county is best understood by reviewing the history of these lands.

During Hubbard County's earliest days of settlement the goal was to utilize the land through logging and agriculture. Huge timber concerns logged the vast pineries fueling the booming communities of Hubbard, Park Rapids, Nevis, and Akeley. When, by 1920, the loggers and mills left, the cutover land was seen as an agricultural resource. Public ownership of land was not desired nor deemed important.

But the public gained ownership of large tracts of the county as logged lands went tax forfeit and farmers struggled through the drought and depression of the 1930s. A new law encouraged tax-delinquent lands to go tax forfeit whereby the State owned the lands but the counties administered them. By 1939 private, tax paying, land ownership in Hubbard County fell to just over one-third of the land base. After World War II, the state facilitated the sale of much of the acres and supported forest management of the rest.

The land selling phase of tax forfeited lands more or less ended in the 1970s. By this time the counties realized the on-going value of these lands to produce timber and support for various forms of recreation. Hubbard County intensified its management by

adding professional staff and working to upgrade the forest resource.

Once seen as lands to exploit and leave behind, and then as something better off returned to the private sector, the county's tax forfeited lands are now seen as a valuable resource best kept as publicly owned. The economic importance of the lands is obvious, but their role in satisfying social needs is equally important. These lands contribute to the quality of life enjoyed by residents and visitors.

Ecological Context

Provinces

As shown in Map 1, Minnesota is divided into three major ecological provinces each representing distinctive ecological features and processes.⁵

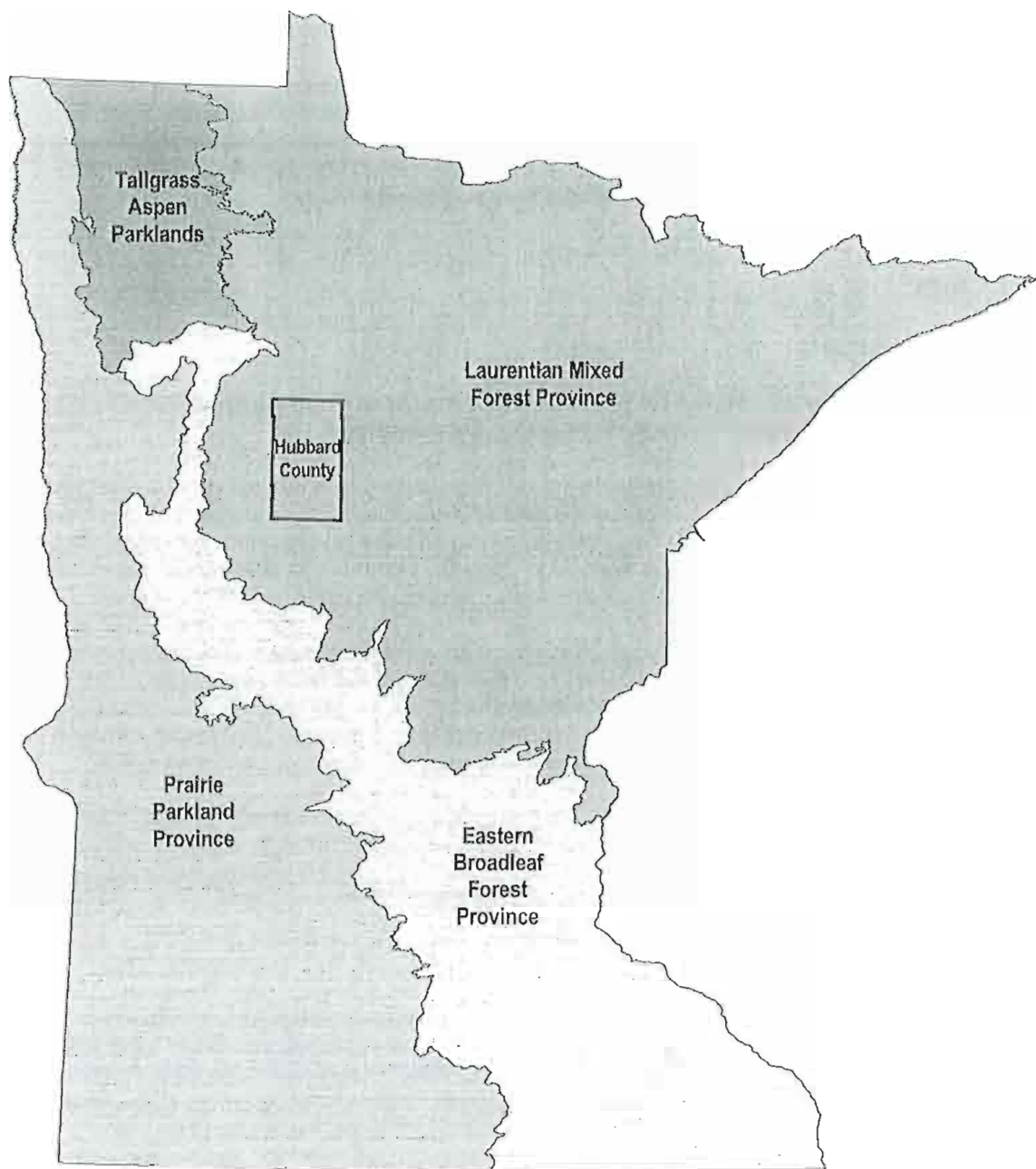
- ❑ Laurentian Mixed Forest Province: Minnesota's true forested lands, at the time of settlement this region consisted of extensive conifer, conifer-hardwood mix, or hardwood forest. The topography is variable with landforms ranging from lake plains and outwash plains to ground and end moraines. Extensive peatlands occupy much of this area. Hubbard 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 2); Hubbard County lies in the Northern Minnesota Drift and Lake Plains Section: "The central theme for this section is that of extremely variable deposits of deep glacial drift, with numerous lakes and wetlands, and forest types that broadly include deciduous forests, coniferous forests, mixtures of these two types, and large areas of conifer swamp forests. The surface water patterns and forest types are correlated with glacial landforms including: outwash plains, lake plains, till plains, narrow outwash channels, moraine ridges, and drumlin fields."⁶

⁵ The descriptions for these provinces comes from the MDNR's web site [www.dnr.mn.us/ebm/ecs]; 1999.

⁶ "Ecological Land Classification Handbook for the Northern Minnesota Drift & Lake Plains and the Chippewa National Forest", draft, John C. Almendinger and Dan S. Hanson, MDNR, June 1998.

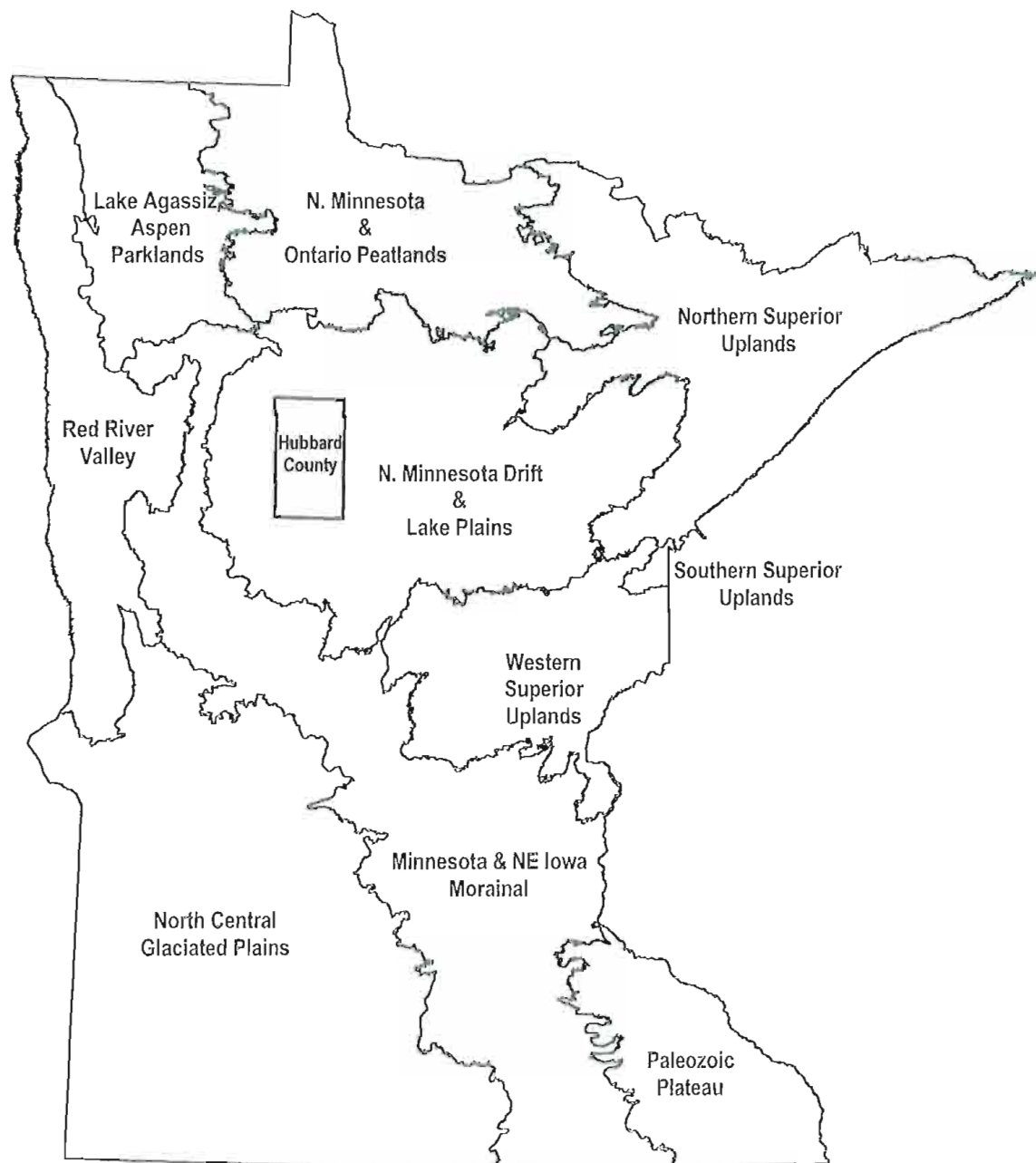


**Map 1: Ecological Provinces
State of Minnesota**



Scale: 1 inch = 60 miles

Map prepared by: Pro-West & Assoc.

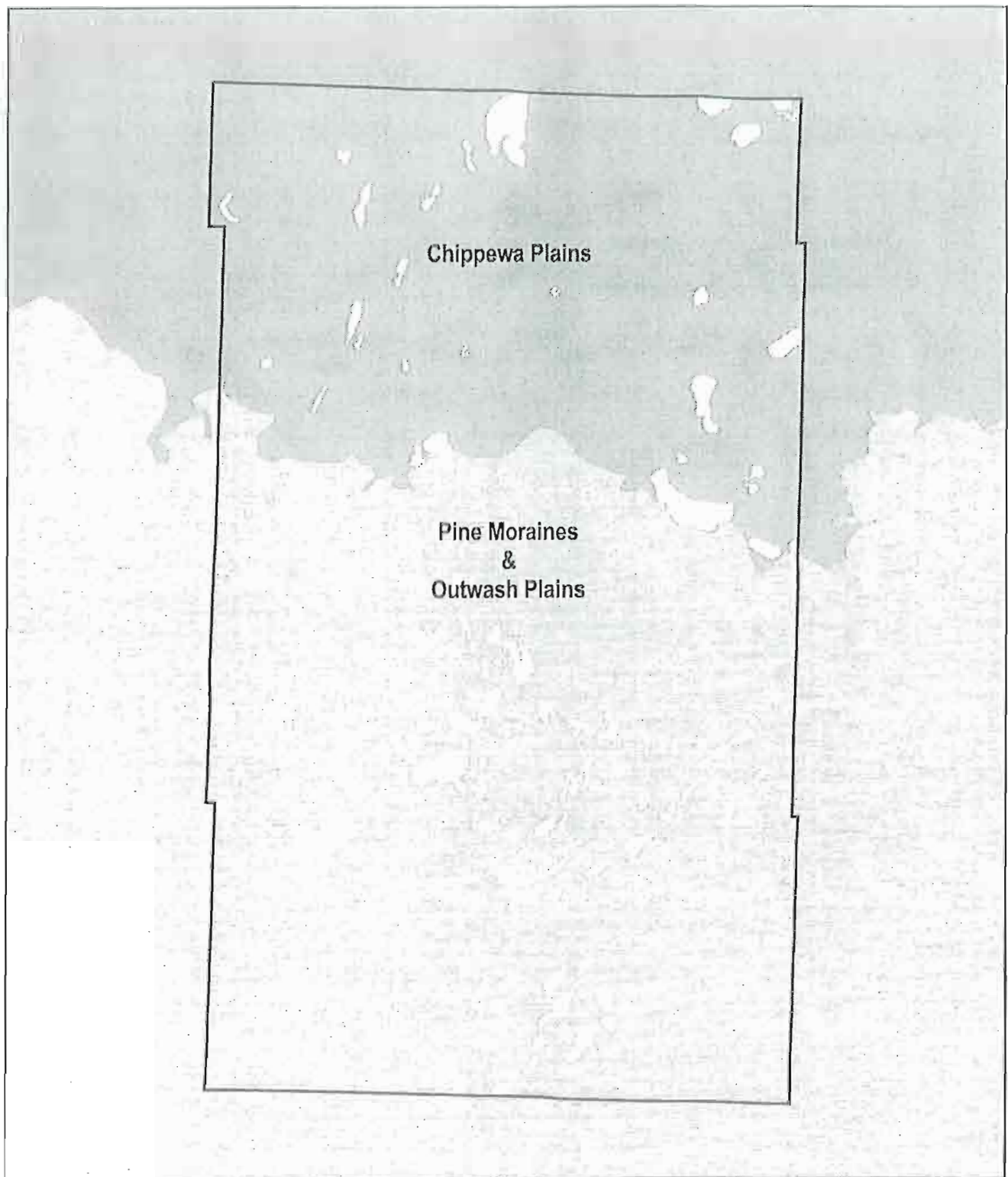


**Map 2: Ecological Sections
State of Minnesota**



Scale: 1 inch = 60 miles

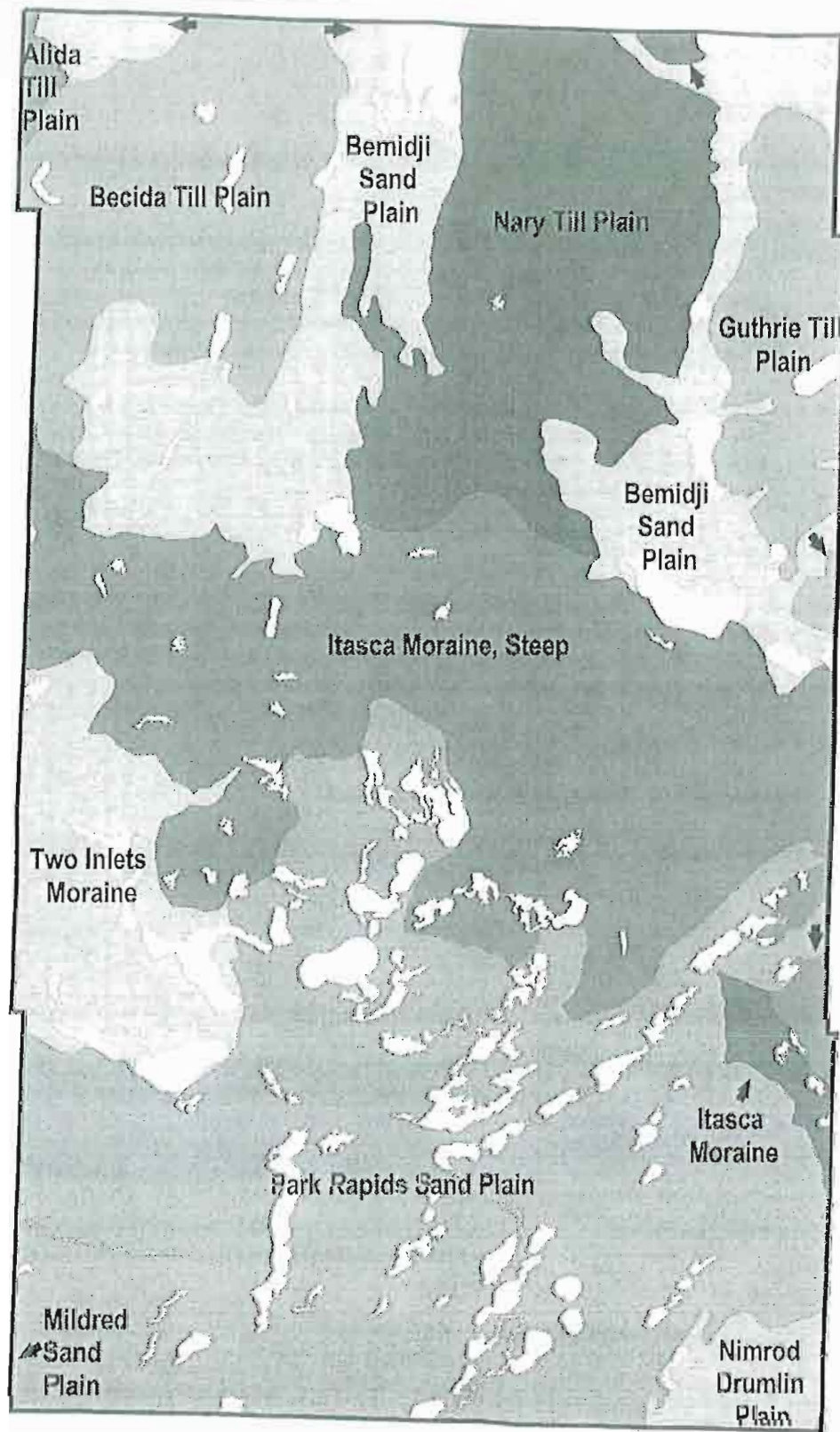
Map prepared by: Pro-West & Assoc.



**Map 3: Ecological Subsections
in
Hubbard County**



Map prepared by: Pro-West & Assoc.



**Map 4: Ecological LTA's
in
Hubbard County**



Map prepared by: Pro-West & Assoc.

Subsections

As shown in Map 3, the 10 sections are divided into 26 subsections of which two cover Hubbard County.

- **Pine Moraines and Outwash Plains:** This subsection is a blend of end moraines, outwash plains, till plains, and drumlin fields. On the end moraines and till plains white and red pine forests tended to dominate. Well drained locations on outwash plains supported jack pine woodlands and forest. Lakes are common on the end moraines and less frequently on the outwash plains.
- **Chippewa Plains:** This subsection is characterized by level to gently rolling lake plains and till plains. Sandier sites were dominated by conifers. More productive sites supported a mix of hardwoods including aspen-birch, sugar maple, basswood, and red/bur oak.

LandType Associations

The final ecological class to be mapped in this narrative is the **Land Type Association (LTA)** (Map 4). This geographic level is proving to be well suited to forest management planning. The Minnesota DNR is using LTA-level analysis as the basis for its emerging forest management efforts. LTAs are generally defined by glacial landforms, bedrock types, topographic roughness, lake and stream distributions and types, wetland patterns, and soil parent material.⁷

Pine Moraines & Outwash Plains Subsection

Itasca Moraine:	A landscape characterized by steep irregularly shaped slopes with many closed depressions.
Itasca Moraine, Steep:	Characterized by steep rugged terrain with well drained soils.
Mildred Sand Plain:	Dominated by rolling to steep terrain and sandy soils
Nimrod Drumlin Plain:	Characterized by outwash plains with many long narrow ridges (drumlins) of till material (unsorted mix of soils).
Park Rapids Sand Plain:	Landscape dominated by level to rolling outwash plains with over half the soils formed under prairie/forest.
Two Inlets Moraine:	Characterized by a rolling to hummocky landscape dominated by a complex of outwash plains and end moraines.

Chippewa Plains Subsection

Alida Till Plain:	A complex of rolling till plains and moraines separated by outwash channels.
Becida Till Plain:	A complex of till plains (rolling landscape) separated by

⁷ Draft Land Type Associations for Hubbard County: Legend and Brief Description of Characteristics Used for Delineation, work in progress last revised 1/23/01, John Almendinger, Mn DNR.

outwash channels (level).

Bemidji Sand Plain:	A nearly level to gently rolling outwash plain with the majority of soils being dry sand.
Guthrie Till Plain:	This LTA consists of several islands of till separated by narrow sand plains from a different LTA.
Nary Till Plain:	Characterized by level to rolling till plans.

Forest Ecological Systems

The concept of ecological systems provides a reasonable approximation of the potential of a given tract of land to produce a forest. Given enough time and the absence of disturbance the forest on a given piece of land will evolve to a specific type of forest or biotic community. This "potential" is determined by such factors as soil, moisture, topography, surficial geology, slope, and land form. Depending upon the author, this potential forest is called "habitat type", "native plant community", or "forest ecological system", which is the term used in this plan.

The challenge in Hubbard County was to *approximate* the Forest Ecological System (FES) units without having to resort to expensive and time consuming field work. Ultimately, over time the County will verify and amend the approximate FES characterizations of any given stand through field work. However, for the purposes of this management plan, computer based technology, primarily Geographic Information Systems (GIS), was used to generate the probable FES for each stand.

The primary data source used in this effort was Hubbard County's detailed soil survey. From previous work it was known that two soil characteristics, surface texture and drainage, provide the basis for understanding productivity and probable vegetation. This information was correlated with the "bearing tree" information from the original land survey conducted in the late 1880s to relate tree species and density to the underlying soil properties. The FES types that emerged from this analysis were compared with work done by the US Forest Service on its lands within the same ecological section. The FES names and descriptions came from the ecological research and publications of the Minnesota DNR [Almendinger and Hanson].

General descriptions of the major forest ecological systems (identified as native plant communities in the DNR's report) found in Hubbard County follow.

Dry Pine / Oak Woodland

Dry / Dry Mesic system ~ forests characterized by plants that are adapted to fire.

Description	Fire-dependent, multiple-aged, somewhat brushy, jack pine / bur oak woodlands on somewhat excessively or well-drained sandy soils, flat habitats.
Vegetation	Canopy of jack pine; canopy occasionally mixed with red pine; in old stands (60+ years) as jack pine dies deciduous trees reach canopy (quaking aspen and paper birch but also bur/red oak, bigtooth aspen); easy to convert to boreal hardwoods and oak by removing pine.
Ecology	Historically dependent upon fire for persistence and ecological integrity (frequent moderate to low intensity fire with occasional high intensity crown fires); fire regime favored deciduous trees and tall shrubs; gross physiognomy and relative abundance of deciduous trees versus jack pine is believed to be quite variable; in modern times community has forest-like structure – dominance of jack pine and canopy closure is believed to be community's response to fire-suppression.
Forest Management Considerations	Restoration of the natural fire regime is needed to restore the ecological integrity of the community and provide woodland wildlife habitat that has been absent from the landscape for nearly a century. In absence of fire, jack and red pine can be grown as well as aspen and oak.

Dry Poor Pine Forest

Dry / Dry Mesic system ~ forests characterized by plants that are adapted to fire.

Description	Fire-dependent, even-aged, open, jack (and red) pine forests of somewhat excessively drained sandy soils, flat habitats.
Vegetation	Canopy of jack or red pine; jack pine is dominant tree; balsam fir and white spruce can occur in understory and when present, fir can be abundant; even and generally low crown height (<66 feet).
Ecology	Historically dependent upon catastrophic crown fires; jack pine senesce at about 60 years – difficult to find individuals over 80; characterized by high abundance of evergreen plants – composed almost entirely of evergreen trees; correlates with low-nutrient environments
Forest Management Considerations	Age structure was even; natural fire rotation estimated at 50-80 years; bare mineral soil is required for best seedbed conditions; hot fires help promote loss of nitrogen and maintain fire-dependent species; sufficiently hot or frequent fire is important to keep tall-shrub density low and perpetuate this forest.

Dry Pine Forest

Dry / Dry Mesic system ~ forests characterized by plants that are adapted to fire.

Description	Fire-dependent, multiple-aged, somewhat brushy, jack / red pine forests on somewhat excessively or well-drained sandy / gravelly soils, flat to strongly rolling habitats.
Vegetation	Mixed canopy of jack and red pine with scattered white pine; very few deciduous trees except some paper birch; succession of jack pine dominance following disturbance with red pine replacing it at about 80 years; possible to convert to aspen but only with many pine volunteers; strongly dominated by coniferous trees.
Ecology	Historically dependent upon frequent and sometimes catastrophic fire for regeneration, persistence, and ecological integrity; stand replacement fires every 80-150 years; exposed mineral soil needed for regeneration; significant component of evergreen plants in ground layer (correlated to low nutrient level and nitrogen depleted by fire).
Forest Management Considerations	Red and jack pine; even aged giving way to multiple aged with two or more species; need fire to keep beaked hazelnut colonies small; managing older stands as a multiple-aged system can be accomplished indefinitely by opening the canopy above well established cohorts of regenerating pine and by using prescribed surface fires to initiate establishment of pine seedlings.

Dry Mesic Pine Forest

Dry / Dry Mesic system ~ forests characterized by plants that are adapted to fire.

Description	Fire-dependent, multiple-storied, brushy, pine / spruce / fir / birch forests on well-drained sandy / gravelly over loamy soils, undulating to steeply rolling habitats.
Vegetation	Coniferous supercanopy of mostly pine (red and white) and mixed subcanopy (dominated by deciduous trees); white spruce and balsam fir occasionally are in canopy; deciduous trees can reach canopy (most often paper birch and red maple but also individuals of bur/red oak, aspen).
Ecology	Community most-often envisioned as the great, lumber-producing pinery of north-central Minnesota; frequent fires encouraged pines at expense of deciduous trees on habitats that are sufficiently rich so dense stands grew tall and large; almost always a soil property at depth holding water into active growing season.
Forest Management Considerations	Red and white pine are historic dominants; community provides best opportunity to grow these in mixture with jack pine and white spruce; paper birch and aspen grow well here; as a general rule, the negative impacts of fire-suppression are most felt on mesic habitats that historically burned (succession to more mesic flora is more rapid here than on drier sites); restoring frequent surface fire is priority if ecological integrity is goal; initially even aged, stands become multiple-aged as it matures; managing older stands as multiple-age system can be accomplished indefinitely by opening the canopy above well-established cohorts of regenerating pine and by using prescribed surface fire to initiate establishment of pine seedlings; fires must be frequent enough to prevent spruce and fir from reaching heights that would promote crowning; thin out luxuriant growth of beaked hazel.

Dry Mesic Pine / Oak Forest

Dry / Dry Mesic system ~ forests characterized by plants that are adapted to fire.

Description	Fire-dependent, multiple-storied, brushy, pine / oak / aspen forests of well-drained sandy / gravelly over loamy soils, undulating to steeply rolling habitats.
Vegetation	Supercanopy of pine (jack, red or white alone or in mixture) and subcanopy of oak, aspen, and red maple; hallmark is a diverse and vertically complicated canopy composed of a mixture of pines and deciduous trees.
Ecology	Fire regime is difficult to interpret – due to fact this community is succeeding to deciduous forest in a management environment that is biased towards pulpwood production and fire-exclusion; strong evidence of fire as historic factor; moderate to low intensity surface fires with 5-40 year frequency (estimated); presence of water at depth in soils allows for success of deciduous trees and shrubs – presence of tall deciduous trees is good field indicator that the vegetation is not one of the dry communities.
Forest Management Considerations	Most malleable of the fire-dependent communities from a management perspective; jack, red and white pine; aspen, red and bur oak; restoring frequent surface fire is priority if ecological restoration is goal; maintaining a mix pine/deciduous canopy is vital if wildlife is management concern; burned openings of 3-6 acres might produce pine habitat if standard plantation methods are not desired.

Mesic Oak Forest

Mesic system ~ forests characterized by plants adapted to shade and rapid nutrient recycling with tolerance for fire.

Description	Fire-tolerant, multiple-aged, brushy, oak / birch / aspen forests on well-drained sandy / gravelly over clayey / loamy soils, undulating to steeply rolling habitats.
Vegetation	Mixed canopy of oak, boreal hardwoods, and rarely pine; red oak, bur oak, aspen, and red maple are most important canopy trees; white pine may have been more abundant in the past
Ecology	Is essentially limited to rugged terrain within stagnation moraines; ecological processes associated with slopes are important to the ecology of plants in this community; competitive ability of sugar maple is deterred by occasional fire; historically dependent upon occasional but unpredictable surface fire because they invariably occurred next to a fire-dependent plant community.
Forest Management Considerations	Red oak, bur oak, basswood, paper birch, aspen plus red and sugar maple; fire is critical to stand regeneration stage if something besides sugar maple is desired; downed logs are critical for trapping sediment and nutrients on slopes and as nursery beds (e.g., for paper birch).

Map: 5 In Forest Ecological Systems Hubbard County

1" = 3.5 Miles



- Dry Pine/Oak Woodland
- Dry Poor Pine Forest
- Dry Mesic Pine Forest
- Dry Mesic Pine/Oak Forest
- Wet Mesic Lowland Mixed Forest
- Organic Lowland Conifer



Wet Mesic Lowland Mixed Forest

Wet Mesic system ~ forests characterized by plants adapted to shade and rapid recycling but which are wetter and richer than mesic systems.

Description

These forests will contain various mixes of deciduous and coniferous cover types. Management depends upon the nature of the mix. [There are no available narratives for vegetation, ecology, or forest management considerations.]

Organic Lowland Conifer

Organic system ~ forests characterized by plants adapted to permanently waterlogged soils and water buffered by carbonates. Acid systems are characterized by plants buffered by organic acids.

Description

As delineated in Hubbard County this designation probably covers a wide range of organic systems. Most are probably on the richer end of the spectrum possessing tamarack and white cedar. There are probably acidic sites with treeless bogs. In between lie black spruce swamps and bogs. [There are no available narratives for vegetation, ecology, or forest management considerations.]

Forest Dynamics

The Role of Fire

To envision the range of management options for Hubbard County, it is imperative to understand the dynamics of the natural forest systems and how those dynamics have been altered by human activity. And for the vast majority of Hubbard County, the dominant factor was fire and is, now, fire-suppression. The following discussion is based on Almendinger and Hanson's book on the Drift and Lakes Plain Section and all quotes are from that volume.

Roughly 6,000 years ago the vegetation of Hubbard County was mostly prairies and oak-dominated savanna. They had replaced pine dominated forests which had been there previously but disappeared during a warm and dry climatic period beginning about 8,000 years ago. However, as the climate reversed again, "white, red and jack pine migrated concurrently back into the Section from the east in response to climatic cooling and increased precipitation in Minnesota.... By about 1,000 years ago, the pines had completed their westward migration across the Section. Thus, the overall distribution of forests similar to those of the Fire-Dependent Pine/Oak System stabilized at about that time. Thus, there is great temporal variation in the establishment of pine-dominated vegetation within the Section. Many sites in the west have had but a few generations of pine."

The change in climate changed the fire-regime which influences the vegetation in this area. Thus, "changes in the fire-regime caused shifts among the fire-dependent community types that we see in the modern vegetation, as well as some types that are now absent from the [Drift and Lake Plains] Section such as prairies, savanna, and woodlands without pine." Almendinger and Hanson note that "Although fire has not been allowed to fill its natural role on the landscape since the initial reforestation efforts on public lands demanded fire-prevention (ca. 1910-1940), it is still the most proximal

ecological factor that explains the overall distribution of fire-dependent plants and the vegetational variation among the Native Plant Communities" in this section.

However, "[t]he effect of fire on vegetation is not universal or invariant.... In Minnesota, it is traditional to link fire-regimes to vegetational types. This is so because the vegetation itself largely determines the probability that a stand will burn." Other researchers have "pointed out that there are static components of landscapes that also have a significant effect on the overall fire-probability pattern. Topographic roughness; the density, distribution, and orientation of water-related firebreaks; and soil texture as it affects the overall hydration of vegetation are all important as they affect fire behavior."

Just as fire was the dominant factor in creating the type of vegetation that historically occupied Hubbard County and which set the stage for the modern forest, so has the active suppression of fire made its impact. As noted above, "It is important, however, to remember that fire regimes were not completely independent of physical site factors. In the past, these factors operated to some degree independently of fire to cause community differentiation. *In the future, these physical factors will take on greater significance if fire is excluded from the system.*" [emphasis added]

The absence of extensive fire in ecological systems that are dependent upon fire for their persistence and ecological integrity, means that the forests gradually evolve to other forms or become stunted. Simply stated, pine and oak forests are less competitive than fire-intolerant deciduous forests over time in the absence of fire. Certain pine types, such as jack pine, are difficult to regenerate without fire.

Forest Succession

It is deemed important to the health and vitality of the forest, and as a consequence, 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 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."⁸

The basic pattern of forest succession involves four major phases:⁹

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

⁸ Hunter, Malcolm, Jr. "Principles of Ecological Forestry", in *Maintaining Biodiversity in Forest Ecosystems*, edited by Malcolm Hunter, Jr., Cambridge University Press, 1999.

⁹ Spies, Thomas, "Forest Stand Structure, Composition, and Function", in *Creating a Forestry for the 21st Century*, edited by Kathryn A. Kohm and Jerry F. Franklin, Island Press, 1997.

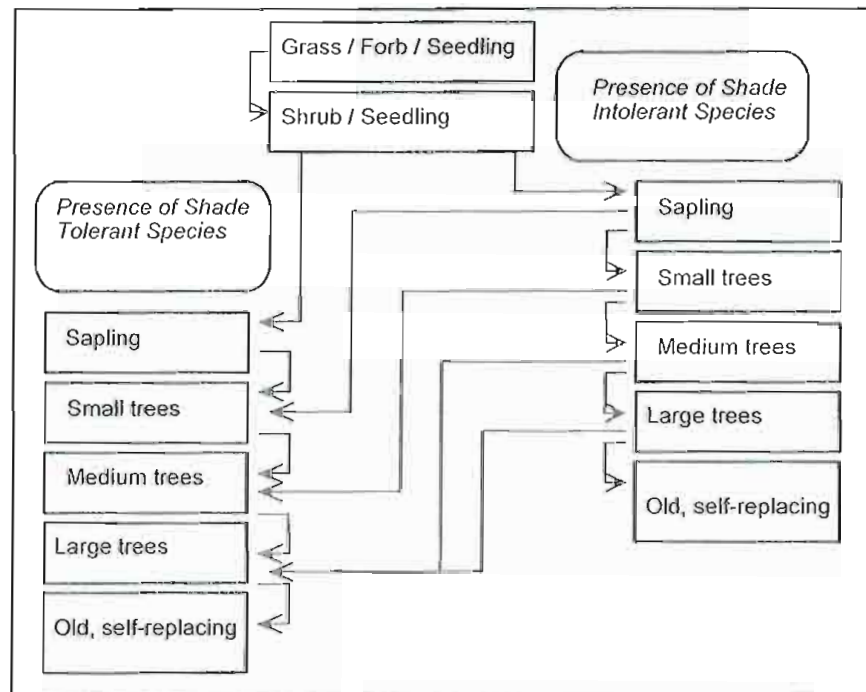
competition for light and water.

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.

Generalized Vegetation Growth Stages

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.

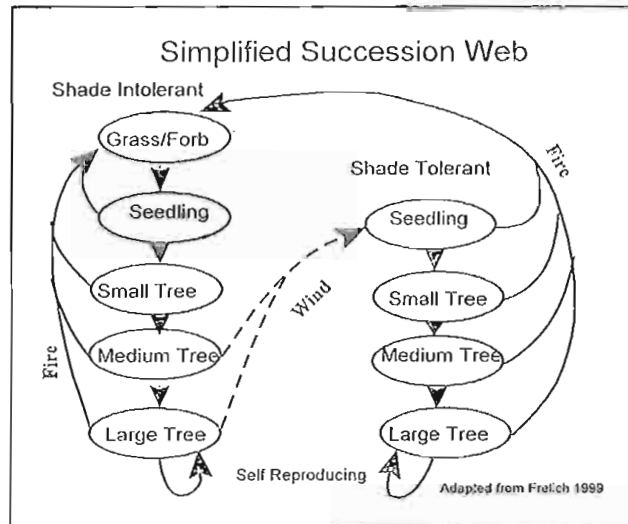


The primary growth stages are: grass / forb / seedling; shrub / seedling (seedlings and shrubs now dominate the site); sapling (dense stands of trees less than 2" in diameter); small trees (trees are thinning out in number as size increases to 2-5" in diameter); medium trees (dominant trees are 5-9" 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 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.

The linear description of succession above does not take into account the impact of disturbance. As shown in the figure absent intervention by humans, fire and wind play the major roles in altering the forest land-scape (in Hubbard County fire was *the* dominant stand altering force). 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, the 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. The capacity and timing of fire and wind to alter stands range from very short (50-80) years on dry outwash-dominated landscapes (such as that found in Hubbard County) 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. By running the 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. 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.

Forest Patches

Another important aspect forest integrity is managing for a range of sizes and spatial

arrangements of forest patches. Forest patches are defined as areas containing a contiguous forest type of similar composition and age (patches can also be comprised of non-forest elements such as fields). Associated with patch is the concept of "edge", or the area where two patches meet.

A key quality of patches is the amount of "interior" forest area. Interior area is defined a continuous forest area beyond the range of "edge effects", which are ecological effects related to penetration of light and wind into the forest, as well as to the different habitats created between open lands and forest, or between different forest types. The analysis used in Hubbard County defined the edge effect as extending 100 meters (327 feet) into the patch. Knowing the amount of edge and interior area is important for understanding the value of forests as habitat for wildlife and plants of concern. It also provides insights into the dynamics of the forest itself (e.g., susceptibility to wind, succession).

Patches, of any size, and edge are not inherently "good" or "bad" for a forest or wildlife. Simply stated, a healthy forest has a distribution of patch types, sizes and amounts of edge that taken as a whole is appropriate for the landscape. This insures there is a mix of forest and habitat critical to sustaining forest types / communities and providing essential habitat for all wildlife.

Hubbard County's forest cover has been analyzed at two levels, using different techniques, regarding the size, location, and other attributes of patches. The **first level of patch analysis** was based upon a satellite-produced image of the entire county. While this analysis has two drawbacks – it merges the forest into groups of cover types and it cannot consider forest age -- it does provide a broad landscape view encompassing all ownerships. This level of analysis establishes the "big picture" landscape perspective of the county and provides the context for a closer examination of the County's land base. The result of this analysis is an understanding of the size and distribution of forest patches across the landscape.

The **second level of patch analysis** is based upon only the County's detailed forest inventory. While it does not provide the multi-ownership view of the entire county, it produces an analysis of patches based on individual cover type and age class. This fine-grained review allows for detailed examination of patches and edge and the opportunities to appropriately modify those patterns in accord with management goals.

The analysis of Hubbard County's patches and edge is found in the "Timber Management: General" section of the Strategic Management chapter.



Hubbard County Forest Resources Management Plan

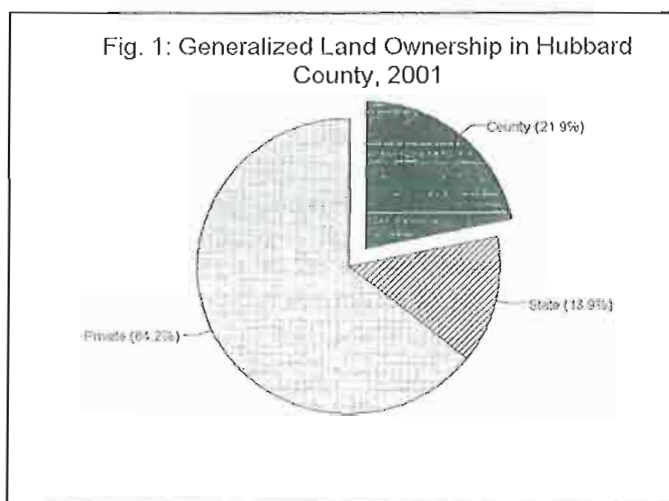
Resource Description

This chapter generally describes the natural resources on Hubbard County's tax forfeited land base. This information provides a "big picture" overview of the resource which, in subsequent chapters, is discussed in terms of various functions.

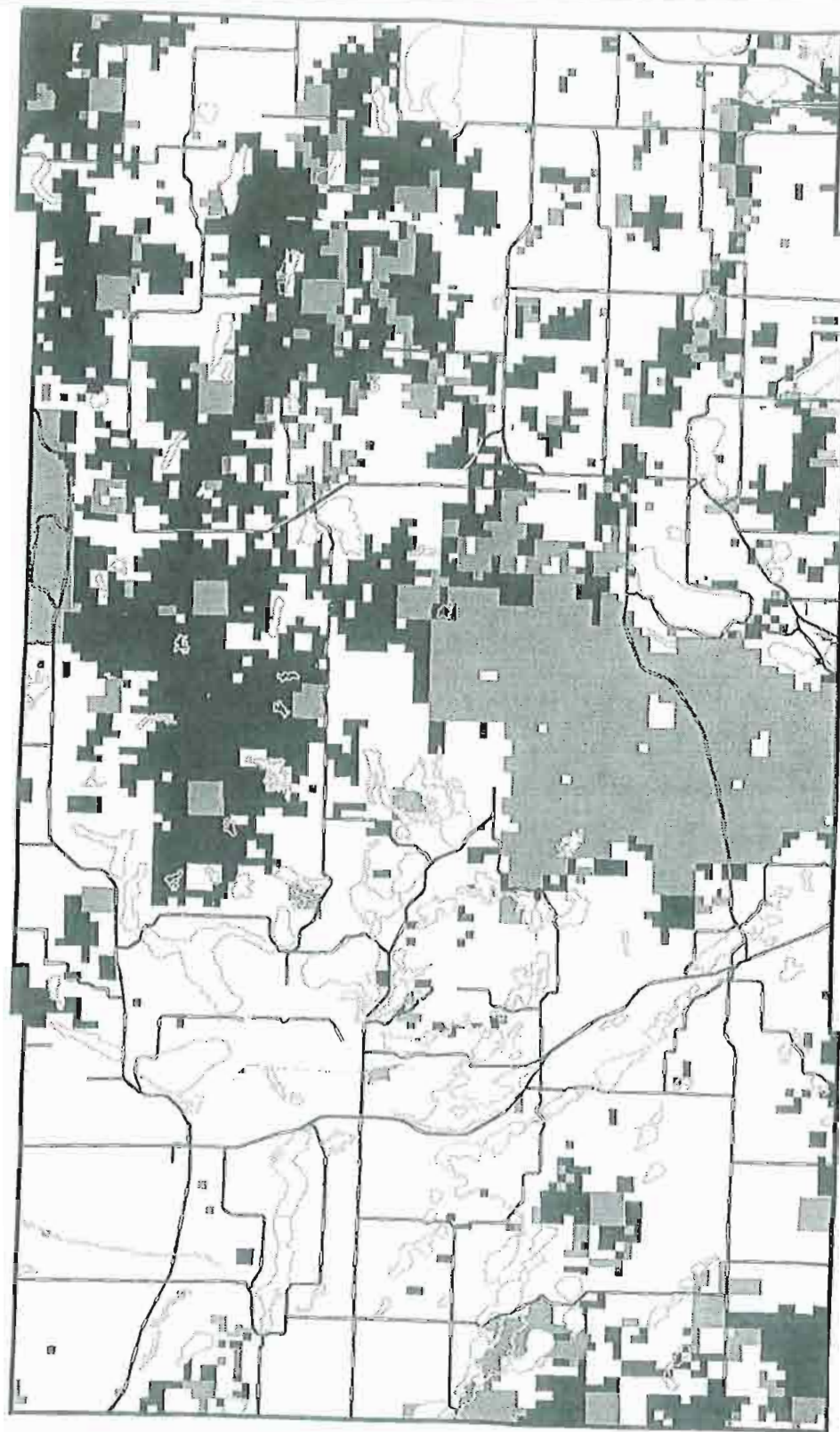
Ownership

County administered tax forfeit land represents just over one-fifth of the total area of Hubbard County. State ownership, including a small portion of Itasca State Park, increases the amount of public ownership to 36%. Table 1, Figure 1, and Map 6 present the general ownership figures for the county.

Table 1: Landownership in Hubbard County		
Owner	Acres	Percent of Total
Hubbard County	137,910	21.9%
State	87,656	13.9%
Private	404,989	64.2%
Total	630,555	100.0%



Much like its ecological position in the state, Hubbard County occupies a "middle" zone in terms of public land ownership. The amount of public ownership in the county is greater than that of counties to the south but substantially less than that of those to the north and east. This means that Hubbard is a "front line" county for primarily metropolitan visitors seeking to recreate on public lands. It also means that the amount of public land to satisfy this growing demand (and the demand for timber products from the same land base) is limited.



Map 6: Public Ownership in Hubbard County



Map prepared by: Pro-West & Assoc.

2 0 2 4 6 Miles

Forest Cover Type

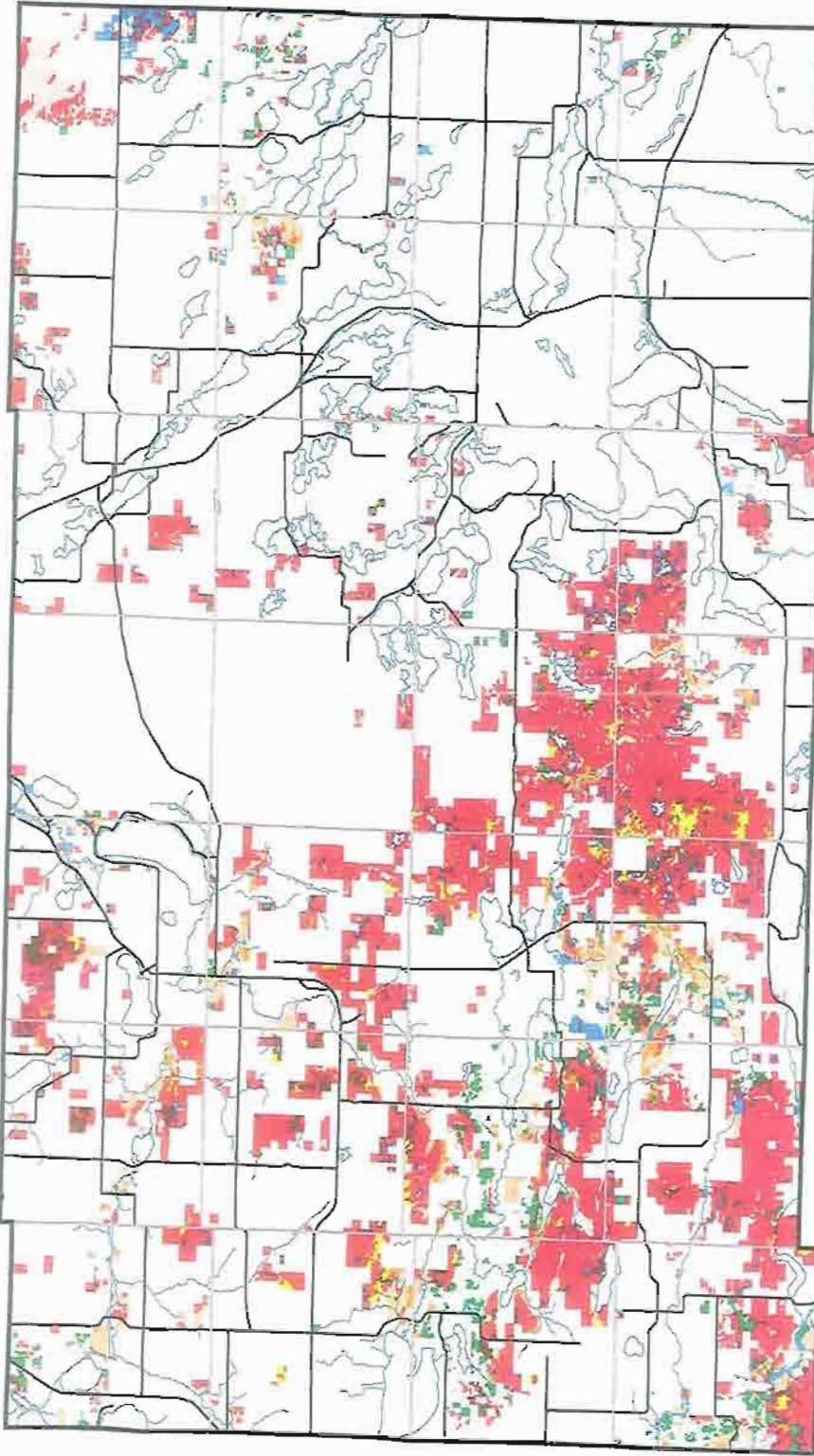
Cover type indicates the type of forest currently growing on a given stand (based on inventory data). This term must be used with a degree of caution. Cover types are named after a specific tree species, for example aspen, but this does not mean the stand is comprised exclusively of that species. A stand is assigned its cover type based on the dominant tree species over a given diameter size. By the time a stand is 30-40 years old, the dominant species may only be 25-35% of the total stock of trees. Thus, with rare exceptions, there are few pure stands of any cover type.

Table 2 shows the acres and percentages for the cover types inventoried on Hubbard County's tax forfeited lands. Figure 2 shows the distribution for generalized groups. Map 7 shows the geographic distribution. Table 3 provides age class distributions for forested lands.

Cover Type	Acres	Percent
Ash	946	0.7%
Aspen	66,195	48.1%
Balm of Gilead	437	0.3%
Balsam Fir	3,186	2.3%
Birch	7,652	5.6%
Black Spruce, Lowland	3,836	2.8%
Lowland Hardwoods	416	0.3%
Northern Hardwoods	3,080	2.2%
Pine, Jack	16,193	11.8%
Pine, Red	6,698	4.9%
Pine, White	191	0.1%
Oak	3,926	2.9%
Tamarack	2,708	2.0%
White Cedar	291	0.2%
White Spruce	665	0.5%
Stagnant Cedar / Spruce / Tamarack	181	0.1%
Upland Grass / Brush	1,667	1.2%
Lowland Grass / Brush	10,123	7.4%
Offsite Aspen-Oak/ Cutover Area	1,001	0.7%
Marsh / Muskeg	4,273	3.1%
Permanent Water	2,518	1.8%
Non-permanent Water	780	0.6%
Developed / Roads / Agricultural / Other	629	0.5%
Total	137,592	100.0%

Map 7: Forest Cover Types Hubbard County

1" = 3.5 Miles



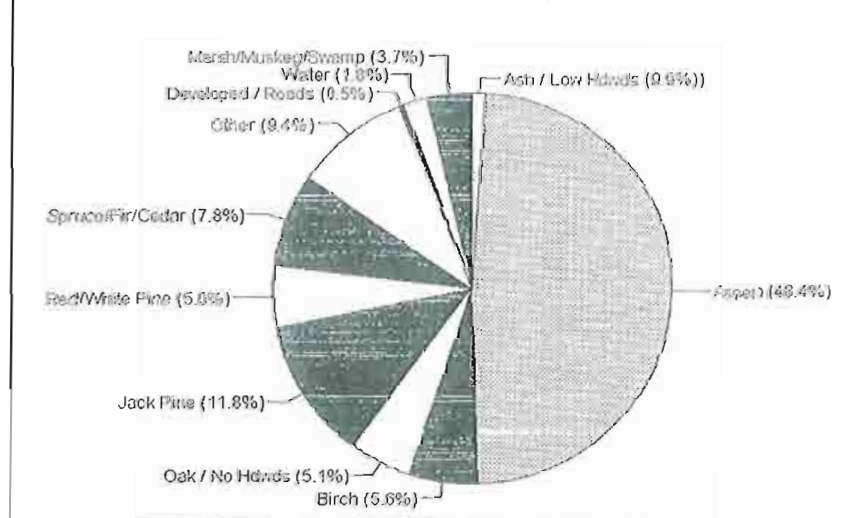
Major Roads
Township Boundary
Rivers or Streams
Lakes

Forest Types
Ash/Lowland Hardwood
Birch/N Hardwood
Oak
White/Red Pine
Jack Pine
W Spruce/B Fir
B Spruce/Tamarack/W Cedar
Stagnant Conifer/Marsh-Muskeg
Low & Upland Brush & Grass
Roads & Industrial
Non-managed Lakes

**Table 3: Age Class for Selected Cover Types on Hubbard County Tax Forfeited Lands, 2001
(acres per age class)**

Cover Type	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121+	Total
Ash	0	6	0	0	4	49	87	182	87	109	190	139	93	946
Lowland Hardwoods	0	0	0	0	0	134	87	140	25	0	4	0	26	416
Aspen	9,676	8,647	6,341	3,275	3,574	9,067	16,664	8,354	578	19	0	0	0	66,195
Birch	246	31	31	8	151	1,435	3,272	2,044	434	0	0	0	0	7,652
Balm of Gilead	0	25	0	7	46	91	144	124	0	0	0	0	0	437
Northern Hardwoods	0	22	6	0	129	220	1,416	1,089	160	20	18	0	0	3,080
Oak	12	25	23	24	0	139	1,115	1,728	499	190	52	66	53	3,926
White Pine	128	2	0	0	0	15	0	0	22	13	4	7	0	191
Red Pine	333	2,423	740	335	162	128	329	347	822	619	338	92	30	6,698
Jack Pine	2,064	410	574	464	1,624	4,668	3,952	2,240	167	10	11	0	0	16,184
White Spruce	163	338	45	0	11	13	29	16	2	48	0	0	0	665
Balsam Fir	18	94	50	7	122	828	1,299	517	180	55	7	0	9	3,186
Black Spruce, Lowland	74	21	70	123	48	212	562	434	558	853	435	207	239	3,836
Tamarack	0	39	106	95	188	155	270	345	488	415	264	162	181	2,708
White Cedar	0	0	0	0	0	0	4	7	33	87	14	52	94	291
Total	12,714	12,083	7,986	4,338	6,059	17,154	29,230	17,567	4,055	2,438	1,337	725	725	116,420

Fig. 2: Cover Type on Hubbard County Tax Forfeited Land, 2001



The following graphs portray the age class distributions for selected cover types. These graphs illustrate the nature of the current resource and the challenge facing the County in managing them.

Fig. 3: Aspen Cover Type by Age Class, 2001

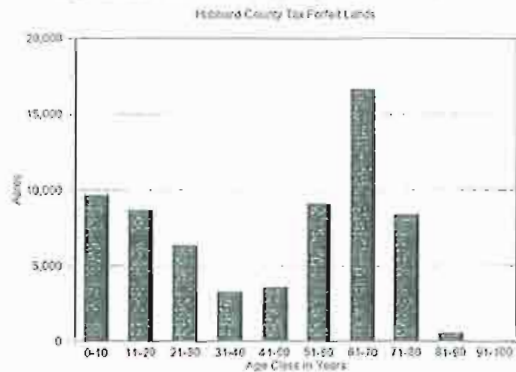


Fig. 4: Jack Pine Cover Type by Age Class, 2001

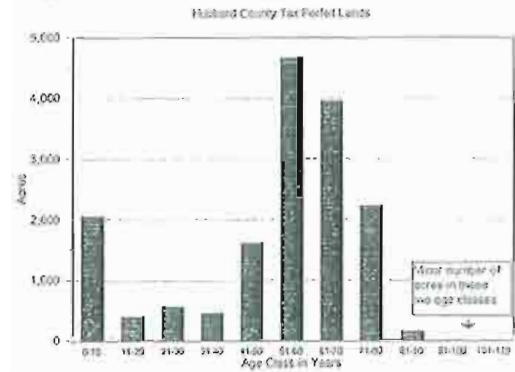


Fig. 5: Birch Cover Type by Age Class, 2001

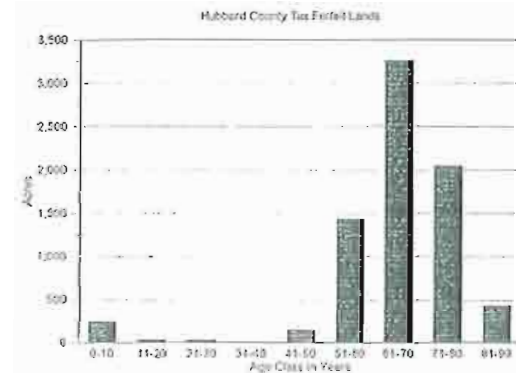


Fig. 6: Red Pine Cover Type by Age Class, 2001

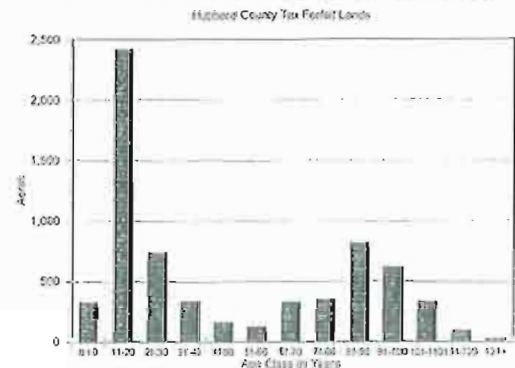


Fig. 7: Oak Cover Type by Age Class, 2001

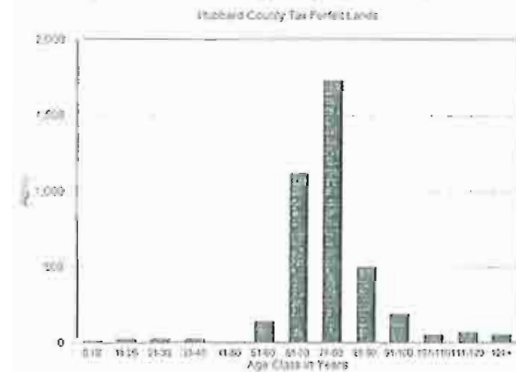
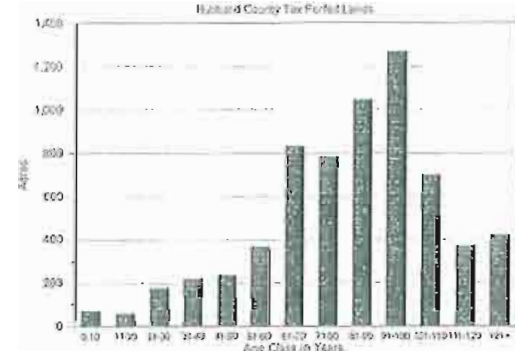


Fig. 8: Black Spruce/Tamarack Cover Type by Age Class, 2001



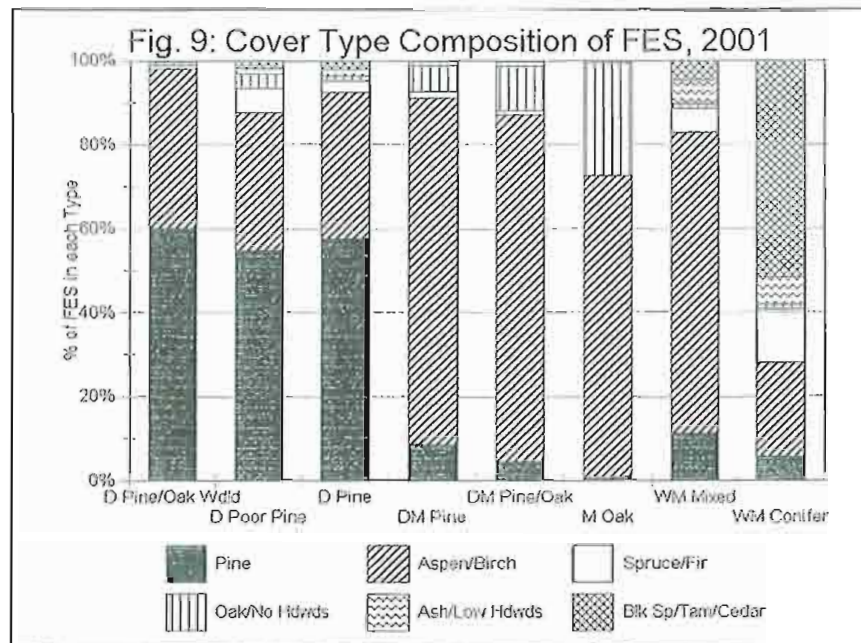
Forest Ecological Systems

Earlier, Map 5 showed the distribution of forest ecological systems in Hubbard County. Table 4 presents the distribution in terms of ownership.

FES	County		State		Private		Total
	Acres	%	Acres	%	Acres	%	Acres
D Pine/Oak Woodland	1,232	2.6%	1,509	3.2%	43,777	94.1%	46,518
D Poor Pine	23,837	44.4%	4,207	7.8%	25,623	47.7%	53,667
D Pine	8,212	13.2%	4,316	6.9%	49,589	79.8%	62,117
DM Pine	48,781	20.6%	57,168	24.1%	131,000	55.3%	236,949
DM Pine/Oak Forest	23,711	27.6%	3,669	4.3%	58,571	68.1%	85,951
M Oak Forest	1,442	12.5%	498	4.3%	9,551	83.1%	11,491
WM Lowland Mixed	2,505	18.0%	1,026	7.4%	10,376	74.6%	13,907
O Lowland Conifer	25,119	34.1%	13,513	18.4%	34,927	47.5%	73,559

Table 5 and Figure 9 examine the distribution of existing forest cover types within each of the forest ecological systems.

FES	Pine	Aspen / Birch	Spruce / Fir	Oak / No. Hdwds	Ash / Low Hdwds	Blk Sp / Tam / Cedar	Total
D Pine/Oak Woodland	60.1%	38.0%	1.0%	0.8%	0.0%	0.2%	100%
D Poor Pine	54.8%	32.8%	5.8%	3.6%	1.2%	1.8%	100%
D Pine	57.6%	34.7%	2.8%	1.4%	1.4%	2.1%	100%
DM Pine	8.6%	82.7%	1.3%	6.5%	0.6%	0.4%	100%
DM Pine/Oak Forest	4.5%	82.7%	0.9%	10.7%	0.9%	0.3%	100%
M Oak Forest	0.8%	71.7%	0.1%	26.7%	0.7%	0.0%	100%
WM Lowland Mixed	11.3%	71.7%	5.8%	1.0%	5.7%	4.6%	100%
O Lowland Conifer	5.9%	22.1%	12.7%	1.1%	6.5%	51.6%	100%

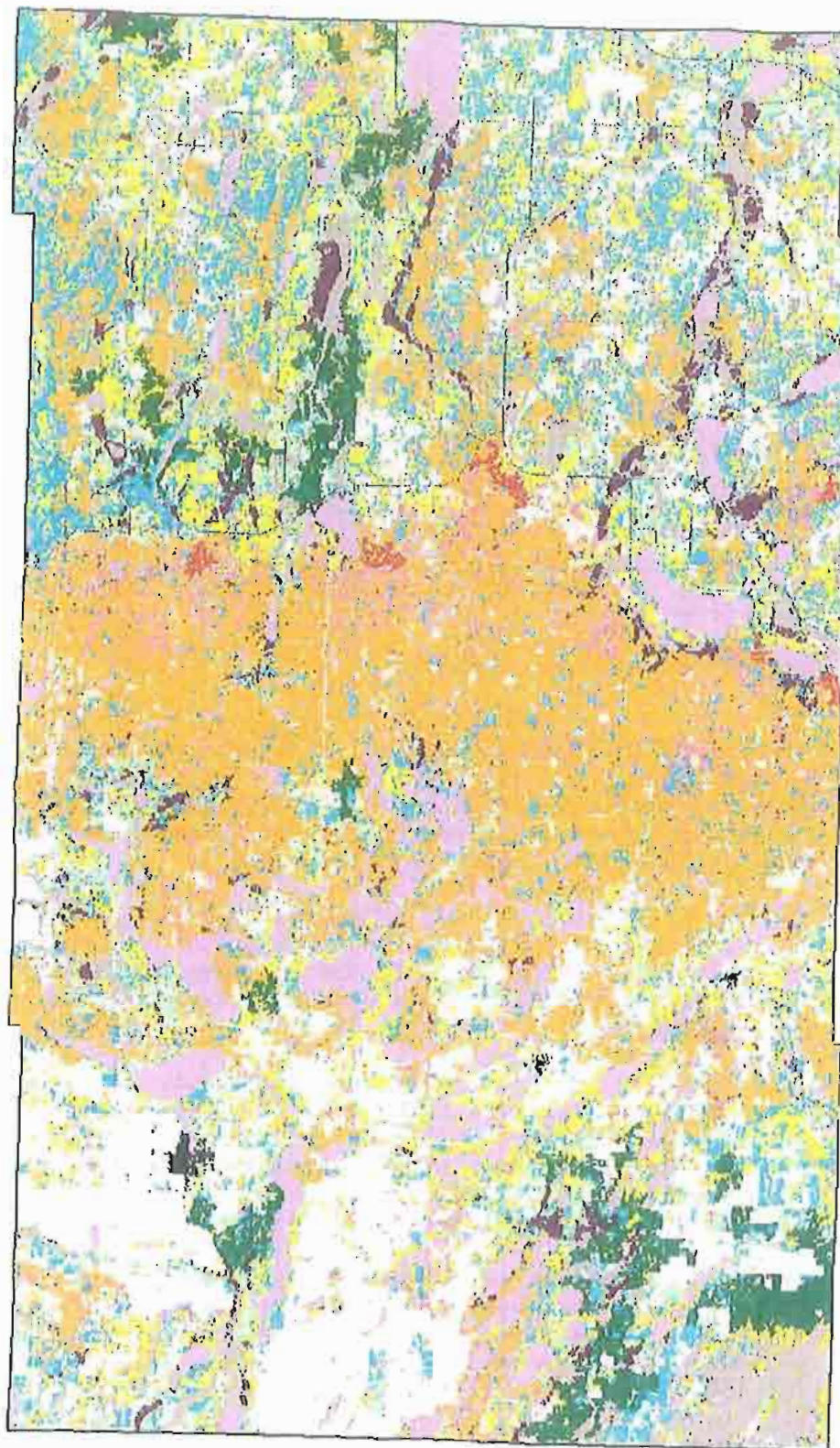








The next two tables interpret existing cover type on tax forfeited lands in terms of vegetation growth stage (VGS or forest succession). Stage definitions are based on the habitat table (Table 9) in the Habitat section of the Strategic Management chapter as follows: Establishment = "shrub-sapling opening and regeneration"; Thinning / Transition = "young and mature"; Mature / Shifting Mosaic = "old".

Table 6 shows the VGS in terms of shade intolerant (e.g., aspen, birch, jack pine) and shade tolerant (e.g., northern hardwoods, balsam fir, white spruce) cover types.

FES	Establishment		Thinning / Transition		Mature / Shifting Mosaic		Total Acres
	Acres	%	Acres	%	Acres	%	
Either / Both	29,728	22.2%					29,728
Shade Tolerant			5,665	4.2%	2,332	1.7%	7,997
Shade Intolerant			61,705	46.1%	34,299	25.6%	96,004
Total	29,728	22.2%	67,370	50.4%	36,631	27.4%	133,729

Table 7 presents existing cover type in terms of the vegetation growth stage across each of the forest ecological systems.



Land Cover	
	Aspen-Birch
	Developed
	Jack Pine
	Lowland Forest
	Lowland Grass/Shrub
	Oak
	Other Upland Forests/Shrub
	Upland Grass/AG
	Water

Map 8 : Large Patches Based on Gap TM Classification in Hubbard County

Map prepared by: George Host / Mark White



Large Patches	
	Oak Patches > 100 Acres
	Jack Pine Patches > 200 Acres
	Aspen-Birch Patches > 500 Acres

1" = 5 Miles

Table 7: Distribution of Generalized Vegetational Growth Stages by Forest Ecological System on Hubbard County Tax Forfeited Lands, 2001

FES	Establishment		Thinning / Transition		Mature / Shifting Mosaic		Total Acres
	Acres	%*	Acres	%	Acres	%	
D Pine/Oak Woodland	0	0.0%	496	61.3%	313	38.7%	809
D Poor Pine	3,936	16.7%	13,280	56.5%	6,292	26.8%	23,508
D Pine	1,082	13.3%	5,370	66.0%	1,683	20.7%	8,135
DM Pine	7,007	14.6%	22,245	46.3%	18,845	39.2%	48,097
DM Pine/Oak Forest	3,510	14.9%	15,202	64.3%	4,920	20.8%	23,632
M Oak Forest	114	8.0%	814	57.4%	491	34.6%	1,419
WM Lowland Mixed	579	23.3%	1,625	65.5%	276	11.1%	2,480
O Lowland Conifer	12,775	53.2%	7,721	32.2%	3,507	14.6%	24,003

* Percent of FES within the growth stage.

The Range of Natural Variability (RNV) for the distribution of forest VGS has been determined for the area including Hubbard County.¹⁰ Although comparing RNV to the current cover type is complicated by significantly differing definitions (RNV uses "years since stand altering disturbance" and cover type is measured by age of dominant trees), some meaningful findings can be generated as follows:

- On the Dry Pine Forest FES Hubbard County's inventory is within the RNV for the younger age classes. However, it exceeds RNV in the intermediate age classes and is dramatically under RNV for older groups. This reflects a forest dominated by jack pine and aspen and lacking red and white pine, especially older stands.
- On the Dry Mesic Pine Forest FES a similar situation is seen. Here the younger age classes are within or relatively close to RNV, intermediate age groups significantly exceed RNV, and older age classes are substantially below RNV or absent altogether. This latter point is important as the RNV for this ecological system is heavily skewed to older age groups. Again, the current situation reflects a forest dominated by aspen and lacking red and white pine.
- On the Dry Mesic Pine/Oak Forest FES the current inventory substantially exceeds RNV for younger stands, generally exceeds RNV for intermediate aged stands, and is significantly below RNV for older stands. The current forest is dominated by aspen and lacks substantial amounts of oak, hardwoods, and pine.

Map 8 shows the distribution of large forest patches (defined only by cover type but not age) across the entire county. The map clearly shows the massive, essentially contiguous aspen forest across the middle third of the county; when examined by age this swath becomes more of a checkerboard of varying aged small patches. The map

¹⁰ Frelich, Lee E., *Natural Range of Variability estimates for forest vegetation growth stages of Minnesota's Drift and Lake Plains*, final version, April 16, 2000.

also identifies significant jack pine patches in the north central and southeastern portions of the county; when examined by age it becomes obvious that these are old, decadent stands. Finally, the map shows a band of oak patches emerging along the northern edge of the Dry Mesic Pine forest ecological system; additional review indicates clusters of smaller oak patches along this edge.

Assessment

The following summarizes key points regarding the current status of Hubbard County's forests:

- Hubbard County's forests reflect not the results of a century of directed management but a century of significant forest cover alteration followed by directed management. The logging of a hundred years ago drastically altered the forests. This was followed by fire and then active fire suppression, conversion to agriculture, and, in many cases, reversion to forest. These events significantly reduced the presence of many forest types and dramatically shifted forest succession to favor younger forests.
- Hubbard County's forests occupy ecological systems that predominantly depend upon fire to define and sustain the forest. A half century of effective fire suppression, done to preserve timber supply and protect lives and property, has created circumstances that no longer favor fire dependent forests (e.g., jack pine, red pine, oak) while fostering non-fire dependent types (e.g., hardwoods).
- Aspen dominates Hubbard County's forests; the whole middle third of the county (including State lands) is essentially an aspen forest. Jack pine is the second most abundant type. Relative to its potential, oak is fairly well represented and, in fact, may be more abundant on the landscape than inventories indicate. Red and white pine are substantially absent as compared to the landscape's potential, being the cover type most displaced by the younger aspen forest.
- Within cover types, the age distributions are seriously imbalanced. Aspen has an over abundance of older stands and a relative lack of middle aged stands. Jack pine is dominated by older age classes and has almost no resource in its intermediate age groups. Birch is dominated by older age classes and has essentially nothing under 40 years of age. Oak is dominated by intermediate age classes with nearly no young or old age classes.
- The overall distribution of the forest in terms of vegetative growth stage/forest succession reflects the dominance of the aspen and jack pine cover types. In general, the forest exceeds natural distributions in the young and intermediate stages (which includes older aspen stands) and is significantly below them for late successional forest stages (e.g., old red pine, mature northern hardwoods).
- Both the County and the State practiced small cut harvesting for several decades creating a pattern of excessively small forest patches across the landscape. While this pattern supports game habitat, it diminishes other types of important habitat, particularly those based on interior forests.



Hubbard County Forest Resources Management Plan

Strategic Management

This chapter contains the strategic, long-range plan for managing tax forfeited lands within Hubbard County. It begins with a series of statements regarding the Assumptions underpinning the plan.

The assumptions are followed by a package of statements that, taken together, present the overall intent and direction of this strategic plan. The first set of statements define Principles – the underlying guidelines for forest management decisions. These are followed by Initiatives – statements that identify the main thrusts of the plan. The final set is Geographic Direction – the concepts that apply to specific geographic areas within the county.

The rest of the chapter consists of detailed assessments, goals, policies, and strategic implementation actions for the following topics: Department Administration, Land Administration (general and for easements/timber sales/leases), Habitat, Forest Roads, Recreation, and Timber Management (general and for each major cover type).

Assumptions

Any plan, especially one that looks forward a full century, relies upon a set of assumptions that underpin decisions and expectations. The following are the critical assumptions for Hubbard County's strategic plan:

- The **amount of land** administered by Hubbard County is expected to remain relatively unchanged in amount and quality. The same is true for land administered by the Minnesota DNR and major private forest management firms.
- The world's **climate** is undergoing change – it is warming and becoming more erratic. Predicting the impact of this change over the course of the hundred years covered by this strategic plan is impossible. If and when the impacts of climate change become noticeable and understandable relative to the ability of the landscape to produce forests, Hubbard County will assess its management options and act accordingly.
- The **demand for forest products** is unpredictable across a variety of perspectives including absolute demand for any given species and the prices (and hence revenue to the County) that may be supported. This plan does not attempt to produce a forest for today's market or anticipated future ones; rather, it aims to produce a sustainable, healthy, diverse, and quality forest capable of meeting the needs of a wide variety of market conditions over time.
- This plan is based upon many sets of **information** concerning soils, productivity, forest resource inventory, and resource growth and yield. While this information varies in accuracy, it is the best that is available and, for the purposes of this strategic plan, is considered excellent. However, over time key components need to be ground proofed, refined, and updated; subsequent revisions of this plan need to utilize that improved information.

Principles

The following principles present the core values which serve as the foundation for Hubbard County's management of its forested lands. The principles provide strategic guidance to the development and implementation of specific management activities on County lands.

■ Long-term forest integrity is the foundation of all management

Principle/ Retaining forest stability, defined as maintenance of forest integrity, is essential to the ongoing health, diversity, and productivity of the forest.

Three levels of stability are recognized: *species stability* referring to the maintenance of viable populations of individual species; *structural stability* referring to the stability of various aspects of ecosystem structure (e.g., food-web organization, species numbers, soils); and *process stability* referring to the stability of processes such as productivity and nutrient cycling. Stability is understood as the maintenance of change within certain bounds. Two aspects of stability are: (1) *resistance*, the ability of a system to absorb small disturbances and prevent them from amplifying into large disturbances; and (2) *resilience or recovery*, the capacity to return to some given system state. An example of resilience is succession. Although a forest state to which a stable system recovers is unlikely to exactly replicate the forest which had been there before, it will possess the same core elements and support the same vital processes. A critical feature of recovery is the ability to rapidly stabilize the soil ecosystem, including nutrients, physical structure, and food webs.¹

Principle/ Strategic management is based upon those forest elements which are the most constant and enduring over time.

Although policies and relative values placed upon resources will change over the course of a 100-year plan, landforms, soils, and the vegetation potential of forest sites are unlikely to change.²

■ Patch size distribution will tend to favor larger, aggregated patches

Principle/ Except where management objectives, such as wildlife considerations, support smaller forest patches, the general trend of patch size distribution will be toward creation of larger patches.

This principle is founded on the desire to increase the amount of effective interior forest habitat, especially in conifers and hardwoods. It will tend to counterbalance past practices which almost exclusively favored small, edge-dominated cuts. However, as noted, smaller patches may be retained or even created as determined by management objectives for a specific area.

¹ Perry, David A. and Michael P. Amranthus, *Disturbance, Recovery and Stability*, in "Creating a Forestry for the 21st Century", edited by Kathryn A. Kohm and Jerry F. Franklin, Island Press 1997.

² Diaz, Nancy M. and Simon Bell, *Landscape Analysis and Design*, in "Creating a Forestry for the 21st Century", edited by Kathryn A. Kohm and Jerry F. Franklin, Island Press 1997.

■ **Consistency with Forest Ecological System**

Principle/ Stands will be managed so that their forest type, cover type, and related attributes are in accord with the underlying Forest Ecological System.

■ **Distribution by Vegetational Growth Stage**

Principle/ Management will seek to secure a representative distribution of vegetational growth stages (a.k.a. successional stages or phases) across the aggregated stands for each Forest Ecological System.

■ **Management by species age**

Principle/ Establish a balance of age class groups as appropriate for each cover type.

■ **Modifying Considerations**

Application of the Strategic Management Principles may be modified at the stand or aggregated stand level due to consideration of factors including but not limited to the following:

- Wildlife.
- Recreation.
- Ownership.
- Historical and cultural resources.
- Aesthetics / views.
- Water quantity or quality.
- Natural disturbance.

Initiatives

Hubbard County intends to undertake a series of broad strategic initiatives to implement this plan. The following statements highlight these strategies.

- ▲ **Aspen**, which is Hubbard County's primary cover type and revenue producing species, will continue to be actively managed with increased consideration of converting stands to more appropriate cover types and to assuring a sustainable flow of timber resource.
 - The most productive sites, roughly two-thirds of the resource, will be managed to remain as aspen cover type.
 - The least productive and least densely stocked stands, between 5-10% of the aspen acres, will be converted to conifer (primarily red pine) or oak/hardwood as appropriate to the ecological system and stand characteristics.
 - Management will obtain a balance of age classes across five age classes with a "tail" of two smaller, older age classes to provide mature stand habitat, sawtimber size resource, and flexibility in management. To achieve this situation there will be an "accelerated" harvest level for roughly 20 years followed by a lower, sustainable level.

- ▲ **Jack Pine** will be managed for retention and regeneration on the most appropriate ecological systems.
 - Roughly three-quarters of the existing cover type will be managed for retention and regeneration. These stands will be on the most appropriate ecological systems for jack pine, primarily in the northern third of the county.
 - The remaining quarter of the existing resource will be converted, as appropriate to the underlying ecological system, to red pine or white spruce.
 - Due to the age imbalance favoring older, decadent stands, the first 20 years of the plan will have an accelerated harvest/regeneration/conversion program followed by a sustained level of harvest and regeneration.
 - Hubbard County will assist the formation of a multi-county cooperative project to regenerate jack pine. Among the objectives of this cooperative will be to create unified planting and management programs (e.g., to protect the young trees, use of fire, etc.) to reduce costs.
- ▲ **Northern hardwoods / oak** acres will be increased and the resource managed as appropriate to stand quality.
 - Roughly 3,000 acres of low density mixed aspen/hardwood stands will be converted through active and passive management to northern hardwood stands.
 - High quality northern hardwood stands will be managed as multiple-aged stands with characteristics of mature forests in larger patches.
 - Lower quality northern hardwood stands will be managed as even-aged (with residuals) or two-cohort stands.
 - Oak acres will remain roughly stable with some stands converting to aspen and some aspen stands converting to oak. Larger patches of oak will be encouraged.
- ▲ In general, management will tend towards the creation of larger **forest patches** (defined by cover type and age). Smaller patch sizes and greater amounts of edge will be encouraged in specific wildlife-oriented management areas.
- ▲ **Wildlife** needs will be met through the provision of a range of habitats utilizing a "coarse filter" approach.
 - County will strive to have sufficient amounts of land within each habitat type across the ecological systems represented on County lands.
 - Special consideration will be made to maintain deer wintering yards where they exist now and to provide additional yards in the middle third of the county.
 - "Fine filter" level concerns will be addressed through site specific management (e.g., nests, biotic communities).
- ▲ **Recreational opportunities** will focus on providing land for dispersed recreation and motorized and non-motorized trails.
 - The current system of parks and accesses will be retained.
 - County will work with motorized and non-motorized trail user groups to insure ongoing designation and maintenance of trails for each group.
 - There will be no significant changes in the number of parks or swimming areas. The number of cabin leases will remain constant.

Geographic Direction

In general, Hubbard County will manage its forest according to cover type and ecological system regardless of location within the county. However, there are selected places where area-specific objectives will be emphasized. The following identifies these areas:

▲ Northern Jack Pine Management Area

Within three townships – Schoolcraft, Fern, and Rockwood – lies the heart of the county's jack pine forest resource. It, especially Schoolcraft, is also an area well populated with deer which heavily browse on seedling jack pine. Regenerating jack pine, even in this prime ecological zone, is exceptionally difficult. As a result, the County is adopting a special approach to jack pine management in this area. The overall goal is to retain at least 50% of the current jack pine stands as jack pine; in general the best stands will be selected for retention; various techniques including bud capping and chemical deterrents will be used to prevent or at least reduce deer browse impact. In order to retain upland conifer forest, of the remaining stands currently in jack pine, two-thirds will be converted to red pine and one-third into white spruce.

▲ Badoura Prairie Chicken Management Area

In 1987 the County and Minnesota DNR agreed to establish and jointly manage 16.5 square miles in southeastern Hubbard County to provide habitat for prairie chickens and sandhill cranes. The vegetative objective is to promote grassland and maintain the brushland in an early stage of growth (i.e., keep the brush from getting too tall and rank).

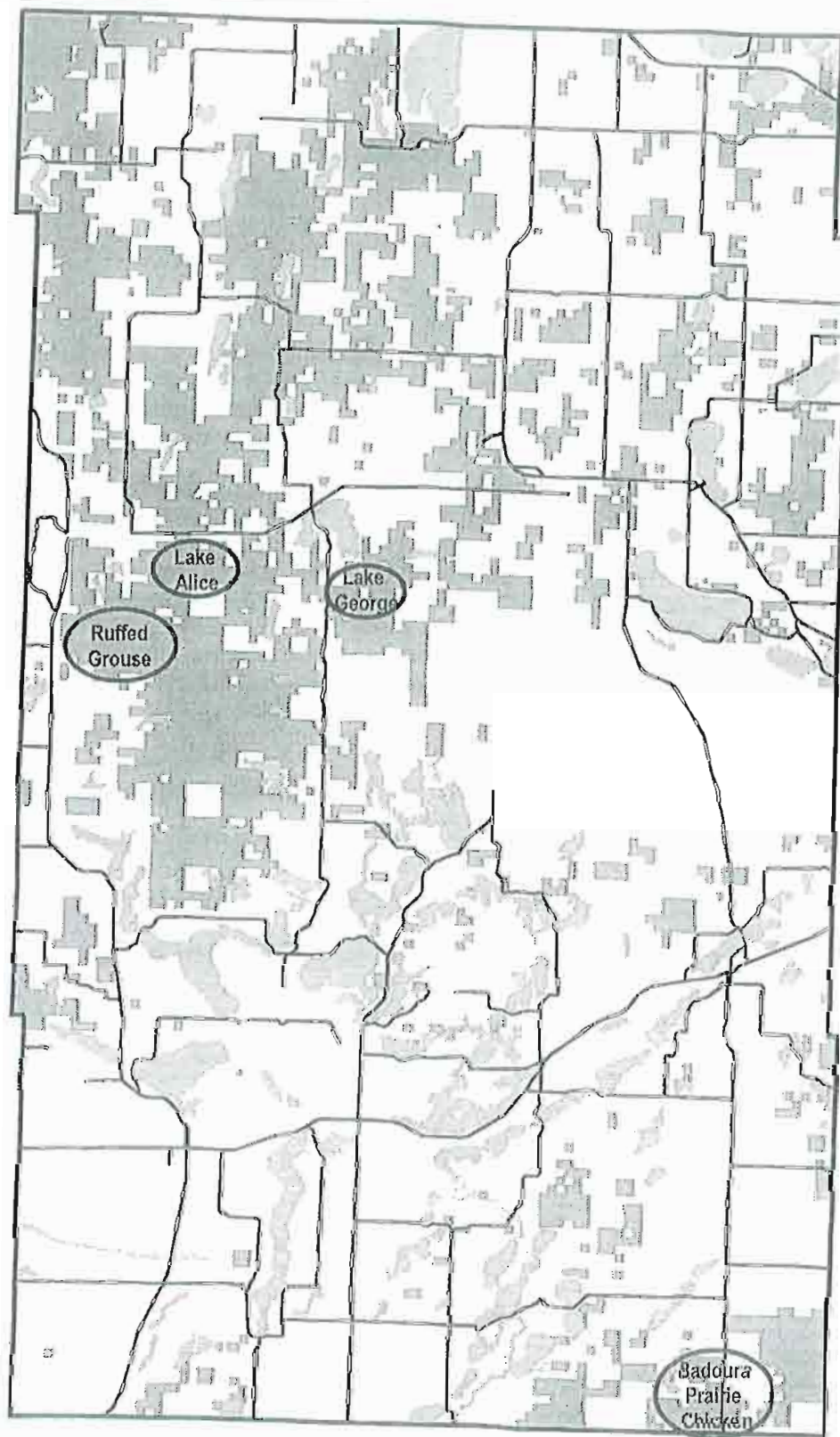
Specific management objectives include: conducting censuses and surveys of target populations; eliminate off-site aspen stands to create grassland islands for use as display grounds and nesting areas; provide proper fire breaks; and use prescribed burns and mechanical means to maintain grass and brush lands.

△ Clover Township Ruffed Grouse Management Area

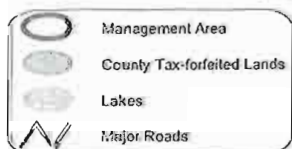
This area is being managed for ruffed grouse habitat in coordination with the Minnesota DNR and the Ruffed Grouse Society. Habitat will be enhanced through a variety of techniques including smaller cuts, emphasis on edge, aspen stands of various ages close to one another, and seeded trails.

△ Lake George / Lake Alice Hardwoods Management Area

Two locations of primarily County administered tax forfeited land offer excellent opportunities for encouraging high quality oak / northern hardwood forests. Currently these areas have many smaller patches of oak / hardwoods. The objective is to consolidate these patches into larger ones through conversion of other cover types (primarily aspen with strong oak/hardwood component) to oak/hardwood. This will benefit species that require interior forest habitat and production of hardwood timber.



**Map 9: Forest Management Areas
in
Hubbard County**



Map prepared by: Pro-West & Assoc.



Strategic Management:

DEPARTMENT ADMINISTRATION



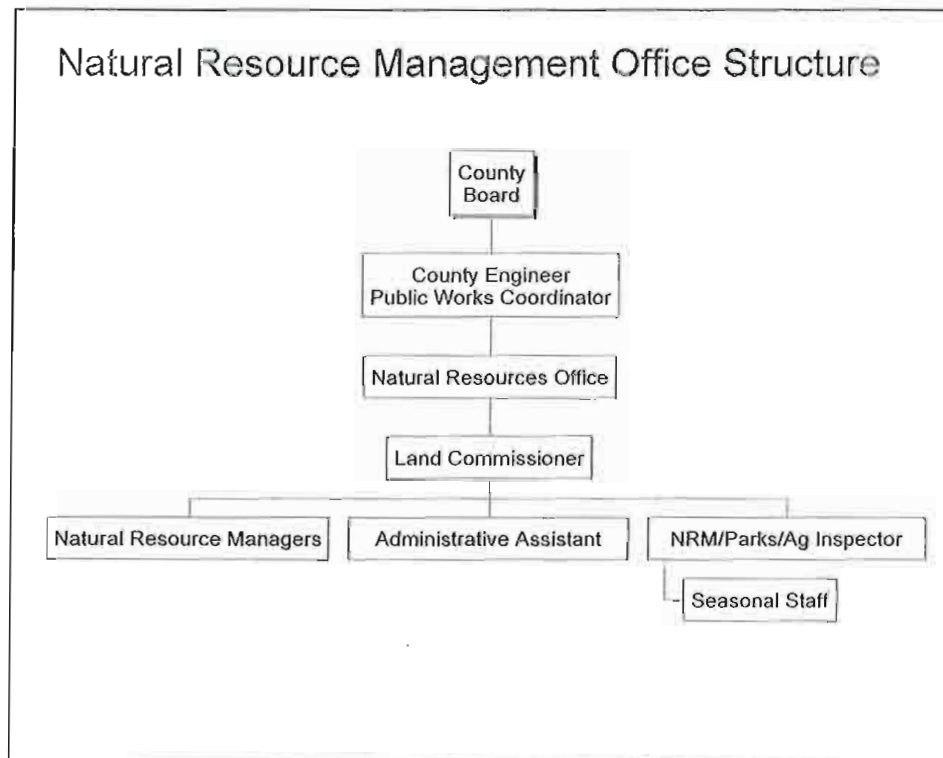
ASSESSMENT

Authority and Organization

Tax forfeited land is property that has been forfeited to the State of Minnesota for non-payment of property taxes. This land is administered by the County as a statutory trust on behalf of the taxpayers, schools, and local governments of Hubbard County. The primary source of legislative guidance is set forth in Minnesota Statutes 282.

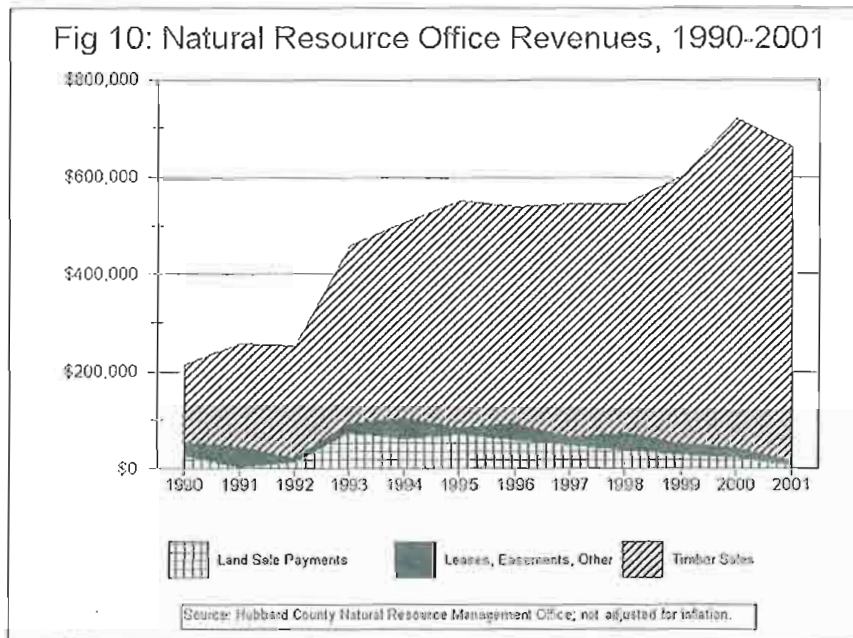
Management of the tax forfeited lands in Hubbard County has evolved over a period of roughly 70 years. Initially, during and following the massive tax forfeitures of the Depression-era, administration across northern Minnesota was handled by each county auditor with forest management assistance coming from the Minnesota Department of Conservation (now DNR) and the Office of Iron Range Resources and Rehabilitation (now the IRRR Commission). In the 1970s and 1980s the counties undertook direct responsibility for managing their forests by hiring professional staffs. During this time Hubbard County established its Land Department which in 1992 became the Natural Resource Management Office; in 2000 the office was placed within the Public Works Department.

The following figure indicates the organization of the Natural Resource Office within the context of the county administrative structure.



Revenues

The land office is a significant generator of income for the County. Initially most revenues were generated through the sale of land but as forest management became the dominant endeavor, timber sales have come to generate the vast majority of office revenues. Figure 10 indicates the magnitude and trend of office revenues in the past decade. The increase in timber sales revenues is due to rapidly rising prices for timber; the volume of timber sold has remained relatively constant over this period.



From these resources the office deducts its expenses for administration, timber development, road development, inventory and planning, and parks and recreation. The remaining revenue is apportioned, according to state law, to various local governments within the county. Table 8 shows the amount of these apportionments during the 1990s.

Table 8: Amount of Net Land Office Income Apportioned to Local Government	
Year	Amount
1990	\$90,774
1991	\$112,990
1992	\$63,731
1993	\$221,029
1994	\$263,375
1995	\$320,779
1996	\$269,279
1997	\$320,509
1998	\$294,204
1999	\$329,366
Total	\$2,286,036

Interagency Cooperation

The department is involved in a number of cooperative ventures with other agencies and entities. These include:

- Minnesota Association of County Land Commissioners.
- Coordination with MnDNR on forestry and wildlife resource activities.
- Forest Resource Council.
- Coordination with major forest owners.

Public Participation

The department engages the public as appropriate for planning and management activities.

The Forest Advisory Committee was created for the purpose of devising the updated management plan. This ad hoc committee structure will be retained for use in the future as general or specific planning issues or processes arise.

The department uses a variety of means to disseminate information to the general public including news releases, a booth at the county fair, and participation in public meetings. In addition, the department provides official notices of its actions as required by law.

GOALS

- ❖ To be a progressive, professional, and publicly sensitive organization at all levels of planning and implementation.

POLICIES

- ❖ The *Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers* (February 1999) adopted by the Minnesota Forest Resources Council, as may be amended from time to time, and as may be modified by Hubbard County is included by reference as County policy.
- ❖ Maintain current department funding levels for the next 10 year plan period.
- ❖ Continue to support the State's in-lieu of property tax payments and county forest road funding.
- ❖ Continue inter-disciplinary planning and cooperation with other natural resource management agencies.
- ❖ The Department shall maintain an up-to-date inventory of its lands and resources.
- ❖ The following policies govern staffing and training within the Department:

Maintain current staffing positions and add new position to handle inventory and GIS.

Increase the use of temporary "summer intern foresters" to help implement department programs.

Recruit and retain highly qualified employees by evaluating salaries for competitiveness with other forest management agencies.'

Promote staff proficiency by offering training or continuing education opportunities.

- ❖ A Forest Advisory Committee will be formed to provide advice and input to the Land Department and County Board on planning and management issues related to tax forfeited lands.
- ❖ Information concerning tax forfeited lands shall be regularly disseminated to the general public through a variety of means.
- ✓ Support technical innovation and public awareness of resource management through memberships in organizations with these purposes.
- ❖ Non-industrial owners of private forest lands will be encouraged to have stewardship plans for their lands prepared by a natural resource professional and to follow the plan.

STRATEGIC ACTIONS

1. Add sufficient Natural Resource Manager positions to help implement the two decade period of accelerated management for aspen and jack pine. After that time, the staff may be reduced through attrition.
- ❖ Natural Resources Management Office may utilize County Geographic Information System personnel to assist with GIS needs in the office.
3. Formally establish the Forest Advisory Committee with members representing a range of interests (e.g., forest products, recreation, environmental, etc.) to advise the Natural Resources Office staff and County Board.
4. Conduct annual reviews of forest conditions and management. Reviews to be done by Forest Advisory Committee and staff.
5. Devise a procedure to guide the case-by-case consideration of contacting adjacent or affected landowners regarding management activities planned for a given parcel of land.
6. Continually update forest resource inventory including periodic visits to regenerating stands and proofing of forest ecological system, and evaluation of stands for revised management. Periodic analyses will be based upon the inventory to examine progress on management objectives, possible changes in management, reaction to changes in markets or environmental conditions, and the like.
7. Evaluate options for third-party certification of County management of tax forfeited lands within 3-5 years.



Strategic Management:

LAND ADMINISTRATION: GENERAL

ASSESSMENT

Ownership

In 1946 the amount of tax forfeited lands peaked at about 163,000 acres or 27% of the county's total land base. A policy of selling these lands during the 1960s and 1970s shifted about 26,000 acres to private ownership. Since then, the amount of County-administered tax forfeited lands has remained relatively stable at approximately 137,000 acres. The trend over the past 20 years has been one of few forfeitures and these usually being small lots which are classified for disposal and sold. This trend is expected to continue for the foreseeable future.

See Map 6 and Figure 1 for details on Hubbard County's ownership.

One important observation from Map 6 is that the public ownership, both County and State, is generally in large blocks. These large blocks make for more effective management and provide enhanced recreational opportunities. At the same time, there remain numerous opportunities to consolidate ownerships to increase management efficiency and reduce operating costs (e.g., reduce or eliminate needs to mark boundaries). The County will work with the DNR and such large landowners as Potlatch to identify and execute value-for-value land exchanges when desired and feasible.

Land Use Classification

State law requires that all tax forfeited land be classified as to its use. Lands deemed suitable and desirable for forest resource or recreational purposes can be retained by the County while all other lands are to be disposed through sale or exchange. In the late 1980s Hubbard County undertook a major review of its land classifications and acted upon those decisions. Since then the number of forfeitures has been so low and most of these involve small lots. As a consequence, classification has been done by the Land Commissioner who forwards the recommendation to the County Board for action.

Memorial Forest

State law provides for certain tax forfeited lands to be classified "memorial forest" as a means of adding an extra layer of assurance that these lands will be retained in public ownership and management. Hubbard County has just under 30,000 acres in nine memorial forests. However, this designation is of little importance since the County's policy has become to retain all tax forfeited lands except those few newly forfeited lands that because of size, location, or nature are better suited for resale.

Mississippi River Corridor

Along with seven other counties, Hubbard is a member of the Mississippi River Headwaters Board (MHB), a cooperative entity designed to oversee management of private and public land along the river corridor. Of particular interest to this plan is the MHB's desire to expand the amount of public land within the corridor and to insure responsible forest management.

Nearly all the river corridor lying within Hubbard County is in public ownership, primarily

tax forfeited lands. The management of these lands has been in accord with MHB guidelines and will continue to be so under this new strategic plan.

GOALS

- ❖ Ensure a stable land base sufficient in size and character capable of effecting the intent of this management plan and provide long-term multiple use benefits.

POLICIES

- ❖ In general, following state statute, County resolutions, and policies, the County shall retain or enhance its tax forfeited land base and will only consider selling those parcels that meet the following criteria: platted property; small oddly sized or shaped parcels; parcels isolated from other County ownership; new acreage forfeitures that do not fit into a management strategy, and/or other parcels that do not fit into a management strategy. If a parcel is classified for retention, the Land Department will deny requests for its sale.
- ❖ Tax forfeited lands will continue to be evaluated and classified by the County Board based on recommendations by the Land Commissioner as to retention or disposal, method of disposal (e.g., sale or exchange), and preferred use. All newly forfeited lands shall be classified within a year of forfeiture.
- ❖ Classification of additional lands as Memorial Forest will not be pursued.
- ❖ Land acquisition will be limited to specialized purposes such as access to public waters or blocks of public land.
- ❖ Land exchanges with public and private parties should be considered if they achieve a County management purpose such as to consolidate County land holdings, obtain access to County ownership, further the management objectives of a management unit and/or a specific property, or eliminate any parcels that may cause liability to the taxing districts.
- ❖ Lands within the Mississippi Headwaters corridor will be managed in accordance with the approved Mississippi Headwaters plan and ordinance adopted by Hubbard County as per Minnesota Statutes.
- ❖ The County may charge a lease and/or require a performance bond for any formally organized event which uses County administered tax forfeited land.
- ❖ The County supports an active program to remonument property to reduce survey costs and increase accuracy of property line location.
- ❖ Before any land or site altering activity the County will determine if any significant cultural, historical, or scientific values would be adversely impacted.
- ❖ Management of tax forfeited lands will be consistent with other County plans and ordinances.

STRATEGIC ACTIONS

1. The County will prepare and adopt an omnibus ordinance governing various aspects of management and use of tax forfeited lands. Likely key sections of

the ordinance are listed below:

Forest Roads and Trails

Purpose.

Definitions.

Eligible uses.

Authority to Land Department to classify roads and trails.

Construction classes and standards.

Use classifications.

Prohibition of off-trail motorized travel.

Prohibition of the creation of unauthorized trails.

Standards for posting trails and roads. (Specifically note that trail markers are to be on free standing posts, not attached to trees.)

Identification of who is responsible for enforcement.

Motorized access by disabled persons. (Discretionary authority granted to Land Commissioner, need for permit, acceptable reasons for permit, not allowed in certain non-motorized areas such as WMAs, for individual use only, definition of who is considered disabled for the purposes of this permit.)

Gravel Mining

Adopt gravel mining standards of Hubbard County zoning ordinance as those applicable on tax forfeited lands.

Camping

Based on policy in this plan, authorize terms and conditions in which camping is allowed.

Identify, specifically or by type, areas within tax forfeited lands on which camping is prohibited.

Timber Trespass

Define (include cutting or felling of trees for shooting lanes).

Recreational Structures

Define various types (e.g., docks, shacks, hunting stands).

Types allowed on tax forfeited lands.

Identify lands where special terms regarding hunting stand use and placement are in effect.

Park and Forest Recreation Area Designations

Definitions.

Specifically identify by legal description, name, and purpose the official parks and forest recreation areas on tax forfeited lands.

State basic rules and regulations governing use of the areas (including boat accesses).

Enforcement

Identification of authorized enforcement entities. (Specifically note intent to establish formal, perhaps legislatively-driven, arrangements with the DNR to allow for DNR enforcement of certain County regulations under this ordinance.)

Make violations misdemeanors

Strategic Management:

LAND ADMINISTRATION:

TIMBER SALES, LEASES, EASEMENTS

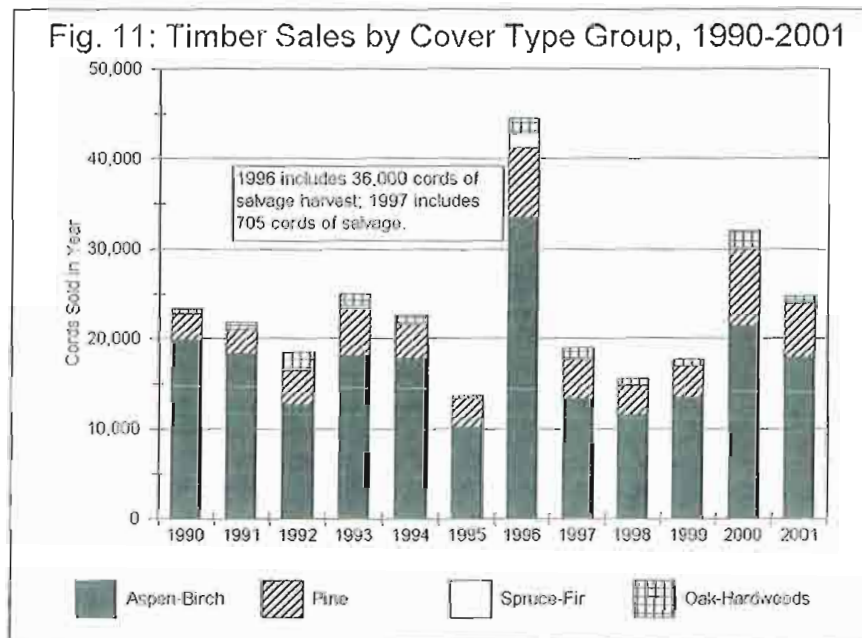


ASSESSMENT

Timber Sales

The sale of timber harvest rights is the primary source of revenues and represents the primary management tool for Hubbard County. Despite changes in the resource base, the County has attempted to provide an even flow of timber resource as shown in Figure 11. The slump in 1995 was due to a massive wind storm as was the huge increase the following year when salvage operations sought to minimize the loss of product.

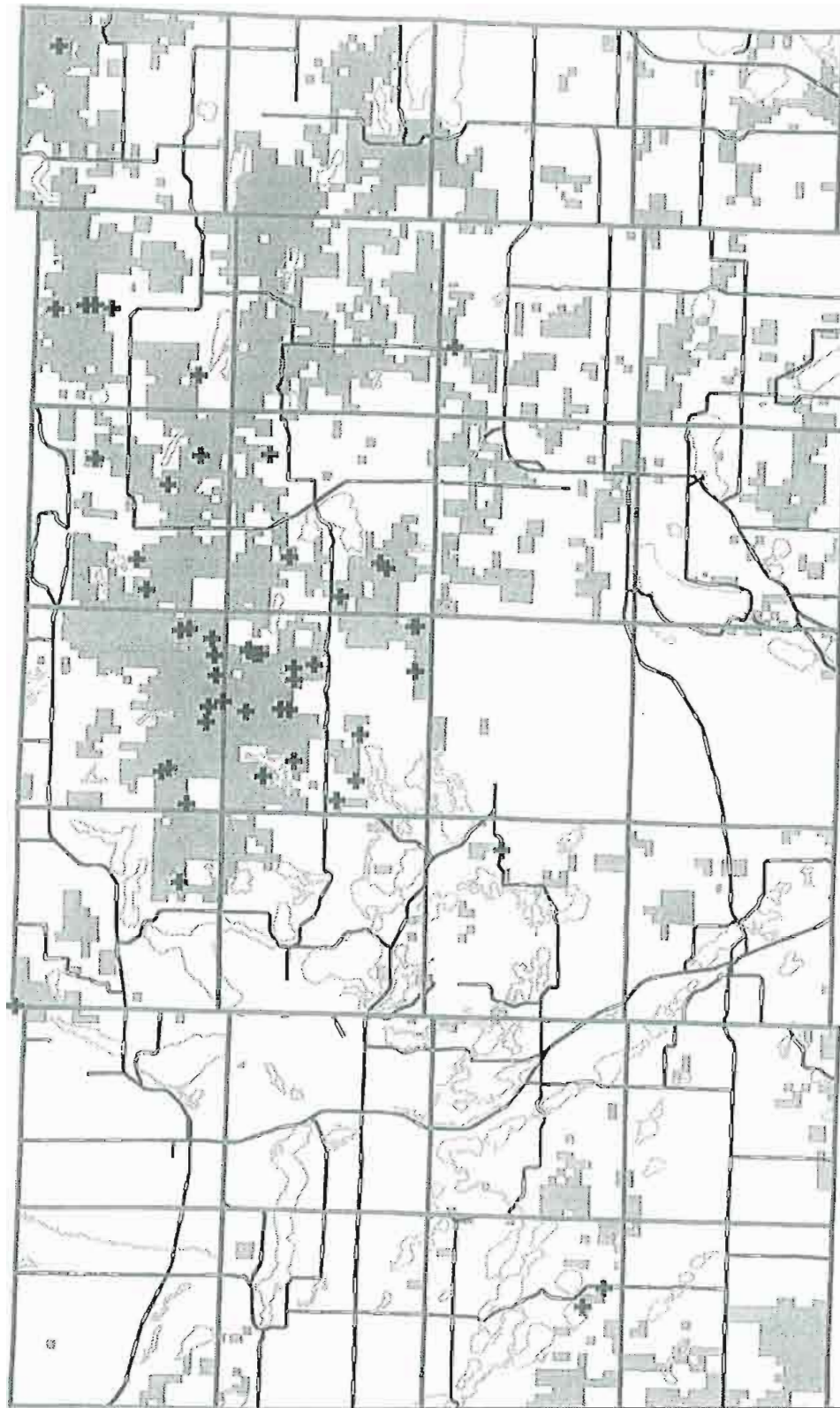
The department issues harvest permits through an auction process. The professional foresters design individual sales, the sales are auctioned, and the foresters monitor logging operations through post-harvest. Most sales are sold by auction; a small number are through informal sales, a tool used for harvests in sensitive areas and tracts with unique access or other factors.



The dramatic growth in timber sales income has resulted from changes in the forest resources market. As shown in Figure 11, the level of timber sold by the County has been essentially steady during this period (with the exception of emergency salvage sales after a massive wind storm). The figure also indicates the dominant role played by aspen in generating department revenues.

Leases

The County is allowed under state law to issue leases to private and public entities for the right to occupy or use tax forfeited lands. Such leases can be for hunting cabins, agriculture, gravel extraction, placement of structures, and other similar uses.



✚ Cabin Lease Locations

County Fee-Forfeited Lands

Township Boundary

Lakes

Major Roads

**Map 10: Cabin Lease Locations
on
Hubbard County Land**



2 0 2 4 6 Miles

Leases for agriculture usually involve allowing a farmer to harvest hay from a field or to pasture animals in one. Hubbard County currently issues four such leases for haying.

The county also has three leases for a variety of uses including piling of snow by a city and a private garage.

There are 51 leases for hunting cabin issued by the County. This is down from 57 in 1990. Of these, 37 leases are held by people who reside outside of the county and 18 are on ponds or lakes.

While there is little controversy over the agriculture and miscellaneous other leases, hunting cabin leases are a different matter. The benefits of the leases are twofold: the lessees gain recreation opportunities, and, the County receives \$150 per year in gross revenues in terms of fees, personal property tax, and solid waste disposal assessments. However, the disadvantages are more numerous. They include: general public may be deterred from using land in the vicinity of the leases (an implied "privatization" of public land); conflict when the County harvests near a lease; presence of cabins ruining the wild character of the land; potential for unsightly cabin sites; and the cost of administering the leases.

Aitkin and Beltrami Counties have never issued leases. Cass and Crow Wing Counties are terminating their current leases. Itasca County received special legislation to sell its lakeshore leases; it is retaining its forest land leases. Becker, Carlton, Koochiching, and St. Louis Counties are maintaining their current number of leases. No county is issuing new ones. Hubbard County has not issued any new leases for nearly a decade.

Easements, Special Use Deeds, Permits

Easements may be granted by the County to parties that require access across County land in order to use their property or for utility corridors. These easements are conditional and can be revoked if there are conflicts with public uses. Easements may have one-time or annual payments. In general, the County prefers to provide easements only as a last resort method. The County seeks to avoid granting easements that require the filling or alteration of wetlands. The County prefers not to grant a conditional easement for the purpose of providing access to platted land; permanent legal access must be secured by the private parties in these situations.

State law allows the County Board to recommend conveyance (by the State Department of Revenue), at no cost, land to public entities for the purpose of an authorized public use (e.g., roads, parks, town hall, cemeteries). The County prefers, however, to encourage the sale of land for these purposes as this prevents reversion of property so conveyed that is subsequently abandoned (and possibly then encumbered with uses or structures that create additional liability for the County).

Non-Timber Resource Leases / Permits

There are a number of non-timber commercial uses of tax forfeited lands that raise issues requiring a policy response. These uses include trapping leeches from natural ponds, seining minnows from natural ponds, and maple syrup tapping. Of these, the first two are quite prevalent on Hubbard County lands although there are no precise figures. Currently, the County does not require a permit or any form of authorization for individuals or firms to trap leeches or seine minnows.

There are several issues at play. First, the trappers and seiners often create their own trails to the remote ponds; in the process they damage trees, cause sedimentation and erosion, and damage wetlands. Under the policies of this plan, the creation of

unauthorized trails is prohibited. Second, leeches and minnows are a valuable resource. While the County seeks to support local economic enterprises that utilize natural resources, the County is mandated to generate income from its land for the benefit of local government and it is required to appropriately and sustainably manage the resource. There is a danger that uncontrolled trapping and seining will seriously diminish or eliminate the resource.

Thus, the task for the County is to find a way to support these particular economic enterprises while ensuring that the resource remains viable over time. One possible approach that could be considered is to require permits to trap leeches or seine minnows from County lands. The purpose of the permits would be to identify who is conducting these activities, regulate access to the ponds, allow for exclusive access to ponds for designated time periods so as to prevent over harvesting, and monitor the level of harvesting.

Private Commercial Services on County Lands

A number of individuals and firms are providing guiding services, primarily for hunters, on County administered tax forfeited lands. There is no reliable estimate on the number of such services or the level of activity. The assumption is that the level is low. At this point there is no known damage to the resource specifically arising from these services. The County has no reason at this time to regulate this activity as it helps the local economy and does not appear to harm the resource. The County will seek ways to monitor this activity as a means to determine the extent of an economic activity benefitting from the tax forfeited land base.

GOALS

- ◆ Meet the need for specific local services and specialized land uses without compromising overall public benefits.

POLICIES

- ❖ The Land Commissioner will receive requests for leases and easements and review them with appropriate authorities according to department procedures, and, will periodically review fee schedules for leases and easements.
- ❖ Hunting Shack Leases

No additional cabin (hunting shack) leases shall be granted. Existing leases may be transferred. Leases will be terminated if lessees fail to adhere to all lease regulations.

To the terms and requirements of all existing leases will be added the prohibition on making unauthorized changes to the landscape such as creating or altering food plots, wildlife openings, trails, and the like.
- ❖ Timber harvesting permits will continue to be structured to provide the opportunity for timber harvesters and users with various capabilities to purchase timber stumpage. Detailed procedures will be prepared regarding auction and informal sales.
- ❖ Resource harvesting activities including timber harvesting, bough gathering,

partial tree harvesting, and similar activities will be sold and permitted as timber sales.

- ❖ Access to resource harvesting sites such as leech and minnow ponds may require permits.
- ❖ The County will monitor the level of activity of commercial services such as guiding and game baiting on tax forfeited lands.
- ❖ The following policies govern gravel pits on tax forfeited lands:

The County will evaluate its land base to identify probable location of gravel deposits.

In general, the use of gravel mined from tax forfeited lands shall be restricted to Hubbard County for public purposes.

- ❖ The following policies govern leases of tax forfeited land:

Tax forfeited lands may be leased to individuals, corporations, or organized subdivisions of the state for specific uses such as agriculture, maple sugar bushes, gravel, peat or mineral exploration/extraction, and other similar uses provided that such leases are consistent with County management objectives and that reasonable terms are attached to the lease including, but not limited to, use of market value rates, lease duration is reasonable and specific, and a reclamation plan, if appropriate, is specified. Leases for extractive operations and those that involve a structure or improvements shall conform to the applicable standards of Hubbard County land use control (zoning) ordinances.

Consistent with the County's tax forfeited land trust obligations, the rate of all land leases will be based upon market values.

- ❖ In those cases where a qualified public entity seeks a special use deed, the County's preference will be to sell the land if such sale is consistent with parcel's classification and management objectives and the County's tax forfeited trust obligations.

STRATEGIC ACTIONS

1. Establish new fee schedule for cabin leases. The new fee will be \$100. In 2003 the fee will be increased to \$150. In each of the next three years the fee will be increased by \$25. At the end of that period a review will be made regarding the lease rate as compared to the value of the property.
2. The Forest Advisory Committee will conduct a review of leech and minnow harvesting on County lands. This review is to include: monitoring of the current level of activity on County lands; discussions with harvesters regarding need for access controls, leasing of ponds, etc.; discussions with DNR resource managers; and identification of ponds on County lands that are leech and minnow resource sites.
3. Identify the number of guiding services using County lands and monitor the level of use on County lands.

Strategic Management: **HABITAT**



ASSESSMENT

Coarse Filter / Fine Filter Approach

Consideration of wildlife concerns through forestry management is handled on two levels.

The broadest level will be a so-called "coarse filter" comprised of forest habitats based on cover type and age. Table 9 lists the forest habitats used in this coarse filter and their definitions. As noted in the tables in Appendix A, a series of mammals, birds, and amphibians and reptiles are associated with each habitat. The species listed are identified as "typical" users of the habitat and are not to be considered indicator species or the species for which the habitat is being managed. The tables are based on the Wildlife Habitat Association Database developed for and used on the Chippewa National Forest.

The intent of the coarse filter is to identify major habitat types and then monitor the presence and condition of these over time. This is easily done through the County's updated inventory database and GIS applications. This information can be reviewed with MnDNR wildlife specialists, the County Biological Survey, and other informed people and entities to determine if significant changes in the amount, variety, and distribution of coarse habitats are occurring and warrant more specific review and analysis.

The second level of review is the "fine filter", generally to be interpreted as species specific. At this level, management focuses on a specific species or group of species either over the entire County's land base or for a given geographic area. Examples of fine filter level management that is or may occur within the county include:

- Use of County Biological Survey and similar information to identify eagle nests, heron rookeries, and locations of rare plant communities. This information guides actions for specific locations (e.g., avoid intrusions in an area during nesting season, retain specific trees, time activities to avoid sensitive time plants, etc.).
- Management of a specific area to enhance a specific species such as retaining large open landscapes for prairie chickens and other open land wildlife species, managing ruffed grouse habitat, or maintaining wintering yards for deer.
- Adoption of guidelines to guide forest activities in areas where specific species may be found.
- Work with various sportsman and outdoor groups to obtain funding and support for projects that benefit wildlife.

Table 9: Upland Habitats for Use in Analyzing Wildlife Impacts of Forest Plan

Habitat Categories		Definitions (age or size: cover types)
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, birch
	Mature	41-60 yrs: "
	Old	61+ yrs: "
Upland Forest: Deciduous [NoHwd/Oak]	Young	11-60 yrs: northern hardwoods, oak
	Mature	61-100 yrs: "
	Old	101+ 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 71-100 yrs: red/white pine, white spruce, upland black spruce
	Old	61+ yrs: balsam fir, jack pine 101+ yrs: red/white pine, white spruce, upland black spruce
Upland Forest: Mixed	Young	11-40 yrs: aspen-birch/spruce-fir, birch/sp-fir, boreal hwd/conifer 11-60 yrs: northern hwd/conifer
	Mature	41-60 yrs: aspen-birch/spruce-fir, birch/sp-fir, boreal hwd/conifer 61-120 yrs: northern hwd/conifer
	Old	61+ yrs: aspen-birch/spruce-fir, birch/sp-fir, boreal hwd/conifer 121+ yrs: northern hwd/conifer
Lowland Forest: Deciduous	Young	11-60 yrs: ash, lowland hardwood
	Mature	61-100 yrs: "
	Old	101+ yrs: "
Lowland Forest: Coniferous	Young	11-70 yrs: blk spruce, tamarack, white cedar, stagnant blk spruce/tam/white cedar
	Mature	71-100 yrs: blk spruce, tamarack, stagnant blk spruce/tam/white cedar 71-120 yrs: white cedar
	Old	101+ yrs: blk spruce, tamarack, stagnant blk spruce/tam/white cedar 121+ yrs: white cedar

Note: Due to absence of sufficient data, the upland mixed forest will not be evaluated for this plan.

Coarse Filter Issues

At the coarse filter, broad landscape scale there are several habitat issues that generally reflect the overall nature of Hubbard County's forests. For instance, oak, northern hardwood and red/white pine forest types are relatively rare today but had been more plentiful prior to the logging/settlement era. These have generally been replaced by aspen dominated forests which themselves are now aging.

The historic loss of upland conifer could be exacerbated by the loss of aging jack pine stands which cannot be regenerated easily. The County is aware of this concern and is proposing actions to retain jack pine where it is best suited and converting other stands to red/white pine and white spruce.

The amount of oak and northern hardwood forest may be enhanced through targeted conversion of aspen stands. These types can also be supported through silvicultural practices that retain these species within the understory of aspen stands.

Harvest techniques of the County, State, and private entities during the 1970s and 1980s emphasized small cuts increasing edge while decreasing effective interior forest space. This practice favored such game species as deer and ruffed grouse and a host of edge loving birds and animals. However, it worked against species which require extensive amounts of interior conifer or deciduous forest. In the 1990s the DNR reversed its practice and with this plan so will Hubbard County (except in those areas where edge species are to be favored).

In general there has been and will continue to be loss of fire-dependent ecosystems. Although fire may be used in limited areas, there is no likelihood of it being applied on the geographic scale which had shaped the original forests. Harvesting techniques can mimic fire impact up to a point but probably cannot replicate the full ecological ramifications of fire.

Fine Filter Issues

For the most part Hubbard County will deal with habitat issues at the coarse filter level. However several species are managed at the fine filter level through forest management in selected areas. At present these are game wildlife species although the County will prepare special management policies and actions for any species or biotic community of concern.

In the southeast corner of the county is the Badoura prairie chicken habitat area managed cooperatively by the DNR and the County. The primary activity is retain open, non-forested upland grass and brush habitat. DNR monitoring of this area notes that a small population of prairie chickens breeds here. In addition, sandhill cranes are now using the area. Other species of concern that utilize the management area include ruffed grouse and woodcock.

The County maintains a several hundred acre ruffed grouse management area in Clover Township. Management consists of maintaining aspen cover type, emphasis on forest edge, and seeding roads.

The DNR has evaluated Hubbard County for deer wintering yards which primarily consist of mature jack pine and lowland conifers. Deer yards are critical to allow deer to survive the most severe winters. The most important issue will be the successful regeneration of jack pine much of which is nearing maturity. Roughly 9,900 acres of tax forfeited land could be considered as having the qualities of a deer yard.

GOALS

- ◆ Protect fish and wildlife populations by maintaining and improving biological (habitat) diversity in the forest.
- ◆ Protect and/or improve critical plant communities for habitat (e.g., forest openings, deer wintering complexes, nesting areas).
- ◆ Protect significant natural heritage features (e.g., rare flora and fauna, old-growth forest ecosystems).

POLICIES

- ❖ Adopt a “coarse filter” approach as the primary means to identify the extent of, landscape orientation, and change in wildlife habitat.
- ❖ Within the coarse filter framework, adopt a “fine filter” approach to manage for specific species or biotic communities of concern or interest.
- ❖ County may undertake on its own and/or coordinate and cooperate with the State and Federal agencies and private interests in the establishment and management of areas dedicated to wildlife habitat and values.
- ❖ County may undertake on its own and/or coordinate and cooperate with State and Federal agencies and private interests regarding project level management for habitat and wildlife, monitoring and evaluation of habitat and key species, and similar activities.

STRATEGIC ACTIONS

1. Create a management plan for the Clover Township Ruffed Grouse Management Area. This will be done in coordination with the Ruffed Grouse Society, the DNR, and other interested parties.
2. Maintain updated listing of natural heritage features on or near County lands.
3. Adopt, as necessary, special policies and procedures for conducting forest management activities in areas with known or suspected endangered, threatened, or special concern natural features.

Strategic Habitat Management: Riparian Zones and Fish Habitat

Objective

To protect fish habitat from harmful runoff, to protect streams from erosion and sedimentation, and to maintain shading and cooling provided by forest canopies.

Strategic Actions

1. Follow Best Management Practices for riparian areas as provided in *Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines*.
2. Reserve stand timber from clear-cutting within 150 feet of designated trout streams and lakes. Within this zone, partial or salvage cutting will be done only after consultation with local DNR Fisheries manager.
3. Design harvests within perimeter zones (66 feet out from edge) of qualifying wetlands (open-water types 3, 4, and 5 larger than 1 acre) so that no more 50% of the zone is harvested within 5 years.
4. Reserve from clear cut harvesting a 200 foot strip from the edge of lakes classified as "Natural Resource-Residential", "Recreational", or "General Development" according to the DNR's Shoreland Management Standards.

Strategic Habitat Management: Wetlands

Objective

To protect wildlife and habitat values provided by wetlands throughout the county.

Strategic Actions

1. Follow Best Management Practices for wetlands as provided in *Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines* for road construction, timber harvest, site preparation, and chemical use. This means no landings on open water wetlands.
2. Use seasonably wet areas for landings only where upland sites are not practical. On seasonably wet areas used for winter landings, no logging slash or other debris is to remain once logging is completed.
3. Reserve timber from harvest along selected wetlands.
4. Keep all logging slash out of wetlands and not concentrating slash or windrows within 50 feet of wetlands.
5. Wetlands will be created, restored, or improved by: allowing beaver activity to change or expand wetlands except where other high-value resources are threatened (e.g., roads, conifer swamps, winter deer cover); constructing water impoundments or similar features in cooperation with DNR Wildlife, Hubbard

County Highway Department, and US Natural Resources Services.

Strategic Habitat Management:

Upland Game Habitat

Objective

To support viable populations of game species (primarily ruffed grouse, white-tailed deer, black bear) and the species that are associated with the habitats needed for these target species.

Strategic Actions

1. Follow DNR forest habitat composition guidelines.
2. Plan harvests of aspen-birch cover types to distribute disturbance and regeneration of these types throughout the county.
3. In areas where game habitat is to be emphasized (e.g., Clover Township Ruffed Grouse Management Area), harvesting of aspen-birch will be done in small blocks with 5-10 years between adjacent cuts.
4. With aspen-birch harvest areas reserve clumps (100-150 trees) or strips (2-5 chains wide) in harvest areas over 20 acres.
5. Within aspen-birch harvests reserve most inclusions of long-lived species (e.g., oak, northern hardwoods, red / white pine, ash, spruce) except where they are at risk of loss within 5 years.
6. Reserve dead snags and live residual trees (oak and white pine will be priorities if present). Hardwood inclusions and riparian reserves within a harvest area may be used for this purpose. Preference will be to leave trees of 6" dbh or larger.
7. Secondary hardwood species will be harvested as needed to encourage future stand diversity.
8. Secondary species of balsam fir and spruce will be retained.
9. Undertake intensive supportive management efforts within the Clover Township Ruffed Grouse Management Area and consider designation of additional such areas.
10. Older, well-established brushlands and sparsely-stocked forest lands will not be converted without prior consultation with DNR Wildlife managers. In selected areas and in consultation with DNR Wildlife managers, these areas will be regenerated as brush.
11. "Permanent" forest openings will be sustained over time in cooperation with the DNR. Additional acres may be developed over time. New openings are to be located around harvest "landings" and away from other natural or man-made openings. Manage small failures (5 acres or less) within planted regeneration areas forest openings (up to a maximum of 10% of the regenerating area).

Strategic Habitat Management: **Deer Wintering Complexes**

Objective

To provide critical wintering habitat for white-tailed deer.

Strategic Actions

1. Deer wintering complexes will be identified through computer analysis and field experience and surveys by DNR Wildlife managers.
2. Primary deer wintering areas will be managed as a whole by developing composition goals and management guides for each one.
3. Secondary wintering areas will be managed by: regenerating 10 acre and larger conifer stands in predominantly aspen areas back to conifers; reserving white cedar from harvest; delaying harvest of types with cedar or immature balsam fir understories.
4. Biological diversity and the integrity of individual wintering complexes will be maintained or improved by: harvesting only parts of larger jack pine stands or delaying harvest of smaller stands; regenerate jack pine back into jack pine or other conifer species; regenerate hardwoods adjacent to winter cover; maintain or improve vegetation diversity in pine stands.

Strategic Habitat Management: **Northern Hardwoods / Oak Forests**

Objective

To expand the amount of northern hardwood / oak forests in order to provide habitat for species requiring large forest interiors within moderate to long-lived deciduous forests.

Strategic Actions

1. Convert appropriate aspen-birch stands to northern hardwoods and/or oak.
2. Use a variety of means to increase the average size of hardwood/oak patches.
3. Manage northern hardwoods for multi-aged stands with characteristics of mature forests.
4. Retain shorter-lived aspen-birch components for nesting-cavity habitat and associated wildlife values.
5. Use a variety of techniques to enhance acorn production in both burr and red oak. Methods might include thinning and regeneration with shelterwood cuts in old stands with no advanced reproduction.

Strategic Habitat Management: Endangered, Threatened or Special Concern Species

Objective

To retain and enhance habitat critical to support these species.

Strategic Actions

1. Nesting areas for colonial birds (e.g., great blue herons) will be reserved from harvest and allowed to expand.
2. Eagle nests on or close to County lands will be protected by implementing nest management plans provided by DNR's Regional Nongame specialist.
3. Designated prairie chicken and sandhill crane management areas will be maintained and improved by: not artificially converting grasslands and brushlands to forest, and, cooperating with DNR Wildlife to maintain grasslands through shearing, prescribed burning, etc.
4. Use Natural Heritage database information, DNR Wildlife and Non-game staff, and other data to determine if endangered, threatened or special concern species (and biotic communities) might be present on County lands. As appropriate, create general policies or place-specific practices to protect and enhance these areas. This action will apply to **other significant natural heritage features** which may be present on the landscape.

Strategic Management: FOREST ROADS



ASSESSMENT

Hubbard County has nearly 150 miles of forest roads developed and maintained by the County for the purpose of accessing tax forfeit land for management purposes. Although the department builds and maintains roads, it is not legally considered a public road authority. Thus, its forest roads are considered private roads open to the public, for public use (for map of roads see Recreation subsection).

The County has two grades of roads:

- CLASS A: Multi-purpose secondary forest access road, 1-2 lanes, all weather with exceptions, gravel surface, regular maintenance. 28 miles.
- CLASS B: Multi-purpose seasonal or temporary woods road, usually 1 lane, minimum maintenance. 122 miles.

All roads are built with County funds and to County standards.

Where absolutely necessary and no reasonable options exist, the County secures access across private lands. The County cooperates with the DNR and such large private owners as Potlatch on access roads that jointly serve their lands.

The County assigns varying levels of authorized uses for the roads. These limitations may be seasonal, as in order to prevent damage during spring break-up, or year-round, so as to discourage inappropriate uses. As noted in the policy section, all new Class B roads will be closed to motorized recreation uses.

Since the 1990 plan, the County has constructed about 15 miles of road and received 17 miles of DNR forest roads. Maintenance includes brushing and grading, primarily on Class A roads.

GOALS

- ◆ Access County forest lands appropriately to protect, manage and utilize forest resources for all programs and multiple uses.
- ◆ Maintain a trunk road system, in cooperation with other road authorities, that will sustain prolonged vehicle use.
- ◆ Minimize conflicts arising from "multiple-use" of forest roads.

POLICIES

- ❖ Maintain roadsides with mechanical means if possible. Herbicides will only be used according to label specifications.
- ❖ Officially recognized roads on tax forfeited lands will be classified as to design and maintenance levels as follows:

CLASS A: Multi-purpose secondary forest access road, 1-2 lanes, all weather with exceptions, gravel surface, regular maintenance;

CLASS B: Multi-purpose seasonal or temporary woods road, usually 1 lane, minimum maintenance.

- ❖ Designate all official forest roads as to type and level of use as follows:

Open Use: In general, these roads are open to motorized traffic at all times, however, good judgement should be used when using these roads during excessively wet periods so as not to cause major road damage. Some roads are co-designated as Grant in Aid snowmobile trails and may have additional restrictions on use by other vehicles. In case of joint logging and recreational uses on a road, priority is given to logging activities.

Limited Use – Seasonal: These roads are open to motorized traffic except during the spring "break up" period or during periods when the road could be severely damaged (e.g., construction or excessively wet periods) at which times these roads will be gated. ATV use or non-motorized uses are allowed. Some trails may be closed to motorized uses for hunting or other non-motorized recreational uses.

Restricted Use – Non-Motorized: These roads are closed to all motorized uses. These roads are usually short length, spur roads off a major forest access road, and designated to give the user more of a solitude experience and lessen potential disturbances to wildlife. These roads will be gated full time.

- ❖ Construct roads using "best management practices" guidelines.
- ❖ New roads are to be planned to meet integrated management objectives of timber harvest, wildlife habitat improvement and recreation.
- ❖ All new forest roads on County administered tax forfeited lands will be closed to recreational vehicle use.
- ❖ Incorporate aesthetic resource management with other program practices along significant travel corridors.
- ❖ Proposed road development is to be coordinated between the Land Department and affected property owners to maximize safety, minimize conflicts, and encourage cooperative development and use.
- ❖ Off road motorized travel across County administered tax forfeited lands is prohibited. All motorized vehicles must stay on official forest roads in accordance with use designations.
- ❖ The creation of unauthorized roads and trails on County administered tax forfeited lands is prohibited.
- ❖ Roads may be gated and/or signed, as necessary, to ensure desired use of an area, to protect natural resources, or to otherwise achieve a specified management purpose in the area.

STRATEGIC ACTIONS

1. Build 5-10 miles of forest road of varying classes during first 10 years of plan.
2. Assign use designations to all official roads and trails.



Strategic Management: RECREATION

ASSESSMENT

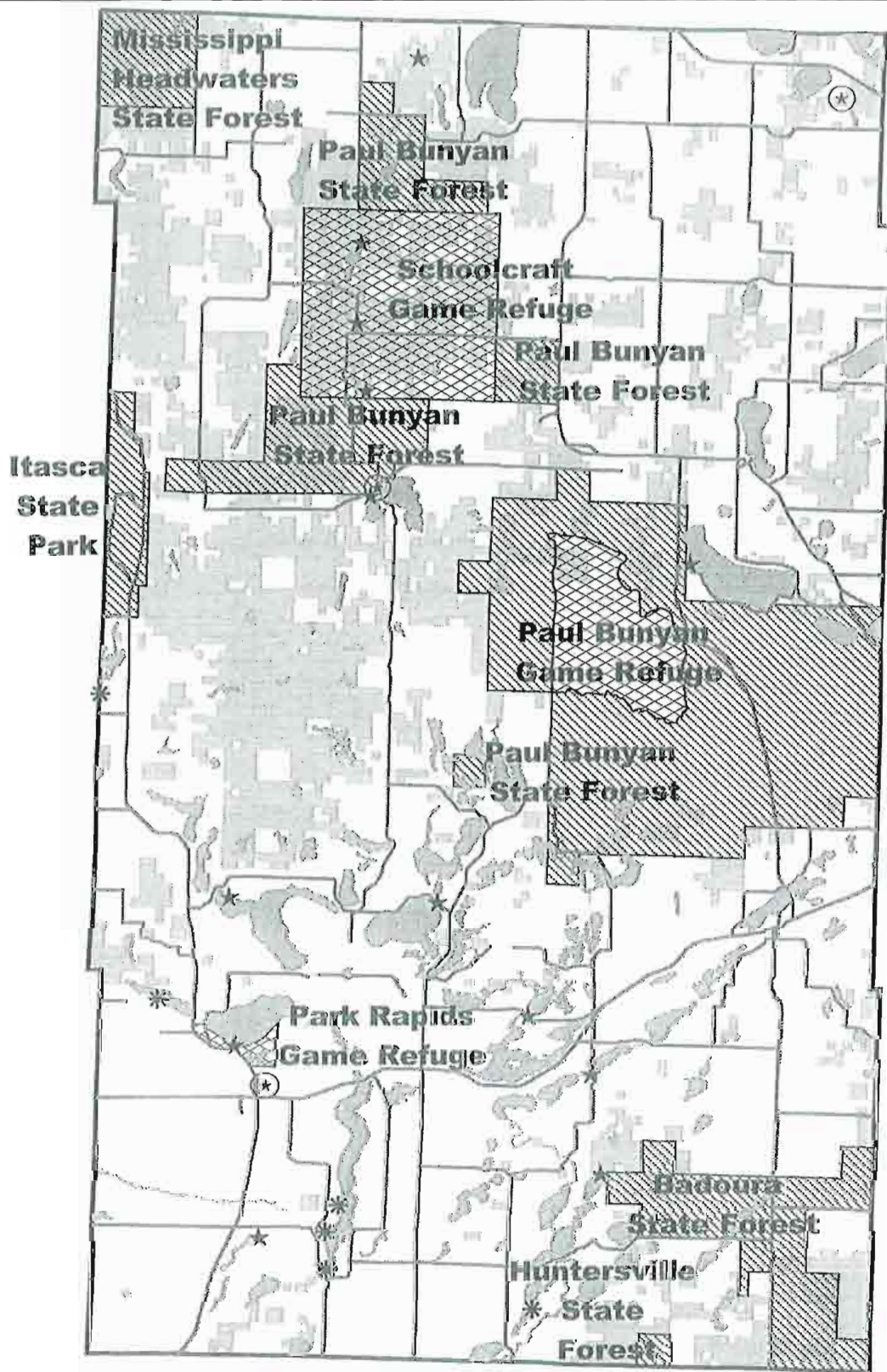
The importance of outdoor recreation to enhance the quality of life for residents and to support a strong tourism industry cannot be overstated. The "Plan Context" chapter highlighted these values.

County administered tax forfeit land plays an vital role in meeting the outdoor recreation needs of residents and tourists. The County's multiple-use management approach recognizes the recreational value of the forest and manages the land accordingly.

All County administered tax forfeit land is available to the general public for what is known as "dispersed" recreation, that is, walking, hunting, nature observation, and similar activities that do not require developed facilities. In addition, the County has developed three parks as summarized in Table 10.

Table 10: County Parks			
Amenity	Farris Park	Heartland Park	Lake George Community Park
Athletic field	✓	✓	✓
Boat landing		✓	✓
Drinking water	✓	✓	✓
Fishing		✓	✓
Hiking trail	✓	✓	
Picnic grounds	✓	✓	✓
Play ground	✓	✓	✓
Swimming		✓	✓
Tennis courts	✓	✓	
Toilets	✓	✓	✓

In addition to the parks, the County has developed 22 boat accesses (not including those at two of the parks listed above), a swimming beach, and a wayside rest. These are listed in Table 11 and shown on Map 11.



Map 11 : Boat Accesses & Recreation Sites in Hubbard County

Map prepared by: Pro-West & Assoc.

- ★ Boat Access
County Owned & Maintained
- * Boat Access
Township Owned-County Maintained
- ⊙ County Park
- ▨ State Forest
- ⊗ Game Refuge



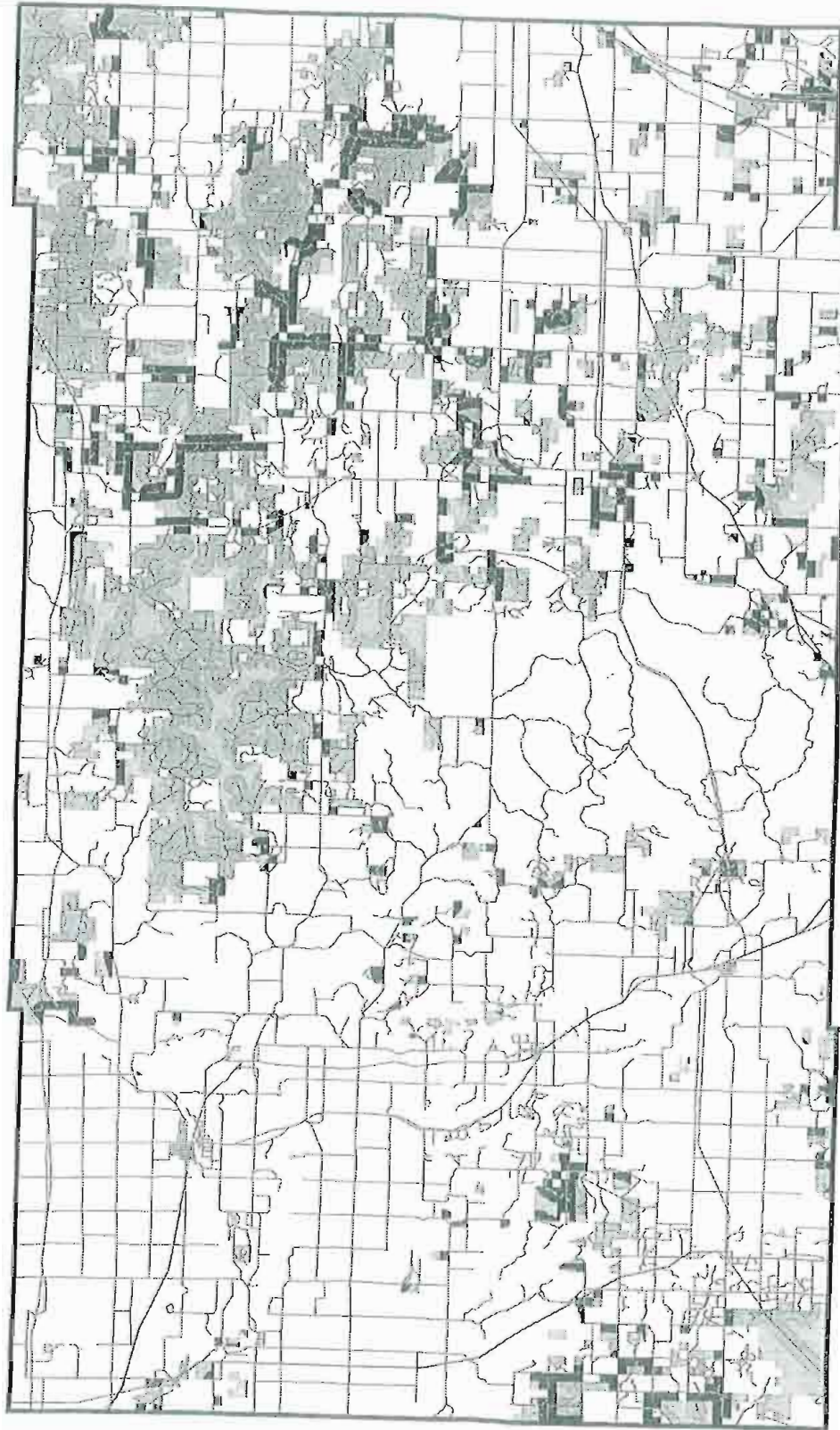
- County Tax-forfeited Lands
- Lakes
- Major Roads

2 0 2 4 6 Miles

Table 11: County Boat Accesses and Related Sites

Facility	Boat launch	Swimming	Picnic tables	Toilets
Beauty	✓			
Coon	✓			
Emma	✓	✓		
Evergreen	✓			
Fishhook	✓		✓	✓
Hinds	✓			
Island	✓			
Kabekona	✓			
Little Mantrap	✓			
Long Lake "Beach"	✓	✓	✓	✓
Long Lake "Nakomis"	✓			
Long Lake "Norway Bay"	✓			
Minnie	✓			
Moran	✓			
Newman	✓			
Paine	✓	✓	✓	✓
Palmer	✓			
Potato	✓			
Seventh Crow Wing	✓			
Shallow	✓			
Stony Swimming Beach		✓	✓	✓
Twenty	✓			
Wayside			✓	✓

Hubbard County is well-served by a network of recreational trails, both motorized and non-motorized. These trails run across County, State, and private lands. The largest amount are for snowmobiling, but new trails are being added for hiking/biking and Off Highway Vehicles (OHV). The County uses Global Positioning System (GPS) and other means to locate and map trails and roads. Map 12 shows the location of County forest roads and recreation trails; the map also uses a quarter-mile buffer to indicate the land most directly accessible via the roads and trails.



County Forest Lands within 1320 foot
of Designated Road

- Land Accessed by Public Roads
- Lands Accessed by Forest Trails
- County Tax-forfeited Lands

Public Roads and Forest Trails

Map 12: Access to County Forest in Hubbard County



Map prepared by: Pro-West & Assoc.

2 0 2 4 6 Miles

Table 12 summarizes the total extent of trails in the county. Additional discussion can be found under the motorized/non-motorized discussion.

Table 12: Recreational Trails in Hubbard County				
Administrator	Ski	Non-Motorized	Snowmobile / Motorized	Total
County (Grant In Aid)	8	10	172	190
DNR Forestry		33	104	137
State Trails		22	21	43
Total	8	65	297	370

Deer Herd Density – Forestry and Hunting

Deer hunting is a major recreational activity in Hubbard County. According to MnDNR surveys, the level of hunter pressure has steadily increased over the past five years. This is reflected in the number of deer killed which has increased from a decade low of roughly 3,000 (Park Rapids DNR field office area) in 1997 to not quite 11,000 by 2001.

According to MnDNR monitoring programs, the deer herd in Hubbard County has the second highest per square mile average density in the entire state. The density is routinely 50% higher than the desired level. While this presents good hunting prospects for hunters each fall, the situation poses serious problems for foresters trying to regenerate certain tree species. In particular, jack and red pine (and northern white cedar although there is little of this type in the county) are vulnerable to deer browsing. Many planted areas are completely browsed within a year or two of planting. Combined with the low level of fire used for regeneration and release, this situation makes it difficult to regenerate these forest types.

The DNR's response has been to issue double the number of antlerless deer hunting permits and to encourage hunters to shoot does. However, this strategy has only modest success. In years when the DNR increases the number of antlerless deer permits the actual number of such deer killed only rises slightly (ex: in 2001, 7,000 permits were issued but only 2,800 antlerless deer were killed – a number only slightly higher than the previous year when 4,500 permits were issued).

Motorized and Non-motorized Recreation

A growing point of controversy on forested lands throughout the state revolves around recreational trails – the so-called "motorized vs non-motorized" issue. The heart of the matter is the increasing level of demands being placed on a limited resource to satisfy the needs of people with significantly different perspectives on recreation. In addition, there is the concern by land managers, private and public, that certain uses damage the resource.

Nearly all the attention focuses on motorized uses with the major concern being the creation of unauthorized trails, cross country use that adversely impacts the resource, or excessive use of trails resulting in rutted, eroded trails. Motorized recreation users state that they are entitled to have access to public lands and that State gasoline tax funds set aside for motorized trails must be used to help provide this access.

Within or immediately adjacent to Hubbard County, most forms of motorized recreation are better served than elsewhere in the state. There is over 200 miles of designated ATV trails, a 120 mile off-highway motorcycle system, and various recognized forest trails open to their use.

In addition, the MnDNR has designated its forest lands as "managed" meaning that motor vehicles may operate on forest roads and trails unless they are posted and designated closed. Recent legislation prohibited off trail travel on state forests except for specified purposes during selected times of the year including building hunting stands, trapping, retrieving downed big game, and conducting forest management activities.

The MnDNR has undertaken a OHV system plan for the northwest region including Hubbard County. Among other things this plan proposes a designated ATV trail system centered on the Two Inlets State Forest and the area east to the Paul Bunyan State Forest. In addition, the Round River ATV trail in the Paul Bunyan Forest may have 52 miles of designated ATV trails.

The County feels that the State's actions adequately address the needs of motorized recreation without the County having to develop any new trails. While the County itself will not create new motorized trails, it may allow easements across appropriate land for trails as may be necessary and consistent with overall management objectives. The County will work with user groups, the DNR, and affected property owners on planning for future trails. In general, the County will encourage user groups to prepare comprehensive trail system plans so that the County, MnDNR, and others can evaluate an entire system of trails, even if development will occur a segment at a time.

The County will maintain its policy of closing any newly created forest roads or trails to motorized use. It will continue its policies that identify appropriate existing forest roads and trails for motorized use. The County will also seek to keep its policies consistent with State law and policy for state forested lands within the county. Because of the intermingled ownerships, this approach will minimize confusion and potential conflict.

The County will continue to have specifically designated non-motorized recreation areas. In general these include designated hunter/walking trails. In addition, the County is exploring the designation of blocks of land as non-motorized recreation areas. It must be noted that designation of areas for non-motorized recreation does not preclude mechanized forest management activities.

Visual Resource Management

The scenic quality of the forest is widely recognized as a value important to recreation, tourism, and local quality of life. Striving to achieve and maintain desired scenic values has become an integral part of forest management.

Obviously, the public perception of "visual quality" varies with the person and often are contradictory. One person's version of a "natural" looking forest may include dead and down trees while another's only includes stately pines with no underbrush. It is the land manager's challenge to find the appropriate balance.

In 1994 Hubbard County along with fifteen other northern counties and the MnDNR completed a visual quality classification of its lands which was then implemented through an adopted set of Visual Quality Best Management Practices. Three factors were used in the classification process: the perceived degree of sensitivity of users of a travel route or recreation area concerning landscape aesthetics; the volume and type of use a

travel route or recreation area receives; and the speed of travel within a route or area.³

Three levels of sensitivity were defined: most sensitive (high traffic and use areas of high scenic quality such as public highways, recreational lakes and designated recreational trails), moderate sensitivity (similar areas as before but with lower levels of public use), and less sensitive (areas where visual qualities are of less concern including low volume roads, and non-designated trails). The map showing Hubbard County's classifications can be viewed at the MnDNR's Division of Forestry web page.

The proposed County comprehensive plan suggests that the Lake Country Scenic Byway -- all Highway 34 and Highway 71 (from Park Rapids to Itasca State Park) -- be especially managed for visual qualities.

Long-Term Primitive Camping

Camping is allowed on most tax forfeited land. New policy in this plan will prohibit it from or near developed accesses and parks. The policy will also set a maximum time limit -- 21 days -- which a camp can be set up at any one place. In general, these limitations are needed to prevent inappropriate squatters from occupying and often abusing public land.

However, the policy runs counter to some traditional long-term camping in certain portions of the county, particularly Schoolcraft Township. A small number of camps are often set up for several months at a time during the archery deer hunting season. As with hunting shack leases, these long-term camps raise issues of de facto privatization of public lands whereby other, non-camp affiliated hunters, are deprived of a reasonable use of these public lands. To the best of the County's knowledge, no other county or DNR area has a similar traditional use.

The County's response is to establish appropriate camping regulations that apply universally across all County land and to provide an extended camping time period for the archery deer hunting season. No fees will be charged for camping.

Permanent Hunting Stands

A long-running discussion throughout Minnesota has centered on whether permanent hunting stands should be allowed on public lands. The pro side of the argument focuses on maintaining tradition, safety, and ease of use. The con side focuses on damage to trees, threat of damage to harvest and processing equipment and operators, illegal cutting of shooting lanes, debris left by abandoned stands, unsightliness, unauthorized trails created by hunters using ATVs to haul in building materials, and implied exclusive use of public land.

Permanent stands come in two varieties. First there is the traditional stand placed in a tree or group of trees. The second is the free-standing unit often involving posts embedded in the ground and elaborate enclosed shooting platforms.

Some states such as Wisconsin do not allow permanent stands. Such stands are not allowed in Minnesota's Wildlife Management Areas. Beltrami County is in the process of prohibiting such stands on its officially designated park and recreation land.

Comments received on the draft version of this management plan underscored the

³ MnDNR Division of Forestry web site, www.dnr.mn.us/forestry/visual_sensitivity, March 2002.

debate about stands. There was support for banning all permanent stands or for prohibiting permanent stands in trees but allowing free-standing ones. Other people stated a concern for the safety of hunters if only portables were allowed. Still others suggested there would be a negative economic impact if permanent stands were prohibited.

GOALS

- ◆ Provide adequately developed, dispersed facilities such as trails.
- ◆ Enhance undeveloped, dispersed recreation opportunities, such as hunting and wildlife viewing, and to provide public access to public waters.
- ◆ Protect the natural aesthetic resources enjoyed by the public.

POLICIES

- ❖ Continue to disperse timber cutting over time and areas unless emergency timber salvage is necessary.
- ❖ Continue timber sale regulations that protect visual quality on all timber sales.
- ❖ Reserve from clear-cut harvest a 200 foot strip from the ordinary high water level of lakes classified as "Natural Environmental - Residential", "Recreational", or "General Development". Carefully planned partial cuts with underplanting or natural regeneration may be used to improve long-term visual quality.
- ❖ Consider impacts of management actions on visual qualities especially in areas of high scenic or recreational value and modify management activities accordingly.
- ❖ The following policies govern recreational trails on tax forfeited land:

Officially designated trails on tax forfeited lands will be classified as to maintenance level and use.

All designated forest roads and trails on County administered tax forfeited lands are considered open to use by snowmobiles and ATVs unless posted closed. If the State changes the designation of its forested lands from "managed" to "limited" status, the County may alter this policy to be consistent.

Proposed designated trail development is to be coordinated between the Land Department and affected property owners to maximize safety, minimize conflicts, and encourage cooperative development and use.

The County will cooperate in the preparation of an integrated county-wide recreational trail plan with user groups (e.g., snowmobilers, cross country skiers, ATVers) and other affected land owners and managers as the basis for trail designation, relocation, development, and maintenance.

So as to minimize intrusions through the forest and to the extent possible and appropriate, trails will be designed and designated to serve multiple recreational uses.

Off trail motorized travel across County administered tax forfeited lands is prohibited. All motorized recreational vehicles must stay on existing roads and trails in accordance with use designations. During big game hunting seasons, off trail travel by ATVs or similar light vehicles is permitted exclusively for the purpose of retrieving downed big game as per game regulations.

The creation of unauthorized trails on County administered tax forfeited lands is prohibited.

Trails may be gated and/or signed, as necessary, to ensure desired use of an area, to protect natural resources, or to otherwise achieve a specified management purpose in the area.

While priority is given to forest management activities, efforts will be made to adjust schedules and procedures so as to prevent or minimize conflicts with recreational uses, including use of trails.

- ❖ Primitive camping on County-administered tax forfeit land is permitted under the following guidelines: camps cannot be used for more than 21 consecutive days; persons wishing to camp more than 21 days must relocate their camp onto a site more than a mile distant from the first camp; camps cannot be established within a mile of any public campground or site; campers must remove all trash and debris from the site; live trees may not be felled for making a camp, accessing a camp, or for use as firewood; no camping is allowed within a quarter mile of a public boat access or a designated County or State camp-ground; camping is not allowed in any area designated no camping by the County.
- ❖ The following policies govern the construction, placement, and use of structures for recreation, hunting, and similar uses on tax forfeited lands:

Permanent structures for personal recreational use are prohibited on County administered tax forfeited lands. Such prohibited structures include, but are not limited to, docks, shacks (unless allowed through a specific lease), and similar structures except that permanent hunting stands are allowed whether free-standing or affixed to trees. The use of portable or temporary stands is encouraged.

The cutting or felling of live trees regardless of size for the purpose of creating shooting lanes is considered timber trespass and prohibited.

The County has the right, under Minnesota statute, to remove any non-authorized structure on County administered tax forfeited lands without cause or notice.

STRATEGIC ACTIONS

1. Work with DNR and user groups to define routes for Grant-in-Aid trail system.
2. Regulate timber hauling and signing of trails during times of logging / hauling to minimize user conflicts.
3. Develop county ordinance to establish regulations and methods of enforcement regarding use of trails, structures, and forest uses.
4. Provide 5-10 miles of new non-motorized forest access trails.

Strategic Management:

TIMBER MANAGEMENT: GENERAL



ASSESSMENT

Introduction

The primary tool available to Hubbard County to manage its forested lands is through the vegetation management in the form of timber harvesting, site alteration (e.g., through use of fire), and reforestation. Although, as this plan indicates, planning is done at the landscape level, actual management is done according to forest cover types at the stand or aggregated stand level.

Hubbard County's forests reflect not the results of a century of directed management but a century in which significant alteration followed by directed management. The logging of a hundred years ago drastically altered the forests. This was followed by fire and then active fire suppression, conversion to agriculture, and, in many cases, reversion to forest. These events significantly reduced the presence of many forest types and dramatically shifted forest succession to favor younger forests. This was the forest that Hubbard County actively began managing 30-40 years ago.

It is important to remember that Hubbard County's forests occupy ecological systems that predominantly depend upon fire to define and sustain the forest. A half century of effective fire suppression, done to preserve timber supply and protect lives and property, has created circumstances that no longer favor fire dependent forests (e.g., jack pine, red pine, oak) while fostering non-fire dependent types (e.g., hardwoods). It is unlikely that fire will again play a significant role in influencing the forested landscape and the impact of this must be kept in mind when examining the County's forest management practices.

Landscape Level Perspective

Hubbard County's forest management is being conducted within the context of a broader landscape level perspective that transcends County ownership. This is seen in the use of forest ecological systems to help define forest potential and appropriate management strategies. It is also seen in various cooperative ventures between the County and other major landowners such as the Minnesota DNR.

It is also seen in a change in approach to the size of harvest cuts. Over the past couple decades both the County and the DNR utilized small cuts to create optimal game habitat. The result has been a landscape riddled with small patches that emphasize forest edge to the detriment of interior spaces.

In its 1996 management plan the DNR changed its strategy in Hubbard County stating "...that a few large patches (up to 1,000 acres) of relatively even aged timber for interior species habitat were desirable. It was decided to reduce the past efforts to create a wide distribution of smaller patch disturbances. Harvest efforts would focus on harvesting by type, joining older cuts with planner harvests to create some larger future stands."⁴ In this management plan the County has adopted a similar strategy on much of its lands although it will continue small cut harvesting in prime game habitat areas.

⁴ *Park Rapids TMP Effort, Summer 1996, MnDNR Forestry.*

The effect of creating larger patches will be to restore critical interior forest habitats and to mimic the prior fire-influenced forest landscape.

Hubbard County is also seeking to insure there is a representative distribution of forest types by successional phase (e.g., vegetational growth stage). As has been discussed in this plan, the current forest lacks sufficient variation in this regard. One aspect of efforts to address this situation is to foster development of forest patches which have the characteristics of older, mature forests. Another aspect of this approach will be efforts to secure successful regeneration of key forest types such as jack pine.

Cover Type

The following restates the assessment of Hubbard County's forested lands provided in the Plan Context chapter of the plan.

- Aspen dominates Hubbard County's forests; the whole middle third of the county (including State lands) is essentially an aspen forest. Jack pine is the second most abundant type. Relative to its potential, Oak is fairly well represented and, in fact, may be more abundant on the landscape than inventories indicate. Red and white pine are substantially absent as compared to the landscape's potential, being the cover type most displaced by the younger aspen forest.
- Within cover types, the age distributions are seriously imbalanced. Aspen has an over abundance of older stands and a relative lack of middle aged stands. Jack pine is dominated by older age classes and has almost no resource in its intermediate age groups. Birch is dominated by older age classes and has essentially nothing under 40 years of age. Oak is dominated by intermediate age classes with nearly no young or old age classes.
- The overall distribution of the forest in terms of vegetative growth stage/forest succession reflects the dominance of the aspen and jack pine cover types. In general, the forest exceeds natural distributions in the young and intermediate stages (which include older aspen stands) and is significantly below them for late successional forest stages (e.g., old red pine, mature northern hardwoods).

Patches

Map 8 in the Resource Description chapter illustrated the nature of generalized forest patches across the entire county. The primary conclusion drawn from that map was that aspen, at least for unaged patches, comprised a massive portion of the county. The following analysis of forest patches is only for county administered tax forfeited lands.

For this analysis the County's forest inventory was used to identify contiguous patches of forest defined by single cover types and broad age categories.

Tables 13 and 14 show patch information for the aspen cover type. Table 13 presents the number of total acres in each patch size group by age class. Table 14 indicates the number of patches in each grouping.

Table 13: Aspen Cover Type – Total Acres in Patch Size Category by Age Class Group, Hubbard County Tax Forfeited Lands, 2001

Age Class	Patch Size (acres)				
	<41	41 - 80	81 - 120	121-640	641+
< 20	7,744	4,761	1,631	3,158	1,039
21 - 40	4,727	2,281	1,319	1,292	0
41 - 60	4,879	2,441	2,069	2,160	1,109
61 - 120	6,302	3,068	2,173	8,712	5,419
Total	23,652	12,551	7,192	15,322	7,567
% of Total	35.7%	18.9%	10.9%	23.1%	11.4%

Table 14: Aspen Cover Type – Number of Patches in Patch Size Category by Age Class Group, Hubbard County Tax Forfeited Lands, 2001

Age Class	Patch Size (acres)				
	<41	41 - 80	81 - 120	121-640	641+
< 20	451	85	16	14	1
21 - 40	333	42	13	7	0
41 - 60	320	44	22	10	1
61 - 120	433	54	22	36	4
Total	1,537	225	73	67	6

Tables 15 and 16 present similar information for jack pine cover type patches.

Table 15: Jack Pine Cover Type – Total Acres in Patch Size Category by Age Class Group, Hubbard County Tax Forfeited Lands, 2001

Age Class	Patch Size (acres)				
	<41	41 - 80	81 - 120	121-640	641+
< 20	1,566	342	414	157	0
21 - 40	551	167	181	148	0
41 - 60	3,381	872	432	1,637	0
61 - 120	3,065	1,007	440	2,000	0
Total	8,563	2,388	1,467	3,942	0
% of Total	52.3%	14.6%	9.0%	24.1%	0.0%

Table 16: Jack Pine Cover Type – Number of Patches in Patch Size Category by Age Class Group, Hubbard County Tax Forfeited Lands, 2001					
Age Class	Patch Size (acres)				
	<41	41 - 80	81 - 120	121-640	641+
< 20	121	7	4	1	0
21 - 40	46	3	2	1	0
41 - 60	272	18	4	7	0
61 - 120	236	20	4	10	0
Total	675	48	14	19	0

Figures 12 and 13 show the distribution of patches by size and age class for aspen and jack pine. These figures depict the variation in patch size generated by management activities over the past 40 years. Patches greater than 40 years of age generally reflect forest not receiving extensive amounts of deliberate management; those that are 21-40 years old reflect the initial phase of intensive management, especially for aspen, while the younger patches reflect the most recent management actions.

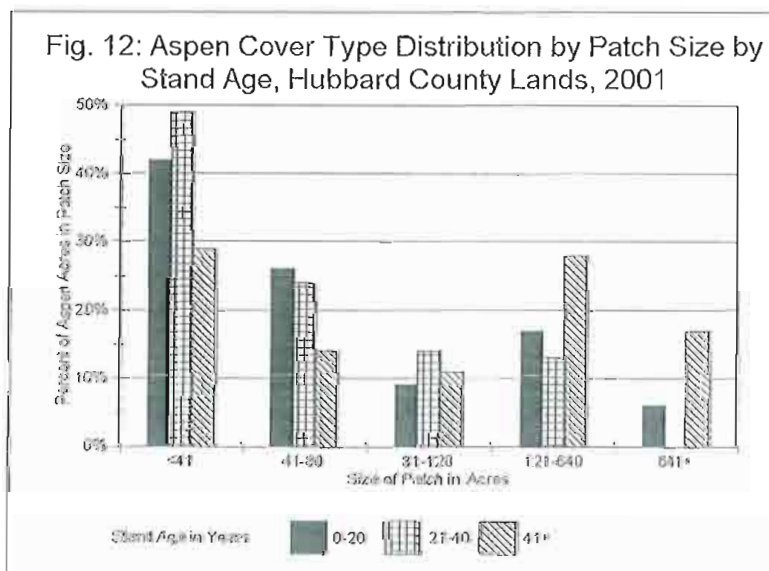
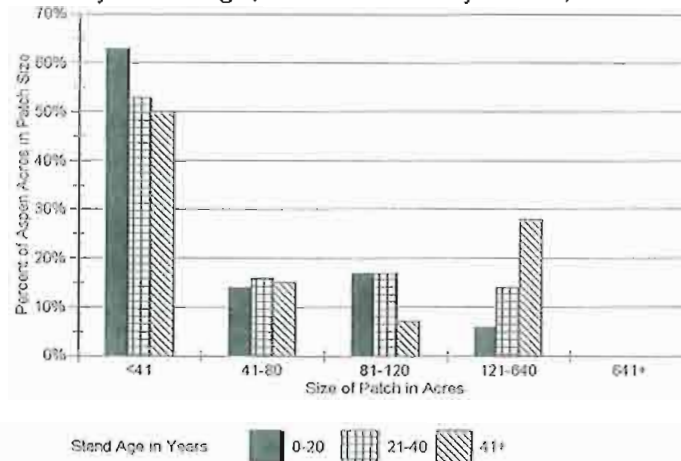


Fig. 13: Jack Pine Cover Type Distribution by Patch Size by Stand Age, Hubbard County Lands, 2001



Similar analyses for oak indicate that nearly half (46%) of the oak on County land is in patches 40 acres in size or smaller. The remaining acres are nearly evenly distributed across the next three patch sizes with none in patches larger than 640 acres.

The figures for northern hardwoods are similar to oak. Half of the acres are in the smallest patch class, 16% in the 41-80 acre range, 9% in the 81-120 range, and 25% in the 121-640 category; none are in the largest patch group.

Among the conclusions drawn from the analysis of patches are:

- Over the past 40 years management activities for aspen and jack pine have tended to significantly fragment the forest landscape by increasing the number of smaller patches and the amount of total acres in those patches.
- The bulk of acres for each of the four cover types analyzed lies in the smallest patch size group (40 acres and smaller).
- The forest conditions and habitat created by this distribution of patch size tend to favor species which prefer "edge" over "forest interior" space.

The analysis did not examine the shape or the spatial distribution of patches. These are critical landscape attributes that require attention and should be considered in future management activities.

For the aspen cover type, smaller patches with increased forest edge was a management objective in order to foster more habitat for deer and ruffed grouse. However, in recent years concern over forest fragmentation have been raised including "decreased biological diversity, increased susceptibility to disturbance, and

increased vulnerability to predation and parasitism.”⁵ The authors continue to note that “the results of these and many other studies suggest that simplifying the composition and structure of landscape ecosystems is a common cumulative effect of human land use. Economic efficiency, at least in the short term, may require simplification of ecosystems used for the production of commodities. However, ecologic efficiency, as defined by maintaining the integrity of self-organizing systems such as ecosystems, may well require embracing complexity.”

Lacking a firm understanding of all key aspects of forest fragmentation as it applies to the Hubbard County landscape, the County has adopted a management approach (as stated in its strategic principles, initiatives, and policies) that will seek to retain the distribution of patch sizes at the current overall level (as indicated in the bottom rows of Tables 13 and 15) for aspen and jack pine, and, progressively increase the number of acres in the largest patch size groupings for oak and northern hardwoods. This will mean that future management activities will favor larger patch sizes in order to achieve the desired distribution.

Management Approach

In general, the County is managing the forest seeking to achieve a desired blend of cover type, age class, habitat, ecological dynamics, and other attributes. In doing so, the objective is to have a forest that provides a range of forest products to satisfy evolving future markets, meets a variety of recreational and social needs, and is ecologically appropriate. As a consequence, the County will generally establish annual goals for managing a number of acres of forest (by cover type), which management might mean commercial harvesting, regeneration, non-commercial thins and conversions, seedling protection, road development and maintenance, and the like. It will be attempted to insure a relatively consistent flow of forest products, but that will depend upon the quality of the acres being managed.

General Silvicultural Practices

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 following table identifies the range of harvest intensity used by the County; the narratives on management for each specific cover type identifies the level of intensity used for each type.

⁵ Thomas R. Crow and Eric J. Gustafson, *Ecosystem Management: Managing Natural Resources in Time and Space*, in “Creating a Forestry for the 21st Century”, edited by Kathryn A. Kohm and Jerry F. Franklin, Island Press 1997.

Harvest Intensity Key	
High Intensity	
Type I ■ Even age - clearcut Harvest removes over 90% of the trees in an area larger than 10 acres in order to regenerate shade intolerant trees.	Type II □ Even age clearcut with residuals Harvest removes between 65-90% of the trees in an area larger than 10 acres in order to regenerate shade intolerant trees. Residual trees will enhance the diversity of the future forest stand.
Moderate Intensity	
Type III ■ Even age patch cut Same as Type I or II except area treated is smaller than 10 acres.	Type IV ■ Even age partial cut Harvest removes between 35-65% of the trees in an area larger than 10 acres. Generally the reserved trees will be the major component of the future forest stand.
Low Intensity	
Type V ■ Even age thinning Harvest removes less than 35% of the trees to enhance growth on the desired trees in the stand, which is comprised of shade intolerant or mid-tolerant trees.	Type VI ■ Uneven age selection Harvest removes less than 35% of the trees to encourage a desired balance of tree ages and sizes in a forest stand comprised of shade tolerant trees.

Fire

Primary responsibility for fighting fire lies with the Minnesota Department of Natural Resources. The County monitors for fire on its land and coordinates fire fighting with the DNR.

Hubbard County staff is trained in the use of controlled fire for management.

Pest Control

The County monitors its lands for signs of pest infestations. 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.

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. 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;
- 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.

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.

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 are made.

Certain species of significance to Hubbard County are difficult to successfully regenerate. Key among these are jack pine and white pine both of which fall prey to browsing by deer. Hubbard 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.

Prescribed fire will be considered as a tool to regenerate selected species such as jack pine and to sustain desired ecological systems and stand characteristics. Because the County lacks the resources for anything but small-scale burns, coordination with other entities including the MnDNR and US Forest Service will be required for larger burns.

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.

Riparian Resources

In general, the County will follow Best Management Practices for riparian areas as provided in the *Voluntary Site-Level Forest Management Guidelines*. Further, the County will follow the county defined management guidelines specified in the riparian zone habitat management section of this plan. Further, on a stand by stand

basis the County will consider applying extended rotation ages for any harvesting that occurs in or adjacent to riparian zones. Finally, the County will systematically reduce its harvest estimates to account for the reduced harvest potential of stands in riparian zones.

Visual Quality Management

The County will consider visual quality issues when undertaking management in areas that can be viewed from roads, recreational trails or lakes and streams. Efforts will be taken to minimize any adverse impacts from management activities. Among the possible actions to be taken are retention of unharvested forest "screens" which may be harvested after the initial cut is regenerated, shaping of cuts to minimize vistas of large-scale harvested areas, timing cuts to avoid prime recreational periods of the year, retention of uncut islands, and the like. Related to these efforts will be consideration of retention of unharvested strips along roads to act as a "living snow fence."

Natural Disturbance

After a fire or wind event, Hubbard County staff evaluates the stand 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, 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.

Mature Forest Management

The County will identify stands or parts of stands that are or could become old-growth forest. These sites will serve as cores for larger areas that will be managed as complementary "mature forests", that is, stands with most of the characteristics of older forest for the type of forest on the stand. It is understood that in most cases these surrounding areas will be managed stands with varying levels of active management applied to produce the older characteristics. It is also understood, that some stands may not be perpetually designated as older forests since the type of forest on them may require harvesting to simulate natural forest succession. Finally, it is understood that the old-growth cores might be expanded as appropriate and possible.

Special Guidelines

Special guidelines will be adopted as necessary as policy.

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.

GOALS

- ◆ Align forest cover with the potential of the landscape to produce forests in order to provide a healthy, productive, diverse, and viable future timber resource.
- ◆ Protect the county's timber resources from losses due to insects, disease, fire, and similar forces.
- ◆ Regulate timber harvest and regeneration for a sustained-yield, long-term output of wood products to provide income to the tax-forfeited land trust fund and commodities for a strong timber industry economy.
- ◆ Protect and/or improve all forest resources for multiple-use by integrating other program goals with timber management.

POLICIES

- ❖ In general, forested lands will be managed within the broader landscape and in a manner consistent with the site's forest ecological system (type).
- ❖ The gathering of plants (whole or parts including berries), pine/fir cones, nuts and seeds, and other similar vegetative materials is allowed without a permit provided such activity is consistent with State and Federal laws and does not result in the destruction or serious depletion of the resource. Under no circumstances may Federal or State listed rare, threatened or endangered species be gathered.

Tapping and collecting of tree sap for making syrup may be allowed provided that the individual obtains a permit for such activity.

- ❖ The County will review natural heritage information as part of all management planning including preparation of stand-level prescriptions and will act accordingly.
- ❖ The County recognizes the validity and necessity of timber and resource harvesting as critical to the management of the forest resource relative to achieving desired management objectives and generating revenues capable of sustaining management activities.
- ❖ Efforts will be made to minimize the use of chemical herbicides and pesticides in forest management. All uses of chemicals will be in accord with applicable standards for handling and application.
- ❖ Recognizing that there are few, if any, true old growth forest stands on its land base, the County will evaluate selected stands for management for "mature forest characteristics".

- ❖ Management will be coordinated with other forest uses including recreational trails to minimize conflicts.

STRATEGIC ACTIONS

1. Develop "on-going vegetation assessment and inventory update" system.
2. Prepare 2-year tactical management plans. The specific stands selected for management will be drawn from a 10-year pool of eligible stands.

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. Usually the dominant species comprises over half the trees; the exact mix varies with cover type and the successional phase of the stand. The information provided for each cover type is:

Age Class Distribution: number of acres within broad age classes in the base year.

General Management Objective: a short statement of the basic purpose of County management for this cover type.

Featured on Forest Ecological System: most cover types can occur on a wide variety of forest ecological systems, but they do best or are best suited on a smaller number. Checks are placed by those systems on which the County will stress the particular cover type.

Rotation Age: the average age at which stands of this cover type would be harvested. This age may vary by ecological system as the trees may be able to sustain older ages on certain systems. The average rotation age may be varied to account for stand conditions, coordination with adjacent stands, location within visually sensitive areas, and the like.

Harvest: checks are placed by the harvest techniques generally used for this cover type (the techniques are described in the general timber management chapter). The notes provide additional information regarding timing and intensity of harvest.

Regeneration: checks are placed by the regeneration techniques generally used for this cover type. The notes provide additional information.

Other Notes: additional information to help explain management objectives and actions.

Strategic Management:

TIMBER MANAGEMENT: ASPEN

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Aspen	18,323	9,616	12,641	25,018	597	0	0	66,195

General Management Objective:

Maintain aspen as a cover type on appropriate sites and balance age classes.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which aspen is emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		50
		Dry Pine/Oak Woodland		50
		Dry Pine Forest		50
		Dry Mesic Pine/Oak Forest	✓	70/80
		Dry Mesic Pine Forest	✓	70/80
	Mesic	Mesic Oak Forest	✓	50
	Wet Mesic	Lowland Mixed	✓	50
	Organic	Lowland Conifer		50

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection	Notes: Clearcuts retain residuals for wildlife and inclusions of long-lived species such as red pine, northern hardwoods, oak, and lowland conifers. Require cutting during dormant season on sensitive soils.

Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other	Notes:

Other Notes:

Depending on ecological systems and the exact presence of secondary species, low density aspen stands will be converted to northern hardwoods/oak (Dry Pine, Dry Pine/Oak Woodland) or pine and white spruce (Dry Poor Pine). Roughly 11% of current aspen type will be converted.

On DMPO and DMP sites the 70 or 80 year rotation age will be assigned according to site index.

Between 2002-2021 aspen will undergo accelerated harvest in order to bring the cover type into the desired mix of age classes. After that time, harvest will be at lower, sustained level.

Advanced reproduction of conifers like balsam fir will be protected in harvest areas.

The limited extent of **Balm O'Gilead** will be managed in a fashion similar to aspen; harvest age of 50.

ASPEN Cover Type Strategic Management Summary

Harvest Regime: 2002-2011:	Acres managed (maximum per year):	1,500
	Acres regenerated as aspen cover type (per year):	1,200
	Acres converted to other cover types (per year):	300
Harvest Regime: 2012-2021:	Acres managed (maximum per year):	1,250
	Acres regenerated as aspen cover type (per year):	1,050
	Acres converted to other cover types (per year):	200
Harvest Regime: 2022 >:	Acres harvested (maximum per year):	1,030
	Acres regenerated as aspen cover type (per year):	1,030
	Acres converted to other cover types (per year):	0

Notes:

During 2002-2011 an additional 100 acres per year of non-harvested stands (e.g., certain riparian zones, steep slopes, etc.) will be converted to other cover types.
Harvest levels in 2042-2051 will average 970 acres.

Aspen Age Class Distribution

Year	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81+	Total
2001	9,676	8,647	6,341	3,275	3,574	9,067	16,664	8,354	597	66,195
2051	10,089	10,396	11,074	10,703	10,592	3,391	2,396	229	4	58,874
2101	11,132	10,515	10,414	10,733	11,004	1,739	1,993	1,332	0	58,862

Strategic Management:

TIMBER MANAGEMENT: ASH-LOWLAND HARDWOODS

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Ash	6	0	53	269	196	329	93	946
Low Hdwds	0	0	134	227	25	4	26	416

General Management Objective:

Sustain these cover types for long-term management.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which ash and lowland hardwoods are emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		
		Dry Pine/Oak Woodland		
		Dry Pine Forest		
		Dry Mesic Pine/Oak Forest		
		Dry Mesic Pine Forest		
	Mesic	Mesic Oak Forest		100
	Wet Mesic	Lowland Mixed	✓	100
	Organic	Lowland Conifer		100

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	<input checked="" type="checkbox"/> Even age clearcut <input checked="" type="checkbox"/> Even age clearcut with residuals <input checked="" type="checkbox"/> Even age patch cut <input checked="" type="checkbox"/> Even age partial cut <input checked="" type="checkbox"/> Even age thinning <input checked="" type="checkbox"/> Uneven age selection	Notes:
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	<input checked="" type="checkbox"/> Natural regeneration <input checked="" type="checkbox"/> Scarification <input checked="" type="checkbox"/> Burning <input checked="" type="checkbox"/> Hand planting <input checked="" type="checkbox"/> Direct seeding <input checked="" type="checkbox"/> Herbicides <input checked="" type="checkbox"/> Other	Notes:
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Other Notes:

Low quality sites will be thinned by age 90 and harvested at age 100. These stands will be harvested at Intensity Type II, that is, clear cuts with extensive amounts of residuals to insure future stands with appropriate characteristics.

High quality sites will managed through select tree harvesting when stand volume warrants.

Strategic Management:

TIMBER MANAGEMENT: BALSAM FIR

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Balsam fir	112	57	950	1,816	235	7	9	3,186

General Management Objective:

To maintain the cover type where it exists today; encourage more growth within aspen and birch cover types; balance age classes.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which balsam fir is emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest	✓	60
		Dry Pine/Oak Woodland	✓	60
		Dry Pine Forest		60
		Dry Mesic Pine/Oak Forest		60
		Dry Mesic Pine Forest	✓	60
	Mesic	Mesic Oak Forest		70
	Wet Mesic	Lowland Mixed	✓	70
	Organic	Lowland Conifer		70

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection	Notes: Stands with advanced regeneration of younger balsam fir will retain the regenerating trees (will result in two-cohort stands).
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other	Notes:
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Other Notes:

Strategic Management:

TIMBER MANAGEMENT: BIRCH

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Birch	277	39	1,586	5,316	434	0	0	7,652

General Management Objective:

Sustain birch where possible although conversion to other types is likely.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which birch is emphasized as a <u>cover type</u>.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		70
		Dry Pine/Oak Woodland	✓	70
		Dry Pine Forest		70
		Dry Mesic Pine/Oak Forest	✓	70
		Dry Mesic Pine Forest	✓	70
	Mesic	Mesic Oak Forest		70
	Wet Mesic	Lowland Mixed		70
	Organic	Lowland Conifer		

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	<ul style="list-style-type: none"> ✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection 	Notes: Clearcuts retain residuals for wildlife and low-risk inclusions of long-lived species such as red pine, northern hardwoods, oak, and lowland conifers. Increasing requirements for cutting during dormant season on sensitive soils.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	<ul style="list-style-type: none"> ✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other 	Notes: Birch regeneration will favor natural conversion to mixed stands dominated by aspen. Artificial conversion of birch to conifer will be considered when number of sprouting hardwood stumps is <100/acre and there is inadequate aspen root suckering. Jack pine and spruce will be favored.
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Other Notes:

Advance reproduction of conifers like balsam fir will be protected in harvest areas.

Strategic Management:

TIMBER MANAGEMENT: LOWLAND CONIFER

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Bl. Spruce	95	193	260	996	1,411	642	239	3,836
Tamarack	39	201	343	615	903	426	181	2,708
Wh. Cedar	0	0	0	11	120	66	94	291

General Management Objective:

Maintain black spruce and tamarack cover types while balancing age classes; strive to hold on to limited white cedar resource and encourage its regeneration.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which lowland conifers are emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		
		Dry Pine/Oak Woodland		
		Dry Pine Forest		
		Dry Mesic Pine/Oak Forest		
		Dry Mesic Pine Forest		
	Mesic	Mesic Oak Forest		
	Wet Mesic	Lowland Mixed	✓	110
	Organic	Lowland Conifer	✓	110

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection	Notes: Essentially no white cedar will be harvested except for occasional single tree selection.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other	Notes: Natural seeding for black spruce and tamarack will be preferred methods.
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Other Notes: White cedar will be retained for wildlife habitat values.
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Strategic Management:

TIMBER MANAGEMENT: JACK PINE

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Jack Pine	2,474	1,038	6,292	6,192	177	11	0	16,184

General Management Objective:

Strive to retain jack pine type across a variety of ecological systems and with a better balance of age classes.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which jack pine is emphasized as a <u>cover type</u>.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest	✓	60
		Dry Pine/Oak Woodland	✓	60
		Dry Pine Forest	✓	60
		Dry Mesic Pine/Oak Forest	✓	60
		Dry Mesic Pine Forest		60
	Mesic	Mesic Oak Forest		50
	Wet Mesic	Lowland Mixed		50
	Organic	Lowland Conifer		

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	<ul style="list-style-type: none"> ✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection 	Notes: Harvest will be in larger blocks to mimic historic fire regime and reduce impact of deer browse.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	<ul style="list-style-type: none"> ✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other 	Notes: Variety of techniques will be used to secure successful regeneration and to protect seedlings from deer browsing. Most stands will be harvested in summer to foster successful natural reseeding.
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Other Notes:

Jack pine is critical for deer wintering yards. Management will be directed at sustaining a mix of wintering yards across the landscape.

Jack pine will be retained on its best sites (about 75% of the resource). On appropriate ecological systems jack pine stands will be converted to red pine (Dry Pine/Oak Woodland, Dry Mesic Pine/Oak) or to white spruce (Dry Mesic Pine). Some stands will be converted to white pine as well.

Between 2002-2021 jack pine will be harvested on an accelerated basis in order to eliminate degrading stands and bring cover type into desired mix of age classes. After that time, harvests will be on a lower, sustained level.

County will cooperate with other entities regarding jack pine regeneration techniques.

JACK PINE Cover Type Strategic Management Summary		
Harvest Regime: 2002-2011:	Acres harvested (maximum per year):	750
	Acres regenerated as jack pine cover type (per year):	530
	Acres converted to other cover types (per year):	220
Harvest Regime: 2012-2021:	Acres harvested (maximum per year):	520
	Acres regenerated as jack pine cover type (per year):	350
	Acres converted to other cover types (per year):	170
Harvest Regime: 2022-2051	Acres harvested (<u>maximum</u> per year):	60
	Acres harvested (<u>minimum</u> per year):	40
	Acres regenerated as jack pine cover type	All
Harvest Regime: 2052-2101	Acres harvested (maximum per year):	206
	Acres regenerated as aspen cover type (per year):	206
Notes: During 2022-2051 small age classes require variable harvest levels as resource allows. Jack pine is essentially in balanced age classes by 2101.		

Jack Pine Age Class Distribution

Year	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81+	Total
2001	2,064	410	574	464	1,624	4,668	3,952	2,240	188	16,184
2051	425	575	1,719	2,965	4,240	2,056	34	0	0	12,014
2101	2,074	2,239	2,863	2,612	1,900	326	0	0	0	12,014

Strategic Management:

TIMBER MANAGEMENT: NORTHERN HARDWOOD

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
No. Hdwd	22	6	349	2,505	180	18	0	3,080

General Management Objective:

To maintain and increase the amount of acreage, primarily for wildlife habitat.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which northern hardwoods are emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		N.A.
		Dry Pine/Oak Woodland		N.A.
		Dry Pine Forest		N.A.
		Dry Mesic Pine/Oak Forest		N.A.
		Dry Mesic Pine Forest	✓	N.A.
	Mesic	Mesic Oak Forest	✓	N.A.
	Wet Mesic	Lowland Mixed		N.A.
	Organic	Lowland Conifer		N.A.

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	<ul style="list-style-type: none"> ✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection 	Notes: Some even age clearcuts on low quality stands may occur over age 120. High quality stands will be managed regularly to reduce stand volume while retaining characteristics of a mature forest.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	<ul style="list-style-type: none"> ✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other 	Notes: When aspen is present, harvests will be designed to retain stands as hardwoods and prevent conversion to aspen stands.
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Other Notes: Emphasis will be on multi-aged stand management resulting in stands with older look and "feel". Attempt will be made to produce saw-timber quality trees. Low quality sites with aspen present (e.g., 30% or more of stand volume) will be converted to aspen. Other low quality sites will be clear cut to encourage better regeneration and stand quality. These stands will be harvested at Intensity Type II, that is, clear cuts with extensive amounts of residuals to insure future northern hardwood stands with appropriate characteristics.

Strategic Management:

TIMBER MANAGEMENT: OAK

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Oak	37	47	139	2,843	689	118	53	3,926

General Management Objective:

To maintain or increase extent of this cover type, primarily for wildlife habitat.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which oak is emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		
		Dry Pine/Oak Woodland	✓	140
		Dry Pine Forest		140
		Dry Mesic Pine/Oak Forest	✓	140
		Dry Mesic Pine Forest		140
	Mesic	Mesic Oak Forest	✓	140
	Wet Mesic	Lowland Mixed		140
	Organic	Lowland Conifer		

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection	Notes: Stands will be thinned around age 100. Low quality stands may be harvested at age 100.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other	Notes:
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Other Notes:

Some low quality stands may be converted to other cover types depending upon ecological system and presence of other species in stand.

Aspen regeneration will be minimized through harvesting stands with low aspen stocking, reserving mature aspen, and selective use of herbicides.

Strategic Management:

TIMBER MANAGEMENT: RED / WHITE PINE

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Red Pine	2,756	1,075	290	676	1,441	430	30	6,698
White Pine	130	0	15	0	35	11	0	191

General Management Objective:

To increase the acres of these cover types.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which red/white pine is emphasized as a cover type.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest	✓	120
		Dry Pine/Oak Woodland	✓	120
		Dry Pine Forest	✓	120
		Dry Mesic Pine/Oak Forest	✓	120
		Dry Mesic Pine Forest	✓	120
	Mesic	Mesic Oak Forest		120
	Wet Mesic	Lowland Mixed		
	Organic	Lowland Conifer		

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	<ul style="list-style-type: none"> ✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection 	Notes: White pine harvests will be limited to select tree harvesting if at all. Red pine stands will be thinned between ages 30 and 90. White pine stands will be thinned between ages 30 and 90 and again between ages 90 and 110.
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Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	<ul style="list-style-type: none"> ✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other 	Notes: White pine will be planted in a variety of areas in an attempt to revitalize this resource.
---	--	--

Other Notes: Red pine will be used to replace jack pine in areas where jack pine is prone to drought, deer browsing, and other factors. White pine will be planted in areas where deer browsing is low.
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Strategic Management:

TIMBER MANAGEMENT: WHITE SPRUCE

Age Class Distribution: 2001

	0-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Wh. Spruce	501	45	24	45	50	0	0	665

General Management Objective:

To maintain cover type and expand acres where possible; balance age classes.

Cover Type Featured on Forest Ecological System: <i>Check marks identify the ecological systems on which white spruce is emphasized as a <u>cover type</u>.</i> Rotation Age: <i>The target rotation (harvest) age is listed for each ecological system.</i>	Dry Mesic	Poor Pine Forest		120
		Dry Pine/Oak Woodland		120
		Dry Pine Forest		120
		Dry Mesic Pine/Oak Forest		120
		Dry Mesic Pine Forest	✓	120
	Mesic	Mesic Oak Forest	✓	120
	Wet Mesic	Lowland Mixed		120
	Organic	Lowland Conifer		

Harvest: <i>Check marks identify the level of harvest intensity used for this cover type.</i>	✓ Even age clearcut ✓ Even age clearcut with residuals ✓ Even age patch cut ✓ Even age partial cut ✓ Even age thinning ✓ Uneven age selection	Notes: Stands will be thinned between ages of 25-30, 60, and no later than 90.
---	--	--

Regeneration: <i>Usual methods of reforestation and regeneration are checked.</i>	✓ Natural regeneration ✓ Scarification ✓ Burning ✓ Hand planting ✓ Direct seeding ✓ Herbicides ✓ Other	Notes:
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Other Notes:

White spruce will be planted on appropriate aspen and jack pine stands.

Some white spruce will be allowed to grow past harvest age of 120.

Table 17: Projected Management Schedule by Decade

Cover Type	2002-2011			Acres Managed / Harvested / Thinned			
	Acres Managed	Acres Thinned	Est. Volume (cd)	2012-2021	2022-2031	2032-2041	2042-2051
Ash	184	24	2,949	201	170	94	0
Lowland Hardwoods	29	41	1,148	29	29	87	0
Aspen	14,605	0	371,345	12,236	11,092	10,161	9,276
Birch	1,105	0	21,188	1,149	1,105	1,102	1,092
Northern Hardwoods	392	394	18,728	1,158	951	1,805	2,388
Oak	776	127	15,166	1,046	777	661	456
White Pine	15	83	855	70	98	137	282
Red Pine	122	1,402	33,740	654	2,128	3,687	2,962
Jack Pine	7,618	0	114,300*	4,123	1,504	574	376
White Spruce	66	45	2,042	10	16	29	13
Balsam Fir	894	0	14,640	750	852	493	59
Black Spruce	406	0	3,527	369	304	475	334
Tamarack	253	0	3,476	191	301	133	239
White Cedar	0	0	0	0	0	8	8

* The estimated volumes are based upon the inventory figures for 2001. In the judgement of the staff foresters, the volume for jack pine, which is listed as 175,480 cords, has been decreased by one-third to account for probable stand decadence.



Hubbard County Forest Resources Management Plan

Assessment of Change: 2001-2101

This chapter presents the likely changes to occur to Hubbard County's forested lands over the course of 100 years if this management plan is implemented. These depictions of the future forest are projections developed through models. The most important aspect of these descriptions is the direction and magnitude of the trends.

Summary Highlights

Forest Rejuvenation

A major objective of this plan is to redress the negative impacts of forest mismanagement early in the 1900s. Through this plan the forest is better aligned in terms of the landscape's potential, distribution of forest and habitat types, and its ability to satisfy economic and social needs. Not all the desired changes are achieved within the 100-year outlook of this plan. For instance, balancing the jack pine resource and the maturing of the new red and white pine forests will not occur until roughly 20 years later.

Aspen Shift

The aspen resource is reduced by about 11% as selected stands convert to more appropriate types. The current age imbalance is corrected while still providing a significantly large "tail" of older stands.

Jack Pine Shift

Three-quarters of the rapidly degrading jack pine forest is managed for retention in a series of balanced age classes. One-quarter of the stands are converted to other upland conifer types which are easier to regenerate.

Timber Flow

The plan produces a predictable flow of timber resource. The future forest is more diverse in types, allows for a wider production of fiber and sawtimber, and for key species generates an even yield of material.

Habitats Sustained

No habitat niches are lost during this plan period. The mix of habitats is altered with more young and far more mid-age habitats provided. Older types are reduced as the aging current forest is managed, but critical older types such as mature hardwood forests are substantially increased.

Recreation

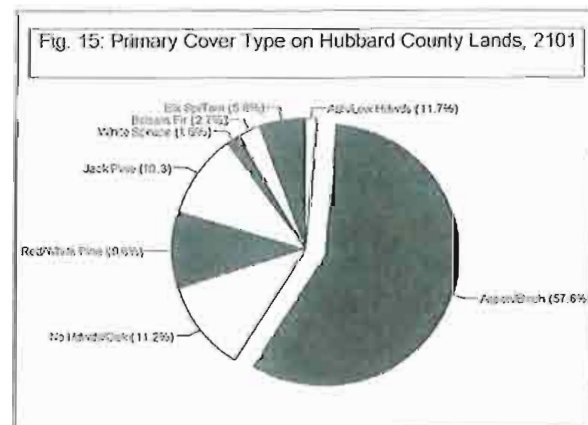
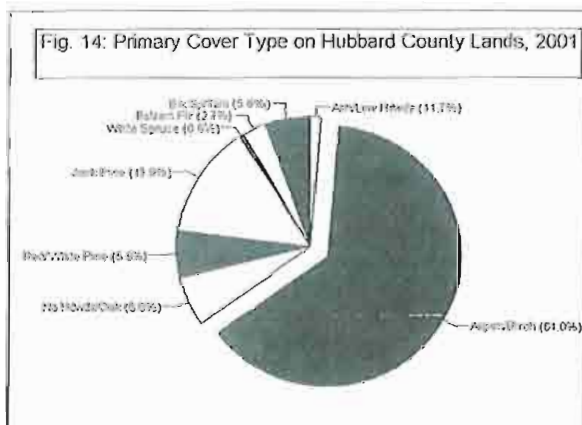
No major changes in recreation facilities, outside of additional trails, are anticipated. Pressures on public lands for recreational uses will increase.

Cover Type

This section highlights the changes in cover type that might result from the implementation of this strategic plan.

Table 15 and Figures 14 and 15 indicate the change in acres for the major forested cover types.

Cover Type	2001		2101		Change	
	Acres	Percent	Acres	Percent	Acres	%
Ash	946	0.8%	946	0.8%	0	0%
Aspen	66,195	56.9%	58,874	50.6%	(7,321)	-11%
Balm of Gilead	437	0.4%	437	0.4%	0	0%
Balsam Fir	3,186	2.7%	3,186	2.7%	0	0%
Birch	7,652	6.6%	7,652	6.6%	0	0%
Black Spruce, Lowland	3,836	3.3%	3,836	3.3%	0	0%
Lowland Hardwoods	416	0.4%	416	0.4%	0	0%
Northern Hardwoods	3,080	2.6%	9,037	7.8%	5,957	193%
Pine, Jack	16,193	13.9%	12,014	10.3%	(4,179)	-26%
Pine, Red	6,698	5.8%	10,334	8.9%	3,636	54%
Pine, White	191	0.2%	820	0.7%	629	329%
Oak	3,926	3.4%	4,003	3.4%	77	2%
Tamarack	2,708	2.3%	2,708	2.3%	0	0%
White Cedar	291	0.3%	291	0.3%	0	0%
White Spruce	665	0.6%	1,884	1.6%	1,219	183%
Total	116,420	100.0%	116,438	100.0%		



The following charts indicate the nature of change within the major cover types on tax forfeited lands.

Fig. 16: Hubbard County Tax Forfeit Lands
ASPEN Cover Type, Acres in 2001 / 2051 / 2101

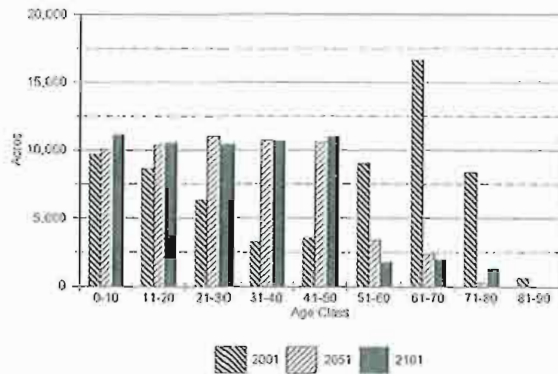


Fig. 17: Hubbard County Tax Forfeit Lands
BIRCH Cover Type, Acres in 2001 / 2051 / 2101

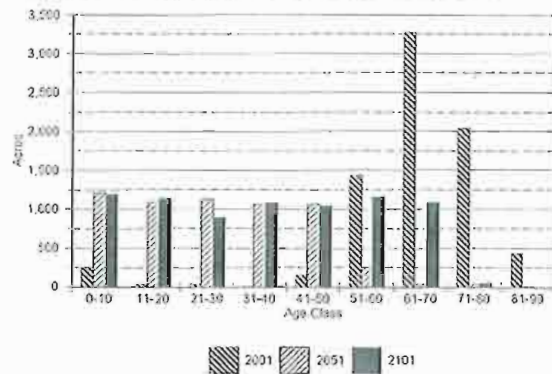


Fig. 18: Hubbard County Tax Forfeit Lands
NORTH. HDWDS Cover Type, Acres in 2001 / 2051 / 2101

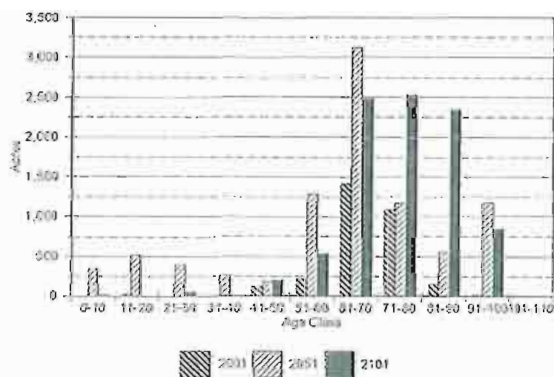


Fig. 19: Hubbard County Tax Forfeit Lands
JACK PINE Cover Type, Acres in 2001 / 2051 / 2101

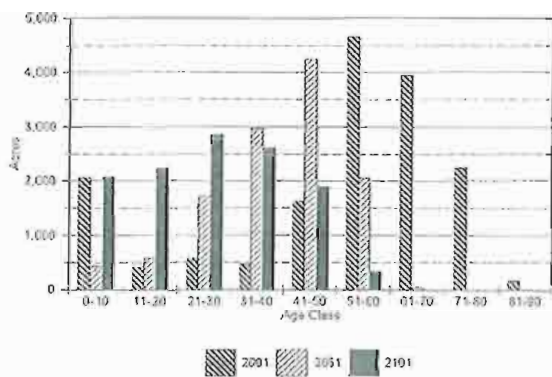
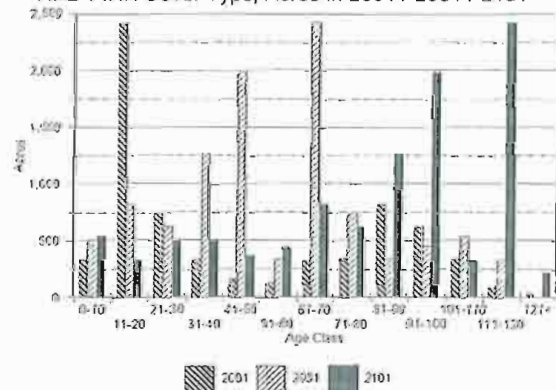


Fig. 20: Hubbard County Tax Forfeit Lands
RED PINE Cover Type, Acres in 2001 / 2051 / 2101



As is shown in Table 13, the amount of acreage of several cover types changes during the plan period. These conversions reflect deliberate management decisions to adjust cover types to better fit the land's potential and the likely ability to retain some of the cover types (e.g., jack pine). Nearly all conversions will occur during the plan's first 20 years. Table 16 summarizes the flow of these changes.

Table 16. Summary of Cover Type Conversions, 2001 to 2101		
From	To	Acres
Aspen*	Northern Hardwoods	6,383
	Oak	483
	Red Pine	1,314
Northern Hardwoods	Aspen	426
Oak	Aspen	406
Jack Pine	White Pine	629
	Red Pine	2,322
	White Spruce	1,219
Net Gain/Loss		
	Aspen	(7,348)
	Northern Hardwood	5,957
	Oak	77
	White Pine	629
	Red Pine	3,636
	Jack Pine	(4,170)
	White Spruce	1,219

* Includes aspen and "off-site" aspen.

Among the pertinent aspects of the anticipated change in the forest over the next 100 years are:

- Management of the aspen cover type will reduce the amount acres by 11% while creating a balanced resource in terms of age class distribution. The stands eliminated from this cover type generally have low densities of aspen and are better candidates for management as northern hardwoods or oak. The mix of rotation ages provides a "tail" within the upper age classes allowing for more flexibility in management, creating more saw timber quality trees, and providing older forest habitats. At the same time, the flow of fiber from the aspen stands will be on a sustained basis at a level equal to or higher than what has been experienced in the past decade.
- Jack pine will also see a reduction in acreage – 25% – as management focuses regeneration on the sites best suited for jack pine and most likely to have successful plantings. Jack pine is being replaced with red pine, white pine, and white spruce. Thus, the amount of upland conifer on Hubbard's lands is retained although there will be some ecological variations due to the different mix of pine types. Jack pine's current serious age class imbalance is nearly balanced by the end of the century although another 10-30 years are needed to

accomplish that task.

- Northern hardwoods gain substantially as many low quality aspen sites are converted through management. Many of the new stands identified as northern hardwoods may in fact be closer to oak stands although the northern hardwood label will be used at this time. Because northern hardwood stands will be managed on an uneven-age basis, the stands will gradually gain the look and feel of mature, shifting mosaic forests. These stands should produce quality saw timber while providing much needed habitats. Patch sizes will be increased in these forests as well.

Ecological Systems and Cover Type

The management regimes proposed in this strategic plan are heavily based upon the ecological potential of the landscape as expressed in forest ecological systems. Decisions on which cover types to feature on which system impact the change in forest composition across each of the ecological systems. Table 17 shows the changes which are likely to occur over the next century.

Table 17: Change in Generalized Cover Type Composition of Forest Ecological Systems on Hubbard County Tax Forfeit Lands, 2001 - 2101

FES	Pine	Aspen / Birch	Spruce / Fir	Oak / No. Hdws	Ash / Low Hdws	Blk Sp / Tam / Cedar	Total
2001							
D Pine/Oak Woodland	60.1%	38.0%	1.0%	0.8%	0.0%	0.2%	100%
D Poor Pine	54.8%	32.8%	5.8%	3.6%	1.2%	1.8%	100%
D Pine	57.6%	34.7%	2.8%	1.4%	1.4%	2.1%	100%
DM Pine	8.6%	82.7%	1.3%	6.5%	0.6%	0.4%	100%
DM Pine/Oak Forest	4.5%	82.7%	0.9%	10.7%	0.9%	0.3%	100%
M Oak Forest	0.8%	71.7%	0.1%	26.7%	0.7%	0.0%	100%
WM Lowland Mixed	11.3%	71.7%	5.8%	1.0%	5.7%	4.6%	100%
O Lowland Conifer	5.9%	22.1%	12.7%	1.1%	6.5%	51.6%	100%
2101							
D Pine/Oak Woodland	59.1%	34.7%	1.0%	5.0%	0.0%	0.2%	100%
D Poor Pine	54.5%	31.0%	8.8%	3.0%	1.0%	1.8%	100%
D Pine	57.4%	29.3%	3.0%	7.4%	0.8%	2.1%	100%
DM Pine	8.8%	74.3%	2.3%	13.9%	0.6%	0.4%	100%
DM Pine/Oak Forest	5.1%	74.3%	0.9%	18.6%	0.8%	0.4%	100%
M Oak Forest	1.0%	66.6%	0.0%	31.9%	1.0%	0.0%	100%
WM Lowland Mixed	10.4%	70.7%	6.7%	2.6%	5.1%	4.6%	100%
O Lowland Conifer	5.8%	21.4%	12.9%	3.3%	5.0%	51.6%	100%
Direction of Change							
D Pine/Oak Woodland		▼		▲			
D Poor Pine		▼	▲				
D Pine		▼		▲			
DM Pine		▼		▲			
DM Pine/Oak Forest		▼		▲			
M Oak Forest		▼		▲			
WM Lowland Mixed		▼	▲	▲			
O Lowland Conifer				▲	▼		

Among the pertinent elements of the change in cover type composition of the forest ecological systems are:

- The managed shift of the aspen resource to primarily northern hardwoods is clearly reflected in the table. The level of aspen cover type decreases across all but the lowland conifer systems while northern hardwoods increase on all but the ill-suited poor pine sites.
- Upland conifers in the form of white spruce make gains on two ecological systems, this time in exchange for jack pine.
- The overall pine component remains essentially unchanged across all systems. However, as was noted in the cover type review, the mix of pine will change – over 4,000 acres of jack pine are replaced by red and white pine (and white spruce on two systems).

Succession/ Vegetation Growth Stage

A critical perspective of the future forest is gained by viewing 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. Table 18 shows the VGS for the current and future forests by ecological system.

Table 18: Change in Distribution of Generalized Vegetational Growth Stages by Forest Ecological System on Hubbard County Tax Forfeited Lands, 2001 & 2101				
FES	Establishment	Thinning / Transition	Mature / Shifting Mosaic	Total
2001				
D Pine/Oak Woodland	33%	40%	27%	100%
D Poor Pine	17%	53%	30%	100%
D Pine	13%	64%	23%	100%
DM Pine	15%	39%	46%	100%
DM Pine/Oak Forest	15%	57%	28%	100%
M Oak Forest	8%	53%	39%	100%
WM Lowland Mixed	23%	64%	13%	100%
O Lowland Conifer	53%	31%	16%	100%
2101				
D Pine/Oak Woodland	15%	70%	15%	100%
D Poor Pine	19%	73%	8%	100%
D Pine	26%	67%	7%	100%
DM Pine	16%	69%	15%	100%
DM Pine/Oak Forest	16%	64%	20%	100%
M Oak Forest	9%	85%	6%	100%
WM Lowland Mixed	44%	52%	4%	100%
O Lowland Conifer	57%	36%	7%	100%
Direction of Change				
D Pine/Oak Woodland	▼	▲	▼	
D Poor Pine	▲	▲	▼	
D Pine	▲	▲	▼	
DM Pine	▲	▲	▼	
DM Pine/Oak Forest	▲	▲	▼	
M Oak Forest	▲	▲	▼	
WM Lowland Mixed	▲	▼	▼	
O Lowland Conifer	▲	▲	▼	

This table can be misleading if a full understanding of the dynamics of the changes in the forest are not kept in mind. Key points concerning this change are:

- The current forest still heavily reflects the impacts of historical accident and lack of directed management. This is seen in the excessive amounts of both old jack pine and aspen-birch stands and the dearth of middle-aged stands (younger stands have resulted from vigorous management over the past 30 years).
- Much of Hubbard County's forests are fire-dependent regimes with tree species that produce even-aged forests (e.g., jack pine, aspen, birch, oak). Jack pine, which is a dominant species, is not long-lived in the drier conditions of Hubbard County and thus cannot be sustained into more mature forest conditions.
- On all but one ecological system the amount of establishment forest will increase. This is due to a set of rigorous management regimes that continually uses harvesting to reset the successional process, especially on the even-age fire-dependent cover types.
- The significant decrease in the amount of mature forests reflects the directed management of the aspen and jack pine resource during the first decades of the plan. The excessive amounts of older stands in these types have been aggressively managed to provide a more balanced forest in terms of age classes.
- The northern hardwood forests, which are most commonly found on the Dry Mesic Pine and Dry Mesic Pine/Oak Forest systems, will provide an increasing amount of mature/shifting mosaic forest. These forests are managed as uneven-aged types in large patches.
- By the end of the century the aggressive conversion of jack pine to longer-lived pine and fir species in the early decades of the plan has yet to be felt in terms of the amount of mature forest. It will take another 20 years or so before these stands shift from the thinning/transition stage into the mature stage.

Habitat

As indicated in Table 19, there will be some changes to the habitat mix provided on Hubbard County's tax-forfeited lands. Of course, the missing part of this review is a consideration of what will happen on the other public and private land within the county. This is important since the County with its limited land base cannot be expected to sustain all habitat niches required in the area. However, the goal of the management regimes was to retain those which were present in 2001.

- The mature and old portions of upland deciduous / aspen-birch habitats decrease over the course of the century although the younger habitat niche increases. The dramatic decline in old habitat of this type primarily results from the managed reduction of the excessive amount of very old aspen which existed in 2001 (this type would have shown a similar decline even in the absence of management). Species, especially game species, which require a mix of young and middle-aged aspen-birch, will continue to have a steady supply of desired habitat.
- The amount of old upland deciduous / hardwood-oak habitat increases substantially. This is due to both an increase in the amount of northern hardwoods and oak on the landscape and management regimes based on uneven-aged, older forest practices. This will favor the full suite of species that require larger patches of old hardwood forests.
- Upland coniferous habitats will experience a swing from old to young during the century although the rebounding swing to older forests will be underway. The decline in old habitat is caused by the elimination of the huge amount of rapidly degrading jack pine; its replacement stands of jack pine, red and white pine are just coming into age as the century perspective of this plan ends. Within 20 more years substantial amounts of mature forest will be shifting into the older habitat niche.
- Management of the relatively small amount of lowland deciduous forest will favor mature and old habitats. If greater amounts of younger habitat is desired, a certain amount of clear-cutting will be required. It should be noted that harvesting within older stands will create small patches of young habitat, but these patches may not be large enough for many species needing this niche.
- Upland grass openings will continue to be managed for habitat. Some of these may actually represent failed artificially regenerated stands of pine that will eventually be converted into forests.

Table 19: Change in Habitat Acres on Hubbard County Lands , 2001 - 2051 - 2101

Habitat Categories		2001		2051		2101		Percent Change 2001-2100
		Acres	%	Acres	%	Acres	%	
Open Habitat Types	Lowland open	14,396	9.7%	14,460	10.8%	14,960	11.1%	4%
	Upland grass opening	981	0.7%	920	0.7%	920	0.7%	-6%
	Shrub-Sapling opening / Regeneration	14,351	9.7%	15,463	11.6%	18,527	13.8%	29%
Upland Forest: Deciduous Aspen-Birch	Young	32,867	22.2%	35,603	26.6%	34,990	26.1%	6%
	Mature	19,529	13.2%	15,531	11.6%	15,170	11.3%	-22%
	Old	26,344	17.8%	4,484	3.4%	4,479	3.3%	-83%
Upland Forest: Deciduous [NoHwd/Oak]	Young	618	0.4%	5,530	4.1%	1,412	1.1%	128%
	Mature	6,413	4.3%	6,604	4.9%	4,627	3.4%	-28%
	Old	53	0.0%	134	0.1%	6,791	5.1%	12713%
Upland Forest: Coniferous	Young	5,711	3.9%	14,626	10.9%	10,493	7.8%	84%
	Mature	10,036	6.8%	11,627	8.7%	10,753	8.0%	7%
	Old	8,477	5.7%	981	0.7%	3,378	2.5%	-60%
Lowland Forest: Deciduous	Young	193	0.1%	726	0.5%	11	0.0%	-94%
	Mature	1,050	0.7%	10	0.0%	726	0.5%	-31%
	Old	119	0.1%	615	0.5%	625	0.5%	425%
Lowland Forest: Coniferous	Young	1,982	1.3%	2,481	1.9%	2,754	2.1%	39%
	Mature	3,322	2.2%	1,273	1.0%	2,455	1.8%	-26%
	Old	1,638	1.1%	2,611	2.0%	1,159	0.9%	-29%
Total			100.0%		100.0%		100.0%	

Roads

The extent of major forest roads is expected to increase by 5-10 miles during the first decade of the plan. After that, no significant increases are expected.

Recreation

The County does not anticipate increasing the number of cabin leases during the plan period nor are there any plans to provide additional developed recreational sites.

The number of trails of all types is expected to increase although no firm figure can be set at this time since most trails will be proposed by other entities.

The County anticipates greater levels of use on all forms of trails.

The primary use of the overall land base will remain hunting, hiking, and other forms of dispersed recreation. The County anticipates the level of pressure on public lands for these uses to increase as more private lands are sold into smaller parcels and posted. The impact of Potlatch's embryonic program to lease its lands for hunting purposes cannot be assessed at this type but the assumption is that this will increase hunting pressure on County lands.