Timber Harvest on State Lands

- Report -

To the

Senate Environment & Natural Resources

Finance Division

House Environment & Natural Resources

Finance Committee

By the

Minnesota Department of Natural Resources

Division of Forestry

St. Paul, Minnesota

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Prepared Pursuant to the

1995 Laws of Minnesota

Chapter 220, Section 5, Subdivision 4

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St. Paul, Minnesota

November 1, 1996

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I. INTRODUCTION

This report is prepared pursuant to the 1995 Laws of Minnesota, Chapter 220, Section 5, Subdivision 4 which 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.

II. BACKGROUND

The 1995 Legislature appropriated $2,015,000 for the 1996-1997 biennium to the Department of Natural Resources (DNR) to increase timber harvests within long-term sustainable levels on state lands. The purpose for the appropriation was to provide additional personnel and forest management monies that would allow the DNR to reach an annual long-term sustainable harvest level of 875,000 cords estimated for its 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 and $1,430,000 the second year, was based on increasing revenues from timber sales above 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 timber sales were to be phased in as follows:

Table II A. **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

The increased harvest was expected to come primarily from birch, tamarack, lower valued hardwoods, market-fringe aspen plus pine, spruce, and hardwood thinnings.

It was estimated to take three (3) years 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 at the time of the appropriation was being considered, the additional timber 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. Assuming that future timber sold would be distributed by class of land in the same

proportions as FY 1994, the revenue and management costs by land class for the fully implemented program would be as follows:

Table II B. ESTIMATED LONG TERM AVERAGE ANNUAL PROGRAM REVENUES AND COSTS

Land Type	Gross	Cost	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 appropriations were 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. Further, in implementing the planned harvests, as with all state land timber sales, the DNR was to follow existing guidelines for protection of forest resource values.

Shortly after the start of FY 1996, during the period July 9 to July 14, 1995, a tornado and several wind storms 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. Fifteen counties and the White Earth Reservation were declared a federal disaster area by President Clinton in August, 1995.

The volume of timber that was blown down or damaged by the storms was estimated at 750,000

cords. Salvage harvesting of damaged and downed timber had to be accomplished quickly to utilize the wood before it deteriorated or created insect or fire problems. In order to encourage loggers to harvest storm-damaged timber, Governor Carlson signed Executive Order #95-11 on August 28, 1995 granting 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 harvest salvage sales.

The sudden availability of storm damaged timber produced a flood of wood on the market which 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 natural resource managers, loggers, and forest industries in Minnesota who made adjustments in their operations that enabled as much of the damaged wood to be utilized as possible.

III. FY 1996 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 based on resources in hand to accomplish the targets. The table below shows what annual harvest levels were planned in each region from existing timber management plans:

Table III A. **FY 1996**

	Region	Planned (Cds)	Offered (Cds)	Sold (Cds)
I	Bemidji	256,680	250,200	238,400
II	Grand Rapids	332,530	408,700	366,500
III	Brainerd	133,460	149,500	142,200
V	Rochester	2,350	2,500	2,200
VI	Metro		400	400
	Total	725,020	811,300	749,700

The amount of timber offered for sale during FY 1996 exceeded the minimum target by 86,280 cords; it also exceeded the amount of timber used as the basis for the appropriation (788,000 cords in FY 1996) by 23,300 cords. However, the basis for the appropriation was the value of timber actually sold, not just offered for sale. The amount of timber actually sold was 38,300 cords short of the 788,000 cord appropriation target.

Revenues Generated

In order 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, and not at the time the permit is sold. At the time of purchase, a permittee is required to provide 25% of the appraised value of a timber sale, which is often refunded when surety is later provided to cover the full value of the purchase price. 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 - "MN DNR - FORESTRY TIMBER SALE PERMITS" which describes the various features of each kind of timber permit the DNR issues.

The following table compares FY 1996 results to the two previous fiscal years:

Table III B.

FY	Cords Sold	Cords Harvested	Value Sold	Gross Receipts
'96	749,700	549,800	$14,102,200	$9,638,850
'95	678,000	556,400	13,967,300	8,423,750
'94	661,300	677,800	10,853,100	7,743,750

The revenue from FY 1996 timber sales came from the following land classes:

Table III C.

Land Type	Gross
Trust Lands	$5,649,055
Acquired	1,676,220
Con-Con	1,743,185
Wildlife	553,305
Other	17,085
Total	$9,638,850

Table III D. FY 1996 TIMBER SALE INITIATIVE PERFORMANCE

Item	FY 96 Planned (1)	FY 96 Actual	Difference
New Volume Sold	127,000 Cords	88,700 Cords	-38,300 cords
New Receipts Generated(2)	$993,600	$1,311,062	+$317,462
New General Fund Revenue	665,000	795,284	+ 130,284
New General Fund Costs	585,000	585,000	-0-
Net General Fund Gain (Loss)	80,000	210,284	+ 130,284

Note: (1) Planned Levels are incremental changes over FY 1994 actual levels
(2) Based on average selling price per cord on all DNR sales times new cords sold

Two major events adversely effected actual program performance during FY 1996. First, lower stumpage prices associated with the sale of salvage wood from the July, 1995, wind storms reduced revenues by an average of $5.47 per cord, or an estimated $405,327 for the 74,100 cords salvaged. Second, the slump in the national Forest Products markets (discussed later in this report) resulted in a reduction from planned volume sold levels of 38,300 cords during fiscal year

1996. Revenue losses were, however, more than offset by increased selling (bid) prices for timber sales not effected by the wind damage.

IV. PROJECTIONS FOR FY 1997

The annual work plan targets for timber sales to be offered in FY 1997 have been set as follows:

Table IV A.

	Region	Planned (Cds)	Offered (Cds)	Sold (Cds)
I	Bemidji	243,910	WORK	
II	Grand Rapids	311,780	IN	
III	Brainerd	139,160	PROGRESS	
V	Rochester	3,460		
VI	Metro	-		
	Total	698,310		

The targets for FY 1997 are less than those for FY 1996 despite the original intent to offer 875,000 cords which was the basis for the appropriation. This is due to a combination of factors:

1. A reduction in the amount of timber that would be harvested in the short term in the area affected by the July 1995 windstorms.

2. The amount of timber sold and not harvested on existing DNR timber permits at the end of FY 1996 was 1,524,000 cords. This is a 193,000 cord increase compared to the end of FY 1995. A good portion of this increased amount of wood under permit can be attributed to the forest industries and logging community postponing harvests on previously purchased permits in order to maximize salvage of windstorm damaged timber.

3. Finally, and most significant, new area timber management plans are generally projecting lower estimates of the long-term sustainable timber harvest levels on state land. More recent area timber management plans being completed across the state reflect greater influence from revised or new forest management guidelines, such as the Extended Rotation Forests Guideline.

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 designed to attain specific reforestation results. It is usually defined in terms of the harvest method used to prepare the site for reforestation. Some harvest methods (e.g. thinnings) are not intended to prepare a site for reforestation, but are designed to remove valuable products and improve the quality and growth potential of the remaining trees. These harvest methods are stand treatments, 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 influences which silviculture system is prescribed to harvest timber.

Silviculture systems and stand treatments commonly used in Minnesota include:

Clearcut: Removal or felling, in a single cutting, of essentially all trees in the stand to prepare the site for natural or artificial regeneration of new even-aged stand.

Clearcut With Reserves: A clearcutting method (as above) in which varying numbers of trees, or groups of trees, are not harvested to attain goals such as wildlife habitat improvement.

Group Selection: A method of regenerating uneven-aged stands in which trees are removed in small groups or patches and new age classes are established in the openings created.

Seed Tree: An even-aged regeneration method in which an area is clearcut except that certain trees, called seed trees, are left standing singly or in groups for the purpose of producing seed to restock the cleared area. Seed trees are removed after regeneration is established.

Shelterwood: A method of regenerating an even-aged stand by a series of partial cuttings, resembling thinnings, which extend over a small fraction of the life span of the stand. The

residual canopy of mature trees provides protection and conditions for establishing new seedlings.

Selective Thinning: Commercial harvest of selected trees in a stand. Often the harvest trees are marked. Generally done to: a.) remove less desirable trees (species or form) from a stand, b.) decrease stand density and increase future growth of remaining desirable trees.

Table V A. 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 compiled from DNR Forestry forest development module reports. Comparing the figures for the two years, notable is the change in the percent of various forms of clear-cutting (i.e. clearcut, clearcut with reserves, group selection). In 1991 it was 95%; in 1996 it was 84%. Also of note is the change in the percent of thinnings, from 3% in 1991 to 10% in 1996. These trends are the outcome of more intensive forest management practices, new logging technologies, and the influence of revised or new management guidelines.

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

COVERTYPE[3] FY96 timber sold acres by covertype in ( ). All acres rounded to nearest 10.		PERCENT of COVERTYPE AREA HARVESTED by SILVICULTURE SYSTEM or STAND TREATMENT								PERCENT OF TOTAL AREA HARVESTED
		Clearcut	Clear-cut with Reserves	Group Selec-tion	Seed Tree	Shelterwood	Selec-tive Thinning	Row & other Thinning	Other[4]	
Jack Pine	FY91	82%	13%	3%	0	0	0	1%	0	7%
(2,170 acres)	FY96	40%	41%	1%	0	1%	1%	4%	12%	5%
Norway Pine	FY91	33%	4%	3%	0	1%	15%	45%	0	2%
(2,500 acres)	FY96	13%	5%	0	0	0	44%	33%	5%	6%
White Pine	FY91	White pine was not separated out as a type in FY1991 survey. It was included in other pine types.								
(210 acres)	FY96	11%	0	0	9%	7%	36%	29%	8%	.5%
W.Spruce/Balsam Fir	FY91	52%	44%	4%	0	0	0	0	0	6%
(2,910 acres)[5]	FY96	44%	41%	0	1%	0	3%	5%	7%	7%
Black Spruce	FY91	83%	2%	2%	1%	0	0	6%	9%	14%
(4,270 acres)[6]	FY96	65%	29%	0	0	0	2	0	4%	10%
White Cedar	FY91	7%	49%	35%	0	0	10%	0	0	<1%
(260 acres)	FY96	15%	73%	0	6%	0	3%	1%	2%	1%
Tamarack	FY91	82%	10%	3%	10%	0	0	0	0	1%
(1,790 acres)	FY96	59%	21%	0	18%	0	2%	0	0	4%
Oak	FY91	24%	48%	12%	0	0	8%	2%	6%	1%
(870 acres)	FY96	20%	27%	0	3%	1%	42%	1%	7%	2%
Lowland Hardwoods	FY91	6%	57%	9%	0	0	18%	11%	0	1%
(730 acres)[7]	FY96	8%	21%	18%	0	1%	24%	0	29%	2%
Northern Hardwoods	FY91	7%	30%	10%	0	13%	20%	21%	0	2%
(1,150 acres)	FY96	8%	30%	14%	0	1%	33%	0	13%	3%
Aspen	FY91	55%	48%	1%	0	0	0	0	0	61%
(20,180 acres)	FY96	47%	50%	0	0	0	0	3%	0	49%
Birch	FY91	46%	42%	16%	0	0	0	0	0	4%
(1,990 acres)	FY96	42%	43%	1%	0	0	0	0	13%	5%
Balm of Gilead	FY91	83%	16%	1%	0	0	0	0	0	2%
(880 acres)	FY96	55%	31%	0	5%	0	0	0	9%	2%
Other Types[8]	FY91	Other types were not separated out in the FY1991 survey. They were included in the 12 types listed.								
(970 acres)	FY96	26%	38%	0	2%	0	5%	3%	26%	2%
TOTAL FOR ALL TYPES 30,690 ac sold in	FY91	56%	36%	3%	<1%	<1%	1%	2%	1%	100%
40,880 ac sold in	FY96	43%	40%	1%	1%	<1%	6%	4%	5%	100%

See explanatory notes and definitions on following page.

Explanatory notes and definitions for Table V A.

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

2. FY 1996 data from Area forest development module FY 96 annual accomplishment reports.

3. A covertype is defined by the predominate tree species occupying the site. A specific covertype may contain trees of species other than predominate species for which the type is named. As an example, a forest stand typed as 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. Some 1,960 acres of harvest falls in the "other harvest method" category. In FY96 almost 85% of this is salvage of damaged or dying stands.

5. The FY 96 white spruce/balsam fir type harvest includes 400 acres of white spruce type and 2,510 acres of balsam fir type. In FY 91 the white spruce and balsam fir types were not separated.

6. The FY 96 black spruce type harvest does not include 2,680 acres of stagnant black spruce type selectively cut for commercial Christmas trees. This type of harvest affects a very small proportion (usually <1%) of the trees within the harvest area.

7. The FY 96 lowland hardwoods type harvest includes 490 acres of ash type and 240 acres of lowland hardwood type. In FY 91 the ash and lowland hardwood types where not separated.

8. The FY 96 other types harvest includes timber harvesting from lowland and upland brush types (40%), minor species types and stands typed as various non-forest classifications.

VI. MANAGEMENT GUIDELINES APPLIED TO TIMBER SALES ON

DNR-ADMINISTERED LANDS

1. Protecting Water Quality and Wetlands in Forest Management: Best management practices (BMPs) serve as the cornerstone for the forestry program to protect water quality in Minnesota. The use of BMPs for water quality has been actively promoted in Minnesota since 1988 in response to mandates contained in the 1987 Amendments to the Federal Clean Water Act. In 1995, wetland BMPs were developed and added to the water quality guide book. These BMPs are:

* Required on most state, federal and county lands
* Applied to forest activities
* Designed to prevent pollution of water sources by sediments, nutrients, pesticides, fuels and lubricants, organic matter, and thermal impacts
* Cover the following major forest activities
  - Fuel and lubricants management, filter strip application adjacent to open water, shade strip designation adjacent to streams, lakes and open wetlands.
  - Building and maintaining forest roads
  - Timber harvesting
  - Mechanical site preparation
  - Pesticide use
  - Prescribed burning

Compliance with the BMP recommendations has been monitored by multi-interest field auditing teams in 1991, 1993 and 1995. Based on field audits in 1991-1993, compliance across all forest land ownerships averaged 84%. Results from the 1995 field audits, which include the new wetland BMPs, show annual compliance across all forest land ownerships at 91%. The majority of departures from BMP recommendations were minor (i.e. small in magnitude and localized with small potential to impact water quality).

2. 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 their development. Developed by a stakeholder working group, the BMPs 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 who are designating the visual sensitivity levels of roads, rivers and streams, lakes, trails, and recreation areas. Fourteen counties have either completed or are working on the designation and mapping process.

3. Old-Growth Forests: Identification and evaluation of old-growth forests on DNR-administered lands started with the completion of the original Old-Growth Guideline in 1990. In June, 1994 revised Old-Growth Forests Guideline was implemented following a series of three stakeholder round tables. The DNR has 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 on-going process, and currently there are over 4,700 acres of candidate stands that need to be field 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.

4. Extended Rotation Forests (ERF): In July 1994, the DNR adopted a statewide ERF Guideline to be applied to DNR-administered forest lands. The goal of the ERF 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 these guidelines which define ERF on state lands, and establish a 10% minimum designation of ERF on DNR-administered timberlands within each landscape region. It is likely that the 10% minimum designation will be exceeded in many landscapes as demonstrated in the Baudette and Orr Area timber management plans. ERF designations will be determined through a landscape-based planning process, and carried out primarily through the DNR Forestry area timber management plans.

5. 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 by reserved areas; creation of openings and edge; perpetuation of key stands and associated plant species; wetland protection and /or enhancement; 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.

6. Forest Health: Pest management guidelines developed by the division or adopted from research and guidelines developed by other agencies have been utilized in the management of forested 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.

7. Future Guideline Development: 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 the forest ecosystems. Technical teams are currently working on guidelines for: historical/cultural resources, forest soil productivity, wildlife habitat, and riparian zone management. Over 60 individuals representing a broad cross-section of interests are participating on the technical teams. Development and integration of the guidelines is expected to be completed by the summer of 1998. The DNR is committed to apply these guidelines on DNR-administered timber lands when they are completed.

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. These area timber management plans (TMP) are scheduled to be updated more frequently than in the past (i.e., new management plans cover a 5-year period versus the 10-year period of previous plans). Appendix C provides the current status and schedule for updates to DNR Forestry area timber management plans.

In general terms, the division's timber management planning process applies a modified area control method (i.e., based on acres rather than volume) of forest regulation to each of several cover types within a management unit (e.g., administrative area, ecological landscape). The planning process results in a pool of forest stands that are available to be treated (i.e., harvested, thinned, salvaged, regenerated, etc.) over a five-year planning horizon. In this context, forest regulation should not be confused with statutory regulation; it 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.

In this sense, 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 (i.e., 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 the following disciplines: Forestry (region staff and area forester), Natural Heritage, Ecological Services, 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 and Wildlife 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. sub-sections of the DNR's Ecological Classification System, see Appendix D) 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. clearcut 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 towards 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/budget limitations. Area annual timber management work plans are then compiled into regional and statewide annual timber management work plans.

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 which 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 1997

While it is impossible to predict market behavior and specifically the effect on DNR timber sales and revenue, we can provide a general sense of the "pulse" of the market and its likely effect on stumpage prices and timber demand.

National statistics presented in the September and October 1996 issues of the PaperTree Letter, a forest economics newsletter, show a 25 percent reduction in value (prices), and up to a 50 percent reduction in volumes shipped, for U.S. pulp, paper and board manufacturers between August 1995 and September 1996. This covers the bulk (approximately 80%) of the market for forest products in Minnesota. The bottom of the current production slump was reached in April 1996 when mills nationwide operated at only 81% of practical maximum capacity. Leading indicators tracked by PaperTree Letter analysts suggest that the market is now on an upswing which, on average, should peak in 3 to 9 months and last about 15 months. Unfortunately, stumpage sales typically lag behind the market for consumer products by an additional 3 to 9 months, depending on how long it takes both consumers and producers to reduce their excess stocks of product on hand. Based on the current statistics, it would appear that program performance will be significantly better in the next biennium, than in the current biennium.

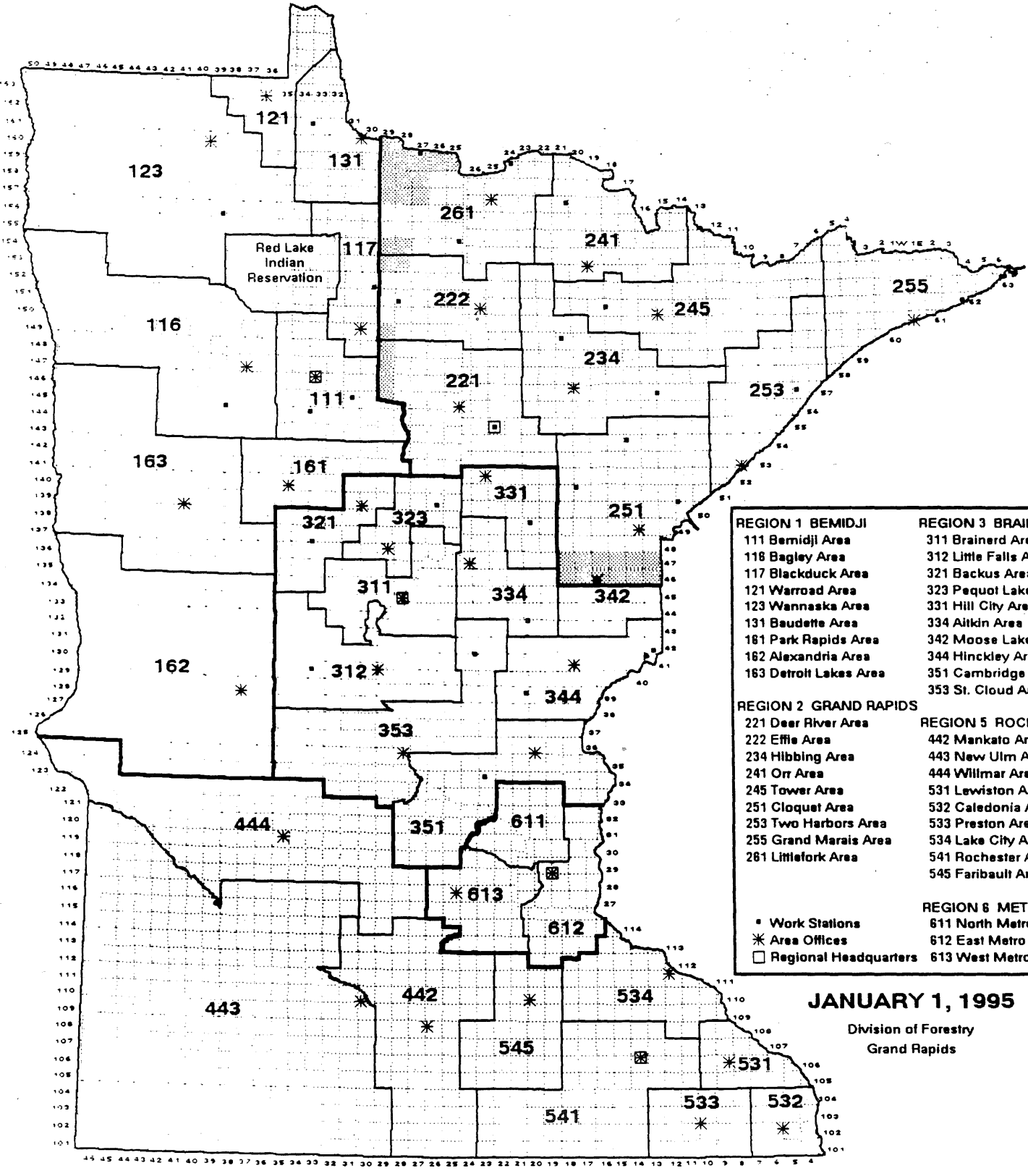
Finally, the pulp, paper, and oriented strand board industries in Minnesota should continue to set the pace for other similar mills in the U.S. Minnesota's paper mills are some of the most modern in the world in terms of efficiency and being environmentally friendly. Minnesota mills will continue to operate near capacity and gradually change their species mix to better reflect the composition of the forest. In the short term, stumpage prices for new DNR timber sales should remain about the same. In the long term, increases in stumpage prices can be expected as competition for forest resources throughout North America becomes more intensive.

MN DNR - FORESTRY TIMBER SALE PERMITS

	REGULAR AUCTION SALE	INTERMEDIATE AUCTION SALE	INFORMAL SALE	SPECIAL FUELWOOD PERMIT	SPECIAL PRODUCT PERMIT
MN 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 $5.00.	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 $25.00)
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 yr-8% interest and recalculate stumpage prices	1 yr-8% interest and recalculate stumpage prices	1 yr - 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 corp. 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

Appendix A

DNR FORESTRY
ADMINISTRATIVE BOUNDARIES



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 Area
- 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 5 ROCHESTER
- 442 Mankato Area
- 443 New Ulm Area
- 444 Willmar Area
- 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

• Work Stations
✳ Area Offices
☐ Regional Headquarters

JANUARY 1, 1995

Division of Forestry
Grand Rapids

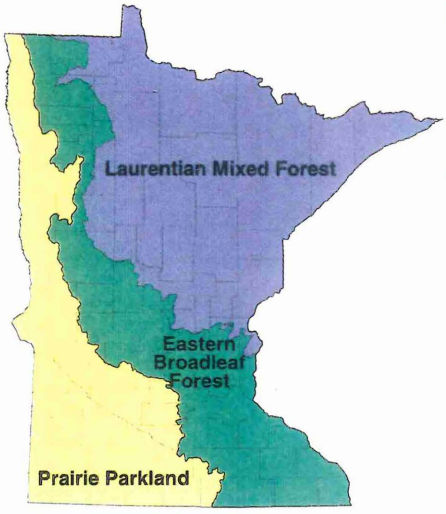
DNR - Forestry
Status of Timber Management Plans

Area	Date of Plan
Bemidji	In process
Bagley	In process
Blackduck	10/95
Warroad	'92
Wannaska	'92
Baudette	'95
Park Rapids	'96
Alexandria	'86
Detroit Lakes	'86
Deer River	6/96
Effie	1/96
Hibbing	Scheduled 2/97
Orr	3/95
Tower	8/95
Cloquet	11/94
Two Harbors	Scheduled 6/97
Grand Marais	1/94
Littlefork	Scheduled 10/96
Brainerd	In process
Little Falls	N/A (Camp Ripley dependent on DMA plans)
Backus	In process
Pequot Lakes	In process
Hill City	Scheduled '98
Aitkin	Scheduled '98
Moose Lake	1/96
Hinckley	1/96
Cambridge	Scheduled '97
St. Cloud	Scheduled 9/96
Mankato	N\A
New Ulm	N\A
Willmar	N\A
Lewiston	Scheduled Winter '96-'97}
Caledonia	Scheduled Winter '96-'97} RJ Dorer S.F.
Preston	Scheduled Winter '96-'97} to be done as
Lake City	Scheduled Winter '96-'97} a unit.
Rochester	Scheduled Winter '96-'97}
Faribault	N\A
Metro Area	N\A

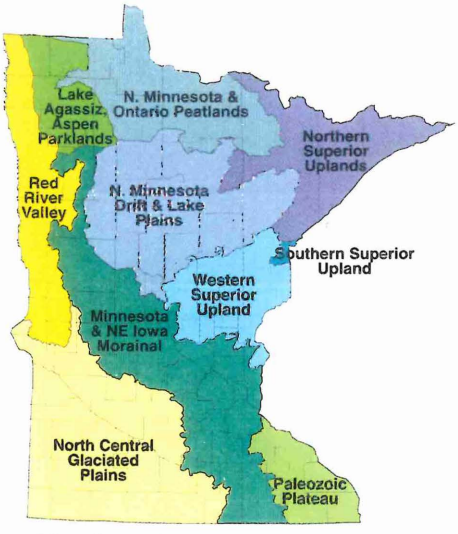
(N\A = not applicable, little or no timber land)

9-30-96

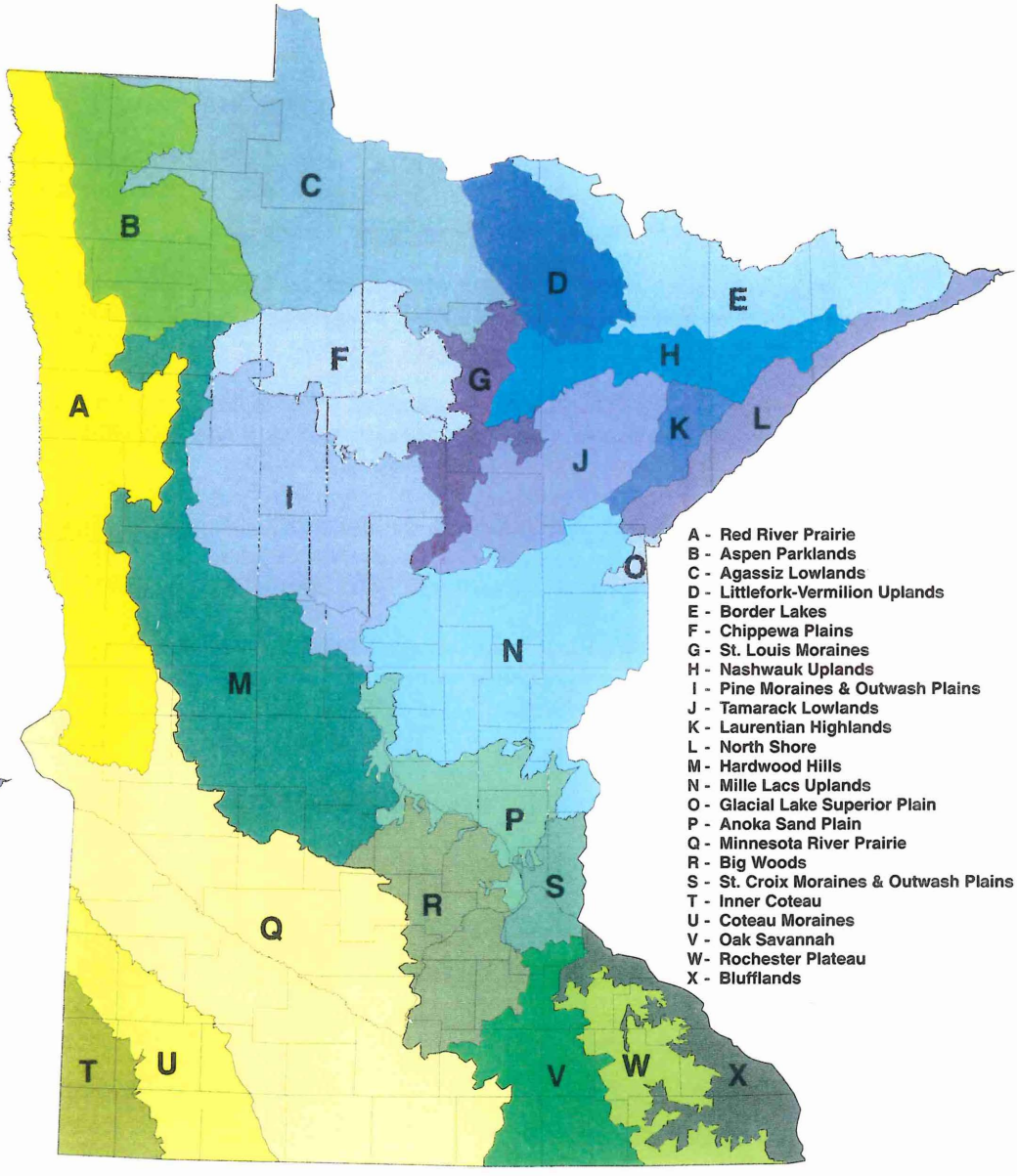
Upper Three Levels of ECS for Minnesota



1) Province



2) Section



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

3) Subsection

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
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January, 1996

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.