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THE FOREST STORY

THE FOREST STORY has been created by the Minnesota Department of Natural Resources, Division of Forestry to acquaint you with Minnesota's forests.

Included in this packet are *Leaflets* of information concerning the past, present, and future of Minnesota's forests. These *Leaflets* are intended to provide you with the most current information available concerning trees and the forest environment.

Additional information can be obtained by contacting: Minnesota Department of Natural Resources, Division of Forestry, 500 Lafayette Road, St. Paul, MN 55155-4044, (612) 296-4491.

Leaflet #1	Tree Growth
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Glossary

Words found in the text in ***bold italics*** appear in the glossary.

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TREE GROWTH

Anyone can plant a tree. But not everyone will.

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When you think about it, you have to be quite an optimist to plant a tree. Planting trees is truly an act of faith. Faith—that the seedling will survive insects, wildlife, disease, fire, and weather. Each tree that you see, each forest that you admire was established by optimists before us.

A person interested in making a lot of money right away will not plant trees (the first income from most tree plantations is not realized until the trees are more than 20 to 25 years old). Obviously, many tree planters are not around to receive compensation for their investment.

But if you are interested in planting a bit of history, trees for planting can be obtained by contacting your local, state-certified nurseries and garden centers. Or contact one of the following organizations and agencies for trees and information:

The **Minnesota Department of Natural Resources (DNR)** is a source of low-cost trees. The seedlings come bareroot and by law must be used for **reforestation**, establishing windbreaks and shelterbelts, erosion control, soil and water conservation, or permanent food and cover for wildlife. Each year, orders are taken from September through February and March (depending on where you live in Minnesota). Contact the DNR at 1-800-766-6000 or (612) 296-4491 for more information.

The **Minnesota Forestry Association (MFA)** has containerized seedlings available for statewide tree plantings by schools, civic organizations, and other groups. Contact the MFA at 26 East Exchange Street, Suite 507, Exchange Building, St. Paul, MN 55101, (612) 292-0051.

The **Twin Cities Tree Trust** has containerized seedlings available for tree plantings by schools. Contact Kirk Brown, 4100 Vernon Avenue South, St. Louis Park, MN 55416-3199, (612) 920-9326.

Most **Soil and Water Conservation Districts** have trees available for sale. Look in your phone book under your County Soil and Water Conservation District or Soil Conservation Service.

absorb only about 2,900 pounds (350 gallons) within its own life system.

- From 1900 to 1988 we grew and used the equivalent of 13 billion of your 100-foot tree.
- Because of good forest practices, America's green forests are the envy of the world, and America still has nearly 70 percent of the forest land it had when Columbus visited the New World (500 years ago!).
- Young, healthy, and growing forests generally do a better job for the environment than older, decadent ones. When a forest gets old and overcrowded, the trees barely grow and begin to use oxygen rather than produce oxygen. Your tree took in 8,000 pounds of carbon dioxide. As an additional benefit, your tree exhaled 6,000 pounds of oxygen as part of its growing process.
- Your tree is a **"woody plant,"** growing as one stem or trunk, and can grow from 20 to over 100 feet tall when fully mature. (Woody plants with several stems and growing less than 20 feet tall are shrubs, not trees.)

"Pines have earned the reputation of being evergreen by the same device that governments use to achieve the appearance of perpetuity: overlapping terms of office. By taking on new needles on the new growth of each year, and discarding old needles at longer intervals, they lead the casual onlooker to believe that needles remain forever green."

—Aldo Leopold

Imagine: You have a 100-foot tree...

Part of the miracle of your tree is that it uses resources—without using them up. It works magic with the sun, soil, water, and air. Your tree is **renewable**.

- Your tree is not so much a heavy drinker as it is a heavy **lifter**. In 60 years, your 100-foot tree will take more than 5 MILLION pounds of water (600,000 gallons) from the soil and breathe it into the air. Your tree itself will

- Believe it or not, the trunk of your tree never grows *upward*. If you were to drive a nail into the trunk of a young tree, it would always remain in the same place. It is the buds on the branches that cause each limb of the tree to grow, making the tree taller. The limbs also spread to receive more sunlight.

WHAT IS A TREE?

Trunk Section

Annual Rings:
Reveal age of tree by showing new growth added each year.

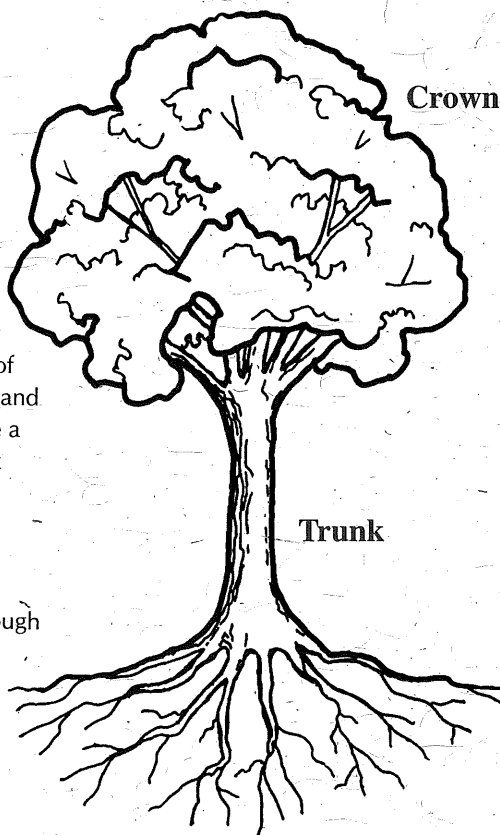
Outer Bark:
Protects tree from weather, insects, disease, fire, and animals.

Sapwood: Sap rises through these cells from roots to crown. Food for seed production and for new tree growth is also stored here.

Cambium: layer of cells that divides and grows to produce a new layer of bark and wood.

Inner bark: Food made in leaves moves down through these cells to branches, trunk, and roots for growth and storage.

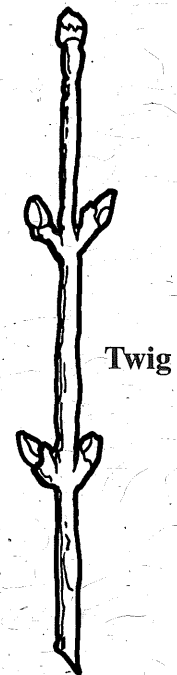
Heartwood: Core of inactive cells, formerly sapwood, which gives the tree strength and durability.



Crown

Trunk

Roots



Twig

Trees ready for planting are available from public and private nurseries in several forms. The two most common are **bareroot** and **containerized seedlings**.

Bareroot seedlings, as the name implies, are trees that have had the excess soil removed from their roots while at the nursery. These seedlings should be planted in the early spring before the buds are ready to break and tree growth begins. There must be adequate moisture in the soil to ensure that the seedling will survive.

Containerized seedlings are raised in greenhouses in individual pots or compartments. Sometimes the tree is taken out of the container with the "plug" of soil attached to its roots, and then planted. The tree may also be planted in the container where it grew, the container disinte-

grating into the ground over time. Containerized seedlings can be planted anytime the soil moisture is adequate, although spring and fall are the best times.

In Minnesota, two common methods are used to plant tree seedlings—by machine or by hand.

Machine planting is usually faster and less expensive than hand planting. There are different types of machines for planting, but most of them only work best on level ground, free of rocks and brush.

A tree planting machine is pulled by a tractor or other piece of heavy equipment. While it is moving, the machine cuts a narrow trench in the ground. A person rides on the planter and places a tree in the trench. Two wheels are mounted at the back of the tree planter to press the soil back in place.

Tree planting machines can plant from 500 to 1,500 trees per hour.

Hand planting is used when it is more economical, or when the ground is not suitable for machine planting. Trees are usually planted by hand when the ground has steep hills, low, swampy areas or has many rocks and stumps.

Seedlings are carried to the planting site in pails or pouches lined with wet moss or mud to make sure the roots do not dry out. Shovels and hoes may be used to create the holes for the trees, but the most effective tool is the "**dibble**."

Planting is done with one or two people.

A landowner can expect a tree planter to plant an average of 200 to 1,000 trees per day.

FORESTRY AS A PROFESSION

So you want to be a forester?

Forestry means more than just trees. It means people, wood products, recreation, wildlife habitat, forage, and a number of other ecological and social linkages.

The nation's forests are vast, ranging from the urbanized areas of the continent to the undeveloped lands in Alaska. Covering approximately one-third of the United States, forests are owned and managed by a myriad of individuals, corporations, and government agencies.

The forestry profession has grown beyond an era when forest managers worked in remote areas and a forestry position was considered a rugged, outdoor job. Foresters work with people, as much as with trees. They are now at home in offices, on college campuses, with forest product companies, with government agencies—and in front of computers.

The need for effective management of our forest resources is a matter of increasing concern. Environmental issues such as global warming, tropical deforestation, acid rain, and the role of trees in the atmosphere's oxygen-carbon dioxide exchange are topics that must be addressed. In addition, the demand for forest products is projected to grow substantially by the year 2000.

The multiple demands being placed on our forests often compete with one another. A career in forestry now requires that one have a unique combination of skills and knowledge.

Minnesotans are fortunate in that the state is host to one of the top forestry schools in the country. The University of Minnesota's College of

Natural Resources enrolls approximately 550 undergraduate and 120 graduate students in its programs.

For more information about the College of Natural Resources and its programs, contact:

Office for Student Affairs
University of Minnesota
College of Natural Resources
135 Natural Resources
Administration Building
2003 Upper Buford Circle
St. Paul, MN 55108-1030
(612) 624-6768.



*"I speak for the Lorax. I speak for the trees.
I speak for the trees, for the trees have no tongues.
And I am asking you, sir, at the top of my lungs,
Unless someone like you cares a whole awful lot,
Nothing is going to get better. It's not."*

—Dr. Seuss

College of Natural Resources, University of Minnesota

The University of Minnesota's College of Natural Resources offers six major curricula leading to the bachelor of science (B.S.) degree.

1. The **Forest Products** curriculum is designed for students interested in the development, production, marketing, and use of the products that flow from forests. Courses

emphasize the chemical, physical, and mechanical properties of wood and the technologies for converting this raw material into its final forms.

2. The **Forest Resources** curriculum prepares students to manage forest and related lands for timber, wildlife, recreation, water quality, and environmental enhancement. Graduates may become directly involved in land management, or may play specialized supporting roles in areas ranging from resource planning or nursery management to public relations. Others find employment in related fields such as environmental education and interpretation.

3. **Urban Forestry** involves planning and managing vegetation and associated natural resources in and near urban communities—along streets and in farmbelts and open spaces.

4. **Natural Resources and Environmental Studies** is interdisciplinary (using forest management principles to enhance other natural resources like fish and wildlife), focusing on the use, management, and protection of natural resources, and the study of the environment.

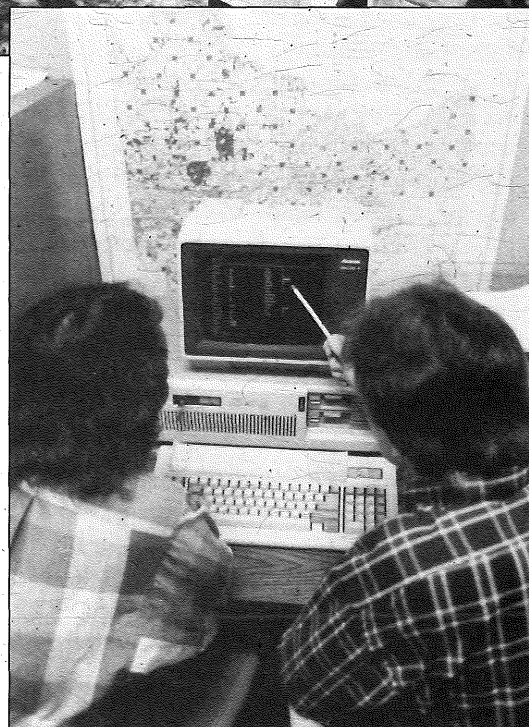
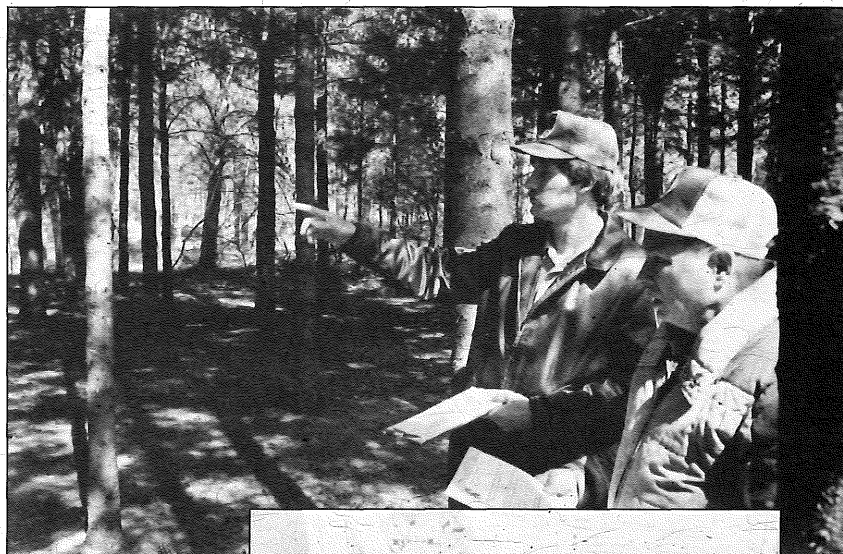
5. The objective of the **Recreation Resource Management** curriculum is to prepare students for careers in planning and management of land and water for recreation, with emphasis on natural, non-urban areas.

6. The **Fisheries and Wildlife** curriculum provides basic education in the biological and physical sciences, emphasizing principles and quantitative approaches to fisheries and wildlife conservation.

The largest part of our nation's forests are in private ownership. These owners of ***non-industrial, private forest (NIPF) lands*** in fact own 58 percent of the nation's productive forested areas. In Minnesota, NIPF landowners own over 40 percent of the state's commercial and non-productive forests. Forestry careers of the '90s demand that professionals have a sensitivity to the needs of people; and an understanding of the various social, economic, and political factors that influence human behavior. Forestry, whether public or private, also involves business management and application of modern technology.

Foresters are found in mills, offices, laboratories, classrooms, board rooms, even in the halls of Congress—as well as in the woods. The field of forestry has developed to the point where there are many subdisciplines that may be entered during one's career, including research, silviculture, economics, watershed management, information systems, policy, and planning. To prepare for a career in the '90s, students should have a strong background in math, communications, and business management, in addition to biology.

A genuine preference for the outdoors and a feeling of being “at home in the forest” are essential characteristics of a career forester. But merely liking the outdoors is not enough. The field of forestry has become diverse and requires that one be involved in public relations, as well as in the biology of the forest resource.



THE WOOD INDUSTRY

"...draw from the forest, while protecting it, the best returns which it is capable of giving."

—Clifford Pinchot, Father of American Forestry

For many decades, people have benefited from the values provided by the diverse forest types found within Minnesota's boundaries. And the use of wood is on the increase. Per capita consumption of wood has risen more than 31 percent nationwide since 1970, thus making it one of the world's most important raw materials. In fact, the weight of wood used every year exceeds the combined weight of *all* metals, *all* plastics, and portland cement.

The economic importance of wood is often underestimated because the wood products of the 20th century are often not recognized as "wood." For instance, in addition to its use in the more traditional products like furniture, lumber, and paper, wood is also used in curtains, draperies, and bedspreads. When these materials contain "rayon," they contain wood, for rayon is made of regenerated *cellulose*, usually from wood. Even the high-impact plastic of your telephone contains finely ground wood flour.

Although difficult to recognize, wood is found in the family car, in the door liners, the dashboard, and as filler in the bucket seats, trunk liner, and interior exposed surfaces.

Wood is the basis for Minnesota's second largest manufacturing industry. It produces a total annual payroll of \$2.2 billion and provides employment for over 59,000 people.

It takes the wood from a 100-foot tree (about three-fourths of a *cord* in a forester's measurement) to keep the average Minnesotan supplied for a year with newspapers, books, magazines, tissues, paper towels, housing, furniture, fences,

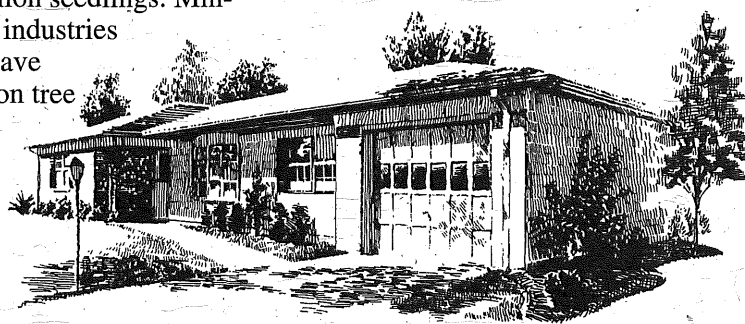
bags, boxes, and other assorted products.

Minnesota's use of trees makes it a tree-growing state. In 1990, landowners and the forest industry planted 1.9 billion seedlings. Minnesota's forest industries and foresters have been working on tree farming techniques since the 1940s. Minnesota now has more trees growing than it did in 1900!

One cord of wood yields:

- 7,500,000 toothpicks
- 1,000-2,000 lbs. of paper
- 942 1-lb. books
- 61,370 #10 standard-size envelopes
- 4,384,000 commemorative postage stamps
- 460,000 personal checks
- 89,870 sheets of letterhead (8 1/2" x 11")
- 1,200 copies of the National Geographic
- 2,700 copies of the daily paper (35 pages)
- 250 copies of the Sunday New York Times
- 30 Boston rocking chairs
- 12 dining room tables (one table seats 8).

Building an average 1,800 square-foot home uses 10,000 feet of lumber—equivalent to 20 cords of wood



How many trees make a cord of wood?

It depends on the size of the tree. For instance, it requires 170 trees that are two inches in diameter at 4 1/2 feet from the ground to make a cord. Foresters call this measurement *diameter at breast height* or d.b.h.

It requires 15 trees with a diameter of 10 inches at breast height to produce a cord of wood.

One tree at 24 d.b.h. will produce one cord of wood.

Minnesota Timberland by Ownership

Who owns Minnesota's *commercial forest lands*, lands that are considered useful for growing and harvesting trees?

Minnesota boasts 14.8 million acres of commercial forest lands or *timberland*. Unlike many western states where forest lands are largely controlled by federal government, the majority of Minnesota's productive forests (approximately 42 percent) are in the hands of Minnesota's private citizens. State government owns and manages 19 percent; federal, as well as county and municipal governments combined, own and manage 17 percent. Forest industries own and manage 5 percent of Minnesota's commercial forest lands.

On a national level, private landowners own 58 percent of the nation's 483 million acres of commercial forest lands; the forest products industry owns 14 percent.

Minnesota Land Use

Minnesota's forest lands are owned and managed by a variety of private and public entities—entities that are responsible for the stewardship of the forests and for ensuring a balanced use.

While timberland and the forest products industry rank high in importance in the economy of the state, forest management is planned to meet other interests, those of recreation, aesthetics, wildlife habitat, and environmental quality. The term for the variety of demands placed upon Minnesota's forests is "*multiple use*."

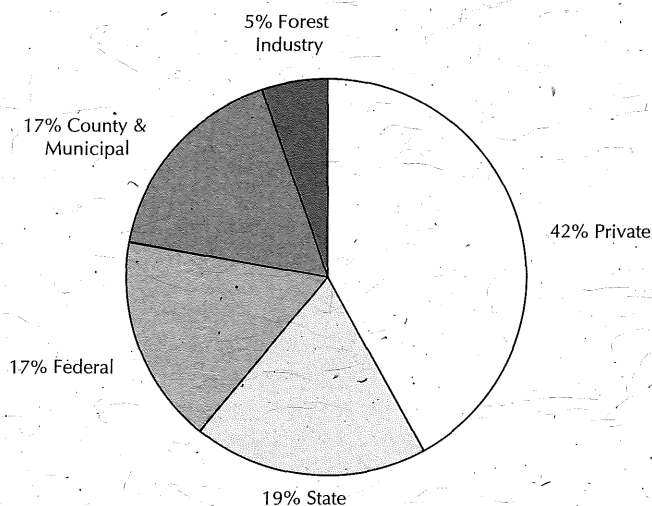
Total Wood Harvested in Minnesota

The forest products industry is one of Minnesota's oldest industries, historically drawing entrepreneurs and job seekers to the north woods. The industry continues to grow. From 1979 to 1990, nearly a dozen new or refurbished paper and board plants have come on line. In 1991 alone, four new plants opened.

In Minnesota, trees are managed so they remain a *renewable re-*

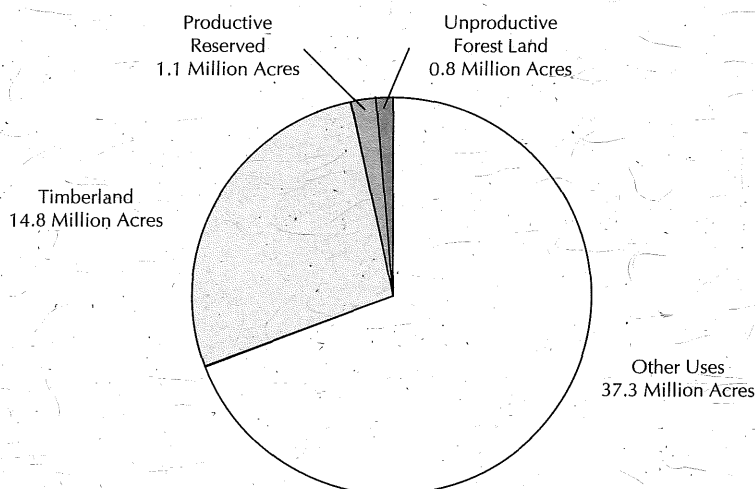
MINNESOTA TIMBERLAND BY OWNERSHIP

Total of 14.8 Million Acres



MINNESOTA LAND USE

Total of 54 Million Acres



source. The Department of Natural Resources (DNR) and the forest products industry conduct aggressive replanting programs. During the 1980s, the DNR shipped an average of 20 million seedlings a year for replanting; half went to state forests on public lands; the other half was planted on private lands managed for forest production.

The 1982 Forest Resource Management Act requires that the DNR reforest every acre of state-owned land that is harvested.

Increased concern over the world's dwindling rain forests has led to confusion about the condition of forests everywhere, including

those in the United States. **Deforestation**, as it refers to what is taking place in tropical rain forests, does not take place in Minnesota as a result of timber harvesting for wood products. Deforestation occurs in the tropics as land is cleared of forests for crop production, fuelwood, and livestock grazing.

Loss of forest land in Minnesota is primarily the result of clearing for residential and commercial development near expanding urban areas and for agriculture.

FOREST MANAGEMENT

What was it like?

- *Tax-delinquent lands*
- *Abandoned farmland*
- *Cut-over, burned forests*

Minnesota's forests have done a remarkable thing since the day when the baby boomers first entered school—they've grown! In spite of the pressures of increasing population numbers, and the corresponding urbanization of the past quarter century, Minnesota is home to some of the most beautiful, well-managed forest land in the world. Cooperation among federal, state, and county governments, private citizens, and industry have ensured that our forests are maintained for *"multiple use."*

However, despite this success story, the state's forests have not always been managed. The history of our forests in Minnesota is similar to the general history of forests throughout the U.S. Our forests have been exploited, reconstructed, and now are managed in order to furnish our generation and future generations with products and services that only forests can provide.

In the beginning of the 19th century, the state's forests began to disappear as settlers came and the forests were exploited for timber products and agricultural land. In fact, it was predicted at the time that all of Minnesota would "go under the plow," and that farming would be "possible" in all areas of the state. Indiscriminate logging was, indeed, encouraged. After logging, debris and stumps were burned. This burning to clear lands for agriculture led to

some very disastrous wildfires.

These fires are a vital part of Minnesota's forest history. In 1894, the Hinckley Forest Fire, which covered a large area in Pine County, resulted in the loss of 418 lives. The Chisholm fires of 1908 and the Baudette and Spooner forest fires in 1910 swept vast acreages of northern Minnesota.

These tragedies marked the beginning of our present day



Minnesota Department of Natural Resources, Division of Forestry. The catastrophic fires influenced the Minnesota State Legislature to take its first step toward management of forests and the prevention of wildfires by appointing a "forest commissioner."

The state's commitment to the management and protection of the state's resources has led to the development of state tree nurseries, management and administration of tax-forfeited lands, the establishment of memorial forests, and laws such as the Private Forest Management Act that provides technical management assistance to the small woodland owner.

One of the remnant virgin pine forests that remained after the wildfires became our first state park in 1891—Itasca State Park.

"Once there was a board shop. Every time a truck would come there would be a big load of logs. But one day every tree in Minnesota disappeared because nobody was taking care of the trees. The man who drives the truck came back and told his boss there were no more trees. The Boss said, 'No logs. Now there won't be any boards for houses and paper.' Then the boss had an idea. He told his people to tell people to plant trees and he told children to find walnuts and plant them. His idea worked and there were a lot of trees again."

**—Dan Dorn, 2nd grade
Nicollet Elementary School**

WHEN A FOREST IS PROPERLY MANAGED...

it can provide a diversity of values. It can provide habitat for wildlife, numerous recreational opportunities, scenic landscapes, clean air, stable soil, high quality water, jobs that help support the economy, the wood products that we use every day—and healthy trees for the future.

Let's take a look at a mythical, 100-acre forest.

Our Green Woods, our mythical forest, is 100 acres in size, consisting of two **cover types**—aspen and balsam fir. As professional foresters, we write a management plan that we often refer to as a “F-80.” The management plan for the Green Woods is developed only after consulting a number of guidelines covering the care of such forest amenities as wildlife habitat, recreational opportunities, and aesthetics.

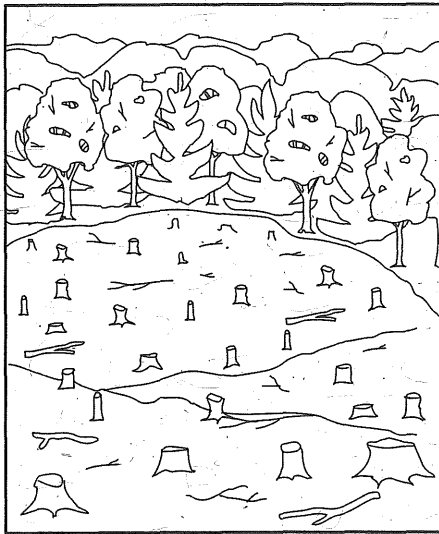
We determine that the Green Woods is best suited to grow the aspen and balsam we now find there, and thus write our plan to perpetuate these species; we decide to harvest part of the Green Woods every 10 years.

Now, 10 years after our first cut, the aspen that has regenerated naturally, stands 25 feet tall and serves as prime habitat for Minnesota game birds, the ruffed grouse and woodcock. We cannot overlook the fact that, while *now* too tall for the deer to feed on, our growing aspen has, for the past 10 years, served as prime feeding for white-tailed deer.

The balsam species that we planted after our first 10-year harvest, has begun growing more abundantly within our aspen cover type. Balsam is “shade tolerant” and will grow even though shadowed by the taller aspen trees. Balsam provides winter cover for a number of native wildlife species.

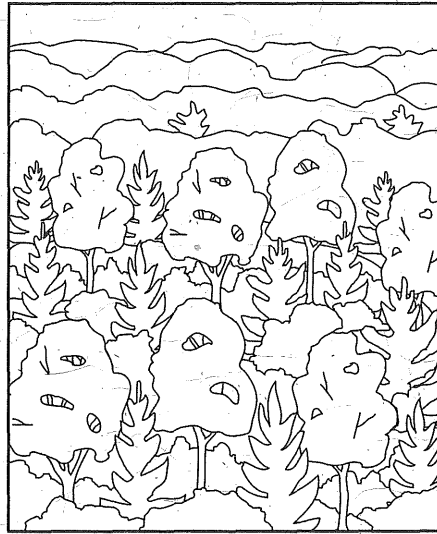
In addition to the economic benefits we receive as the aspen is sold to wood products companies to make things like paper and wafer-board, the Green Woods is criss-crossed with logging trails that can now be used for hiking and skiing. A few wild raspberry bushes have taken root where we harvested our aspen.

To meet society's changing needs and increased demands on our forest resource, today's forests are managed with today AND tomorrow in mind. Careful analysis, planning, and forecasting of conditions is essential to the management of every Green Woods in the State of Minnesota.



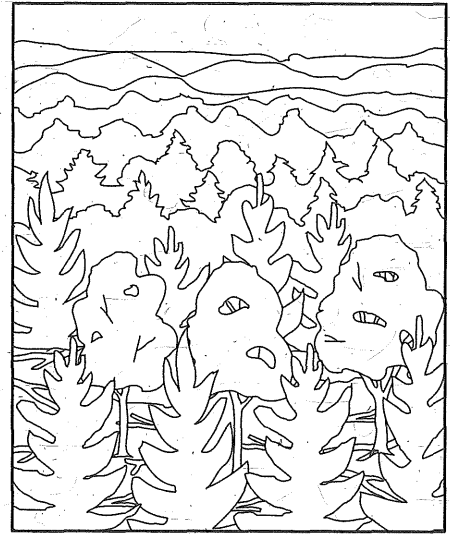
First Harvest:

Our harvested forest may be a disturbing view at first, but regeneration begins immediately. Young aspen regenerate from root sprouts, and begin to provide succulent food for deer.



10-25 Years Later:

Trees range in diameter from 4 to 8 inches. Seedlings, sprout growth, and berry bushes increase the food supply for wildlife. Woodcock and ruffed grouse, in particular, are attracted to these woods.



75 Years After First Harvest:

This ongoing forest, with its canopy of trees of all sizes, is healthy and pleasing to look at (and be in!).

NATIVE MINNESOTA TREES

"A man has made a start on discovering the meaning of life when he plants shade trees under which he knows full well he will never sit."

—Elton Trueblood

From the earliest time, wood has been one of the most common, useful, and remarkable of all **renewable resources**. The "history" of this raw material in the Midwest and northeastern states begins 10 to 12 thousand years ago, when glaciers retreated leaving land features suitable for the growth of vegetation. As this glacial period ended and the climate warmed, three distinct plant regions developed in Minnesota: the **evergreen** forests of the northeast; the **hardwood** forests of east central and south-east Minnesota; and the prairies in the west and southwest.

The northeastern evergreen region was the largest. The original forest included white, red, and jack pines; black and white spruce, balsam fir, tamarack, northern white cedar; and some **broadleaf** trees (mostly aspen and birch). The trees did not appear in one big mix, rather each species grew where the soil and moisture conditions were right for its growing needs.

After the first loggers cut the evergreens, fire swept through and destroyed many seed trees and young **conifers**, allowing aspen, birch, and oak to grow. Today, most of the evergreen forest is a mixture of aspen and birch, and in places, oaks and other hardwoods, together with young stands of pine, spruce, and fir wherever fires and logging did not completely eliminate these trees.

The original hardwood forests of the southeast and east central areas had stands of mixed hardwood species (oak, elm, ash, walnut, basswood, butternut, maple, cottonwood, willow, aspen, and others). As settlers moved into the state between 1820 and 1920, much of



White Spruce



Paper Birch



Northern White Cedar

THE FOLLOWING IS A LIST OF TREES COMMONLY CONSIDERED "NATIVE" MINNESOTA TREE SPECIES

(References: Vascular Plants of Minnesota by Gerald B. Ownbey and Thomas Morley. Silvics of North America, Volume 1 & 2, USDA Forest Service.)

Conifers (softwoods):

Cedar, eastern red (also called juniper)	<i>Juniperus virginiana</i>
Cedar, northern white	<i>Thuja occidentalis</i>
Fir, balsam	<i>Abies balsamea</i>
Hemlock	<i>Tsuga canadensis</i>
Pine, jack	<i>Pinus banksiana</i>
Pine, red (also called Norway pine)	<i>Pinus resinosa</i>
Pine, eastern white	<i>Pinus strobus</i>
Spruce, black	<i>Picea mariana</i>
Spruce, white	<i>Picea glauca</i>
Tamarack (also called eastern or American larch)	<i>Larix laricina</i>

Deciduous (hardwoods):

Ash, American mountain	<i>Sorbus americana</i>
Ash, black	<i>Fraxinus nigra</i>
Ash, green (also called red ash)	<i>Fraxinus pennsylvanica</i>
Ash, northern mountain	<i>Sorbus decora</i>
Ash, white	<i>Fraxinus americana</i>
Aspen, bigtooth (also largetooth aspen, poplar, popple)	<i>Populus grandidentata</i>
Aspen, quaking (also trembling aspen, poplar, popple)	<i>Populus tremuloides</i>
Basswood, American	<i>Tilia americana</i>
Box Elder	<i>Acer negundo</i>
Birch, paper	<i>Betula papyrifera</i>
Birch, river	<i>Betula nigra</i>
Birch, swamp	<i>Betula glandulifera</i>
Birch, yellow	<i>Betula alleghaniensis</i>
Butternut	<i>Juglans cinerea</i>
Cherry, black	<i>Prunus serotina</i>
Cherry, pin	<i>Prunus pensylvanica</i>
Cottonwood, eastern	<i>Populus deltoides</i>
Elm, American	<i>Ulmus americana</i>
Elm, rock	<i>Ulmus thomasii</i>
Elm, slippery (also called red elm)	<i>Ulmus rubra</i>
Hackberry	<i>Celtis occidentalis</i>
Hickory, bitternut	<i>Carya cordiformis</i>
Hickory, shagbark	<i>Carya ovata</i>
Hophornbeam, eastern (also called ironwood)	<i>Ostrya virginiana</i>
Hornbeam, American (also called blue beech)	<i>Carpinus caroliniana</i>
Maple, black	<i>Acer nigrum</i>
Maple, mountain	<i>Acer spicatum</i>
Maple, red	<i>Acer rubrum</i>
Maple, silver	<i>Acer saccharinum</i>
Maple, sugar	<i>Acer saccharum</i>
Mulberry, red	<i>Morus rubra</i>
Oak, black	<i>Quercus velutina</i>
Oak, bur	<i>Quercus macrocarpa</i>
Oak, chinkapin (also called yellow chestnut oak)	<i>Quercus muehlenbergii</i>
Oak, northern, pin (also called Jack oak, Hill oak)	<i>Quercus ellipsoidalis</i>
Oak, northern red	<i>Quercus rubra</i>
Oak, swamp white	<i>Quercus bicolor</i>
Oak, white	<i>Quercus alba</i>
Poplar, balsam (also called balm-of-gilead)	<i>Populus balsamifera</i>
Walnut, black	<i>Juglans nigra</i>
Willow: Many of Minnesota's native willows are shrub-like; they do not attain tree-size. Distinguishing one willow from another is often difficult, even for a professional botanist.	<i>Salix species</i>

PERCENT OF TIMBERLAND BY COVER TYPE

the hardwood area was cleared for agriculture. Remnants of these hardwood forests still stand along the rivers and in many small woodlands.

The original forests of the prairie region of western and southwestern Minnesota grew along the valleys and flood plains of rivers and streams. Because this area receives less rainfall, it was never covered by forests like the evergreen and hardwood regions.

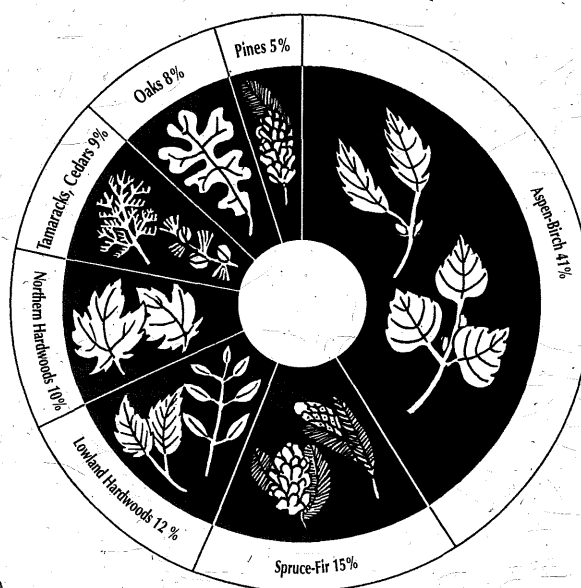
Forests are one of Minnesota's most "visible" resources. They cover nearly one-third of the state (16.7 million acres); 14.8 million of these acres are available for a variety of uses, including wildlife habitat, recreation, and timber management.

Today, aspen and birch tree types cover over one-third of the **commercial forest land** of Minnesota; spruce-fir forests cover about 15 percent. Moving down in percentages are the lowland hardwoods, northern hardwoods, oaks, pines, cedars, and tamaracks.

Minnesota now grows more wood than it is harvesting. Public agencies, Minnesota's forest industries, and small woodland owners have planted over 500 million trees, mostly evergreens, to reforest areas where trees were harvested or once grew but did not come back naturally.

The term "hardwood" does not necessarily mean the wood is hard. This simply is a term referring to broadleaf or deciduous trees.

By enforcing sound forestry practices, ample timber is left to meet future demands for wood and wood fiber, as well as to insure sufficient food, cover, and habitat for Minnesota's wildlife.



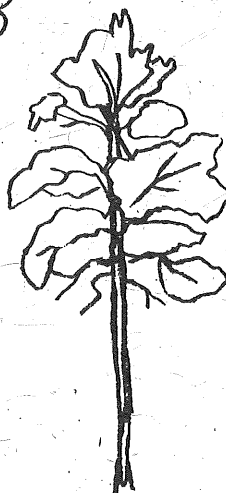
Quaking Aspen



American Basswood



Sugar Maple



Red (Norway) Pine

Minnesota's trees annually supply us with approximately

- 330 million board feet of lumber and logs
- over 5 million Christmas trees and wreaths
- 28,000 cords of matchwood and veneer logs
- 500,000 posts and poles
- 1 million cords of fuelwood.

These forest products (excluding pulpwood) have a value of over \$220 million. Our forests also produce wild berries, nuts, fruits, maple syrup, and pine cones.

Minnesota's native red pine was named the official state tree in 1953. The Norway pine, as it is called in Minnesota, is the most commonly planted species in the state. In 30 years, a Norway pine is a marketable size for pulpwood to make high-grade printing and wrapping paper. During the first 30 years of life, the branches of the Norway pine provide winter cover for Minnesota's white-tailed deer.

OLD-GROWTH FORESTS

"Old growth." The term is simple. The words are short. Yet the concept is one of the most intricate and complex of all biological principles.

Old-growth forests have developed over a long period of time, having escaped major disturbances like fire, windstorms, or logging practices. They contain large, old trees of long-lived species that are beyond "rotation" age—the age at which they would generally be harvested for wood products.

Like prairies and wetlands, old-growth forests are becoming rare. Most old-growth stands in Minnesota that existed before settlers came have been harvested.

Some **hardwood** species (for instance, sugar maple and basswood), as well as species like cedar, white spruce, and red and white pine, can develop into old-growth forests. Usually aspen, birch, and jack pine are not considered candidates for potential old-growth forests because they are relatively short-lived trees that do not tolerate being overshadowed by other tree species. These species are therefore considered **intermediate species** that evolve to a **climax species**.

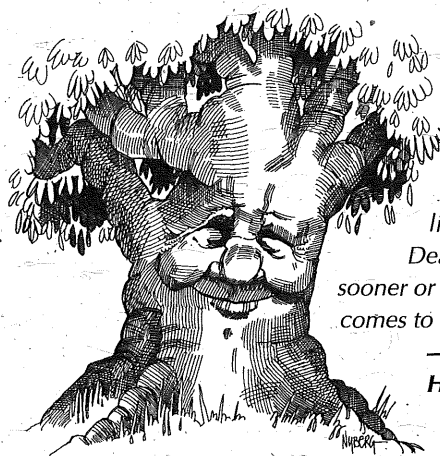
Because old-growth forests have developed without large-scale disturbances for a long time, they are valuable for scientific and educational reasons, providing important insights into forest **ecosystems**.

The Minnesota Department of Natural Resources has identified approximately 25,000 acres of Minnesota's forests as "**candidate**" **old-growth stands**. These stands will be protected from planned disturbances such as harvesting and road, trail, or wildlife habitat development until they are examined by professional foresters to determine if

they meet the criteria established for "old growth." This examination will continue for a number of years, and is taking place simultaneously on federal lands within the state.

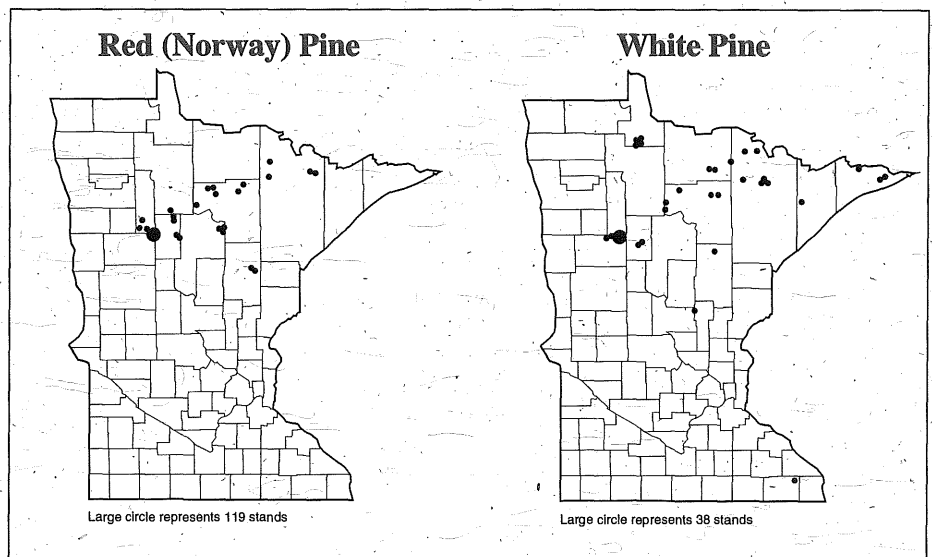
Minnesota's old-growth forests are important as examples of forest **succession** happening without

significant human and natural disturbances. The unique habitat these forests provide, such as multi-layered canopies, understory trees with many perches, and **snag** trees, provide different habitats and features for a variety of native plants and animals.



"Some trees may live for centuries; but trees, though they may be long-lived, are not immortal. Death, as it must come sooner or later to us all, eventually comes to a tree."

—from "Famous and Historic Trees"



The red (Norway) and white pine are two Minnesota tree species considered candidates for old-growth classification. Locations of old-growth candidate stands for white and red pine are shown here.

To understand old growth is to realize that it is merely a part of the “bigger picture” of the natural environment. That broad picture includes not only trees, but a variety of animal and plant species that interact with one another, with the soil, the air, and the water around them. This global picture is referred to as “**biological diversity**” or “**biodiversity**.” Biodiversity is at once both microscopic and global in scope. The word refers not only to the variety of species in an ecosystem, but also to the genetic diversity within animal and plant populations, as well as the multitude of interactions that link organisms to one another.

Old growth represents the latter stages of “*succession*” in forested ecosystems. “Succession” is a term referring to how a natural community of plants changes in composition and structure as it ages. Old-growth stands are being managed to ensure that these unique environments are available for research and for our enjoyment.

ERF—Extended Rotation Forests—is a philosophy, a prescription for the management of old forests that makes important contributions to conserving biological diversity. Under this type of management, the harvest time for forests is extended to an older age to help restore or enhance a particular natural forest community.

Foresters distinguish between “*old-growth forests*,” and “*old forests*.” *Old-growth forests* are unique sites that have not been disturbed for a long time. They are usually over 120 years old. Old forests are forests that are managed with the goal of having them develop into forests with older-aged trees. Old forests are managed under a plan called “*extended rotation forests*” (ERF).

URBAN FORESTS

"Trees take away some of the anxiety and tension of the urgent 'now' by showing us that there are long enduring patterns of life."

—Albert Einstein

There's a tree growing in St. Paul (and Minneapolis and Brainerd and Grand Rapids and International Falls). In fact, there are many trees growing on boulevards, in parks and school and municipal forests, near residential dwellings and commercial and industrial sites throughout Minnesota.

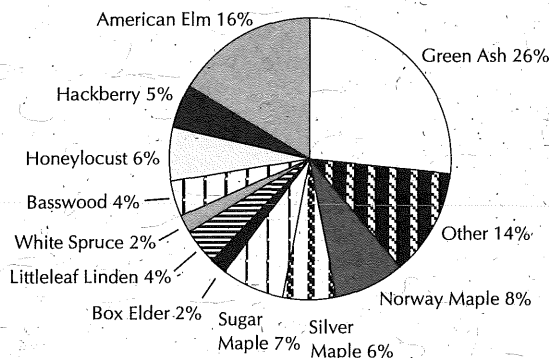
Have you thought about how your **urban forest** is doing today? As a tax paying citizen, you are part owner of what is referred to as the "urban" or "community" forest. Simply put, the urban forest is all the trees and associated vegetation in an urban area, which encompasses everything from the town center to the suburban fringe.

We treasure the trees in Minnesota's cities and towns—our **community forests**—as valuable contributors to Minnesota's quality of life. One of the greatest contributions of trees in the urban environment is in combating global warming by providing a savings in energy. For instance, trees provide shade from sun, and windbreaks from cold breezes.

Trees actually combat global warming by taking in carbon dioxide, "fixing" the carbon in their wood, and releasing oxygen. This carbon is stored in the wood until the tree is burned or rots. Minnesota's forests remove and store about 10 percent of the carbon released each year by the state's citizens as they drive cars, use electricity, and heat

MINNESOTA'S STREET TREE SPECIES

From 1989 Street Tree Survey of U.S. Cities and Towns, American Forestry Association



and cool the buildings they live and work in.

Trees reduce air and noise pollution, save energy, add beauty and dignity to our surroundings, soften harsh inner city lines—and soothe our minds!

Urban areas are expanding nationally at a rate of 32,500 acres daily. Does that translate into 32,500 acres of new urban forest? Probably not.

In fact, concern has risen in recent years over the devastation of many of Minnesota's urban forests due to insects, disease, drought, and urban development. The American Forestry Association (now American Forests) tells us that nationwide, for every four trees lost to development, disease, or neglect, only one is planted.

All Minnesota communities face the challenge of maintaining healthy community forests. Many communities have passed ordinances to protect trees in areas of development. Sherburne and Anoka counties have organized "tree boards" consisting of elected officials, technical experts, and citizens. The Minnesota ReLeaf Program aims to plant 1 million trees in cities, increase rural woodlands by 500,000 acres, and create a network of 1 million community tree caretakers—all by the year 2000. According to a 1989 Minnesota Department of Natural Resources survey, there are about 360,000 trees lining the boulevards of our communities. We still have room for more. In fact, there is space for another 360,000.

Write to Minnesota ReLeaf, DNR Division of Forestry, 500 Lafayette Road, St. Paul, MN 55155-4044 to find out how you can become involved in "greening up" your community.



COLOR MAIN STREET "GREEN"

The Benefits of Urban Trees

Social:

Try to remove the trees along Main Street to widen it and you will understand the strong ties that exist between people and trees! Unfortunately, many Minnesotans have learned the hard way the vital role trees play in their communities; they have seen the devastation of Dutch elm disease (DED), which continues its death march across the state. Minnesota and local communities invested more than \$200 million to fight the DED epidemic in the '70s and '80s.

The choice is not "trees or people;" both are essential elements of the community.

Community:

Building today's communities means planning parks, neighborhoods, shopping centers, and industrial districts. Bringing the natural world of trees into communities and their infrastructure requires planning and forethought. Many communities are now forming "urban forest councils." The councils are coalitions of urban dwellers who organize to address concerns about the trees near where they live and work. Today, 47 state urban forest councils exist. These local councils give trees a voice with community officials who make the decisions on city planning.

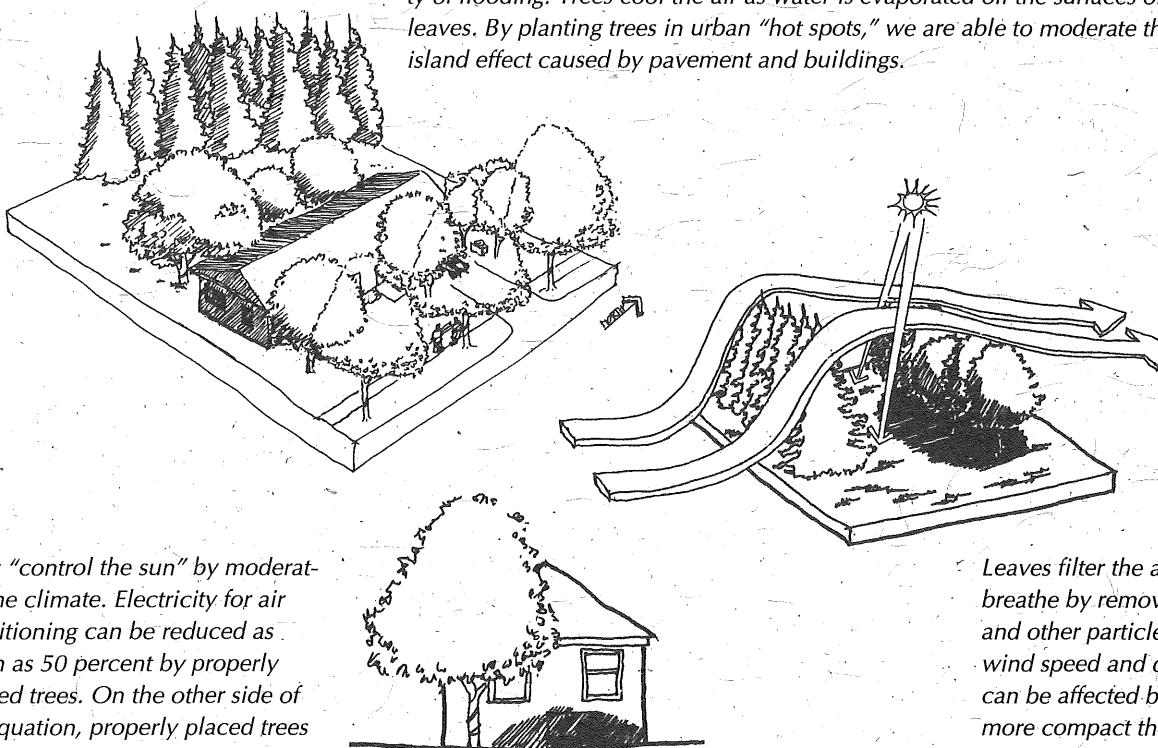
Everyone knows that trees can't talk and don't vote, but people can do it for them.

Environmental:

According to the American Forestry Association (now American Forests), the average 50-year-old urban tree is worth \$75 a year for air conditioning, \$75 for soil erosion and storm water control, \$75 for wildlife shelter, and \$50 for air pollution control. The total value in the 1985 economy: \$273. Compounded at 5 percent for 50 years, the benefits total \$57,151 per tree. (Multiply this by the hundreds of thousands of trees in U.S. communities and one begins to see the worth of city trees.)

Trees alter the environment in which we live by moderating climate, improving air quality, conserving water, and harboring wildlife.

From Energy Saving Landscapes: The Minnesota Homeowner's Guide.
Used with permission. Illustrator: William W. Weaver



Trees intercept water, storing some of it. This reduces storm runoff and the possibility of flooding. Trees cool the air as water is evaporated off the surfaces of tree leaves. By planting trees in urban "hot spots," we are able to moderate the heat island effect caused by pavement and buildings.

Trees "control the sun" by moderating the climate. Electricity for air conditioning can be reduced as much as 50 percent by properly located trees. On the other side of the equation, properly placed trees can reduce winter heating costs by 4 to 22 percent.

Leaves filter the air we breathe by removing dust and other particles. Even wind speed and direction can be affected by trees. The more compact the foliage, the greater the influence of the windbreak.

RECYCLING

"One simple act of conservation, multiplied by millions, makes a great environment."

—Unknown

"Green goals" have become the buzz phrase of the 1990s. Demands on this "Decade of the Environment" include "clean water, clean air, and clean lands."

A million paper coffee cups, a few million magazines, slip in a million or so pounds of office paper, and citizens have become aware—and irate—about the solid waste produced by this generation.

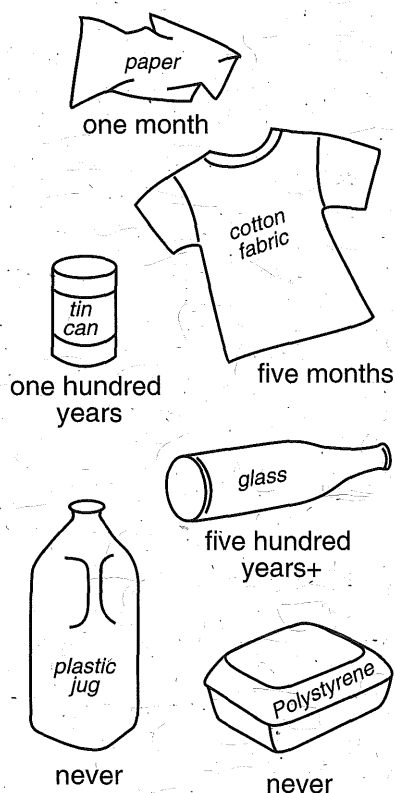
A major effort has been made in both the public and private sectors to recycle paper products. "**Recycling**" has become a household word and a household act throughout the United States. The U.S. paper industry itself is committed to recovering and reusing 40 percent of all wastepaper by 1995. One of the major setbacks to this goal has been the difficulty of recycling high quality papers, such as those used in magazines like *Time* and *National Geographic*. Removing contaminants such as resins, glues, and plastics makes it technically difficult to make these papers recyclable. The problem is so serious that the University of Minnesota has dedicated its Department of Forest Products to researching the technology of paper recycling.

Recycling paper and paper products makes sense. However, recycling is more than a save-a-tree issue. It makes sense because it saves on the space needed for landfills. Paper products comprise more than 40 percent of our landfill waste. And landfill space is decreasing. The good news is that paper products account for more than 80 percent of all "**post-consumer waste**" recovered for recycling.

It is also fortunate that trees are a **renewable resource**. We will always need to harvest trees to provide virgin fiber to replace weakened recycled fiber. The United States has more trees today than it had 70 years ago. A 1990 timber inventory indicated Minnesota is growing over 25 percent more wood than in 1977 on approximately the same acreage.

Recycling, combined with sound forest management, will extend the life of landfills and provide fiber for the products we use every day.

How long does it take these things to decompose?



Did you know that...

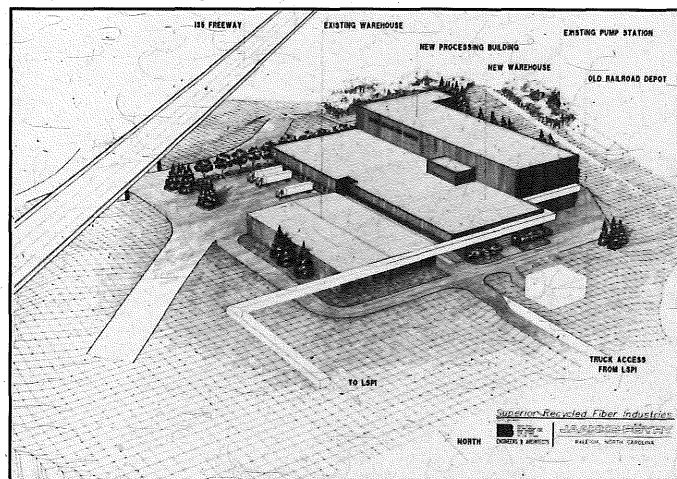
- Even when paper is labeled "made from recycled fibers," a portion of raw fiber (the actual wood from trees, a renewable resource) is still used to produce that product?
- Raw fiber breaks down and becomes weaker each time it is used? Even though we reduce, reuse, and recycle paper products, some raw fiber from trees needs to be used to ensure strength and durability of all final paper products.
- Americans use enough corrugated cardboard in a year to make a bale the size of a football field and the height of the World Trade Center? (About 40 percent of it is recycled.)
- To make plastics, the U.S. uses about a billion barrels of petroleum by-products (a **non-renewable resource**) each year? How much is that? Enough to fill over 56,000 olympic-size swimming pools.

Recycling facts from The Recyclers Handbook by the Earth Works Group

A "WASTEFUL" QUIZ

Take this quiz to see how much you know about paper recycling.

1. The largest single source of wastepaper collected for recycling is (a) computer paper (b) newspaper (c) corrugated boxes.
2. The amount of garbage that is considered "packaging" and is tossed out immediately is (a) 33% (b) 50% (c) 10%.
3. The first paper made in an American paper mill was made of (a) birch bark (b) wood fiber (c) cotton and linen rags.
4. The amount of paper used by an average American in one year is (a) 125 lbs. (b) 580 lbs. (c) 820 lbs.
5. The paper products in which recycled paper is most often used are (a) facial tissue and moist towelettes (b) paper towels and toilet paper (c) typing paper and computer paper.
6. The percentage of paper mills in the U.S. using wastepaper exclusively is (a) 17% (b) 5% (c) 33%.
7. The amount of high-grade recyclable paper thrown away by the average office worker each year is (a) 180 lbs. (b) 65 lbs. (c) 100 lbs.
8. The amount of landfill space saved by each ton of recycled paper is (a) 10 cubic feet (b) 3 cubic yards (c) 1 cubic yard.
9. The amount of garbage produced by Americans each year is enough to (a) cover New York City with a layer of trash 1 mile thick (b) circle the Earth twice (c) fill the New Orleans superdome from top to bottom, twice a day, every day.
10. The percentage of garbage thrown out by Americans each year that could be recycled is (a) 50% (b) 25% (c) 75%.
11. If you stacked up all the paper an average American uses in one year that could be recycled, the stack would stand as high as (a) a table (b) a giraffe (c) a two-story house.
12. The paper that four people use in a year weighs as much as (a) a refrigerator (b) a big car (c) a wheelbarrow full of sand.



Synertec, a subsidiary of Minnesota Power, is developing a \$74 million paper recycling plant in Duluth that will recycle 120,000 tons of paper waste a year.

There's a "save-a-landfill" philosophy behind an innovative paper-recycling plant currently being built in Duluth.

Superior Recycled Fiber Industries (SRFI), a venture of Synertec (a subsidiary of Minnesota Power), will remove the ink from and convert into pulp, approximately 120,000 tons per year of sorted office wastepaper and printing plant overruns.

Synertec combines American, European, and Japanese technology to accomplish the following steps necessary for printed paper recycling: pulping (starts ink separation); cleaning (removes adhesives); washing (removes small ink particles); flotation (removes large ink particles); dispersion (breaks up remaining ink); and color stripping (removes colors through a hydrogen peroxide process).

The product of the SRFI process is a high-quality pulp for use in paper making. This product will enhance area paper mills' ability to produce recycled printing and writing grade paper by supplying them with recycled fiber suitable for that purpose. In fact, 70 percent of the plant's production has already been sold to mills including Blandin Paper Co., Canadian Pacific Forest Products Ltd., Consolidated Papers Inc., Potlatch Corporation, and Lake Superior Paper Industries. A residue by-product from the recycling process will also be in a form that can be used as landfill cover.

According to the Synertec philosophy, recycling is not an issue of "saving trees"—a renewable resource—but one of decreasing the demand on the ever-declining space needed for garbage and landfills.

Answers to A "Wasteful" Quiz: 1.(c); 2.(a); 3.(c); 4.(b); 5.(b); 6.(c); 7.(a); 8.(b); 9.(c); 10.(a); 11.(c); 12.(b).
How you scored:
10-12 correct—Recycling Maniac
6-9 correct—Waste Watcher
3-5 correct—Recycling Recruit
Less than 3—It's never too late to learn more about how you can recycle.

STEWARDSHIP

What is beautiful, improves air quality, produces income, and enhances wildlife populations?

A tree.

The right to own land is among an individual's most treasured rights. However, ownership not only grants the landowner the privilege of achieving personal objectives on that property, it also asks the landowner to take on the responsibility of good *stewardship*.

Stewardship is defined as "the application of economic and environmental principles to manage privately-owned forest land." Stewardship is more than a word, or a concept, or an ideal—it is now a formalized and nationally recognized program.

A statewide Stewardship Program has been developed by the Minnesota Department of Natural Resources, Division of Forestry in cooperation with other state, federal, and local natural resource agencies. The goal of the program is to help private landowners prepare and apply management plans on unmanaged land. Ultimately, the purpose of the plan is to provide increased assistance to landowners to achieve their personal land ownership objectives, while still ensuring that the renewable resources on their lands will be sustained for the long-term benefits of society as a whole.

Of the approximately 131,000 non-industrial private forest (NIPF) landowners in Minnesota, only a fraction (12 percent) regularly include natural resource professionals in managing their woodlands. The Stewardship Program will assist landowners in actively managing their lands, keeping in mind the balance between forest ecosystems and wood fiber production, recreation and aesthetics, soils, and water.

WHAT DO MINNESOTANS EXPECT FROM THEIR FORESTS?



"The days have ended when the forest may be viewed only as trees, and trees viewed only as timber. The soil and water, the grasses and the shrubs, the fish and the wildlife, and the beauty that is the forest must become integral parts of resource managers' thinking and actions."

—The late Senator Hubert Humphrey

IMAGINE THE POSSIBILITIES, AND THEN PLAN ON THEM!

Planning future forests

- **Non-industrial private forest (NIPF) lands** make important contributions to environmental quality and the raw material requirements of the nation. Pressure has been growing to develop more public land policies and to more intensively manage natural resources on private lands.
- The primary goal of Minnesota's Forest Stewardship Program is to greatly increase the amount of managed NIPF lands.
- Other goals of the Stewardship Program are to place 440,000 acres of NIPF lands under management, and to prepare over 11,000 *stewardship plans* by 1994.
- Incentive programs will be available to NIPF landowners to cost-share their stewardship activities.
- A managed forest begins with a good management plan designed to meet a landowner's needs.
- You are a forest steward when you apply management principals to your woodland for personal benefits, while protecting the quality of its natural resources (soil, water, wood, and wildlife) for future generations.



Become a woodland steward by actively managing your land for personal benefits, while protecting the quality of its natural resources (soil, water, wildlife, trees, and other plants.)

The Minnesota Forest Stewardship Program is a new initiative conducted with the cooperation of many natural resource agencies, private organizations, and businesses. Its purpose is to assist the private landowner in *multiple-use* management of his or her woodlands.

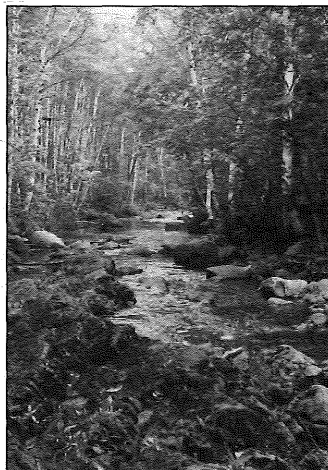
Begin your plan by contacting a local office of the Department of Natural Resources, Soil and Water Conservation District, Minnesota Extension Service, forest industry, or forestry consultant.

INVESTING IN STEWARDSHIP IS INVESTING IN THE ENVIRONMENT TO:

**Enhance fish and
wildlife habitat.**



**Improve water quality
and reduce soil erosion.**



**Provide recreational
and aesthetic opportu-
nities.**



Improve air quality.



FORESTRY: THE '90s

"We ask the leaf, 'Are you complete?' And the leaf answers, 'No my life is in the branches.' We ask the branch and the branch answers, 'No, my life is in the trunk.' We ask the trunk and it answers, 'No, my life is in the branches and the leaves.' So it is with our lives. Nothing is completely and merely individual."

—Harry Emerson Fosdick

It is a little-known fact that "forestry" is a relatively young profession in the United States. It developed in response to some troublesome environmental and economic problems. Namely, how do we provide wildlife habitat, recreational opportunities, and wood and paper products to meet the needs and wants of the nation's citizens—without jeopardizing the health and sustainability of the forest resource?

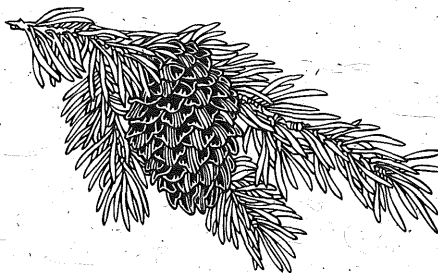
The first "professional" forester in the United States, Gifford Pinchot, began applying scientific forestry principles to land management in the southern United States in 1892. He stated then that if his management principles to improve the condition of the woodlands he was charged with restoring worked, he "would not fear undertaking the management of any piece of forest land I have seen in the United States."

As the forestry profession turned 100 years old in 1992, some of Pinchot's professional forestry practices, and others, have resulted in reforestation of millions of acres of cut-over land, flood and erosion control, wildfire management, and sustainable wood supplies for now and in the future. In fact, nationwide, forest growth is now more than three times what it was in 1920. Great strides have been taken in the past century in saving millions of acres of forests from fire, insect, and disease damage.

As the centennial of forestry is upon us, the forestry profession is faced with meeting increased demands on the forest resource. As our population rises, our consumption of

natural resources rises correspondingly. Heightened public awareness, a rising number of special interest groups, and new competing objectives for the forest resource have led to growing controversy about land management. The nation's citizens are now playing an important role in forest-related decisions and debates, especially on public land.

This interest has led to new research, new ideas, and new technology. Turn the page to find out what forestry is about in this decade of the '90s.



The following agencies are committed to the sound management and stewardship of our state's natural resources. Contact them to answer your questions about Minnesota's forest resource.

- American Forests (American Forestry Association): P.O. Box 2000, Washington, DC 20013, (202) 667-3300.
- County Soil and Water Conservation District: Look in your local phone book under "U.S. Government offices."
- County Extension Office: Look in your local phone book under your specific county name, then "Extension Office."

- Chippewa National Forest (federal): Route 3 Box 244, Cass Lake, MN 56633, (218) 335-8600.
- Christmas Tree Growers Association: P.O. Box 124, Osseo, MN 55369.
- Maple Syrup Producers Association: 3002 Horseshoe Lake Road, Grand Rapids, MN 55744.
- Minnesota Deer Hunters Association: P.O. Box 413, Grand Rapids, MN 55744, (218) 327-1103.
- Minnesota Department of Natural Resources, Division of Forestry: 500 Lafayette Road, St. Paul, MN 55155-4044, (612) 296-4491.
- Minnesota Forest Industries, Inc.: 1015 Torrey Building, 314 West Superior Street, Duluth, MN 55802, (218) 722-5013.
- Minnesota Forestry Association: 26 Exchange Street East, Suite 507, Exchange Building, St. Paul, MN 55101, (612) 292-0051.
- North Central Forest Experiment Station (federal): USDA Forest Service, 1992 Folwell Avenue, St. Paul, MN 55108, (612) 649-5000.
- Superior National Forest (federal): 236 Federal Building, 515 West First Street, Duluth, MN 55801, (218) 720-5324.
- University of Minnesota, Forest Resources: 116 Green Hall, 1530 North Cleveland Avenue, St. Paul, MN 55108, (612) 624-3020.

FORESTRY OF THE '90s: GEIS, BMPs, NEW FORESTRY

Minnesota's Generic Environmental Impact Statement on Timber Harvesting and Management, best known as the "GEIS," should "cut a swath as wide and clean as a clear-cut across some of the state's thorniest forestry issues," according to the GEIS project manager, Michael Kilgore.

The GEIS is a major study of the environmental impact timber harvesting has on Minnesota resources. The project, handled by a private contractor, is analyzing the social, economic, as well as environmental impact of harvesting on all forest ownerships statewide.

The GEIS was ordered by Minnesota's Environmental Quality Board. The 2-year study is expected to be completed in 1993.

"The GEIS will examine the effects of expanded timber harvesting. It is a long-term planning tool that will generate a wealth of information useful in making important decisions on how the state's forests are managed and used in the future."

—Michael Kilgore, GEIS Project Manager

Best Management Practices for Water Quality. In forester's lingo, that's "BMPs." Logging operations are a source of potential, and sometimes realized nightmares. Those nightmares take the shape and color of eroded riverbanks, silt-laden streams, and washed-out hillsides. The Minnesota Department of Natural Resources (DNR), working with professional foresters and the Minnesota Pollution Control Agency, developed BMPs in response to requirements of the 1987 Clean Water Act.

BMPs are timber management and harvesting practices that reduce and/or prevent **non-point source pollution** from timber harvesting operations. They include such acts as leaving buffer strips of vegetation next to streams and building stream crossings that cause minimal damage to flowing waters.

"The need to maintain water quality in forested areas is an issue important to natural resource managers. Even with the limited potential impact of forest practices upon water quality, the water quality issue will mold forestry activities in the 1990s."

—Bruce Zumbahlen, DNR Division of Forestry

A new decade, a new day, a new beginning is dawning on forests and the concept of forest management. As demands for economic and aesthetic amenities increase, forestry professionals are working to apply both old and new principles to forest management. One new idea that has surfaced in the '90s is a concept called "**New Forestry**." Also termed "**New Perspectives**" or the "**enlightened forest**," the term refers to forest management that emphasizes ecological considerations.

For instance, New Forestry might mean leaving a mix of live and dead standing trees and fallen trees when harvesting a forest. This mixture returns nutrients to the soil and improves wildlife habitat through a process that seeks to mimic nature.

"'New Forestry'—I view this new approach (to forest management) as a kinder and gentler forestry that better accommodates ecological values, while allowing for the extraction of commodities."

—Dr. Jerry Franklin

GLOSSARY OF FORESTRY TERMS

Bareroot seedlings: Young trees that have had the excess soil removed from their roots at the nursery before they are transported to where they will be planted.

Biological diversity or biodiversity: The variety of species in a living system, like a forest. It refers to not only the genetic variety in a population, but also to the multitude of interactions among organisms at all levels, and the habitat diversity within an area.

Broadleaf: Trees that have leaves such as oaks, maples, ashes, elms. These trees lose their leaves during the winter season. Often called "hardwoods," the name does not necessarily refer to the hardness of the wood. Also called "deciduous." Compare to "Conifer."

Candidate old-growth stand: A forested area that is protected from planned disturbances until determined if it meets the criteria designating it as "old-growth forest."

Cellulose: The woody part of trees and plants. Cellulose is used to make paper and is a component of other materials like rayon.

Climax species: A type of tree that is found in a "climax forest," in other words, in a forest that is in its later ecological stage of succession. Climax species are tolerant of shade and include such species as maple, basswood, spruce, and fir. See "Intermediate species."

Commercial forest land: Land capable of growing timber that is economically desirable for commercial use.

Community forest: The trees in Minnesota's cities and towns. Boulevards, parks, school forests, municipal forests, greenbelts, residential dwellings, commercial and industrial sites, and undeveloped areas within our cities are places where community forests occur. Also referred to as "urban forest."

Conifer: A tree belonging to the order Coniferae. It is usually evergreen with cones and needle-shaped leaves. It produces what is commercially known as "softwood." Usually its foliage is green throughout the year. One Minnesota exception is the tamarack. Compare to "Broadleaf."

Containerized seedlings: Young trees raised in greenhouses in individual pots or compartments. These trees may be pulled from the container at planting time, or may be planted in a container that disintegrates in the ground.

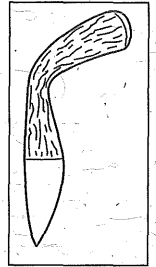
Cord: A standard measure of a stack of wood that is eight feet long, four feet wide, and four feet high. The volume of a standard cord is 128 cubic feet.

Cover type: Classification given to the type of vegetation growing on a particular site.

Diameter, breast high (d.b.h.): The diameter of the trunk of a tree at 4 1/2 feet above the average ground level.

Deforestation: The removal of trees from a forest without plans to replace the resource. Most often referred to in "tropical deforestation" where tropical and semi-deciduous forests are being cleared for crop production, timber, fuelwood, and livestock grazing without regard or plan for conservation of these forests for future generations.

Dibble: A planting tool consisting of a long iron handle with a blade on the end. The blade is usually a flat piece of steel varying from two to four inches in width. The dibble is used to open a spot where tree seedlings can be planted.



Dibble

Ecosystem: The interacting natural world, including both the living and non-living environment.

Enlightened forest: Also known as "New Forestry" or "New Perspectives," the term refers to a forest management philosophy emphasizing ecological considerations

Evergreen: See "Conifer."

Extended rotation forests: A new concept describing stands of forests that have been identified through a planning process as forests that will be managed for a longer time period before being harvested.

Hardwood: A term used to describe broadleaf trees such as oaks, maples, ashes, and elms. The term does not necessarily refer to the hardness of the wood. Hardwoods are "deciduous," trees that lose their leaves in winter. Refer to "Broadleaf."

Intermediate species: Trees that are in a stage of ecological succession between a "pioneer" (first) forest and a "climax forest." (See "Climax species.") These species make up a forest that is characterized by pine trees, like the white and red (Norway) pine that are shade intolerant (do not like being shaded by other trees).

Multiple use: Using and managing a forested area to provide more than one benefit simultaneously. Common uses may include wildlife habitat, timber production, recreation activities, and water quality.

New Forestry, New Perspectives: See "Enlightened forest."

Non-industrial private forest (NIPF) lands: Forest lands owned by a private individual, group, or corporation not involved in wood processing.

Non-point source pollution: Pollution arising from an ill-defined and diffuse source, such as runoff from cultivated fields, grazing lands, or urban areas.

Old forests: Forests that are managed with the goal of having them develop into older forests.

Old growth: A forest dominated by long-lived species that have escaped catastrophic disturbance for at least 120 years. These forests usually consist of aging, dying trees, large snags, and downed logs.

Post-consumer waste: Products that have already been utilized by the consumer and are now considered as waste.

Recycling: To reuse a product in an effort to reclaim its value and to prevent waste.

Reforestation: The natural or artificial restocking of an area with forest trees.

Renewable resource: A resource, like trees, that can be renewed. Trees can be renewed through planting, seeding, or natural regeneration so the resource never runs out.

Rotation: The age at which a particular species of tree generally would be harvested for wood products.

Snag: A standing dead tree used by many species of birds and mammals for feeding and nesting.

Stewardship: Taking good care of the land. In reference to forestry it means a conscientiousness of the aesthetic and economic value of the forest, and the responsibility of applying economic and environmental principles to its management.

Stewardship plan: A written plan describing the goals, natural resources, and recommended management possibilities on a specific woodland. A stewardship plan helps a forest landowner define his or her goals.

Succession: The gradual replacement of one plant community by another.

Timberland: A stand of trees, usually of commercial size. See "Commercial forest land."

Urban forest: Trees that grow in our cities and towns. Also referred to as "community forest."

Woody plant: Plants that live longer than two years and have a thick, tough stem or trunk covered with a layer of cork.

