

# MINNESOTA'S FOREST RESOURCES



Department of Natural Resources  
Division of Forestry  
March 2001

500 Lafayette Road  
St. Paul, Minnesota 55155

MAY 07 2001

# Minnesota Wood Industry - 2001

## Annual Economic Impact\*

- ⊗ Value of Forest Products Manufactured = 7.7 Billion (estimated)
- ⊗ 3rd Largest Manufacturing Industry in Minnesota Based on Employment
  - #1 = Machinery and Computer Equipment
  - #2 = Electronic Equipment and Instruments
- ⊗ Generates 14% of Dollars of all Manufacturing
- ⊗ Value Added = \$3.71 Billion that stays in Minnesota

## Employment

- ⊗ 61,000 Employees
  - Primary Processing = 28,100
  - Secondary Manufacturing = 32,900
- ⊗ \$2.0 Billion in Wages Paid (15% of all Manufacturing in Minnesota)

## Industry

- ⊗ 6 Pulp & Paper
- ⊗ 3 Recycled Pulp & Paper
- ⊗ 3 Hardboard & Specialty
- ⊗ 6 Oriented Strand/Structural Board
- ⊗ 500 Sawmills
- ⊗ 150 Associated Industries
- ⊗ Over 850 Secondary

## Annual Volume of Timber Harvested\*\*

- ⊗ Pulpwood = 2,987,000 Cords
- ⊗ Saw Logs = 270 Million Board Feet
- ⊗ Fuelwood = 752,000 Cords  
(202,000 from Timberland)
- ⊗ Veneer = 8.0 Million Board Feet (Domestic)  
= .5 Million Board Feet (Exported)
- ⊗ Chips = 9,000 Cords (Fuel and Mulch)
- ⊗ Shavings = 14,000 Cords (Animal Bedding)
- ⊗ Posts and Poles = 9,100 Cords

\*Source: Minnesota Employment Review and Survey of Current Businesses

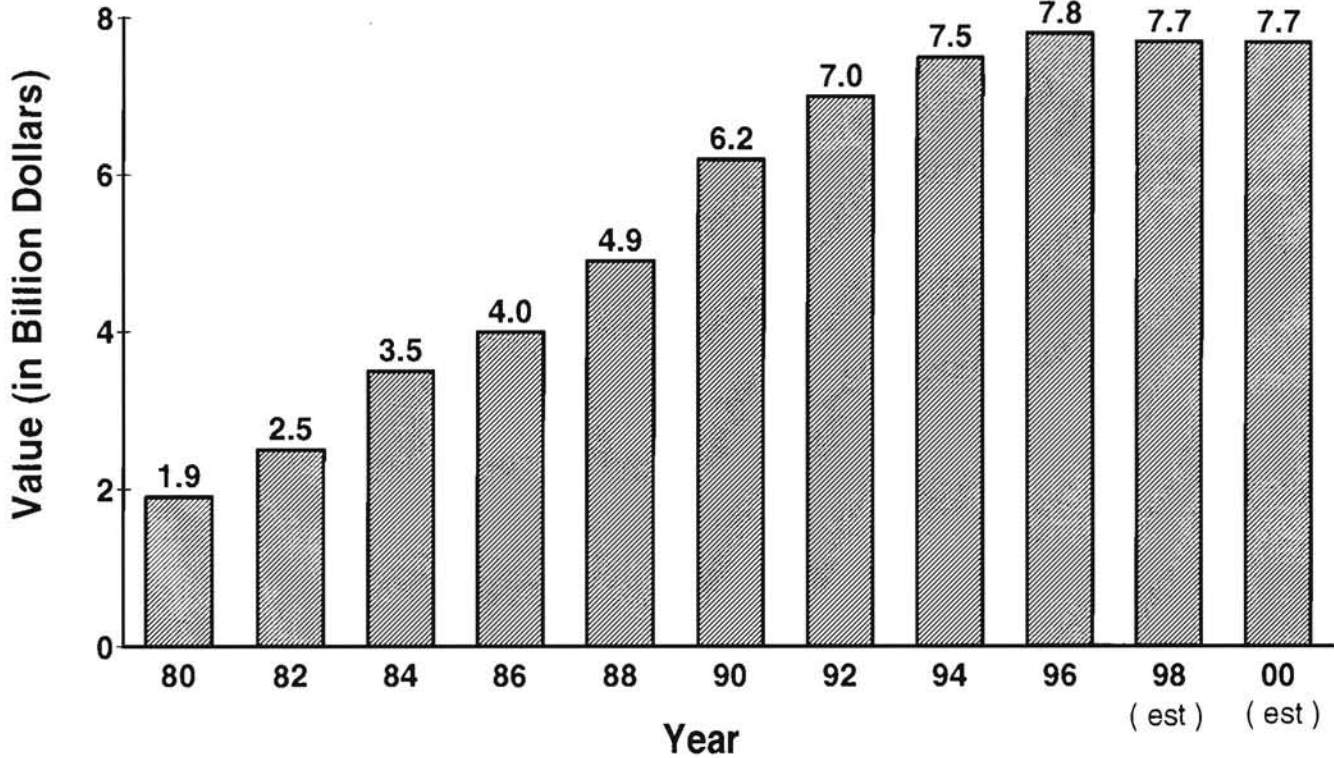
\*\*Source: NCFES and DNR Surveys

# MINNESOTA WOOD INDUSTRY

## EMPLOYMENT

- ❖ **Primary Processing - (28,000 employees)**
- ❖ **Secondary Manufacturing - (33,000 employees)**
  - Cabinets & cabinet parts - (MN is #2 in US)
  - Store fixtures - (MN is #4 in US)
  - Furniture - office & residential
  - Pallets, crating, & pallet parts  
(Toro, Arctic Cat, Polaris are big users of Minnesota wood)
  - Millwork
  - Wood shavings - (poultry industry)
  - Window & door components - (MN is #2 in US)
- ❖ **Non-Traditional Industries Dependent Upon Forestry**
  - Balsam boughs for the wreath industry  
(annual sales of \$30+ million)
  - Wood "flour" energy for the taconite industry
  - 6 co-generation facilities utilizing wood for electricity production

## Value of Forest Products Manufactured in Minnesota

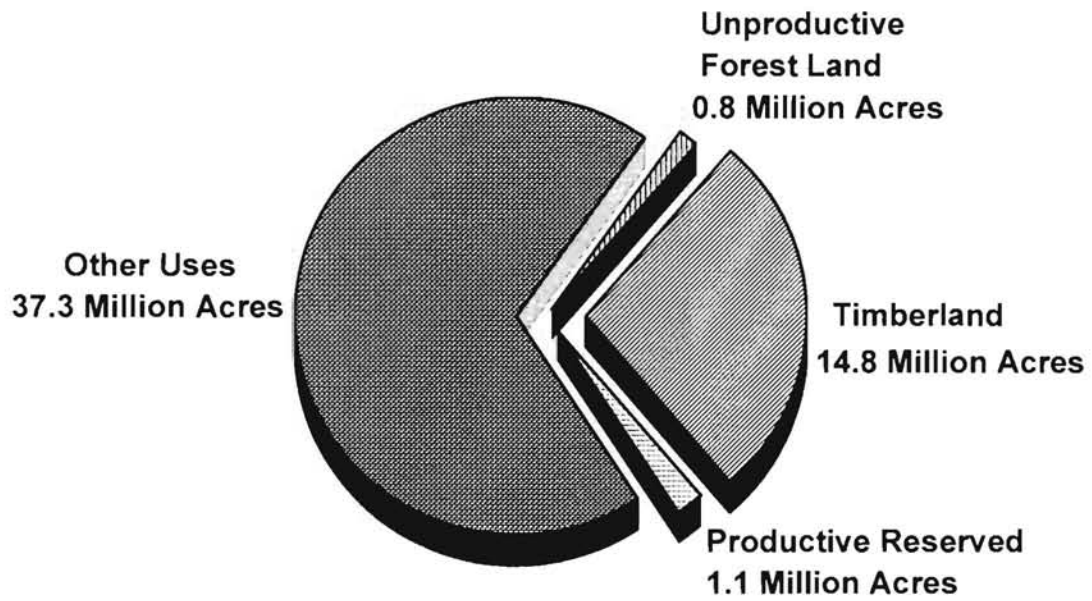


Source : MFI and Estimate from US Dept of Commerce, Bureau of Economic Analysis

DNR-Forestry 11/00

## MINNESOTA LAND USE

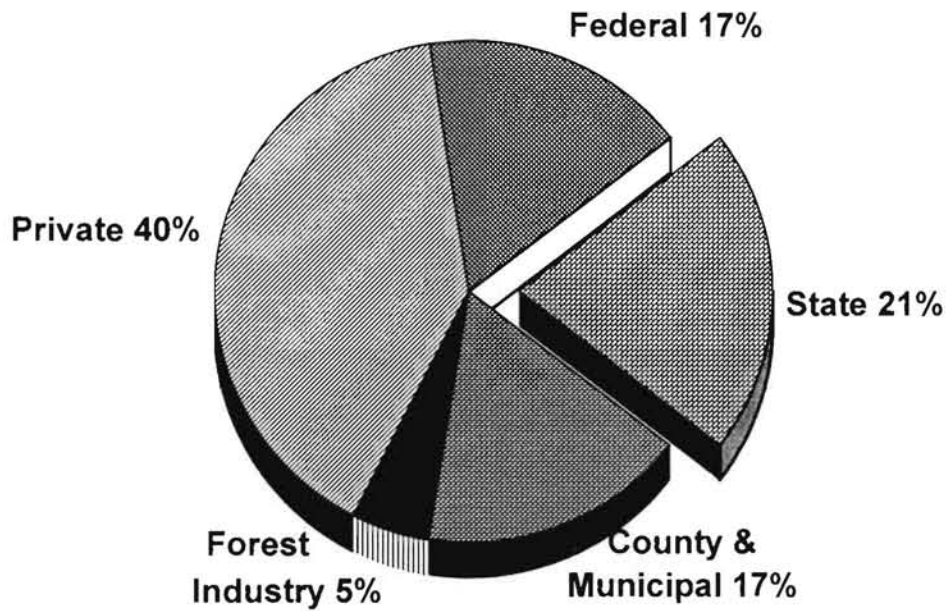
- Total of 54 Million Acres -



Source : Minnesota FIA 1990 Eastwide database provided by USFS N. Central F. Exp. Station

## MINNESOTA TIMBERLAND by OWNERSHIP

- 14.8 Million Acres -



Source : Minnesota Forest Statistics, 1990 - USFS, Resource Bull. NC-141 (Table 2)

**Area of Timberland in Minnesota  
by Forest Type  
—1990—**

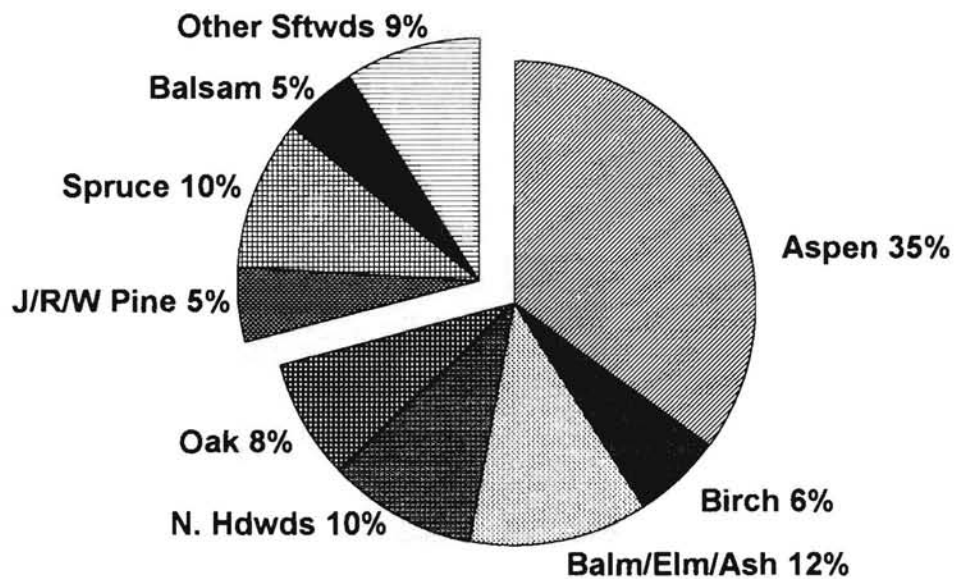
Forest Type	Acres (000's)
Jack Pine	447.5
Red Pine	301.6
White Pine	63.2
Balsam Fir	734.3
White Spruce	93.8
Black Spruce	1,322.1
Cedar	680.5
Tamarack	705.1
Oak	1,184.3
Elm - Ash	1,291.5
Maple - Basswood	1,402.9
Aspen	5,114.2
Birch	835.8
Balm of Gilead	427.7
Non-Forest	168.9
Total All Types	14,773.4

Source: Based on MN Forest Statistics, 1990, USDA Forest Service  
Resource Bulletin NC-141.

## MINNESOTA TIMBERLAND by COVER TYPE

- State of Minnesota -

14.8 Million Acres



**Cover Type :** A classification of forest land based on the species forming a plurality of live tree stocking.

**Minnesota Forest Statistics, Resource Bulletin NC-141, 1990.**

DNR 11/94



**Total Wood Harvest in Minnesota by Species - Timberland**  
(Pulpwood: 1999; Sawtimber: Updated to 1999; Fuelwood: 1995-96)  
(in thousand cords)

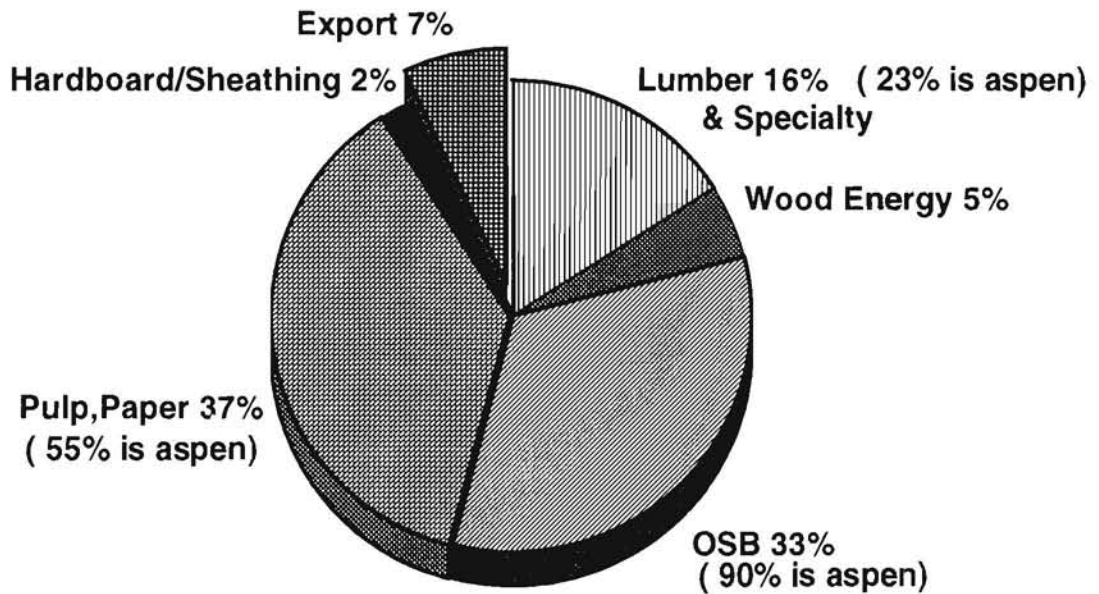
Species	Pulpwood*	Sawlogs & Others	Fuel		Total
			Residential**	Commercial	
Aspen	2,241.2	142.2	29.0	.6	2,413.0
Birch	144.4	40.1	40.3	6.3	231.1
Balm of Gilead	104.1	1.9	---	.1	106.1
Ash	1.1	12.0	11.5	.2	24.8
Oak	.6	109.0	77.6	1.0	188.2
Basswood	6.2	30.4	3.2	---	39.8
Maple	15.7	13.0	11.4	4.7	44.8
Cottonwood	---	9.7	---	---	9.7
Other Hardwood	.1	13.8	13.1	---	27.0
Sub-Total Hardwood	2,513.4	372.1	186.1	12.9	3,084.5
Pine					
Red Pine	52.7	103.2	1.0	---	156.9
White Pine	1.5	12.8	.2	---	14.5
Jack Pine	59.5	110.8	1.3	---	171.6
Spruce	155.3	10.5	.1	---	165.9
Balsam	188.2	9.1	.1	---	197.4
Tamarack	16.4	.1	.6	---	17.1
Cedar	---	8.2	.1	---	8.3
Sub-Total Softwood	473.6 457.2	254.7	3.4	---	731.7
Total	2,987.0	626.80	189.5	12.9	3,816.2

\* Figures include pulpwood exported to Wisconsin: Spruce: 39,200 cds.; Balsam: 5,200 cds.; Aspen: 92,600 cds.; Jack Pine: 29,000 cds.; Red Pine: 18,100.; Tamarack:13,800 cds.; Birch: 30,600 cds.; and Maple: 800 cds.

\*\*This is fuelwood removed from growing stock 1995-96.

Sources: Pulpwood (NRCS), Sawtimber & Fuelwood (DNR)

**WOOD USE by PRODUCT from TIMBER HARVEST in MINNESOTA  
- 1999 -  
Total 3.81 Million Cords (Includes All Species)**



Source : Harvest data compiled by NCFES & DNR

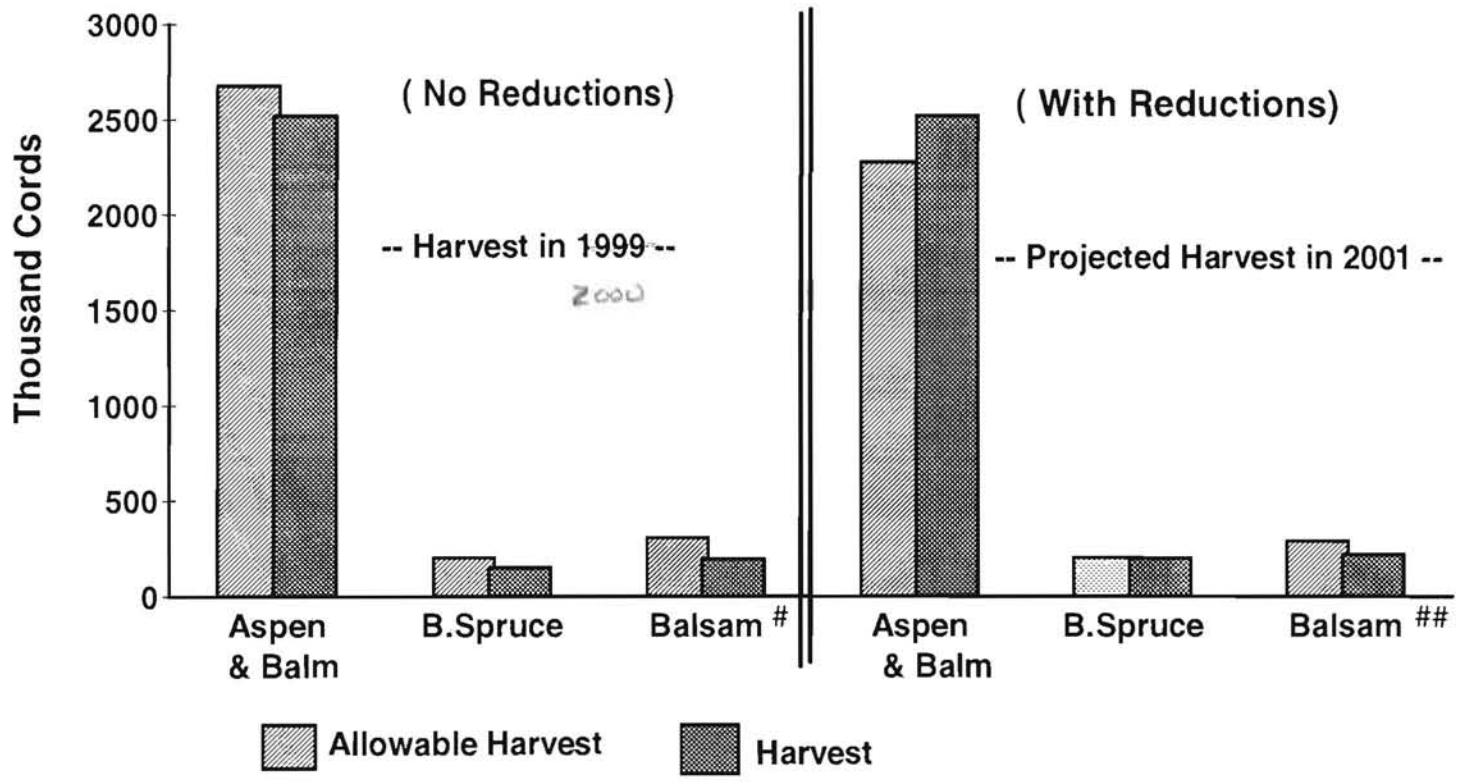
Special products include veneer, posts & poles, shavings wood, & landscape chips.

Export is primarily pulpwood shipped to Wisconsin mills.

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Do this one

### ESTIMATED ALLOWABLE HARVEST & ACTUAL HARVEST From Timberland : Minnesota 2000



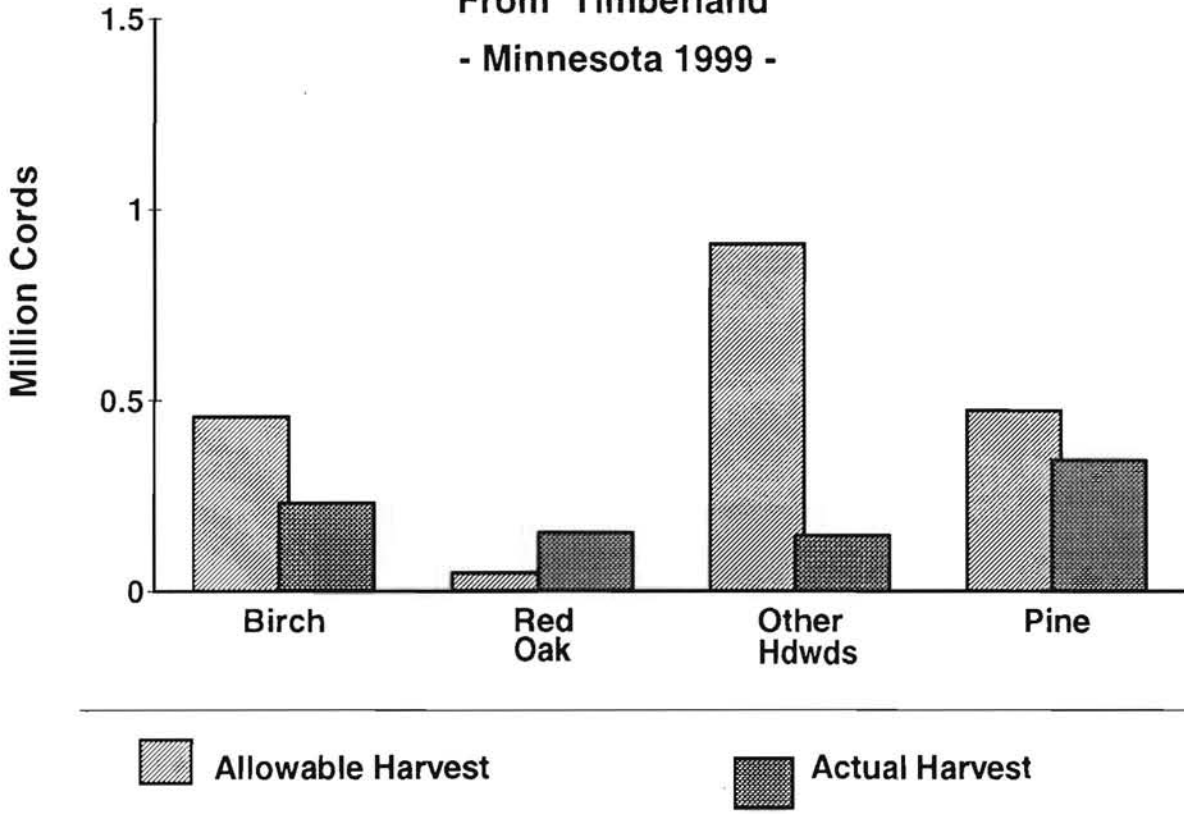
Aspen/Balm based on GEIS (Table 6.25, medium level, Dec. 92 , without reductions)  
Reductions : aspen/balm(-15%), balsam fir ( #: - 28%in 1999, ##: - 32%in 2001)  
Harvest data compiled for 1999 by NCFES & DNR.

DNR 2/01

*Where does this fit best?  
Age ... in 2000*

### ESTIMATED ALLOWABLE HARVEST & ACTUAL HARVEST

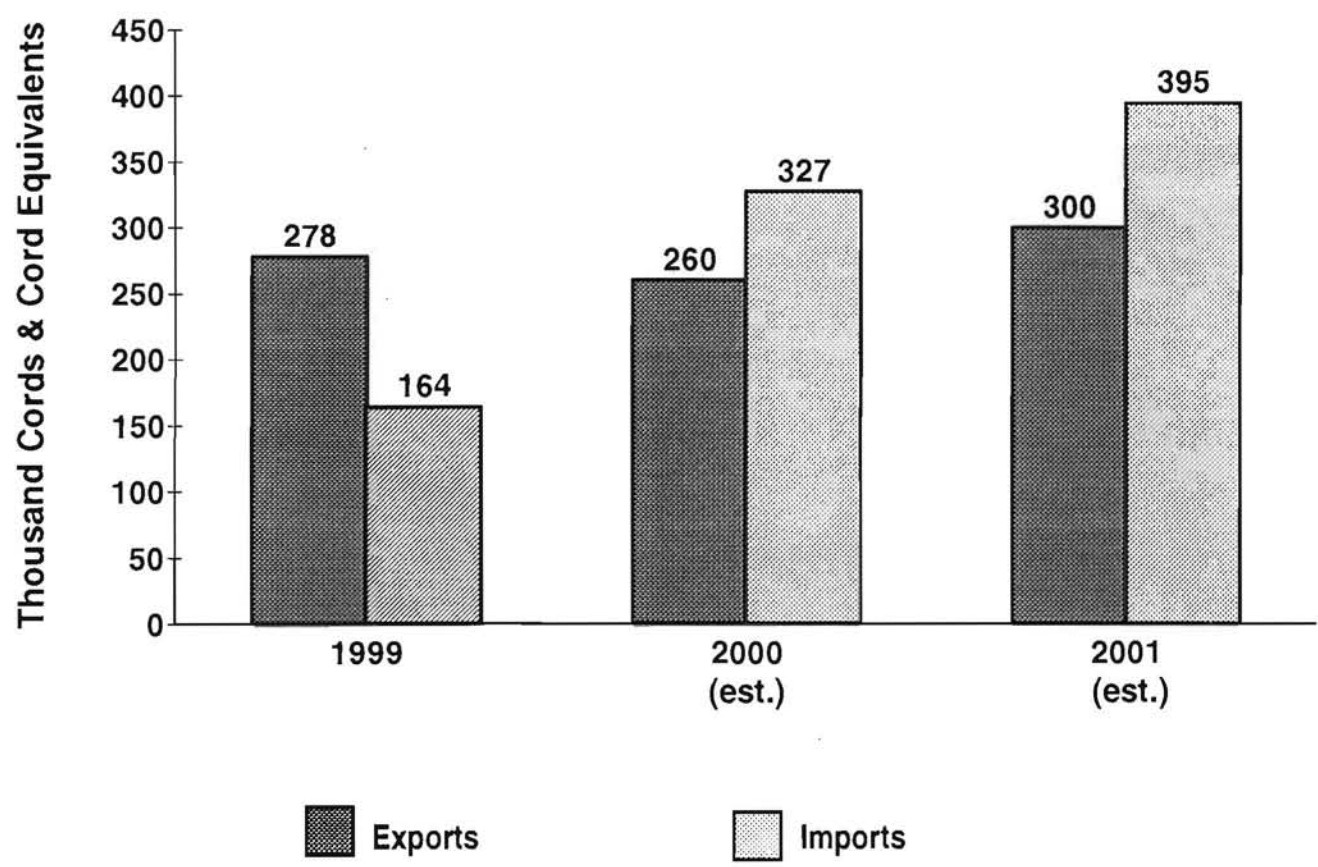
From Timberland  
- Minnesota 1999 -



DNR 11/00

*Where does this fit best?  
Update this to 2007  
& get actual 2000 figures?*

### Imports & Exports of Pulpwood Roundwood & Chips Minnesota



## Minnesota Pulp and Paper — 2001 —

Firm	Wood Used	Product
UPM Kymmene Blandin Paper Company Grand Rapids	Aspen, Balsam & Spruce	Magazines, Catalogs
Boise Cascade International Falls	Aspen, Balm, Pine, Spruce, Balsam, Birch, & Tamarack	Business, Xerox, Envelope, Computer
International Paper Sartell	Aspen, Balsam & Spruce	Magazines, Catalogs
Stora Enso Duluth Mills Duluth	Balsam, Pine & Spruce	Advertising Supplements
Potlatch Corporation (2) Brainerd & Cloquet	Aspen, Balm, Maple, Basswood, Tamarack & Pine	Business & Printing

<b>Recycling Mills</b>		
Rock-Tenn Company St. Paul	Recycled Paper & Corrugated	Cardboard & Corrugated Boxes
Stora Enso Duluth Mills Recycled Fiber Duluth	High Grade Office Paper & Computer Paper	Market Pulp for Paper
Liberty Paper Company Becker	Recycled Paper & Corrugated	Cardboard & Corrugated Boxes

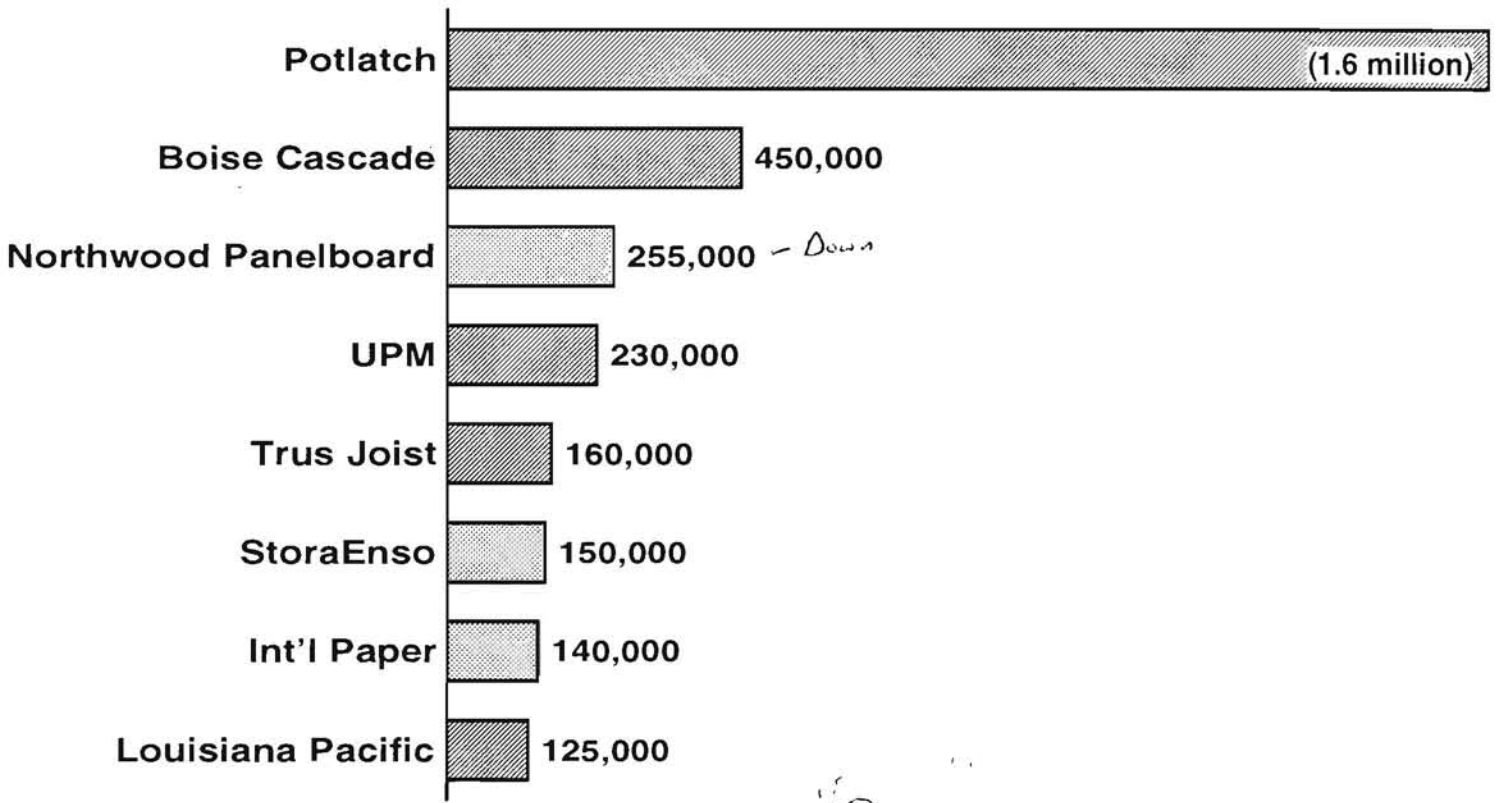
**Minnesota Oriented Strand Board (OSB)**  
**— 2001 —**

<b>Firm</b>	<b>Wood Used</b>	<b>Product</b>
Potlatch Grand Rapids	Aspen, Balm, Birch, Pine, & Maple	OSB—"Potlatch Select"
Louisiana-Pacific Two Harbors	Aspen & Balm	OSB—Siding "Inner Seal"
Northwood Panelboard Solway	Aspen & Balm	OSB—"Norbord"
Potlatch Bemidji	Aspen, Balm, Birch, Pine & Maple	OSB—"Oxboard"
Potlatch Cook	Aspen, Balm, Birch, Maple, & Pine	OSB—"Oxboard"
Trus Joist Weyerhaeuser Deerwood	Aspen	Laminated Structural Lumber "TimberStrand"

**Minnesota Hardboard and Specialty**  
**— 2001 —**

<b>Firm</b>	<b>Wood Used</b>	<b>Product</b>
Certaiteed Corporation Shakopee	Aspen & Recycled Paper	Roofing Felt
International Biltrite International Falls	Aspen, Balm, & Recycled Paper	Sheathing
Georgia-Pacific Corporation, Superwood Division, Duluth	Aspen, Pine, & Mixed Hardwoods	Industrial Hardboard

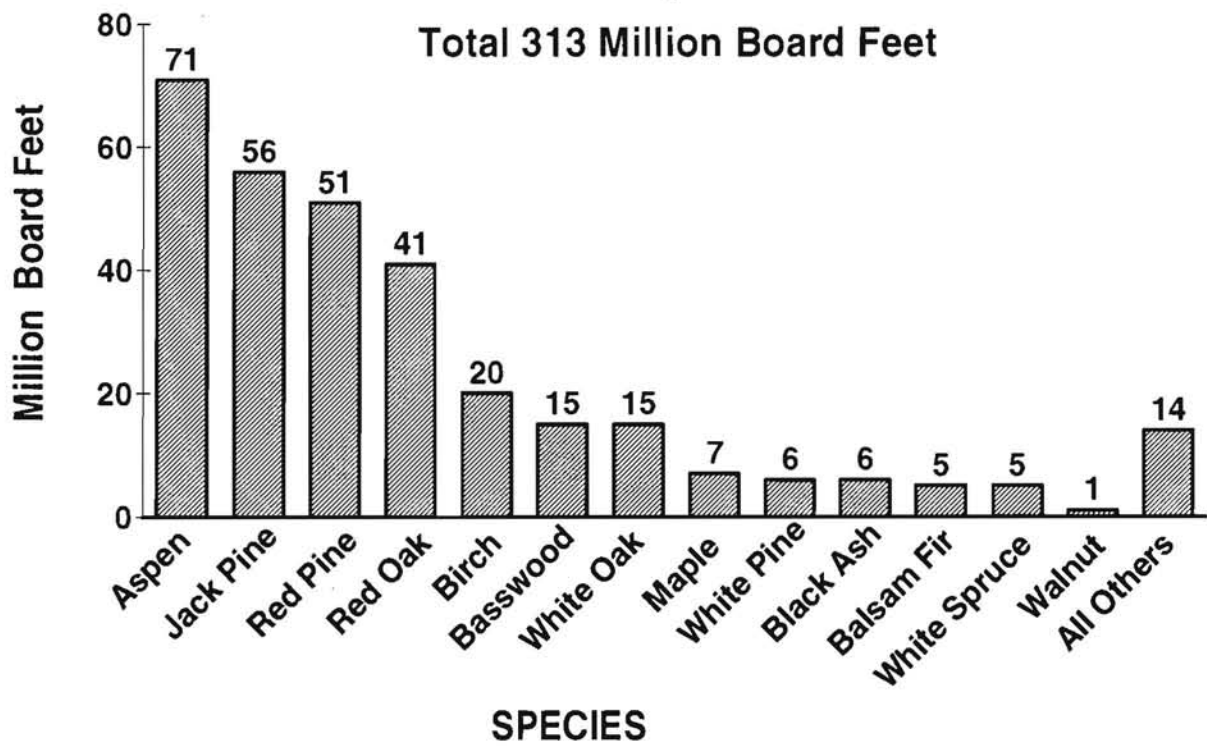
**Industry Wood Use Harvested from Minnesota - 2000**  
(in cords)





**MINNESOTA TIMBER PRODUCED by SPECIES**  
( Lumber , Posts/Poles , Shavings , Veneer , Energy & Landscape Chips )

- 1999 adjusted -



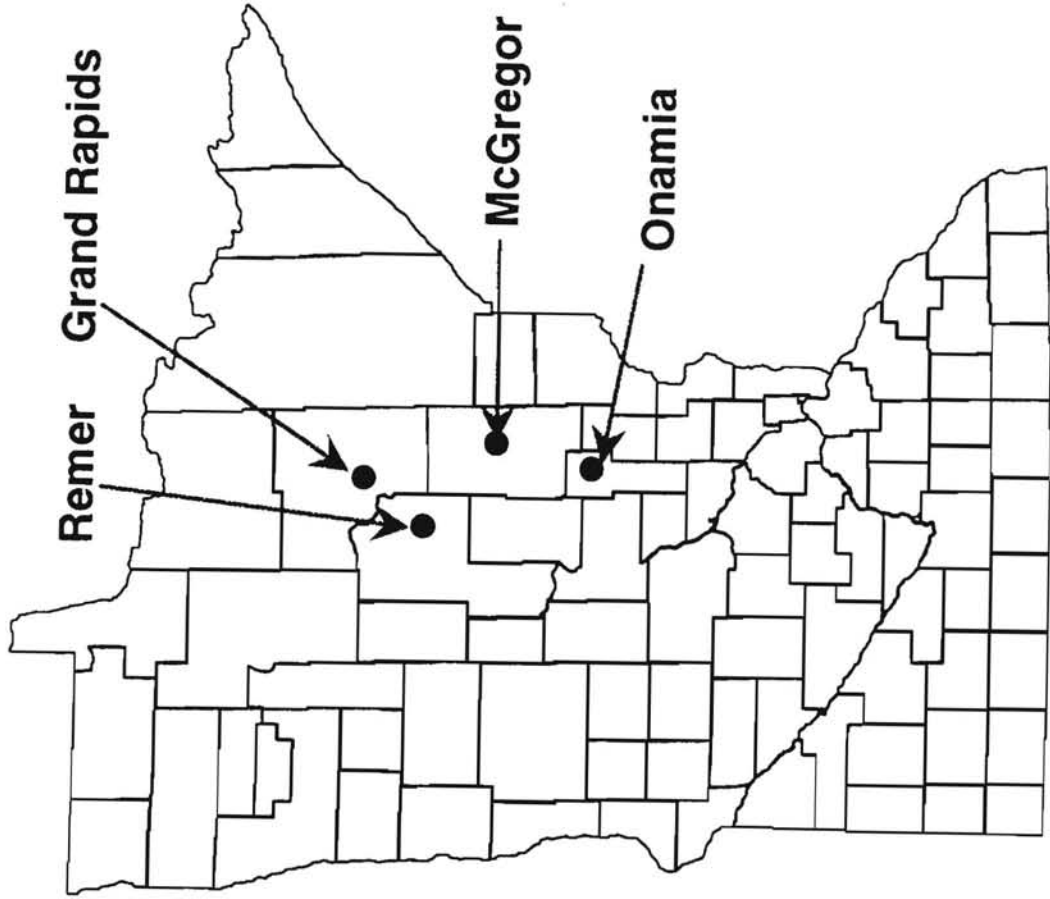
Source : DNR sawmill survey.

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Saw

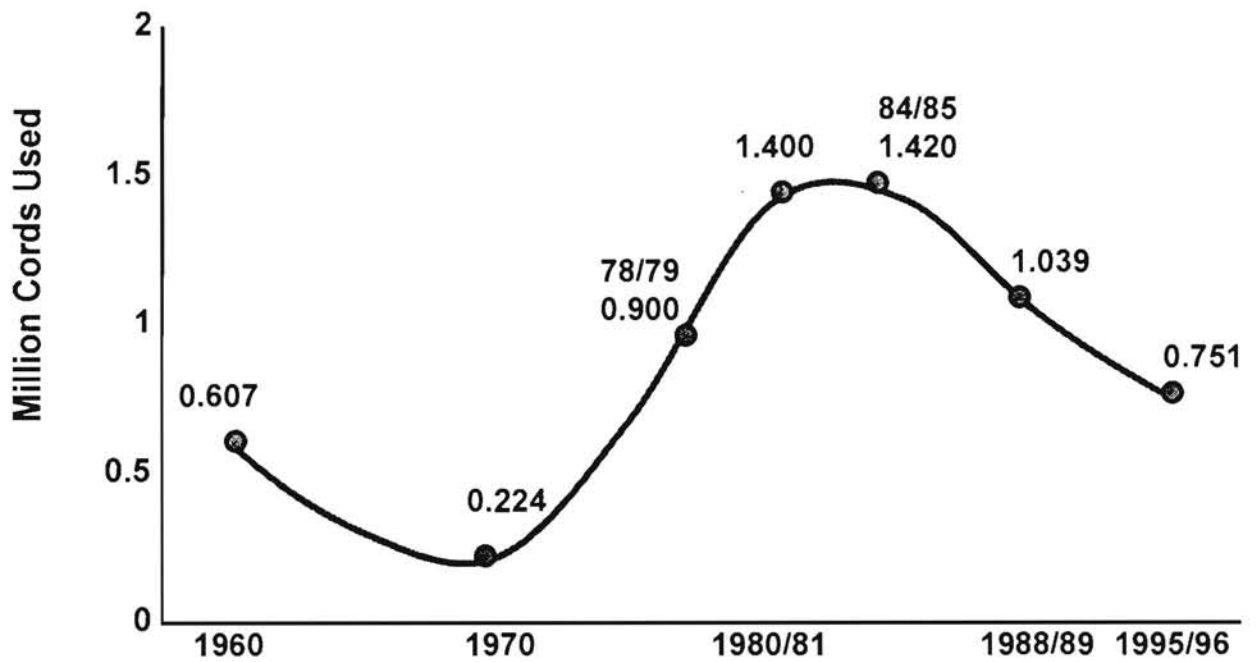
# MINNESOTA MILLS UTILIZING SMALL HARDWOODS

2001



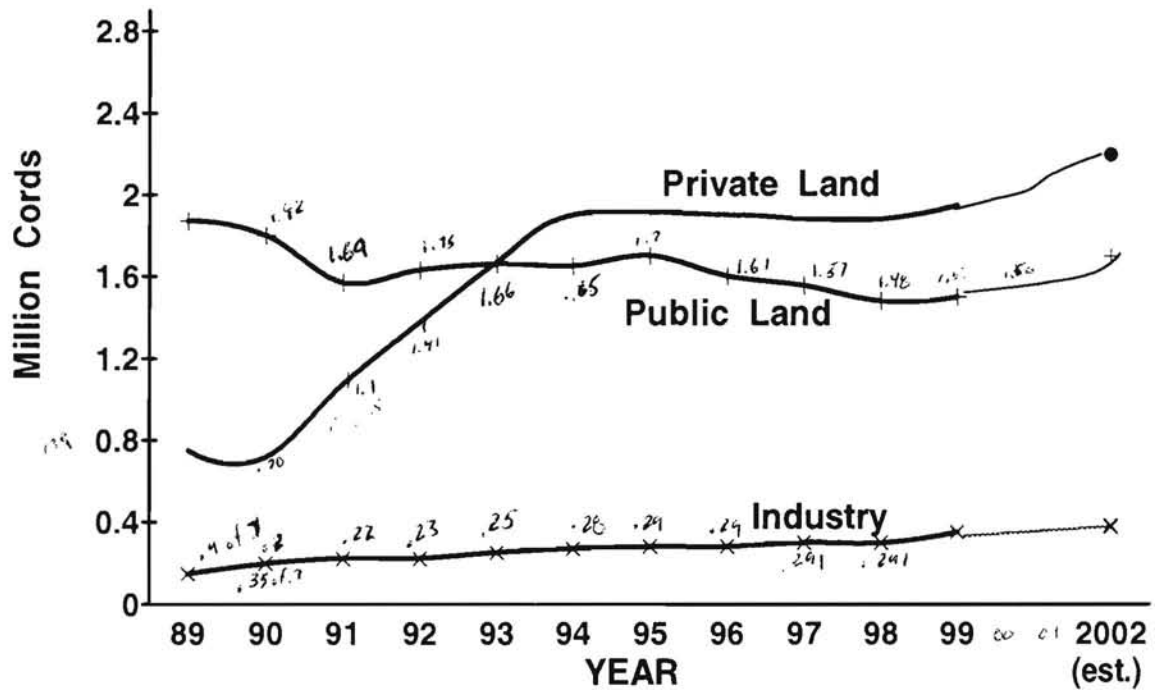
## FUELWOOD DEMAND in MINNESOTA

1960 - 1995/96



Source : DNR Fuelwood Use Surveys

## VOLUME of TIMBER SOLD by OWNERSHIP - MINNESOTA

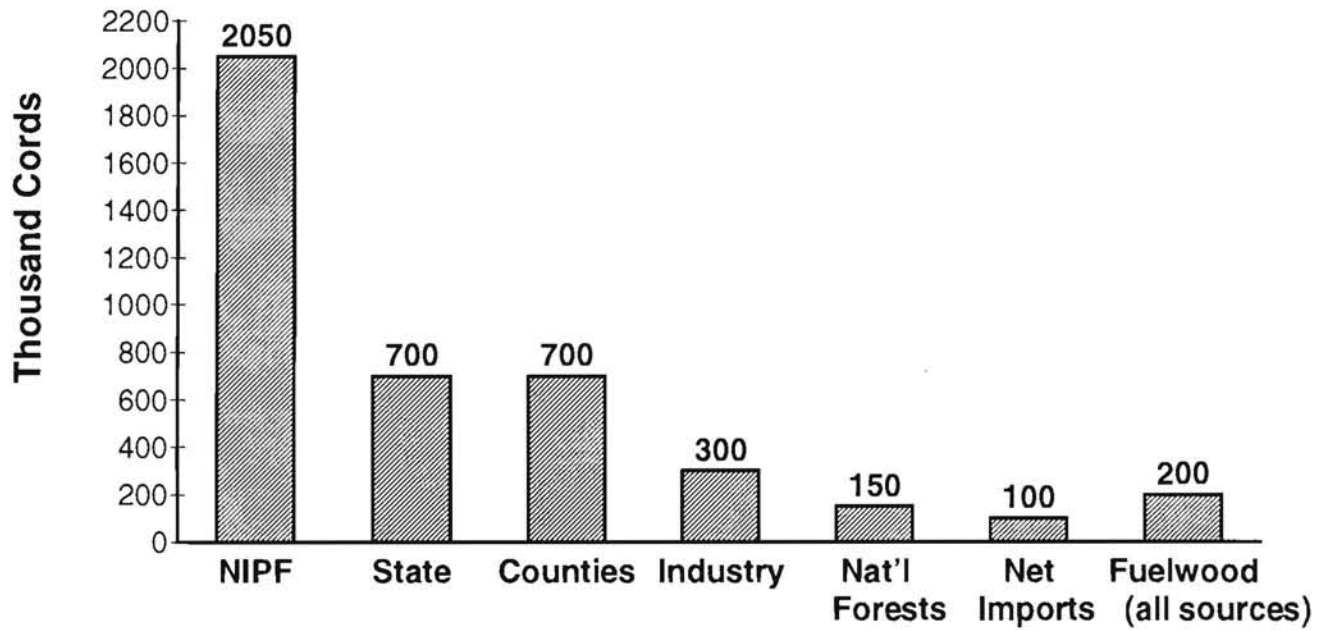


Public Land : State, Chippewa & Superior Nat'l Forest, BIA, and 15 Counties.  
 Source : Volume of timber sold by public land agencies, DNR survey,  
 NCFES pulpwood use survey, MFI industry survey.  
 Estimated 2002 based on announced industry expansions.

DNR 10/00

## Contributors to Estimated Harvest in Minnesota - Year 2001 -

Total Harvest = 4.2 million cords, all sources



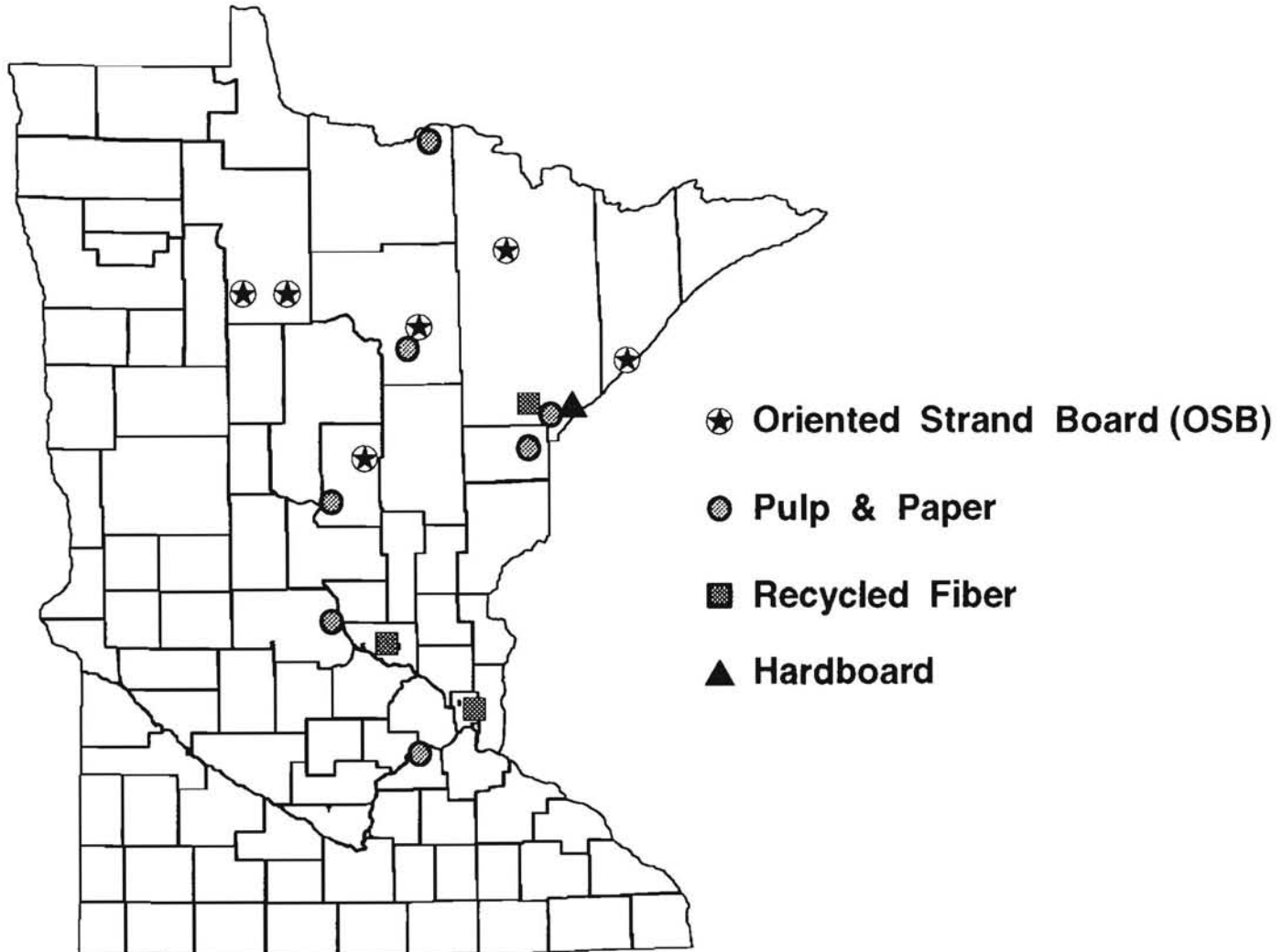
<b>Minnesota -- New and Expanding Large Wood Industry</b>		
<b>1975 - 2001</b>	<b>Product</b>	<b>Capital Investments (\$Millions)</b>
Potlatch - expansion	Paper	\$100
Potlatch - Bemidji	OSB	40
Potlatch - Cook	OSB	40
Northwood Panelboard	OSB	45
Champion Int'l - now Int'l Paper	Paper	250
Blandin - now Potlatch	OSB	50
Louisiana Pacific	OSB	30
Blandin - now UPM Mills	Paper	350
Potlatch - modernization	Paper	100
LSPI - now Stora Enso	Paper	404
International Biltrite	Sheathing	12
Boise Cascade	Paper	535
MacMillian Bloedel - now Trus Joist Weyerhaeuser	*PSL	70
Potlatch - Bemidji expansion	OSB	35
Potlatch	Lumber	22
Potlatch	Pulp Mill	525
Potlatch - Cook expansion	OSB	60
<b>Total</b>		\$2.668 (\$2,668,000,000)

\*Parallel Strand Lumber

Source: MN DNR - Forestry

# OSB, PULP & PAPER, HARDBOARD & RECYCLING MILLS

Minnesota 2001



## Current and Projected Wood Harvest from Timberland

-Minnesota Statewide-

Species	(In Thousand Cords)	
	1999	Projected 2002*
Aspen/Balm-of-Gilead	2,519.1	2,535
Birch	231.1	377
Ash	24.8	30
Oak	188.2	190
Basswood	39.8	103
Maple	44.8	113
Cottonwood	9.7	10
Other Hardwoods	27.0	25
Pine	343.0	432
Spruce	165.9	230
Balsam	197.4	215
Tamarack	17.1	50
Cedar	8.3	6
<b>Total</b>	<b>3,816.2</b>	<b>4,316</b>

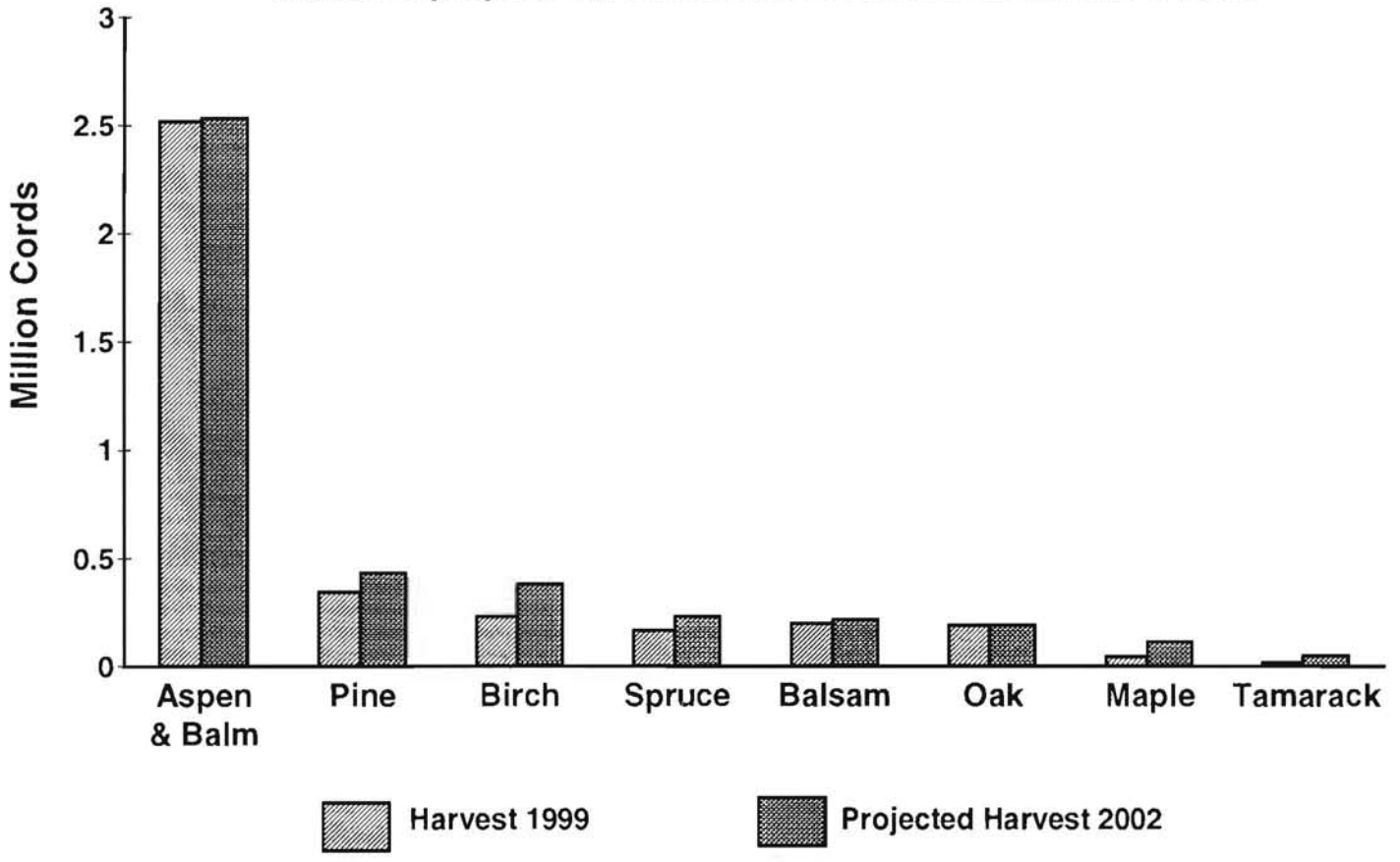
**Source:** 1999 Harvest Data compiled by NCFES and DNR.  
Projected 2002 based on announced expansions and industry interviews.

- \*Adjustments due to:
- Potlatch expansion of pulpmill at Cloquet ✓
  - Potlatch rebuild of OSB mill at Cook
  - UPM Mills switch to more spruce/balsam
  - Potlatch additions to lumbermill
  - Closing of aspen sawmill and reductions at other mills
  - A portion of Boise Cascade proposed increase ✓
  - International Paper increases in spruce/less balsam



*\* Needs work*

### HARVEST & PROJECTED HARVEST for MAJOR MINNESOTA SPECIES - includes pulpwood, sawtimber & fuelwood from live trees -



Note: 66% of Minnesota Harvest was Aspen / Balm

3/01

*Project to 2004*  
*Update to actual 2002, then*

## ESTIMATE OF INCREASES/DECREASES BY 2002: MINNESOTA HARVEST

	ASPEN/BALM	PINE	SPRUCE	BALSAM	BIRCH	MAPLE	BASSWOOD
<b>POTLATCH MILLS (Bemidji, Cook, Cloquet, &amp; Grand Rapids)</b>	138,000	60,000*			135,000	64,000	60,000
<b>POTLATCH LUMBERMILL**</b>		37,500	10,000	17,500			
<b>BOISE CASCADE***</b>	10,000		1,000	2,000	6,000		
<b>BLANDIN</b>	(-)50,000		25,000	25,000			
<b>SAWMILLS</b>	(-)35,000	5,000	5,000		10,000		5,000

\* This roundwood may be reduced approximately 30,000 cd. equivalents when expansion of lumbermill is finalized.

\*\* Assumes all wood being harvested in Minnesota.

\*\*\* 20% of projected increase over next 10 years.

### NOTES

- 1) The <sup>2000</sup>1999 harvest figures are used as a basis for determining estimated harvest in <sup>2003</sup>2002.
- 2) The 1999 roundwood harvest increased 155,000 cords compared to 1998. Mill inventories at the end of 2000 are at their lowest point in years. Year 2001 may reflect additional harvest to build inventory even though mill capacity will remain fairly constant.
- 3) Pulpwood exports to Wisconsin will continue to decrease as the demand and stumpage prices in Minnesota continues to increase.
- 4) There has been an overall reduction in saw timber production since mill surveys were taken in 1997. The figures in 2002 reflect this reduction except for one sawmill as indicated above. There was a reduction of 30,000 cords in sawmill production in 1999.
- 5) The Ontario Ministry of Natural Resources has stated that they are offering permits to export surplus aspen and white birch pulpwood from government lands over the next 3 years. This is a major policy change and may impact additional pulpwood resources available to Minnesota industry.

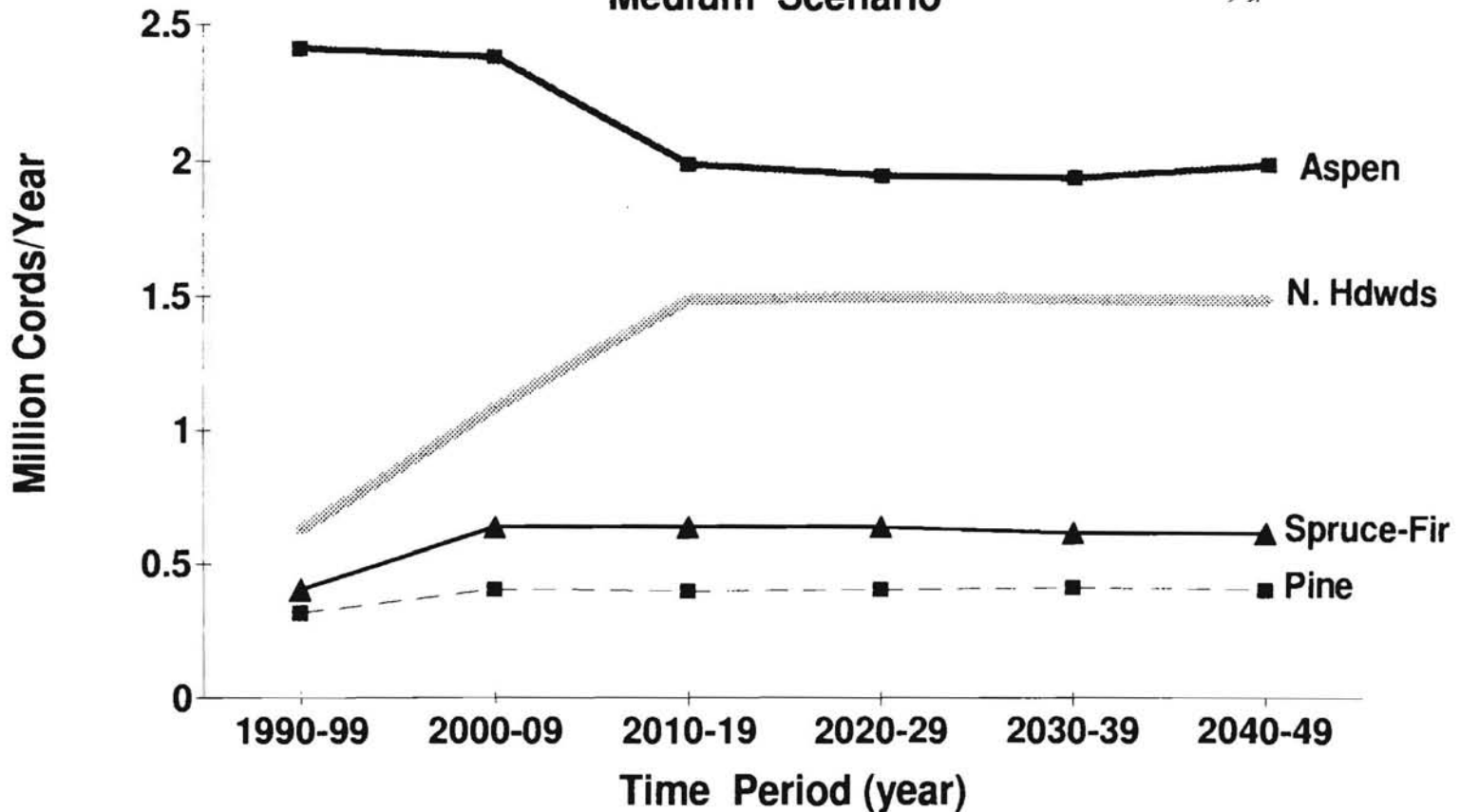
*Need to check this:*

## **NOTE TO READERS**

There is no direct correlation between current harvest levels and long-term sustained harvest levels because there are many options for moving towards a fully regulated forest age class structure. Normally, transitions from the present structure to a target age class structure require several rotations. The choice of amount and timing of harvest can vary considerably by decade. Harvest plans are typically assessed periodically as markets and other conditions dictate.

There is no one best way or time period to reach a target age class structure. Transition harvests may at some time be either higher or lower than the long-term sustained yield.

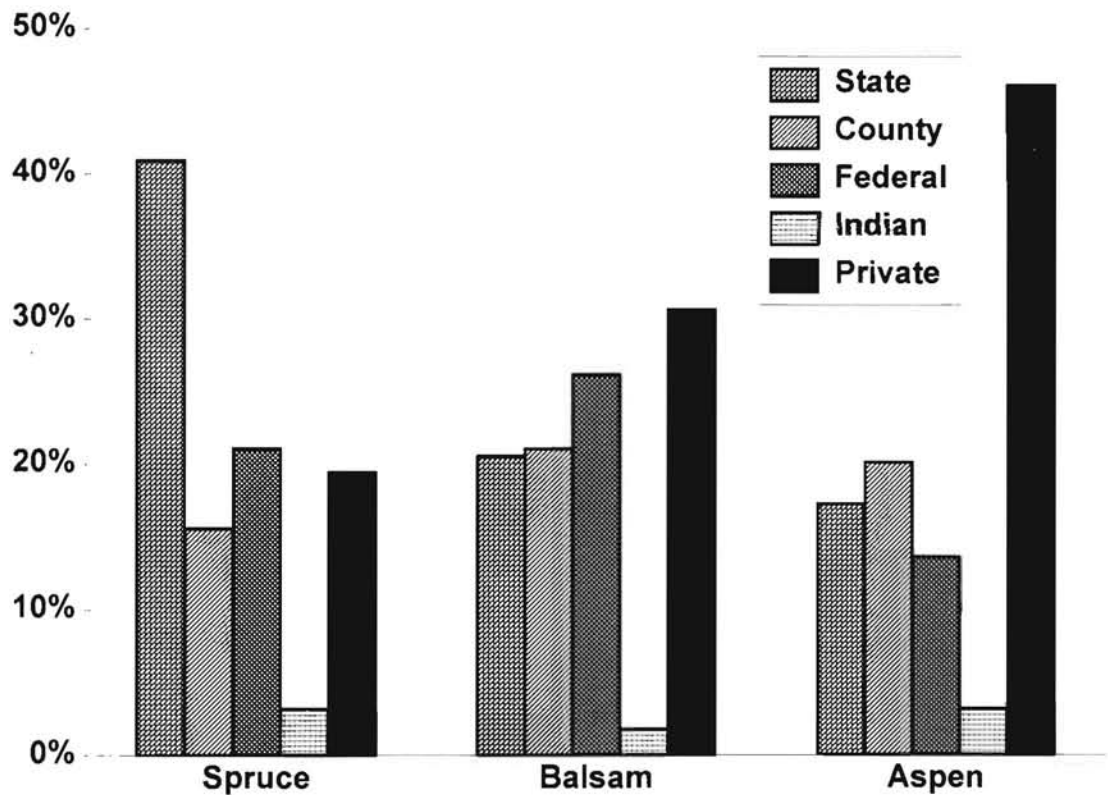
**SCHEDULING HARVEST by MODEL for PRODUCT GROUP**  
**Minnesota Northern Region, All Ownerships**  
**Medium Scenario**



Source : GEIS table 6.8 medium scenario, 2nd run ( p210 of M.P. & F. Reso. Base, 12/1992 )  
 Assumptions used : Ownership constraints (riparian lands & old growth forests, etc.)

Objective : To harvest every stand at least once during a rotation with the goal to achieve a sustainable harvest level from a regulated forest at some point.

**OWNERSHIP of SPRUCE, BALSAM & ASPEN TYPES in MINNESOTA**



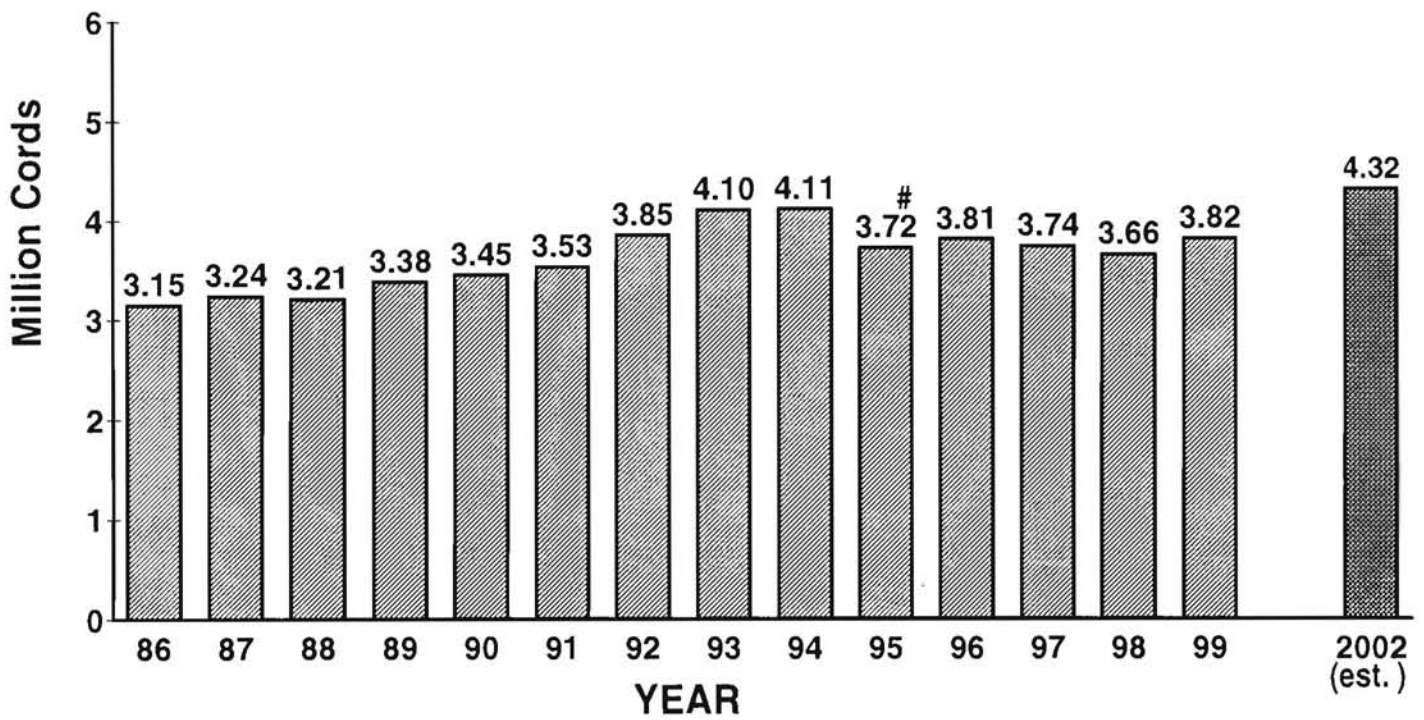
Total ( in 1,000 acres ) : 1,415.9

734.3

5,114.2

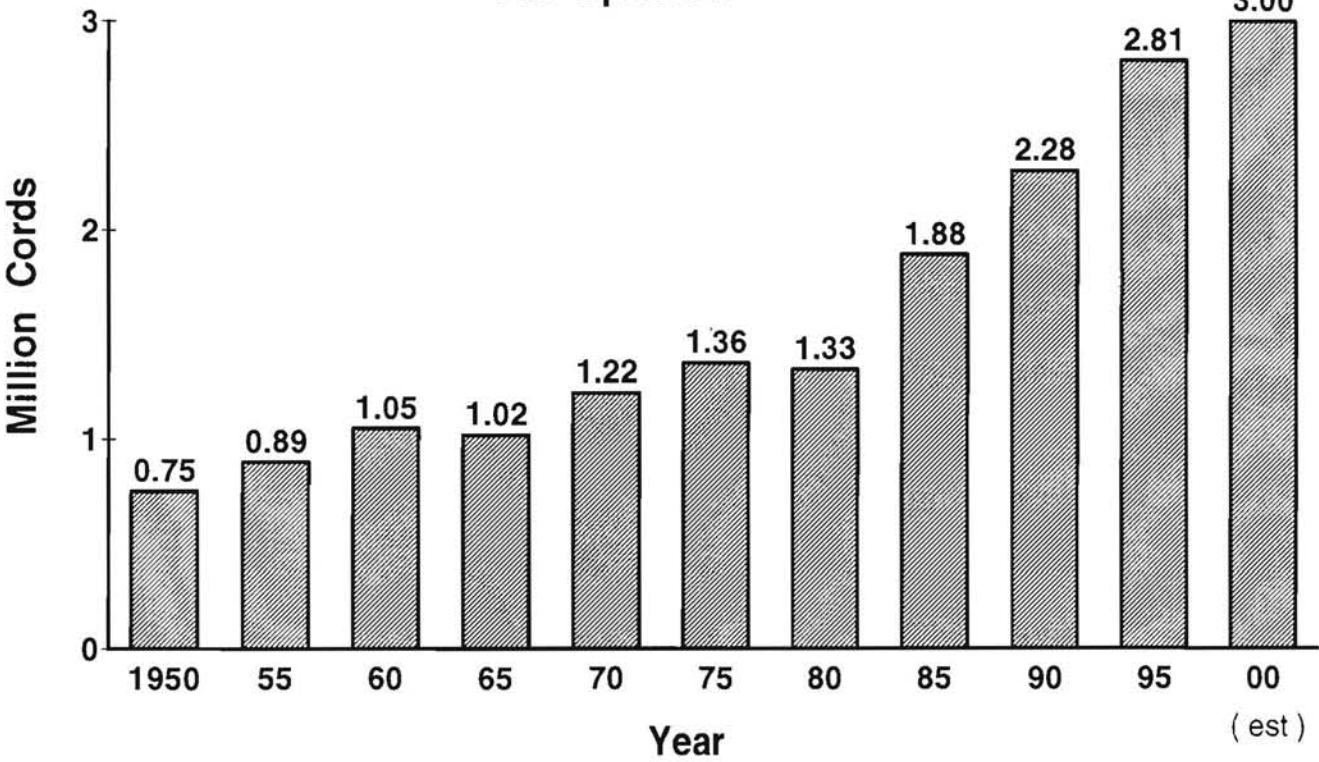
Source : Minnesota Forest Statistics, 1990 - USFS, Resource Bull. NC-141 (Table 8)

**ACTUAL & PROJECTED TIMBER HARVEST in MINNESOTA**  
 - from MN Timberland , all Ownerships, all Species -



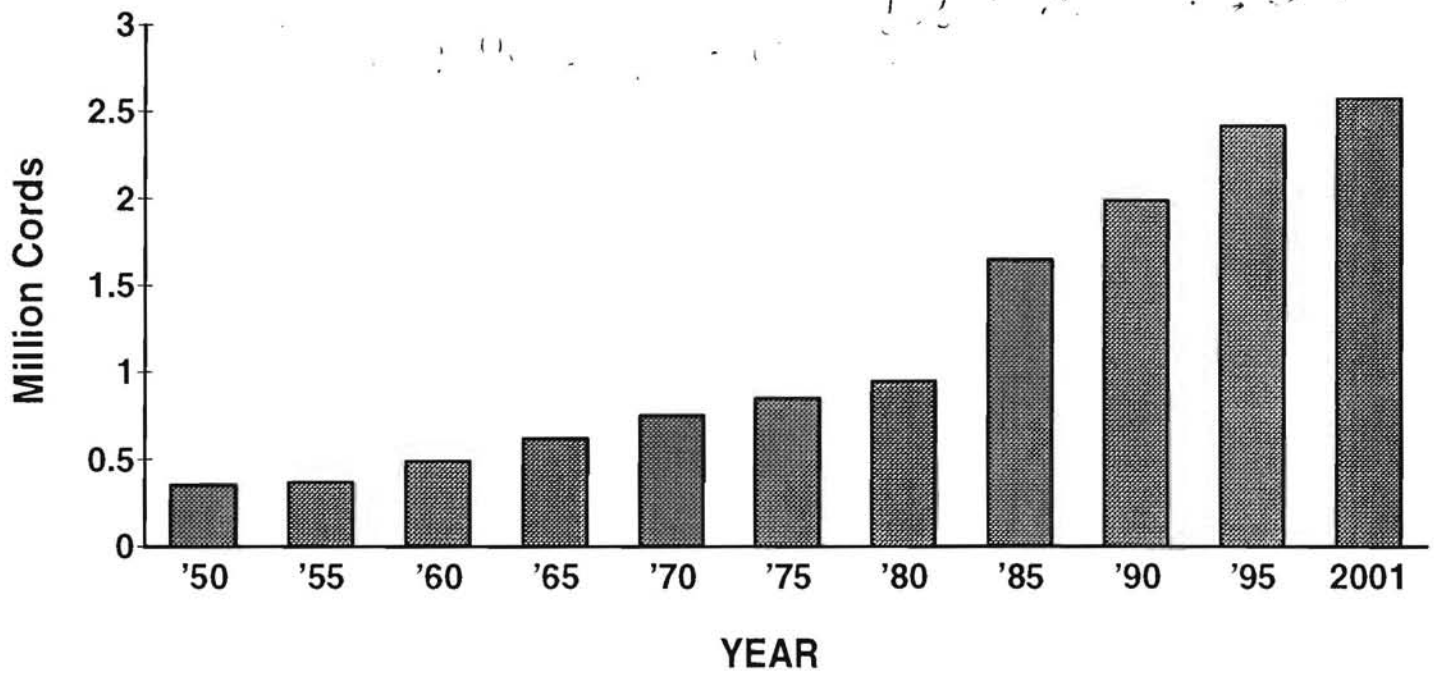
Source : # 1995 adjustment due to decrease in fuelwood use since 1989/90  
 ## Harvest Data Compiled by NCFES and DNR.

**PULPWOOD PRODUCTION in MINNESOTA**  
**1950 - 2000**  
**- All Species -**



11/00

### ASPEN & BALM HARVEST in MINNESOTA

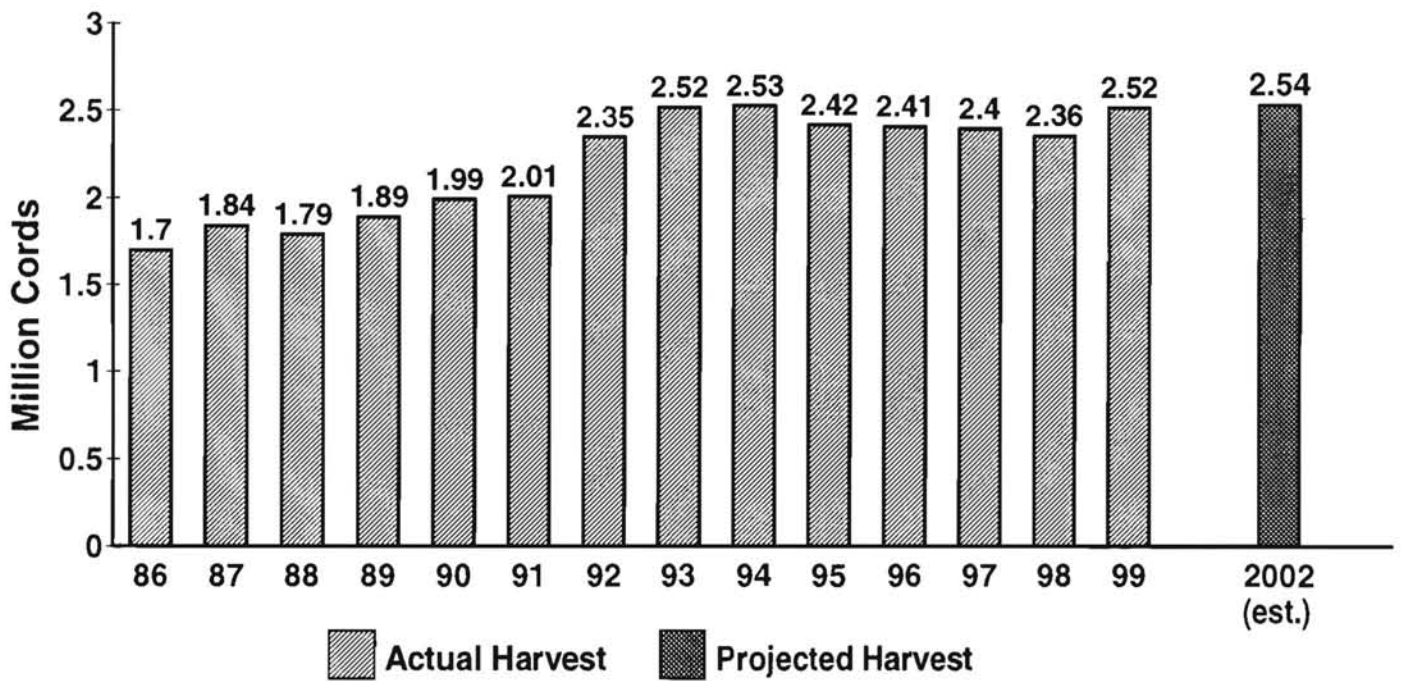


Source : NCFES & DNR Surveys

DNR 1/01

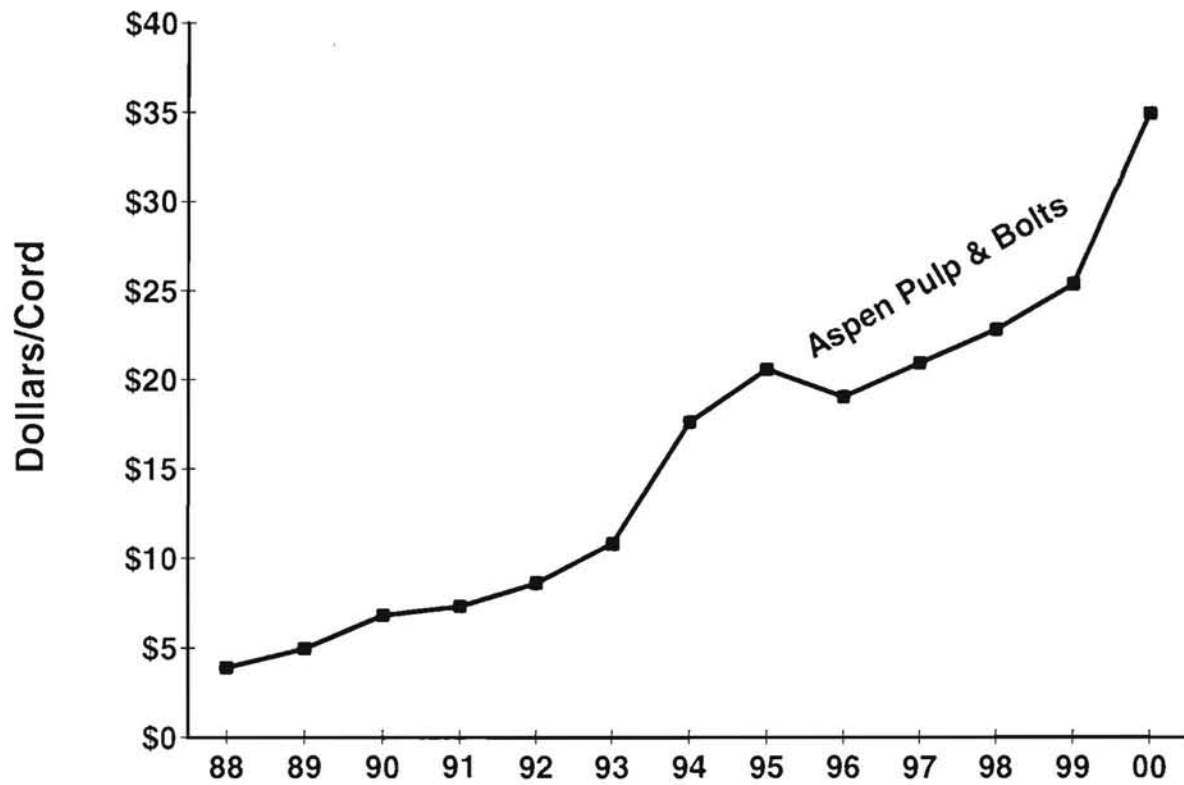


**ASPEN & BALM HARVEST in MINNESOTA : ACTUAL & PROJECTED**  
 (includes pulpwood, sawtimber, wood for energy & specialty products)



- 1) Annual sustainable yield=2.68 million cords based on Table 6.25, GEIS, medium level, Dec, 92
- 2) Harvest data compiled by NCFES & DNR

**AVERAGE PRICES RECEIVED for ASPEN STUMPAGE SOLD by  
PUBLIC LAND AGENCIES in MINNESOTA**



\* Not adjusted for inflation

Source : Volume of timber sold by public land agencies, a DNR survey .

# Aspen/Balm-of-Gilead

## Present and Projected Demand

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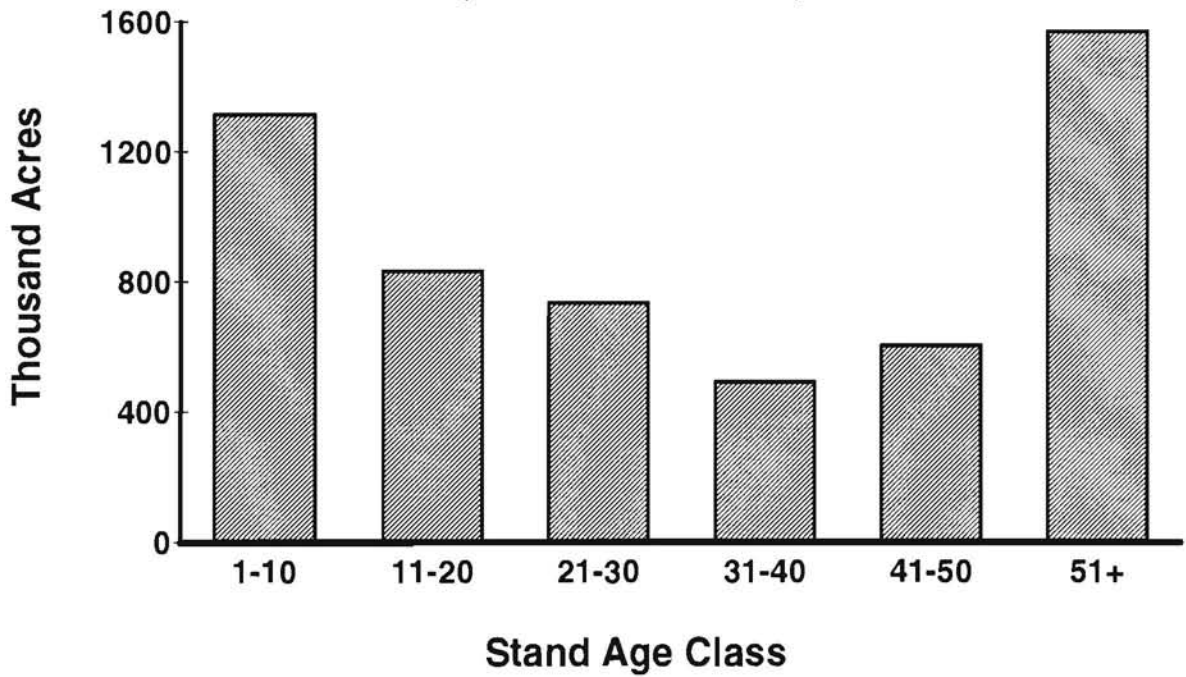
	cords
<b>1999 Harvest</b> .....	<b>2,519,100</b>
• Minnesota Pulpwood Industries:	
◦ Pulp & Paper, Hardboard, Sheathing, Shingles .....	1,004,600
◦ OSB .....	1,250,000
• Pulpwood Export .....	92,600
• Sawlogs & Other .....	142,200
• Fuelwood (from growing stock) .....	29,700
<b>2002 Projected Harvest</b> .....	<b>2,535,000</b>
• Minnesota Pulpwood Industries:	
◦ Pulp & Paper, Hardboard, Sheathing, Shingles .....	932,000
◦ OSB .....	1,356,000
• Pulpwood Export .....	70,000
• Sawlogs & Other .....	160,000
• Fuelwood (from growing stock) .....	30,000

**Figures include a projected OSB and pulp mill increases and a shift to the use of alternative species by present OSB industries.**

**Source:** NCFES & DNR Surveys  
 Projections based on DNR/Industry Announcements

## ASPEN & BALM TYPE AGE DISTRIBUTION - YEAR 2000

Minnesota Statewide  
( 5.5 million acres )



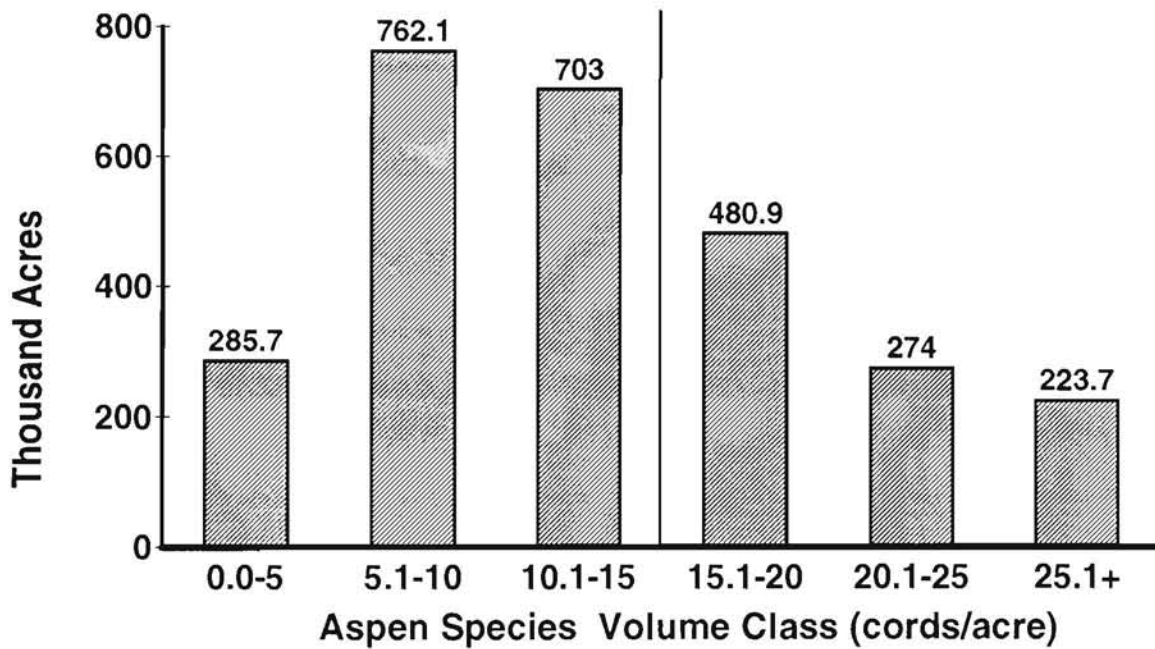
Source : Estimated by a DNR demand & supply model based on MN FIA 1990 Eastwide database.

1/31/00 rev.

# Aspen Species in Aspen Type : Total Acreage by Species Volume Class

Minnesota FIA 90, Statewide, All Ownerships

For Stand Age 40 & over at the Time of Survey

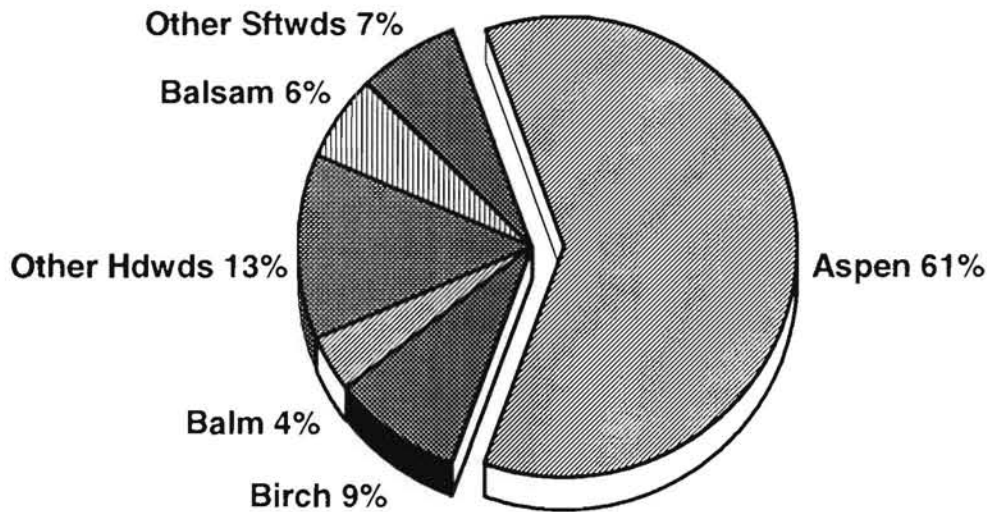


Est. 14.4 million cords  
is in these stands

Est. 19.6 million cords  
was in these stands

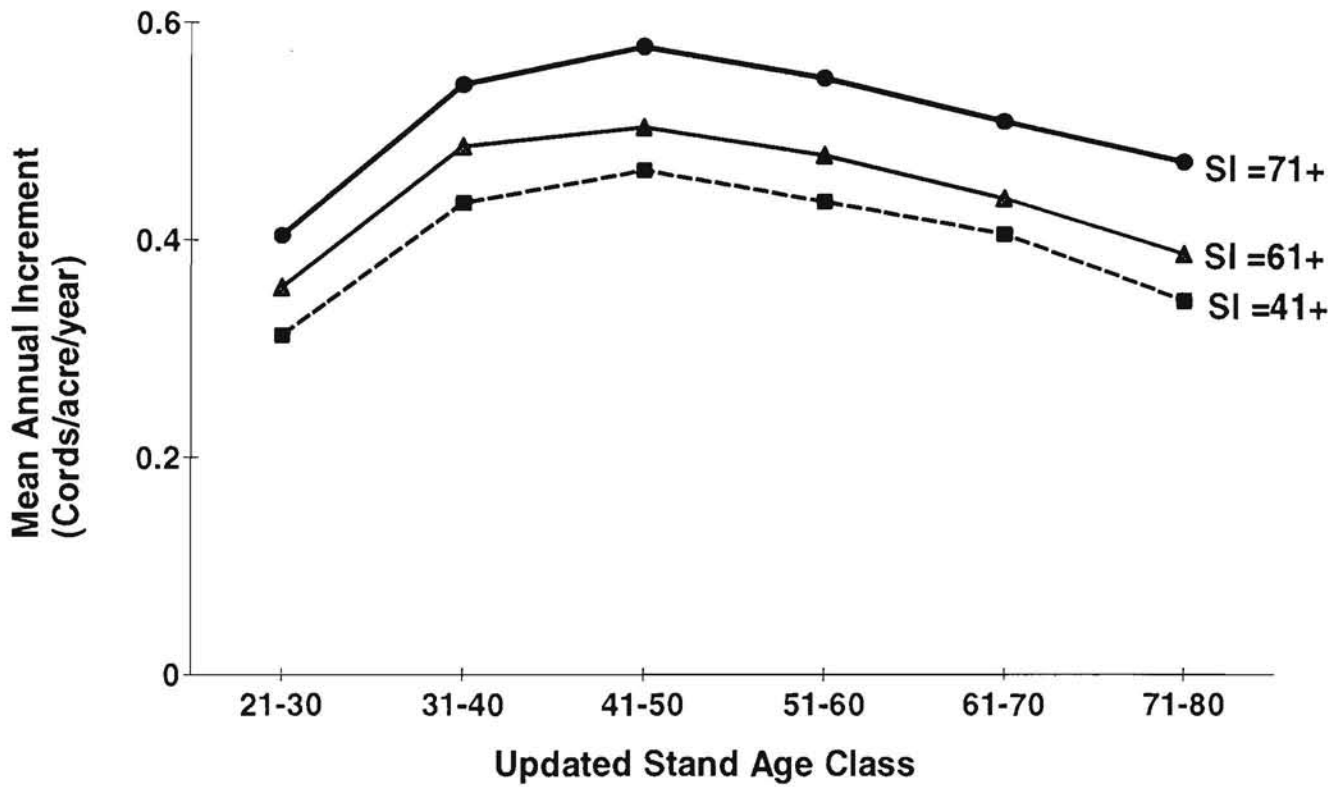
10/00

**MINNESOTA : ASPEN TYPE by SPECIES COMPOSITION**  
(5.1 Million Acres Aspen Type)  
- 1990 Forest Survey -



Source : Minnesota Forest Statistics , 1990 - USFS, Resource Bull. NC-141 (Table 47)

**Aspen Type Mean Annual Increment by Updated Age**  
**CSA Statewide : Based on Volume Yield Model**

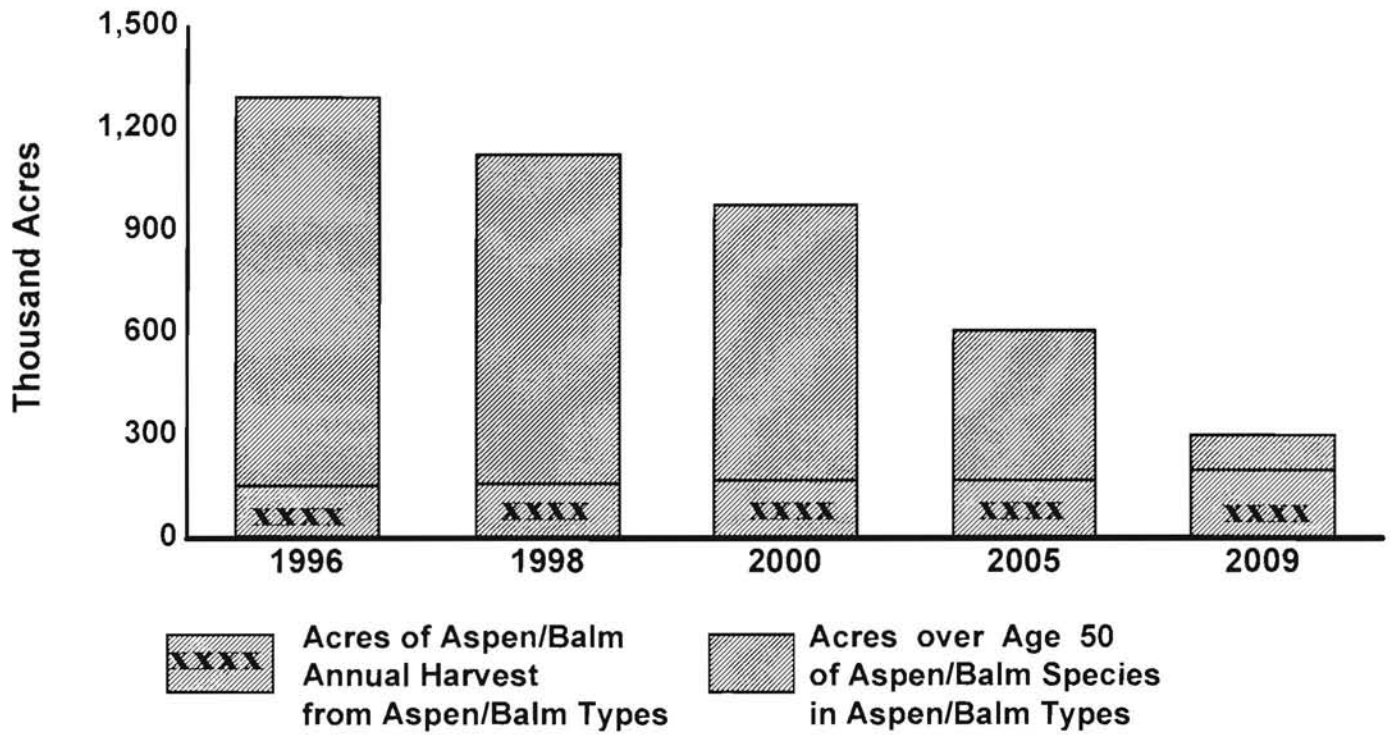


\* The CSA biological yield model based on stands at the time of survey age.  
 Gross volume including net & cull volume of live trees

DNR-Forestry 11/30/95

## ASPEN & BALM TYPES : ANNUAL HARVEST VS ACRES over AGE 50 Minnesota Statewide

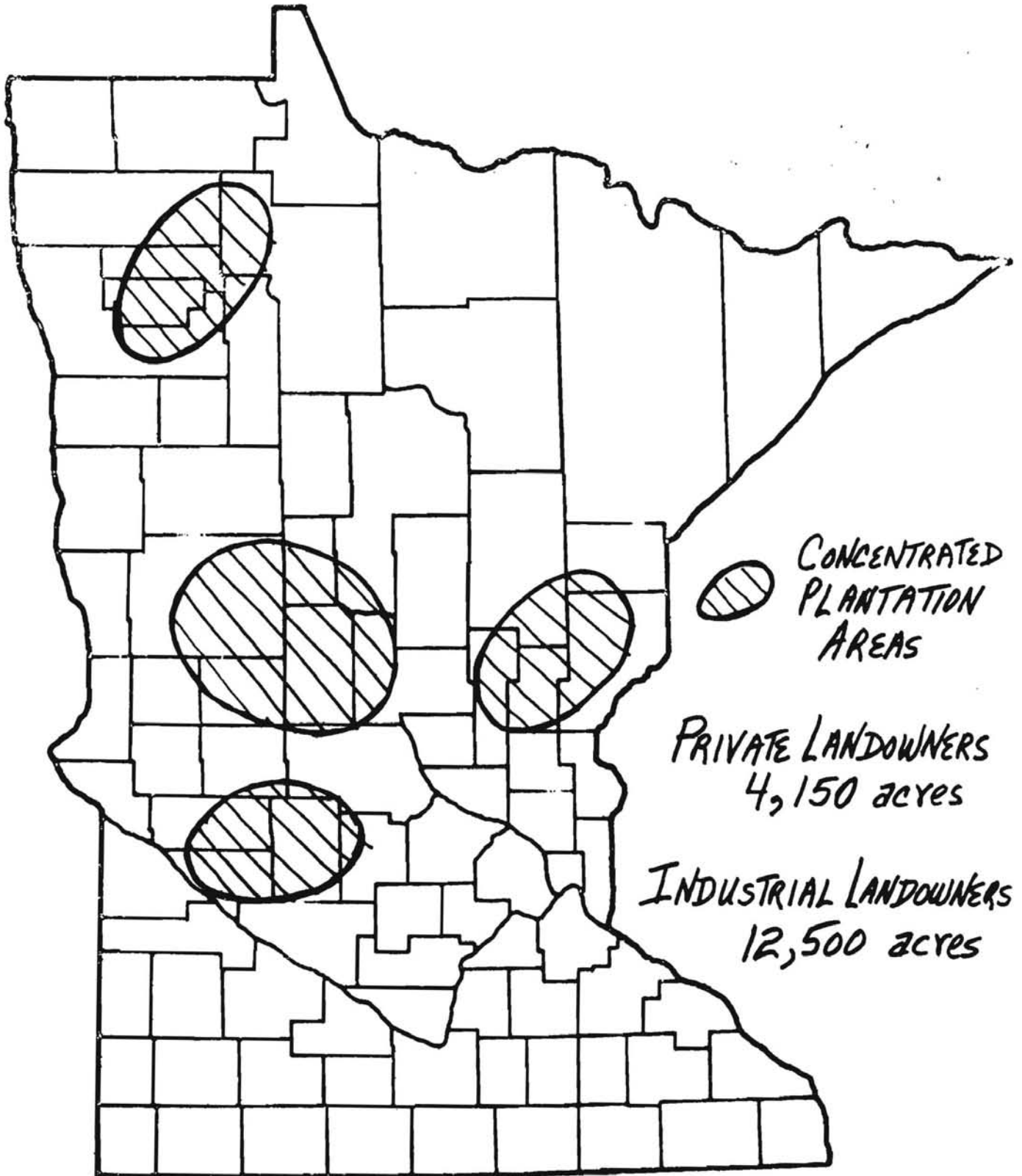
(includes aspen & Balm species in the aspen & Balm types only)



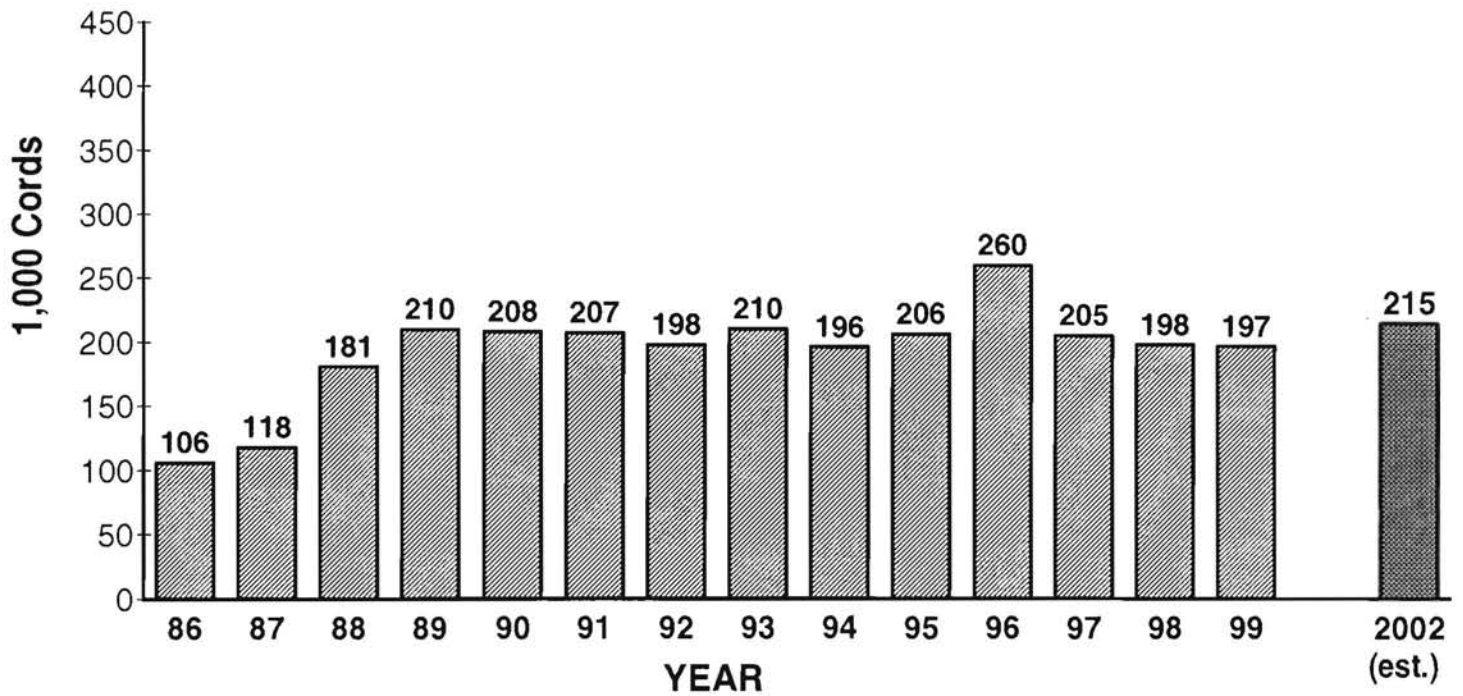


# HYBRID POPLAR IN MINNESOTA

- as of JANUARY 2001 -



**BALSAM FIR HARVEST in MINNESOTA : ACTUAL & PROJECTED**  
 (includes pulpwood and sawtimber)



**Sustainable harvest ( 291,000 cords) reduced 32% since 1989 due to mortality from spruce budworm.  
 The sustainable harvest not adjusted for restrictions ( riparian and other)  
 Harvest data compiled by NCFES & DNR.**

3/01

# Balsam Fir

## Present and Projected Demand from Minnesota

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	cords
<b>1999 Harvest</b> .....	<b>197,400</b>
• Minnesota Pulpwood Industries .....	183,000
• Pulpwood Export .....	5,200
• Sawlogs & Other .....	9,100
• Fuelwood .....	100
<b>2002 Projected Harvest</b> .....	<b>215,000</b>
• Minnesota Pulpwood Industries .....	184,400
• Pulpwood Export .....	5,000
• Sawlogs & Other .....	26,600

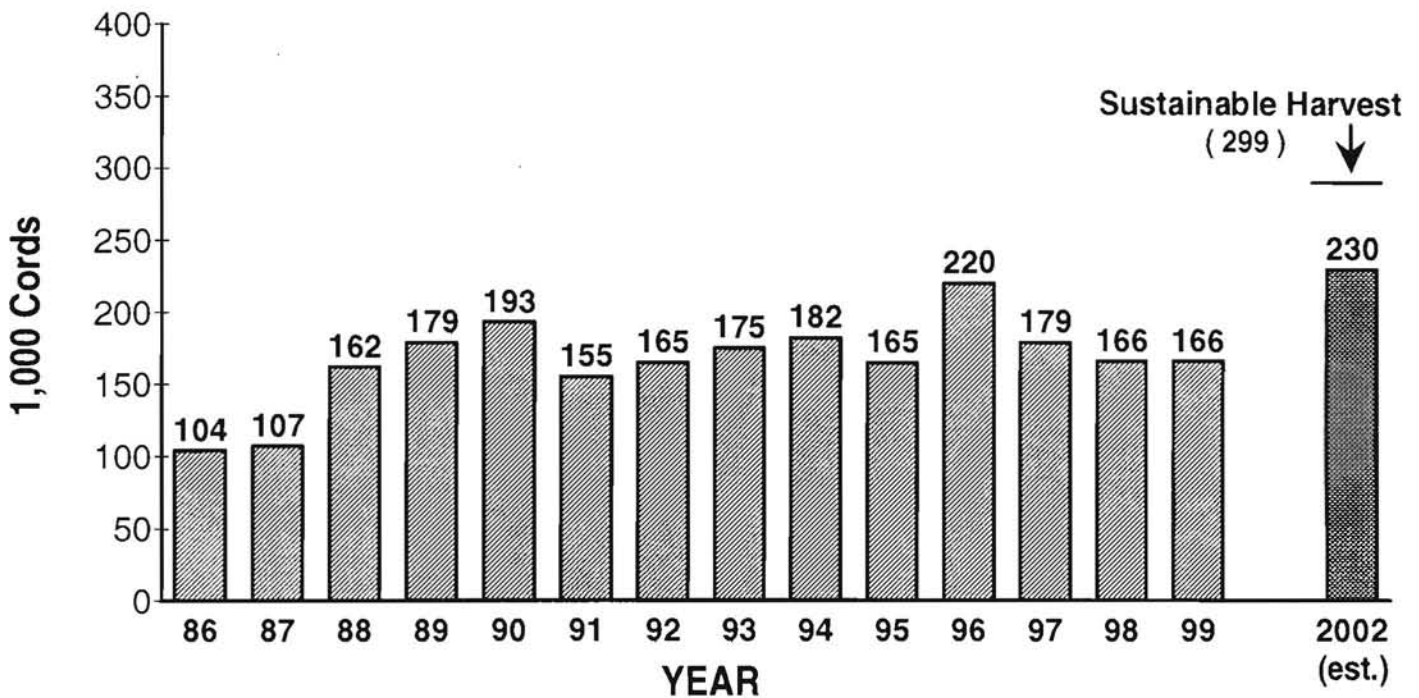
### Concerns:

- Balsam availability dependent upon harvest of aspen (45% of balsam in aspen type).
- Volume tied up in types not currently harvestable.
- Summer access wood: 30 to 50% maximum.
- Spruce budworm impact in NE Minnesota.

**Source:** NCFES & DNR Surveys

Projections based on DNR/Industry Announcements

**SPRUCE HARVEST in MINNESOTA : ACTUAL & PROJECTED**  
 (includes pulpwood and sawtimber)



- 1) Harvest data compiled by NCFES & DNR
- 2) Based on DNR's method sustainable harvest = 298,700 cords/year.  
 ( Black Spruce 202,600 cords. White Spruce 96,100 cords/year based on trees 9" & larger ).
- 3) The sustainable harvest not adusted for restrictions (riparian and other)

# Spruce

## Present and Projected Demand from Minnesota

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	cords
<b>1999 Harvest</b> .....	<b>165,900</b>
• Minnesota Pulpwood Industries .....	116,100
• Pulpwood Export .....	39,200
• Sawlogs & Other .....	10,500
• Fuelwood .....	100
<b>2002 Projected Harvest</b> .....	<b>230,000</b>
• Minnesota Pulpwood Industries .....	169,500
• Pulpwood Export .....	35,000
• Sawlogs & Other .....	25,500
• Utilization to 3" top increases availability by at least 10%	
• Thinning white spruce plantations could increase availability by 5%	

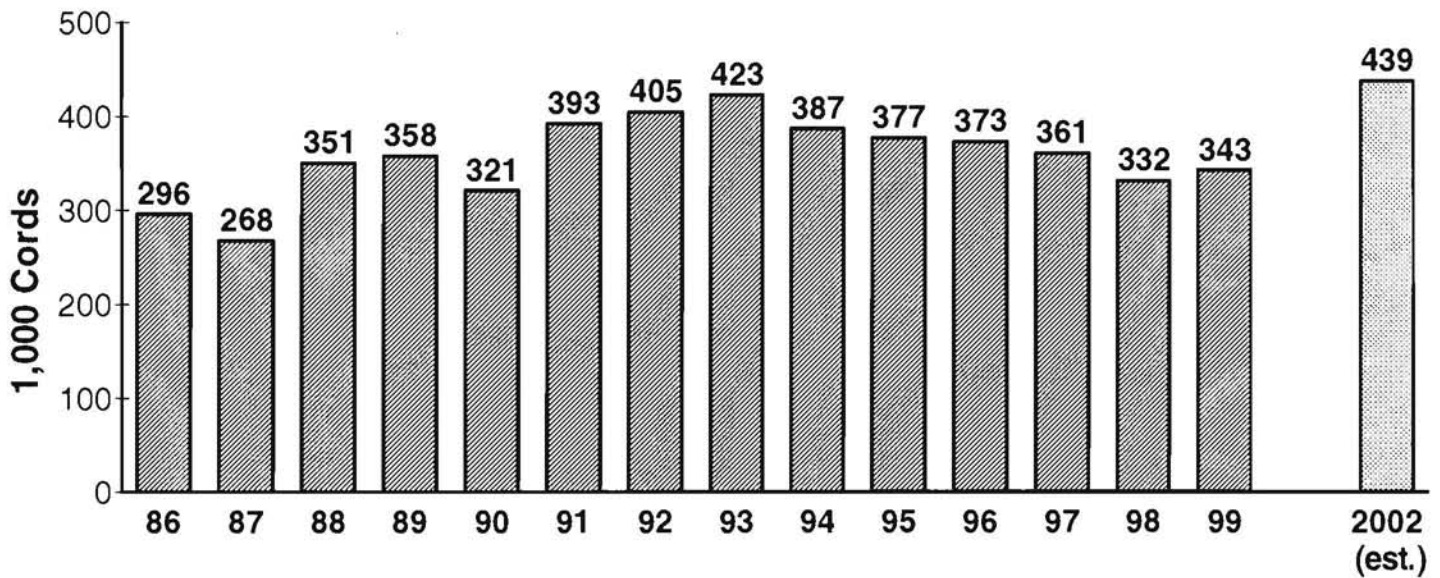
### Concerns:

- Volume tied up in types not currently harvestable.
- Forest types with low volume/acre of spruce.
- Increasing competition for sawbolts.
- Summer access.

**Source:** NCFES & DNR Surveys  
Projections based on DNR/Industry Announcements

*Do not include pine segment*

### PINE HARVEST in MINNESOTA : ACTUAL & PROJECTED (includes pulpwood, sawtimber, wood for energy & specialty products)



1) Harvest data compiled by NCFES & DNR

2) Based on DNR's method, sustainable harvest = 473,700 cords / year :

1. Assumes 20% of the red/white pine in the non-pine cover types would be harvested at the rotation specified for the non-pine cover type.
2. Includes thinnings from red pine plantations & natural stands.
3. Selective harvests only in the white pine type
4. The sustainable harvest not adjusted for restrictions ( riparian and other).

10/00

# Pine

## Present and Projected Demand

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	cords
<b>1999 Harvest</b> .....	<b>343,000</b>
• Minnesota Pulpwood Industries .....	66,600
• Pulpwood Export .....	47,100
• Sawlogs & Other .....	226,800
• Fuelwood .....	2,500
<b>2002 Projected Harvest</b> .....	<b>439,000</b>
• Minnesota Pulpwood Industries:	
◦ Pulp & Paper .....	92,000
◦ OSB .....	28,000
• Pulpwood Export .....	50,000
• Sawlogs & Other .....	269,000

*- use will be used more?*

*?*

*- potatoes*

*- practice 1000 mill*

**Anticipate 20% to 25% volume from red and white pine plantation thinnings.**

**Source:** NCFES & DNR Surveys  
Projections based on DNR/Industry Announcements

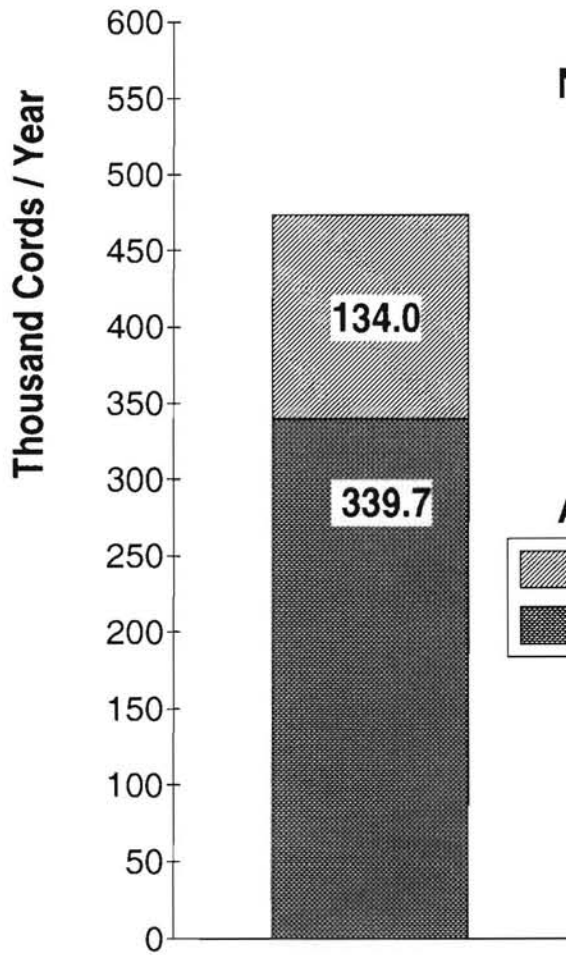
# PINE SUSTAINABLE HARVEST

( 1990 - 2000 )

Minnesota Statewide, all Ownerships

- Based on 1990 Survey -

Total : 473.7 Thousand Cords / Year  
from all Cover Types



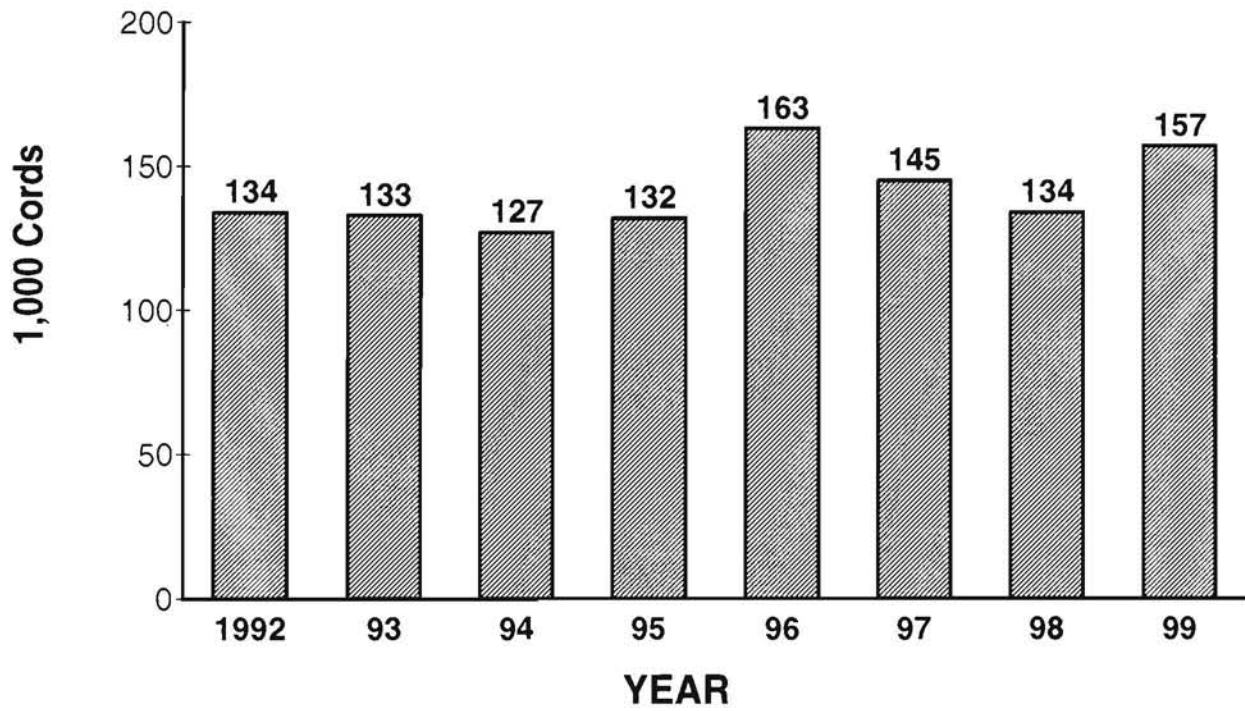
Annual Sustainable Harvest (Net Volume) :

-  Volume Available from Thinnings (Age 31-90)
-  All Live Trees



**RED PINE HARVEST in MINNESOTA  
( Pulpwood, Sawtimber, Special Products )**

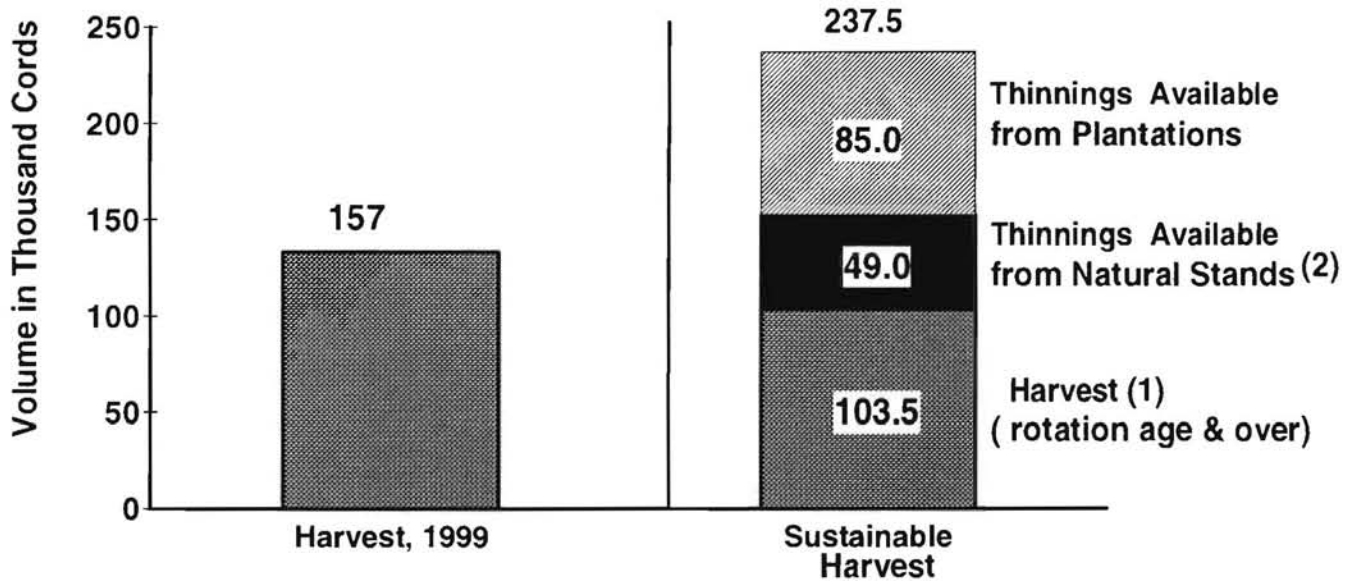
**Statewide, All Ownerships**



11/00

## Red Pine : Annual Volume Available for Sustainable Harvest

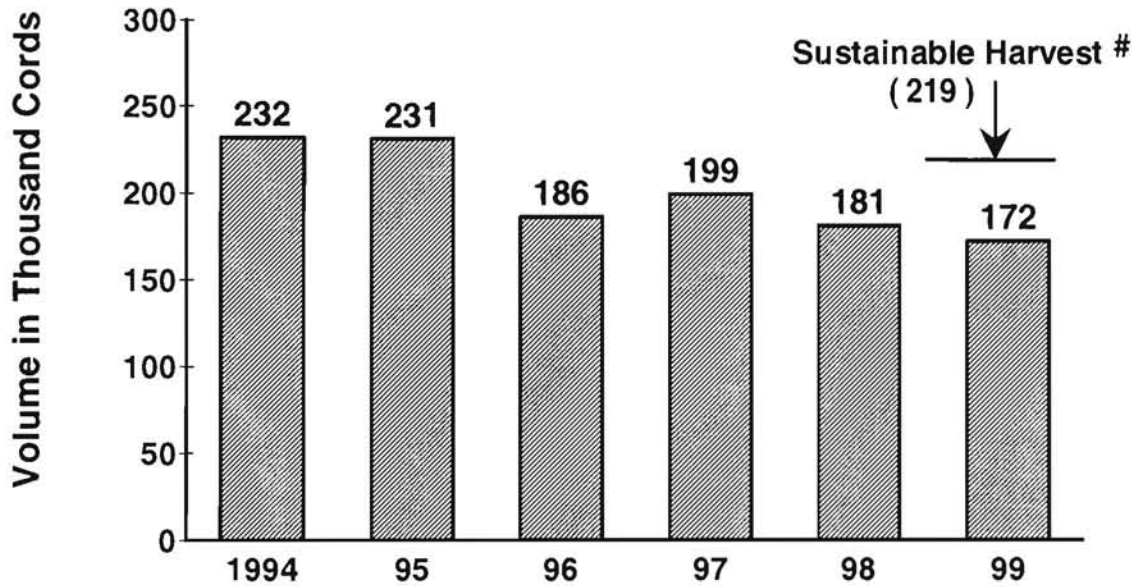
Minnesota Statewide, All Ownerships, FIA 90 Updated to Year 2000 by Model



- (1) The sustainable harvest ( red pine from all types) not adjusted for restrictions ( riparian and other) Assumes 20% of the red pine in the non-pine cover types would be harvested at the rotation specified for the non-pine cover type.
- (2) The annual thinnings from the natural red pine stands= (751,000 cords/10 years) x 65.3% red pine .
- (3) The annual volume available from thinnings : thin to 90 sq.ft/acre from age 31-90.

11 / 00

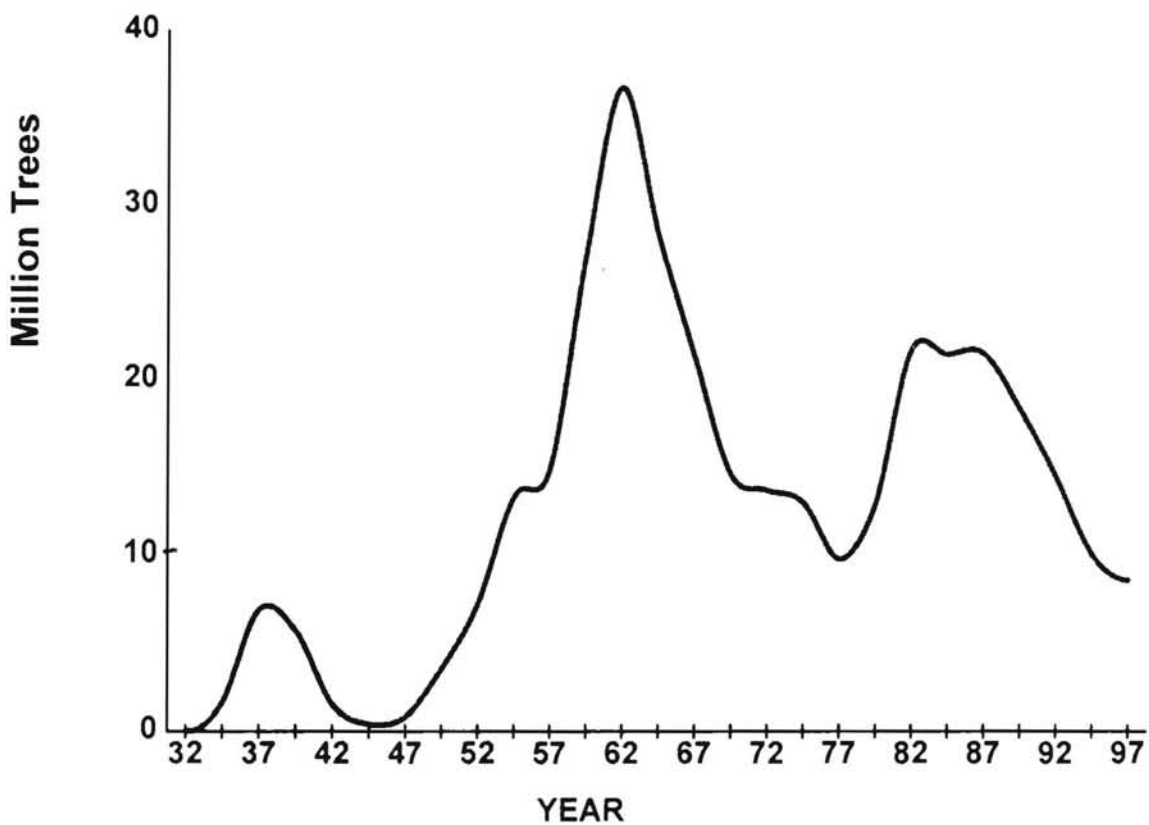
### Jack Pine Harvest Compared to Sustainable Harvest Minnesota Statewide, All Ownerships



# The sustainable harvest not adjusted for restrictions ( riparian and other)  
The sustainable harvest based on Minnesota FIA 1990

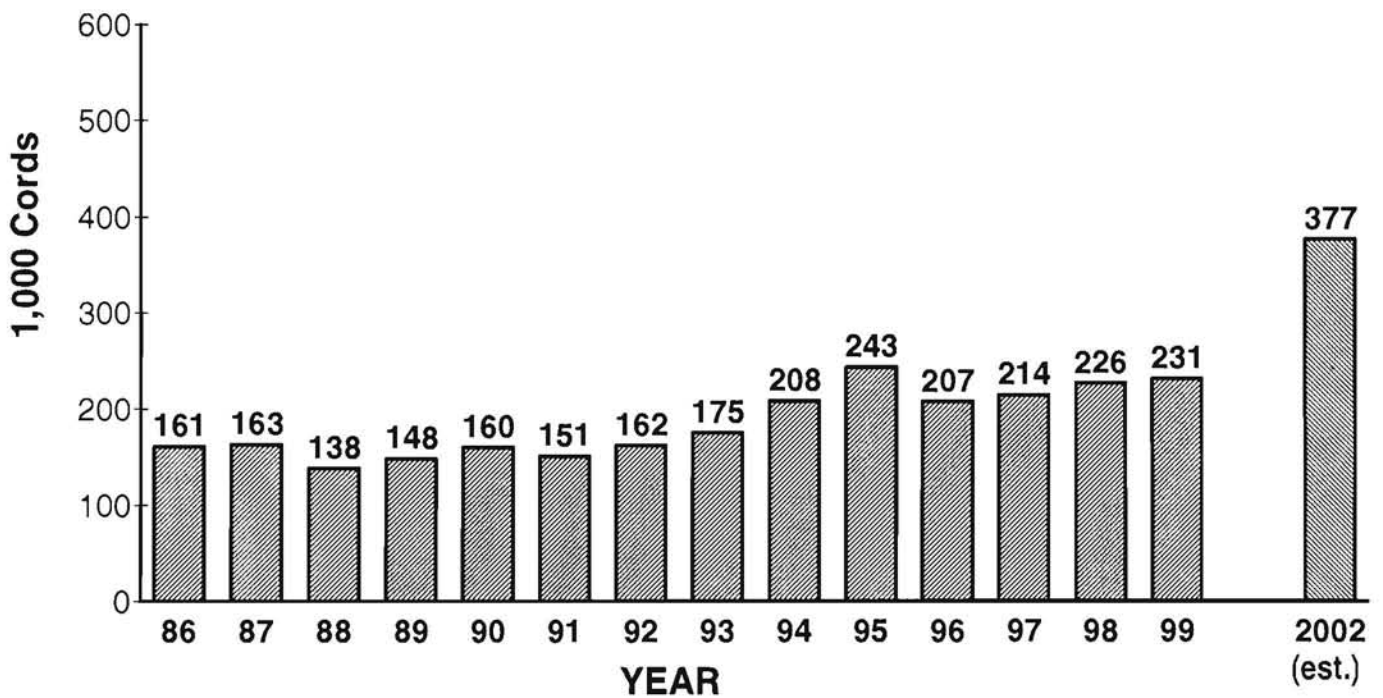
11/00

### Trees Shipped from Minnesota State Nurseries



Source : DNR nursery records

**BIRCH HARVEST in MINNESOTA : ACTUAL & PROJECTED**  
(includes pulpwood, sawtimber, wood for energy & specialty products)



- 1). Sustainable harvest 457,000 cds/yr. DNR method adjusted 30% due to mortality.
- 2). Harvest data compiled by NCFES & DNR
- 3). The sustainable harvest not adjusted for restrictions ( riparian and other).

10/00

# Birch

## Present and Projected Demand

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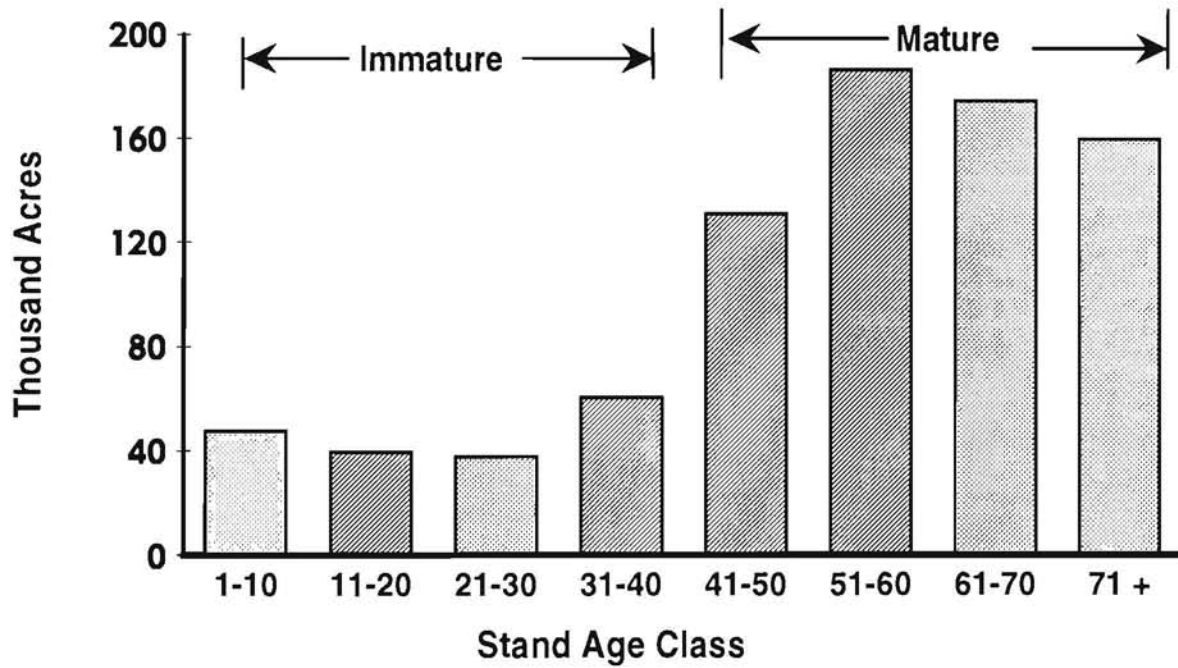
	cords
<b>1999 Harvest</b> .....	<b>231,100</b>
• Minnesota Pulpwood Industries .....	113,400
• Pulpwood Export .....	30,600
• Sawlogs & Other .....	40,100
• Fuelwood (from growing stock) .....	47,000
<b>2002 Projected Harvest</b> .....	<b>377,000</b>
• Minnesota Pulpwood Industries:	
◦ Pulp & Paper .....	106,000
◦ OSB & Hardboard .....	120,000
• Pulpwood Export .....	40,000
• Sawlogs & Other .....	54,000
• Fuelwood (from growing stock) .....	57,000

**Figures include a pulp and paper mill expansion and a increases in OSB use by present companies.**

**Source:** NCFES & DNR Surveys

Projections based on DNR/Industry Announcements

**BIRCH AGE DISTRIBUTION - (1990)**  
**Minnesota Statewide, all Ownerships**  
**Timberland, Total 835.8 thousand acres**

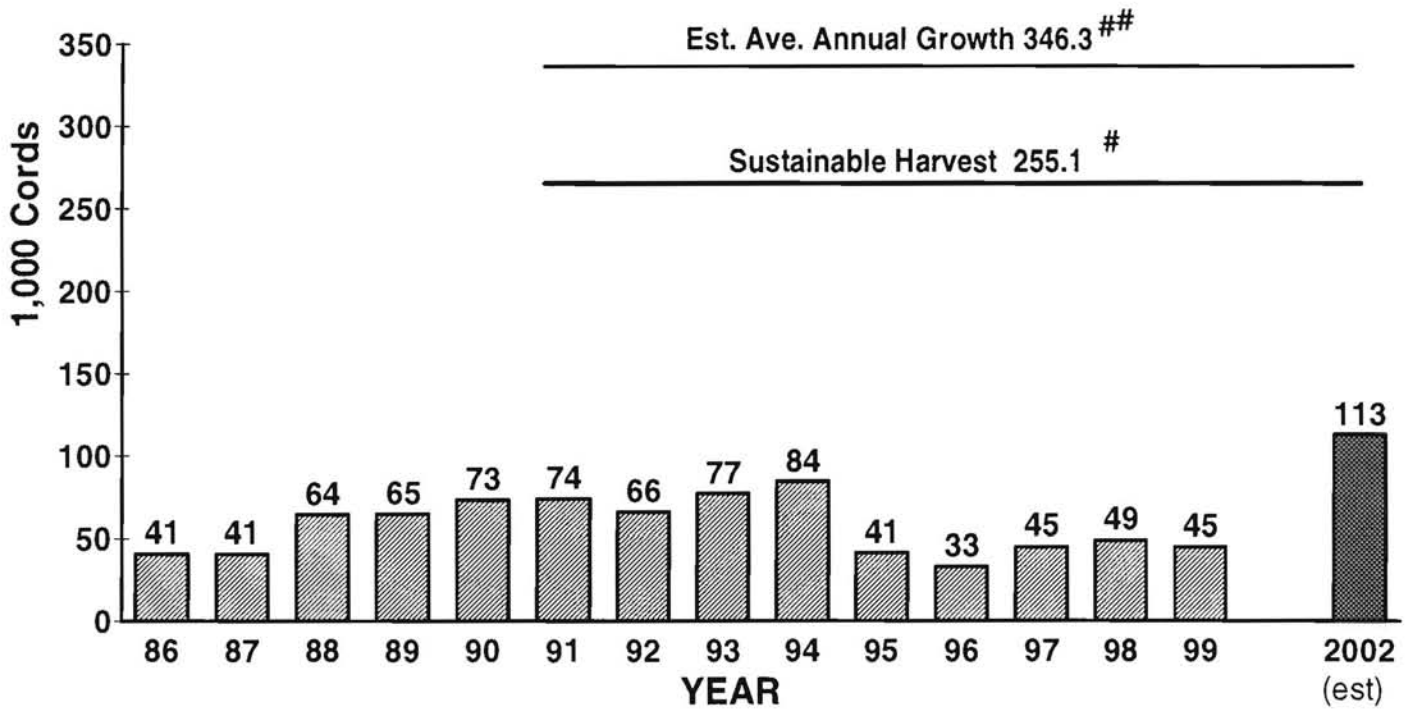


Source : USFS NC Table #116 (10/7/91)

5/13/92

**MAPLE HARVEST in MINNESOTA : ACTUAL & PROJECTED  
 COMPARED to SUSTAINABLE HARVEST & AVE. GROWTH**

**- from MN Statewide Timberland, all Ownerships -**



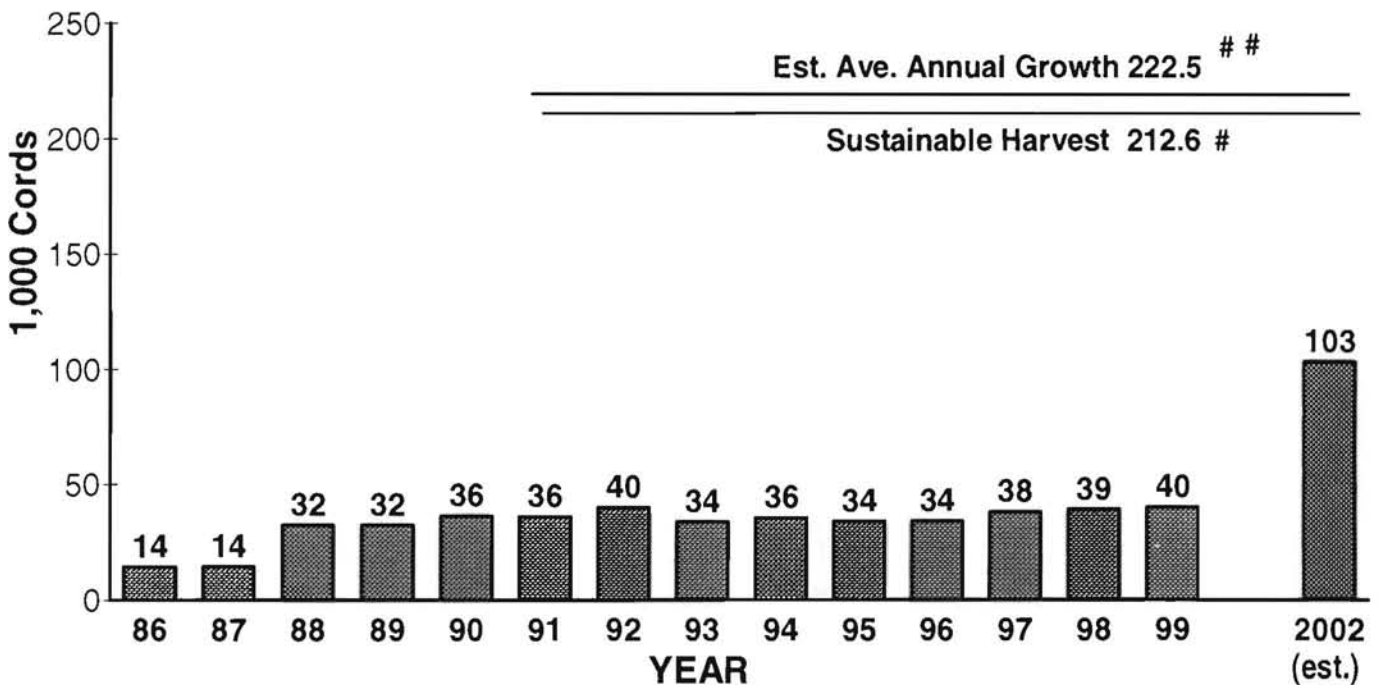
# DNR's method : Area regulations with growth contribution of all live trees ( based on MN FIA 90 )

## Based on MN Forest Statistics, 1990 (USDA FS Reso.Bull. NC-141, table #21)

10/00



**BASSWOOD HARVEST in MINNESOTA : ACTUAL & PROJECTED  
 COMPARED to SUSTAINABLE HARVEST & AVE. GROWTH  
 - from MN Statewide Timberland, all Ownerships -**



# DNR's method : Area regulations with growth of all live trees ( based on MN FIA 90 )  
 ( The sustainable harvest not adjusted for restrictions : riparian and other)

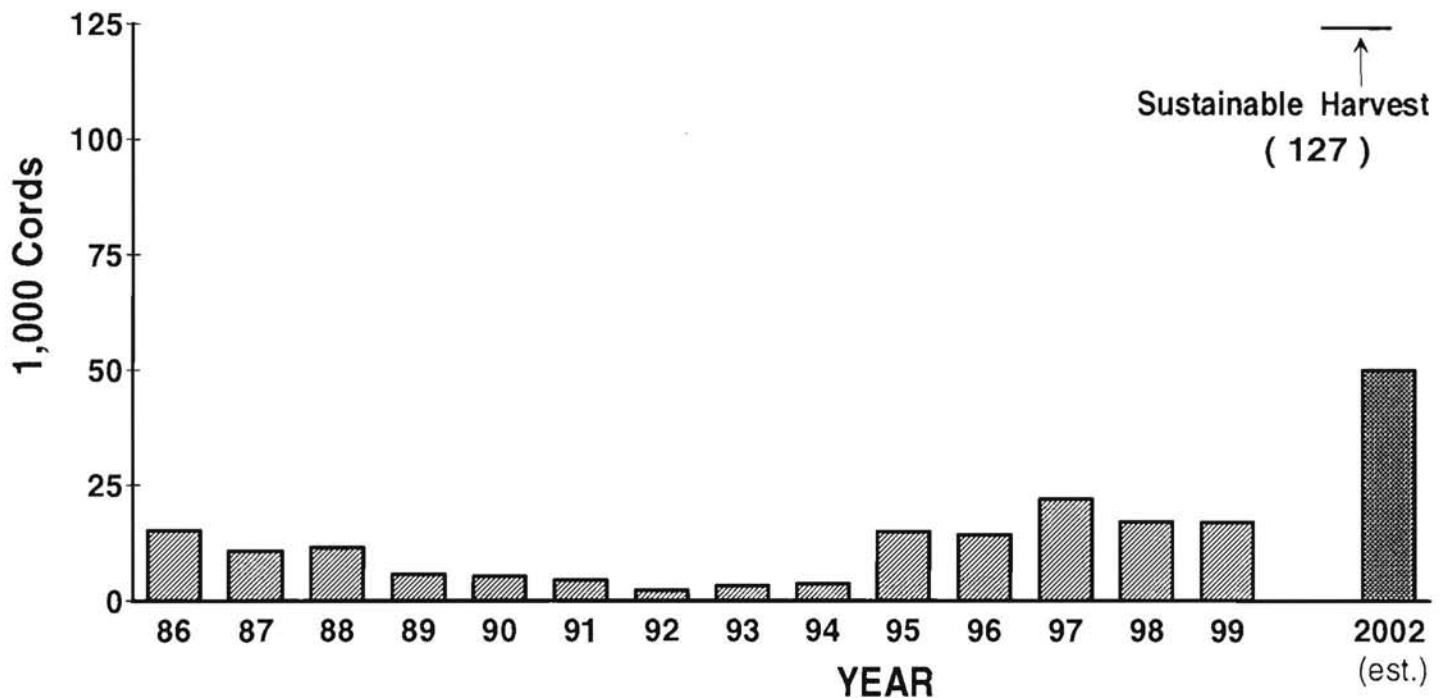
## Based on MN Forest Statistics, 1990 (USDA FS Reso.Bull. NC-141, table #21)

10/00

revised analysis

# TAMARACK HARVEST in MINNESOTA : ACTUAL & PROJECTED COMPARED to ESTIMATED ALLOWABLE HARVEST

- from Timberland -



Estimated sustainable harvest based on DNR method.

The sustainable harvest not adjusted for restrictions ( riparian and other)

3 / 01

# Tamarack

## Present and Projected Demand from Minnesota

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	cords
<b>1999 Harvest</b> .....	<b>17,100</b>
• Minnesota Pulpwood Industries .....	3,200
• Pulpwood Export .....	13,800
• Sawbolts & Other .....	100
<b>2002 Projected Harvest</b> .....	<b>50,000</b>
• Minnesota Pulpwood Industries .....	10,300
• Pulpwood Export .....	39,000
• Sawbolts & Other .....	700

### Concerns:

- Volume tied up in types not harvestable
- Forest types with low volume/acre of tamarack
- Some small, poor site stands
- Winter access only

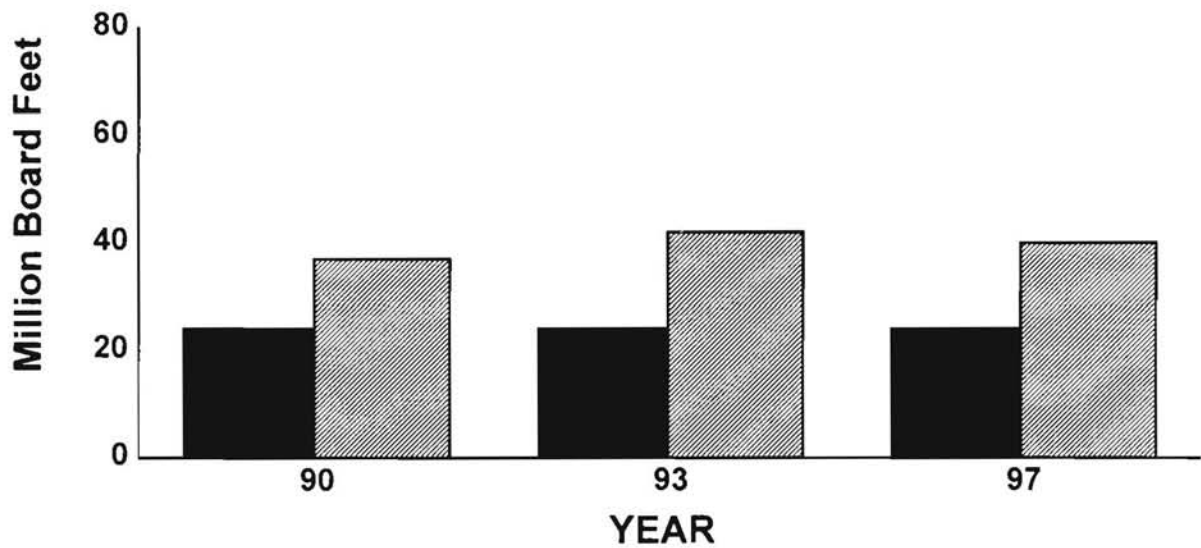
### Available Annual Surplus:

- 2000 ..... 50,000 to 60,000

Source: NCFES & DNR Surveys

Projections based on DNR/Industry Announcements

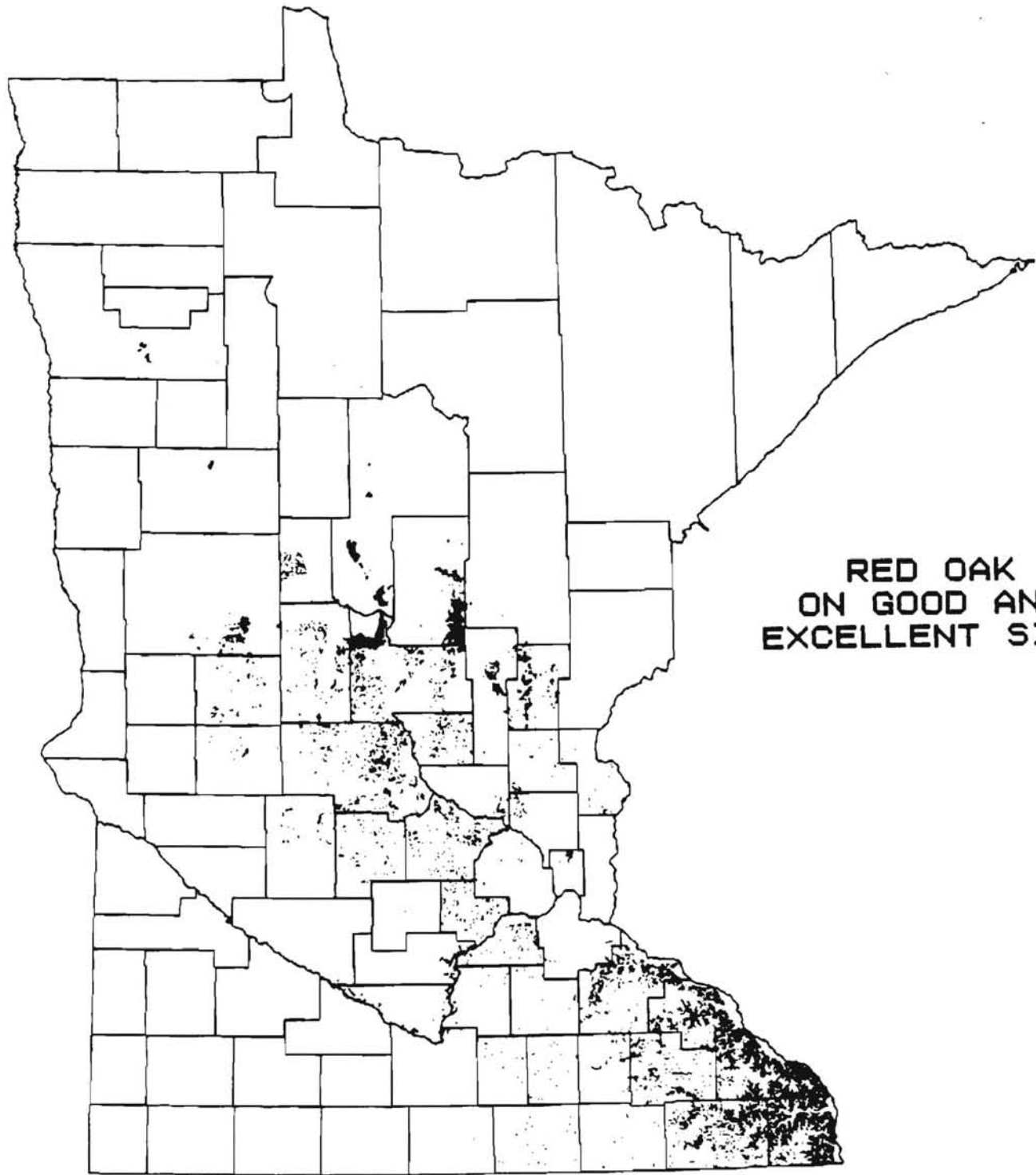
**RED OAK SAWTIMBER ESTIMATED & ACTUAL HARVEST**  
**- Minnesota Statewide -**



■ Estimated Allowable Harvest  
based on Table 6.25, GEIS, Dec. 1992  
( medium level )

▨ Annual Harvest

DNR 2/99



**RED OAK  
ON GOOD AND  
EXCELLENT SITES**

# Average Prices Received for Stumpage Sold by Public Land Agencies in Minnesota: 1990–1999

(Compiled by Doug Ford, Timber Sales Supervisor, DNR-Forestry)

## Pulpwood (\$s per cord)

Species	1991	1992	1993	1994	1995	1996	1997	1998	1999
Aspen	\$6.61	\$7.25	\$9.28	\$14.82	\$18.69	\$16.09	\$19.20	\$20.54	\$23.40
Balm	3.58	4.51	6.43	12.73	16.48	13.24	13.76	16.95	14.13
Birch	2.95	4.19	3.23	5.45	3.52	7.52	7.88	7.53	7.66
Ash	4.19	3.96	3.60	3.42	4.46	5.00	4.46	5.51	2.28
Oak	3.79	3.57	5.24	5.27	4.51	4.37	5.64	8.98	10.76
Basswood	—	—	—	—	4.85	4.01	4.27	4.88	5.67
Balsam	6.69	8.09	10.36	15.15	18.76	14.35	12.65	14.12	12.09
W. Spruce	13.27	16.46	12.16	15.66	26.18	19.06	12.80	19.18	26.62
B. Spruce	12.32	12.78	11.96	20.54	23.65	22.90	18.40	21.16	20.61
Tamarack	4.13	4.29	4.38	4.90	7.73	7.25	6.71	7.29	5.79
Cedar	9.39	9.98	8.37	9.92	10.48	10.55	11.27	7.31	6.83
J. Pine	12.79	14.65	15.99	24.81	32.08	23.48	23.59	24.72	24.32
R. & W. Pine	14.06	8.14	10.39	24.57	17.49	21.18	23.35	15.63	17.02

## Sawtimber (\$s per MBF)

Species	1991	1992	1993	1994	1995	1996	1997	1998	1999
Aspen	\$23.66	\$28.53	\$37.20	\$64.67	\$68.93	\$71.22	\$93.83	\$100.54	\$85.09
Birch	24.24	26.38	26.34	43.12	50.67	52.31	36.60	39.78	36.12
Ash <sup>b</sup>	63.37	90.63	106.62	132.52	151.28	147.18	108.93	97.09	48.70
Elm	36.26	36.93	48.90	50.68	47.02	60.08	107.20	53.31	56.50
Oak <sup>a</sup>	64.45	73.99	91.69	110.67	156.88	177.30	155.97	140.20	146.00
Basswood	NA	NA	66.80	90.60	120.91	105.37	107.07	81.15	74.77
Balsam	23.29	25.39	34.30	52.95	55.10	61.49	71.61	88.30	80.82
W. Spruce	42.58	45.48	48.04	72.45	77.79	73.47	83.23	78.34	81.91
Cedar	33.19	29.69	33.88	37.59	38.55	42.58	37.00	38.64	39.13
J. Pine	62.72	72.96	83.59	120.51	136.55	108.37	115.46	121.84	124.00
R. & W. Pine	101.13	108.84	132.83	183.95	171.55	163.64	174.34	161.01	198.99

Pulpwood prices for 1999 based on 1.12 million cords sold; sawtimber based on 122 MMBF.

<sup>a</sup> Oak sawtimber prices mainly from public lands in northern Minnesota.

<sup>b</sup> Black ash: includes veneer.

Average prices based on those reported by Minnesota counties, Chippewa and Superior National Forests, Bureau of Indian Affairs, and Minnesota DNR-Forestry.

# Average Prices Received for Stumpage Sold by Public Land Agencies in Minnesota: 1994-1999

(Compiled by Doug Ford, Timber Sales Supervisor, DNR-Forestry)

## Sold As Pulp & Bolts in Combination (\$s per cord)

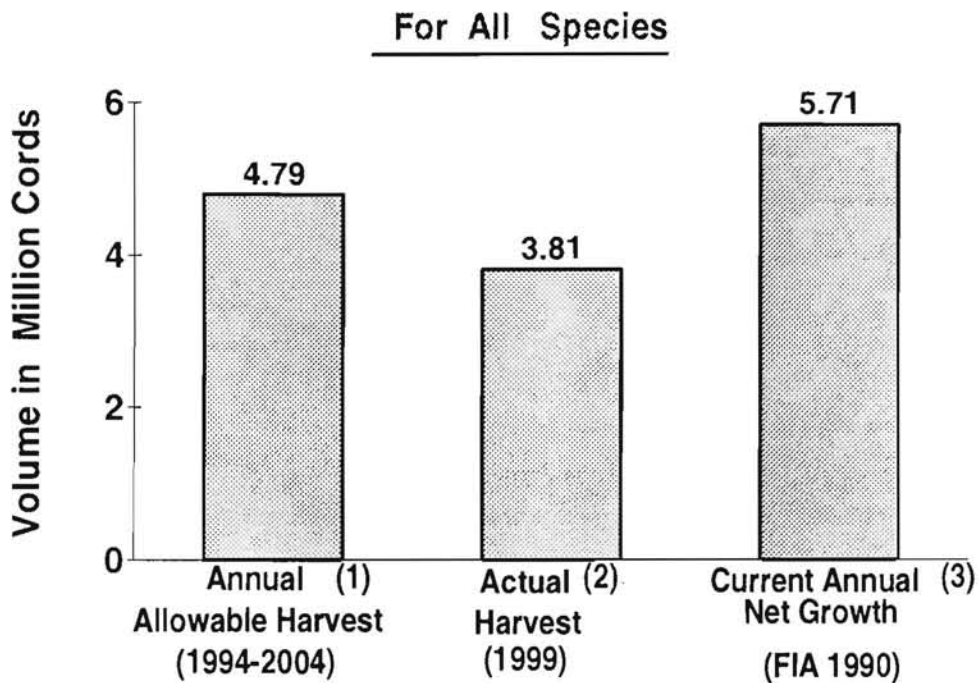
Species	1994	1995	1996	1997	1998	1999*
Aspen	\$17.16	\$20.59	\$19.05	\$22.85	\$25.39	\$26.35
Balm of Gilead	13.23	16.96	15.48	16.01	19.51	18.04
Birch	7.51	5.48	9.51	9.03	9.40	8.97
Ash	23.95	28.76	28.65	26.70	18.45	7.09
Oak	20.34	32.82	35.48	30.71	24.58	34.00
Basswood	21.70	29.80	18.69	30.17	17.80	17.65
Balsam Fir	16.03	19.26	15.68	14.97	17.49	15.60
White Spruce	17.04	29.57	26.51	27.78	26.56	29.83
Black Spruce	22.45	23.76	23.03	19.05	21.16	21.28
Tamarack	5.36	8.00	7.78	6.96	8.18	6.97
White Cedar	12.28	11.73	12.53	12.05	9.29	10.24
Jack Pine	34.26	39.21	31.27	31.97	33.83	32.78
Red/White pine	50.60	53.05	44.78	44.71	48.81	57.93

\*Pulp & Bolts price for 1999 based on 1.39 million cords sold.

A **bolt** is defined as a short log, usually 100" length, with a specific minimum diameter and generally sawn for lumber.

Averages prices based on those reported by Minnesota counties, Chippewa and Superior National Forests, Bureau of Indian Affairs, and Minnesota DNR-Forestry.

**ESTIMATED ALLOWABLE HARVEST, HARVEST & ANNUAL GROWTH**  
**- Minnesota Statewide Timberland , all Ownerships -**



Source :

- 1). Table 6.25, GEIS, Medium Level : Maintaining Productivity & Forest Resource Base Tech. Pap., Dec 92 ;
- 2). NCFES 96 Pulpwood Harvest, 92-93 DNR Sawtimber Survey, 95-96 Statewide Fuelwood Use Survey.
- 3). Table #63 of NCFES Resource Bulletin, NC-141, Aug. 92.

DNR 1/01