



Aitkin County Land Department
Long Range
Strategic Plan
2011

Aitkin County Long Range Strategic Plan

Adopted: November 2011

This document updates "Aitkin County Tax Forfeited Land Management Plan" adopted September 4, 2001.

Aitkin County Board

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By Commissioner: Marcotte

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Long Range Strategic Management Plan

WHEREAS, On September 7, 2011, Forest Advisory Committee made the unanimous recommendation to present the Aitkin County Land Departments' Long Range Strategic Management Plan to the public and solicit comments for the plan, and

WHEREAS, A public meeting was held on October 19, 2011 at 6:00 pm, to receive public comments on this Strategic Plan, and

WHEREAS, On October 26, 2011, the Aitkin County Forest Advisory Committee has reviewed the received comments and made unanimous recommendation that the Strategic Plan be adopted as amended.

THEREFORE, BE IT RESOLVED, that the Aitkin County Board of Commissioners hereby adopt this Long Range Strategic Management Plan for the management of the county tax forfeited lands in Aitkin County.

Commissioner Napstad moved the adoption of the resolution and it was declared adopted upon the following vote

FIVE MEMBERS PRESENT

All Members Voting Yes

STATE OF MINNESOTA)
County of Aitkin) ss.
Office of County Auditor,)

I, Kirk Peysar, Auditor, of the County of Aitkin, do hereby certify that I have compared the foregoing with the original resolution filed in my office on the 8th day of November A.D., 2011, and that the same is a true and correct copy of the whole thereof.

WITNESS MY HAND AND SEAL OF OFFICE at Aitkin, Minnesota, this 8th day of November A.D. 2011


KIRK PEYSAR, County Auditor
BY _____, Deputy

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Chapter 1.0 Mission & Strategic Perspective

1.1 Scope and Purpose

This plan addresses matters related to the use and management of the tax-forfeited lands of Aitkin County serving to:

- Describe the tax-forfeited resource.
- Identify needs and opportunities associated with management of tax-forfeited land.
- Set management direction and document Land Department policies.
- Provide basis for management coordination and cooperation with other public agencies and the forest industry.
- Promote continuity of management in the event of personnel changes.

1.2 Mission

Regarding the management of tax-forfeited lands it is the mission of the Aitkin County Land Department to:

To fulfill the County's obligation as trustee for the local governmental jurisdictions of Aitkin County by being a responsible steward who sustains the forest for future generations, generates income for the County and local governmental jurisdictions, and properly utilizes the land base and renewable forest resources to sustain the region's economic and social well-being.

1.3 Strategic Assumptions

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

- The tax-forfeited land is held in trust for the citizens of Aitkin County and should be managed in the best interest of those citizens.
- The amount of tax-forfeited land administered by the County will remain essentially unchanged throughout the management period.
- All statutory and regulatory guidelines pertaining to tax-forfeited land will be followed.
- Within the context of managing for multiple uses and values, overall management will generate sustained net income for the County and benefiting local units of government.
- The plan assumes a relatively stable local climate. ACLD addresses the potential impacts of climate change by managing for a naturally diverse, healthy, and productive forest possessing enhanced resilience for adapting to future changes in local climate.
- The product of the planning process will be a broad-based resource management plan serving to establish administrative direction and provide a foundation for decision-making.

- Planning is an ongoing process.
- County Board is final authority.

1.4 Certification

On October 30, 1997 220,000 acres of forestland, managed by the Aitkin County Land Department (ACLD) became one of the first county managed forest lands in the United States to become "green certified" by SmartWood™, a non-profit forest certification organization which is located in Vermont. This certification is approved by the Forest Stewardship Council (FSC®), which is the international monitoring organization for forest certification.

Each year, certain steps are required for Aitkin County to reach and each year Aitkin County's Land Department has excelled at reaching those requirements. The public can be assured that through this process, ACLD's standards for monitoring and managing its lands are of the highest caliber.

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

1. Compliance with Laws and FSC® Principles
Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC® Principles and Criteria.
2. Tenure and Use Rights and Responsibilities
Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
3. Indigenous People's Rights
The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.
4. Community Relations and Worker's Rights
Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
5. Benefits from the Forest
Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
6. Environmental Impact
Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.
7. Management Plan
A management plan -- appropriate to the scale and intensity of the operations -- shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.
8. Monitoring and Assessment
Monitoring shall be conducted -- appropriate to the scale and intensity of forest management -- to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

9. Maintenance of High Conservation Value Forests
Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.
10. Plantations
Plantations shall be planned and managed in accordance with Principles 1 - 9, and Principle 10. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

1.5 Strategic Objectives

MS 282.01 provides that lands classified by the County Board as “conservation lands” are to be managed for public benefits. Aitkin County strives to manage these lands so they contribute to the quality of life for county residents in terms of economic, ecological, and social benefits. In accordance with state statute, its mission, management approach and the FSC[®] principles, Aitkin County sets forth the following objectives it will strive to achieve through its forest management practices. It must be noted that the three objective groups are of equal value and the listings are not in any order of priority.

Objectives for Ecological Sustainability

To sustain a healthy and diverse forest.

1. Enhance and conserve the natural environment, unique recreational, historical and scenic values, essential habitat, rare and endangered species and plant communities, as well as forest soil and water quality.
2. Strive toward a natural forest structure.
3. Maintain ecosystem diversity at all levels—landscape, stand, species, and genetic.
4. Protect water bodies and watersheds to maintain water quantity and quality.
5. Maintain diversity and quality of riparian habitats.
6. Maintain productivity of forest soils except on areas needed for permanent roads or other permanent infrastructure.
7. Encourage other area forest resource managers, public and private, to adopt ecosystem-based management.
8. Cooperate with other area forest resource managers to implement ecosystem-based management.

Objectives for Economic Sustainability

To insure continuing viability of timber and non-timber economic activities dependent upon Aitkin County's forested lands.

1. Contribute to the local economy over time in terms of economic opportunity and employment as well as provide direct financial returns to the County and its subdivisions.
2. Provide a sustained yield of renewable resources for utilization for multiple purposes.
3. Maintain a safe working environment for employees, contractors, and the public.
4. Maintain and/or enhance timber quality and productivity of the forests.
5. Encourage the best use of wood off the land base.
6. Reduce losses in timber productivity from insects and disease.

7. Provide forest qualities that support and enhance non-consumptive economic values such as tourism, recreation, second home development, and lakeshore development.

Objectives for Social Sustainability

To satisfy Aitkin County's obligation as steward of the lands.

1. Assure orderly and controlled development resulting from the disposition of tax forfeited land.
2. Maintain a progressive, cost effective resource development program and investment in proven management systems.
3. Meet contractual and legal obligations specifically including such agreements and arrangements as the Mississippi Headwaters Board, MacMillan Bloedel Settlement, and various treaties with Minnesota Chippewa tribes and bands.
4. Anticipate and respond to concerns about potential and actual impacts of forest management activities on other forest uses, users, and managers.
5. Provide recreational opportunities on forested lands for residents and visitors.
6. Maintain visual values in areas of high public use and visibility such as resort lakes, recreational rivers, and near communities.
7. Sustain socio-economic benefits of forestry activities for area communities.
8. Enhance Aitkin County as a quality place to live.
9. Affirm and establish direction through a public involvement process which utilizes evaluation of issues and policy recommendations of the Forestry Advisory Committee
10. Provide opportunities for meaningful and effective public involvement throughout the forest management planning cycle before irreversible decisions are made.

1.6 Guiding Principles for Management

The following narrative describes the manner in which Aitkin County **organizes its land base** for the purpose of management, the **principles** which guide that management, and the considerations which may **modify** the specific application of the strategic principles.

HABITAT MANAGEMENT ZONES

Every portion of Aitkin County's forest is assigned to one of three types of Habitat Management Zones – *clustered, mosaic, and dispersed* – that determine the direction of management and intensity of harvest activity.

STRATEGIC MANAGEMENT PRINCIPLES

The following principles provide strategic guidance to the development and implementation of specific management activities on County lands.

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

Principle/ *The desired trend of patch size distribution will be directed by type of Harvest Management Zone as Active Aggregation (into fewer, larger patches), Moderate Aggregation, or Maintenance (future distribution to approximate current distribution).*

Principle/ *Stands will be managed so that their forest type, cover type, and related attributes are in accord with the underlying Native Plant Community.*

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 Native Plant Community.*

Principle/ *Stands targeted to remain in a given vegetational growth stage or within a given sequence of growth stages will be primarily selected on the basis of productivity of the objective tree species.*

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 up to the management unit 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

1.7 Strategic Initiatives

Established with the 2001 management plan, the following strategic initiatives identify the broad courses of action the County will take regarding tax forfeited land management.

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.

Enhance the quality, vigor, and value of northern and lowland hardwoods.

The primary focus of County management will be to improve the ecological, economic, and social values generated by the extensive hardwood forests. Management will encourage formation of larger forest patches.

Retain a vigorous, productive, and balanced aspen resource.

Aspen management will focus on sustaining aspen on those lands where it grows best, balancing age classes to support consistent yields of forest products, and enhancing the social and recreational values (e.g., hunting and wildlife viewing) of this cover type.

Increase the amount of upland conifer forest.

Pine and upland spruce or balsam fir cover types will be expanded to strengthen the timber supply base, enhance aesthetics, and provide additional ecological habitats. This expansion in area will occur primarily on suitable lands currently occupied by deciduous forests.

Increase the amount of oak forest.

The oak cover type will be expanded to strengthen economic, ecological, and social values. This expansion in area will most likely occur on lands currently occupied by northern hardwoods with significant oak component.

Strive to retain the birch cover type.

Retention of the birch cover type will focus on those ecological systems where birch is present today and which is well suited for birch cover type. Where appropriate, the County will manage for paper birch as a component in other forest types.

Manage for the needs of wildlife through provision of range of habitats.

The County will utilize a *coarse filter* approach as its primary tool for wildlife management. To this end, the County will strive to provide the full range of habitat, in terms of forest age and patch sizes at the landscape level and important habitat characteristics at the site level.

Focus recreational management on provision of dispersed recreation and trails.

While retaining its current developed facilities (campgrounds, swimming beach, accesses), the County will focus on providing opportunities for dispersed recreation (e.g. hunting, bird watching, berry picking) across its land base.

Maintain / enhance the quality of water yielded from County land.

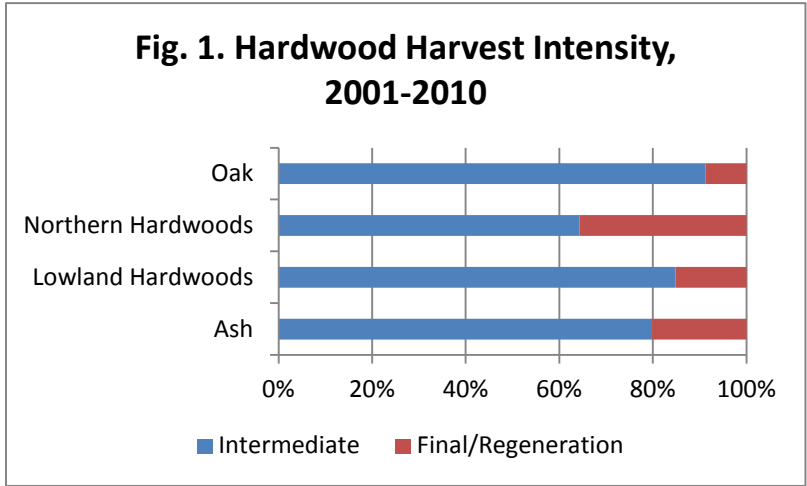
Improve water quality by assessing and monitoring forest condition (e.g., forest types and age classes) on County lands, coordinating forest management with other landowners within specific watersheds, and applying the appropriate site level practices (BMPs) in forest management activities.

1.8 Progress over Past 10 Years in Meeting Strategic Objectives

Enhance the quality, vigor, and value of northern and lowland hardwoods.

ACLD uses a variety of intermediate stand treatments or low intensity harvest techniques to improve the vigor, quality and value of its hardwood forests. These actions have gained in

importance as hardwood management becomes an ever larger aspect of ACLD activity. Figure 1 shows the dominance of low intensity management for hardwoods in the past 10 years.

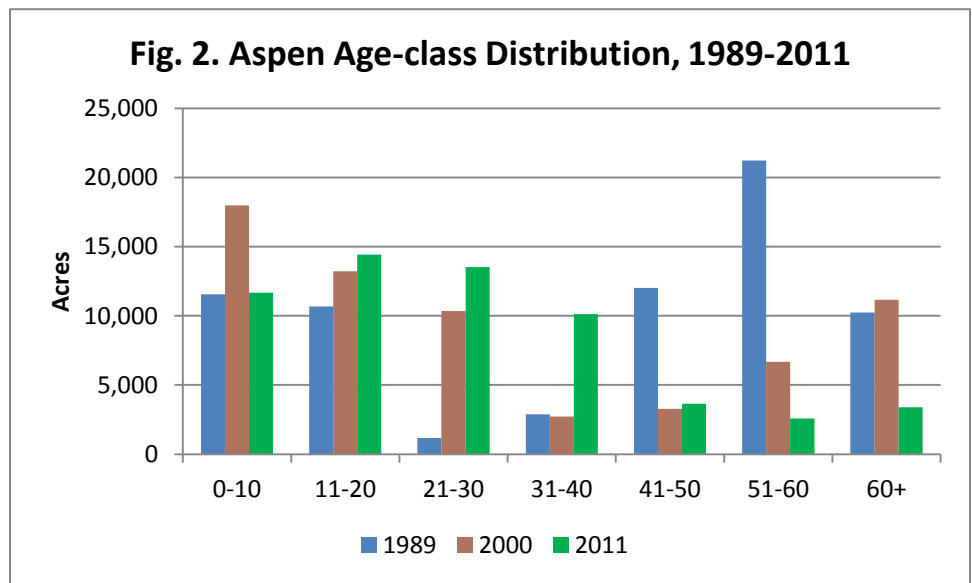


As part of its enhanced hardwood management, ACLD is conducting research regarding: mapping of native plant communities in targeted areas as a refined tool to guide forest management, and, forest growth projects in oak, northern hardwood, and aspen to evaluate tree response to intermediate stand treatments such as thinnings and crown release.

Retain a vigorous, productive, and balanced aspen resource.

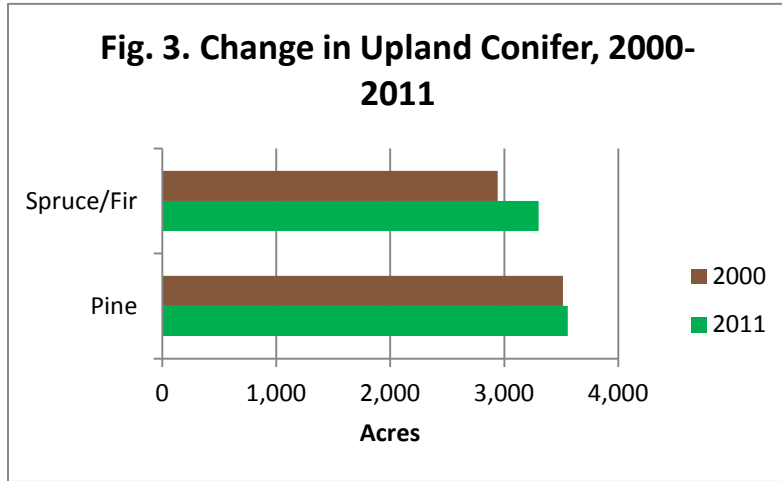
Even prior to adopting its first strategic management plan in 2001 the ACLD was managing its aspen resource with the intent to re-invigorate it through a balance of 10-year age classes. Now more than 20 years into this effort the results are becoming clear.

Figure 2 shows how consistently applied strategic management has brought the aspen resource into a more balanced condition with the resource focused on the most appropriate lands.



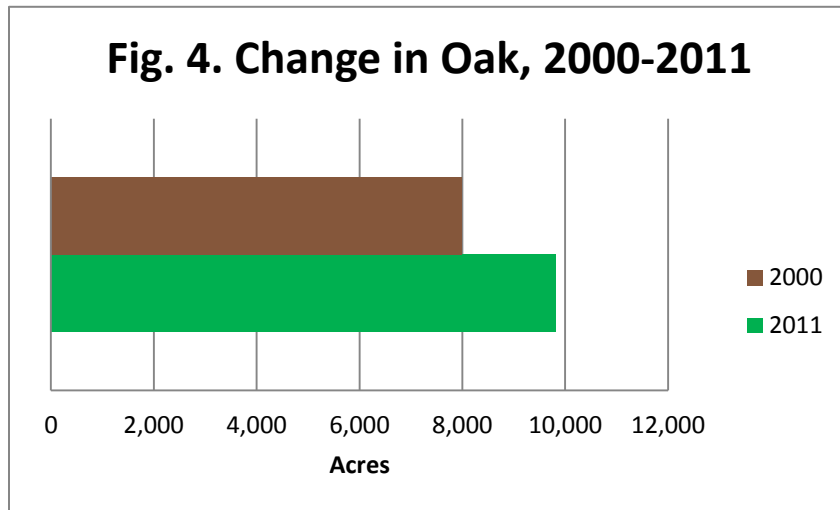
Increase the amount of upland conifer forest.

As noted in Figure 3 ACLD is making steady progress on its objective to increase the amount of upland conifer (pine and spruce/fir) forest. Most of these gains result from the targeted conversion of aspen stands that are situated on native plant communities more appropriate for pine types.



Increase the amount of oak forest.

Through management and re-inventorying of stands ACLD has achieved the amount of oak forest type it hopes to sustain over time. As shown in Figure 4 the amount of oak acres have increased nearly 25% in the past decade. The objectives now become to sustainably manage these acres, and, to introduce more oak as a component in other forest types, principally northern hardwoods.

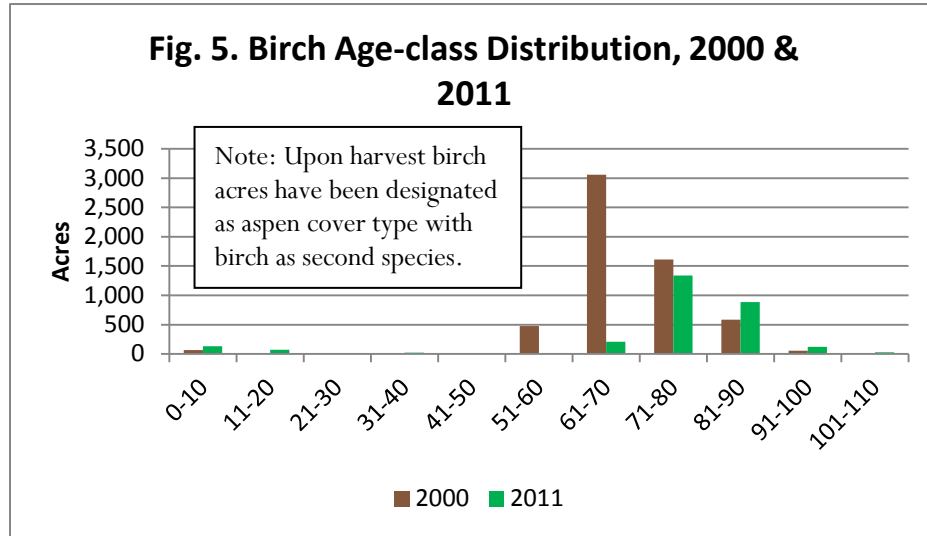


Strive to retain the birch cover type.

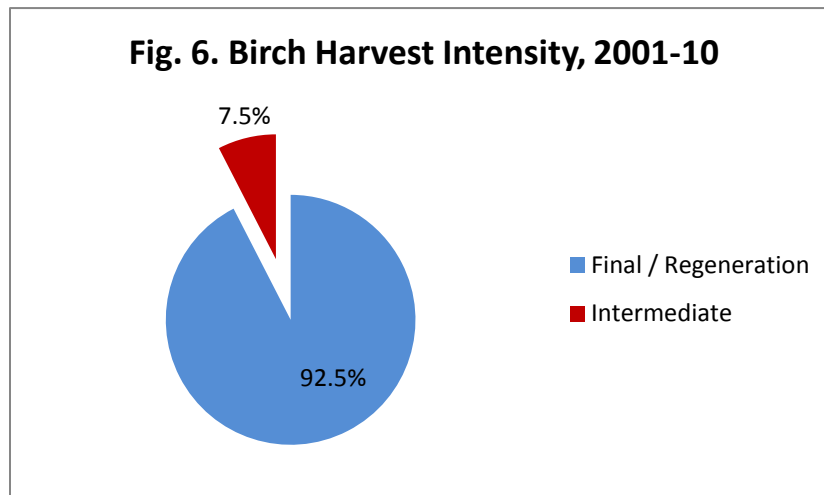
Across all of northern Minnesota retaining paper birch as a forest cover type is proving exceptionally difficult. Over the past decade half of Aitkin County's birch type has been lost, primarily due to natural succession into other types and poor regeneration; in addition, upon

harvest birch stands are re-designated as aspen stands since aspen is the dominant regenerating species although birch remains a vigorous second species.

ACLD's objective is to retain as much birch as possible as a vigorous, viable resource. This may be in the form of birch cover type and birch as a component in other forest types.



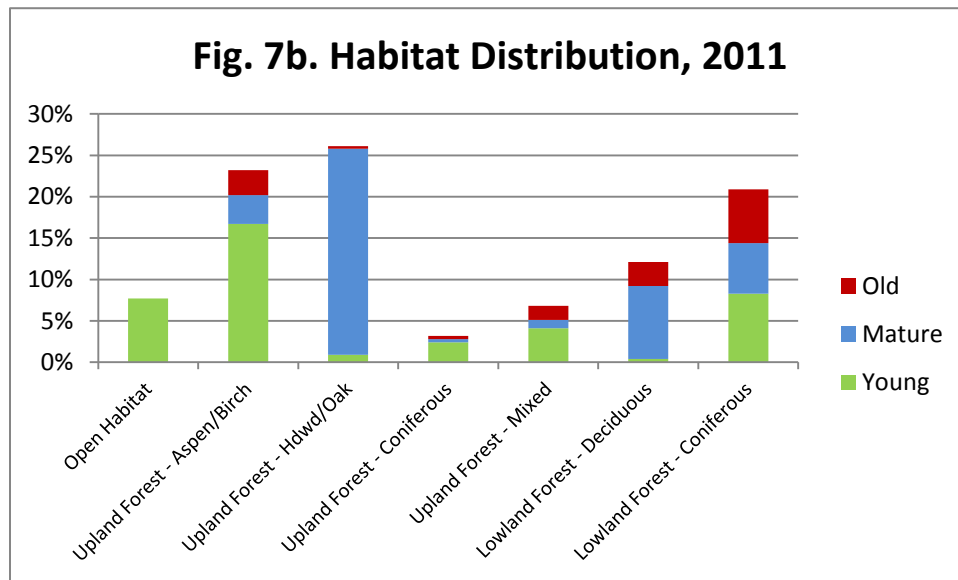
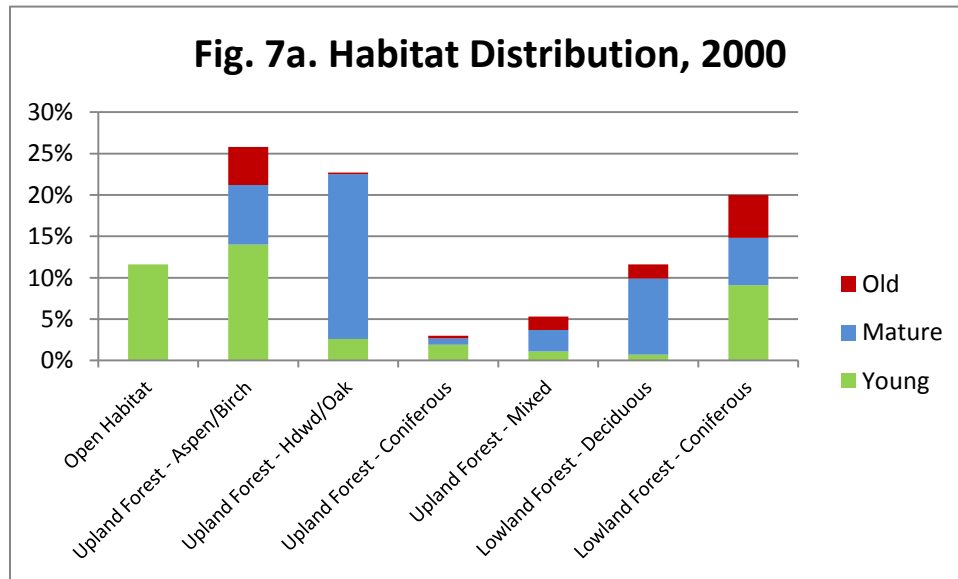
Birch regeneration requires high intensity even age harvest management in which stump sprouting and natural seeding can successfully occur. As shown in Figure 6 nearly all birch harvests over the past 10 years have been of this type. Low intensity, intermediate stand treatment techniques have been used less frequently as a means to improve stand vigor and quality.



Manage for the needs of wildlife through provision of range of habitats.

ACLD utilizes its Habitat Management Zone concept to manage wildlife habitats at the “coarse filter”, landscape level. Every acre of ACLD-administered land is assigned to one of three zone types – Clustered, Dispersed, Mosaic, which along with cover type then becomes the basis for the intensity of management activity on the land.

Figures 7a and 7b indicate the change in distribution of habitats over the past decade. The changes directly reflect the impacts of ACLD forest management during this period: continued reduction of excessively old aspen/birch forests into more balanced forests, and, initiation of more extensively applied intermediate treatment hardwood management.



Focus recreational management on provision of dispersed recreation and trails.

Aitkin County has been exceptionally active regarding recreational management over the past ten years.

- County Parks and Recreation Ordinance: This multi-faceted ordinance codified many existing and new policies into a single, comprehensive statement to direct management and oversight of county park lands, the Long Lake Conservation Center, and recreational use of lands managed by the county. It also established the duties and authorities of the Park Commission and the ACLD regarding park and recreation activities.
- Comprehensive Recreation Trail Plan: Adopted in 2010 this plan recognizes that proper planning for the development and management of recreational trails is integral to the success of a county recreational trail program. This extensive document establishes the context for recreational trails in the county, sets out a process and procedures for trail planning, devised a trail suitability matrix for assessing where and how trails could be created, and identified types of trails and uses of trails that would be appropriate for the county. The resulting trail management plan addresses roles and responsibilities, public involvement, education and training, monitoring/enforcement/safety, general maintenance, and marketing and promotion.
- Northwoods Regional ATV Trail System: Beginning in 2007 Aitkin and Itasca County have cooperated on what is now called the Northwoods Regional ATV Trail System project. The purpose of the project is to:
 - Development at least 70 miles of new trail.
 - Provide trails with desirable destination points providing a diverse, enjoyable experience for users.
 - Have an environmentally friendly design addressing environmental protection through a comprehensive assessment.
 - Develop local community support through inclusive and transparent public process.
 - Link communities for economic benefits.
 - Enhance enforcement efforts.

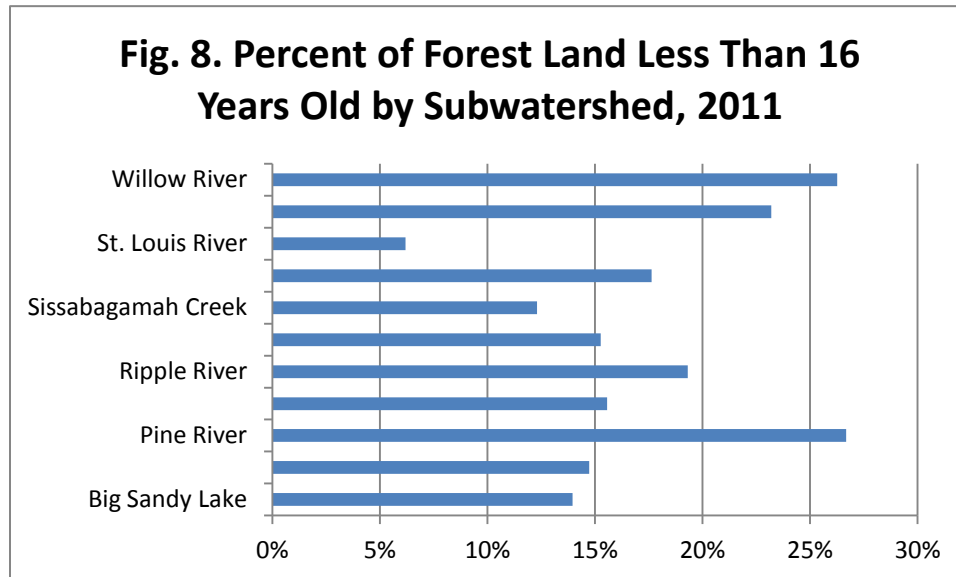
To date several segments of the trail have opened and the next phase of segments is being programmed.

In addition, the county continues to manage a number of recreational facilities including trails, lake accesses, and campgrounds.

Maintain / enhance the quality of water yielded from County land.

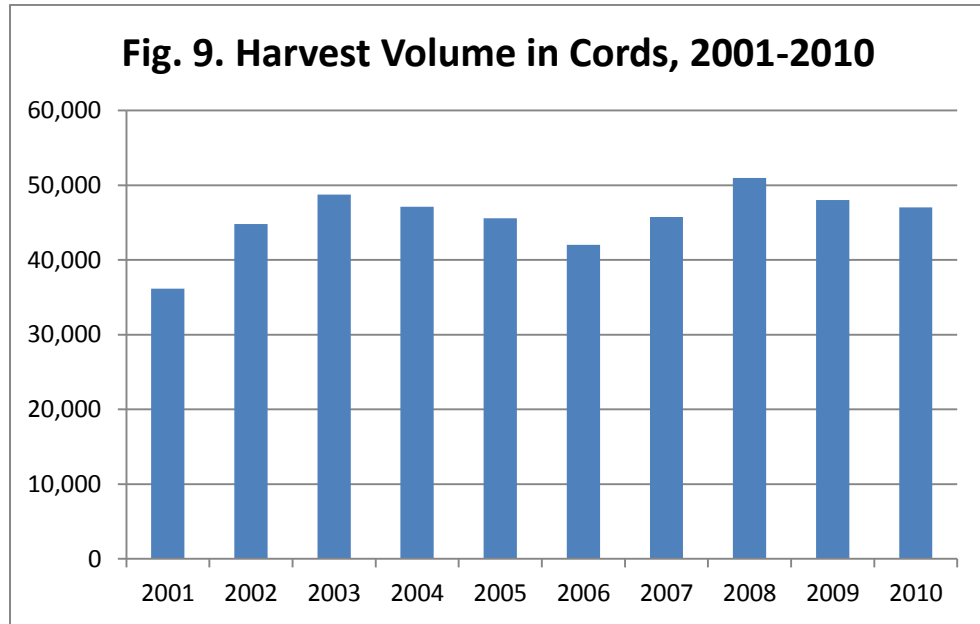
ACLD seeks to protect water quality through a variety of measures. One, as shown in Figure 8, is to keep young forest under 30% of the land base within a subwatershed. A second is to conduct harvests in winter so as to minimize damage to soils and surface vegetation and stream crossings and to minimize runoff and sedimentation; as noted in Table 1, during the past 10 years 66% of all harvests were conducted during the winter. Finally, ACLD applies a variety of site level measures aimed at eliminating or minimizing adverse impacts to surface water at specific harvest sites.

Cover Type	Winter (Frozen)	Summer / Fall (Non-frozen)
Ash / Lowland Hardwoods	98%	2%
Aspen	56%	44%
Birch	20%	80%
Northern Hardwoods	86%	14%
Oak	83%	17%
Pine	5%	95%
Spruce / Fir	41%	59%
Lowland Conifer	100%	0%
Total	66%	34%



Economic benefit

The primary, but not only, economic benefit generated by management of Aitkin County’s forested lands is harvested timber that creates jobs for loggers and provides raw material for area industries. Over the past 10 years ACLD-managed lands have produced over 456,000 cords of harvested wood. The volume produced in the second half of the decade was 5% greater than that generated in the first half.



1.9 2100: The Future Forest

This document updates the 100-year outlook strategic plan adopted by ACLD in 2001. Thus, it retains the year 2100 as the target future forest.

The forest management portion of this plan was devised through a months’ long process of developing and evaluating versions of management regimes all with an eye to achieving ACLD’s strategic objectives. Each management approach was “grown” forward using *Forest View* by PWA®, a proprietary software package created by Pro-West & Associates. This modeling tool provided decade by decade views of the impacts of various management approaches which allowed ACLD to find the combination of actions that best meets its needs and objectives.

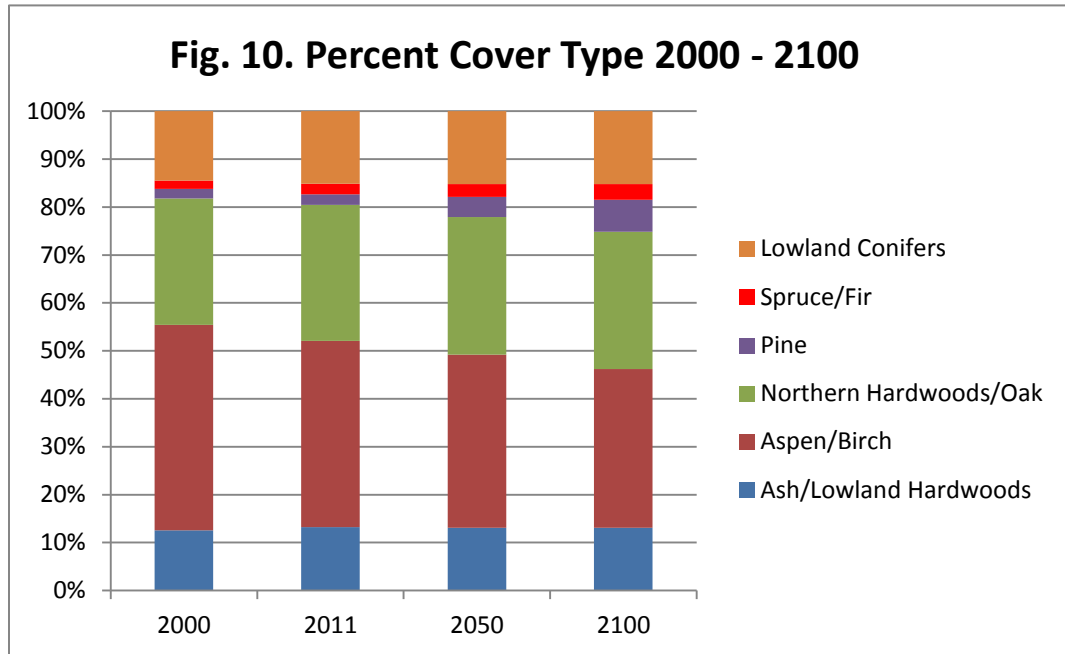
This extensive process produced a strong, balanced three-legged stool of aspen, hardwoods, and pine. Aspen remains the dominant cover type in terms of acres, product and revenue. But it has been reduced in size to be located on the best aspen growing sites. In turn, land best suited for red and white pine and white spruce is converted to those species and as they mature their higher-value product stream comes into play. At the same time, hardwood forests are being rigorously managed through harvests and a heavy dose of intermediate treatments that generate high-value products and vigorous, healthy forests.

The result is a diverse landscape on which forest cover types are better aligned with the land’s ecological potential. This landscape offers a healthy, sustainable mix of habitat, recreational opportunities, and scenic values all while producing a sustainable blend of forest products for county and regional industries.

Figure 10 highlights the changes in forest cover that are anticipated to occur by 2100:

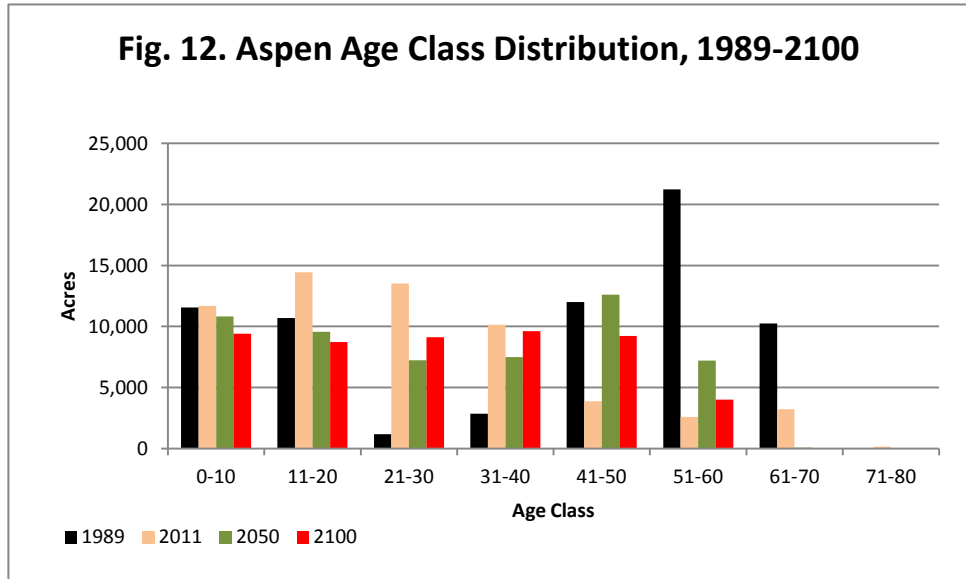
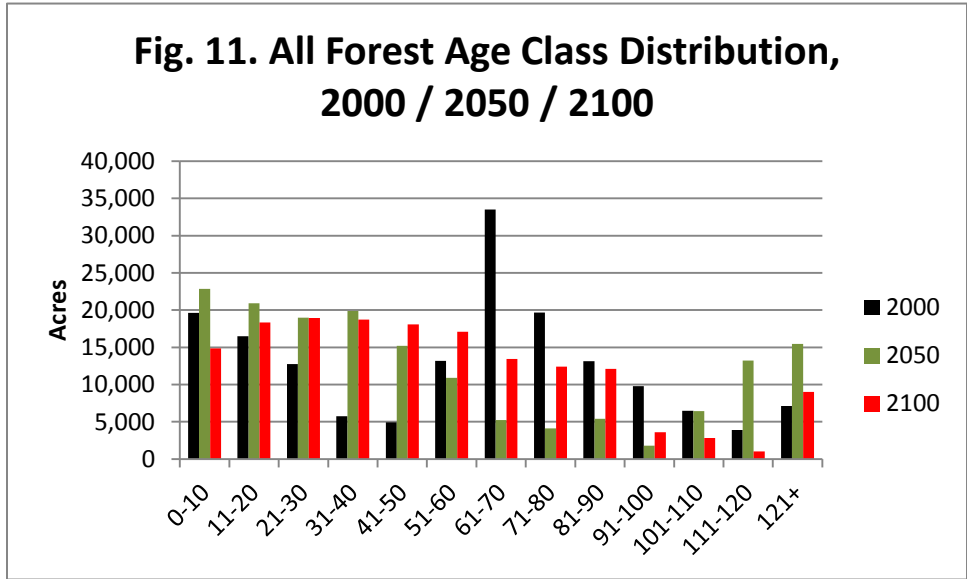
- Aspen forest will decrease from over 60,000 acres to approximately 50,100 acres.
- Birch cover type will hold steady at roughly 2,800 acres. Management will seek to increase birch as a component species in other forest types.

- Oak will also hold steady at about 9,800 acres and increase as a component in northern hardwoods.
- White pine will see a five-fold increase to nearly 2,100 acres.
- Red pine will more than double to almost 8,600 acres.
- White spruce will nearly double to just under 3,700 acres.

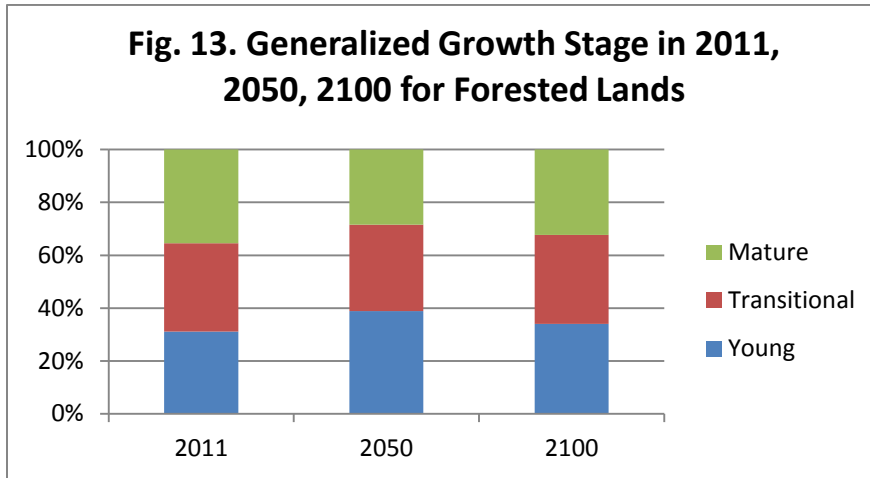


One perspective on this change in the structure of Aitkin’s forest resource is seen in the shifts in age class distribution over the planning period (Figure 11). By 2100 the overall forest is more evenly distributed across age classes providing for a more vigorous, productive, healthy and resilient resource. What cannot be seen from this figure is that the stock of older forest (>120 years old) shifts in terms of forest type; whereas in 2000 these older stands were a mix of all cover types regardless of appropriateness and quality, by 2100 the older forest is comprised of managed stands of northern hardwoods, ash/lowland hardwoods, and lowland conifer.

Figure 12 indicates the change in structure for the valuable aspen cover type. As the number of acres are being reduced through conversion to other forest types, focused managed brings the aspen forest into a desired balance through the first five 10-year age classes with a short “tail” of slightly older stands on prime sites providing opportunities for secondary species and sawlog quality wood.

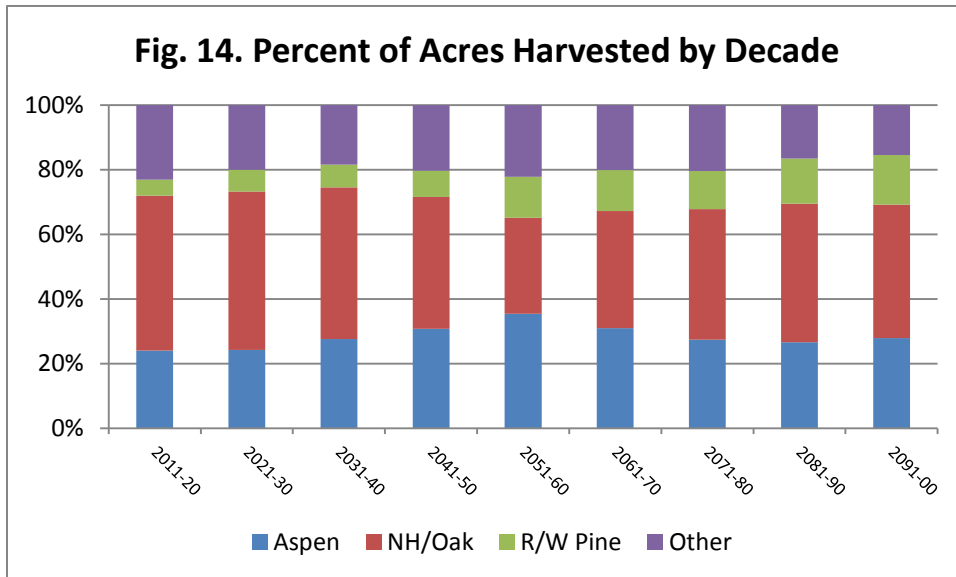


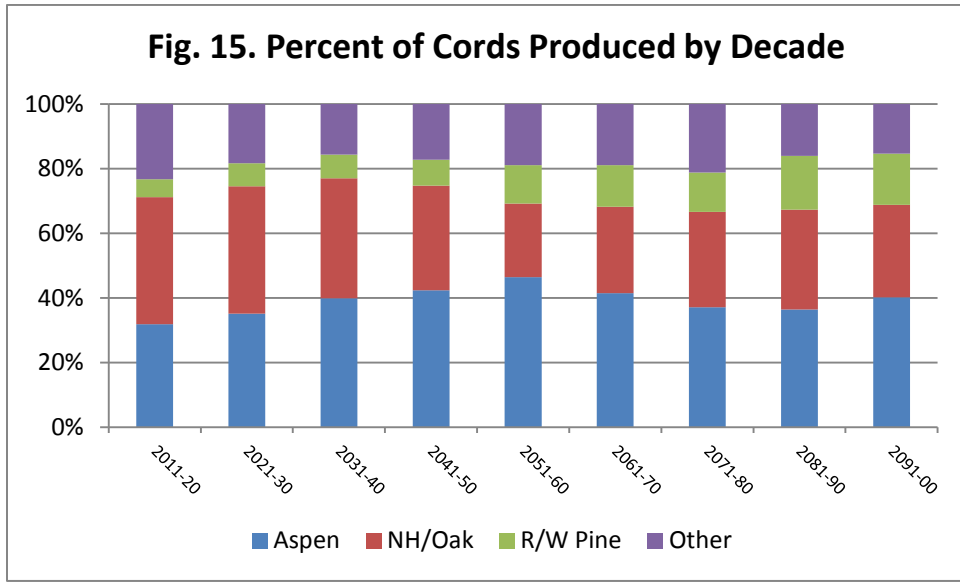
These changes in forest cover type will be undertaken within the structure of ACLD’s Habitat Management Zone concept in order to enhance habitat protection and diversity and water quality. One way of viewing the forest in terms of coarse level habitat is shown in Figure 13, which indicates the amount of “young”, “transitional” and “mature” forest. The comparative amounts fluctuate but remain within good balance throughout the plan period.



The landscape changes just described result from a complex management regime (see Chapter 8) that is summarized in Figures 14 and 15.

- Aspen’s percentage of acres harvested declines.
- Northern hardwood acres fluctuate with 75% of management being intermediate treatments.
- Pine management increases in level as amount of cover type expands and the forest matures. The number of acres managed will nearly triple over the plan period.
- White spruce management increases four-fold as number of acres increase and the forest matures.





The change in the mix of forest types does more than just make for a more diverse landscape. It also allows for a more diverse blend of forest products. By increasing the amount of pine and conifer and by enhancing the vigor of hardwoods, the proposed management approach generates more higher-value product than currently. This provides for higher returns to the county and offers a richer mix of material for county and regional industries. Figure 16 shows how the amount of higher-value bolt / sawtimber / veneer grade wood increases over the plan period.

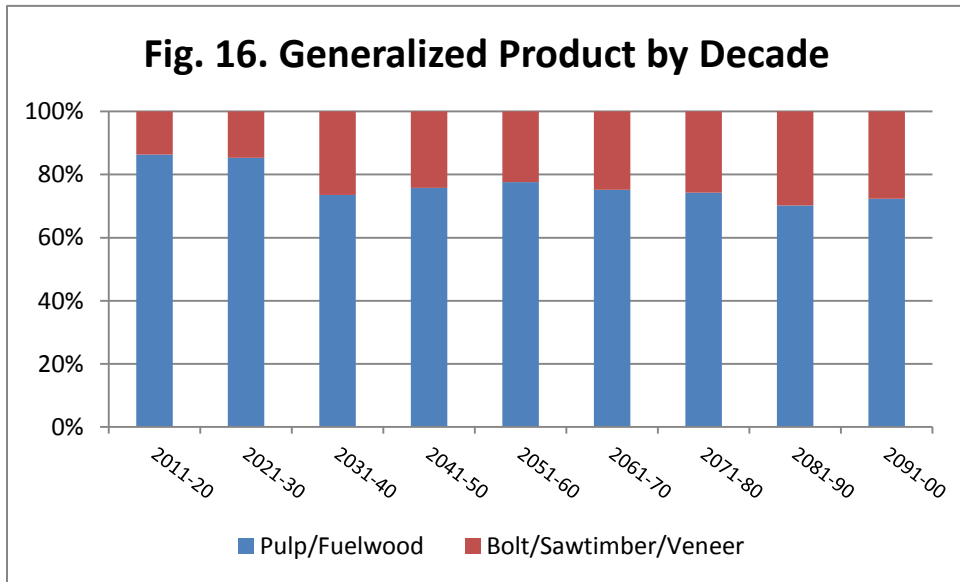
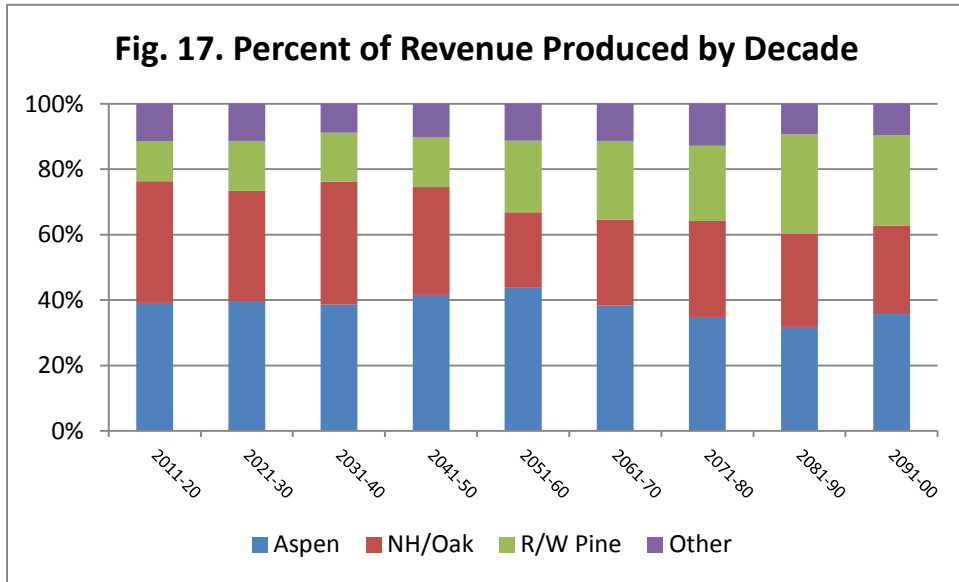


Figure 17 shows how the distribution of revenue generation changes over time. Pine gradually increases in value over time while dependence upon aspen is lessened. The strengthened and more balanced

three-legged resource stool – aspen, hardwoods, pine – provides a more resilient base for ACLD and the local forest products industry.





Chapter 2.0 Understanding the Resource

2.1 Socio-Economic Context

Historical Overview

Aitkin County's management of tax forfeited lands began in the 1930s when massive amounts of land reverted to public ownership through tax forfeiture. This trend continued into the 1940s when an average of 10,000 acres forfeited every year with a high of 29,000 acres in 1945.

The Aitkin County Land Department was created between 1939 and 1942. At first the primary policy was to resell tax forfeited land and place it back on the property tax rolls. Even so, by 1960 the amount of tax forfeited land in Aitkin County rose to 334,000 acres and 41% of previously forfeited land that had been sold had forfeited for the second time (usually after being logged off).

During the early 1960s land sales including a single 50,000 acre sale significantly reduced the amount of tax forfeited land. Fueled by a demand for agricultural, private hunting, and recreation lands, these sales reduced the tax forfeited land base to around 245,000 acres by 1966. Although there was little enthusiasm for additional publicly owned and managed lands, it was at this time that Aitkin County took a different approach to tax forfeited lands.

In 1960 Aitkin County established County Memorial Forests. This decision asserted the intent of Aitkin County to manage its best suited lands for long-term forestry purposes. Then, in 1962, the County established a County Parks Commission and designated 8,000 acres of tax forfeited lands with high recreational and scenic values as parks; another 2,000 acres was added in 1963. Since 1963, additional lands have been designated as memorial forest and/or county park lands.

Aitkin County's role in tourism and conservation/environmental education expanded in the upcoming years. Started in 1963, the Long Lake Conservation Center opened for its first classes in 1965. In 1964 the County constructed camping and boat access points on the Mississippi River at Jacobson, Palisade, and Aitkin. A few years later the Snake River campground was built.

Since that era of transition in management approach, Aitkin County has developed a professional Land Department administering a stable base of roughly 221,500 acres of tax forfeited land. Its management philosophy is directed at the long term sustainability of a diverse, quality forest capable of satisfying a blend of economic, social, and ecological objectives.

Aitkin County Comprehensive Plan

In April 2000 Aitkin County adopted the *Aitkin County Comprehensive Land Use Management Plan* which presented assessments and goals for a variety of issues related to this effort. The plan's introduction summarizes the present situation for Aitkin County:

"Since the first land use plan and County zoning were adopted in the early 1940s, Aitkin County has changed much. The County lost almost one-third of its population in the 1940s and 1950s when the agriculture sector reorganized, but has now entered a new growth era based on natural resource amenities, quality of life, technology, services, and value added resource processing."

Among the outcomes relevant to forestry and public land management the plan seeks to encourage are:

- A strong commercial forestry and agriculture base protected through appropriate zoning measures.
- Better management of the fast expanding rural residential development around the county's lakes and along the rural wooded roadways.
- Continued economic development by expanding and diversifying job opportunities.
- Expanded tourism opportunities, both resource and culture based, especially related to hunting, wildlife observation, and trails.
- Continuation of the County's long standing policies in management of public lands including continuation of the land classification committee, the County park and recreation system, and the pioneering initiatives in sustainable forestry.
- Careful management of the lakes and surrounding watersheds.

Population Trends & Projections

Aitkin County lies in north central Minnesota's rural lake area which has shown steady growth in the past decades and is forecasted to continue to grow. Table 2 shows the dramatic increase in population experienced between 1990 and 2000. That growth continued in the next decade but at a pace that was roughly half what the Minnesota State Demographic Center had projected for 2010. While the county will likely grow through 2020, the level of growth will probably be far less than what has been projected.

Table 2. Aitkin County Population, 1990 - 2020				
	US Census			Projection
	1990	2000	2010	2020*
Population	12,425	15,301	16,202	18,700
Change		2,876	901	2,498
Percent Change		23.1%	5.9%	15.4%

Source: US Census; Minnesota State Demographic Center.

*Projection, which was made in 2007, is probably too high given that SDC's then projected 2010 population was 17,050.

County Economy

The value of Aitkin County's forests is evidenced in Table 3, which shows county economic activity in terms of output and employment for the top 15 economic sectors.

Sector**	Output*	Employment	% of Output	% of Employment
Private hospitals	\$ 34,916,676	273	6.73%	4.58%
Electric power generation, transmission, and distribution	32,035,858	69	6.17%	1.17%
Education (state & local government)	26,286,608	485	5.06%	8.14%
Agriculture & food processing	24,466,936	271	4.72%	4.55%
Wholesale trade businesses	22,059,228	160	4.25%	2.68%
Commercial logging + wood mfrg	20,305,332	160	3.91%	2.68%
Construction of other new nonresidential structures	19,691,474	215	3.79%	3.60%
Food services and drinking places	19,429,584	456	3.74%	7.65%
Monetary authorities and depository credit intermediation activities	15,460,732	67	2.98%	1.13%
Transport by truck	14,335,195	114	2.76%	1.91%
Nursing and residential care facilities	13,395,157	273	2.58%	4.58%
State & local government (non-education)	13,133,328	245	2.53%	4.11%
Steel product manufacturing from purchased steel	11,506,201	20	2.22%	0.34%
Construction of new nonresidential commercial and health care structures	11,311,527	133	2.18%	2.23%
Machine shops	9,282,388	72	1.79%	1.21%
All Other	\$498,895,305	3,236	51.56%	44.70%
Total	\$519,200,637	5,959	100.00%	100.00%

* Includes employee compensation, proprietary income, other income, indirect business taxes. Often is considered a county's "gross domestic production".

**Excludes sector that accounts for imputed rental activity for owner-occupied dwellings.

Source: Minnesota IMPLAN Group 2011³

The value of the forest products industry and its potential for being the focal point of economic development are underscored in the current *Northeast Minnesota Comprehensive Economic Development Strategy 2010* (Arrowhead Regional Development Commission, June 2010). The report identified a number of regional industry clusters around which to build future economic development. Those that pertain to Aitkin County's timber based industry are:

- New Energy Production, Manufacturing and Servicing

³ Data and software: Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55802 (www.implan.com).

- Key subsectors: Biomass, solar, wind, and potential green energy and chemical spinoffs.
- Reason: Builds off of existing regional strengths in forestry, manufacturing and technical expertise.
- Timber, Wood, Paper and Spinoffs
 - Key Subsectors: Forestry, wood product manufacturing, paper manufacturing, and furniture manufacturing.
 - Reason: One of the largest traditional industrial clusters in the region.

The report specifically identified several wood products projects that could be considered for development:

- Dry kiln project: Drying kiln for wood products for use by building materials, furniture, and cabinetry industries.
- Biomass pelletizer: create pellets from local resources for use in biomass generator to power industrial park customers.

Land Ownership Pattern

Over half of Aitkin County’s total land area (including water but not Mille Lacs Lake) is owned by the public. Federal ownership is limited, basically limited to the Rice Lake National Wildlife Refuge. The State owns nearly a third of the county; Savanna Portage State Park is a major component of this while much of the peatlands and lowlands of Aitkin County are in State ownership.

Aitkin County administers nearly one-fifth of the county through direct fee ownership or administration of tax forfeited land. The County’s ownership is scattered across the county although there are areas of concentration, most notably along the western border, the northeast, and in the central southern section.

Table 4. Generalized Landownership in Aitkin County		
Owner	Acres	Percent of Total
Aitkin County*	224,851	19.2%
State	393,962	33.6%
Federal	14,790	1.3%
Private	538,071	45.9%
Total	1,171,673	100.0%

*Includes county administered tax forfeited land.

2.2 Ecological Context

Ecological Classification System

A description of the ecological characteristics of Aitkin County relative to land form and vegetative cover is provided through the use of National Hierarchical Framework of Ecological Units adopted by

various land management entities including Aitkin County⁴. This Ecological Classification System (ECS) provides a series of increasingly smaller and more detailed levels of description of the landscape. It is exceptionally well suited to understanding the potential for forest cover and growth and for framing appropriate strategic and tactical management decisions.

Provinces

As shown in Map A-1, Minnesota is divided into three major ecological provinces each representing distinctive ecological features and processes.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. Aitkin 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). The northern two-thirds of Aitkin County lies in the Northern Minnesota Drift and Lake Plains Section and the southern third is in the Western Superior Uplands Section.

- Northern Minnesota Drift and Lake Plains Section: This section covers the center of northern Minnesota. It has complex surface geology, formed over many episodes of glaciation and is characterized by deep glacial deposits in outwash plains, lake plains, till plains, outwash channels, moraines, and drumlin fields. The patterns of vegetation in this section reflect the complex and patchy distribution of these glacial deposits. Mesic forests of sugar maple, basswood, paper birch, aspen, and northern red oak are widespread. They occur mostly on moraines or till plains characterized by rough topography, fine-textured parent material, or soils with subhorizons that perch snowmelt and rainfall. Historically, forests and woodlands of jack pine and red pine were very common. These fire-dependent communities occur on the sandy outwash plains formed by glacial meltwater. Sandy and gravelly deposits that cap many of the major moraines in the western part of the section provide habitat for mixed forests of pine and boreal hardwood species such as quaking aspen and paper birch. The eastern part of is formed of deposits from glacial lakes Upham and Aitkin. These lake plains have expansive areas of acid peatland communities such as black spruce bogs and poor swamp forests, along with

⁴ McNab, W. H. and P.E. Avers, 1994, Ecological Subregions of the United States: Section Descriptions, US Forest Service publication WO-WSA-5, Washington, D.C.

⁵ The descriptions of Provinces, Sections, and Subsections are from the Minnesota Department of Natural Resources' web site [www.dnr.mn.us/ebm/ecs]; 2011.

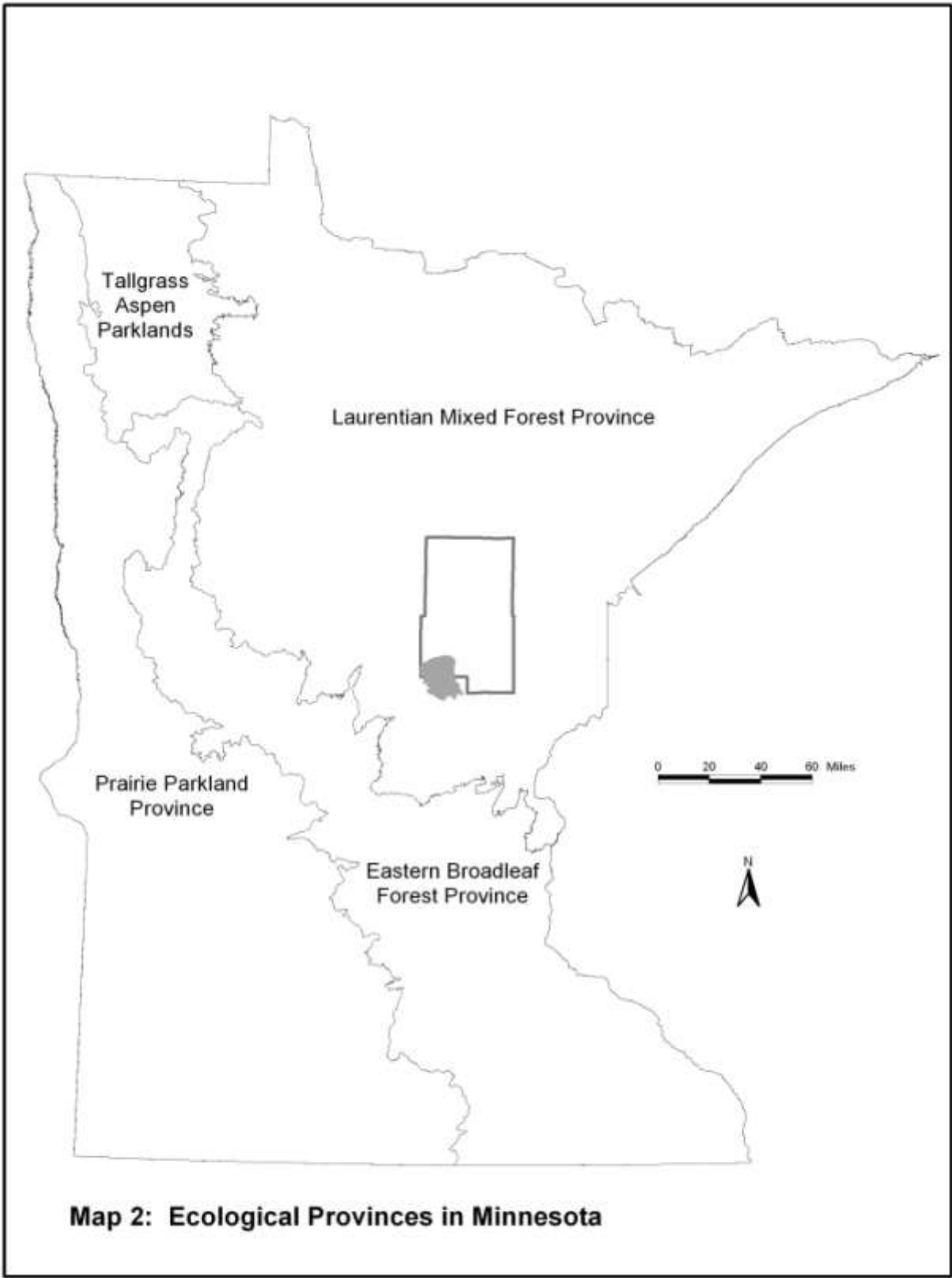
rich swamp forests of white cedar and black ash. Sedge meadows and alder and willow swamps occur along the sluggish streams draining the flat lake plains and along the Mississippi River.

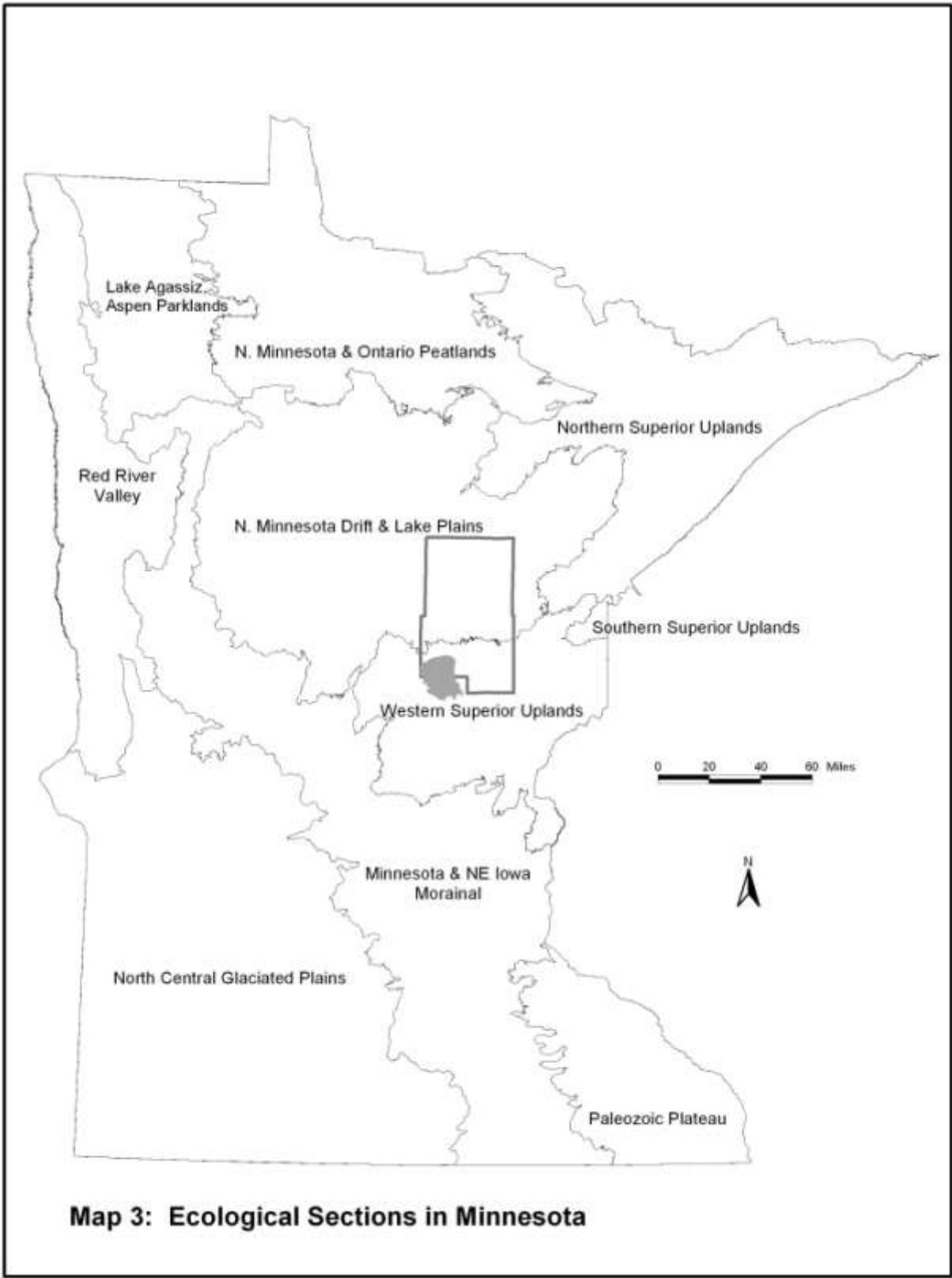
- Western Superior Uplands Section: This is a large region of non-calcareous till deposited by glacial ice that advanced southward from the Lake Superior Basin. Most of this till is deposited in level to undulating ground moraines or in drumlins. These landforms are coarse-textured near the southwestern edge of the section but become increasingly clayey to the northeast because of later, less extensive advances of glacial ice that incorporated clayey sediments from Glacial Lake Duluth with the glacial till. The areas of coarser drift are occupied by forests dominated by northern red oak, while areas of clayey till have forests of sugar maple, aspen, and birch. Sandy terraces along the St. Croix River and small sand plains in other parts of the section have fire-dependent woodlands or forests of jack pine, bur oak, northern pin oak, and aspen. Fire-dependent pine, oak, and aspen forests are also present occasionally with mesic hardwood forests on coarse till and drumlins. Peatlands and other wetland communities are present mostly as inclusions within the broad areas of hardwood forest.

Subsections

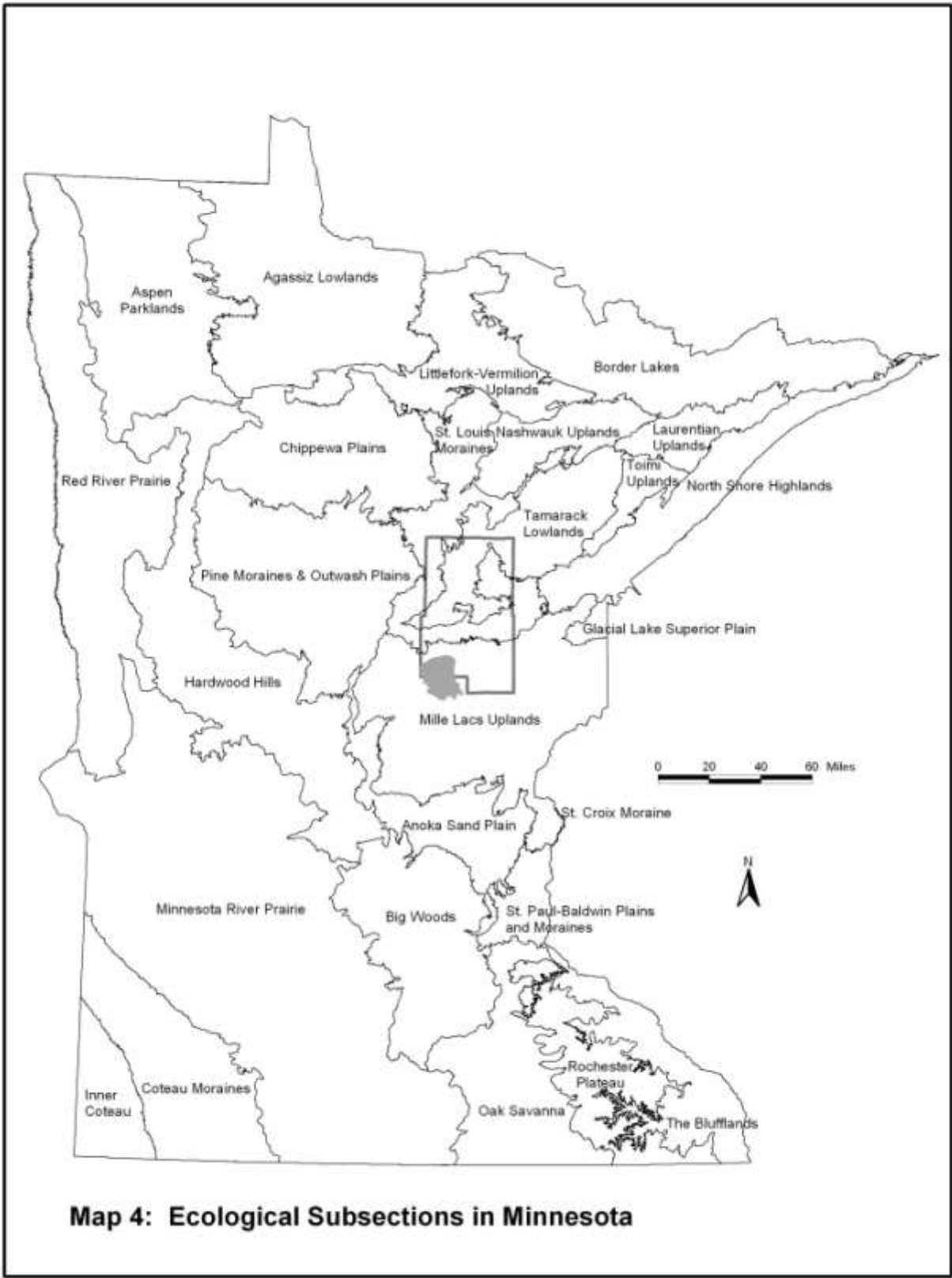
As shown in Map3 the ten sections in Minnesota are divided into 26 subsections of which three cover Aitkin County.

- St. Louis Moraine: Rolling to steep slopes characterize much of this subsection. End moraines are the dominant landform. The Mississippi River cuts this subsection virtually in half. The river flows northwest to southeast close to the north-south midpoint of the subsection. Several small, relatively short rivers are present. They include the Prairie, Willow, Hill, and Moose rivers. The drainage network is poorly developed due to landform characteristics; lakes are numerous. White pine-red pine forest covered large portions of the steep moraines and portions of the pitted outwash along the eastern edge of the subsection. South of Grand Rapids was an area of moraine dominated by northern hardwoods. Aspen-birch forests also grew on the moraines, but were more common on the outwash, which had excessively well drained sandy soils. Mixed hardwood-pine forest was locally present on the moraines, generally near large lakes. Conifer swamp and bogs were scattered throughout the subsection, occupying both kettles and linear depressions in the pitted outwash and moraines
- Tamarack Lowlands: The boundaries of this subsection coincide with the boundaries of the Glacial Lake Upham Plain and the Aurora Till Plain. This is a unique area topographically and climatically. The till plain is included because it forms a relatively flat plain ecologically similar to the adjacent lacustrine plain. Level to gently rolling topography is characteristic of this region. The largest landform is a lake plain. Around the edges of the old glacial lake is a till plain (Aurora Till Plain) formed in Superior lobe sediments. There is also a small piece of end moraine north of Sandy Lake that is related to the St. Louis moraines. Vegetation in the lowlands was dominated by lowland conifers (black spruce, tamarack, and white cedar) and lowland hardwoods (black ash). Sedge meadows were also extensive. Uplands supported aspen-birch and upland conifer forest. White pine-red pine forests were located on the ground moraine at the edges of the lake plain, but were not extensive.
- Mille Lacs Uplands: This subsection covers the large area of Superior Lobe ground moraines and end moraine in east-central Minnesota. Gently rolling till plains and drumlin fields are the dominant landforms in this ecoregion. Mille Lacs Lake is a central feature. The original vegetation consisted of a mosaic of forest types. Along the southern boundary, maple-basswood forests were prevalent. The rest of the subsection was a vast mix of conifer, hardwood and mixed conifer-hardwood forests. Peatland areas were inhabited by sedge-fen, black spruce-sphagnum, or white cedar-black ash communities.





Map 3: Ecological Sections in Minnesota



Map 4: Ecological Subsections in Minnesota

LandType Associations

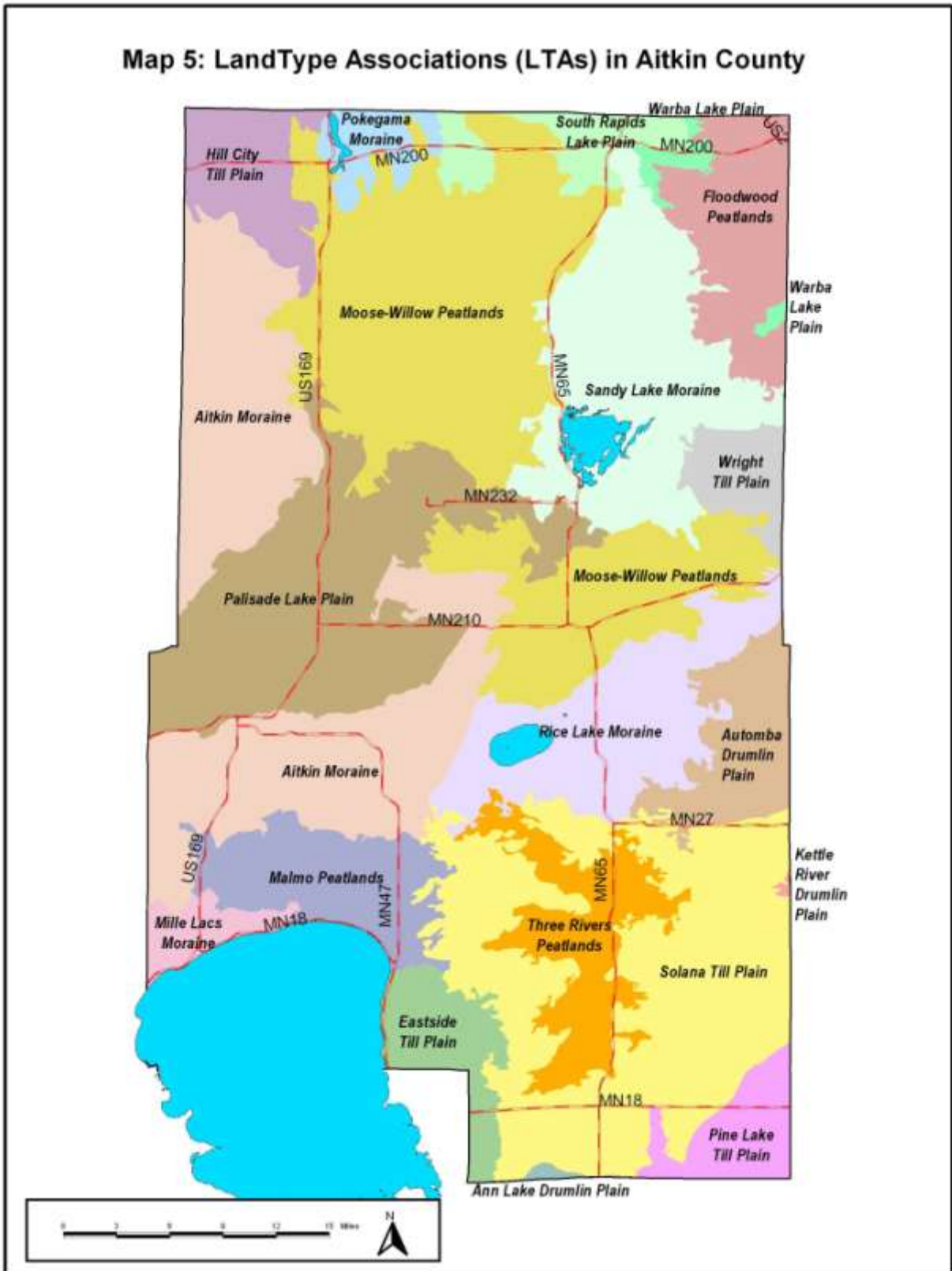
The smallest ecological class above native plant communities to be mapped is the Land Type Association (LTA). This geographic level is well suited to some levels of strategic forest management planning because of its smaller size (50,000-300,000 acres) and more uniform characteristics. LTAs are generally defined by glacial landforms, bedrock types, topographic roughness, lake and stream distributions and types, wetland patterns, and soil parent material.⁶

- St. Louis Moraines Subsection
 - Nb02. Aitkin Moraine: Characterized by hilly terrain and steep slopes. Soil is quite variable, ranging from clay to sand to silt, and is fairly high in nutrients, especially calcium. Uplands occupy 64% of the area, wetlands 22%, and lakes 12%. Area has many lakes of all sizes. White Elk Lake is designated wildlife lake and is a traditional ricing and sugar bush area. Stream density is .44 miles/square mile of land; 239 miles of stream.
 - Nb05 Sugar Hills Moraine: Characterized by areas of hilly terrain with steep slopes separated by areas of level to gently rolling terrain. Quadna Mountain, the highest point in the county, is located in this LTA. Uplands occupy 77%, wetlands 14% and lakes 6%. Soil materials are a mixture of sand and loam. Taylor Lake and Morrison Brook are managed trout waters. Stream density is .46 miles/square mile of land; 90 miles of stream.
 - Nb10 Sandy Lake Moraine: Characterized by very hilly terrain with steep slopes. Uplands occupy 59% of the LTA, small peatlands 24%, and lakes 14%. Soil material is loamy or clayey and is fairly high in nutrients, especially calcium. Big Sandy Lake and associated waterways is a dominant feature. Stream density is .42 miles/square mile of land; 80 miles of stream.
 - Nb11 Wright Till Plain: Characterized by gently rolling hills. Uplands occupy 63% and wetlands 36%. Stream density is .54 miles/square mile with 61 miles of stream. Soils are clay loam in the northwest and sandy loam in the southeast.
 - Nb12 Hill City Till Plain: Characterized by nearly level to gently rolling topography. Uplands occupy 75% and wetlands 21%. Several large and many medium to small bogs are in area. Stream density is .56 miles/square mile with 99 miles of stream. Soil materials consist of even mixture of sand, silt and clay with few stones.
 - Nb13 Rice Lake Moraine: Characterized by nearly level to gently rolling terrain mixed with wetlands. Uplands occupy 69%, wetlands 23% and lakes 6% of the area. Stream density is .48 miles/square mile with 58 miles. Soil material is clay loam and loam. The Rice Lake National Wildlife Refuge is the dominant feature.
 - Nb19 Lawler Till Plain: Characterized by rolling hills punctuated with long, steep, cigar-shaped ridges called drumlins. Uplands occupy 55% and wetlands 43% of the area. Stream density is .51 miles/square mile with 82 miles. Soil materials consist of even mixture of sand, silt and clay with few stones
- Tamarack Lowlands Subsection
 - Nd01(n) Moose-Willow Peatlands: Characterized by large peatlands with scattered upland islands. Wetlands occupy 67% and uplands 31% of the area. Stream density is 1.1 miles/square mile with 381 miles. Upland soils are loamy and sandy in texture and often are wet.

⁶ Descriptions of LTAs are from *Aitkin and Hill City DNR Forestry FY 2000-04 Comprehensive Forest Resources Tactical Plan* (draft), prepared by the Minnesota DNR.

- Nd01(s) McGregor Peatlands: Characterized by a flat landscape composed of large peatlands with scattered upland islands. Wetlands occupy 66% and uplands 31% of the area. Stream density is 1.1 miles/square mile with 381 miles. Upland soils are loamy and sandy in texture and often are wet.
 - Ndo2 South Rapids Lake Plain: Characterized by rolling hills dotted with many small peatlands. Uplands occupy 53% and wetlands 42% of the area. Upland soil material is loamy in texture.
 - Nd03 Floodwood Lake Plain: Characterized by large peatlands with ridges and clusters of small upland islands (created by blowing sand deposited during last glacial era). Peatlands reach depths of 30 feet and are crisscrossed by drainage ditches. Wetlands occupy 89% of the area. Stream density is .8 miles/square mile with 380 miles. The LTA is split by the Continental Divide. Wildlife includes Great Gray owls, moose and gray wolves.
 - Nd04 Warba Lake Plain: Characterized by rolling hills dotted with many small peatlands. Uplands occupy 63% and wetlands 33% of the area. Stream density is high at 1.2 miles/square mile (few of these in Aitkin County and there are no lakes or large streams)..
 - Nd08 Palisade Lake Plain: Characterized by large peatlands with islands of uplands. Uplands occupy 70% and wetlands 25%. Stream density is 1.4 miles/square mile with 330 miles. Soil material is loamy or sandy in texture; most of it is wet.
- Mille Lacs Uplands Subsection
- Kb03 Malmö Outwash Plain: Characterized by level to gently rolling terrain. Uplands occupy 60%, wetlands 34% and lakes 3% of the area. Stream density is high at .63 miles/square mile with 46 miles. Upland soils are sandy loam or sand and gravel.
 - Kb05 Eastside Till Plain: Characterized by rolling to hilly terrain; steep slopes separated by areas of level to gently rolling terrain. Uplands occupy 76% and lowlands 24%. Stream density is low at .39 miles/square mile with 39 miles. Soils in hilly areas are loamy; level areas are mostly sand.
 - Kb06 Three Rivers Peatland: Characterized by level rolling terrain and wetlands. Wetlands occupy 75% of the area; uplands 24%. Stream density is high at .68 miles/square mile with 50 miles. Large peatlands are common. Area is source for three rivers: the Snake, Rice, and Split Rock (Kettle).
 - Kb07 Solana Till Plain: Characterized by extensive wetlands, gradually rising to uplands in some areas, with occasionally hilly terrain. Uplands occupy 75% and wetlands 25% of area. Stream density is .46 miles/square mile with 128 miles of stream. Soil is variable from loam to sand.
 - Kb08 Pine Lake Till Plain: Characterized by rolling hills. Uplands occupy 85% and wetlands 10% of the area. Stream density is high at .79 miles/square mile with 115 miles. Soil material is variable and ranges from loam to sandy loam. Natural white pine regeneration is occurring in this area.
 - Kb09 Unnamed: Characterized by rolling hills. Only 1,100 acres in county. Uplands occupy 74% and wetlands 25% of area. Overall stream density is .85 miles/square mile with 476 miles of stream.

Map 5: LandType Associations (LTAs) in Aitkin County



- Kb28 Kathio Moraine: Characterized by rolling to hilly terrain with steep slopes. Uplands occupy 72%, wetlands 12% and lakes 13% of the area. Isolated small peatlands are common. Stream density is low at .2 miles/square mile and 19 miles. Roads and trails occupy 4% of the area. Soils are variable ranging from loam to sand and gravel.

Native Plant Communities / Forest Ecological Systems

The smallest geographic unit within the Ecological Classification System is the native plant community (NPC). The MnDNR, which has identified the NPCs within Minnesota, defines NPC as “a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable units, such as oak savannas, pine forests, or marshes, that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. Examples of natural disturbances include wildfires, severe droughts, windstorms, and floods.”⁷

The 2001 forest management plan included the mapping of what were then labeled forest ecological systems (FES). That process was similar to subsequent efforts elsewhere in Minnesota to map NPCs. Since then, Aitkin County has “cross walked” its FES designations to NPCs but pending undertaking a comprehensive new NPC-based mapping effort, ACLD continues to use its FES designations but with the added information provided by the NPCs.

Map 6 shows the distribution of FESs within the county. The following narrative lists the FESs and briefly describes the major NPCs likely found within each FES.⁸ In many cases two NPCs are listed for a single FES; these are situations where the FES designation probably included two closely related NPCs with one set prevalent in the northern portion of the county and the other in the southern portion (these have “c” and “Central” in their names).

- Dry-Mesic Hardwood-Conifer

FDn43 Fire Dependent: Northern Mesic Mixed Forest: Mesic pine, aspen, white cedar, or birch forests on loamy soils over bedrock in scoured bedrock uplands and on loamy, rocky, or sandy soils on glacial moraines, till plains, and outwash plains. Crown and severe surface fires were common historically.

MHc26 Mesic Hardwood: Central Dry-Mesic Oak-Aspen Forest: Dry-mesic hardwood or, rarely, hardwood-conifer forests, usually with northern red oak as a canopy dominant. Present on well-drained loamy or sandy soils, primarily on stagnation moraines and less frequently on till plains or glacial river terraces.

- Dry Mesic Conifer

FDn33 Fire Dependent: Northern Dry-Mesic Mixed Woodland: Dry-mesic conifer, conifer-hardwood, or hardwood woodlands dominated by red pine, white pine, jack pine, black spruce, quaking aspen, or paper birch. Most common on sandy soils but also present on shallow, loamy soils over bedrock. Crown and surface fires were common historically.

FDc34 Fire Dependent: Central Dry-Mesic Pine-Hardwood Forest: Dry-mesic pine, hardwood, or pine-hardwood forests on hummocky glacial moraines, often adjacent to outwash plains. Crown fires and mild surface fires were common historically.

⁷ <http://www.dnr.state.mn.us/npc/index.html>, 2011 Minnesota Department of Natural Resources.

⁸ For more information on NPCs see previously cited MnDNR website or “Field Guide to the Native Plant Communities of Minnesota The Laurentian Mixed Forest Province”, MnDNR August 2003.

- Mesic Mixed Hardwood

MHn35 Mesic Hardwood: Northern Mesic Hardwood Forest: Mesic to dry-mesic hardwood forests on well-drained to moderately well-drained loamy soils, most often on stagnation moraines and till plains and less frequently on bedrock hills.

MHc36 Mesic Hardwood: Central Mesic Hardwood Forest: Mesic hardwood forests dominated by basswood, northern red oak, and sugar maple. Present on loamy or sandy loam soils on hummocky stagnation moraines and rolling till plains.

- Mesic Northern Hardwood

MHn47 Northern Rich Mesic Hardwood Forest: Mesic hardwood forests on well-drained to somewhat poorly drained, rich loamy soils on glacial drift and till in areas of undulating to hummocky topography.

- Wet Mesic Boreal Hardwood-Conifer

MHn44 Mesic Hardwood: Northern Wet-Mesic Boreal Hardwood-Conifer Forest: Wet-mesic or mesic hardwood and hardwood-conifer forests, most commonly on level, clayey sites with high local water tables on glacial lake deposits, stagnation moraines, and till plains.

- Wet Mesic Hardwood

MHn46: Mesic Hardwood: Northern Wet-Mesic Hardwood Forest: Wet-mesic, lowland hardwood forests on level sites with clayey subsoils or high local water tables.

MHc47 Mesic Hardwood: Central Wet-Mesic Hardwood Forest: Wet-mesic hardwood and hardwood-conifer forests on somewhat poorly drained sandy loam soils on till plains and stream terraces. Soils are saturated for prolonged periods, either because of clayey subsoil horizons that impede drainage or because of high local water tables.

- Wet-Mesic Lowland Hardwood

FFn57 Floodplain Forest: Northern Terrace Forest: Wet-mesic deciduous forests on silty or sandy alluvium on level, occasionally flooded sites along medium and large rivers in the northern half of Minnesota.

FFn67 Floodplain Forest: Northern Floodplain Forest: Deciduous riparian forests on sandy or silty alluvium on low, level, annually flooded sites along medium and large rivers in central and northern Minnesota. Community is characterized by pools and evidence of recent flooding, such as windrowed debris, ice scars on trees, and freshly deposited silt and sand.

- Organic Hardwood-Conifer

WFn64 Wet Forest: Northern Very Wet Ash Swamp: Wet hardwood or hardwood-conifer forests on peaty soils in small closed depressions or around the edges of large peatlands. Typically with standing water present throughout spring and summer.

WFn55 Wet Forest: Northern Wet Ash Swamp: Wet hardwood forests on mucky mineral soils in shallow basins and groundwater seepage areas or on low, level terrain near rivers, lakes, or wetlands. Typically with standing water in the spring but draining by late summer.

- Organic Lowland Conifer

APn80: Acid Peatland: Northern Poor Conifer Swamp: Black-spruce-dominated peatlands on deep peat. Canopy is often sparse, with stunted trees. Understory is dominated by ericaceous shrubs and fine-leaved graminoids on high Sphagnum hummocks.

FPn82 Forested Rich Peatland: Northern Rich Tamarack Swamp: Tamarack-dominated swamps on moderately deep to deep peat in basins on glacial till or outwash deposits, or occasionally along the margins of large peatlands on glacial lake plains or on floating mats along lake or river shores.

Table 4 shows the distribution of FESs within the county and Map 6 depicts their locations on tax forfeited lands.

Table 4. Estimated Distribution of Forest Ecological Systems on Aitkin County Tax Forfeited Lands, 2011		
Forest Ecological System	Acres*	% of Total
Dry-Mesic Hardwood-Conifer	22,940	10.3%
Dry-Mesic Conifer	5,798	2.6%
Mesic-Mixed Hardwood	37,289	16.8%
Mesic Northern Hardwood	24,524	11.0%
Wet-Mesic Boreal Hardwood-Conifer Forest	16,845	7.6%
Wet-Mesic Lowland Hardwood	3,287	1.5%
Wet Mesic Hardwood	13,606	6.1%
Organic Hardwood-Conifer	39,525	17.8%
Organic Lowland Conifer	58,727	26.4%
Total	222,541	100.0%

*70 acres have an undesignated FES.

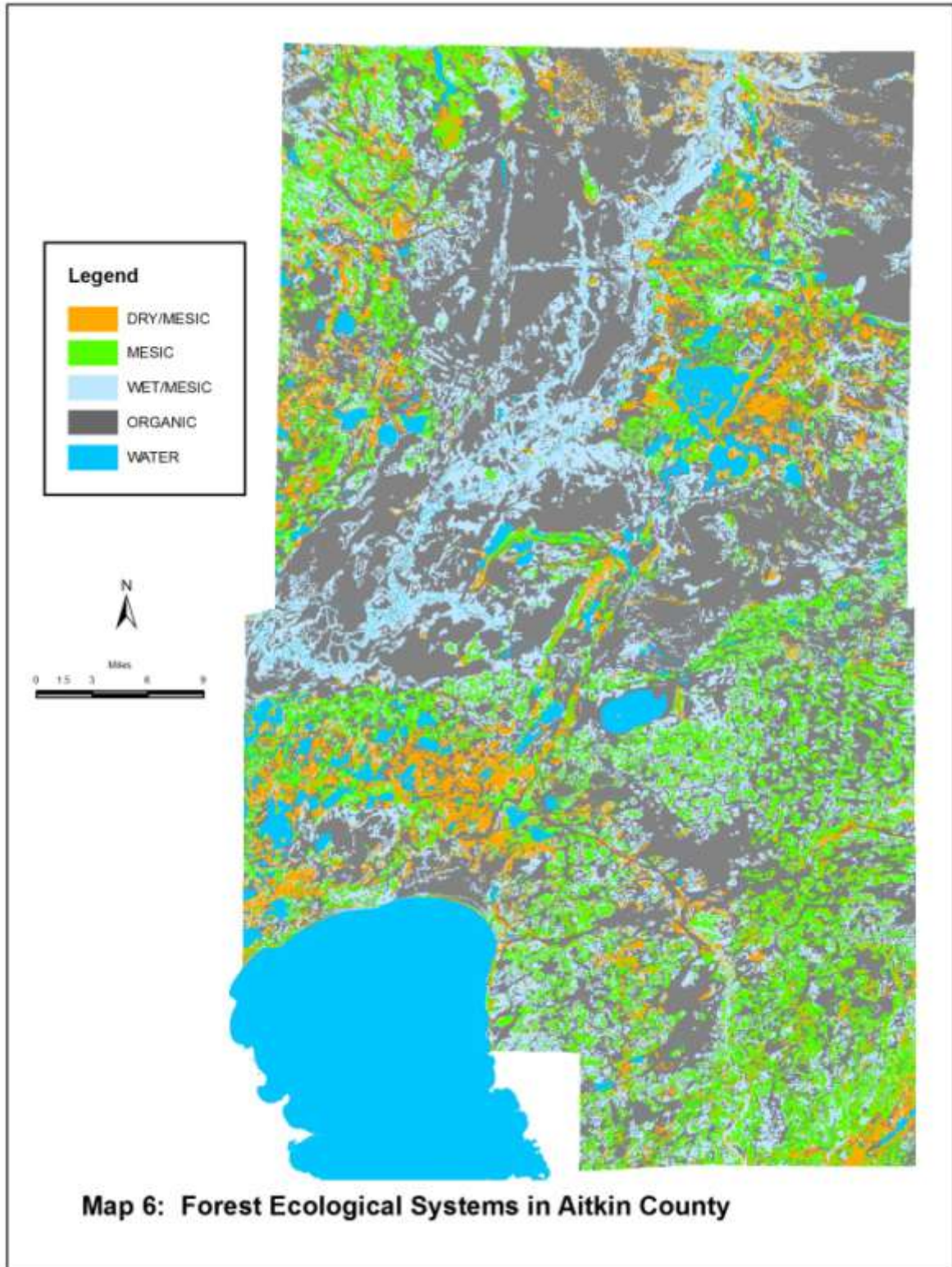


Table 5 presents the distribution of forest cover types by FES.

Cover Type	Dry Mesic Hdwd/Con	Dry Mesic Conifer	Mesic Mixed Hdwd	Mesic No. Hdwd	Wet Mesic Boreal Hdwd/Con	Wet Mesic Lowland Hdwd	Wet Mesic Hdwd	Organic Hdwd/Con	Organic Lowland Conifer
Ash	5		300	423	645	332	280	10,848	4,289
Lowland Hardwoods	24		226	285	317	1,633	369	918	155
Aspen	11,123	3,313	16,582	10,699	9,879	359	7,412	21	
Birch	550	104	1,140	555	247	11	197		
Balm of Gilead				20	51	8	17	8	6
Northern Hardwoods	6,585	709	12,125	8,980	3,182	357	3,765	76	
Oak	2,184	189	4,815	1,450	461	117	604		
White Pine	169	116	10	25	30		16		
Red Pine	826	828	659	426	236		160		
Jack Pine	25	22					9		
White Spruce	508	171	488	325	267	31	156		
Balsam Fir	250	134	33	183	499	5	87	211	35
Black Spruce, lowland			31	48	93		15	2,323	6,814
Tamarack	9		129	71	174		56	2,433	9,501
White Cedar				93	57			2,101	411
Black Spruce, upland	38	18	3	34	40				
Total	24,480	5,604	41,356	25,067	16,178	2,853	13,143	18,939	21,211

Forest Dynamics

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

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

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

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

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

The previous section discussed the potential of the land to grow forests as expressed in native plant communities. The following narrative focuses on understanding key forest dynamics as they relate to forest management.

Forest Succession

It is deemed important to the health and vitality of the forest, and all that is supported ecologically and economically by it, that the county's forested lands possess the full range of development or growth stages. Forests change or succeed from one stage of development to another over time; the agent of change can be natural, such as fire, or human, such as logging and deliberate fire. The basis for a concern to pattern the current forest after the historical forest 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."¹⁰

The basic pattern of forest succession involves four major phases:¹¹

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

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

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

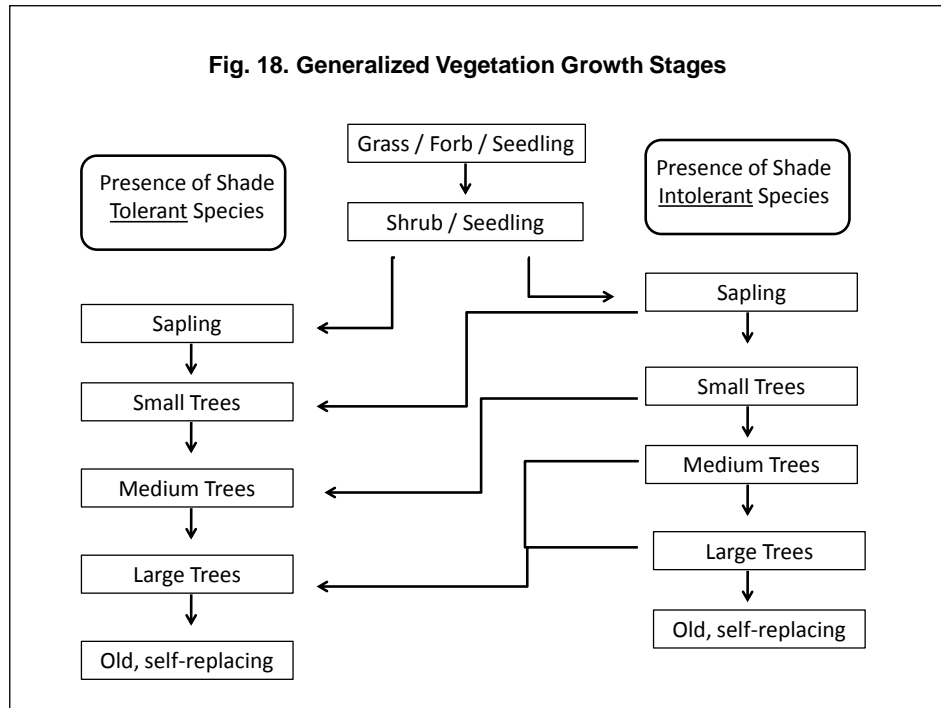
Mature/Shifting Mosaic: is "characterized by a shifting pattern of relatively small patchy disturbances (death of individual canopy trees or groups of trees forming gaps of various sizes and shapes) which provide resources for new establishment of trees in the understory and increased height growth of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

¹⁰ Hunter, Malcolm, Jr., *Principles of Ecological Forestry*, in *Maintaining Biodiversity in Forest Ecosystems*, edited by Malcolm Hunter, Jr., Cambridge University Press, 1999.

¹¹ 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.

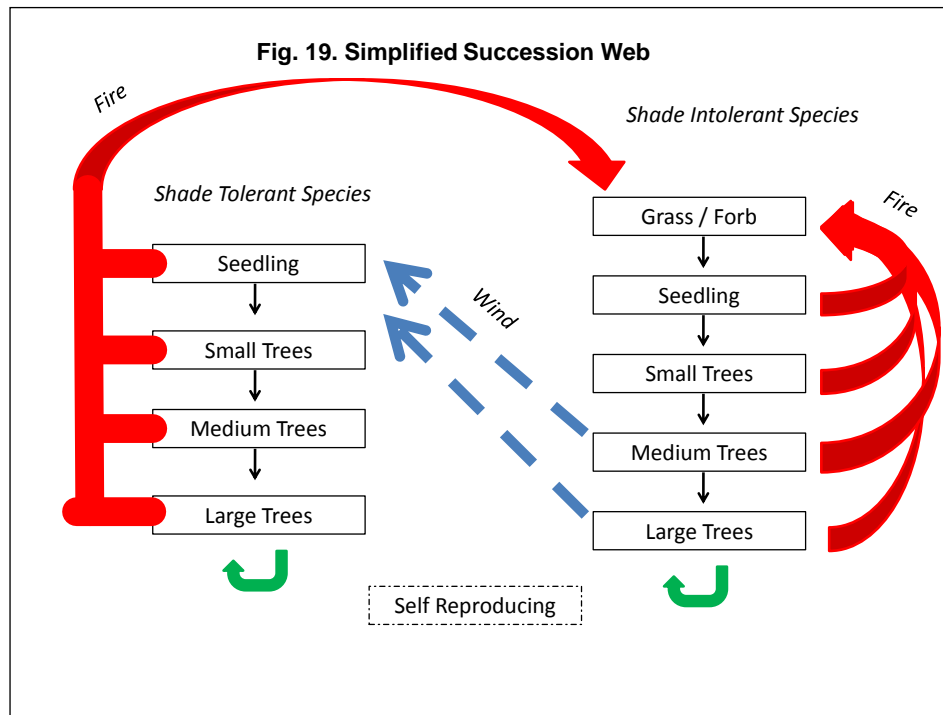
logging and natural disturbances have occurred more frequently than the average life span of the dominant tree species.

The term **Vegetation Growth Stage (VGS)** is used to describe the current condition of a forest and its potential for change through succession. It combines successional and developmental stages that occur after disturbance, where successional stage refers to changes in species composition over time and developmental stage refers to stand structure over time. The primary growth stages are: grass / forb / seedling; shrub / seedling (seedlings and shrubs now dominate the site); sapling (dense stands of trees less than 2" in diameter); small trees (trees are thinning out in number as size increases to 2-5" in diameter); medium trees (dominant trees are 5-9" in diameter while an understory is developing); large trees (dominant trees are 9-12" in diameter and understory is developed); old, self-replacing (dominant trees exceed 12" in diameter and capable of replacing themselves within the current forest structure). The stages are split between shade intolerant species (e.g., aspen, birch, tamarack) and shade tolerant ones (e.g., maple, basswood, balsam fir). Sites dominated by shade intolerant species at one stage may succeed to a shade tolerant stand as the under-story trees come to dominate the site. Figure 18 summarizes the stages and potential direction of change.



Patterns of Forest Succession

The linear description of succession above does not take into account the impact of disturbance. As shown in Figure 19 in a natural state absent intervention by humans, fire and wind play the major roles in altering the forest landscape. Any stand can be affected by fire at any time and, in effect, have its successional cycle reset. Stands at the small tree stage or beyond are susceptible to wind damage, which resets succession back to the seedling or sapling stage and favors shade tolerant species if are present on the site.



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

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

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

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

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

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

Table 6 shows the distribution of forested cover types on Aitkin’s tax forfeited lands by generalized vegetation growth stage.

Table 6. Generalized Vegetation Growth Stages by Ecological System/Native Plant Community, 2011 (acres)				
Ecological System	Native Plant Community	Young	Transition	Mature
Dry Mesic	FDn43	13,711	13,389	797
	MHC26			
	FDn33			
	FDc34			
Mesic	MHn35	24,009	32,916	3,201
	MHc36			
	MHn47			
Wet Mesic	MHn44	14,486	15,352	2,336
	FFn57			
	FFn67			
	MHn46			
	MHc47			
Organic	WFn64	9,878	10,074	20,178
	WFn55			
	APn80			
	FPn82			
Total		62,084	71,731	26,512

Watersheds

Aitkin County has long considered water related values in its forest management activities. Policies and recommendations of the county’s water management plan are followed and the ACLD provides information to watershed districts and lake associations regarding forest activity in their areas.

As shown in Table 7 there are 11 watersheds in the county and County ownership within them is relatively small. Where County ownership is larger, only a small portion of the affected watershed lies within Aitkin County (e.g., Pine, Snake, and Kettle). The minimization or prevention of adverse impacts on watersheds and along specific water bodies is a key element of ACLD management.

Table 7. Ownership within sub-watersheds in Aitkin County, 2011 (acres)						
	Private	State	Federal	County	Total	% of County
Big Sandy Lake	76,492	64,767	303	26,026	167,589	14%
Kettle River	27,329	18,226		21,265	66,820	6%
Pine River	841	1,554		9,231	11,625	1%
Rice River	89,873	40,371	14,430	38,241	182,915	16%
Ripple River	45,271	9,816		554	55,641	5%
Rum River	45,167	4,700		13,165	63,032	5%
Sissabagamah Creek	27,133	1,487	0	935	29,555	3%
Snake River	46,832	38,185		48,249	133,266	11%
St. Louis River	457	41,525		3,524	45,505	4%
Upper Mississippi	111,702	68,021	43	31,889	211,656	18%
Willow River	66,974	105,309	14	31,773	204,069	17%
Totals	538,071	393,962	14,790	224,851	1,171,673	100.0%

2.3 Land Ownership

Over the past 60 years the amount of tax-forfeited land peaked in Aitkin County at 334,000 acres in 1960. A policy of aggressive land sales quickly reduced that number to 245,000 acres in 1966. Since then, in keeping with County policy to retain and manage these lands for the betterment of the county's economy and for use by residents, the number of acres has remain essentially unchanged. There is currently about 221,500 acres of tax forfeited lands in Aitkin County. The County has the goal of sustaining its tax forfeited land base for the purpose of meeting its management objectives. The fact that the objective has been met is seen in the following:

- In 1980 the tax forfeited acres were 221,368. They were 222,733 in 1990; 222,258 in 2000; and 221,494 in 2010.
- During those 30 years, the lowest amount of acres was 220,774 and the highest was 222,765.

Currently, the County owns about 19% of the total area of Aitkin County. Private ownership accounts for 46% followed by the State (34%) and the Federal government (1%).

Not all tax-forfeited land is forested or, if forested, capable of producing commercial products. Table 8 indicates the number of tax-forfeited acres in basic categories.

Table 8. Generalized Cover Types, Aitkin County Tax-Forfeited Land, 2011		
Cover	Acres	% of Total
Commercial forest	160,653	72.3%
Stagnant lowland conifer	12,452	5.6%
Lowland grass	10,121	4.5%
Upland grass	656	0.3%
Lowland brush	17,179	7.7%
Upland brush	72	<0.1%
Agricultural	166	0.1%
Industrial development	635	0.3%
Roads	287	0.1%
Recreational development	13	<0.1%
Permanent water	867	0.4%
Non-permanent water	7,283	3.3%
Marsh	3,690	1.7%
Muskeg	8,521	3.8%
Other	16	<0.1%
Total	222,611	100.0%

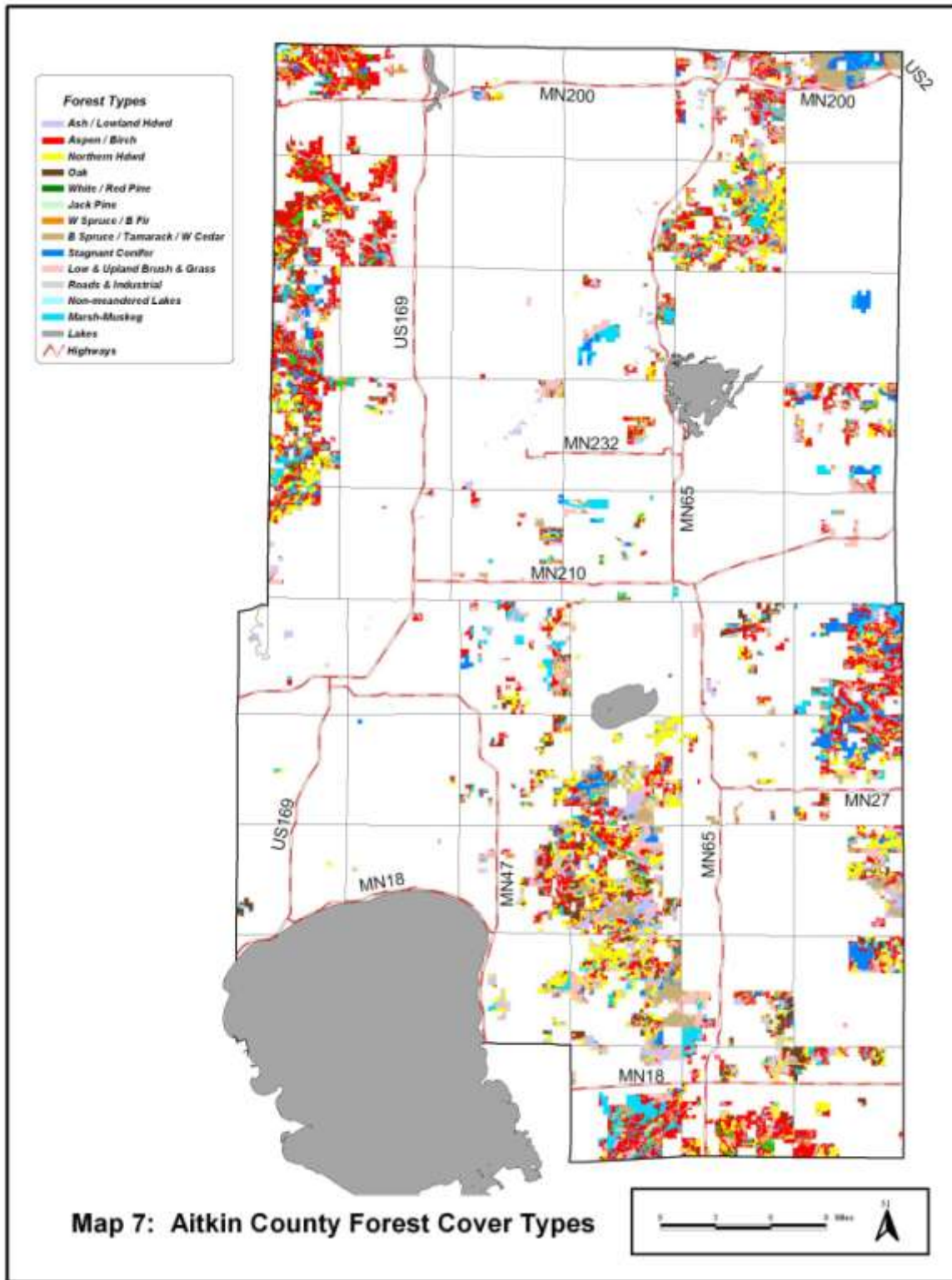
2.4 Commercial Forest Cover Type

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

One way to understand forest cover types is to view their distribution by age class (in 10 year increments). Age class distributions can indicate the expected flow of harvestable trees, the character of the forests (young versus old), and stands that may be naturally succeeding into other cover types. Table 9 shows the age class distributions for commercial forestlands on Aitkin County’s tax-forfeited lands in 2011.

Table 9. Distribution of Selected Forest Cover Types on Aitkin County Tax Forfeited Lands by 10-Year Age Class, 2011

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	78	55	284	180	43	50	138	461	1,713	3,372	3,613	2,432	4,703	17,122
Lowland Hardwoods	0	0	2	0	29	47	336	631	769	1,018	575	381	339	4,127
Aspen	11,684	14,434	13,529	10,152	3,890	2,588	3,221	161	0	0	0	0	0	59,659
Birch	132	71	0	20	0	4	208	1,337	885	119	28	0	0	2,804
Balm of Gilead	0	0	0	21	0	8	28	17	36	0	0	0	0	110
Northern Hardwoods	247	236	382	345	254	261	3,517	14,094	8,811	3,968	2,323	862	479	35,779
Oak	18	7	31	28	0	0	611	3,485	5,186	450	4	0	0	9,820
White Pine	216	2	0	0	32	0	0	0	21	31	23	40	1	366
Red Pine	318	260	1,226	242	562	175	6	55	39	130	79	42	1	3,135
Jack Pine	19	0	18	0	14	5	0	0	0	0	0	0	0	56
White Spruce	722	478	330	63	237	81	35	0	0	0	0	0	0	1,946
Balsam Fir	82	198	67	52	95	177	361	242	97	54	12	0	0	1,437
Black Spruce, upland	0	0	123	0	0	0	0	0	10	0	0	0	0	133
Tamarack	488	112	312	817	488	416	820	1,410	986	1,147	1,464	716	3,197	12,373
White Cedar	0	0	0	0	0	0	0	28	58	366	490	461	1,259	2,662
Black Spruce, lowland	127	216	122	329	1,885	497	546	737	1,181	1,291	1,156	470	767	9,324
Total	14,131	16,069	16,426	12,249	7,529	4,309	9,827	22,658	19,792	11,946	9,767	5,404	10,746	160,853





Chapter 3.0 Department Administration

3.1. Assessment

Flow of Authority

Tax forfeited land is land 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 Aitkin County. Primary legislative guidance is set forth in MS 282. There is approximately 221,500 acres of County-administered tax forfeited land in Aitkin County.

The following describes the chain of management authority concerning tax forfeited lands in Aitkin County.

Aitkin County Board

Ultimate authority within the County. Appoints members of the Advisory Committee and Parks Commission. Hires staff for Land Department. Approves budgets, land sales, and the like.

Aitkin County Land Department

The Land Commissioner, head of the Aitkin County Land Department (ACLD), has been authorized by the County Board to undertake direct responsibility for managing tax forfeited lands. Provides staff for Advisory Committee and Parks Commission.

Forest Advisory Committee

Advises, consults, or makes recommendations to the County Board on matters relating to the development, maintenance, management, and utilization of the forest and related resources on tax forfeited and other lands of Aitkin County. Reviews tax forfeited lands (annually for newly forfeited lands, every decade for all lands) regarding preferred status for retention as public lands or disposal through sale or exchange. Fourteen members appointed by County Board. Established in 1990 in accord with the Settlement Agreement regarding the lawsuit over the then-proposed MacMillan Bloedel facility. Staff provided by Land Department.

County Parks Commission

Established 1964. Approves annual expenditures budget, including that for the Long Lake Conservation Center, or work plans for County Parks (budget and work plans prepared by Land Department). Members appointed by County Board. Staff provided by Land Department.

Land Department Administration

The ACLD is headed by the Land Commissioner who in turn is aided by an Assistant Land Commissioner and various other professional and support staff. In general terms, the ACLD is divided into forestry, parks, support, and the Long Lake Conservation Center. Certain services such as site preparation, timber stand improvement (TSI), tree planting, and planning can be secured as necessary through contracts.

Public Participation

Awareness and Information Dissemination

- **Tactical Plan**
The Land Department notifies the general public and sends notice to specific entities regarding each tactical plan (prepared every five years) prior to its approval by the Forest Advisory Committee.
- **News Releases**
From time to time as appropriate the Land Department issues news releases concerning department activities.
- **Land Tours**
The Land Department gives many tours to groups to highlight ACLD management practices.
- **Web Site**
The ACLD web site provides a wide variety of information including downloads of strategic and tactical plans, special area studies, video presentations about county management, frequently asked questions, land and timber sales, recreation trails, and the like. In addition, the site provides means by which the public can submit questions and commentary to ACLD (e.g., regarding tactical plans).
- **Report to County Board**
Periodically the Department prepares a report to the County Board detailing the activities of the Department.

Public Appeal Process

The Land Department has in place procedures by which plans, decisions, and actions of Aitkin County regarding the management of its tax forfeited lands may be appealed. The public may appeal decisions regarding the prescriptions included in the adoption and modification of tactical plans, as well as delayed decisions, and subsequent significant changes in prescriptions. The process described below must be followed for all such appeals:

- a. Appeals will be submitted to the Aitkin County Land Commissioner.
- b. Any appeal must be postmarked not later than 45 calendar days after the tactical plan is adopted or 45 calendar days after the date of the memorandum of advisement for delayed decisions or changes in prescriptions.
- c. An appeal only will be accepted from a person who has participated in the tactical plan review either through personal attendance or prior submission of written specific prescription recommendations. An appeal may be dismissed without review when the appellant did not make use of the tactical plan review process.
- d. To be accepted, an appeal must state how the decision fails to consider comments previously provided, or how it violates laws, regulations, or policies.
- e. Emergency actions are not subject to normal processes for notification, review, and decision making, and are not subject to appeal. They include matters affecting public safety or welfare,

or significant potential loss of resources, such as salvage after fire, storm, or insect and disease outbreak; or for emergency wildlife feeding. This does not preclude the desirability of scheduling a mini-review when time permits, nor the need for evaluation of whether there may be more value or less impact in simply allowing the effects of natural disturbance to remain as is.

Appeals will be reviewed as follows:

- a. The Land Commissioner will be the sole appeal deciding officer.
- b. The appeal must be decided within 30 calendar days after the closing of the 45-day appeal period.
- c. The Land Commissioner may at his/her discretion extend the appeal decision date for an additional 30 calendar days by notice in writing to the appellant.
- d. The Land Commissioner will render a decision in writing to the appellant including the basis for denying or granting the appeal.

The above appeal process constitutes the final administrative opportunity for the public to influence a County forest prescription prior to implementation. The Land Commissioner's decision represents the final administrative determination by the County.

Any person with standing who has followed the above process who is still unsatisfied with the decision, may appeal the decision to the Aitkin County Board of Commissioners.

The County Board will send the appeal to the Aitkin County Forest Advisory Committee which will conduct a hearing. Based upon that hearing and other investigations, the Forest Advisory Committee will submit its recommendations to the County Board for its consideration.

The County Board will act upon the findings and recommendations submitted by the Forest Advisory Committee

Revenue Generation

In keeping with its legislative mandate to provide public benefit, the ACLD generates revenues from its tax forfeited land base. Department revenues derive from timber sales (aka stumpage), land sales, leases and easements, and miscellaneous sources.

As noted in Figure 20 ACLD revenue peaked in 2003 and 2005 at just over \$2 million. The bulk of income is generated by timber sales. The Great Recession and the accompanying slump in housing hit the national forest products industry hard; northern Minnesota saw the closure of the Ainsworth OSB plants, which had accounted for half of Minnesota's timber harvest. Still, ACLD's revenues have rebounded and are again on an upward climb.

This considerable revenue stream highlights the change in attitude towards tax forfeited land in Minnesota roughly 40 years ago. Up to that point, the dominant philosophy was to sell tax forfeited land putting it back on the property tax rolls. However, northern Minnesota counties realized that retaining the land in public ownership and managing it for sustainable income-generating multiple uses made far more economic sense. In addition, this approach kept the public land base for recreation, tourism, ecological dynamics, and aesthetics.

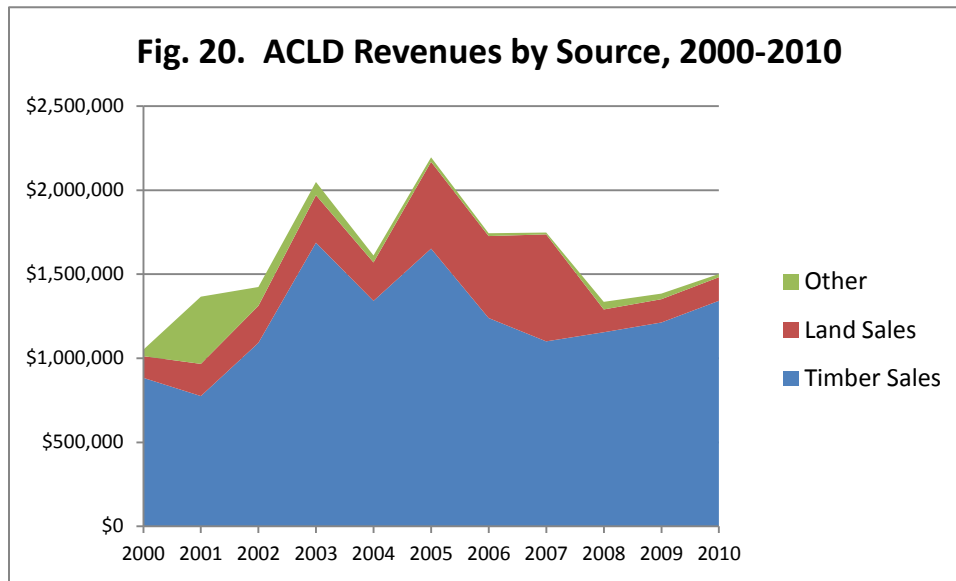


Table 10 shows the annual distribution of tax forfeited apportionment. This amount is the net after ACLD expenses are deducted from revenues. Department expenses include personnel and costs associated with land management, timber appraisal and sales, administering recreational cabin leases, and maintaining recreational facilities. Distribution of the apportionment is determined by state law by which a portion can be retained by the department for memorial forest and reforestation activities and recreational facilities; the remainder is distributed to the County and local taxing jurisdictions.

Table 10. Tax Forfeited Net Revenue Apportionment, 2000 - 2010

Year	Memorial Forest	Parks	Reforest	County	Schools	Townships	Total	% of Tax Forfeit Revenue
2000	\$ 80,694	\$ 84,886	\$127,329	\$ 84,886	\$ 84,885	\$ 42,443	\$ 505,123	48.7%
2001	57,483	73,405	110,108	73,405	73,405	36,703	424,509	31.3%
2002	111,437	126,097	189,147	126,098	126,097	63,049	741,925	53.4%
2003	178,860	220,692	331,039	220,692	220,692	110,346	984,321	62.9%
2004	125,966	153,707	230,560	153,707	153,707	76,853	894,500	54.4%
2005	194,857	226,925	340,388	226,925	226,925	113,463	1,329,483	60.9%
2006	120,588	164,532	246,798	164,532	164,532	82,266	943,248	54.4%
2007	113,901	167,945	251,917	167,945	167,945	83,972	953,625	54.7%
2008	114,858	120,925	181,388	120,925	120,925	60,463	719,484	54.2%
2009	103,699	129,509	194,265	129,509	129,509	64,754	751,245	54.6%
2010	134,848	158,437	237,657	158,436	158,436	79,216	927,030	64.6%

Certification

In 1997 the forested lands managed by the ACLD became some of the first county managed forest lands in the United States to become "green certified" by SmartWood, a non-profit forest certification organization located in Vermont. Since then, Aitkin County has had several yearly audits and two reassessments, the latest being in 2010. The finding of those reviews are submitted for approval by SmartWood and the Forest Stewardship Council™ (FSC®), which is the international monitoring organization for forest certification.

The SmartWood/FSC certification reflects ACLD's environmentally, economically, and socially responsible forest management practices. It also enables the county and users of county timber to use the FSC seal of approval when marketing forest products. This helps the local economy in that certified forest products are desired within the national and global markets.

Each forest land certification is for a five year period. During that time the ACLD needs to address specified requirements aimed at facilitating continued improvements in forest management practices both in the woods and administratively. ACLD has excelled at satisfying those requirements.

County Ordinances

Aitkin County has adopted two ordinances providing guidance for use and management of public lands administered by the County.

- Soo Line Trail Rules and Safety Regulations (2000): This ordinance establishes rules and regulations for the operation, management and safety of the abandoned Soo Line Railway Right of Way, which is a designated recreational trail.
- County Parks and Recreation (2008): This is a comprehensive ordinance that establishes a County Park Commission, governs the operation of the County Parks System, the Long Lake Conservation Center, and the recreational use of lands managed by Aitkin County, and, establishes the duties of the park Commission and the Land Department respective to parklands.

Summaries of the details of these ordinances are discussed in Chapter 5 (Parks, Recreation and Trails).

Planning and Coordination

Aitkin County has long been committed to planning and coordination to guide sound management of its tax-forfeited lands. Its first strategic management plan was adopted in 2001 followed years of solid forest management which had been recognized by the 1997 certification of the ACLD by the SmartWood^{CM} program that the wood provided by the County met program standards relative to sound and sustainable forest management.

In addition to its long range strategic plan, which is revisited at least once every 10 years, ACLD adopts regularly updated five-year tactical plans. These plans define immediate and short-term timber activities.

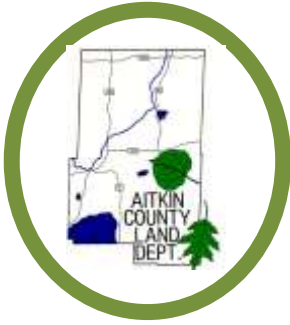
Both strategic and tactical plans are subject to a formal public review process.

As part of its planning and day-to-day management activities, the ACLD coordinates with other landowners, especially the Minnesota DNR. In addition, ACLD has representation on the Aitkin County Private Woodlands Committee.

3.2 Administration Policy

While this management plan provides strategic guidance on resource management for tax forfeited lands within the county, there is the “Aitkin County Land Department Policies and Procedures” manual that sets forth details on a variety of department practices. A copy may be obtained from the Land Department. Among the topics covered by these policies are:

- Consistency of decision making and actions with the objectives and principals of this strategic management plan.
- Preparation of long-range strategic and short-range tactical plans.
- Public participation including appeals of tactical plans.
- Conduct of timber sales.
- Consistency with certification requirements.



Chapter 4.0 Land Base Administration

4.1. Assessment

Land Administration

There is currently about 221,500 acres of tax forfeited lands in Aitkin County. The County has the goal of sustaining its tax forfeited land base for the purpose of meeting its management objectives. The fact that the objective has been met is seen in the following:

- In 1980 the tax forfeited acres were 221,368. They were 222,733 in 1990; 222,258 in 2000; and 221,494 in 2010.
- During those 30 years, the lowest amount of acres was 220,774 and the highest was 222,765.

The land base undergoes minor changes every year as property goes forfeit or, when appropriate, the County sells some of its land. Land sales are generally limited to smaller, platted properties more suitable for private development. Land exchange is preferred to sales so as to maintain the number of acres in the land base and maintain the county property tax base.

State law allows the County Board to recommend the sale at fair market value or conveyance by special use deed, certain tax forfeited lands to local units of government. In most cases, to protect the tax forfeited trust and reduce the potential liability of the County should the ownership revert back, the County's present policy is to not recommend the issuing of special use deeds but instead to approve the direct sale of the tax forfeited lands to the unit of government.

Aitkin County has a general land asset management policy of seeking to consolidate its holdings to improve the efficiency of land management activities and to enhance the local property tax-base. This is accomplished through acquisition of private "tax liability" properties (e.g. remote, landlocked in-holdings) via purchase or exchange. In making acquisitions the County seeks to reduce its management costs, increase the value of the land base, and reduce the cost to local government to supply services to remote, isolated privately owned lands. In turn, Aitkin County returns tax-forfeited property of substantially equal value that is more accessible and has higher development potential to private ownership to enhance the local property tax base.

In a limited number of parcels in the County's land base the County's tax forfeited position is an undivided partial interest shared with other owners. If acquisition of all or part of the land is not beneficial to long term management goals, the County will consider exchange or sale.

The County seeks to maintain proper designation of its property lines and the monumentation of section corners.

The County is required to provide ongoing management of tax forfeited lots in plats within cities and organized or unorganized townships. Many such lots require regular mowing, garbage collection, tree and branch removal, and other general site maintenance. Other lots, which contain structures, present

other issues, problems and liabilities for the County. In general, the County seeks to dispose of these parcels back into private ownership.

Land Classification and Designation

State law (MS 282.01, Subd. 1) requires county boards to classify all tax-forfeited land as either conservation or non-conservation land. Conservation lands, which are those most suited for forestry or conservation purposes, are to be retained for county management and non-conservation lands, which may be better suited for private ownership and use, may be sold or transferred. Aitkin County has a Land Classification Committee that annually reviews incoming tax forfeited lands and periodically reviews all such lands.

Tax-forfeited land that borders on or is adjacent to meandered lakes and other public waters may be not be sold nor can commercial peatlands (MS 92.461). The State of Minnesota holds the deed to tax-forfeited lands and owns the mineral rights under county administered lands.

Besides evaluating lands for retention in tax forfeited status, the County may designate certain tax forfeited lands, which have high forest potential, as memorial forest. Sale of memorial forest lands require approval by the Minnesota DNR Commissioner. Currently, nearly 134,000 acres (60%) of Aitkin's tax forfeited lands have memorial forest designation.

In addition, Aitkin has established a county park designation for portions of its tax forfeited lands. Comprising roughly 11,000 acres, these lands are generally near lakes or streams and tend to have qualities that make them suited for recreation. A small fraction of this acreage is actually developed for recreation including campgrounds and accesses. Forest management activities are allowed on designated park lands. Regardless of designation, dispersed recreational activities such as hiking, hunting, and gathering are allowed on all tax forfeited lands except where posted otherwise. The County Parks and Recreation Ordinance regulates activities and uses on park lands.

Special Use Deeds

State law allows the County Board to recommend conveyance (by the State Department of Revenue), at no cost, of land to public entities for the purpose of an authorized public use (e.g., roads, parks, town and city halls, parking lots, fire halls, parks, and cemeteries). It is County policy to encourage the sale of land for these purposes rather than issue a special use deed. This prevents reversion back to the County of property so conveyed that subsequently is declared abandoned and possibly encumbered with uses or structures that would create additional liability for the County.

Timber Sales

The ACLD actively and responsibly manages its forested lands for timber production. Every five years a tactical plan is prepared based on the current strategic plan, GIS-supported inventory information, and field forester input; this plan is submitted for public review prior to implementation. Timber (or stumpage) is offered through a variety of mechanisms to eligible contractors for harvesting.

Resource Inventory, Monitoring and Research

ACLD has a full-time staff person responsible for maintaining a current inventory of all aspects of the land base and forest resource. This person updates stand level forest inventory information to reflect changes due to harvesting, other management activities, and natural disaster. The inventory staff person also conducts analyses of the forest database to help guide management, understand the resource, and provide information to the public.

The ACLD also has its own geographic information systems (GIS) coordinator. Thus ACLD can generate an array of GIS-based maps and analyses for use by the department and others. The range of GIS products is extensive and includes vegetation cover type, natural features, ownership, forest roads and recreational trails, soils, native plant community, cultural features, current and historical imagery, and more.

In addition, ACLD has access to State and Federal databases concerning their resource inventories, endangered species, critical habitats, and similar vital information.

Between the forest inventory and GIS staff, the ACLD has the capacity to analyze, map, and present the resource at the level of knowledge and detail required for a robust forest management program. ACLD routinely shares its information with the Minnesota DNR, US Fish and Wildlife Service (re: Rice Lake Wildlife Refuge), and other concerned parties.

ACLD also invests to gain a better understanding of its resources. As part of its enhanced hardwood management, ACLD is conducting research regarding: mapping of native plant communities in targeted areas as a refined tool to guide forest management, and, forest growth projects in oak, northern hardwood, and aspen to evaluate tree response to intermediate stand treatments such as thinnings and crown release. For instance, in 2010 it undertook an evaluation of the important hardwood resources of the Cornish area.¹² That study analyzed soil types and compared them with field data on vegetation and soils collected as part of the project. The study also reviewed ACLD management prescriptions for the area relative to their ecological appropriateness for upland forests. The study's results demonstrated "that the area surveyed within the Cornish Unit has high-scoring ecological attributes that meet, or exceed, Forest Stewardship Council criteria for designation as a High Conservation Value Forest."

ACLD is following up on that study with additional research into locations of specific sub-NPC types in order to more appropriately target northern hardwood forest management actions.

Further, the County continues to investigate new management techniques.

Leases and Easements

The County is allowed to lease tax forfeited lands for such activities as agriculture, gravel extraction, and recreation. The number of leases can vary from year to year and are issued for:

Gravel Extraction: Between 20 and 30 leases for gravel mining are in force at any given time. Leases are based on a price yard; a portion of the generated revenue is placed in a special account for rehabilitation and reclamation work. The County Highway Department is allowed to remove gravel and fill at no cost for County road projects.

Soo Line Permits: Roughly 20 permits are issued each year to allow special use of the Soo Line trail. These tend to be for logging access but may include permission to use the trail for other temporary purposes. Returnable deposits are required for these permits.

Agriculture: Approximately 10 leases are issued annually for agricultural activity on County lands. These include collection of native grass seed, hay, and pasture.

Maple Syrup: The County issues permits for designated maple syrup "sugar bushes" as a means to prevent conflict between harvesters and to guide harvesters to desired locations.

¹² Zager, Scott C., "Ecological Evaluation and Assessment of the Cornish Area High Conservation Value Forest (HCVF)", Wildlands Ecological Services, June 15, 2010.

Aitkin County may grant easements across tax forfeited land for utilities or access to private property, per MS 282.04. Aitkin County will consider each application with the long term interest of the residents of Aitkin County. Other considerations such as environmental concerns and other reasonable access routes will be considered. Application and non-refundable down payment is required. A registered survey may be required.

Mississippi River Corridor

Aitkin and seven other counties are members of the Mississippi River Headwaters Board (MHB), a cooperative entity designed to oversee the proper management of private and public land along the river corridor. Of particular relevance to this management plan is the MHB's desire to have public lands expanded within the corridor and obligating the counties to acquire lands adjacent to the Mississippi River whenever possible and feasible.

MacMillan Bloedel Agreement

In 1990 Aitkin County along with other counties and entities signed an agreement that settled potential litigation regarding the MacMillan Bloedel plant near Deerwood. Besides determining the composition of the Forestry Advisory Committee, the agreement articulated specific management guidelines and standards to be followed by the County. The topics covered by these guidelines and standards ranged from a review of harvest plan to old-growth forests and endangered and threatened species. Aitkin County has incorporated these principles into its management policies and practices. Further, third party certification of ACLD management has essentially superseded this agreement.

Treaties and Cooperative Agreements

A small portion of County administered tax forfeited lands in southern Aitkin County lie within the territory covered by the 1837 treaty between the United States and what is now the Mille Lacs, Fond du Lac, Bois Forte, and Grand Portage bands of Chippewa. This treaty granted tribal members the right to fish, hunt and gather within the lands ceded by the tribe. Most attention has been given to off-reservation fishing and hunting by Band members. Court cases have upheld these rights asserting the Band members, under appropriate Band-enforced conservation codes, have the right to hunt, fish and gather on off-reservation public lands (including tax forfeited lands).

In addition, a small portion of southeastern Aitkin County lies within the area covered by the 1854 treaty with the Fond du Lac, Bois Forte, and Grand Portage bands of Chippewa. Within this area, now governed by the formally organized 1854 Treaty Authority, members of these Bands have certain hunting, fishing and gathering rights (the Fond du Lac Band has opted out of the 1854 Treaty Authority although it cooperates with it). To date there has been little 1854-related activity in Aitkin County.

The County cooperates extensively with the Minnesota DNR which manages over 400,000 acres of land within the county. This cooperation includes common management of selected areas (e.g., Cornish Hardwoods) and coordinated harvesting/site activity. The County also cooperates with the State regarding Wildlife Management Areas.

The Rice Lake National Wildlife Refuge lies within Aitkin County. The County considers refuge management objectives when the County undertakes management of its lands around the refuge.

4.2 Land Administration Policy

The Aitkin County Land Department has policies and procedures regarding land base administration. These policies and procedures may be obtained from the Land Department. Among the topics covered by these policies are:

- Ensuring a stable land base sufficient to meet the goals and objectives of this strategic plan.
- Evaluation and classification of tax-forfeited lands.
- Sale or exchange of land in accord with MS 282.
- Granting of easements across tax forfeited lands.
- Maintenance of GIS information for use by ACLD and available to the public.



Chapter 5.0 Parks, Recreation, and Trails

5.1. Assessment

Designated Parks

Roughly 11,000 acres of tax forfeited lands are designated as parks. Most of this land is undeveloped forest near a river or lake. The Land Department maintains eight developed recreational facilities:

- Aitkin Campground – on Mississippi River adjacent to Aitkin.
- Berglund Park – on Mississippi River in Palisade.
- Jacobson Campground – on the Mississippi River.
- Snake River Campground – on the Snake River.
- Jacobson Wayside Area – on Mississippi River along TH 200.
- Lone Lake Swimming Beach
- Round Lake Swimming Beach
- Swatara Picnic area.

In addition, in Glen Township there is the Vispo Property, a 141-acre tract, donated to the County by a private landowner that is a designated non-motorized recreational property. Uses include cross country skiing, walking trail, picnic areas, and a sliding hill.

Dispersed recreation (e.g., hunting, hiking, berry picking, snowshoeing, photography, bird watching, etc.) is allowed on nearly all tax forfeited land in Aitkin County. These are activities which do not require any facilities or improvements provided by the County.

Long Lake Conservation Center

The County owns and manages the Long Lake Conservation Center (LLCC) which occupies 760 acres of County tax forfeited land (130 acres is Long Lake itself). This property is designated as a park whose purpose, as defined by County ordinance, is to be an environmental education center. The Center has extensive facilities including classrooms, dormitories, cafeteria, offices, staff living quarters, and support buildings. There is a “work-in-progress” site plan for the buildings and infrastructure of the Center.

In 2006 the County adopted a demonstration forest management plan for Long Lake. The primary goals of this plan are to integrate educational and recreational activities with active forest management. Specific objectives include:

- To provide **educational opportunities** for the many students who visit LLCC each year. Management should enhance outdoor environments for classes at LLCC.
- To provide “working forest” **demonstration sites** for a variety of forest management activities, including red pine management, aspen management, white pine restoration, and oak and northern hardwood stand improvements.

- To provide **recreational opportunities** for guests to the county park including maintained hiking and ski trails and signed nature walks.
- To enhance the **native wildlife habitat** on the property.
- To provide a **model** for observing “sustainable forestry” implemented on the ground.
- To protect the **aquatic zone** of Long Lake for aesthetics, avian and mammalian habitat, classes on lake bottom organisms and other wildlife and water quality benefits.

Lake and River Accesses

The ACLD maintains 21 accesses for lakes and rivers throughout the county. They are:

Lake Accesses

Boot Lake / carry in	Round (48-24)
Holy Water	Sheriff
Little Ball Bluff	Third Guide
Little McKinney	Turner
Rat House	VanDuse

River Accesses

Mississippi River (4-52-23) / ramp	Mississippi River (23-47-27) / ramp
Mississippi River (14-50-24) / carry in	Mississippi River (5-47-26) / carry in
Mississippi River (27-49-25) / ramp	Snake River (21-43-23) / carry in
Mississippi River (15-48-26) / ramp	Snake River (33-43-23) / carry in

Recreational Trails

Aitkin County actively manages its lands for the appropriate development of various types of recreational trails. In 2010 the County adopted the *Aitkin County Comprehensive Recreation Trail Plan* to provide ongoing guidance for trail development and maintenance. The following are the goals and objectives from that plan.

Trail Goals and Objectives

The goal of the comprehensive recreation trail plan is to provide a framework that will guide recreation trail management on county managed lands in Aitkin County. In addition, the plan development process has included the objective of balancing natural resource protections with recreation demands and competing land uses.

Environmental Sensitivity

Aitkin County is interested in attracting a variety of outdoor recreation enthusiasts to the trails that are available in the county, while maintaining natural resource and wildlife habitat protections. Land use and trail management plans must be compatible with the county’s Forest Stewardship Council certification requirements.

Economic Benefits

Aitkin County is interested in creating “Destination Trails” that promote the use of the trail systems and reduce off-trail activities and negative impacts. The trail system will be supported by

monitoring and enforcement plans, and signs and trail markings will support high quality trail user experiences.

Community Support

Aitkin County is interested in developing recreation trails that support year-round regional visitation and connectivity between major recreation destinations. The trail system will offer diverse trail opportunities for a full range of recreation types.

Snowmobile Trails

The ACLD oversees the designation of all Grant in Aid (GIA) snowmobile trails in the county. Currently there are over 600 miles of GIA trails in the county. ACLD's responsibilities and duties regarding the trails include:

- Process all GIA paper work for existing and new trails.
- Recommend to the County Board whether to accept new GIA trails.
- Monitor trails used for or near active logging sites. This includes working with the logger and the appropriate snowmobile club regarding signing, temporary closure or rerouting of the trail, and other measures to maintain safe trails.
- Maintain inventory of current trail locations.

Trail maintenance is the responsibility of snowmobile clubs. The majority of trails are maintained by: Aitkin Sno-Drifters, Haypoint Jackpine Savages, Palisade SuperSledders, Mille Lacs Snowmobile Club, Giese SnoCruisers, and Tamarack SnoFlyers. Other trails are maintained in Aitkin County by clubs located in: Moose Lake, Garrison, Isle, Emily, Greenway, Floodwood, and Cromwell.

ATV Trails

The ACLD oversees the designation of all Grant in Aid (GIA) ATV trails in the county. Currently there are over 100 miles of GIA trails in the county including: Soo Line ATV Trail (North and South), Rabey Line ATV Trail, Blind Lake ATV Trail, and the Red Top ATV Trail.

The County's responsibilities for ATV trails are similar to that for snowmobile trails. One exception is that the ACLD grades the Soo Line Trails which are owned by the County.

Starting in 2007 Aitkin and Itasca Counties have undertaken the planning and development of what is now known as the Northwoods Regional ATV Trail (originally named the Aitkin-Itasca 70-Mile ATV/OHV Trail Project). The project seeks to create an extensive, first-rate ATV/OHV trail in the two counties. The trail is designed to be environmentally sensitive, economically beneficial, and community supported. When completed, the Northwoods Regional ATV Trail System will:

- Focus the increasing ATV user base on an existing extensive (420+ miles) and meaningful (popular destinations) trail system within 2 hours of the Twin Cities. This should reduce potential negative impacts on natural resources, often caused by unregulated cross-country travel, by providing a well-advertised "place to go" and by linking trail segments in environmentally sensitive ways
- Connect major recreation destinations (from the Mille Lacs area, through McGregor and the Big Sandy Lake areas, and on to the Grand Rapids area) via an ATV trail to promote tourism and its associated economic impacts.
- Revitalize local communities along and near the trail system. These communities benefit economically from seasonal snowmobile use; expanding a similar clientele (ATV users) to a larger segment of the year could have significant benefits to these small communities.

The project is directed by a 19-member oversight committee representing diverse interests and experiences from throughout the project area.

The Northwoods Regional Trail incorporates all of Aitkin County's existing ATV trails including the Rabey, Soo Line, Blind Lake, and Red Top routes.

Hiking, Cross Country Ski, Hunting/Fishing Trails

The ACLD maintains a number of hiking, cross country ski, and non-motorized hunting/walking trails.

- Long Lake Conservation Center: hiking and cross country ski trails.
- No-Achen Cross Country Ski Trail
- Vispo Property Hiking and Cross Country Ski Trails
- Jacobson Campground Walking Trail
- Snake River Walking/Fishing Trail
- Twin River Springs Walking / Fishing Trail
- Hunter / Walking Trails: 13 miles at various sites.

5.2 County Parks and Recreation Ordinance

In 2008 Aitkin County adopted a multi-faceted County Parks and Recreation Ordinance. The following is a synopsis of the ordinance:

- Establishes a County Park Commission and defines its duties.
- Defines duties of the Land Department relative to parks.
- Determines that all parkland must be classified as one of two use types:
 - Limited Use Area: includes camping areas, parking areas, tent camping areas, boat accesses, limited access nature trails, swimming areas, recreation trails, ball fields, environmental education areas, wayside rests, and scenic areas.
 - Open Use Area: all park land not designated as limited use area.
- Sets forth regulations for protecting parks and recreation areas and governing permissible behavior on them. Areas covered include: general conduct; protection of natural resources within limited use areas; camping in limited use areas; swimming; meetings, speeches, demonstrations and parades in parks; vehicles; park operation; and forest roads and recreation trails.
- Among the regulations concerning forest roads and recreation trails are the following:
 - County forest roads are open to highway licensed vehicle use unless gated or posted closed.
 - Off-highway operation (OHV) is prohibited on County forest roads or recreation trails unless designated open for a specific OHV use.
 - Off-highway vehicle travel on County forest roads or recreation trails not designated open to OHV use is prohibited except for ATV's used for trapping during open season and big game hunting during October-December.
 - Off trail, cross-country travel with a motorized vehicle is prohibited on County managed land, except to retrieve downed big game animals with ATV's during legal hunting season.
 - No person shall construct an unauthorized permanent trail on County managed lands.
- Sets the penalty for violating provisions of the ordinance as a misdemeanor.

- Sets oversight of the entire operation of the Long Lake Conservation Center, which is owned and operated by Aitkin County, by the County Park Commission. The LLCC Executive Director will be directly supervised by the Land Commissioner.

5.3 Recreational Facilities and Trails Policy

The Aitkin County Land Department has policies and procedures regarding recreational activities on tax forfeited lands. These policies and procedures may be obtained from the Land Department. Among the topics covered by these policies are:

- Implementation of the County Park Ordinance.
- Conduct planning for recreational trails.



Chapter 6.0 Forest Roads

6.1. Assessment

There are approximately 336 miles of designated roads and trails on Aitkin County managed tax forfeited lands. These routes provide access for forest management and recreation. Table 11 indicates the number of miles of roads and trail by designation.

Table 11. Designated Roads and Trails on Tax Forfeited Lands		
Designation	Miles	Description
Open Use	85	Open to all forms of traffic at all times except during wet periods.
Limited Use: Seasonal	79	Open to motorized use except during spring “break up” and excessively wet periods.
Limited Use: Hunting	24	Open to motorized uses except during spring break up, wet periods, and hunting seasons.
Restricted Use: ATV Use	134	Closed to all vehicles weighing more than an ATV or snowmobile.
Restricted Use: Non-motorized Use	14	Closed to all unauthorized motorized uses.
Total	336	

These roads are also classified by three levels of road maintenance as follows:

Road Maintenance Class

- Multi-purpose primary forest road, gravel surfaced, and usually ditched. Usually has at least a 16’ wide traveling surface and is graded at least four times per year.
- Multi-purpose secondary forest access road, usually gravel surfaced. Generally has at least a 12’ wide traveling surface and is graded at least two times per year.
- Multi-purpose seasonal or temporary forest access road. Usually has less than 12’ wide traveling surface. Generally not maintained unless special circumstances require.

6.2 Forest Road Policy

The Aitkin County Land Department has adopted policies and procedures regarding road designation and use, off road travel and other forest road related activities. These policies may be obtained from the Land Department.



Chapter 7.0 Habitat

7.1 Assessment

Coarse filter / fine filter approach

Aitkin County uses the dual level “coarse filter / fine filter” approach to habitat.

The “coarse filter” level strives to insure that all major habitats are represented on the landscape. The underlying premise is that if the habitats exist they will be capable of supporting the various species and biotic communities that depend upon them.

ALCD establishes its coarse filters as follows. Every township has 36 sections which are grouped into nine habitat management zone (HMZ); each HMZ encompasses four square sections (roughly 2,560 acres). Each HMZ is classified as *Clustered*, *Dispersed*, or *Mosaic*. These designations cover an *area* not an individual stand and intended to provide guidance during planning. General management guidance for each type of HMZ is:

- *Clustered*: seek to increase amount of interior forest.
- *Dispersed*: seek to increase the amount of edge habitat.
- *Mosaic*: transition zone between Clustered and Dispersed.

Using its continually updated inventory database and GIS applications the County can monitor the presence and condition of the major habitats. The resulting information can be shared with MnDNR wildlife specialists, the County Biological Survey, and other informed parties to determine if significant changes in the amount, variety, and distribution of coarse habitats are occurring and warrant more specific review and analysis.

The “fine filter” level is undertaken through direct management for individual species when such action is required or desired. At this level management focuses on a specific species or group of species either over the entire County land base or within a given geographic area. Examples of fine filter 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 such as avoiding intrusions during nesting season, retaining specific trees, or timing activities to avoid sensitive times for plants.
- Management of a specific area to enhance a specific species such as retaining large open landscapes for sharptail grouse and other open land wildlife species.
- Adoption of guidelines for forest activities in areas where specific species may be found. One example of this is the guidelines established by ACLD regarding botrychium (fern) species and habitat.

- Standard site management to include retention of snag and den trees, maintenance of functional wetland buffers, and the like.
- Work with sportsmen and outdoor groups to obtain funding and support for projects that benefit wildlife.

Table 12 presents the definitions of the coarse level habitats applied to Aitkin County. These definitions were originally generated by the US Forest Service for use in northern Minnesota. Table 13 shows the amount of each coarse level habitat on Aitkin County's tax-forfeited lands.

Table 12: Generalized Habitats for Use in Analyzing Wildlife Impacts of Forest Plan

Habitat Categories		Definitions (age or size: cover types)
Open Habitat Types	Small upland grass opening	Less than or equal to 40 acres in size; upland grasses
	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 11-50 yrs: birch
	Mature	41-60 yrs: aspen, Balm of Gilead 51-80 yrs: birch
	Old	61+ yrs: aspen, Balm of Gilead 81+ yrs: birch
Upland Forest: Deciduous [NoHdwd/Oak]	Young	11-60 yrs: northern hardwoods, oak
	Mature	61-120 yrs: “
	Old	121+ yrs: “
Upland Forest: Coniferous	Young	11-40 yrs: balsam fir 11-30 yrs: jack pine 11-70 yrs: red/white pine, white spruce, upland black spruce
	Mature	41-60 yrs: balsam fir 31-60 yrs: jack pine 71-120 yrs: red/white pine 71-100 yrs: white spruce, upland black spruce
	Old	61+ yrs: balsam fir, jack pine 121+ yrs: red/white pine 101+ yrs: white spruce, upland black spruce
Upland Forest: Mixed	Young	11-40 yrs: aspen-birch/spruce-fir, birch/spruce-fir, boreal hardwood/conifer 11-60 yrs: northern hardwood/conifer
	Mature	41-60 yrs: aspen-birch/spruce-fir, birch/spruce-fir, boreal hardwood/conifer 61-120 yrs: northern hardwood/conifer
	Old	61+ yrs: aspen-birch/spruce-fir, birch/spruce-fir, boreal hardwood/conifer 121+ yrs: northern hardwood/conifer
Lowland Forest: Deciduous	Young	11-60 yrs: ash, lowland hardwood
	Mature	61-120 yrs: “
	Old	121+ yrs: “
Lowland Forest: Coniferous	Young	11-70 yrs: black spruce, tamarack, white cedar, stagnant black spruce/tamarack/white cedar
	Mature	71-100 yrs: black spruce, tamarack, stagnant black spruce/tamarack/white cedar 71-120 yrs: white cedar
	Old	101+ yrs: black spruce, tamarack, stagnant black spruce/tamarack/white cedar 121+ yrs: white cedar

Table 13. Distribution of Generalized Habitats on Aitkin County Tax-forfeited Land, 2000 and 2011

Habitat Categories		2000		2011	
		Acres	Percent	Acres	Percent
Open Habitat Types	Small upland grass opening	654	0.4%	561	0.3%
	Shrub-Sapling opening / Regeneration	19,540	11.2%	12,756	7.4%
Upland Forest: Deciduous Aspen-Birch	Young	24,595	14.0%	29,008	16.7%
	Mature	12,671	7.2%	6,136	3.5%
	Old	8,139	4.6%	5,179	3.0%
Upland Forest: Deciduous [NoHdwd/Oak]	Young	4,569	2.6%	1,525	0.9%
	Mature	34,912	19.9%	43,222	24.9%
	Old	399	0.2%	455	0.3%
Upland Forest: Coniferous	Young	3,265	1.9%	4,187	2.4%
	Mature	1,410	0.8%	761	0.4%
	Old	553	0.3%	768	0.4%
Upland Forest: Mixed	Young	1,847	1.1%	7,067	4.1%
	Mature	4,479	2.6%	1,745	1.0%
	Old	2,717	1.6%	2,976	1.7%
Lowland Forest: Deciduous	Young	1,192	0.7%	690	0.4%
	Mature	16,060	9.2%	15,239	8.8%
	Old	2,981	1.7%	5,042	2.9%
Lowland Forest: Coniferous	Young	15,957	9.1%	14,457	8.3%
	Mature	10,051	5.7%	10,547	6.1%
	Old	9,124	5.2%	11,192	6.5%
Totals*		175,115	100.0%	173,513	100.0%

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

Focused Management for Habitat: Species of Concern

The following table identifies species with either federal or state status as rare, threatened, endangered or special concern species.

Table 14. Species of State Level Concern in Aitkin County				
Scientific Name	Common Name	Status*		Type
		State	Global	
<i>Actinonaias ligamentina</i>	Mucket	THR	G5	Invertebrate Animal
<i>Agapetus tomus</i>	A Caddisfly	SPC	G5	Invertebrate Animal
<i>Lasmigona compressa</i>	Creek Heelsplitter	SPC	G5	Invertebrate Animal
<i>Lasmigona costata</i>	Fluted Shell	SPC	G5	Invertebrate Animal
<i>Ligumia recta</i>	Black Sandshell	SPC	G4	Invertebrate Animal
<i>Marpissa grata</i>	A Jumping Spider	SPC	GNR	Invertebrate Animal
<i>Paradamoetas fontana</i>	A Jumping Spider	SPC	GNR	Invertebrate Animal
<i>Botrychium lanceolatum</i>	Triangle Moonwort	THR	G5	Vascular Plant
<i>Botrychium mormo</i>	Goblin Fern	SPC	G3	Vascular Plant
<i>Botrychium oneidense</i>	Blunt-lobed Grapefern	END	G4	Vascular Plant
<i>Botrychium pallidum</i>	Pale Moonwort	END	G3	Vascular Plant
<i>Botrychium rugulosum</i>	St. Lawrence Grapefern	THR	G3	Vascular Plant
<i>Botrychium simplex</i>	Least Moonwort	SPC	G5	Vascular Plant
<i>Carex woodii</i>	Wood's Sedge	SPC	G4	Vascular Plant
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	THR	G3	Vascular Plant
<i>Eleocharis olivacea</i>	Olivaceous Spike-rush	THR	G5	Vascular Plant
<i>Floerkea proserpinacoides</i>	False Mermaid	THR	G5	Vascular Plant
<i>Juglans cinerea</i>	Butternut	SPC	G4	Vascular Plant
<i>Littorella uniflora</i>	American Shore-plantain	SPC	G5	Vascular Plant
<i>Malaxis monophyllos</i> var. <i>brachypoda</i>	White Adder's-mouth	SPC	G4	Vascular Plant
<i>Najas gracillima</i>	Thread-like Naiad	SPC	G5	Vascular Plant
<i>Panax quinquefolius</i>	American Ginseng	SPC	G3	Vascular Plant
<i>Platanthera clavellata</i>	Club-spur Orchid	SPC	G5	Vascular Plant
<i>Poa paludigena</i>	Bog Bluegrass	THR	G3	Vascular Plant
<i>Potamogeton bicupulatus</i>	Snailseed Pondweed	END	G4	Vascular Plant
<i>Potamogeton vaseyi</i>	Vasey's Pondweed	SPC	G4	Vascular Plant
<i>Acipenser fulvescens</i>	Lake Sturgeon	SPC	G3-4	Vertebrate Animal
<i>Ammodramus henslowii</i>	Henslow's Sparrow	END	G4	Vertebrate Animal
<i>Ammodramus nelsoni</i>	Nelson's Sparrow	SPC	G5	Vertebrate Animal
<i>Asio flammeus</i>	Short-eared Owl	SPC	G5	Vertebrate Animal
<i>Buteo lineatus</i>	Red-shouldered Hawk	SPC	G5	Vertebrate Animal
<i>Coturnicops noveboracensis</i>	Yellow Rail	SPC	G5	Vertebrate Animal
<i>Cygnus buccinator</i>	Trumpeter Swan	THR	G5	Vertebrate Animal
<i>Emydoidea blandingii</i>	Blanding's Turtle	THR	G4	Vertebrate Animal

Table 14. Species of State Level Concern in Aitkin County				
Scientific Name	Common Name	Status*		Type
		State	Global	
<i>Etheostoma microperca</i>	Least Darter	SPC	G5	Vertebrate Animal
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SPC	G5	Vertebrate Animal
<i>Hemidactylium scutatum</i>	Four-toed Salamander	SPC	G5	Vertebrate Animal
<i>Notropis anogenus</i>	Pugnose Shiner	SPC	G3	Vertebrate Animal
<i>Phalaropus tricolor</i>	Wilson's Phalarope	THR	G5	Vertebrate Animal
<i>Lanius ludovicianus</i>	Loggerhead shrike	THR	G5	Vertebrate Animal

Source: MnDNR 2011

*State: SPC = Special Concern; THR = Threatened; no species had a federal status; END = endangered. Global: G1 = Critically imperiled; G2 = Imperiled; G3 = Rare, uncommon or threatened, but not immediately imperiled; G4 = Not rare but with cause for long-term concern; G5 = Demonstrably widespread, abundant, and secure.

The ACLD will work with the Minnesota DNR on species recovery goals and implementation actions.

7.2 Habitat Management Policy

The Aitkin County Land Department has adopted policies regarding habitat management. These policies may be obtained from the Land Department. Among the topics covered are:

- Prohibition on use of genetically modified organisms.
- Coordination with MDNR regarding monitoring and response to invasive species.



Chapter 8.0 Forest Resource Management

8.1. Timber Resource Management Policy

The Aitkin County Land Department has adopted policies regarding timber resource management. These policies may be obtained from the Land Department.

8.2 Habitat Management Zone Management

As described in Chapter 7 Habitat the ALCD divides the county into Habitat Management Zones. These zones provide **landscape level** direction that integrates forest and habitat management as noted in the following descriptions.

Clustered HMZ: <i>A mature, contiguous forest.</i>	
Reserve Trees/Patches	>10% basal area (even age regeneration harvest).
Rotation Age	100-120% of normal rotation age.
Forest Stages	Mature and transition stages.
Patch Size	Large forest patches, forest interior habitat.
Forest Types	Long-lived, mid-shade tolerant to tolerant tree species.
<p>General Narrative:</p> <p>Manage for large patch sizes by maintaining, connecting or expanding existing patches and/or creating new large patches through harvesting/regenerating.</p> <p>The objective is to emphasize forest interior habitat by maintaining the largest possible mature, closed-canopy forest habitat patches at any given time. This may require “clustering” regeneration harvests over time and space in zones dominated by shade intolerant tree species.</p>	

Dispersed HMZ: <i>A young, patchy forest.</i>	
Reserve Trees/Patches	<5% basal area (even age regeneration harvest).
Rotation Age	80-100% of normal rotation age.
Forest Stages	Young and transition stages.
Patch Size	Small forest patches, forest edge habitat.
Forest Types	Short-lived, intolerant to mid-tolerant tree species.
<p>General Narrative:</p> <p>Manage for a collection of small (<40 acres) patches.</p> <p>The objective is to emphasize forest edge habitat, including age class and species diversity within a relatively small area.</p>	

Mosaic HMZ: <i>A diverse, "transition zone" forest.</i>	
Reserve Trees/Patches	5-10% basal area (even age regeneration harvest).
Rotation Age	100% of normal rotation age.
Forest Stages	A "balanced" range of stages.
Patch Size	Forest patch size based on their proximity to other HMZ.
Forest Types	A range of forest types.
<p>General Narrative:</p> <p>Manage for a range of patch sizes.</p> <p>Maintain existing large patches with dispersed management in the balance of the zone.</p> <p>The objective is to provide a balance of both edge and interior habitat and in many cases, act as a transition zone between dispersed and clustered zones.</p> <p>It is desirable to position large patches adjacent to large patches in adjoining HMZ's. In areas dominated by early successional shade intolerant species, the mosaic may shift over time (the location of large and small patches).</p>	

The following tables show the distribution of Aitkin County managed land in terms of Habitat Management Zones by native plant community and forest cover types. Table 15 shows HMZ for the entire ACLD land base; Table 16 only includes lands with commercial forest types.

NPC	Acres			Percent		
	Clustered	Dispersed	Mosaic	Clustered	Dispersed	Mosaic
FDn43/MHc27	2,879	7,399	12,662	12.6%	32.3%	55.2%
FDn33/FDc34	324	2,991	2,483	5.6%	51.6%	42.8%
MHn35/MHc36	5,509	12,489	19,291	14.8%	33.5%	51.7%
MHn47	5,202	5,221	14,101	21.2%	21.3%	57.5%
MHn44	1,142	7,592	8,111	6.8%	45.1%	48.2%
FFn57/FFn67	36	1,546	1,705	1.1%	47.0%	51.9%
MHn46/MHc47	2,175	4,406	7,025	16.0%	32.4%	51.6%
WFn64/WFn55	5,578	13,116	20,823	14.1%	33.2%	52.7%
APn80/FPn82	4,513	12,807	41,403	7.7%	21.8%	70.5%
Total	27,358	67,567	127,604	12.3%	30.4%	57.3%

Cover Type	Acres			Percent		
	Clustered	Dispersed	Mosaic	Clustered	Dispersed	Mosaic
Ash	2,924	4,716	9,482	17.1%	27.5%	55.4%
Lowland Hardwoods	205	1,151	2,571	5.2%	29.3%	65.5%
Aspen	3,630	25,495	30,263	6.1%	42.9%	51.0%
Birch	70	973	1,761	2.5%	34.7%	62.8%
Balm of Gilead		25	85	0.0%	22.7%	77.3%
Northern Hardwoods	10,120	6,399	19,260	28.3%	17.9%	53.8%
Oak	2,251	3,320	5,789	19.8%	29.2%	51.0%
White Pine	43	126	197	11.7%	34.4%	53.8%
Red Pine	75	1,346	1,714	2.4%	42.9%	54.7%
Jack Pine		21	35	0.0%	37.5%	62.5%
White Spruce	111	943	892	5.7%	48.5%	45.8%
Balsam Fir	110	620	707	7.7%	43.1%	49.2%
Black Spruce, lowland	1,078	2,331	5,915	11.6%	25.0%	63.4%
Tamarack	1,030	2,195	9,148	8.3%	17.7%	73.9%
White Cedar	311	1,328	1,023	11.7%	49.9%	38.4%
Black Spruce, upland	36		97	27.1%	0.0%	72.9%
Total	21,994	50,989	88,939	13.6%	31.5%	54.9%

8.3 High Conservation Value Forest Management

ACLD had proposed three model forests as areas having unique biodiversity features including rare ferns, salamanders, and birds or generally having high value as wildlife habitat. These Model Forests qualify as High Conservation Value Forests (HCVF) under FSC[®] criteria (HCV1: forests with high biodiversity values).

The three sites are called Cornish, Libby, and Lakeside. The first two are located in the county's northeastern quarter and the third is directly east of Mille Lacs Lake. These forests have rare, threatened, or special concern species from plants to salamanders and/or have unique wildlife habitat features. The wildlife habitat includes elements such as large blocks of forests in high development areas, valuable travel corridors for wildlife along a major river system (Mississippi River), and rich floodplain and mesic hardwood ecosystems.

- Cornish Model Forest: HMZ designations include Clustered and Mosaic; conservation values include red shouldered hawk on ACLD land, rare plants and rare salamanders. This forest contains a good portion of the MHn47 native plant community found in North Central Minnesota.
- Libby Model Forest: HMZ designation is Mosaic; conservation values feature Mississippi River corridor, floodplain terrace forest, and late-successional forest plant species.
- Lakeside Model Forest: HMZ designation is Mosaic; conservation values include rare plants and rare biodiversity features in an area with high development pressure (eastern Mille Lacs Lake).

In April 2011 the Forest Guild¹³ formally designated the Cornish and Libby sites as Model Forests. They join 18 other such sites in the US and are the first in the Lake States of the upper Midwest.

ACLD carefully applies its coarse filter / fine filter approach to habitat/species management in these areas. The coarse filter consists of use of Habitat Management Zone designations and native plant community to guide broad level planning. For the fine-scale management approach, forest staff accounts for and considers rare, threatened, and endangered species on a case-by-case basis along with forest type objectives and appropriate harvest intensity on every timber sale. This is similar to how ACLD approaches all its lands but with an extra special awareness of the unique values present in these areas.

In addition, these areas have value as demonstration areas for educational purposes, both for the general public and natural resource professionals.

8.4 NPC Management

Native plant community designations guide management at both the strategic and stand-specific levels. At the strategic level NPC is used to evaluate overall forest potential and to structure basic management on that potential. At the stand level NPC helps guide forester decisions regarding site-specific management. NPC is becoming especially useful when determining management in northern hardwood

¹³The Forest Guild is a professional organization of forest stewards, associated natural resource professionals, and affiliates who are passionate about restoring and sustaining the integrity of our forests while meeting the needs of the communities that rely on them. The Forest Guild Model Forest program recognizes places, people, and relationships that foster sustainable forest management and demonstrate successful silviculture.

stands where decisions could, for instance, encourage red oak as a component. NPC will also assist decisions regarding management and harvest techniques.

At the strategic level, ACLD uses NPC to identify how forest cover types should be managed. The following table shows how ACLD uses NPC to determine the direction of strategic shifts in acres of specific cover types.

Table 17. Strategic Acreage Shift by Forest Cover Type by Native Plant Community

Native Plant Community	Ash	Lowland Hardwood	Aspen	Paper Birch	Balm of Gilead	Northern Hardwoods	Oak	White Pine	Red Pine	Jack Pine	White Spruce	Balsam Fir	Black Spruce	Tamarack	Northern White Cedar	
FDn43 MHc26	=	=	<	=	=	<	+	++	+	<	+	+	=	=	=	
FDn33 FDc34	=	=	<<	<<	=	<<	=	+	+	=	+	=	=	=	=	
MHn35 MHc35	=	=	=	=	=	<	++	+	<	<	+	=	=	=	=	
MHn47	=	=	<<	<	=	++	+	+	<	<	+	+	=	=	=	
MHn44	=	=	+	<	=	<	<	+	=	<	+	++	=	+	=	
FFn57 FFn67	+	+	<	=	=	<	=	=	=	<	=	=	=	=	=	
MHn46 MHc47	=	=	+	<	=	<	<	+	=	<	+	+	=	=	=	
WFn64 WFn55	+	=	<	=	=	=	=	=	=	=	=	=	=	=	+	
APh80 FPn82	<	<	=	=	=	=	=	=	=	=	=	+	+	+	=	
Acreage shift key:					=	remain stable					<	decrease				
					+	increase					<<	significant decrease				
					++	significant increase										

8.5 General Silvicultural Practices¹⁴

Harvest Intensity

The intensity of harvest for a given stand is determined by the consideration of a blend of factors including cover type, native plant community, harvest management zone, and special management designations. The following table identifies the range of harvest intensity used by ACLD.

¹⁴ ACLD has detailed policies and procedures covering silvicultural practices including stand selection and appraisal, timber sales, and the topics generally covered in this section.

Table 18. Harvest Intensity Key

Final / Regeneration Harvest	
Type I: Clearcut ($< 5\text{RBA}$)	Regenerate the stand by harvesting mature trees, retaining $< 5\text{-sq. ft.}$ of residual basal area (RBA) , creating an even aged forest stand. Allowing nearly full sunlight to reach the forest floor is required to adequately regenerate the stand to the desired forest type. Snag or den trees are retained for wildlife habitat purposes. Application of best management practices (BMPs) should protect water resources potentially impacted by harvest operations. The stand will be re-examined in 3-5 years to evaluate forest regeneration and timber stand improvement (TSI) needs.
Type II: Clearcut with Residuals (5-19 RBA)	Harvest the forest stand, retaining between 5-19 sq. ft. of RBA, creating a forest that is dominated by the regenerating species, but has a secondary component of mature trees. Individual or groups of residual trees are retained for future forest products, wildlife habitat, visual quality and/or forest diversity. Regeneration of desired species will occur in open areas created by the harvest. Increased diameter growth on residual trees can lead to high value timber in the future stand. Retaining live residual trees, snag, and den trees should enhance wildlife habitat. Use of BMPs should protect water resources potentially impacted by the harvest operation. The stand will be re-examined in 3-5 years to evaluate regeneration and TSI needs.
Type III: Two-age Harvest (20-34 RBA)	Harvest the forest stand, retaining between 20-34 sq. ft. of RBA, creating a forest with 2 age classes. The individual or groups of residual trees are retained for future forest products, wildlife habitat, visual quality, and/or forest diversity. Regeneration of desired species will occur in the canopy openings created by the harvest. Increased diameter growth on residual trees can lead to high value timber in the future stand. Retaining live residual trees, snag and den trees should enhance wildlife habitat. Application of BMPs should protect water resources potentially impacted by the harvest operation. The stand will be re-examined in 3-5 years to evaluate regeneration and TSI needs.
Type IV: Partial Harvest (35-40 RBA)	Harvest the forest stand, retaining between 35-49-sq. ft. of RBA. Depending on the management objective, this strategy can be utilized to regenerate the stand to mid tolerant or shade tolerant species under a shelterwood system, releasing the regeneration when it reaches the desired size and stocking, by overstory removal, or, to enhance a component of the current forest type, effectively converting the stand to a more desirable forest type comprised of the species reserved from harvest. Forest regeneration will occur in canopy gaps or openings created by harvest. Retention of snags, den trees and multiple canopy layers should enhance wildlife habitat. Applied BMPs should protect water resources potentially impacted by harvest operations. The stand will be re-examined in 3-5 years to evaluate forest regeneration or TSI needs.
Intermediate Stand Treatment	
Type V: Thin (50+ RBA)	Promote growth on quality trees through a thinning to not $< 50\text{ sq.ft.}$ of RBA. Trees to be removed based on defect, vigor or crown competition with crop trees. This strategy will provide for an even aged stand, managed for future saw-timber. A regeneration harvest will be implemented when the stand reaches the desired rotation age and/or crop trees reach the desired

Table 18. Harvest Intensity Key	
	DBH. Snags, den trees and/or mast producing trees are retained for wildlife habitat purposes. Applied BMPs should protect water resources potentially impacted by harvest operations. The stand will be re-examined in 10 years for future thinning opportunities.
Type VI: Select Cut – Uneven Age (50+ RBA)	Promote desired stand structure and composition, by harvesting marked trees, to promote saw-timber quality and quantity. Trees to be removed based on risk, defect, vigor or crown competition with crop trees, Marking will be done in all size classes to achieve the desired size/age class balance. The RBA target range is 75-90 sq. ft. This strategy will provide for an uneven aged forest stand of 4+ size/age classes that may be perpetuated. Future harvesting will occur on a 10-15 year entry cycle. Canopy gaps created by the removal of large individual or small groups of trees will promote regeneration of shade tolerant or mid tolerant species. Retaining snags, den trees, mast-producing trees, the multi-layered canopy and the perpetual mature forest condition are important wildlife habitat characteristics. Applied BMPs should protect water resources potentially impacted by harvest operations. The stand will be re-examined in 10 years to evaluate forest regeneration, TSI needs and determine future harvest entries.

Site Level Guidelines

ACLD 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. The County will specifically reference and implement these guidelines, as appropriate, at each of its management sites.

In addition, the ACLD has established additional policies that extend, implement or modify aspects of the voluntary guidelines. These can be found in the ACLD’s policies and procedures manual.

Fire Control

Primary responsibility for fighting fire lies with the Minnesota DNR. The County monitors for fire on its land and coordinates firefighting with the DNR.

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

Integrated Pest Management

ACLCD seeks to use an integrated pest management (IPM) approach to gain information on the health of Aitkin County's forests and to provide information and management options to forest managers. The main responsibilities of the ACLD IPM are:

- Monitor forest pests and provide annual training to foresters in pest detection.
- Analyze forest health conditions using field and survey data.
- Develop and maintain management options and systems regarding pest management practices and concepts.

Reforestation

Reforestation of a harvested site depends upon the cover type and management objectives for the stand. Natural regeneration is relied upon whenever possible or viable; this includes monitoring for advanced regeneration prior to harvest.

Artificial regeneration will be used when appropriate for the target species.

Stands will be converted from one cover type to another based on the site's native plant community and management objectives. For example, pine will only be planted on sites that 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. In general, ACLD does not use Highly Hazardous Chemicals (HHCs) in its management. Specific policies for the use of chemicals are contained in ACLD's "Policy and Procedures" manual.

Natural Disturbance

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

- Assess the stand for immediate and future management actions. This involves consideration of the native plant community, surviving trees (type, condition, age), and defined management objectives (including recreational activities) for the area. Based on this assessment the County will prepare an action plan that integrates strategic and tactical considerations.
- Salvage merchantable timber. If the action plan determines that salvage is desired and feasible, a salvage timber sale will be designed and implemented.
- Revise inventory and management schedules. As part of the County's annual inventory update, information reflecting the stand's new condition and status (e.g., change in cover type and age) 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.

Invasive / Exotic Species

The County monitors its lands for signs of undesired exotic species. In general the species being looked for are upland trees and shrubs but also includes wetland species such as purple loosestrife. The policy is to remove such species when they occur in situations where they jeopardize stand or area

management objectives. The County may confer with MnDNR and US Forest Service specialists when devising appropriate measures to address a particular situation.

Biomass and Non-Timber Products

The County allows harvesting for biomass and the gathering of various non-timber resources and products as long as such activity is conducted in a manner not to endanger sustainability of the forest resource. The following are the primary such products gathered or harvested on ACLD administered lands in accord with ACLD policies and procedures to ensure sustainable resources and to protect the overall forest.

- Biomass and chipping operations provide a management challenge to balance the benefits of utilizing wood resources while protecting the residual forest. Biomass chipping (tops/limbs) is treated as a separate permit. Biomass harvesting is not allowed on all sites in consideration of such factors as impact on soils and residual trees.
- Maple trees are a common component in upland forests and are a source for local maple syrup producers. Gathering from “tapping” trees is regulated through a permit process. Guidelines are enforced that protect trees from excessive damage and allow the trees to recover.
- Spruce tops are harvested as ornamental trees through a permit process. The careful management of the harvest promotes natural regrowth. Infrequent entry and harvesting guidelines are enforced to ensure a sustainable harvest and minimizing negative impacts.
- The bark of paper birch trees may be gathered primarily for ornamental purposes and is regulated by a permit process to insure a sustainable harvest.
- Boughs of balsam fir and other conifers are gathered for decorative materials such as wreaths. Gathering is regulated by a permit process to insure a sustainable harvest.

8.6 Timber Sale Procedures

The Aitkin County Land Department has adopted policies and procedures governing timber sales. These policies and procedures may be obtained from the Land Department.

8.7 Cover Type Management

The following pages provide key information regarding the County’s strategic management direction for each of the major forest cover types. Cover type describes individual forest stands in terms of the dominant tree species present or anticipated to be present.

The information provided for each cover type is:

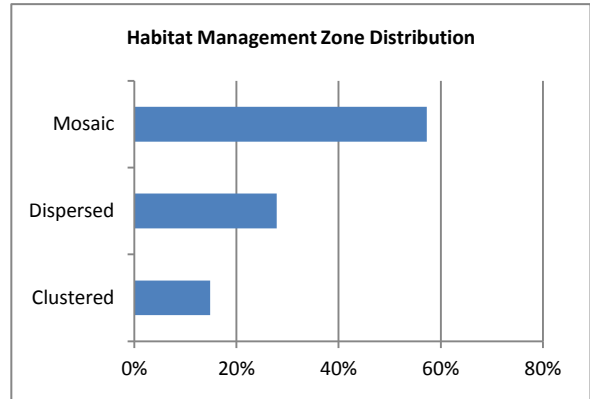
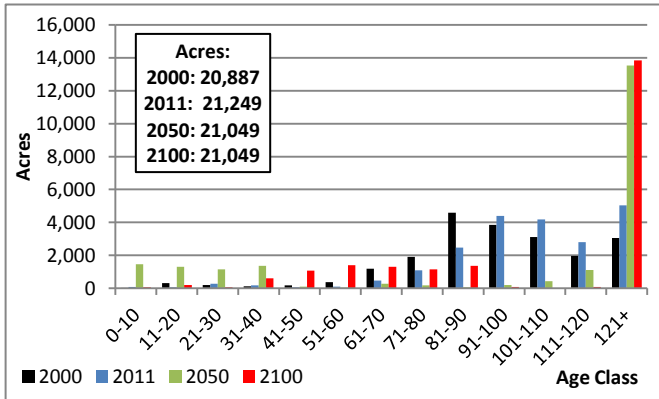
- **General Management Focus:** Statement indicating long-term management objective.
- **Age Class Chart:** Graph showing distribution of cover type acres by 10-year age classes in 2000, 2011, 2050 and 2100.
- **Habitat Management Zone Distribution:** Bar chart showing distribution of cover type acres by the three HMZ designations.
- **Native Plant Community Management Direction:** Indication of the direction of long-term change in acres (decrease, stable, increase) on the NPCs found in Aitkin County.
- **Harvest Intensity:** Harvest intensities used for this cover type.
- **Reforestation:** Reforestation techniques applied for this cover type.
- **Notes:** Additional notes regarding management of the cover type.

Ash/Lowland Hardwoods

General Management Focus:

Identifying and implementing effective regeneration strategies and improving the growth of quality trees through thins.

Harvesting in these forest types is highly dependent on market demand, which fluctuates dramatically. It is anticipated that the demand for hardwood pulpwood will facilitate management to help increase amount of younger age class stands, especially among ash types.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	=	=	=	=	=	+	=	+	<
% of Cover Type in 2011	0.1%	0.0%	2.5%	3.4%	4.6%	9.3%	3.1%	55.9%	21.1%

Key: = stable; < & << decrease; + & ++ increase.

	Harvest Intensity		Used
Final / Regeneration	I	Even age clearcut	
	II	Even age clearcut with residuals	
	III	Two age	✓
	IV	Even age partial cut	✓
Intermediate Stand Treatment	V	Even age thinning	✓
	VI	Uneven age selection	✓

Reforestation
Natural regeneration.

Notes:

Rotation age: 90-120.

Intermediate intensity harvests to promote growth on quality trees.

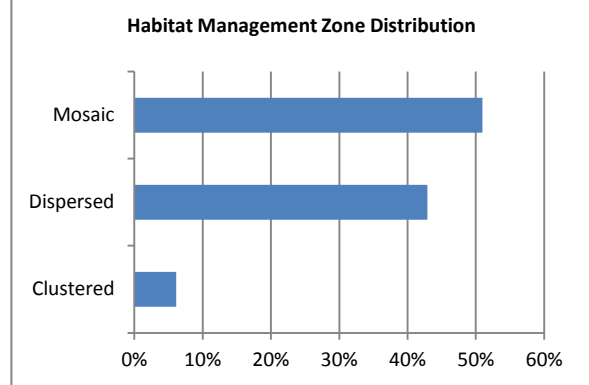
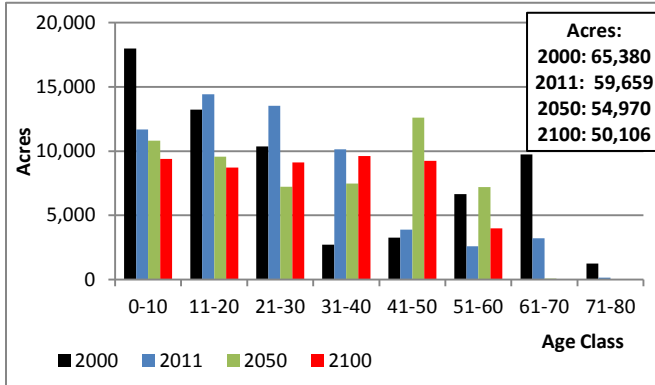
Emerald Ash Borer will impact county forests at some as-of-yet unknown future time. ACLD's response will be in concert with that of the Minnesota DNR and other major land managers.

Aspen

General Management Focus:

Working to create a more balanced age-class distribution.

In recent years the average annual harvest has been above sustainable levels due to the need to correct an extreme age class imbalance. Future management will bring about age class balance and a reduction in acres as less desirable aspen land is converted to other forest types, especially northern hardwoods/oak and pine.



Native Plant Community Management Direction

NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	<	<<	=	<<	+	<	+	<	=
% of Cover Type in 2011	18.7%	5.6%	27.9%	18.0%	16.6%	0.6%	12.5%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used
Final / Regeneration	I	Even age clearcut	✓
	II	Even age clearcut with residuals	✓
	III	Two age	
	IV	Even age partial cut	✓
Intermediate Stand Treatment	V	Even age thinning	
	VI	Uneven age selection	

Reforestation
Natural regeneration.

Notes:

Rotation age: 45-65.

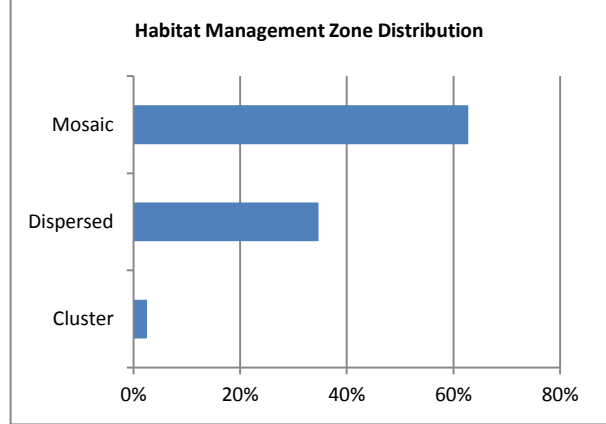
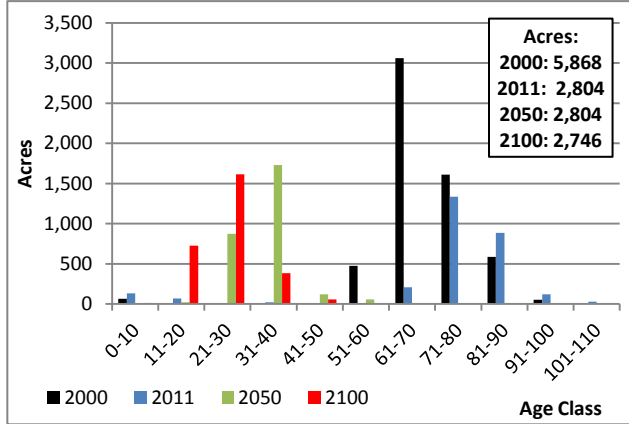
Final / Regeneration intensity harvests at rotation age to regenerate aspen or convert to conifers by planting on suitable sites.

Paper Birch

General Management Focus:

Implementing effective regeneration strategies.

The long-term goal is to reduce birch acres in favor of conversion to conifers on appropriate sites. Efforts to regenerate and maintain this type will focus on mesic NPCs for sawtimber potential. Additionally, the goal is to maintain paper birch as a component in other forest types.



Native Plant Community Management Direction

NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	=	<<	=	<	<	=	<	=	=
% of Cover Type in 2011	19.6%	3.7%	40.7%	19.8%	8.8%	0.4%	7.0%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

	Harvest Intensity		Used
Final / Regeneration	I	Even age clearcut	✓
	II	Even age clearcut with residuals	✓
	III	Two age	✓
	IV	Even age partial cut	✓
Intermediate Stand Treatment	V	Even age thinning	
	VI	Uneven age selection	

Reforestation
Natural regeneration. Scarification.

Notes:

Rotation age: 60-65.

Final /Regeneration intensity harvests (Types I & II) at rotation age to regenerate birch or convert to conifers on suitable sites, and, (Types III & IV) to promote a desirable secondary tree species (conifer or hardwood).

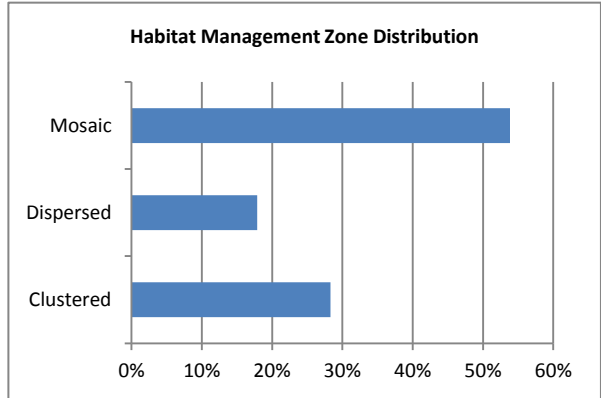
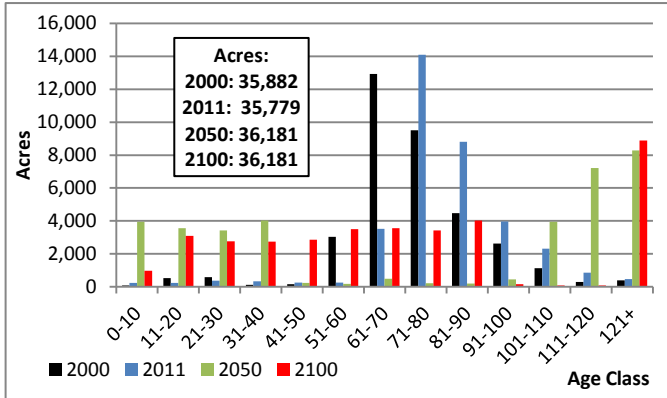
On dry-mesic and wet-mesic native plant communities management will primarily focus on retaining birch as a component species within other cover types.

Northern Hardwoods

General Management Focus:

Improving the growth of quality trees through thins and implementing effective regeneration strategies.

Long-term objective is to increase acres primarily through shifts from aspen types on mesic sites highly suited for sawtimber quality trees. On most sites, basswood and oak component will be favored but quality trees of other species including maple and yellow birch will also be promoted. On drier sites white pine restoration efforts will occur.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDC34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	<	<<	<	++	<	<	<	=	=
% of Cover Type in 2011	18.4%	2.0%	33.9%	25.1%	8.9%	1.0%	10.5%	0.2%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used
Final / Regeneration	I	Even age clearcut	
	II	Even age clearcut with residuals	
	III	Two age	
	IV	Even age partial cut	✓
Intermediate Stand Treatment	V	Even age thinning	✓
	VI	Uneven age selection	✓

Reforestation
Natural regeneration. Scarification. Burning.

Notes:

Rotation age: 90-120.

Intermediate intensity harvests to promote growth on quality trees.

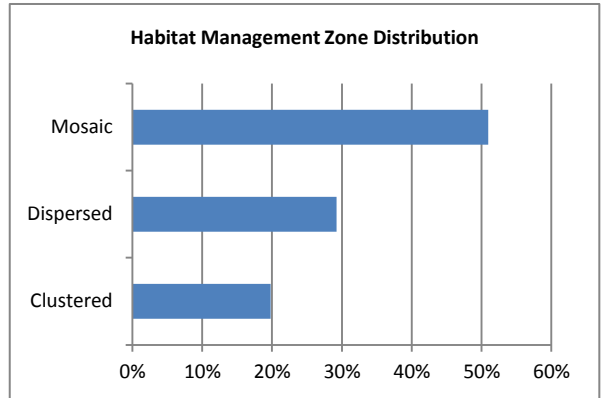
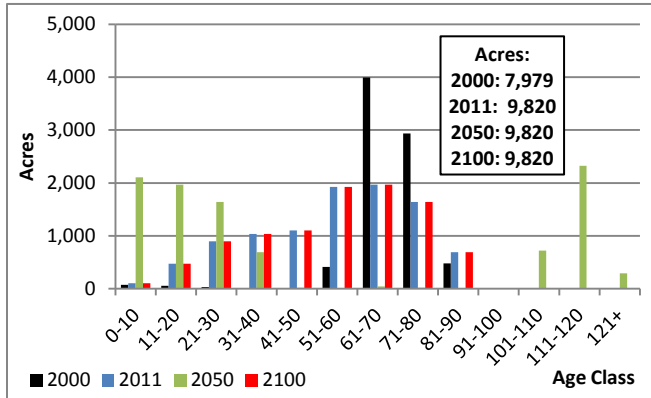
Final / regeneration intensity harvests in degraded stands to promote desirable regeneration.

Oak

General Management Focus:

Improving the growth of quality trees through thins and implementing effective regeneration strategies

Due to a severe age-class imbalance weighted to middle-aged stands ACLD goals are: improve the growth and yield of existing stands through intermediate treatments (e.g., crop tree release), and, accelerate regeneration practices to secure a better future age-class distribution.



Native Plant Community Management Direction

NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	+	=	++	+	<	=	<	=	=
% of Cover Type in 2011	22.2%	1.9%	49.0%	14.8%	4.7%	1.2%	6.2%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used
Final / Regeneration	I	Even age clearcut	
	II	Even age clearcut with residuals	
	III	Two age	✓
	IV	Even age partial cut	✓
Intermediate Stand Treatment	V	Even age thinning	✓
	VI	Uneven age selection	

Reforestation
Natural regeneration. Scarification. Burning. Hand planting.

Notes:

Rotation age: 100-120.

Intermediate intensity harvests to promote growth on quality trees.

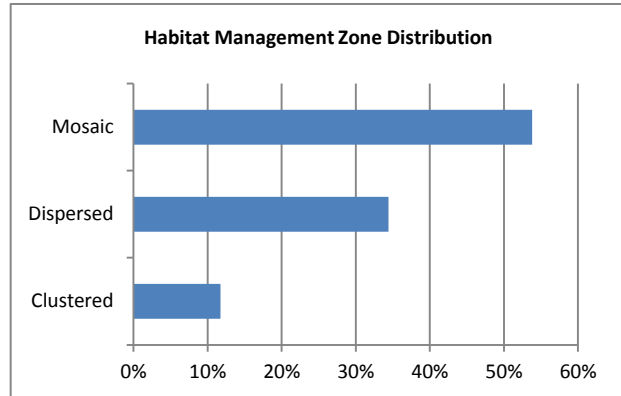
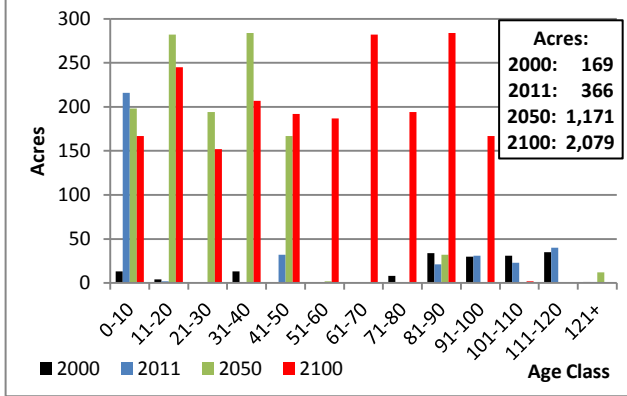
Final / regeneration intensity harvests in degraded stands to promote desirable regeneration.

White Pine

General Management Focus:

Identifying and implementing effective regeneration strategies and improving the growth of quality trees through thins.

Long-term objective is to increase the number of acres through a shift from aspen, birch, and hardwood types on mesic sites for sawtimber potential.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	++	+	+	+	+	=	+	=	=
% of Cover Type in 2011	46.2%	31.7%	2.7%	6.8%	8.2%	0.0%	4.4%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut		Natural regeneration. Scarification. Burning. Hand planting. Herbicides. Other.	
	II	Even age clearcut with residuals			
	III	Two age			
	IV	Even age partial cut	✓		
Intermediate Stand Treatment	V	Even age thinning	✓		
	VI	Uneven age selection	✓		

Notes:

Rotation age: 120-150.

Objective is to expand acres of white pine as cover type and as component within stands.

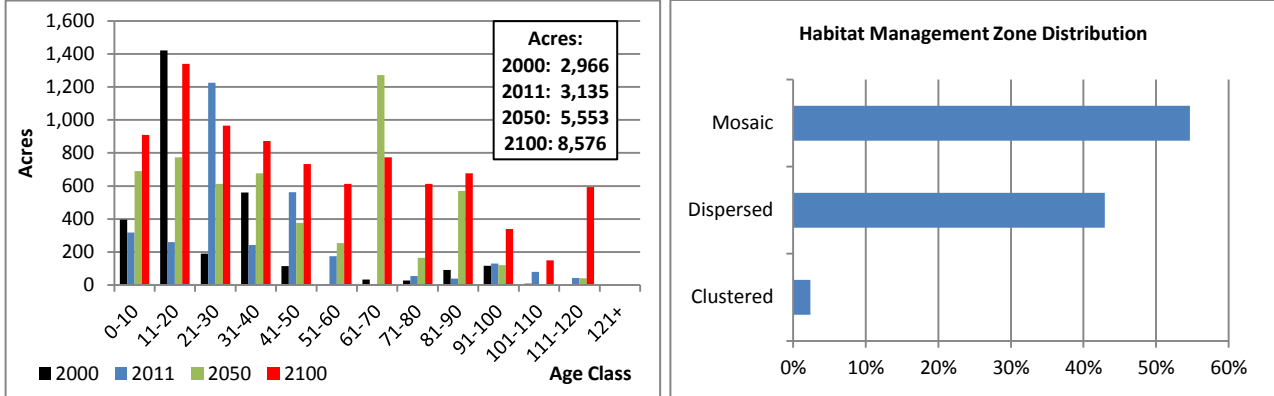
Strategies will be implemented to avoid or minimize damage from blister rust, deer browsing, and white pine weevil.

Red Pine

General Management Focus:

Identifying and implementing effective regeneration strategies and improving the growth of quality trees through thins.

Long-term objective is to increase the number of acres through a shift from aspen, birch, and hardwood types on dry-mesic sites for sawtimber potential.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	+	++	<	<	=	=	=	=	=
% of Cover Type in 2011	26.3%	26.4%	21.0%	13.6%	7.5%	0.0%	5.1%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut	✓	Burning. Hand planting. Herbicides.	
	II	Even age clearcut with residuals	✓		
	III	Two age			
	IV	Even age partial cut			
Intermediate Stand Treatment	V	Even age thinning	✓		
	VI	Uneven age selection			

Notes:

Rotation age: 90-120.

Intermediate intensity harvest to promote growth on quality trees and to capture product.

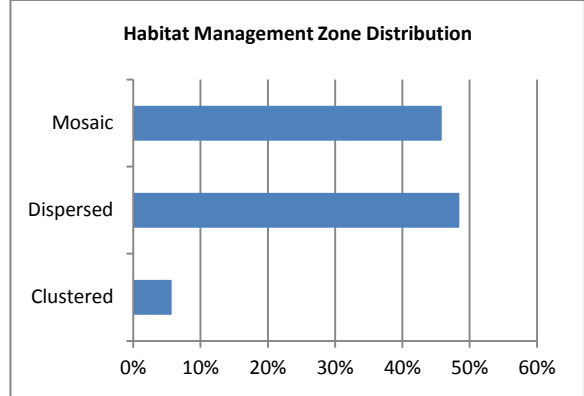
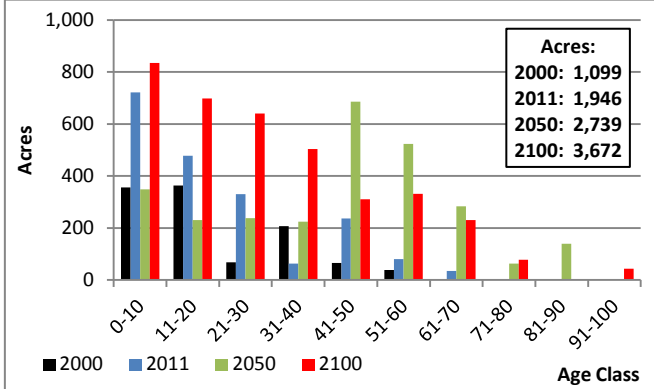
Final / regeneration intensity harvests to regenerate stands.

White Spruce

General Management Focus:

Promoting mixed stands comprised of spruce/fir and deciduous trees.

Most of the existing white spruce stands are the result of planting over the past 50 years. The long-term objective is to increase the amount of this type primarily through shifts from birch and hardwood types on wet-mesic sites.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	+	+	+	+	+	=	+	=	=
% of Cover Type in 2011	26.1%	8.8%	25.1%	16.7%	13.7%	1.6%	8.0%	0.0%	0.0%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut		Natural regeneration. Scarification. Hand planting.	
	II	Even age clearcut with residuals			
	III	Two age	✓		
	IV	Even age partial cut	✓		
Intermediate Stand Treatment	V	Even age thinning	✓		
	VI	Uneven age selection			

Notes:

Rotation age: 75-90.

Intermediate intensity harvests to promote growth on quality trees.

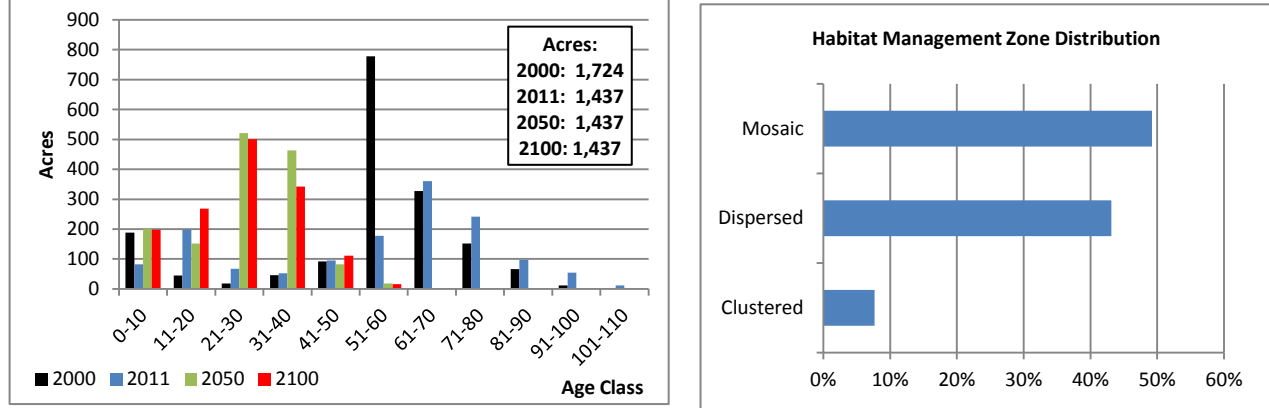
Final / regeneration intensity harvests to promote desirable regeneration, either natural or planted.

Balsam Fir

General Management Focus:

Promoting mixed stands comprised of spruce/fir and deciduous trees.

Most of the existing balsam fir stands are natural in origin. The long-term objective is to increase the amount of this type primarily through shifts from birch and hardwood types on wet-mesic sites.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	+	=	=	+	++	=	+	=	=
% of Cover Type in 2011	17.4%	9.3%	2.3%	12.7%	34.7%	0.3%	6.1%	14.7%	2.4%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut	✓	Natural regeneration. Scarification. Direct seeding.	
	II	Even age clearcut with residuals	✓		
	III	Two age	✓		
	IV	Even age partial cut	✓		
Intermediate Stand Treatment	V	Even age thinning			
	VI	Uneven age selection			

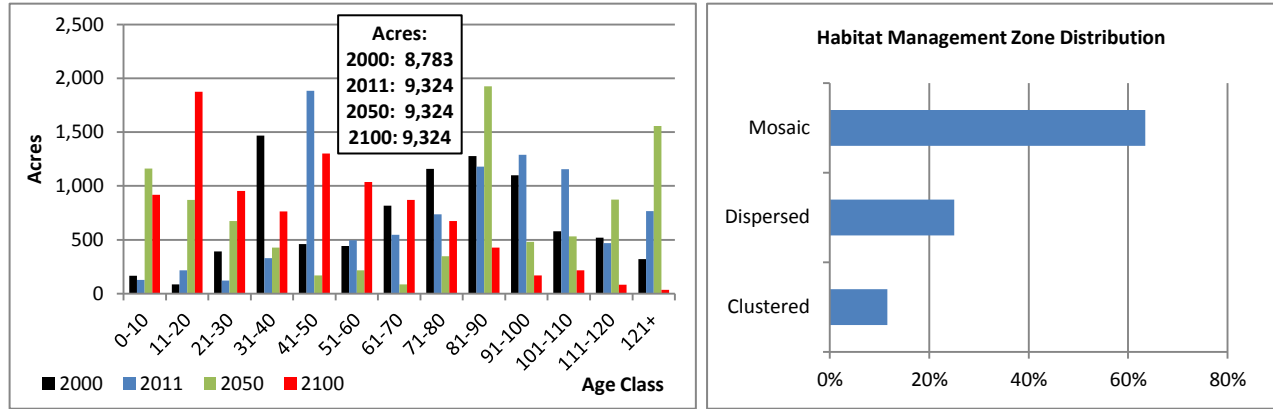
Notes:
 Rotation age: 50-60.
 Final / regeneration intensity harvests at rotation / age to regenerate balsam fir / white spruce, by natural seeding or planting.
 Intermediate intensity harvests to promote a mixed conifer / deciduous (i.e., spruce-fir / aspen-birch) stand.

Black Spruce, Lowland

General Management Focus:

Establishing adequate lowland conifer regeneration.

Utilize market demand to generate younger stands and a more balanced age class distribution.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDC34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	=	=	=	=	=	=	=	=	+
% of Cover Type in 2011	0.0%	0.0%	0.3%	0.5%	1.0%	0.0%	0.2%	24.9%	73.1%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut	✓	Natural regeneration. Burning. Direct seeding.	
	II	Even age clearcut with residuals	✓		
	III	Two age			
	IV	Even age partial cut			
Intermediate Stand Treatment	V	Even age thinning			
	VI	Uneven age selection			

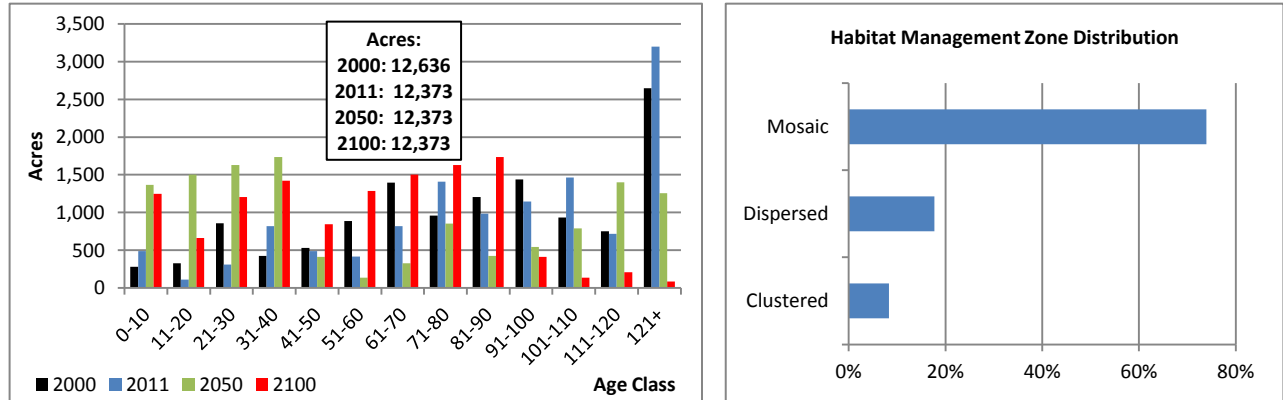
Notes:
 Rotation age: 90-110.
 Final / regeneration intensity harvests at rotation age to regenerate black spruce by natural or artificial seeding.
 In stagnant black spruce stands, tree tips will be harvested for ornamental trees on a sustainable basis.

Tamarack

General Management Focus:

Establishing adequate lowland conifer regeneration.

Utilize market demand to generate younger stands and a more balanced age class distribution.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDC34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	=	=	=	=	=	+	=	+	<
% of Cover Type in 2011	0.1%	0.0%	1.0%	0.0%	1.4%	0.0%	0.5%	19.7%	76.8%

Key: = stable; < & << decrease; + & ++ increase.

Harvest Intensity			Used	Reforestation	
Final / Regeneration	I	Even age clearcut	✓	Natural regeneration. Burning. Direct seeding.	
	II	Even age clearcut with residuals	✓		
	III	Two age			
	IV	Even age partial cut			
Intermediate Stand Treatment	V	Even age thinning			
	VI	Uneven age selection			

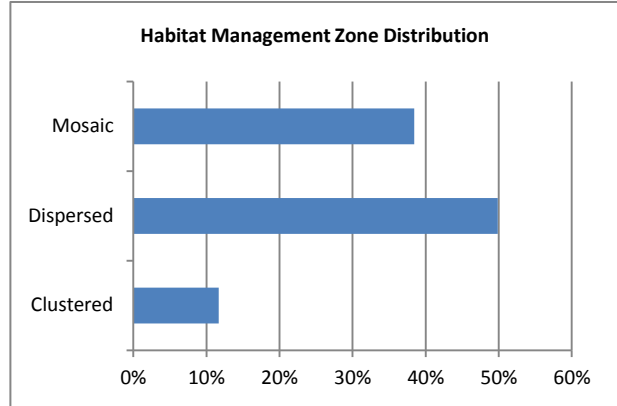
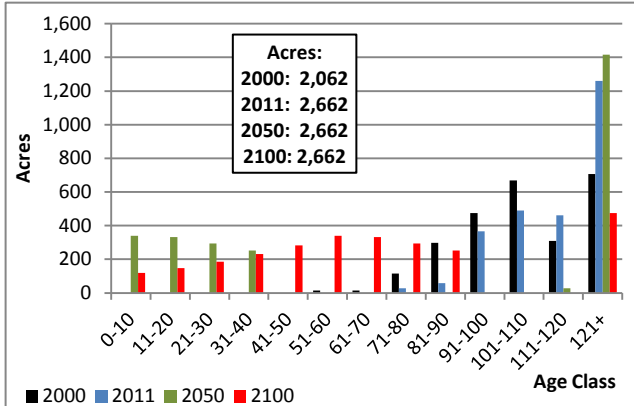
Notes:
 Rotation age: 90-110.
 Final / regeneration intensity harvests at rotation age to regenerate tamarack by natural or artificial seeding.

Northern White Cedar

General Management Focus:

Establishing adequate lowland conifer regeneration.

In recent years regeneration has been hindered by deer browsing. Thus cedar harvesting has been limited to salvage harvests (e.g., beaver flooded stands). Acreage has remained stable since cedar is a long-lived species. Until a viable solution to regeneration is discovered, harvesting will remain limited.



Native Plant Community Management Direction									
NPC	FDn43	FDn33	MHn35	MHn47	MHn44	FFn57	MHn46	WFn64	APn80
	MHc27	FDc34	MHc36			FFn67	MHc47	WFn55	FPn82
Change Direction	=	=	=	=	=	=	=	+	=
% of Cover Type in 2011	0.0%	0.0%	0.0%	3.5%	2.1%	0.0%	0.0%	78.9%	15.4%

Key: = stable; < & << decrease; + & ++ increase.

	Harvest Intensity		Used
	Level	Description	
Final / Regeneration	I	Even age clearcut	
	II	Even age clearcut with residuals	
	III	Two age	✓
	IV	Even age partial cut	
Intermediate Stand Treatment	V	Even age thinning	
	VI	Uneven age selection	✓

Reforestation
Natural regeneration.
Burning.
Hand planting.
Other.

Notes:

Only salvage harvests will be applied until reliable regeneration methods are established.
Most stands will undergo natural disturbance to reset stand.

8.8 Strategic Management Summary

The following table summarizes long-range management in terms of acres managed (final harvest and intermediate treatments) by forest cover type by decade.

Year	Aspen		BSL-T-C	Ash/Lowland Hardwood		Birch	Northern Hardwood/Oak		Balsam Fir	Red/White/Jack Pine		White Spruce		Total
	Harvest	Thin		Harvest	Thin		Harvest	Thin		Harvest	Thin	Harvest	Thin	
2001-2010	1,082	94	77	21	90	159	336	860	57	15	14	4	26	2,835
2011-2020	890	125	306	141	229	194	484	1,523	51	13	194	2	36	4,188
2021-2030	875	125	298	123	224	65	510	1,509	51	11	267	1	60	4,119
2031-2040	1,082	125	312	135	244	2	544	1,509	11	12	293	11	92	4,372
30-year avg.	949	125	305	133	232	87	513	1,514	38	12	251	5	63	4,226
2041-2050	1,085	125	278	131	205	0	558	1,051	20	12	310	8	157	3,940
2051-2060	1,074	125	217	109	226	6	378	629	10	15	412	23	159	3,383
2061-2070	1,073	125	221	54	225	46	372	1,023	39	33	454	31	148	3,844
30-year avg.	1,077	125	239	98	219	17	436	901	23	20	392	21	155	3,722
2071-2080	1,004	125	215	6	229	172	370	1,296	48	33	450	60	110	4,118
2081-2090	996	125	236	19	222	55	340	1,466	26	83	504	50	89	4,211
2091-2100	955	125	210	6	223	1	83	1,519	18	18	579	53	86	3,876
30-year avg.	985	125	220	10	225	76	264	1,427	31	45	511	54	95	4,068
90-year avg.	1,003	125	255	80	225	60	404	1,281	30	26	385	27	104	4,006

Notes: "BSL-T-C" = black spruce, lowland / tamarack / northern white cedar.
Aspen includes Balm of Gilead.