Timber Harvest on State Land

Fiscal Year 1997 Report

to the
Senate Environment &
Natural Resources Finance Division
and
House Environment &
Natural Resources Finance Committee

Minnesota Department of Natural Resources
Division of Forestry

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Report to the Senate Environment & Natural Resources Finance Division and House Environment & Natural Resources Finance Committee

Prepared Pursuant to the
1995 Laws of Minnesota
Chapter 220, Section 5, Subdivision 4

By the
Minnesota Department of Natural Resources
Division of Forestry

November 1, 1997

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I. Introduction

This report is prepared pursuant to the 1995 Laws of Minnesota, Chapter 220, Section 5, Subdivision 4 that states in part:

> By November 1, 1996, and November 1, 1997, the commissioner shall submit to the senate environment and natural resources finance division and the house environment and natural resources finance committee a report that includes: 1) the planned harvested levels for the preceding fiscal year and the fiscal year in which the report is being submitted, and documentation of the methodology used to determine these levels; 2) the volume of, and revenue from, timber sales on state land during the preceding fiscal year; and 3) a description of the resource protection guidelines followed in implementing the planned harvest.

The Department of Natural Resources' forestry staff is available to discuss this report with the committee chairs and members.

II. Background

The 1995 Legislature appropriated $2,015,000 to the Department of Natural Resources (DNR) for the 1996–1997 biennium. The purpose of the appropriation was to provide additional personnel and forest management monies to enable the DNR to reach an annual long-term sustainable harvest level estimated at 875,000 cords for state-owned timber lands. At the time this legislation was being considered, the most recent historical information was from fiscal year (FY) 1994 when the DNR offered for sale 702,000 cords of wood, of which 661,000 cords were actually sold.

The amount of the appropriation ($585,000 for the first year of the biennium and $1,430,000 for the second year) was based on revenues from timber sales increasing over those received in FY 1994. The additional revenue was expected to cover the additional expenses associated with phasing in the increased timber sales effort over the two-year period. In effect, the appropriation was to be "budget neutral." The increased harvest was expected to come primarily from birch, tamarack, lower-valued hardwoods, and market-fringe aspen plus pine, spruce, and hardwood thinnings.

Table 1 - Increased timber sales were to be phased in as:

Cords Sold			
	FY 1994	**FY 1996**	**FY 1997**
Base	661,000	661,000	661,000
Increase		127,000	214,000
Total		788,000	875,000

It was estimated that it would take three years (FY 1996–FY 1998) to fully phase in the program on both the revenue and cost sides of the ledger. Revenues from timber sales are received over time as explained later in this report. Based on FY 1995 sale results when the appropriation was being considered, additional timber harvested was estimated to have a weighted average value of $15.77 per cord with an estimated gross revenue of $3,374,780. Costs were based on $7.67 per cord expended on wood currently appraised but remaining unsold (41,000 cords in FY 1994) plus $9.24 per cord for new offerings.

Table 2 - Assuming that future timber sold would be distributed by land class in the same proportions as FY 1994, the revenue and management costs by land class for the fully implemented program would be as follows:

Estimated Long-Term Average Annual Program Revenues and Costs			
Land Type	**Gross Revenue**	**Costs**	**Net Revenue**
Trust Lands (56%)	$1,889,880	$1,071,275	$818,605
Acquired (19%)	641,200	363,465	277,735
Con-Con (20%)	674,960	382,600	292,360
Wildlife (5%)	168,740	95,650	73,090
Total All Lands	$3,374,780	$1,912,990	$1,461,790
Disposition of Gross Revenues (based on increased annual sales of 214,000 cords)			
Trust Funds	$818,605		
County Transfers	$337,480	(50% of Con-Con Receipts)	
Game & Fish Funds	$168,740		
General Fund	$2,049,955	(100% of Acquired Receipts + 50% of Con-Con Receipts + Certified Trust Costs)	
General Fund Net Profit After Costs	$2,049,955 – $1,912,990 = **$136,965**		

The appropriation was intended to fund 13 field forester positions in FY 1996 and cover related forest management costs, such as reforestation, associated with the increased harvest in FY 1997. The DNR was also to follow existing guidelines for protection of forest resource values in implementing planned harvests, as it was to do with all state land timber sales.

Shortly after the start of FY 1996 during the period July 9 to July 14, 1995, a tornado and several windstorms caused severe damage across northern Minnesota. The extended duration of straight-line winds in excess of 100 miles per hour snapped, leveled, and bent vast expanses of trees. Approximately 375,000 acres of forest lands were affected by the windstorms and in August, 15 affected counties and the White Earth Reservation were declared a federal disaster area by President Clinton.

The volume of timber blown down or damaged by the storms on all ownerships was estimated at 665,000 cords. Salvage harvesting had to be accomplished quickly to utilize the downed or damaged wood before it deteriorated or created insect or fire problems. To encourage loggers to harvest storm-damaged timber, Governor Carlson signed Executive Order #95-11 on August 28,

1995. This granted authority to the Commissioner of Natural Resources to extend, without penalty, the expiration dates of those state permits for standing timber that loggers already held, if the loggers would redirect their harvest to salvage sales. One hundred fifty-five permits were extended under this order.

The sudden availability of storm-damaged timber produced a flood of wood on the market. This not only dampened timber prices, but reduced the harvest that might have occurred on existing timber permits and those sales offered in FY 1996. However, it's to the credit of Minnesota's natural resource managers, loggers, and forest industry workers, who made adjustments in their operations, that as much of the damaged wood was utilized as possible.

About 45 percent to 50 percent of the 665,000 cords damaged in the July storms was recovered for products, primarily pulpwood for paper and oriented strand board (OSB). Aspen prices in 1996 temporarily declined while this timber was being salvaged.

Lingering problems with absorbing this flood of wood at a time when the demand for paper and OSB softened during FY 1997, led to the enactment of legislation (1997 Laws of Minnesota, Chapter 119, Section 6) that extended, for one year, all state land timber harvest permits expiring in the 1997 calendar year.

III. FY 1997 Planned Harvest Levels and Accomplishments

Volume Offered and Sold

Each fiscal year, the Division of Forestry prepares an annual work plan that outlines targets to be accomplished for its major programs.

Table 1 - Annual harvest levels planned in each region from existing timber management plans:

		FY 1997		
	Region	**Planned (Cords)**	**Offered (Cords)**	**Sold (Cords)**
I	Bemidji	243,910	265,160	215,660
II	Grand Rapids	311,780	308,780	264,000
III	Brainerd	139,160	141,300	120,920
V	Rochester	3,460	4,560	3,060
VI	Metro	—	40	40
	Total	698,310	719,840	603,680

The amount of timber offered for sale during FY 1997 exceeded the division's work plan goal (698,310 cords) by 21,530 cords. However, the legislative appropriation was based on the value of timber actually sold, not just offered for sale. The amount of timber actually sold was 271,320 cords short of the 875,000 cord appropriation target. This situation was partially caused by current market conditions and unharvested wood under contract from previous years.

Revenues Generated

To relate timber harvest levels to actual receipts or "cash flow," it should be pointed out that most revenue from DNR timber sales occurs when the wood is actually harvested, not when the permit is sold. A permittee is required to provide only 25 percent of the appraised value of a timber sale at the time of the purchase, which is often refunded when proof is later provided that the full value of the purchase price can be covered. As the timber is actually harvested on a permit, the permittee is billed for the value of cut timber during the billing period. See Appendix A, page 25, "MN DNR Forestry Timber Sale Permits," which describes the various features of each kind of timber permit issued by the DNR.

Table 2 - FY 1997 results compared to the three previous fiscal years:

FY	Cords Sold	Cords Harvested	Value Sold	Gross Receipts
1997	603,700	635,100	$11,829,900	$10,494,300
1996	749,700	549,800	$14,102,200	$9,638,850
1995	678,000	556,400	$13,967,300	$8,423,750
1994	661,300	677,800	$10,853,100	$7,743,750

Table 3 - Revenue from FY 1997 timber sales that came from the following land classes:

Land Type	Gross Revenue
Trust Lands	$5,703,429
Acquired	2,104,020
Con-Con	2,097,849
Wildlife	543,351
Other	45,651
Total	$10,494,300

Table 4 - FY 1997 timber sale initiative performance expected and actual changes over the FY 1994 base year[1]:

Item	FY 1997 Expected	FY 1997 Actual	Difference
New Volume Sold	214,000 cords	(57,300)[2] cords	(271,300) cords
New Receipts Generated	$3,374,780[3]	$0	$(3,374,780)
New General Fund Revenues	$1,825,465[4]	$825,982[5]	$(999,483)
New General Fund Costs	$1,430,000	$1,430,000	$0
Net General Fund Change	$395,465	$(604,018)	$(999,483)

Table 4 Notes:

[1] Expected and actual levels are reported as incremental changes from FY 1994's actual level of 661,000 cords sold.

[2] Losses in cords or dollars shown in parentheses.

[3] Expected new receipts were calculated using the FY 1994 average selling price per cord for all DNR timber sales taken, times the expected new cords to be sold. The value shown does not distinguish between dedicated and non-dedicated receipts.

[4] Expected "new" General Fund Revenues were calculated on the basis of 50 percent of Con-Con Land timber sale receipts plus acquired land timber sale receipts plus increased revenue captured from trust land timber sales through the Minn. Stat. ch. 16A.125 cost certification process.

[5] Actual "new" General Fund Revenues are the result of stumpage price inflation over FY 1994 price levels and the increase in Minn. Stat. ch. 16A.125 subd.5(1) certified costs against trust land revenues.

IV. Projections for FY 1998

The targets for FY 1998 are less than those for FY 1997 despite the original intent to offer the 875,000 cords that was the basis for the legislative appropriation. This is due to a combination of the following factors:

1. A continued reduction in the amount of timber harvested in the short term because of the extension of over 150 permits statewide allowing for the accelerated harvest of timber damaged in the 1995 windstorms.

2. Delays by forest industries and logging operations in harvesting previously purchased permits in order to complete the salvage of wind-damaged timber. The amount of timber sold and not harvested on existing DNR timber permits at the end of FY 1997 was 1,538,000 cords. This 14,000 cord increase of wood under permit as compared to the end of FY 1996 can be directly attributed to these harvest delays.

3. A reduced demand for forest products. A comparison between FY 1996 and FY 1997 illustrates the effects of a softened demand for forest products. In FY 1996, over 92 percent of the wood offered for sale was purchased. In FY 1997, even though the DNR offered less wood for sale than in FY 1996, only about 84 percent of the wood offered was purchased.

4. Lower estimates of long-term sustainable timber harvest levels on state land. Recent area timber management plans completed across the state reflect greater influence from revised or new forest management guidelines, such as the Extended Rotation Forests Guideline. Also, no new capacity by Minnesota industry is expected until the years 2000 and 2001. Present state land allowable harvest levels should be adequate to fill current industry demand.

The annual work plan targets for timber sales to be offered in FY 1998 have been set as follows:

Table 1 - Annual work plan targets for timber sales to be offered in FY 1998:

Region		Planned (Cords)	Offered (Cords)	Sold (Cords)
I	Bemidji	215,820	**Work in Progress**	
II	Grand Rapids	288,620		
III	Brainerd	124,780		
V	Rochester	400		
VI	Metro	–		
	Total	629,620		

V. Harvest Accomplishments by Silviculture System

A variety of silviculture systems and stand treatments are used in harvesting timber on DNR-administered forest lands. A silviculture system is a forest stand treatment specifically designed to attain certain reforestation results. It is usually defined in terms of the harvest method used to prepare the site for reforestation. Some stand treatments, however, involve harvest methods designed to remove valuable products and improve the quality and growth potential of the remaining trees (e.g., thinning). These stand treatments are not silviculture systems.

A silviculture system or stand treatment is chosen for a site based on the desired tree species (or mix of species) being regenerated or the biological requirements of the stand being improved by a treatment. Some silviculture systems are more adapted to certain forest cover types than others. Management objectives for particular geographic areas, along with application of current management guidelines, also influence which silviculture system is prescribed to harvest timber.

Silviculture systems and stand treatments commonly used in Minnesota include:

Clear-cut	Removing or felling, in a single cutting, all trees in the stand to prepare the site for the natural or artificial regeneration of a new even-aged stand.
Clear-cut With Reserves	Leaving varying numbers of trees, or groups of trees, in a clear-cut stand for purposes such as wildlife habitat improvement.
Group Selection	Removing trees in small groups or patches to create new age classes when seedlings are established in the cleared areas.
Seed Tree Selection	Clear-cutting an area except for certain trees, called seed trees, that are left standing singly or in groups to produce seed to restock the harvested area. Seed trees are removed after regeneration is established.
Shelterwood	A series of thinning harvests in an even-aged stand to maintain a canopy of mature trees that provides protection and conditions for establishing new seedlings in the newly opened areas of the stand.
Selective Thinning	Harvesting selected trees in a stand to remove less desirable trees, decrease stand density, and increase the future growth of the remaining trees.

Table 1 on the following two pages describes the silviculture systems and treatments applied in harvesting timber on DNR-administered lands. The figures show FY 1991 harvest data from the Minnesota Generic Environmental Impact Statement's (GEIS) Silvicultural Systems Background Paper and harvest data for FY 1996 and FY 1997 compiled from DNR Forestry's forest development module reports. In comparing the figures for the three years, it is important to note the change in the percent of various forms of clear-cutting (i.e., clear-cut, clear-cut with reserves, group selection). In 1991 clear-cutting was used in 95 percent of timber harvesting operations; in 1996 it was 84 percent; in 1997 it was 80 percent. Also of note is the change in the percent of thinnings, from 3 percent in 1991 to 10 percent in 1996 to 12 percent in 1997. These trends are the outcome of more intensive forest management practices, new logging technologies, and the influence of revised or new management guidelines.

Table 1 - Silviculture systems and treatments used in timber harvesting on DNR-administered state forest land by cover type for timber sold in FY 1991[1], FY 1996[2], and FY 1997[2]. Total timber sold was 30,690 acres in FY 1991, 40,880 acres in FY 1996, and 34,970 acres in FY 1997.

Cover Type[3] FY 1997 and FY 1996 timber sold acres by cover type in ( ). All acres rounded to nearest 10.		Percent of Cover Type Area Sold by Silviculture System or Stand Treatment (Note: All Percentages to Nearest 1%)								Percent of Total Sold Acres
		Clear-cut	Clear-cut With Reserves	Group Selection	Seed Tree	Shelter-wood	Selective Thinning	Row & Other Thinning	Other[4]	
Jack Pine	FY 91	82	13	3	0	0	0	1	0	7
(2,170 acres)	FY 96	40	41	1	0	1	1	4	12	5
(1,700 acres)	FY 97	42	50	0	0	0	2	2	3	5
Norway Pine	FY 91	33	4	3	0	1	15	45	0	2
(2,500 acres)	FY 96	13	5	0	0	0	44	33	5	6
(2,140 acres)	FY 97	4	1	<1	0	4	42	49	<1	6
White Pine	FY 91	White pine was not separated out as a type in the FY 1991 survey. It was included in other pine types.								
(210 acres)	FY 96	11	0	0	9	7	36	29	8	<1
(40 acres)	FY 97	0	2	18	0	39	14	27	0	<1
White Spruce/Balsam Fir	FY 91	52	44	4	0	0	0	0	0	6
(2,910 acres)[5]	FY 96	44	41	0	1	0	3	5	7	7
(2,220 acres)	FY 97	23	66	0	1	1	2	2	5	6
Black Spruce	FY 91	83	2	2	1	0	0	6	9	14
(4,270 acres)[6]	FY 96	65	29	0	0	0	2	0	4	10
(4,590 acres)	FY 97	60	35	0	2	0	1	1	2	13
White Cedar	FY 91	7	49	35	0	0	10	0	0	<1
(260 acres)	FY 96	15	73	0	6	0	3	1	2	1
(480 acres)	FY 97	7	28	2	3	0	32	23	5	1
Tamarack	FY 91	82	10	3	10	0	0	0	0	1
(1,790 acres)	FY 96	59	21	0	18	0	2	0	0	4
(2,050 acres)	FY 97	9	24	0	66	0	0	0	1	6
Oak	FY 91	24	48	12	0	0	8	2	6	1
(870 acres)	FY 96	20	27	0	3	1	42	1	7	2
(1,050 acres)	FY 97	17	9	1	0	5	54	6	8	3
Lowland Hardwoods[7]	FY 91	6	57	9	0	0	18	11	0	1
(730 acres)	FY 96	8	21	18	0	1	24	0	29	2
(650 acres)	FY 97	26	22	0	1	1	22	19	9	2
Northern Hardwoods	FY 91	7	30	10	0	13	20	21	0	2
(1,150 acres)	FY 96	8	30	14	0	1	33	0	13	3
(1,330 acres)	FY 97	2	17	14	2	3	37	14	11	4

Cover Type[3] FY 1997 and FY 1996 timber sold acres by cover type in ( ). All acres rounded to nearest 10.		Percent of Cover Type Area Sold by Silviculture System or Stand Treatment (Note: All Percentages to Nearest 1%)								Percent of Total Sold Acres
		Clear-cut	Clear-cut With Reserves	Group Selection	Seed Tree	Shelter-wood	Selective Thinning	Row & Other Thinning	Other[4]	
Aspen	FY 91	55	48	1	0	0	0	0	0	61
(20,180 acres)	FY 96	47	50	0	0	0	0	3	0	49
(15,670 acres)	FY 97	34	64	1	<1	<1	<1	<1	1	45
Birch	FY 91	46	42	16	0	0	0	0	0	4
(1,990 acres)	FY 96	42	43	1	0	0	0	0	13	5
(1,640 acres)	FY 97	18	75	1	<1	<1	0	0	6	5
Balm of Gilead	FY 91	83	16	1	0	0	0	0	0	2
(880 acres)	FY 96	55	31	0	5	0	0	0	9	2
(1,260 acres)	FY 97	50	47	0	0	0	0	<1	3	4
Other Types[8]	FY 91	**Other types were not separated out in the FY 1991 survey. They were included in the 12 types listed.**								
(970 acres)	FY 96	26	38	0	2	0	5	3	26	2
(150 acres)	FY 97	21	49	0	3	0	10	11	7	<1
TOTAL FOR ALL TYPES										
(30,690 acres)	FY 91	56	36	3	<1	<1	1	2	1	100
(40,880 acres)	FY 96	43	40	1	1	<1	6	4	5	100
(34,970 acres)	FY 97	31	48	1	4	1	7	5	2	100

Explanatory notes and definitions for Table 1:

1 FY 1991 harvest data from Minnesota GEIS, Silviculture Systems Background Paper, 1992.

2 FY 1996 and FY 1997 harvest data from area forest development module annual accomplishment reports.

3 A cover type is defined by the predominate tree species occupying the site. A specific cover type may contain trees of species other than the predominate species for which the type is named. As an example, a forest stand typed birch will often contain aspen and balsam fir trees. Some forest types such as black spruce are often quite pure while other types such as northern hardwoods contain a variety of tree species.

4 In FY 1996, almost 85 percent of the "other" harvest method was salvage of damaged or deteriorated stands. In FY 1997, 55 percent of this category was salvage.

5 In FY 1997, white spruce constituted 208 acres and balsam fir 1,978 acres in this type. In FY 1996, white spruce was 400 acres, balsam fir 2,510 acres. In FY 1991 the white spruce and balsam fir types were not separated.

6 The FY 1996 black spruce type harvest does not include 2,680 acres of stagnant black spruce type selectively thinned for commercial Christmas trees. This type of harvest removes a very small proportion (usually <1 percent) of the trees.

7 The FY 1997 lowland hardwood type harvest included 540 acres of ash type and 110 acres of lowland hardwood type. The FY 1996 lowland hardwood type harvest includes 490 acres of ash type and 240 acres of lowland hardwood type. In FY 1991 the ash and lowland hardwood types were not separated.

8 The FY 1997 and FY 1996 other types harvest includes timber harvesting from lowland and upland brush types, minor species types, and stands typed with various non-forest designations.

VI. Management Guidelines Applied to Timber Sales on DNR-Administered Lands

Protecting Water Quality and Wetlands in Forest Management

Best management practices (BMPs) are the cornerstone for protecting water quality and wetlands in the forested regions of Minnesota. They have been actively promoted in Minnesota since 1988 when they were first developed in response to mandates contained in the 1987 Amendments to the Federal Clean Water Act. In 1995, wetland BMPs were developed and incorporated into a revised BMP guidebook titled, *Protecting Water Quality and Wetlands in Forest Management: Best Management Practices in Minnesota*. These BMPs are:

- Actively promoted on state, county, federal, private industrial, nonindustrial private, and American Indian lands.
- Designed to prevent pollution of water sources by sediments, nutrients, pesticides, fuels and lubricants, organic matter, and thermal impacts, and to protect the hydrologic flow in wetlands.
- Applied to the following forest management activities:
  - Fuel and equipment management, filter strip application adjacent to open water and intermittent drainages, shade strip designation adjacent to streams, lakes, rivers, and open water wetlands,
  - Construction and maintenance of forest roads,
  - Timber harvesting,
  - Mechanical site preparation,
  - Pesticide application, and
  - Prescribed burning.

Minnesota has adopted a voluntary approach to BMP implementation that relies on the use of an effective education and training program and contract language to enhance adoption and use of BMPs. Because of the voluntary nature of the implementation program and the need to demonstrate BMP implementation rates on all land ownerships, compliance with forestry BMP recommendations is monitored on all forest land ownerships by interdisciplinary field teams. Results from the first three years of field audits (1991, 1992, and 1993) indicated an overall compliance level of 84 percent across all forest land ownerships. A majority of departures from BMP recommendations were minor (i.e., small in magnitude and localized with small potential to impact water quality). Results from the 1995 field audits, which included evaluation of compliance with newly developed wetland BMPs, showed continued improvement in the compliance of BMPs across all forest land ownerships. In addition to evaluating the level of BMP application across all forest land ownerships, information from field audits is used to provide a qualitative assessment of BMP effectiveness, identify necessary modifications to BMPs, and target future education efforts and technical assistance.

Visual Quality Best Management Practices for Forest Management

Visual quality BMPs were conceived by representatives of the tourism and timber industries who asked the DNR to participate in a stakeholder working group. The BMPs developed by the group

were printed in 1994 as a technical manual for loggers, foresters, and landowners. The BMPs are currently being implemented in northern forested counties through County Visual Quality Committees that designate the visual sensitivity levels of roads, rivers and streams, lakes, trails, and recreation areas. Fourteen counties have completed the designation and mapping process. A fifteenth county is in the process of designating its visual sensitivity levels. Hand-drawn maps produced by the County Visual Quality Committees are being transformed into electronic maps. County Land Departments and DNR offices will get copies of the files and the maps. Posters have been prepared to direct loggers and landowners to appropriate locations within the counties to view the visual sensitivity maps.

Old-Growth Forests

Identification and evaluation of old-growth forests on DNR-administered lands started with the completion of the original Old-Growth Forests Guideline in 1990. In June of 1994, a revised Old-Growth Forests Guideline was implemented following a series of three stakeholder round tables. In the first round of search for old-growth stands, the DNR identified 20,000 acres of candidate old-growth stands, and more than 7,000 acres of potential future old growth. These lands have all been reserved during the evaluation process. The nomination and field evaluation is an ongoing process and additional candidate old-growth and future old-growth stands are being identified as part of the Forestry division's timber management planning process. Stands meeting the examination criteria are added to the pool of stands to be evaluated. The "Addendum to Old-Growth Forests Guideline: Technical Procedures for Selection" (1996), puts in motion a process for region planners and landscape teams to identify location centers and where old-growth and older forests will be managed together. Landscape teams will select from the pool of field-evaluated candidate stands those designated and protected as old growth.

Extended Rotation Forests

In July of 1994, the DNR adopted a statewide Extended Rotation Forests (ERF) Guideline to be applied to DNR-administered forest lands. The goal of the guideline is to maintain designated areas of forest or stands beyond traditional harvest ages as important components of DNR-administered timber lands. A broad range of interested stakeholders provided input in the development of this guideline defining ERF on state lands and establishing a 10 percent minimum designation of ERF on DNR-administered timber lands within each landscape region. It is likely that the 10 percent minimum designation will be exceeded in many landscapes as demonstrated in the Baudette, Orr, and Effie area timber management plans. ERF designations will continue to be determined through a landscaped-based planning process, and carried out primarily through the DNR Forestry area timber management plans.

Forestry/Wildlife Habitat Management Guidelines

The 1980 Wildlife/Forestry Coordination Policy states that "...the divisions of Forestry and Fish and Wildlife are jointly charged with the responsibility of achieving the goal of integrating forest and wildlife management, while recognizing other multiple-use purposes...". The revised (1985) Forestry/Wildlife Habitat Management Guidelines address the procedures of how this is to be done for a number of activities including: timber harvest to increase food supply from new growth; retention of shelter in reserved areas; creation of openings and edge; perpetuation of key stands and associated plant species; protection and/or enhancement of wetlands; and preservation and/or enhancement of habitat or community types critical to the perpetuation of unique resources. The use of these guidelines over the past 10 years has evolved toward more pre-design of timber sales

through the coordinated timber management planning (TMP) process now being used. While the guidelines are dated, they still provide useful guidance in carrying out forest management activities.

Forest Health

Pest management guidelines developed by the Division of Forestry or adopted from research and guidelines developed by other agencies have been used in the management of forest lands for many years. These guidelines are periodically updated as new information is available from research and field trials. Guidelines for control of the following insects and diseases are incorporated in timber management activities: blister rust in white pine; pine bark beetle; oak wilt; spruce budworm; dwarf mistletoe; white pine weevil. The division also placed a moratorium on the harvest of butternut on state lands until a control is found for the butternut canker. The overall goal is to integrate pest management objectives into timber management activities so as to reduce the threat of any given pest.

Development of Timber Harvesting and Forest Management Guidelines

The Minnesota Sustainable Forest Resources Act of 1995 directs the Minnesota Forest Resources Council to develop comprehensive timber harvesting and forest management guidelines that address site-level impacts to water, air, soil, biotic, recreational, and aesthetic resources found in forest ecosystems. Technical teams are currently working on guidelines for historical/cultural resources, forest soil productivity, site-level wildlife habitat, and riparian zone management. Over 60 individuals representing a broad range of interests are participating on the technical teams. It is anticipated that the guidelines for the four topical areas will be completed by December 1997. Following their completion, the four sets of guidelines will be integrated to ensure compatibility in format and content, and then the best management practices previously developed for forest management (i.e., water quality and wetlands, visual quality) will be incorporated as well. Integration of the guidelines is expected to be completed by late summer of 1998, with the guidelines printed and distributed by the end of December 1998.

White Pine Management Guidelines

In response to concern about the white pine resource in Minnesota, a White Pine Regeneration Work Group was appointed by the DNR early in 1996. On December 19, 1996, that work group delivered a report to the Minnesota Forest Resources Council outlining strategies to increase white pine on Minnesota landscapes. In a March 10, 1997, letter to several legislators, DNR Commissioner Sando stated that the DNR is committed to carrying out the recommendations of the White Pine Strategies Work Group Report as they apply to state land management. Those commitments include: a) completing the designation of white pine old-growth and future old-growth stands in accordance with DNR Old-Growth Guidelines, 2) prohibiting the elimination of white pine from other cover types, c) managing all white pine on state-administered lands under extended rotation forestry guidelines, d) involving public input in the white pine timber management planning process, and e) providing an annual report to the Minnesota Forest Resources Council on the progress of implementing the white pine report's recommendations involving DNR programs and lands.

VII. Methodology Used to Determine Harvest Levels

The DNR derives annual harvest plans from timber management plans that are prepared for each Division of Forestry administrative area (see Appendix B, page 26). These area timber management plans (TMP) are currently being updated more frequently than in the past, new management plans covering a five-year period instead of the 10-year period of previous plans. Appendix C, page 27, provides the current status and schedule for updates to DNR Forestry area timber management plans.

The division's timber management planning process applies a modified area control method of forest regulation based on acres rather than volume to each of several cover types within a management unit (e.g., administrative area within ecological landscapes). The planning process results in a pool of forest stands that are available to be treated (harvested, thinned, salvaged, regenerated, etc.) over a five-year planning horizon. Forest regulation is a forest management concept that refers to a condition of the forest that meets desired future conditions for age class and spatial distribution and cover type composition; it should not be confused with statutory regulation.

The division's timber management planning is the planning of timber harvesting and regeneration activities in the context of long-term, broad-based natural resource objectives, intended to change current forest conditions into desired future conditions. The classic goal of forest regulation (equal acreage or volume in each age class below accepted age at harvest) is tempered on DNR-administered forest lands by other ecosystem goals such as old growth, extended rotation forests, riparian zone management, patch size, rare species and natural communities, species diversity, and spatial distribution.

Regional DNR teams comprised of representatives from Forestry (region and area forestry staff), Ecological Services (including Natural Heritage), and Wildlife (non-game and area manager) develop basic strategies or ground rules to be followed by area teams to develop cover type criteria and management recommendations to achieve desired future conditions.

Area teams comprised of local DNR Forestry, Wildlife, and other discipline personnel use the ground rules established by regional teams to develop area TMP criteria to be used in selecting stands for treatment during the five-year planning period. The area TMP criteria are also based on long-term composition goals developed by the area teams for ecological landscapes (e.g., subsections of the DNR's Ecological Classification System, see Appendix D, page 29) and the need to address various ecosystem considerations. From the criteria and long-term composition goals, the area teams develop an intermediate-term forest composition goal for the five-year period and recommended annual prescriptions (e.g., clear-cut with residuals, thinnings) for each general cover type class to achieve the intermediate goals. The criteria, intermediate composition goals, and recommended annual prescriptions by cover type are then used to select a list of stands, identified by their prescriptions and acreage, that are to be treated over the next five years.

Each Division of Forestry area develops an annual timber management work plan consisting of a subset of the five-year list of stands available to be treated. The annual timber management work plan is based on the recommended annual treatments from the TMP, with adjustments made for unexpected events such as storm damage and insect or disease outbreaks. The adjustments are made to maintain progress toward the intermediate composition goal. For instance, the annual plan may be adjusted downward if the number of acres treated in the previous year was higher than the five-year average or in recognition of staffing and budget limitations. Area annual timber

management work plans are then compiled into regional and statewide annual timber management work plans.

In the future, public involvement in area timber management planning will be more extensive than it has been in the past. The DNR is actively implementing public involvement recommendations recently made by a 15-member public work group convened by the commissioner. Although the group's recommendations related specifically to white pine timber management planning, their implementation will result in more emphasis on public involvement in general. Emphasis is on involving the public proactively and early in the planning process.

While volume is the basis for comparisons in reference to sustainable harvest levels in this report, it is important to remember that the five-year TMP and annual harvest plans are developed using a modified area control method that describes planned harvests in terms of acres to be treated. The volume of timber contained within a planned harvest level is a secondary attribute of the area selected for treatment.

VIII. Forest Products Outlook for 1998

The following statements represent a forest product market outlook for 1998. This outlook may have some effect on stumpage prices and timber demand.

Pulpwood for Paper

Pulpwood for paper and pulp accounts for 36 percent of the total harvest in Minnesota. The six major paper companies in Minnesota producing coated, uncoated, and super calendered lightweight papers are expected to operate at capacity in 1998. Prices for paper produced by Minnesota mills have improved since mid-1997. The positive health of the general economy has encouraged more magazine advertising, more catalogs and brochures, bigger annual reports, more direct mail pieces, and more newspaper advertising inserts. This increase in paper supplements has increased the demand for Minnesota-produced papers followed by gradual increases in paper prices. The industry outlook for 1998 is "greatly improved profitability."

Pulpwood for Oriented Strand Lumber (OSB)

Pulpwood for OSB accounts for 34 percent of the total harvest in Minnesota. The six oriented strand board (OSB) mills in Minnesota continue to rely on aspen as their species of choice although the technology in OSB processing now allows 10 percent to 20 percent of other hardwoods (birch, maple, and pine) in the board.

Wholesale prices for OSB have declined since mid-1996 but are showing an upward trend in the fourth quarter of 1997. Therefore, plants in Minnesota producing commodity board are hoping to "break even" on costs in 1998. One mill, Trus Joist MacMillan, is not affected because of the special product they produce.

These lower prices are a result of increased production capacity of OSB in the U.S. and Canada. It is projected that it will take two to three years for this increased production to equalize with demand. Therefore, Minnesota OSB mills will continue to be at a "break even" status. Minnesota's economy should expect some down time, intentional and unplanned, for the OSB industry in 1998.

Sawtimber Industry

This is a bright spot for Minnesota's forest industry in 1997 that will continue through 1998. The demand for both hardwood and softwood sawbolts and sawtimber continues unabated. Stumpage prices for good quality sawtimber will continue to increase, especially in northern Minnesota.

Summary

In the long term, the pulp, paper, and OSB industries in Minnesota will continue to operate at near capacity. Technological changes within the mills will allow them to change their species mix to better reflect the composition of the forest. Stumpage prices will increase slightly as competition for the mature resource will tighten.

Stumpage prices for most species, except aspen, should remain fairly constant in 1997 and 1998. No new mill capacity is expected to occur until 2001. Aspen, because of its wide use and age class imbalance, will be more limited in availability in coming years. Aspen prices will continue a 3 percent to 5 percent yearly increase.

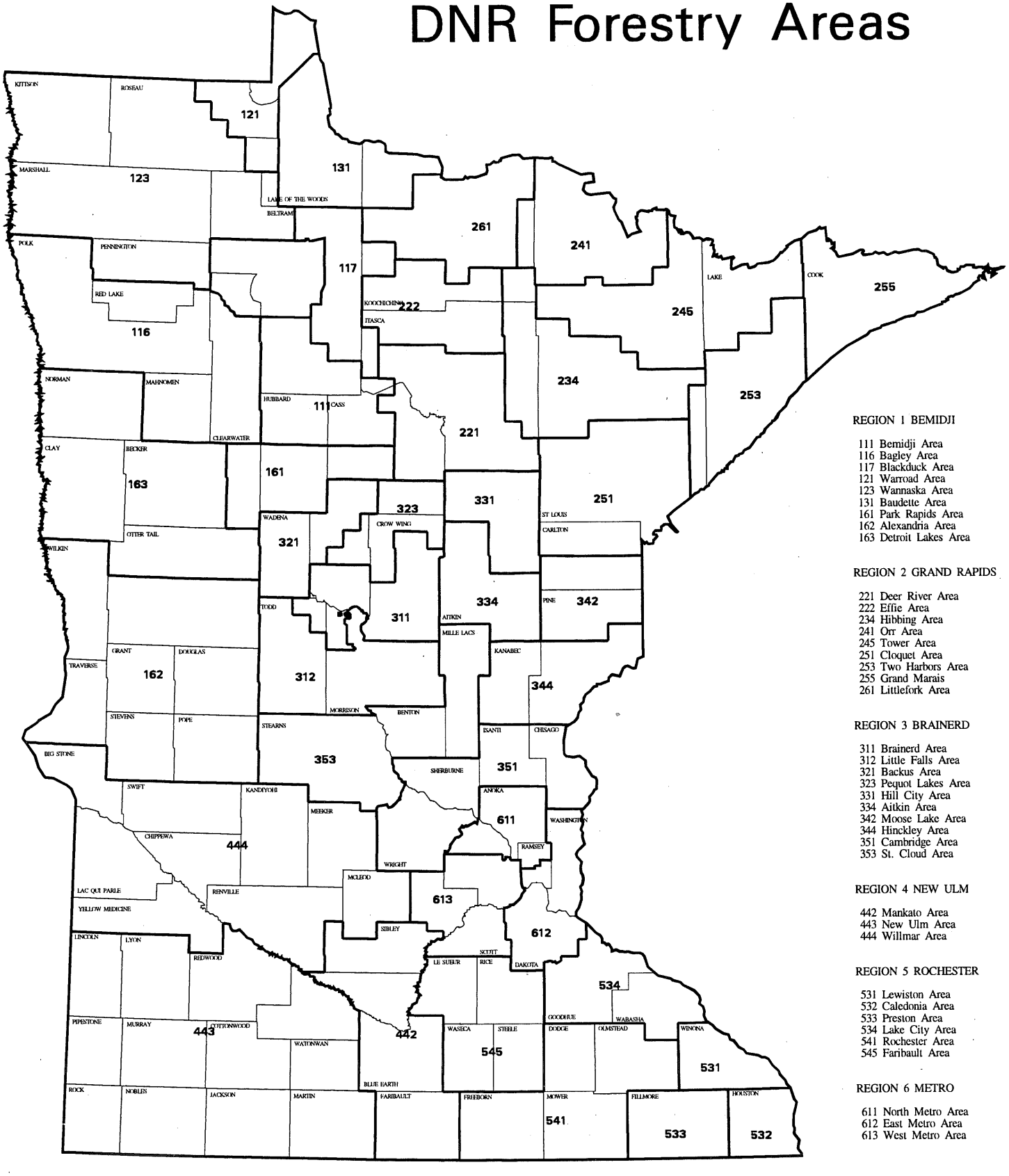
MN DNR Forestry Timber Sales Permits

	Regular Auction Sale	Intermediate Auction Sale	Informal Sale	Special Fuelwood Permit	Special Product Permit
Minn. Statutes	90.101	90.121	90.191	90.195	89.17 Delegation Order 703
Appraisal Maximum (Volume)	6,000 cords	3,000 cords	500 cords	12 cords for not less than $5	Gravel: 500 cu. yds. Hay: 100 tons Boughs: 10 tons
Advertising Period	Post 30 days and advertise 1 week	Post 30 days and advertise 1 week	None	None	None
Type of Bidding	Oral or sealed	Oral or sealed	None	None	None
Payment on Sale Date	25% of appraised value	25% of appraised value	100%	100%	100% (minimum fee: $25)
Bond (Security) Requirements	100% of bid-up value less 25% advance payment, due in 120 days or prepayment of cutting blocks anytime prior to harvesting (25% advance payment returned if bond is equal to 100% of bid-up value of sale)	100% of bid-up value less 25% advance payment, due in 120 days or prepayment of cutting blocks anytime prior to harvesting (25% advance payment returned if bond is equal to 100% of bid-up value of sale)	None	None	None
Length of Sale	5 Years	3 Years	2 Years	Expires 3/31 of each year	3 Months
Special Extension (Hardship)	1 year; 8% interest and recalculate stumpage prices	1 year; 8% interest and recalculate stumpage prices	1 year; 8% interest and recalculate stumpage prices	None	None
Emergency Extension (Natural Catastrophe)	Up to 2-year extension of existing permit without penalty or interest if permittee salvages natural catastrophe-damaged timber	Up to 2-year extension of existing permit without penalty or interest if permittee salvages natural catastrophe-damaged timber	Up to 2-year extension of existing permit without penalty or interest if permittee salvages natural catastrophe-damaged timber	N/A	N/A
Sales per Individual	Any number	Not more than 6 (cannot purchase more than 25% of tracts at first round of bidding and not eligible if more than 20 employees)	2, except partnerships and family corporations in which 3 partners or shareholders (or their spouses) may hold 2 each (total of 6)	1 per year	1 permit in effect at one time
Unsold Tracts	Any tracts not sold may be available for sale for 6 months at appraised value	Any tracts not sold may be available for sale for 6 months at appraised value	N/A	N/A	N/A

8/1/96

Appendix B

DNR Forestry Areas



REGION 1 BEMIDJI

111 Bemidji Area
116 Bagley Area
117 Blackduck Area
121 Warroad Area
123 Wannaska Area
131 Baudette Area
161 Park Rapids Area
162 Alexandria Area
163 Detroit Lakes Area

REGION 2 GRAND RAPIDS

221 Deer River Area
222 Effie Area
234 Hibbing Area
241 Orr Area
245 Tower Area
251 Cloquet Area
253 Two Harbors Area
255 Grand Marais
261 Littlefork Area

REGION 3 BRAINERD

311 Brainerd Area
312 Little Falls Area
321 Backus Area
323 Pequot Lakes Area
331 Hill City Area
334 Aitkin Area
342 Moose Lake Area
344 Hinckley Area
351 Cambridge Area
353 St. Cloud Area

REGION 4 NEW ULM

442 Mankato Area
443 New Ulm Area
444 Willmar Area

REGION 5 ROCHESTER

531 Lewiston Area
532 Caledonia Area
533 Preston Area
534 Lake City Area
541 Rochester Area
545 Faribault Area

REGION 6 METRO

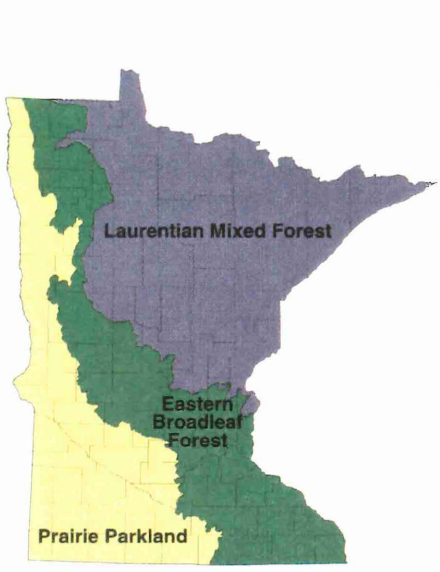
611 North Metro Area
612 East Metro Area
613 West Metro Area

Appendix C

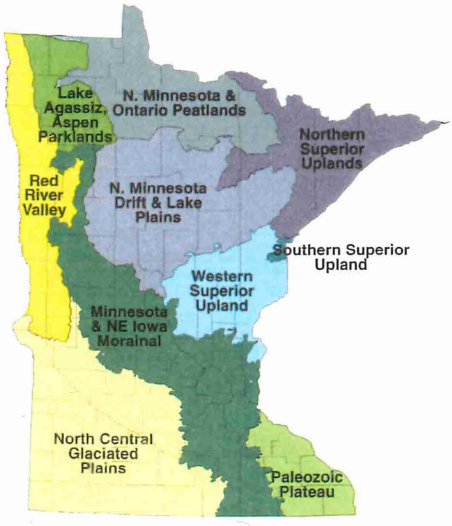
DNR Forestry
Status of Timber Management Plans

Area	Date of Plan
Bemidji	7/97
Bagley	6/97
Blackduck	10/95
Warroad	1992
Wannaska	1992
Baudette	1995
Park Rapids	1996
Alexandria	1986
Detroit Lakes	Scheduled fall 1997
Deer River	6/96
Effie	1/96
Hibbing	6/97
Orr	3/95
Tower	8/95
Cloquet	11/94
Two Harbors	Scheduled 12/97
Grand Marais	1/94
Littlefork	11/96
Brainerd	In process; completion by 11/97
Little Falls	N/A (Camp Ripley dependent on DMA plans)
Backus	In process; completion by 11/97
Pequot Lakes	In process; completion by 10/97
Hill City	Scheduled 1998
Aitkin	Scheduled 1998
Moose Lake	1/96
Hinckley	1/96
Cambridge	Scheduled 12/97
St. Cloud	9/97
Mankato	N/A
New Ulm	N/A
Willmar	N/A
Lewiston	Scheduled 1998
Caledonia	Scheduled 1998 — R. J. Dorer State Forest
Preston	Scheduled 1998 — to be done as
Lake City	Scheduled 1998 — a unit.
Rochester	Scheduled 1998
Faribault	N/A
Metro Area	N/A
(N/A = not applicable—little or no timber land)	8/7/97

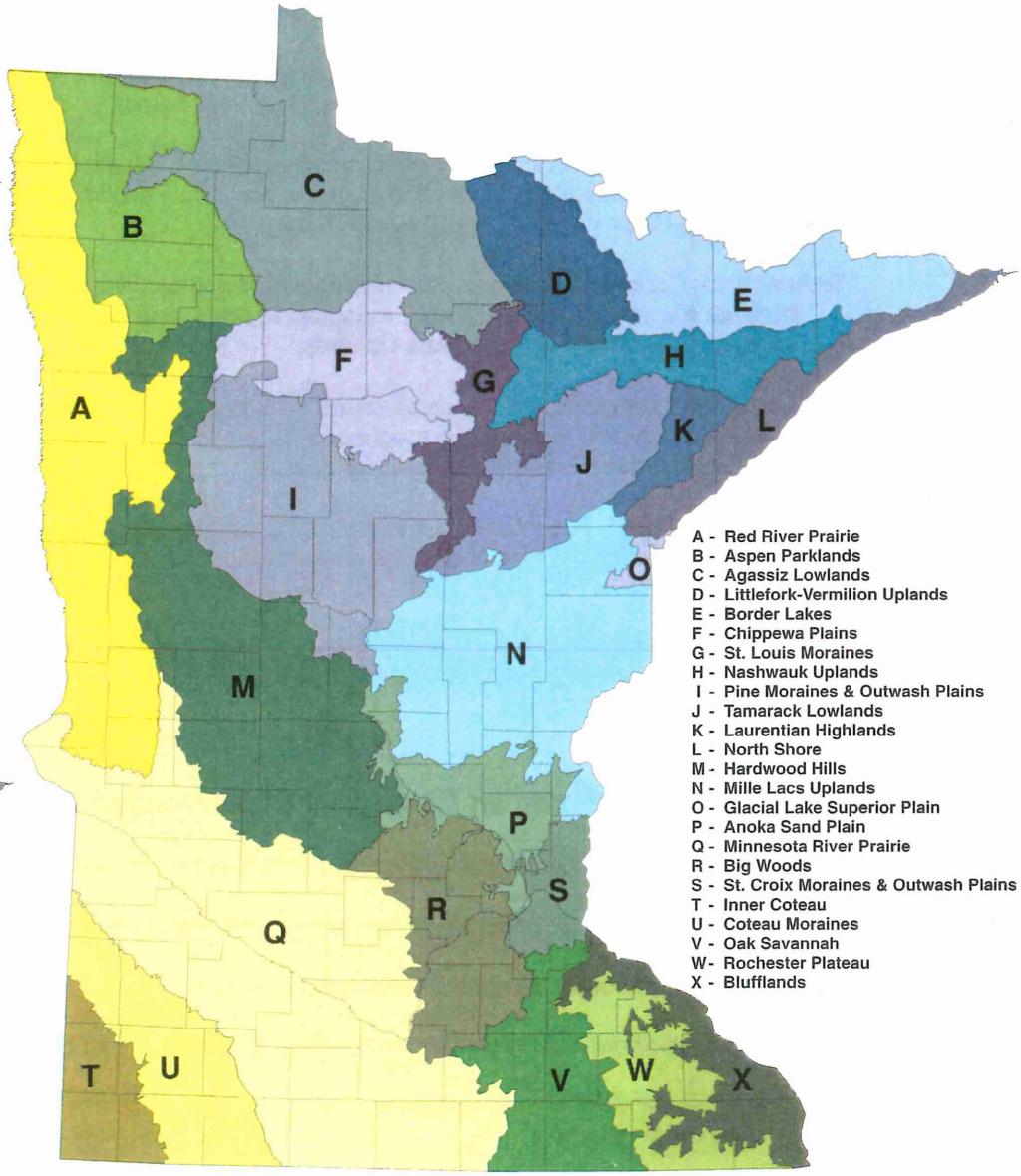
Upper Three Levels of ECS for Minnesota



1) Province



2) Section



3) Subsection

A - Red River Prairie
B - Aspen Parklands
C - Agassiz Lowlands
D - Littlefork-Vermilion Uplands
E - Border Lakes
F - Chippewa Plains
G - St. Louis Moraines
H - Nashwauk Uplands
I - Pine Moraines & Outwash Plains
J - Tamarack Lowlands
K - Laurentian Highlands
L - North Shore
M - Hardwood Hills
N - Mille Lacs Uplands
O - Glacial Lake Superior Plain
P - Anoka Sand Plain
Q - Minnesota River Prairie
R - Big Woods
S - St. Croix Moraines & Outwash Plains
T - Inner Coteau
U - Coteau Moraines
V - Oak Savannah
W - Rochester Plateau
X - Blufflands

Compiled by:
Dept. of Natural Resources
University of Minnesota
USDA Forest Service

For more information contact:
ECS Specialist
MN DNR, Division of Forestry
Resource Assessment Program
2002 Airport Road
Grand Rapids, MN 55744
(218) 327-4449

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Minnesota
DEPARTMENT OF NATURAL RESOURCES

What is an Ecological Classification System (ECS)?

The ECS is part of a nationwide mapping initiative developed to improve our ability to manage all natural resources on a sustainable basis.

- Definition: Ecological Classification System is a method to identify, describe, and map units of land with different capabilities to support natural resources. This is done by integrating climatic, geologic, hydrologic, topographic, soil and vegetation data.

- In Minnesota, the classification and mapping is divided into six levels of detail. These levels are:

Province: Largest units representing the major climate zones in North America, each covering several states. Minnesota has three provinces. Example: Eastern Broadleaf Forest.

Section: Divisions within provinces that often cross state lines. Sections are defined by the origin of glacial deposits, regional elevation, distribution of plants and regional climate. Minnesota has 10 sections. Example: Red River Valley.

Subsection: County-sized areas within sections that are defined by glacial land-forming processes, bedrock formations, local climate, topographic relief, and the distribution of plants. Minnesota has 24 subsections. Example: Mille Lacs Uplands.

Land Type Association: Landscapes within subsections, characterized by glacial formations, bedrock types, topographic roughness, lake and stream patterns, depth to ground water table and soil material. Example: Alexandria Moraine.

Land Type: The individual elements of Land Type Associations, defined by recurring patterns of uplands and wetlands, soil types, plant communities, and fire history. Example: Fire-dependant Xeric Pine-Hardwood Association.

Community: Unique combinations of plants and soils within Land Types, defined by characteristic trees, shrubs and forbs; elevation and soil moisture. Example: Sugar Maple-Basswood Forest.

What can an Ecological Classification System do?

- Define the units of Minnesota's landscape using a consistent methodology.

- Provide a common means for communication among a variety of resource managers and with the public.

- Provide a framework to organize natural resource information.

- Improve predictions about how vegetation will change over time in response to various influences.

- Improve our understanding of the interrelationships between plant communities, wildlife habitat, timber production, and water quality.

What are the end products?

- Maps and descriptions of ecological units for provinces through land types.

- Field keys and descriptions to determine which communities are present on a parcel of land.

- Applications for management for provinces through communities.

- Mapping of province, section, and subsection boundaries is complete throughout Minnesota, as shown by the maps on the reverse. The development of other levels is under way.