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Wisconsin

NATURAL RESOURCES

March-April 1984 Volume 8, Number 2

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SPECIAL ISSUE: *A*

Strategic Plan for Wisconsin Forests

PLAN HIGHLIGHTS

- 1. The plan includes all ownerships of the 14.5 million acres of commercial forest land.
- 2. The plan is not regulatory. It merely identifies opportunities, targets and goals that will maintain a vigorous forest-based economy with recognition of multiple use and other values.
- 3. Major management responsibility for meeting timber needs of the future fall upon the non-industrial forest landowner.
- 4. Annual net growth of hardwoods should increase 59-million cubic feet by the year 2010, a 15% increase over the present level.
- 5. Wisconsin's acreage of northern hardwood and oak is adequate, but proper harvest and timberstand improvement practices must be employed to raise the quality and volume of the timber.
- 6. Aspen acreage is adequate to meet current demand. However, shortages will occur (1995-2005) because of an imbalance of trees reaching maturity during given time periods. Present management is directed at harvesting mature and overmature aspen to obtain regeneration. Continuing efforts will result in a balanced age class distribution for sustained annual yields.
- 7. Fir, spruce, hemlock, cedar and tamarack supplies are adequate to meet projected demands. Fir in particular provides an opportunity for industrial expansion. Management efforts will be directed at regeneration particularly of hemlock and cedar for wildlife, aesthetics and diversity.
- 8. Red and jack pine production is critically needed to meet present and future demands of Wisconsin's forest based industry. About 80% of the softwood fiber used, approximately 2-million cords are imported annually into Wisconsin as roundwood, chips and wood pulp. Only 500,000 cords are produced in the state. This is a deterrent to future expansion and imposes a threat to existing industry. Consequently, annual tree planting increases of 120% over the present level of 15,000 acres are recommended. This would increase the softwood fiber (mostly pine) Wisconsin supplies to industry by about 57-million cubic feet annually. The recommended increases mean planting 810,000 acres during the next 45 years. By comparison, about 870,000 acres were planted over the past 50 years. About 71% would have to occur on private non-industrial lands. It is unrealistic to assume this goal will be achieved unless additional incentives are provided to landowners.
- 9. Production of blister rust resistant white pine seedlings for planting will be a major nursery effort.
- 10. Greater management coordination is recommended among resource managers (forestry, wildlife, recreation, etc.) to achieve greater integrated productivity from the land for all purposes.
- 11. An improved and coordinated information and education program is as critically needed to more effectively communicate forestry issues to the public.

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Hardwood forest in Pierce County. If Strategic Plan goals are achieved annual hardwood production in Wisconsin would go up 60-million cubic feet by the year 2010.
Photo by Don Blegen

Copies of the two portions of the complete plan: *Wisconsin's Forests, An Assessment 1980* and *A Strategic Plan for Wisconsin's Forests* may be obtained by writing Chief Forester, DNR, Box 7921, Madison, WI 53707.

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Parks guide bargain!



The Star Lake plantation was planted in 1913. An excellent example of planned forestry, it proved that plantations are practical and pay off economically.
UW-Extension-Forestry photo

Why plan ahead for forests?

Ten years ago Congress passed the Forest and Rangeland Renewable Resource Planning Act. As a result, land managers started to scrutinize US wood fiber production, forecast its future and relate it to economics, jobs, recreation and other social amenities. Startling facts emerged:

Demand for forest products will double shortly after the turn of the century, but the US forest land base is shrinking 500,000 acres per year.

There are 4½-million forest landowners, but their land produces only one-third its potential in timber.

Insects, disease and weather destroy enough timber every year to build nearly a million wood frame homes.

These and similar facts made it plain that detailed strategic plans must be made now if the nation's forest resources are to meet future needs. It takes a long time to grow a tree.

Consequently the US Forest Service asked each state to make forest resource assessments and strategic plans. The service furnished grants to help out. Wisconsin received about \$20,000 per year. It was a big job and had never been done before. There were also certain requirements. The plan was not to be developed in isolation by DNR but rather by as broad a representation as possible of forest ownerships and interests. While it was to emphasize timber production and related

socio-economic matters, it was also to specifically address other forest values, such as wildlife and outdoor recreation. DNR was given responsibility for planning coordination.

The Wisconsin response, including the assessment, took five years to complete.

Its focus is on a mere eight pages of recommendations that cover about a dozen subject areas. But to come up with them required an impressive array of information and analyses. The plan com-

piles just about all the facts now known about Wisconsin forests and reflects what all the experts and other interested parties think about them. Public participation was conscientious and copious. Comments filled four big files in planner Dick Lindberg's office.

The whole process was guided by an 18-member Technical Review Committee.

Membership included every conceivable forestry interest from private and industrial landowners to the AFL-CIO, Conservation Congress, University of Wisconsin, local fire departments and many others.

As the plan developed, public comments on every phase were received from about 150 individuals, a dozen public agencies and groups, eight organizations as diverse as the Wisconsin Paper Council and the Sierra Club, four advisory councils on Wilderness, Scientific Areas and Forestry and two paper industry corporations.

Four main documents came out of all this work:

- A detailed description of the current makeup of Wisconsin forests, their ownership and the major activities carried out on them. This was published in an 83-page report entitled *Wisconsin's Forests: An Assessment, 1980*.
- A list of 23 issues that affect Wisconsin forest management. These are both positive and negative and include things like public awareness, costs of transportation, softwood fiber shortages, funding for the state forestry program and adequacy of management on private nonindustrial lands. There were many others. Each issue was analyzed and actions proposed to counteract negative effects.
- Ten detailed programs were designed to confront the issues. Various levels of production and landowner commitment were described for timber management, outdoor recreation, wildlife, forest research and other programs.

The Wisconsin Society of American Foresters was pleased to be represented in this group of knowledgeable forest management leaders who, working together, made an effective and professionally creditable contribution toward promoting the development of a wise-use forest resource management ethic and policy in Wisconsin.

FRED LINTELMANN

Wisconsin Society of American Foresters

Monuments to planning never done, stumps like these still dot the north.
DNR photo



The planners

RICHARD D.
LINDBERG
H. JAMES HOVIND

The experts

Forestry Plan Technical Advisory Committee

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- Soil Conservation
Service

Jeffrey Amo

- Local Fire Departments

Frederic Braun

- Private Nonindustrial
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- Wisconsin Woodland
Owner's Association

Thomas Brogan

- Northern Hardwood &
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- DNR - Wildlife
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Wilbur Leslie

- Wisconsin County
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Fred Lintelmann

- Wisconsin Society of
American Foresters

Anthony Lorbetske

- Wisconsin Association of
Conservation Districts

Ralph Monahan

- North Central Forest
Experiment Station
- St. Paul, MN

Mark Mueller

- Northwest Regional
Planning Commission

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- Wisconsin Conservation
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Leo Nickasch

- State AFL-CIO

Thomas Rausch

- DNR - Forestry

Edward Steigerwaldt

- Consulting Forester

Ralph Swanson

- Consolidated
Papers, Inc.

John Wolter

- US Forest Service

Organizations

Wisconsin Paper Council

Wisconsin Society of Biological Scientists

Wisconsin County Forests Association

Wisconsin Conservation Congress

Sierra Club (Wisconsin Chapter)

Northern Hardwood and

Pine Manufacturers Association

Society of American Foresters

(Wisconsin Section)

Land and Conservation Committees of County Boards

Industries

Nekoosa Papers, Inc.

Consolidated Papers, Inc.

Public Agencies and Groups

Wisconsin Department of Development

Wisconsin Department of Energy

Wisconsin Department of Agriculture, Trade

and Consumer Protection

Wisconsin Department of Justice, Division of

Trust Lands and Investments

University of Wisconsin

School of Natural Resources

Geological and Natural History Society

UW-Extension Community Programs

US Department of Agriculture

US Forest Service

National Forest System

State and Private Forestry

North Central Forest Experiment Station

Soil Conservation Service

Northwest Regional Planning Commission

- Recommendations. These choices, nearly 90 of them, were made from among the various program alternatives and are fashioned for use as a guide by all forest ownerships.

Next step is to accomplish the plan's objectives and this can only be achieved through coordinated effort by all ownerships: private, industrial and public. In submitting the document to these groups for possible action, the Technical Review Committee pointed out that the plan is not an end product, but rather a beginning. As new data is obtained and demands on Wisconsin forests change, future recommendations will also change. In the meantime, the committee said it has confidence in the plan's current recommendations and singled out six for special mention:

1. *The need to increase wood fiber production to help meet current and projected shortages;*
2. *The importance of forests for dispersed recreational activities;*
3. *The value of wood fiber to the state's jobs, economy and social well-being;*
4. *The need for better ways to assess the effect of the myriad management decisions on wildlife, recreation and timber values;*
5. *The need to manage forests more intensively for all their values and to stimulate all forest landowners to do this;*
6. *And the need for better public understanding of the forest resource and its best management.*

Following through on these and other recommendations will make sure that Wisconsin wood fiber production increases to help meet demand through the year 2030 and that the social, recreational and wildlife amenities the forests furnish remain viable.

"The Wisconsin Natural Resources Board acknowledges the plan as an important first step in the planning process which must include anticipation of the wood fiber producing potential of Wisconsin's forests in context with multiple use goals and policies;

We encourage staff, within present resource constraints, to continue to derive information and intensify analysis of wood fiber production supply and demand relationships; and

We endorse the interdisciplinary forest resource planning process and direct it be continued and expanded to encourage participation of all affected disciplines in forest planning..."

Wisconsin Natural Resources Board

Economic and social impact

The story of how Wisconsin's great pinery was cut down to build homes and factories for the Midwest and Great Plains is well known. Some idea of the original forest's size can be perceived from the fact that the Chippewa River pinery alone contained 43-billion board feet. Wisconsin's white pine era produced from one to four billion board feet per year from 1869 until the turn of the century. The exploits of the logging camps, the great river runs, the log jams and lumber barons are embedded in history and folklore.

Sawmill towns like Wausau, Stevens Point, Eau Claire, Rhinelander and others still bear the social and economic imprint of their great logging heyday. Today they also share in the benefits of a public policy that recreated one of the greatest reservoirs of second growth timber in the world. The official anxiety that eventually led to a change in forestry practices began about 1900 when the pinery was all but gone and perpetual fires continued to ravage the woods, while loggers turned axes to the virgin hemlock and hardwoods.

In 1905, E.M. Griffith, who had been trained in the new science of forestry in Germany, was named Chief State Forester. Griffith started programs to control fire, opened a tree nursery at Trout Lake for reforestation and began a forest reserve. But in 1915 the program was declared unconstitutional and Griffith left the state never to return. By 1920, Wisconsin's original forest, once considered inexhaustible, had been nearly obliterated. At last, in 1924, a constitutional amendment allowed the state to engage in forestry. This set the stage for recovery, and started a unique state-county-township cooperative effort that brought trees back to many cutover acres and helped make the woods profitable again. It was a long and arduous business.

When loggers finished, the cutover lands had become tax delinquent. At first there was a push, aided by the UW College of Agriculture to turn the cutover into farms. Many people were attracted, but amidst much heartbreak, most failed. The cutover continued to expand, and fire often consumed 300-to-500,000 acres every year. By 1927, more than 4¼-million acres in 17 northern counties had been tax delinquent one or more times. In that same year, a new law authorized creation of county forests. Two years later Langlade County took advantage of the new law and entered 10,000 acres of tax delinquent land. From that beginning, county forests spread to 28 other counties and now comprise over 2¼-million acres.

The timing of the depression in the 1930s coincided with the need for reforestation and for 10 years the Civilian Conservation Corps and other public employees planted millions of trees in Wisconsin. To provide jobs for the unemployed was one of the major economic benefits of the forest in this period.



▲ When logging the pinery finished, cutover lands became tax delinquent—more than 4¼-million acres. Laws authorizing county forests grew out of this debacle.

Photo by Bob Wallen



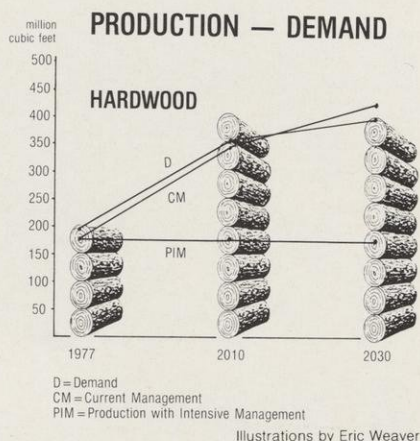
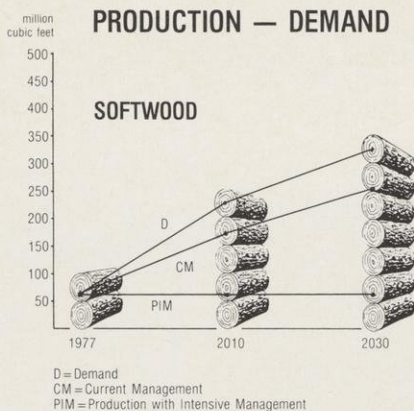
◀ Cutting the eight-foot sticks for papermill stockpiles like this keeps woodworkers busy.

Photo by Dennis Chapman

▼ Several thousand Wisconsin residents earn a living in the woods.

Photo by Denise Dvorscak





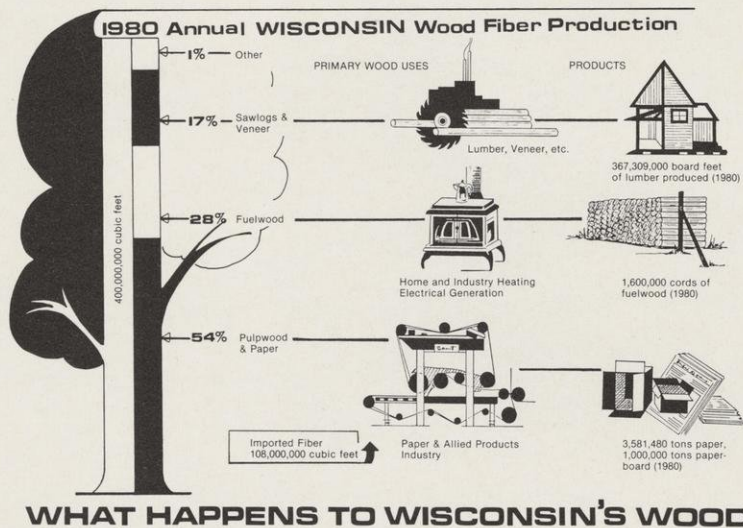
Over the next 40 years, emphasis on county, state and national forests gradually changed from planting trees to management and harvest. Where county forest timber sales were nearly zero in 1935, they brought in more than \$6-million (in constant dollars) for the four year period 1975-1979. As the forest recovered, it was easy to take for granted this naturally increasing contribution to the state's financial vitality.

Today, two of every five acres of land in Wisconsin are classed as commercial forest, directly and indirectly supporting a substantial segment of the state's economy. Jobs in forests, planting, managing and harvesting wood products employ several thousand people directly and provide supplemental income to many more through part-time and seasonal work like pulpwood and fuelwood cutting.

Forest and wood-using industries, including saw mills, paper mills, furniture factories and other plants employ nearly 75,000 people (13.5% of all Wisconsin manufacturing). Between 1974 and 1978 forest industries were the second fastest growing major industrial group in the state. In one year (1978) these industries produced and shipped products valued at nearly \$6-billion.

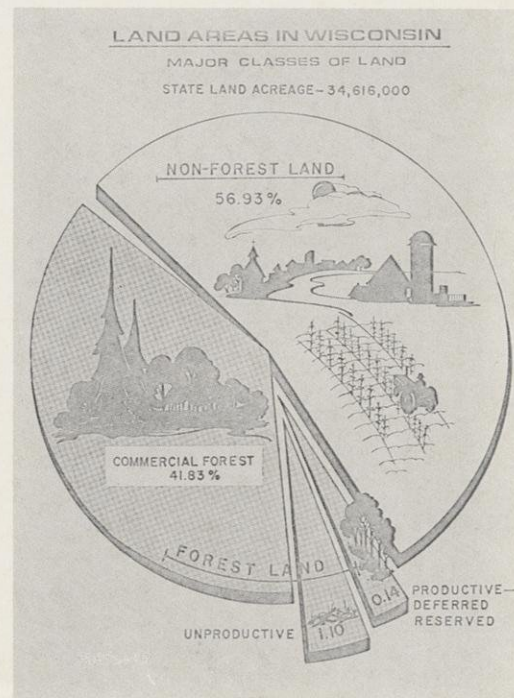
The total number of recreational visitors to all public and private forests combined has not been compiled. However, in 1982 there were nearly 2-million visits to DNR's northern state forests and another 1.8-million to the Chequamegon and Nicolet National Forests. These visitors, many of whom are out-of-state residents also stop at restaurants, stay in motels, buy gasoline and groceries.

Wisconsin's forests are a major economic and recreational base.
Illustration by Mariana Leider



"Whereas, the plan clearly identifies future needs of wood fiber for sustaining the economic viability of the state's forest oriented industries, the Wisconsin State AFL-CIO indicates its recognition of the importance of this plan to assure the proper stewardship of Wisconsin's forest resources, and urges support at appropriate state levels to bring about its implementation."

State AFL-CIO Conservation Committee

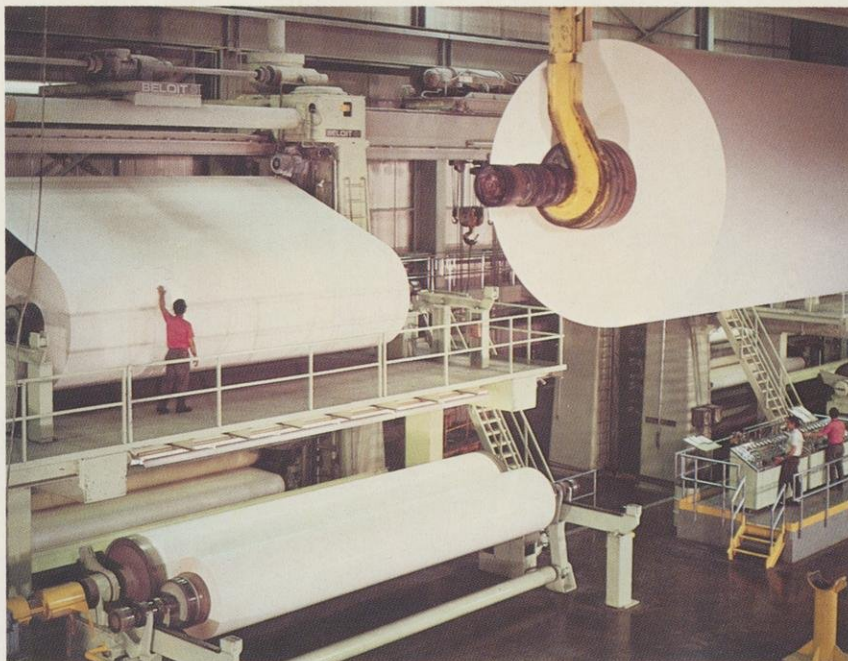


ies and visit other recreational facilities. Tourism is a \$3-billion business in Wisconsin and the state's woods and waters are the main attraction.

Some benefits are difficult to describe in financial terms. Forests provide wildlife habitat, protect soil, water and air quality, furnish berries, nuts and other wild foods, and in general are an essential ingredient in the state's visual attractiveness. Clean air, abundant and potable water and stable productive soils contribute mightily to the quality of human life. Studies show that forests remove air pollutants and release oxygen. They trap and hold runoff water so it can be filtered and purified in the soil and root systems and hold soil in place while fallen leaves and other tree parts enrich it with organic matter. Trees also help stop windblown soil erosion.

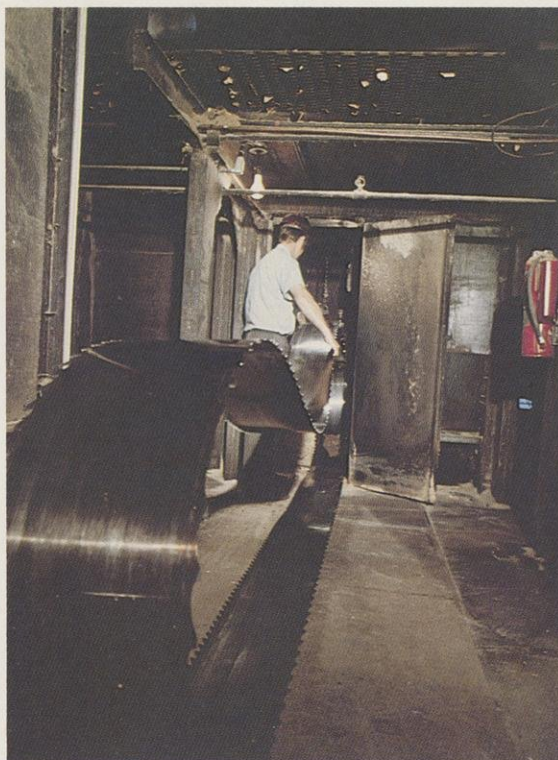
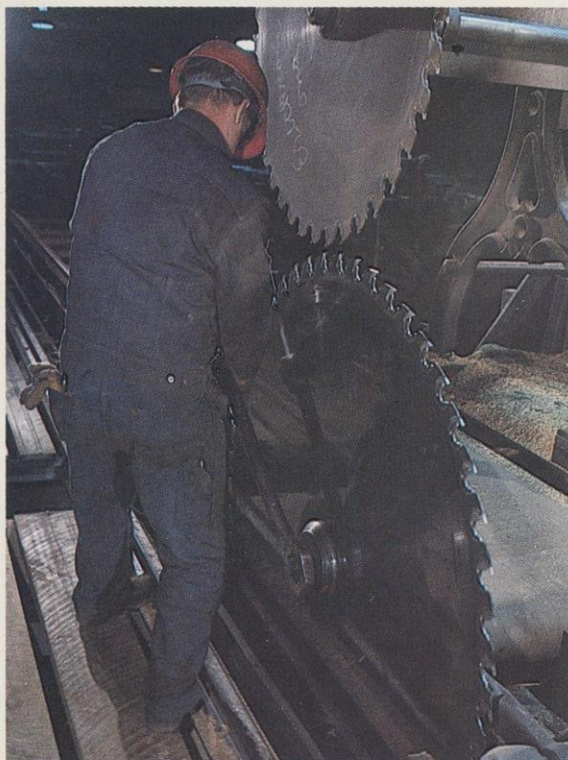
Economically, in the last 10 years as other sectors in Wisconsin's economy have shrunk or stagnated, the wood-using industry has grown. This growth is expected to be significant over the next 50 years as forest production increases and uses are found for underutilized timber.

Current forest productivity is largely supported by natural regeneration and by the historic investment in forest resources made prior to 1955. Many tree plantations have either reached maturity or are now of merchantable size and are being commercially thinned or harvested. If this capital resource is depleted and not replaced, shortages will appear. The future economic strength of wood-using and related industries depends on increased productivity. This requires new investment in the forests and careful management.



▲ The forest industry employs 75,000 people in Wisconsin, many in papermills. This figure could rise to 95,000 if forest productivity goes up. Photo courtesy of the International Paper Company

◀ Some benefits are difficult to describe in financial terms. Photo by Herb Lange, Rt. 1, Hazel Green 53811



Annual production of lumber in Wisconsin has hovered around 400-million board feet for the past 40 years. Sawyers have to be expert with both circular and band saws. UW-Extension-Forestry photos



The forest industry is one of the fastest growing industrial groups in Wisconsin. In one year it produces and ships products valued at more than \$6-billion.

Photo courtesy of International Paper Company

Forests, a social resource

The decisions about how everything from small farm woodlots to multi-thousand acre forests are used and managed are bound to have social impacts. They will directly touch employment, recreation, timber production, environmental quality, population distribution and land use. What the effects of these decisions will be are difficult to measure, but important. The 75,000 jobs now supported by Wisconsin's forest resource could easily increase to 95,000 by the year 2030 if progressive forest management measures are implemented. Creation of better markets for timber now in low demand could add even more jobs.

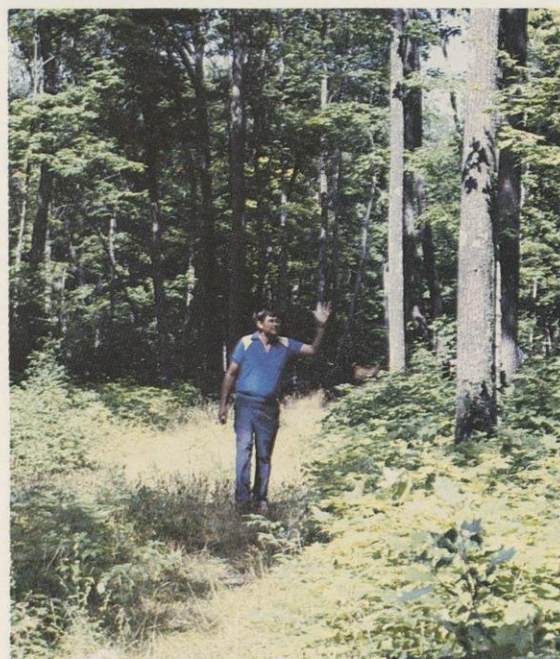
Outdoor recreation that refreshes and keeps us vigorous has obvious personal and social importance. Forests are its basic resource and management decisions must always allow for the myriad recreational activities people need.

Timber production is basic to housing and also contributes taxes. It affects distribution of a portion of the state's population which, in turn, influences such other social concerns as schools, wage structures, transportation systems, health facilities and a variety of service industries. Of about 450 major industrial sectors, timber production directly affects 70.

Expanding wood-using industries attract people and help slow migration to large urban centers and away from rural counties. Studies show that many prefer rural living if they can find jobs.

Those who like to live in forested areas and have built first or second homes there may cause problems. Their developments negatively affect forests by depleting the timber producing base and disrupting local social units. They result in changes in property tax structures, education, transportation, fire and police protection and health care facilities. For example, if homes and other buildings are in the path of forest fires, fire fighters are diverted from protecting timber to protecting houses. Forests rely on good land use policies. When individuals buy or sell land and change its use from farm to housing development, from woodland to agriculture, or from forest to intensive recreation, not only is the resource base reduced, the appearance of an area is radically altered. For those who love the forest's undisturbed natural appearance, this can be a serious loss.

The varied and complex place of forests in the social value structure remains through generations though its relative intensity changes. In the future, the value of forests for fiber production will likely dominate other values. Shortages of wood fiber prompted by population increases and a diminishing forest base will cause this to happen. The resource can no longer be taken for granted. Intensive and sophisticated management which recognizes sometimes conflicting values of forests must be applied now for the greatest long-term good to the public.



The construction industry is directly dependent on forests for raw materials. Lumber consumption amounts to about 200 board feet per person annually. This will rise to 250 board feet by the year 2000.

Photo courtesy of International Paper Company

Decisions regarding production of wood fiber must consider recreational amenities.

Photo by Denise Dvorscak

"The Wisconsin Christmas Tree Producers Association, Inc. wishes to go on record as supporting in principle the statewide provisions for forestry, the production of forest products and continuing comprehensive forest resource planning contained within the Strategic Plan..."

"In addition, the Wisconsin Christmas Tree Producers Association requests that a consideration for Christmas trees as a forest product and their importance to the economy of Wisconsin be included in the next generation plan."

VIRGINIA MOUNTFORD
Executive Secretary
Wisconsin Christmas
Tree Growers
Association

The timber resource

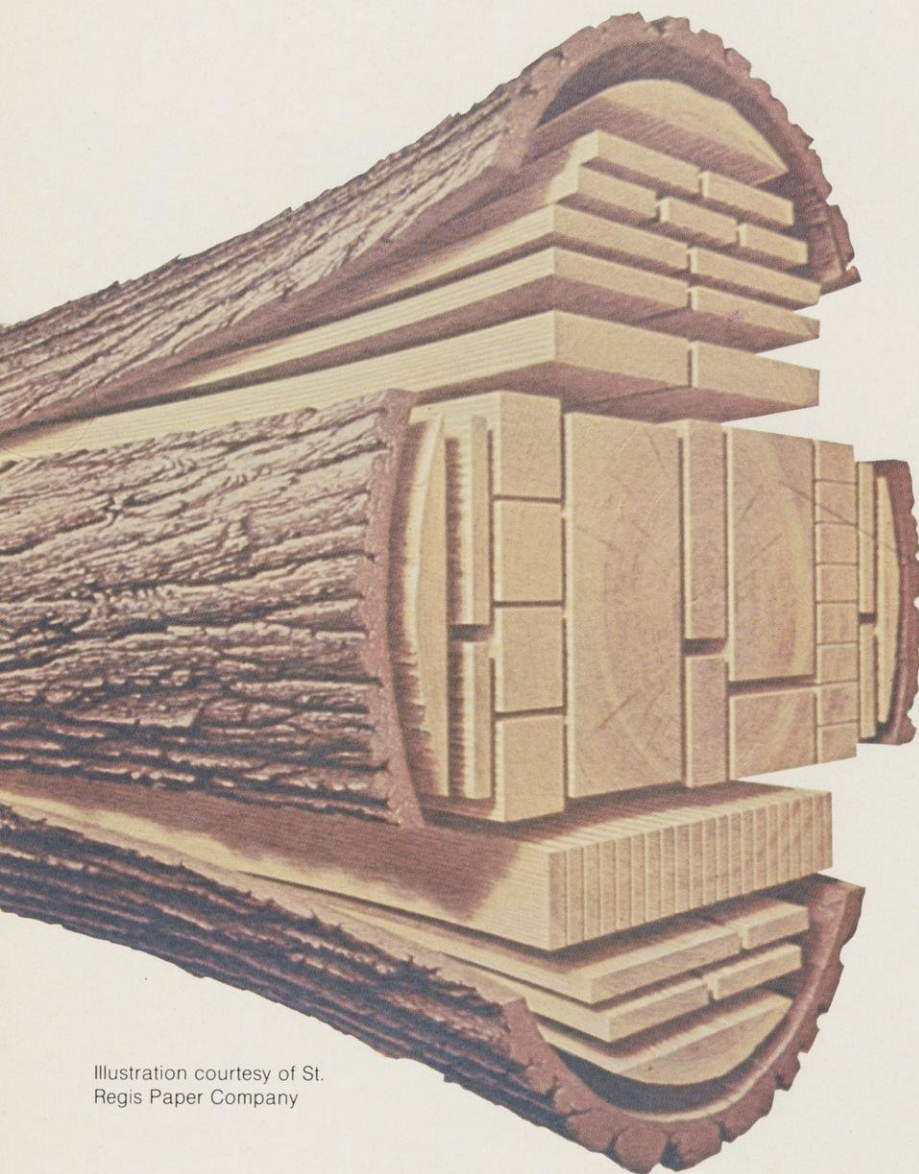


Illustration courtesy of St. Regis Paper Company

The goal of the timber resource program is to intensify management of all private and public commercial forest lands for optimum yield of wood fiber for industrial and domestic use.

Wood fiber: Where does it go?

Every year US consumption of forest products figures out to about 600 pounds of paper and 200 board feet of lumber per person. In addition, annual wood burning and other energy use in Wisconsin amounts to a third of a cord per person. As populations rise and living standards improve, paper consumption will increase about 2.4% per year. This means that in just 16 years, by the year 2000, paper consumption will be up 38% over 1984. Lumber use will grow more slowly but amount to about 250 board feet per person by the same date. Wood burning will go up at a somewhat slower rate.

Wisconsin not only consumes large quantities of wood products, it also produces large quantities. Forest industries comprise one-sixth of all Wisconsin manufacturing and are the largest manufacturing employers in a third of the counties. More paper is made here than in any other state in the country — more than 10% of the total US output.

A prime concern for Wisconsin's economy is to keep these industries healthy. Essential ingredient for their health is a reliable, continuing supply of raw material — wood fiber.

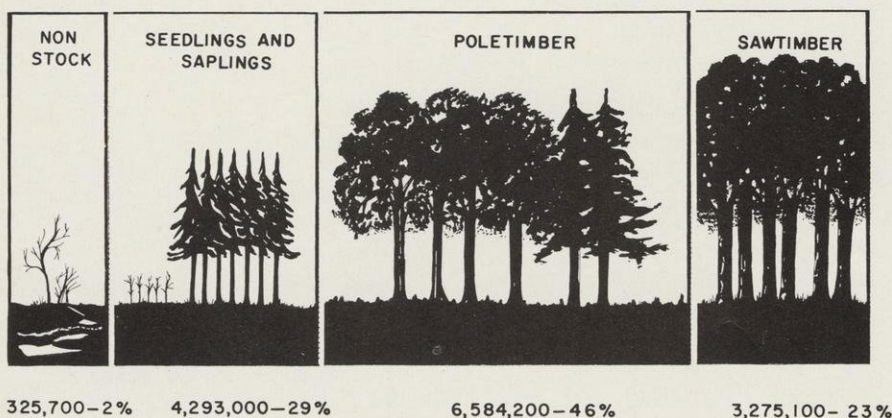
Papermaking

More than half the wood cut in Wisconsin each year goes to the paper industry but it's not enough. To produce 3½-million tons of paper and a million tons of paperboard annually, the industry has to import from other states and Canada. Wisconsin pulpwood supplies less than half the amount of total fiber needed. Recycled fiber is also a major raw material and furnishes about a quarter of state paper industry requirements. Wisconsin-grown pine fiber is in big demand but in critically short supply. High oil prices have dramatically pushed up transportation costs for imports in the last decade and there is strong competition for raw materials from other states. Shortages are developing among former pulpwood suppliers and there are even proposals by Canada to reduce exports. Thus, there is a certain urgency for increasing Wisconsin pulpwood production.

Lumber

Most lumber used in Wisconsin is imported and most is softwood. Sawlogs for lumber make up only about a sixth of Wisconsin's annual harvest and nearly all are hardwoods used for con-

COMMERCIAL FOREST ACREAGE BY SIZE CLASS



struction trim, furniture, flooring, railroad ties, pallets and similar specialties.

Today, amounts of both hardwood and softwood lumber on the stump in Wisconsin are increasing as forests mature and trees put on growth. Right now there is a stable market in hardwoods. However, demand for both hardwood and softwood lumber is expected to increase substantially in the next 50 years across the nation. In 10 to 20 years hardwood harvest in Wisconsin could easily outstrip annual growth. This is already happening to good quality oak in some places. As for softwoods, even if harvest increased significantly, paper industry demand is so strong it could outbid the sawmills. This makes the future of softwood sawtimber uncertain.

Fuelwood

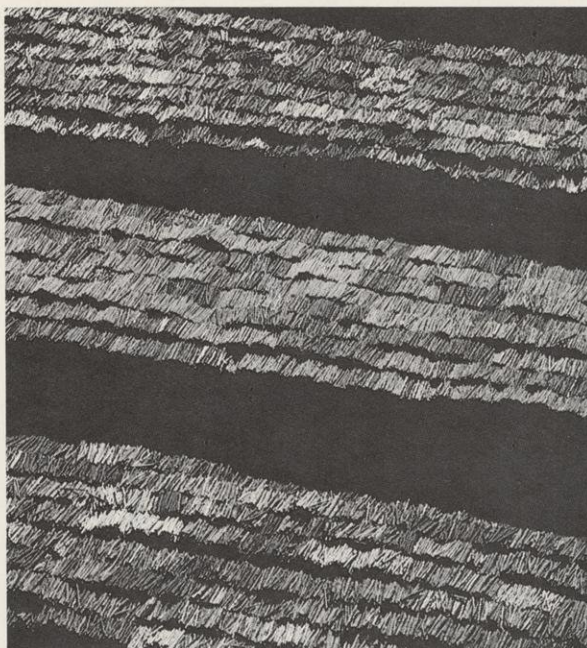
More and more wood furnaces and stoves are being used for home heat to counteract high natural gas and petroleum prices. Some industry is also turning to wood. Overall, this use more than tripled from 1976 to 1980.

Wood burning not only saves money, but if trees are cut properly can also improve forests. About 75% of Wisconsin's annual fuelwood production is of no use to lumber or papermills. It consists of thinnings, tops and dead or cull trees as well as those removed from urban areas. The present good market for fuelwood provides an economic incentive to sell and use the proceeds for forest management activities that may have been neglected because of costs. However, if prime sawlogs and pulpwood are cut for fuel with no attention to good forestry practices, damage could be substantial. In addition, there is some conflict over removing all low quality trees from the forest since many snags and den trees provide habitat for wildlife. A well-managed forest respects wildlife values.

Sawmill and other residue

Mill residues are the leftovers after lumber, veneer, paper and other primary wood products have been produced. They include cores of logs from which all veneer has been removed, rough bark, edges of sawlogs, sawdust and other byproducts. Largely ignored and discarded for many years, their use has increased thirty-fold in the last two decades.

Composition or particle board is made from residues and technological progress has also increased residue use by the paper industry, reducing dependence on pulpwood logs. Residues also supply energy for heat and electricity in many wood-using industries and some utilities. Nearly 50% of the 431,000 cords of hardwood and softwood residue used in Wisconsin in 1982 was imported. Almost all of this byproduct that once was dumped, is now used in one form or another.



This stockpile is part of the 2½-million cords of wood the Wisconsin paper industry uses to produce over 3½-million tons of paper annually.

Photo by Harald Sund, courtesy of the Consolidated Paper Company



Home heating with wood is on the rise in response to high costs of other fuel. This use has more than tripled in Wisconsin since 1976.

Photo by Dennis Chapman

About 75% of the state's fuelwood is of no use for lumber or papermaking. Good sawlogs and pulpwood should not be used for fuel, but if prices rise enough, there is danger they might be. Firewood consumption in Wisconsin amounts to about a third of a cord per person per year.

Photo by Dennis Chapman



MAJOR TIMBER TYPES

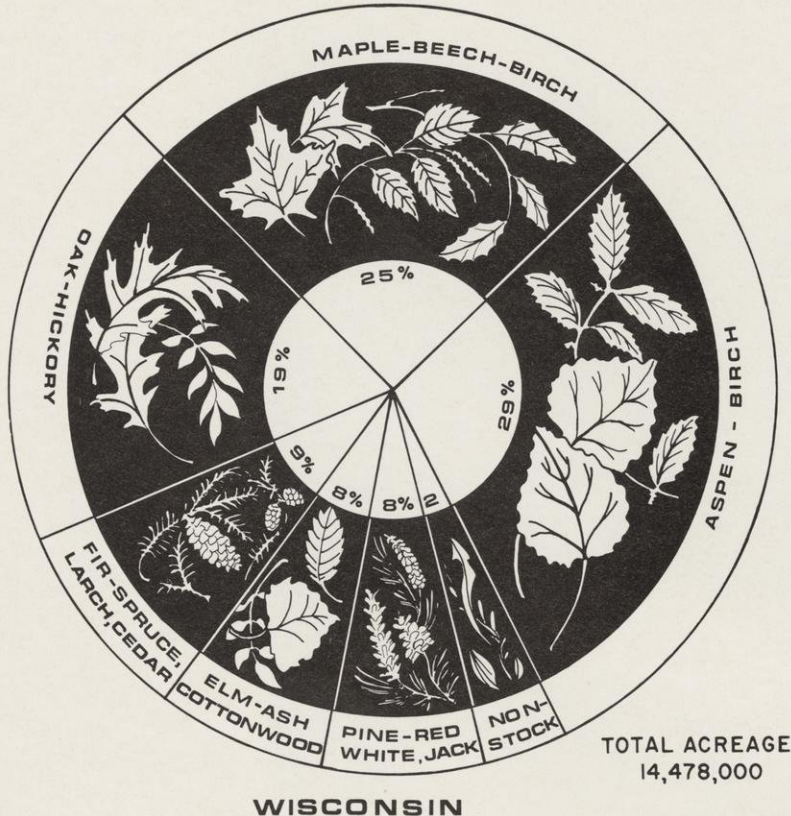


Illustration by Mariana Leider

The softwoods

Historically, softwoods dominated Wisconsin's forest industry. The 3-billion board feet of softwood lumber Wisconsin produced in 1899 was 10 times more than the total of both hardwood and softwood lumber produced in 1976.

The early fires that burned millions of acres in the cutover may have kept white pine from reproducing by destroying seed stock and killing seedlings. When the land regenerated, aspen, oak, northern hardwood and jack pine grew back.

Today, softwood makes up only 17%, or 2.5 million acres of Wisconsin's forest land. Species are primarily red, white and jack pine, plus fir, cedar and other species. This is only 30% of total growing stock and has resulted in a significant shortage of softwood for the paper industry. Almost 2-million acres of Wisconsin forest land has been identified as capable of increased softwood production through more intensive management. In many cases, particularly those where low-yield hardwood acres are converted to pine, the volume produced could more than double.

By managing for high productivity, Wisconsin could almost triple softwood production in 30 years.

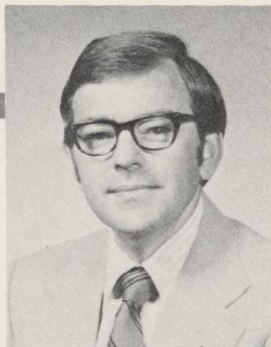
The hardwoods

Currently, hardwood supply is keeping pace with demand. At present management levels, hardwood production will increase about 4% a year until 1990, then decline. National timber consumption, however, is projected to triple in the next 50 years and recent heavy hardwood use for paper and fuel will not abate. Hardwoods for lumber will probably continue to meet demand but shortages are likely for other uses.

Aspen (classed as hardwood because trees drop their leaves in fall) represent a particularly difficult issue. Large tracts are now biologically mature. If not cut within 10 years or so these trees will begin to die and their fiber will be lost. An active aspen harvest program is now underway throughout Wisconsin in an effort to prevent this. It's also a fact that species of less commercial importance take over as an aspen stand declines. The only way aspen can be regenerated is to clear-cut. This can cause problems aesthetically. Many large stands need a clearcut now to preserve the species. If it's not done, Wisconsin stands to lose an important source of pulpwood for papermaking and a valuable habitat species for wildlife. Unfortunately, clearcutting leaves the land unattractive for two to three years and when done carelessly, can result in soil erosion. For these reasons, many oppose clearcutting even though it renews the species. A resolution of these conflicting values must be reached soon.

"Participating in the assessment and strategic planning exercise was enlightening from several perspectives, 1) it demonstrated the enormous amount of data that must be brought together when developing a comprehensive plan, 2) it served as a useful reminder to our scientists that planning processes must proceed even when existing data are not perfect and not all questions have been researched as fully as we might like, and 3) it provided an opportunity to be involved with government in action."

RONALD L. GIESE
Chairman
UW-Madison, Department of Forestry



What are the problems facing the forest resource?

Harvestability

Wisconsin has a critical softwood shortage for papermaking and a projected hardwood shortage. At the same time, research estimates that only about half of the state's net annual growth of wood fiber is harvested. Up to 80% could be taken with no harm to the resource. The cut lags behind its potential because growing stock varies in size, species composition and availability and because of the characteristics of industrial requirements.

Ownership

More than half the commercial forest land in the state is owned by an estimated 160,000 farmers and other private individuals. The average size of their woodlands is about 54 acres. These two facts form the core of the Wisconsin forest resource problem. Some of the barriers to high productivity on these lands are:

- Forest management requires an investment that takes 20 to 30 years or more to show a return.
- The average private forest tract changes hands every 10 years.
- Technical management assistance is sometimes difficult to obtain or expensive and may be of poor quality.
- Loggers are often not interested in small stands. Owners may also fear loggers will take unfair advantage of the owner's lack of knowledge about the business.
- Many owners value woodlands more highly for aesthetics and wildlife or other purposes than for timber production. An estimated 2.4-million acres of commercial forest will be withheld from timber production by the year 2030 because landowners will not choose to cut their trees.

Despite these handicaps, small private owners harvest about 55% of their forest's net annual growth.

Industry-owned forests come closest to realizing the land's full fiber potential. They harvest 75% of annual growth and contribute 16% to the state's annual production while owning only 8% of the resource. Productivity on the Nicolet and Chequamegon National Forests is also good. The two contribute 9% to the state harvest, about the same as the amount of forest land they control. But other public forests, primarily state and county-owned, contribute only 14% despite owning 23% of the commercial forest. Possible reasons for this are a shortage of technical assis-

AREA OF COMMERCIAL FOREST LAND
BY OWNERSHIP

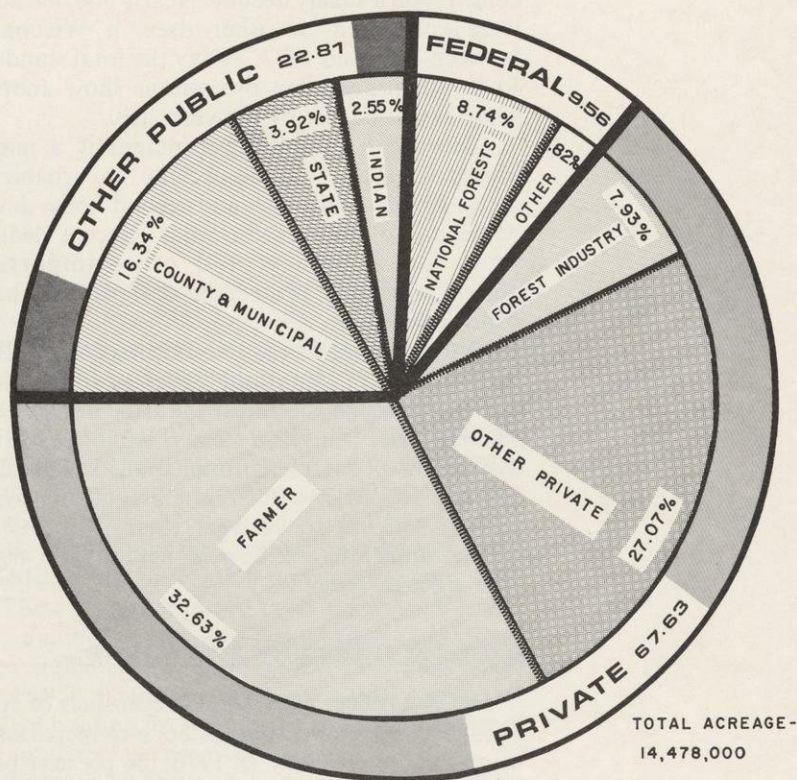


Illustration by Mariana Leider

The 1980 assessment and 1983 Strategic Plan are an excellent beginning for charting our ever changing forest resources. I am very excited about the recent acceptance of the Strategic Plan by the DNR Board. Many identified needs for our future forests can now be addressed.

RALPH G. SWANSON
Timberlands Manager
Consolidated Papers, Inc.



tance and a resource that, by-and-large, was of lesser quality than other ownerships when put under management. Productivity is increasing as the effects of management are realized.

Shrinking forest land

The amount of commercial forest land in Wisconsin is on a steady decline. Nearly 900,000 acres were converted to other uses in Wisconsin between 1956 and 1977. Today the total stands at 14.5-million acres but projections show another 400,000 will be lost by the year 2030.

Clearing land for development is a major source of forest loss, especially in urbanizing areas. Roads, recreation and second home development also claim forest lands. Recent dedications for wilderness and other important preservation and protection designations have added to the loss.

Conflicting land uses and the philosophies that guide them are important issues in forestry, as elsewhere. While the forest industry argues convincingly that it needs a steady, reliable, productive resource base, environmentalists will fight strongly to preserve their interests, and private owners seeking to convert their property to higher, more valuable or personal uses will argue their right to do so.

Growth, mortality and waste

Just as farmers work for more bushels of corn or soybeans per acre, so foresters seek increases in wood fiber production. In 1976, the per acre production averaged only 38 cubic feet (about $\frac{1}{2}$ a cord). The figures for more than half of Wisconsin's commercial forests range from 20 to 50 cubic feet. Some of these lands have fewer preferred trees than could actually grow there (poor stock-

ing). Others have soil and water conditions which could produce larger yields but contain only inferior hardwood species. Foresters think proper harvest techniques, tree planting and improvement of existing stands could nearly double the average production per acre. Ownership and intensity of management also make a difference. In the national forests, for example, only 12% of the commercial timberland grows less than 50 cubic feet per acre per year. National forest figures testify to the importance of investing in management measures which enhance growth and productivity.

Net annual growth is not only affected by low tree vigor and poor stocking but by a number of factors collectively described as "mortality." Estimated mortality in 1976 from weather was 60%, insects and disease 39% and fire 1%. Root rot, Dutch elm disease, aspen hypoxylon canker and oak wilt are the most destructive diseases in hardwoods. Windstorms and ice are the most destructive weather factors. Insect damage is widespread among all species. Some mortality is salvaged, but most is lost to decay because it is so scattered that salvage becomes impractical. The big increase in woodburning is improving salvage of these trees. Mortality losses were about 13% of the net annual growth in 1976. This is a whopping 71.5-million cubic feet, equivalent to about a million cords.

Another 15 to 50% of the timber resource may be wasted during logging. Losses vary widely among the species cut, products removed, size of timber and other factors. In the past, tops and branches were often left to rot. Today, new utilization techniques bring in "chippers" to grind up branches and tops for use by industry. More also goes for fuelwood. Meantime, research is underway to reduce logging waste and cut these significant losses.

Maple seedlings in a woodland tax area.
Photo by Don Blegen



Summary

Demand for wood fiber is expected to double in the next 50 years. Population increases and a rising standard of living will require more lumber for housing and more paper products for dozens of new uses. Wood for heat and electricity will be cost effective in more places. As research creates new products, some future uses of wood may seem like today's science fiction incarnate. Wisconsin's forests have recovered quite well from the devastation of the white pine logging boom, repeated fires, misguided agricultural development and Depression bust. Fire protection, insect and disease research, extensive public works in reforestation, forest management, roadbuilding, industrial forestry programs and government subsidies all helped.

But it remains true that Wisconsin species often occupy the wrong sites. Many stands have been abused. And many more need planting, thinning, release, regeneration and other cultural work.

How can Wisconsin's forests meet the challenge of the future?

The Strategic Plan for Wisconsin Forests 1983 focuses on increasing productivity and makes over 30 recommendations to do it. A modestly accelerated program and better overall management could raise production to more than a billion cubic feet of wood per year. Each recommendation describes a goal and what is necessary to meet it. While the plan emphasizes intensive timber management, it recognizes that forests have other uses as well — outdoor recreation, fish and wildlife propagation, protection of water resources, wilderness preservation and mineral extraction.

Since public agencies control less than one-third of the state's commercial forest (about 4.7-million acres) most decisions regarding the plan will be made by private individuals and industries who own the remainder. The plan is merely a guide to decision makers in control of the forest.

Twelve recommendations apply directly to the timber resource. They deal with tree planting, intensive hardwood and softwood management practices, utilization in logging, silvicultural techniques, fuel wood and program financing.

Conversion and Reforestation

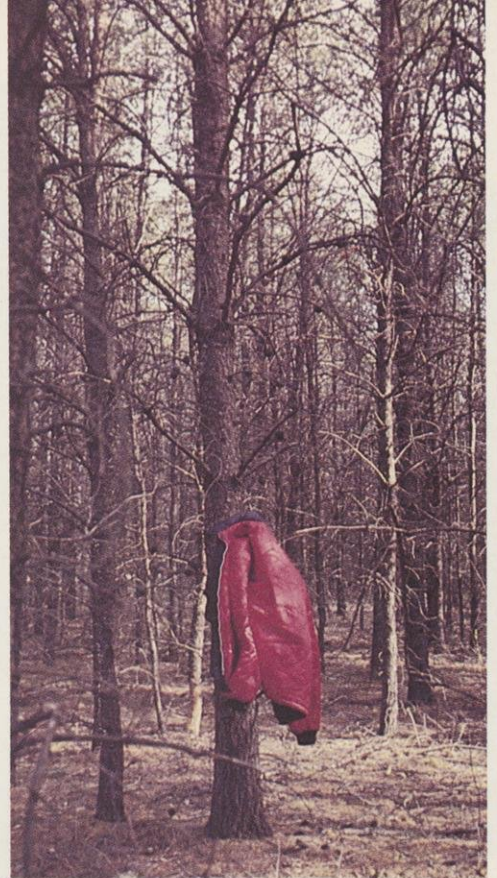
Over 800,000 acres could be reforested or converted to conifers in the next 45 years. This could add 70-million cubic feet (about 50%) to the softwood yield each year. Many acres now growing aspen and birch, or oak-hickory types are better suited to pine which is a very productive species. Some low-quality jack pine acreage could be converted to higher-yielding red pine. These lands may once have been part of the virgin pinery which was logged or burned off and failed to regenerate.

The Strategic Plan is the best available compilation of forestry related statistics available. It will serve a useful purpose in continuing land management planning for the Forest Service and all other ownerships.

John Wolter
Supervisor
Chequamegon National Forest



Many stands of pine like this need thinning and pruning. With management for highest productivity, Wisconsin could nearly double softwood production in the next 30 years.
UW-Extension-Forestry photo

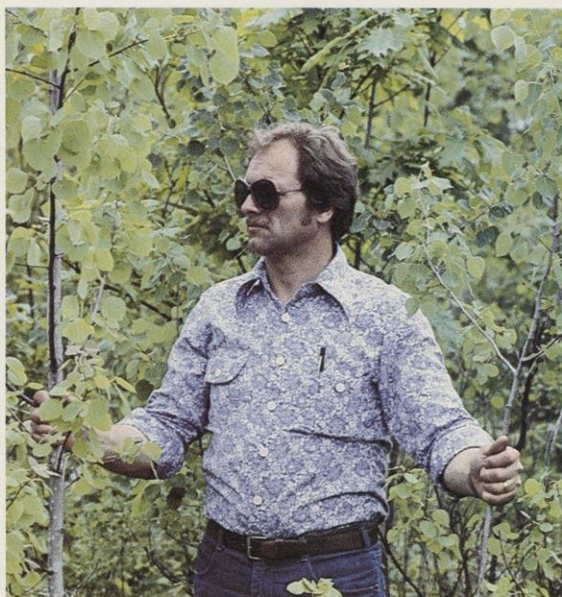


Center Photo: This low-yield aspen stand has been converted to pine for greater productivity. The Strategic Plan recommends the conversion of 570,000 acres during the next 50 years.
DNR photo

Lower Photo: Currently the Wisconsin paper industry imports 80% of its softwood needs. Reforestation, conversion and intensive management could reduce this to about 50% by the year 2030.
UW-Extension-Forestry photo

Profuse aspen regeneration after a clearcut. Although clearcuts could boost productivity on thousands of acres, aesthetic objections often prevent it.

Photo by Dennis Chapman

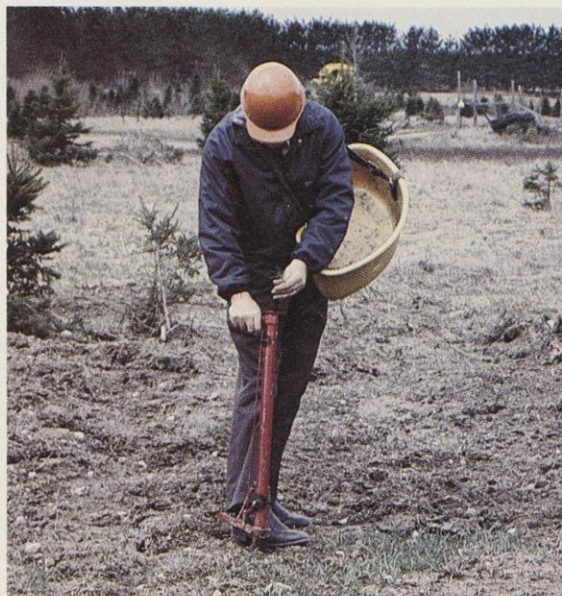


Plantations like this that are properly pruned and thinned are highly productive. Currently there are 537,000 acres of conifer plantations in Wisconsin but many need work.

Photo by Dennis Chapman

A "dibble" is used to set out "tublings" — seedlings sprouted in a plastic container and slid down the hollow tube of the dibble for planting.

Photo by Denise Dvorscak



Softwood is in high demand by the paper industry, which imports 80% of its needs. The plan projects that reforestation, conversion and intensive management of softwoods could cut imports to 50% or less by 2030.

Manage commercial forests intensively.

Many sites were enthusiastically planted with pine a generation or more ago. Now 20 to 30 years old, these trees are crowding each other, competing for sunlight, water and soil nutrients. Thinning them and cutting competing brush and trees could add an additional 2% a year (4-million cubic feet) to the softwood yield. In some cases, sale of wood products from the thinning or release could pay all or most of the cost.

Aspen and birch now grow on more than 1.3-million acres of the land recommended for accelerated management in the plan. Within the next 20 years these stands, many mature or over-mature, should be harvested, boosting annual production of hardwoods by 12.5-million cubic feet. Some sites with higher quality soil and site characteristics are better suited to pine and spruce and can be converted to these species. Other highly productive aspen-birch stands will continue to be managed for that purpose. This hardwood type is very valuable to the paper industry and to wildlife and a special effort should be made to maintain it.

Northern hardwood and oak-hickory forests could be significantly more productive if weak or crowded trees were thinned, just like a gardener thins carrots. If the almost 2-million acres which currently need it are thinned in the next 20 years, net annual growth could increase by 48-million cubic feet.

The plan targets just over 4-million acres of commercial forest land for accelerated management. Sixty-five percent of this amount is controlled by the private, nonindustrial woodland owner. Ownerships which have invested in management in the past, like the national forests, have a smaller part to play in this program than those which have not.

Increase annual harvest and reduce losses.

Currently, of the net annual growth of wood fiber, only a third of the softwood and half of the hardwood is harvested each year. Research indicates that 80%, or more could be harvested without harm to the resource.

Harvests are low in many cases on public lands because timbered tracts are small, scattered and inaccessible. An improved network of forest roads is recommended to allow a harvest increase to the full potential by the year 2010. Inadequate budgets and administrative directions are also deterrents to timber harvesting at recommended levels.

Reducing losses from logging and mortality from insects, disease, fire and windstorms could

boost production by 49-million cubic feet annually. To do it would require changed logging practices and increased use of pesticides and other disease control techniques.

And more research is needed to improve wood fiber utilization in the forest and at the mill.

Use good forestry practices

Many years of research have produced tree growing (silvicultural) guidelines that increase yields at low cost. Several, such as thinning, release, harvest and regeneration cuts have already been described. Many are similar to those used in farming like site preparation and weed control with herbicides. The plan recommends that silvicultural guidelines be described in easily readable form. Acceptance and use of EPA-recommended and approved herbicides, often applied only once during the life of a stand can significantly increase success of planting and other forest practices. Fire is another somewhat controversial forestry tool which can be an inexpensive and effective way to improve and regenerate timber stands on some sites. Forestry specialists need to educate owners about good practices, assist them with technical information, and encourage acceptance and use of good "tree farming" techniques.

Direct wood resources to their best use

The tremendous growth in wood use for home and commercial heating has sent many new people out to cut trees. While any wood can burn, not every tree can be used for pulpwood or furniture. If people select wood for fuel carefully, they can actually improve timber stands and reduce forest residues. But some dead trees and residue should be left for wildlife cover. And high quality hard and softwoods should be earmarked for lumber, paper and other specialty markets. In the future, there will be increased competition between industrial and other wood users for the forest's growing stock. All of it should be put to the best use.

Provide financial incentives and support for timber improvement.

The recommended program of intensive management and tree planting will cost nearly \$2.6-million per year. This will require a long-term investment by all forest owners. It has the potential of producing an additional 121-million cubic feet of wood a year.

While Wisconsin was a leader in creating tax incentives through property tax deferral for privately owned forest lands (Forest Crop and Woodland Tax Laws), only about 16% of those eligible are enrolled in these programs. New kinds of financial incentives for landowners are needed to spur the necessary investment.

Dollars are also needed to improve productivity on public lands.



A tree planting machine at work on the Lincoln County forest. About one-fourth of Wisconsin's county forest land needs this or some other kind of management improvement. DNR Photo



This powerful wild land tree planter is a special machine for rough ground. Tools like it can help achieve the Strategic Plan goals. Photo by Dennis Chapman



A spud is a practical tree planting tool for small jobs. Photo by Dennis Chapman



A large amount of sawmill and papermaking residues are burned in boilers for heat and electricity.
Photo courtesy of International Paper Company

Privately owned forests — an untapped vein

Wisconsin's forest trees are a golden resource and private woodland owners hold title to the mine. There are more than 160,000 of these owners who control nine-million acres of forested land. Privately owned commercial forests are the greatest hope for improving Wisconsin's future wood fiber production. But half of the annual growth in private forests goes unharvested each year. Most of this land is not intensively managed for timber.

With the paper industry importing up to 60% of its raw material, why is so much mature timber still standing in the forests? Are private owners misers hoarding a leafy green treasure? Or are they trustees husbanding resources for future generations?

The answers are gleaned from a complex web of economics, history and conflicting values.

One goal of forestry is to improve the quality and quantity of wood fiber production on private lands to meet society's current and future demands.

Not only do private non-industrial owners hold most of the commercial forest land in the state, the land they hold has the greatest potential for increased production. This is because most of the sites have soils well suited to growing trees and many of the species already there respond well to intensive management.

Why wood isn't going to market?

Most commercial forest tracts are owned by small private landowners, largely farmers, and average about 50 acres each. In some counties up to a third of the forest land is held by absentee owners for recreation, future second home sites, investment, sentiment or a variety of other reasons. About 40% of all private owners withhold their timber from harvest and sale. Economics, markets and social values all affect what happens to this timber.

Prices can vary dramatically depending on a variety of factors. For example, in 1982 jack pine stumpage sold for anywhere from \$8 to \$23 a cord. Sometimes landowners who don't manage their forests intensively get low returns and because of this feel its not worth the effort.

Undeveloped markets are also a barrier. Decades ago farmers piled their corn or wheat into the wagon and drove to the nearest town or grain elevator to sell for whatever price they could get. With luck, prices would be good and they could pay their debts and buy seed for next year. If not, they took what they could get because they didn't have much choice. Modern communications and sophisticated national commodity markets have allowed the farmer to auction his crop



Wisconsin's 160,000 private nonindustrial forest owners hold title to 9-million acres of woods. Increasing their productivity is an essential element of the Strategic Plan.

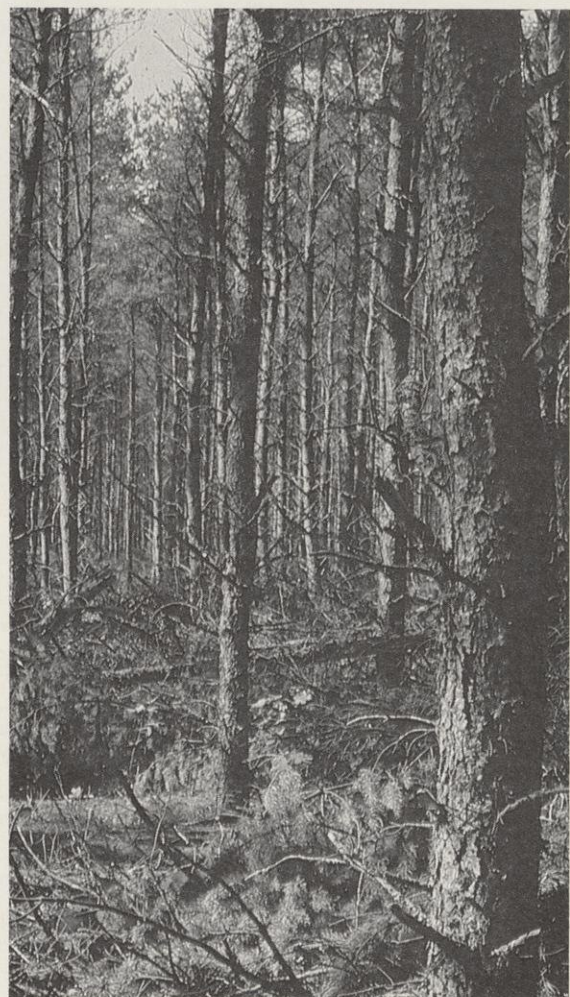
Photo by Dennis Chapman

This "feller-buncher" harvests and loads whole trees. A logger won't bring a machine like this into a small woodlot for only a few cords.

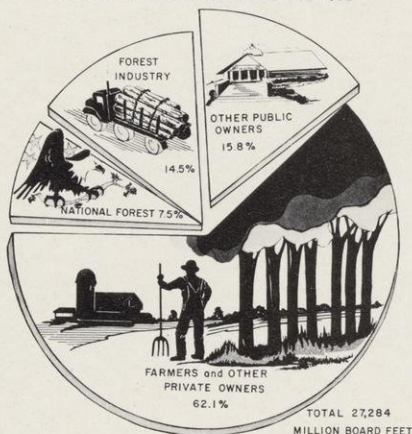
Photo by Bob Wallen

Inset: The business end clips off trees at ground level with minimum waste.

Photo by Bob Wallen



OWNERSHIP DISTRIBUTION of SAWTIMBER in WISCONSIN



Right Photo: A pruned and thinned plantation brings in many more dollars than one that has been neglected.
DNR photo

to the highest of thousands of bidders. But because loggers are seldom interested in cutting a small stand, a private owner who is not careful can sometimes, like the farmer, get stuck in a horse and buggy era buyer-controlled market.

Information on average stumpage prices is distributed both by the UW Extension Service and DNR. For a fee, private consulting foresters will act as brokers, find a buyer and establish and manage the sale. DNR foresters can advise on the way timber should be managed and cut, on recent average stumpage prices and on general conditions of sale. Despite the availability of these services, many private forest owners sell their timber without professional assistance or a written contract. In many cases they come out second-best.

Given market barriers and bad experiences, it's no wonder some private owners are reluctant.

Many people own woodlands because they're pretty. It's restful to walk among the trees and listen to the birds. These people find eternal verities in forests and often scorn those who see trees as board feet of planks, pulpwood and fuel on the stump.

While such owners may keep their land for wildlife habitat, recreation or other personal reasons, they are often unaware their objectives can be enhanced by good timber management and harvest practices.

Even if not opposed to cutting, owners may worry about what will happen to the soils, plants and wildlife of their woodland during and after harvest.

Foresters recognize that many people value woodlands for other reasons than timber production. Foresters respect this but argue that good management also recognizes the value of wildlife and plants, that proper harvest techniques most often have a small and temporary effect, and that a well-managed site can be both beautiful and productive. They feel that land managers have a responsibility to protect Wisconsin's natural resources and use them wisely.

The Strategic Plan for Wisconsin's Forests recognizes that a third or more of private owners will not harvest because they hold land for other purposes. The plan excludes a portion of their acres from projections of potential wood production, recognizing that lands change hands and that eventually a percentage of new owners will favor harvest. For owners who want to harvest and market their timber, the plan recommends prices which bring a profit over the cost of growing the product. The market itself may provide this financial incentive. Stumpage rates paid to landowners are going up. Fuelwood demand and high transportation rates for imports have increased competition for local wood fiber.

Producers could benefit by borrowing some of agriculture's market stabilizing methods. They should use professional help to place a value on their product, use it to establish logging conditions and to write contracts which protect their interests.

Owners of small lots of merchantable but low quality timber are sometimes at a definite disad-



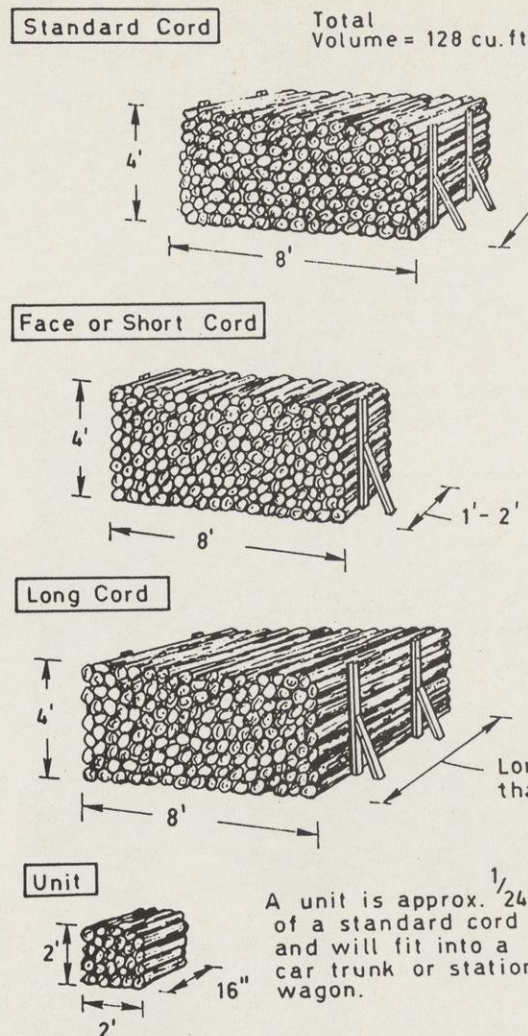
Thousands of acres of privately-owned plantations in Wisconsin need pruning to increase quality.
Photos by Denise Dvorscak



The small woodland owners of Wisconsin needed the research and conclusions coming out of the 1983 Strategic Plan to help them with their problems.

Frederic Braun
Private non-industrial forest owner





One cubic foot equals six board feet.
One cord of pulpwood equals 79 cubic feet of solid wood.

vantage. The value of their wood is often so low that loggers can't realize a profit and it doesn't pay the owner to invest much time or money either. Organizations like the Wisconsin Woodland Owners Association could help these owners with market and harvest information. They might also create marketing organizations modeled after agricultural co-ops.

Many private forest owners do not manage their land for timber production because they lack the information and skills. Measuring volume, evaluating timber quality and stumpage, marking trees for thinning, analyzing and controlling pest damage and many other forestry jobs are special skills. Most owners don't have them and must rely on experts. DNR foresters can give early technical assistance free but there is a long wait-in-line because requests are heavy and there are few foresters. Private consulting foresters are quicker and can do more, but charge fees for their professional service. Except in cases that involve the sale of timber, the cost of consultant services cannot be immediately met. Often these costs must be borne for several years until returns are realized.

The cost of technical assistance is just one of several financial barriers. Forest development investments are extremely long term and not very liquid. There is a chance that because of wide swings in market prices, past investments may not pay off at harvest. Unlike farm crops which can be covered by federal crop insurance, there is no long-term protection for forest crop investments.

And taxes on forest lands are often high. They have increased rapidly over the last 30 years, especially near cities or recreation areas where development potential or recreational value is great. The taxation problem has been addressed by the Forest Crop Law and the Woodland Tax Law, but fewer than one-tenth of private woodland owners participate in these tax deferral programs.

The plan proposes that both the state and federal government aid private forest owners to ensure an adequate future supply of wood fiber. Commodity price supports and timber crop insurance would help. So would more money for direct subsidy and incentive programs like the Forest Improvement Program (FIP) and the Agricultural Conservation Program (ACP). Nearly 1.9-million acres of privately-owned forest land are recommended for intensified management during the next 45 years, most of it by 1994. While opponents might argue there is no guarantee public investment in private timber would actually result in wood fiber harvest, safeguards can be developed.

Owners need to learn more about how taxes can be deferred under Forest Crop and Woodland Tax laws. They need better access to DNR foresters who administer these programs. Landowner fears about long term commitment and other requirements of the law need to be addressed. The tax situation can also be improved by changing the way forest lands are assessed. Currently they are given full market value annually even though



Upper Photo: The Strategic Plan proposes training for forest landowners and others in logging and woodwork techniques.
Photo by Denise Dvorscak

Lower Photo: Marketing cooperatives could help small private woodland owners with transportation.
DNR photo

Help for the private forest owner.

Technicians, associations, tax laws, lending agencies, even industrial experts are available to help the private owner of forest land. Here is a partial list:

Wisconsin Woodland Owners Association

Box 188
Madison, Wisconsin, 53701

An organization of small woodland owners which seeks to improve conditions related to managing, harvesting and marketing on private woodlands. Informational meetings and quarterly newsletter.

Wisconsin Tree Farm Committee

Box 250
Madison, Wisconsin, 53701

Advice and assistance from industry foresters for private forest owners wanting to protect and manage their forest resources.

Private Forestry Consultants

Various locations

Thirty to thirty-five professional forestry firms offer services, on a fee basis, such as surveying, appraisals, timber sale administration, general management planning, litigation, expert testimony and Christmas tree management. The scope of their services is much broader than that provided by DNR foresters.

DNR Foresters

DNR area and sub-area offices

Provide "on-the-ground" technical services for landowners interested in establishing new forests or improving existing ones. First contact for most pub-

lic financial assistance programs for forest land improvement and for entries under the Forest Tax Laws.

Soil Conservation Service

County SCS Office
(usually in the courthouse)

County Conservationists provide technical assistance to forest landowners primarily for soil conservation and watershed protection. Some cost-sharing is available for forest improvement.

Cost-sharing programs

Contact DNR forester

Forestry Incentive Program (FIP) and Agricultural Conservation Program (ACP) are funded by the US Forest Service and the Agricultural Stabilization and

Conservation Service respectively. They provide payments which cover a portion of the costs for timber production, improvement and tree planting.

Forest Tax programs

Contact DNR forester

The Forest Crop Law "encourages a policy of protecting from destructive or premature cutting the forest growth in this state." Under 25 or 50 year agreements private owners of large parcels of forest land (at least an "entire description or government lot") carry out prescribed management practices in return for property taxes of 74¢ per acre plus a severance tax when the timber is sold. These lands must remain open to public hunting and fishing. The Woodland Tax Law follows the same basic arrangement for woodlands 10

acres or more in size (but less than an entire description). Contracts are for 15 years; the owner must have a timber management plan; taxes are \$1.49 per acre; there is no severance tax and the owner may prohibit public access.

Loans

Contact a local bank or rural farm credit association

Loans for developing forest-related enterprises are available from the Farmer's Home Administration and other lending institutions.

The Forest Crop Law

Wisconsin's Forest Crop Law was enacted in 1927 to encourage landowners to grow timber as a continuing crop. The regular taxation system which taxed land and timber annually encouraged premature cutting and discouraged long term investment in forestry. The Forest Crop Law places a fixed annual per acre tax on the land, but the value of the timber is taxed only once when it is harvested. In effect this defers taxes on the timber crop until there is income to the owner. Currently there are over 1.3-million acres in 67 counties enrolled in the program.

no timber is actually ready for harvest. The land may also be assessed for other, usually higher values, such as recreation or second home development, which is unfair to the timber grower. One approach is to tax only the land value and the increased value due to growth rather than the full timber value each year.

Nearly every existing program of assistance to private forest owners relies on the DNR service forester to implement it. Demand has increased so dramatically that one in five requests goes unfilled during the year of request. Quality of assistance is threatened as foresters stretch services to meet demand.

A much larger professional forestry staff, either public or consulting, will be needed to help private forest owners increase timber production to the recommended level. The forest owner, like

the farmer and small business operator, needs information about management, including harvest and marketing. The plan identifies how such information can be obtained.

Summary

Privately owned land is the greatest forest resource in the state. Its potential for improved production and harvest is high. But financial incentives are weak and market systems need improvement. Technical assistance is difficult to get or costly. And private owners do not have the information or desire to manage their land intensively for timber production. If Wisconsin is to meet its timber needs in the next 20 years, the government, the market and private owners must cooperate to make managing and harvesting private forest land more profitable and desirable.

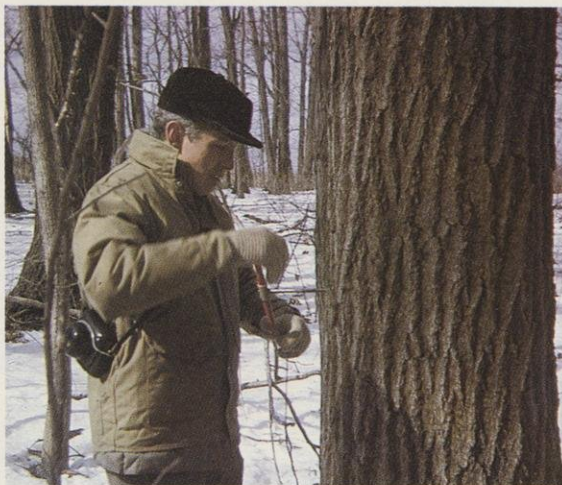


Hand work on small woodlots can be profitable.
Photo by Dennis Chapman



Equipment like this Prentice hydraulic loader on a job requires substantial volume, something small woodlot owners often don't have.
UW Extension-Forestry photo

Thousands of small private woodlands in Wisconsin need help with this kind of intensive forest management work.

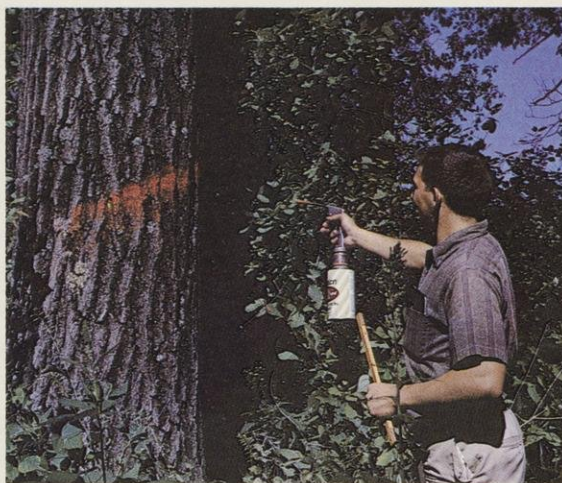


An increment borer measures rate of growth and age.



A Biltmore stick can measure diameter and tree height to give foresters an idea of volume.

Photo by Jerry Lapidakis



A paint sprayer marks a tree for harvest.
DNR photo

"We recognize the substantial role the private forest landowner will play in the implementation of this plan, especially in regard to reforestation, timber stand improvement and information and education activities.

"It is the intent of our organization to implement the plan in all ways possible, fully recognizing the social and economic opportunities it presents for the state and nation."

DAVID JOHNSON

Secretary

Wisconsin Woodland Owners Association

Industrial forests — efficient producers

Unlike some western and southern states where industry owns millions of acres, here in Wisconsin industry owns only about 8% of the commercial forest. These acres work hard — 16% of the state's annual wood harvest comes from them and they support 12% of the growing stock.

In contrast to the "cut and run" timber barons of the last century, modern forest industry leads in sustained yield management. Records also show high productivity. Industry comes closest of any ownership group to harvesting its net annual growth each year — the amount that can be cut without damaging the forest. Most industrial landowners invest heavily in forest improvement, reforestation and management. Larger industries conduct their own forest inventory and research, battle insect outbreaks, and help with fire control. About two-thirds of industry-owned land is enrolled in the Forest Crop Law.

More than a million industry acres are open to public recreation. While the Forest Crop Law requires that enrolled lands be open to public hunting and fishing, some companies have gone beyond this mandate to build boat landings, hiking and nature trails.

Wisconsin's forest industry contributes time, money and energy to committees, councils and associations. Their representatives are members of DNR advisory councils, helping to improve forest management and protection. Industry foresters often give free technical help to private forest owners.

The Strategic Plan targets 34,000 acres of industry forest land for reforestation and conversion. A portion of the aspen, softwood and hardwood types they own will require regeneration cuts and thinning. They have already recognized the need for intensified management and are well ahead of the plan's timetable.



Jackpine



Red Oak



White Pine



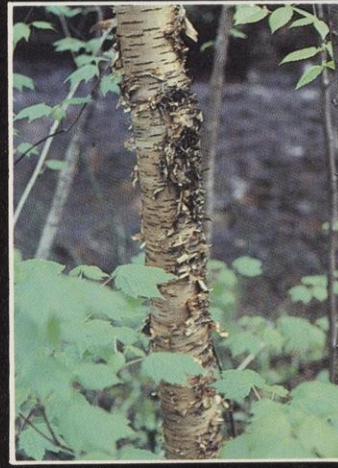
Sugar Maple



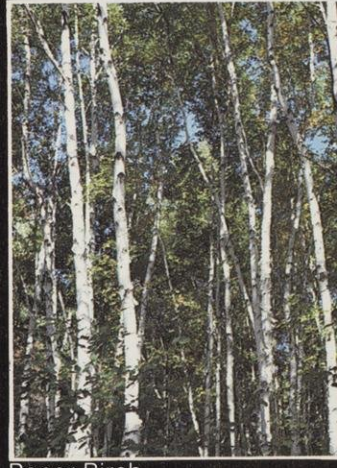
Balsam Fir



American Elm



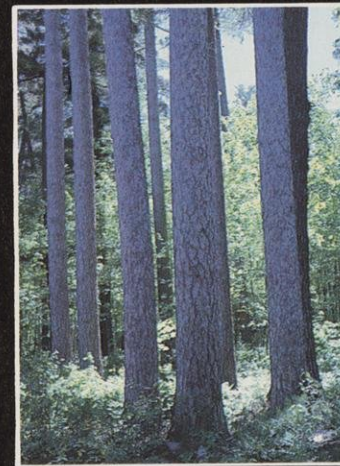
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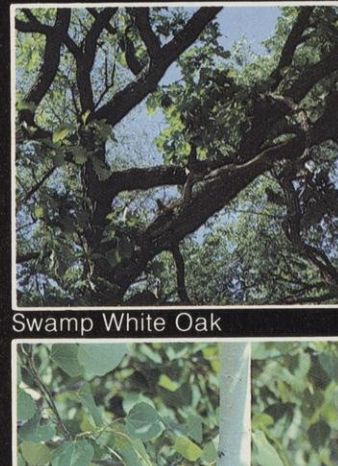
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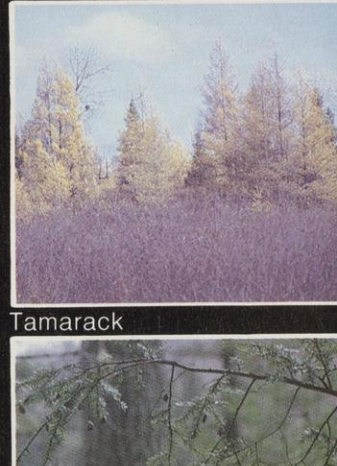
Bigtooth Aspen



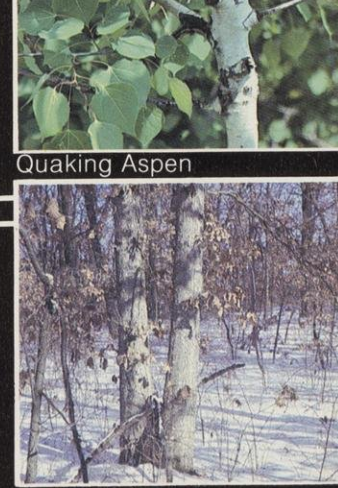
Red Pine



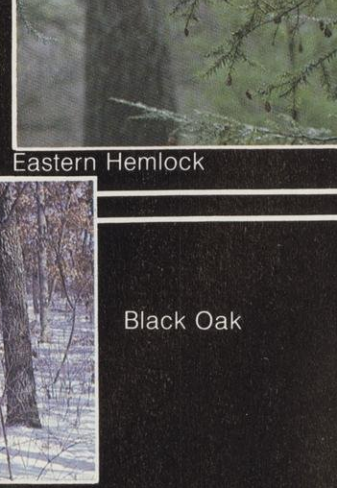
Swamp White Oak



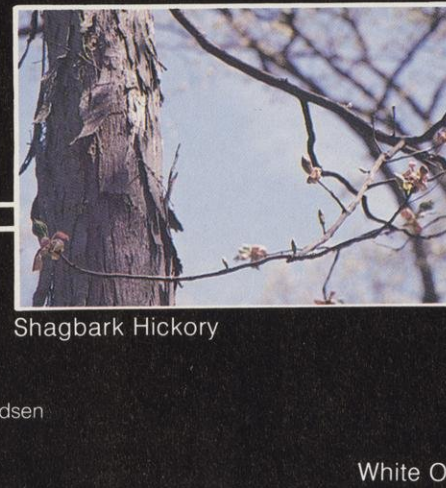
Tamarack



Quaking Aspen



Eastern Hemlock



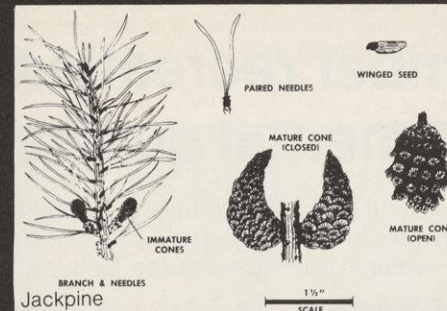
Shagbark Hickory

Photos by:
Virginia Kline, UW-Botany
Red pine photo:
DNR photo (Reese)
Illustrations: George J. Knudsen

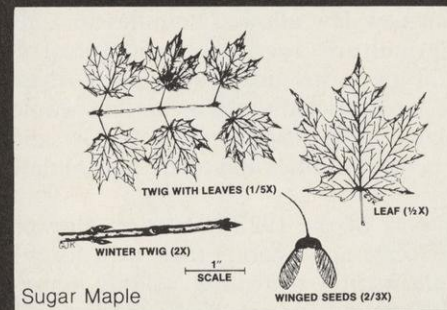
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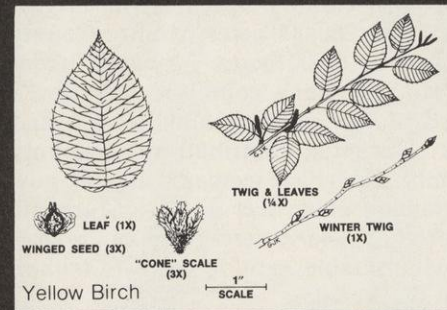
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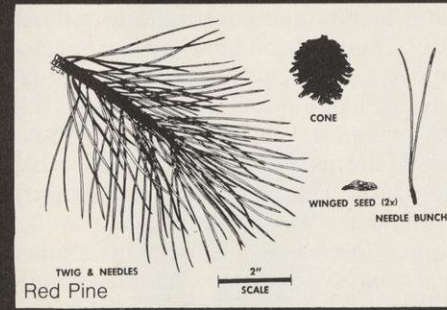
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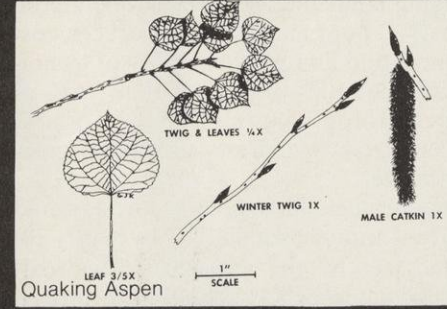
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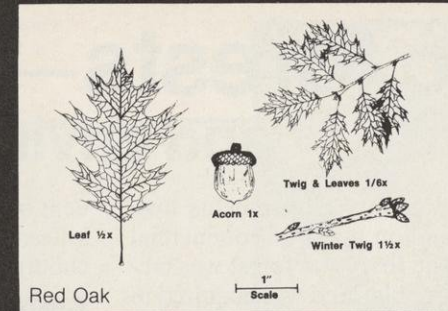
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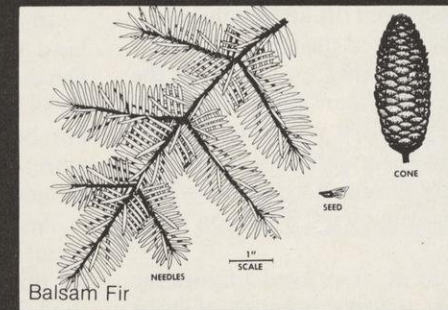
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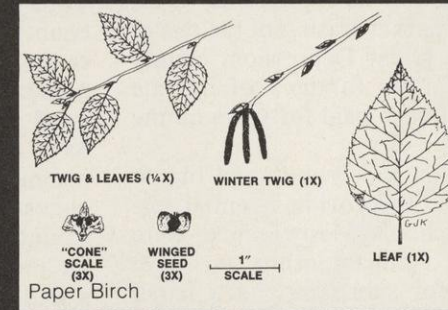
Quaking Aspen



Red Oak



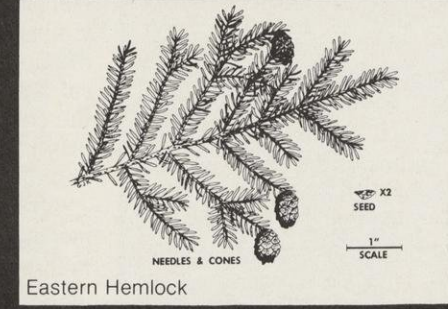
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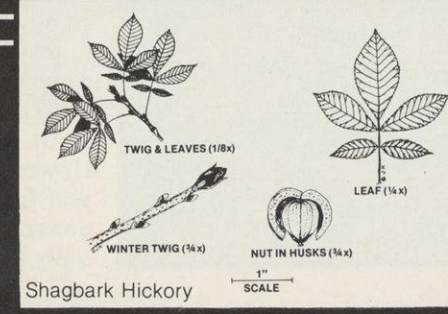
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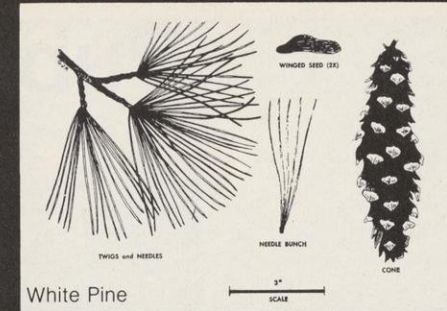
Swamp White Oak



Eastern Hemlock



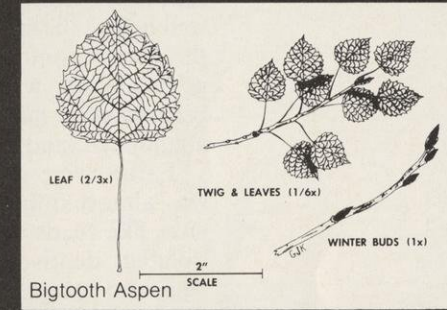
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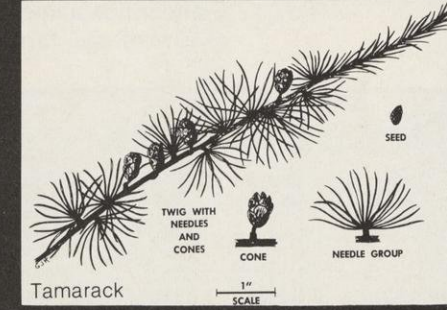
White Pine



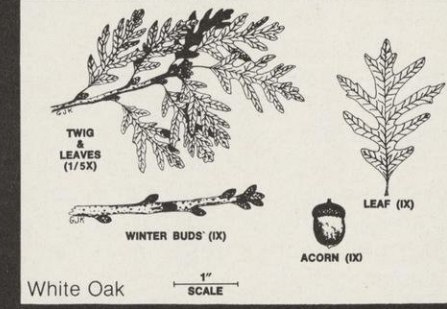
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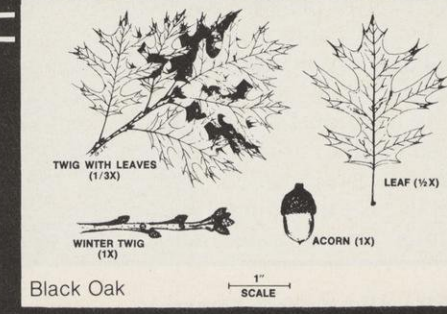
Bigtooth Aspen



Tamarack



White Oak



Black Oak

Identifying forest trees

Public forests—timber recreation and environmental quality

Federal, state and county governments own more than 4½-million acres of commercial forest in Wisconsin. The first state forest was created in 1903, but most public land was acquired in the late 1920s and early 30s when those millions of acres in the north were logged off and abandoned. The legislature first authorized the federal government to buy forest land in 1925, expanding the permission twice more in later years. Then, in 1927, Wisconsin made history when the legislature allowed county governments to acquire and operate forests and use zoning to control where people lived. Counties now own 2.3-million acres of forest.

After the pineries went, it proved impossible for the plow to follow the axe because of poor soil, harsh winters and low farm prices. By 1927, well before the stock market crash sent the rest of the country into the Great Depression, county governments were failing for lack of income because taxes had not been paid for years on the abandoned land.

Farms were often so widely scattered that it was almost impossible to provide essential services like roads and schools. Many families were isolated, deprived of companionship, far from help and struggling for subsistence in a harsh country and a poor economy. In 1921 the Rhinelander newspaper reported: "Joseph Gauthier, 55 years of age, farmer near Monico, being despon-

dent because of ill health and penniless, shot himself on Christmas morning. He left a wife and six children destitute." Something had to be done.

County Forests

In 1927 a new law allowed counties to zone land for agriculture, recreation and forestry. Development of farms and buildings in these areas could be restricted so that families would not be isolated from neighbors, snowplow and store. This helped counties and towns consolidate services.

Another part of the 1927 legislation allowed counties to create and operate their own forests for timber production, recreation, wildlife, watershed protection and stream flow stabilization. Today, Douglas County operates the largest county forest with 260,000 acres. Monroe County is the smallest at 6,500 acres. Managed under mandatory 10-year plans, county forests have a good record of tree planting and harvest, and have made substantial contributions to county income. Timber sales have increased and are now almost 20-million cubic feet a year. Marinette County's forest of 224,000 acres is one of the largest and most profitable, earning nearly \$1-million a year from timber sales.

County forests also support recreation, furnish environmental quality and contribute to natural beauty. Many counties have built intensive recreational facilities. Others encourage activities that need little service like hunting, cross country skiing, snowmobiling and nature study. Recreational demands are generally low because other locations have more attractions and many county forests are too far from big cities.

Under county forest multiple use plans, timber production is primary. However, the same conditions which have kept many private forest owners from managing lands intensively also operate on county forests — poor and variable markets, cost of management and limited availability of technical assistance. Counties own more than 16% of the commercial forest land in the state. To meet projected needs, county forests too, must grow and harvest more.

Under the Strategic Plan, county forests could increase current annual productivity by nearly 20-million cubic feet by the year 2030. Approximately 641,000 acres, or 25% could be improved by aspen regeneration, hardwood and softwood stand improvement and tree planting. While funding would have to come from individual county coffers and state aid in the form of technical assistance and interest-free loans, some investment returns will be realized immediately. However, they will be greatest following the 25th year (about 2010) as the first established plantations reach merchantable size and can be commercially thinned.

Wisconsin's County Forests

Wisconsin's unique county owned forests comprise just over 2-1/4 million acres administered and managed as a partnership with the state. Located in 28 northern and central counties they account for over one-half of all our publicly owned commercial forest land.

Under this "partnership" local administration is performed by County Board Forestry Committees and Administrators while DNR provides management assistance.

Emphasis is on maximum public benefit through multiple use management.

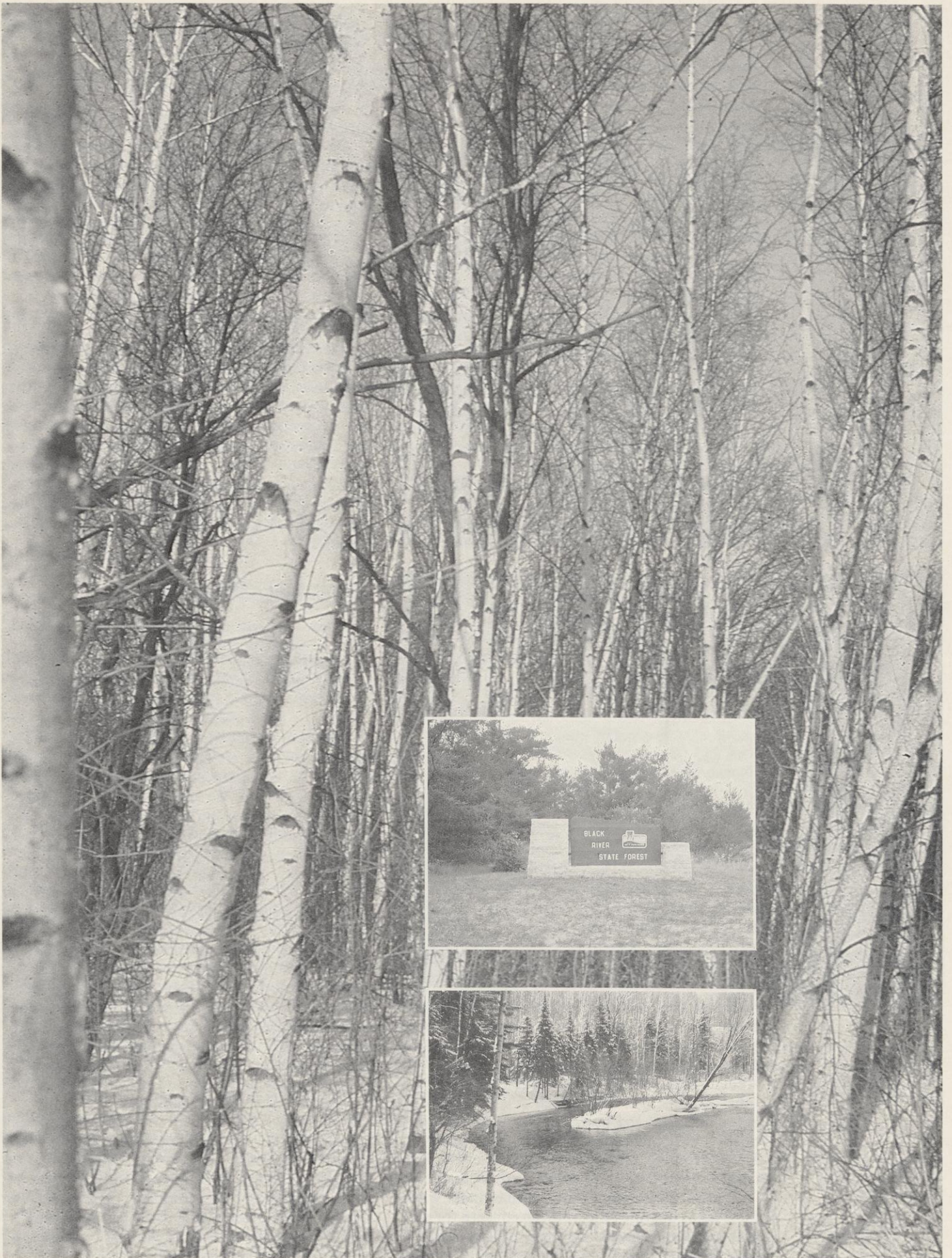
The state pays 10¢ per acre annually to counties in the program for forestry working capital as a noninterest-bearing loan and another 20¢ per acre annually to towns involved as a grant in lieu of taxes. Counties make additional appropriations from local sources for development and management.

Counties share revenue from timber sales. Ten percent goes to towns and 20% to the state as reimbursement for the 10¢ per acre loan.

In 1980, timber sales amounted to about \$4.7 million.

There are about 100 major developed recreation areas on county forests.

In addition 145 boat landings and almost 100 other formally developed outdoor areas including scenic vistas, waysides, and hunter parking lots are provided. Also, 2,647 miles of trails are maintained for public use including 1,691 miles of snowmobile trail, 467 miles of hunter walking trails and 491 miles of multiple use trails.



National Forests

The Chequamegon and Nicolet National Forests in Wisconsin are a thriving tribute to the success of reforestation and forest management. Most of the 1.5-million acres in these two forests were part of the cutover, burned out lands of the 1920s and 30s. Today they yield about 20-million cubic feet of wood fiber per year. Most of the federal land is well stocked and has minor reforestation needs. However, an estimated 350,000 acres could be improved by intensified management practices such as thinning and release.

The national forests, as much as any other in the state, display the benefits of intense multiple-use management. They supply wood fiber to industry which in turn provides jobs and products. They return more than a million dollars a year as timber sale revenue and payments in lieu of taxes to counties in which they are located. Their forests are both a recreation base and an ecological stronghold for high quality water, soil and wildlife resources. The two forests include 61,000 acres of lakes, 1,300 miles of streams and 85,000 acres of wetlands.

It was the US Forest Service which initiated the national planning process. The Strategic Plan for Wisconsin is a direct offshoot of these efforts and contains recommendations for the Chequamegon and Nicolet.

According to the plan, each year during the next decade Wisconsin's two national forests should intensify management on about 19,000 acres and convert 110 acres to better timber types.

Indian Lands

In addition to the national forests, there are about 400,000 acres of Indian lands in Wisconsin. The 215,000-acre Menominee Reservation is intensively managed for timber production by the Tribal Council and yields over 20-million board feet of saw timber and considerable pulpwood annually. The yield from other Indian lands is much lower and is not expected to improve because of fragmented ownership. In order to cut timber, approval from many widely scattered tribal members and their descendants is needed, an almost impossible job.

State Forests

Fewer than half a million acres of commercial forest are owned and managed directly by DNR — less than 4% of the state total. Northern state forests are managed primarily for timber with scenic values, outdoor recreation, wildlife and other aspects also emphasized. Fish and wildlife lands are managed primarily for their own purposes and southern state forests, principally the Kettle Moraine, are managed for recreation. They contribute little to state wood fiber production.

Natural Resources Board policies under which these lands operate reflect citizen concern for multiple-use management. Controls try to protect all natural amenities. For example, loggers may be

required to cut trees only in winter to avoid destroying undergrowth and causing soil erosion or disturbing eagle or osprey nesting areas. They may have to close and seed temporary roads, clean up slash (leftover branches which are unmarketable) and leave land in a specified condition.

As with county and national forests, recommendations for tree planting and stand improvements on state holdings will require additional expenditures of effort and money each year throughout the program's 45 years. Costs will drop after the twentieth year due to completion of stand improvement measures.

Wilderness preserves

The shrinking land base for commercial forest is a grave concern. The million acres lost to timber production between 1950 and 1980 went mostly for development of various kinds including homes and agriculture. Today wilderness preservation and similar programs are adding to the loss. Approximately 50,000 acres of public land has now been set aside for wilderness and more is being considered. A strategic plan recommendation calls for a 77,000 acre ceiling on such public designations.

The public commitment

Major new financial commitments by several levels of government will be needed to improve forest management and boost future wood fiber production. The public will probably have strong and divided opinions on such expenditures.

Today's commercial forest situation may be compared to energy in the early 1970s. The forest industry (like the energy and automotive industries) must make long-range plans and investments to supply public needs. They look at higher future populations and current use trends and project strong, continuing growth in wood fiber demand. The pulp and paper industry, for example, increased fiber consumption by about 15% between 1977 and 1982 and remained a strong employer and contributor to the state's economy throughout the recent recession.

The forest planning process is the first step in an effort to spur production, encourage use of neglected resources and enhance technology. The missing and still unknown element is the reaction of the public. Will they keep buying more forest products? Will attitudes change? What kind of political pressure will they bring? How will they respond to the call for more efficient and "thrifty" use of renewable forest resources?

Committing tax resources to increasing timber production is a question for public debate. The authors of the plan, the citizen advisory committee and the dozens of people who participated in its development have come to agree that the state's future citizens will benefit if we invest a modest amount of today's financial resources in increasing wood production.

Forests and wildlife

— an inseparable pair

Wildlife managers have not always seen eye-to-eye with foresters. The one views trees as part of a habitat, to be cut, trimmed or left standing for the benefit of wildlife. The other sees valuable products to be managed for the best growth and most profitable use. Considering it is less than 50 years since Aldo Leopold, a forester, first began to teach the “community concept” — the interdependence of plants, trees and animals — it’s not surprising that timber and wildlife interests have often clashed.

In some cases the two cannot be reconciled. But with good inventories of the co-existing resources and reasonable planning, wildlife interests can be accommodated in timber management. Game species like deer, woodcock and grouse thrive in young, fast growing stands of aspen and brush-covered openings produced by timber harvest.

While many non-game species still do not have specific management prescriptions, they are a valuable component of the forest ecosystem and have traditionally been able to adapt to changes in the forest environment. Selective harvest leaves many trees in the forest undisturbed as homes for these species. Even clearcutting eventually benefits wildlife.

Some endangered and threatened species of plants and animals are protected by designation or by purchase of critical habitat. Often their special needs, basic numbers and life cycle functions are not well known. For others like osprey and eagles, which have been studied for some time, special timber management techniques are used to preserve their nesting areas. Snags are left in the woods and no harvest is allowed nearby. In general, however, more information is needed to develop better management practices that can help these special habitats. The plan recommends that non-game, threatened and endangered species be recognized and inventoried and that management plans be developed to perpetuate and improve their habitats.

The Strategic Plan focuses on increasing timber production. However, it recognizes wildlife’s ecological interconnections with the forest. Foresters and wildlife managers who understand each others goals can design land management techniques that benefit both trees and wildlife. Some guidelines have already been developed. Others are needed.

DNR land management guidelines specify how to treat deer yards, and what to do to preserve the forest edge and openings — the “supermarket” of feeding opportunities for many types of wildlife. Other recommended activities include: seeding logging roads to grasses preferred by grouse and other game; and preserving den trees and those for nesting as well as “mast” trees which produce nuts and other wildlife food. Guidelines



Upper Photo: While this rectangular clearcut leaves a limited amount of edge for deer, woodcock and grouse, wildlife managers have found ways to improve on it.
DNR photo

Lower Photo: A well-planned clearcut can leave extra edge and openings to create a real “supermarket” of feeding opportunities for wildlife.
DNR photo (“Nevin”)

encourage access trails or roads for hunters and managers; planting of conifers for cover; and modifying size and shape of timber sales to allow species to complete nesting, to create more edge or to protect a particularly valuable pocket of habitat.

State, county, industry and national forests already incorporate these and other guidelines into their timber management plans. Private owners often are not aware of the potential for preserving wildlife habitat as they manage and sell timber. In part, this is because most private timber sales take place without technical assistance from a forester or wildlife specialist who can routinely discuss wildlife and other needs with owners. Most owners appreciate and implement suggestions of how recreation and wildlife can be helped by timber harvest.

While protecting habitat, the Strategic Plan recommends intensive timber management and harvest on state and federal wildlife lands. Currently only about 1.5-million cubic feet of wood fiber are harvested annually from these lands. This could be increased six-fold without harm and would bring in over a million dollars a year. Modified reforestation, conversion, management and harvests could be accomplished with minimal impact on the wildlife for which these lands are preserved. Some forest management practices would be highly beneficial. In all cases the goals and objectives of wildlife would be the principle consideration.

Cutting firewood is beginning to have an effect

on wildlife. The oak forests of southern Wisconsin have become prized resources for firewood. Diseased and dead trees look like prime candidates for the fireplace or stove. Yet these trees shelter owl, squirrel and raccoon and provide feasts of insects for woodpeckers, nuthatches and other creatures. They are so valuable to wildlife that one well-known wildlife biologist actually erected dead elms in her front lawn to encourage owls and other species to visit and nest. If people who cut firewood understand the value of these trees they might spare them. With a little good technical advice their fuelwood harvest could improve timber yields by cutting poor quality live trees instead of dead ones.

There is an acute worldwide shortage of certain kinds of softwood fiber. The strategic plan identifies over 800,000 acres of forest land that should be planted or converted to desirable softwood species to help meet this shortage. It seems inevitable that market forces will ensure that this conversion takes place. These acres can be planted with or without wildlife or other forest values in mind. If public awareness is combined with immediate active planning, the reforestation can occur with minimal damage to wildlife and aesthetics. In some cases wildlife will benefit. The key to what happens rests with the thousands of private owners of commercial forest land where most reforestation will probably take place. They must be sensitive to these other values and know how to protect them because wildlife and forests are an inseparable, interdependent pair.

This moth will soon be lunch for nestlings in a nearby tree. Forests are host to a complex wildlife community.
Photo by Don Blegen



Cutting guidelines recommend preserving den trees for small animals and birds.
Photo by Ken Wardius



The strategic plan is a huge step for not only insuring fiber and lumber for tomorrow's needs, but also a huge step in helping wildlife habitat and the countless other uses and functions of Wisconsin's forests.

DONALD NELSON
Wisconsin Conservation Congress

Special timber management techniques are used to preserve eagle nests. Snags are left in the woods and no harvest is allowed nearby.



Diseased and dead trees look ripe for firewood cutting, but they shelter pileated woodpeckers, owls (top), squirrels, raccoons, nuthatches and other creatures. It's better to cut poor quality live trees than dead ones.

All three photos by Herb Lange, Rt. 1, Hazel Green, 53811

Recreation

In the last decade, more people than ever chose forests for recreation. Nature study, hiking, trail biking and canoeing equalled traditional outdoor favorites, hunting and fishing, in popularity. Winter sports like ski touring and snowmobiling attracted thousands more. In response, public and private forest owners improved access and facilities, and these improvements in turn brought new visitors.

Travel costs are going up, the population is aging, and few new facilities are being built, so future recreation demand will likely increase only moderately. Short term demand is hard to predict because it varies with the economy, recreation fads, changes in resource quality and cost. Growth in the next 20 years will likely occur in most recreational forest uses. Planning for recreation in Wisconsin has centered on the State Comprehensive Outdoor Recreation Plan and plans of individual ownerships.

With minor investments in developments such as trails and access points, forests can easily accommodate many of the newly popular forms of recreation. It is much less costly, for example, to clear brush for a hiking or ski trail than to grade a campsite and install water, toilets and other amenities. Some forest recreation activities (ski touring and snowmobiling, for example) may

conflict with each other. Occasionally they will conflict with timber management activities. But, overall, the dispersed forms of recreation which don't require much site preparation or development are compatible with forest management for timber and wildlife.

Recreation which requires intensive developments — picnic areas, campgrounds, swimming beaches and the like — not only permanently convert the commercial forest land on which they are sited, they also lower production of timber and wildlife on the buffer acres which surround them. While the loss of these acres is not nearly as great as the productivity lost when private owners choose not to harvest timber, it is a problem to consider in recreation and forest planning.

The plan emphasizes dispersed recreation and de-emphasizes intensive development on public lands.

Recreation on private lands

Because private owners control almost 60% of the state's forested land, they represent the greatest opportunity for expanding recreational opportunities. However, private owners are increasingly reluctant to permit strangers to use their lands. They worry about liability, vandalism and other poor behavior.

More people than ever chose forests for recreation in the last 10 years.
UW Extension-Forestry photo



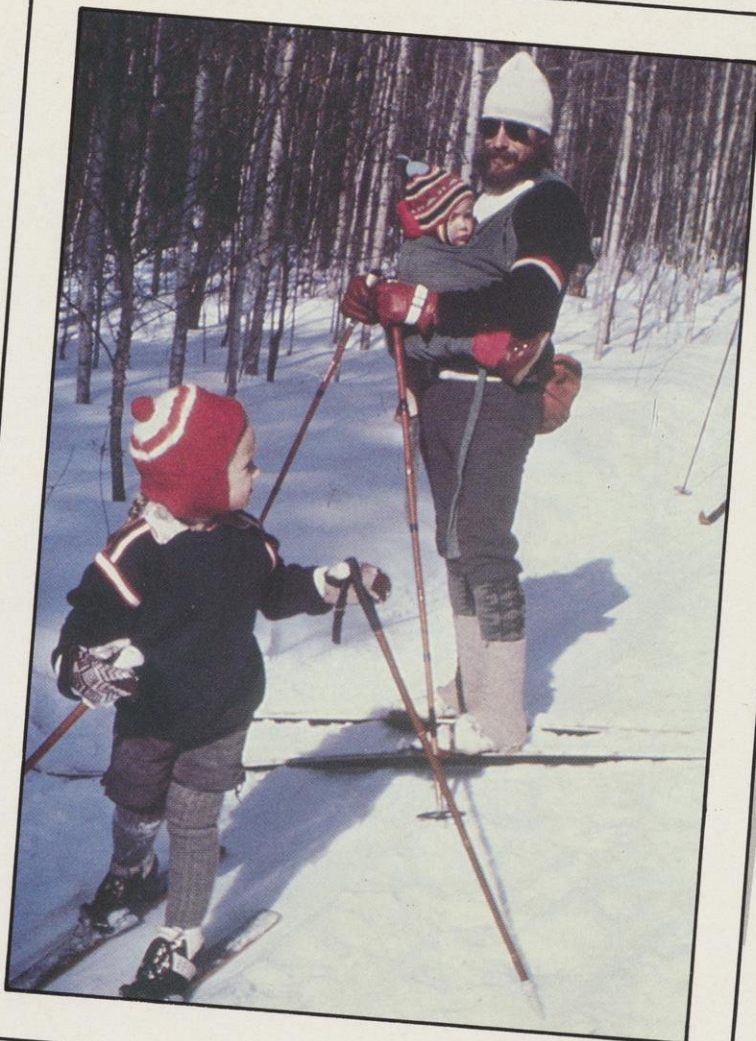
Many private owners keep their land for personal recreation and exclude other users. Even if owners are willing, when they don't live on the land year-round (30% are absentees and the number is growing), it is difficult to get permission to use it.

There are few financial incentives to encourage private owners to allow recreation on their lands. Private development for intensive outdoor recreation has proven relatively unprofitable and it is very difficult to control access and collect fees for dispersed activities like hunting or nature study.

The plan encourages private owners to open their lands for low investment recreation uses through tax relief, incentive payments, government collected user fees or other methods.

Programs like "Project Respect" already exist to improve relations between landowners and recreationists. While it's important to support and expand them, such programs don't address the financial and legal concerns of property owners. Tax relief, incentive payments and management services do and may open many private acres to recreation.

One idea is to have recreational user fees handled by government. A general access fee could be charged for any form of dispersed recreation and then redistributed to cooperating landowners according to the use permitted.



Cross country skiing is a family sport easy to provide in forests.
DNR photo

Public forests have recreation facilities, but private owners are reluctant to open their land. Incentive programs may help.
DNR photo

It doesn't cost much to open trails for hunting, hiking, skiing, snowmobiling and similar low impact recreation.
DNR photo





UW Extension-Forestry photos

Intensive development like campgrounds take forest land out of production. But most dispersed recreation like hunting, fishing, hiking, canoeing, nature study and cycling are compatible with good timber management and harvest practices.
UW Extension-Forestry photo

In addition to economics down the road to the year 2000 and beyond - I hope we've created recreation areas for the working people. I don't believe anyone needs recreation areas more than the working class.

LEO NICKASCH
AFL-CIO Conservation Committee





Forestry research

Every step wood fiber takes from seed to paper is studied. Here a research chemist examines the surface of a sheet of paper with an electron microscope looking for ways to improve fiber composition.
Photo courtesy of the International Paper Company

When a tree is cut about 35% of its wood fiber is left to decay in the forest. This kind of waste has been reduced in the past 30 years largely through research which has discovered how to use more of the tree more efficiently. During the same period, the annual net growth of wood fiber in US forests has increased by over 50%. This is because research has found better ways to manage the forest and has developed faster growing species.

Every step wood fiber takes from seed to paper to recycling has been studied. Results of this careful work for example, have enabled industry to make paper from more hardwood species, mill residues and recycled paper.

Many proposals and recommendations in The Strategic Plan rely on new information or look forward to techniques and processes not yet developed. Research is needed in these six areas:

- Timber management
- Timber protection
- Wood harvesting, processing and marketing
- Nontimber values of forests
- Meeting economic and social needs
- Sharing and coordination of information among researchers and users of research

Timber Management

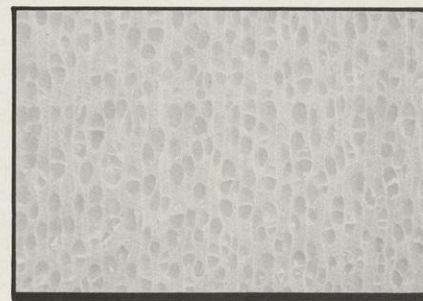
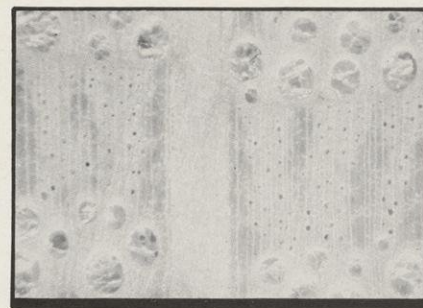
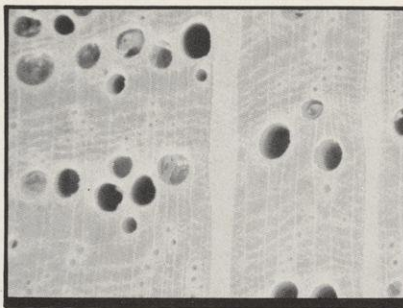
A forest left to natural processes will take many years to mature. That same forest can grow faster, be more productive and of higher quality under intensive management. "Until recently," says Jack Wolff, vice president for land and timber at Weyerhaeuser Co., "the US has been living off a wild, naturally created forest resource just as our prehistoric ancestors lived off wild fruits and grains." But just as agriculture stabilized food supply, so too, foresters have become tree farmers, managing the forests from seed to harvest. Studies have been conducted over the years which verify the benefits of intensive management.

Genetic research and cloning techniques have the potential for greatly reducing the time it takes to grow tree species. Because trees grow to maturity so slowly, it takes 15 to 30 years to produce seed from one generation. When young trees of certain species show promise by growing faster than their neighbors or displaying disease resistance, for example, there is no need to wait for

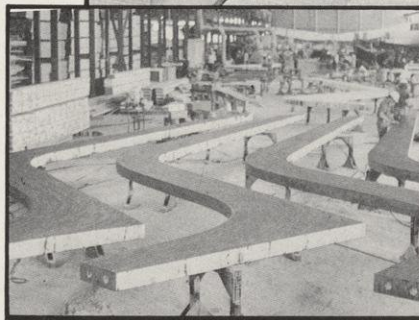
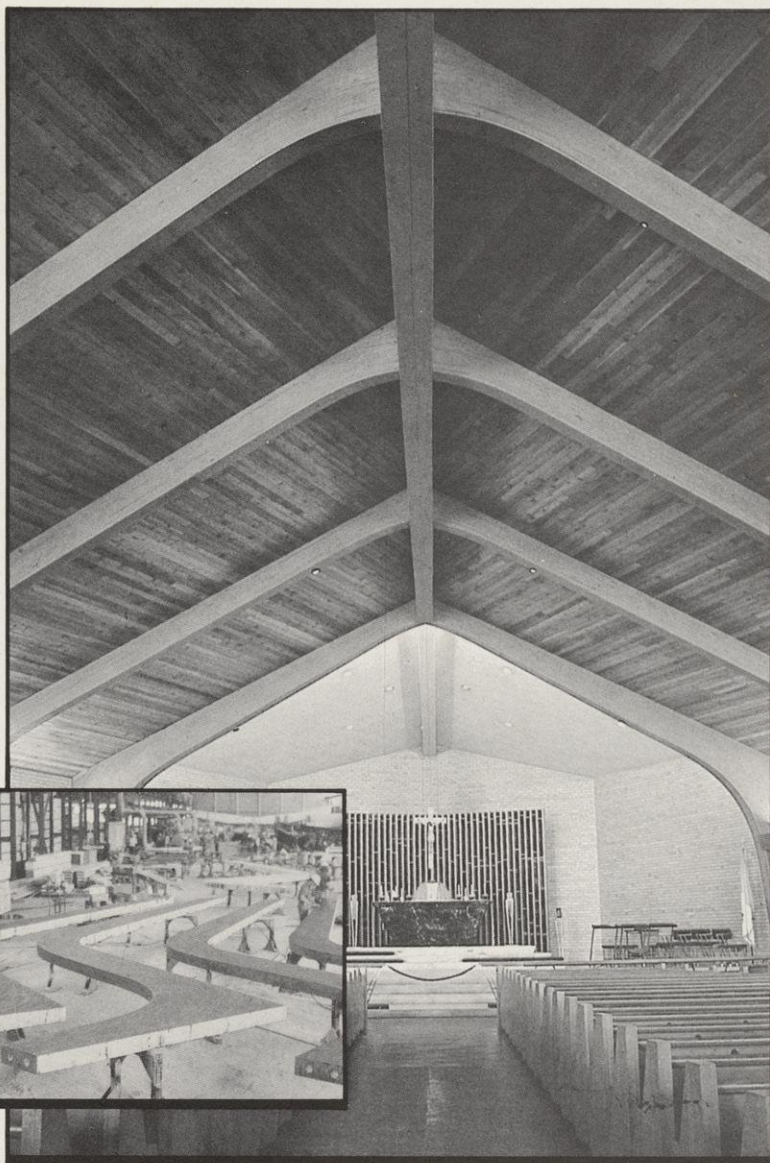
New products like these laminated wood beams, create new markets for wood fiber. This in turn helps income and provides incentives for better forestry practices.
Photo by US Forest Products Laboratory

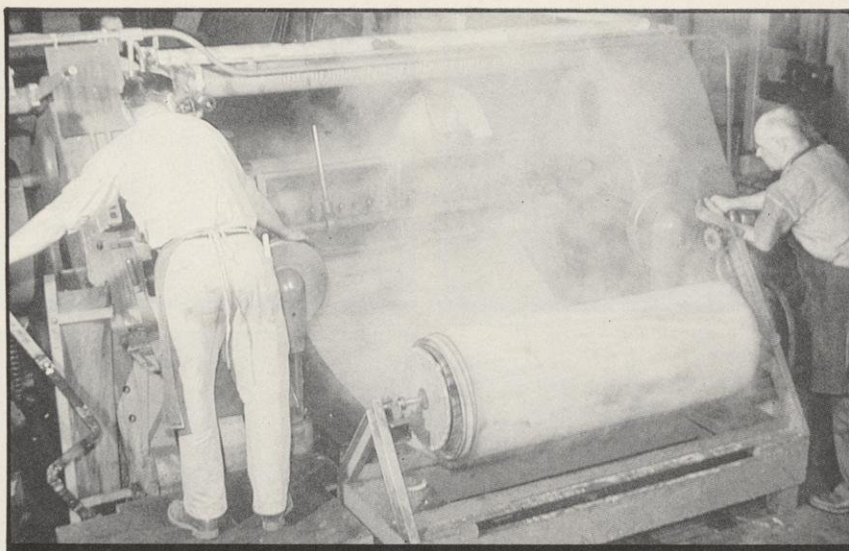
them to produce seed. A few cells in a tube of special medium can be coaxed to produce a complete young "plantlet." But tree improvement research is still relatively primitive and much remains to be done.

Only in the last 30 to 40 years has government been concerned about the private forest land-



Compared to agriculture, forestry research is in its infancy. Basic research helps develop new techniques for timber management, protection, harvesting and processing. These cross sections of red oak (above), white oak (top right) and cottonwood (bottom right) show cell structure and fiber density. Photos by Oregon State University School of Forestry





New veneer cutting techniques developed at the US Forest Products Laboratory in Madison have made more of the tree useable, reducing waste. Other research is underway to improve forest management, help meet environmental concerns and improve economic forecasting.
Photo by US Forest Products Laboratory

Acid Rain

A research project to determine the affect of acid rain on forests will be completed next summer. James G. Bockheim, soils professor at UW-Madison, says preliminary results confirm that precipitation in two watersheds being studied is about 10 times more acidic than in a non-polluted area. However, Bockheim has found that soils and vegetation neutralize the acid and that there are no effects on tree growth. His studies show that sulphuric acid remains in the soil and nitric acid is taken up by trees. A final report is due next summer.



Forest water collector. Rain water is collected in the funnel, runs down the tube, and is stored in the container until collected for analysis.



Wet/dry precipitation collector. One of the containers is for precipitation and the other for dry material, such as dust. The cover position is controlled by a sensor, which moves the cover over the dry material collector when it starts raining.



Stem flow collector. Water running down the tree trunk is captured and stored in the container for collection and analysis.

owner. Realizing that these people hold the key to any big future increase in forest productivity, researchers are now looking for answers on how to grow and harvest timber while maintaining other values like natural beauty and the plants and wildlife landowners want to preserve.

"Biomass" means all the useful fiber produced in an area. One current technique used in some large industrial forests outside Wisconsin employs a machine which clears an eight foot swath of brush and other plants and cuts them into chips. While this may or may not be tried here, experimental biomass plantations exist in Wisconsin and some research already suggests that a usable 20-foot tree can be produced and cut every five to seven years. More work is needed to determine which species are most productive and what conditions they require.

Another continuing problem of forest management is keeping track of the size and distribution of trees. While farmers normally grow and cut their entire crop every year, foresters have to wait many years, have a much bigger area to cover, and need to adjust records to reflect growth variations and other factors over the years. Computers have the potential for streamlining forest record keeping. But they are only as good as the information they store and the models they use for analysis. Better ways to collect and store useable accurate data are needed.

Fire is a useful tool for the forest manager. When humans first settled in forests they regarded fire as a threat to life and prosperity or as a method for clearing land and controlling brush. Today it's believed that with careful application, fire can be a useful and inexpensive way of regenerating and managing some forest land. Additional research, however, is needed to perfect this use in Wisconsin.

Finally, research needs to focus on new uses for tree species which are in good supply but low demand like white cedar, scrub oak and swamp and bottomland hardwood.

Forest Protection

To protect standing timber, the plan calls for improved fire retardants and controls plus integrated pest management to reduce losses from fire, insects and disease by half.

The biggest losses of standing timber are due to weather. Insects and disease are next but unlike the weather are susceptible to control. Pest management tools like herbicides have the advantage of being inexpensive to apply to large forest areas. However, some of these chemicals have been sharply criticized by environmental and health groups for their suspected hazards to humans and forest flora and fauna. Research is needed to improve or validate the safety of herbicides and to develop guidelines for their most economical and effective use.

Wood Harvest and Marketing

If private forest owners are to contribute effectively, timber production has to be possible and profitable. One key is to improve markets for low quality wood, small lots of wood and low demand species. It won't be easy but it's extremely possible. For example, until recently dense hardwoods were in low demand as pulpwood for paper and small diameter trees seldom found their way to the sawmill. Research changed all this and the value of the woodlot has increased accordingly. Much more needs to be done to solve production problems for the small owner.

Other Values

The plan also proposes that research look at how forestry practices affect other parts of the forest ecosystem, including recreational users, and how the users impact on the ecosystem.

A major obstacle to timber harvest in the last 15 years has been objections by people who value forests for other reasons. Environmental groups have blocked clearcutting operations and demanded information on how forestry practices affect woodlands, wildlife and plants. They are not satisfied with traditional timber research and want a new approach that will give these other elements more weight. Continued work is needed on these environmental concerns. Similarly, as more people use forested areas for recreation, changes may occur in the forest ecosystem and this too should be studied.

Social and Economic Resource

To meet economic and social needs, the plan wants research to develop accurate economic models for timber demand and proposes studies on the social value of forested lands, as well as on the impact of tax laws. A survey is needed on attitudes and objectives of private forest owners. Results might reveal hints for motivating owners to maintain productive forests.

Forecasting the future is tricky in any business. When the business is forestry, the future is at least 50 years from now. Demand projections have traditionally been simple extrapolation from the past. But many factors can affect demand, as the energy industry discovered in the 1970's. And when future demand figures are used to justify expenditures, these projections should be the most accurate possible. Current computer technology may have the capability of improving these forecasts, but the models are not yet well-developed. Further research and the application of economic forecasting techniques can improve the process.

One great shortcoming of research in the forest industry can be described as a kind of information lag. Research has trouble responding quickly to problems and then transmitting findings to the public and forest managers in a way that results in prompt acceptance and implementation. The Strategic Plan suggests releasing information

quickly in language the public can understand. It also suggests that involving managers in research planning may help focus the work on practical "on the ground" problems.

Compared to agriculture, forestry research is in its infancy. Plenty of work is needed on how to produce and market more wood fiber.

The Star Lake Plantation in Vilas County was the state's first timber research plantation. Each tree has a life history, from planting through annual growth measurements to thinning, cutting volume and sale price. Other plantations and research sites look for disease and insect resistance, faster growth characteristics and better tree shape. Production of seed for these programs is slow. Future use of cloning techniques may speed up the process.
DNR photo



Wisconsin's tree nurseries

Wisconsin's three state nurseries, at Boscobel, Wisconsin Rapids and Hayward produce more than 18-million seedlings and transplants a year. Four-fifths of these are planted on private lands, including industrial forests.

The US Forest Service nursery at Watersmeet, Michigan supplies national forests in the lake states. In industry, Nekoosa Papers and Consolidated Papers both operate nurseries to supply their own needs. If Strategic Plan recommendations for reforestation and conversion are implemented, a lot more seedlings will be needed. DNR production will have to at least double and federal and industrial production go up 20%. Fortunately, state nurseries are capable of producing up to 40-million seedlings annually with existing land and equipment.

Biggest problems for the state will be greater risk from insects and disease (already a concern) and a shortage of seed of the proper species and quality.

Red pine, white pine and white spruce make up 90% of current nursery production. Future production will probably concentrate on these plus high yield, and still experimental, European and hybrid larch to help make up the state's softwood deficit. DNR nurseries also produce Norway spruce, white cedar, walnut, hard maple, red and white oak, and a variety of other tree species and shrubs. They also grow a few experimental species like larch and hybrid aspen, production of which can be expanded if landowners demand it. About 40,000 hybrid aspen are distributed annually for experimental biomass production.

Sixty percent of the state's nursery production is purchased at cost by small, private landowners. Private nurseries furnish more variety, but prices are much higher. County forests buy seedlings at half price and state forests receive them free. Since 92% of the plan's recommended reforestation and

State tree nurseries produce more than 18-million seedlings and transplants a year. Some are sold like this in unsorted bags of 1500 direct from the beds.
Photo by Dennis Chapman



conversion work is directed at private, state and county lands, it is clear DNR nurseries will have to supply the majority of seedlings for this program.

Most seed used by state nurseries is bought from the public who collect in Wisconsin. Some is imported to improve the gene pool. Seed orchards established in the 1960s are beginning to produce and programs to improve quality are expanding. But species improvement for trees is 50 years behind agriculture. The first successful hybrid corn seed for example, was distributed in the late 1920s.

According to the Strategic Plan, federal and state tree improvement programs, seed orchards and superior seed collection areas all need to be expanded.

The simplest, but not the best way to improve nursery stock is to find mature trees which are taller, exhibit fast growth, have better stem and branch characteristics, or appear more disease resistant, and then collect and plant their seeds. Sometimes an area with many such superior trees can be improved by cutting out those of lower quality and trying to eliminate nearby stands to avoid wind-blown pollination. But it doesn't always work and results can be a catch as catch can business.

The best way to improve nursery stock is by establishing seed orchards. Here seed is planted from the highest quality trees of known origin and the same species. Then, as the trees mature, low quality specimens are thinned, leaving the fastest-growing and biggest trees for parent stock. Red pine seed orchards begun at Avoca, Wisconsin Rapids and Lake Tomahawk in 1970 were originally planted with 15,000 trees at each site. The first thinnings have been made, and ultimately each will hold 750 of the finest pine trees in the state. Seedlings from them should grow two to four percent faster and produce up to an 11% gain in volume. A two or three percent height increase, multiplied by the 10-million or so pine seedlings planted annually, can mean a significant gain in wood production.

It will take 20 years for seed orchards to produce enough viable seed to make a difference. Meantime, the University of Wisconsin, the U.S. Forest Service and forest industries are working on other ways to speed the slow process of species improvement. Cloning, grafting, and other modern agri-genetic techniques are being tried but as yet are too limited and expensive to produce the quantity of seed needed.

Sorted by age and size and packed for shipment at the Griffith Nursery in Wisconsin Rapids, seedlings are sold for reforestation on private lands.



Nurseries will have to more than double production to meet future demand. Improved species from seed orchards and other techniques will increase wood production. Photo by Dennis Chapman

Trees from the nursery

By law state produced nursery stock may be used only for growing forest products, soil erosion control, windbreaks, shelterbelts, game food or cover and education. Use for landscaping or Christmas trees (except when Christmas trees are a byproduct of periodic, needed thinning) is prohibited.

Trees are available free to registered school and community forests, to landowners who lease property to the state for public hunting and fishing grounds, to the state forests and to qualifying private landowners who have enrolled land in approved wildlife production programs.

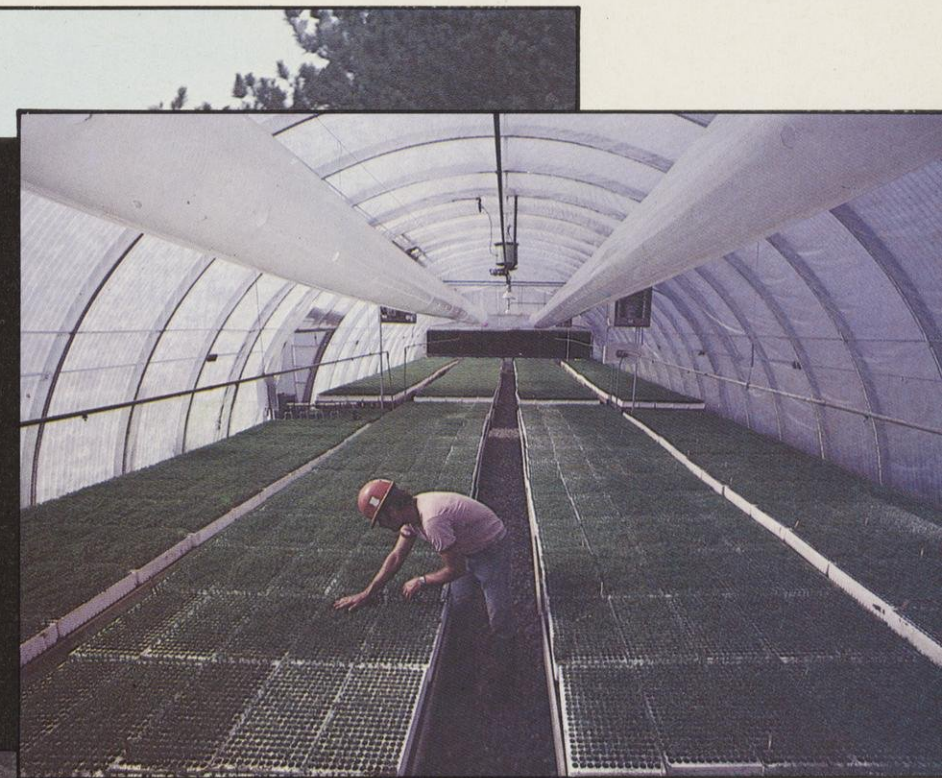
Current prices range from \$36 per thousand for bulk-ordered two year old seedlings to \$132 per thousand for bulk ordered transplants.

The minimum order is 500 plants. Larger orders are accepted only in multiples of 500 except for windbreak and wildlife packets which contain smaller numbers of shrubs.

Fourteen tree species and seven shrubs are available.

For information on ordering contact the local DNR forester, Agricultural Extension Office or DNR Bureau of Forestry, Box 7921, Madison, WI 53707.

State nurseries have room to expand and will have no trouble furnishing seedlings for Strategic Plan goals.
DNR photo



Industry nurseries and greenhouses supply a portion of their own needs. Their experiments with new growing techniques may soon pay off in more productive species.
Photo by Harald Sund, Courtesy of Consolidated Papers, Inc.



Modern agri-genetic techniques are being tried but are still limited and expensive.
Photo by Dennis Chapman

Forest fire prevention and control programs have been highly successful. While more than 17,000 acres are burned in an average year, that's less than .1 percent of the total under protection.
DNR photos



Protecting forests from fire, insects and disease



Fires, insects and disease, along with weather are the primary causes of tree mortality. Wood fiber loss from these causes is significant, equal to 13% of the state's net annual wood fiber growth.

"[The fire] burned to the tops of the tallest trees, enveloped them in a mantle of flames, or, winding itself about them like a huge serpent, crept to their summits, out upon the branches, and wound its huge folds about them. Hissing and glaring, it lapped out its myriad fiery tongues while its fierce breath swept off the green leaves and roared through the forest like a tempest."

Rev. Peter Pernin
"The Great Peshtigo Fire"

Forest fires

The history of forest fires in Wisconsin reflects the history of the state. Until Europeans came to settle in the early 1800s, lightning was the most frequent natural cause of fire and a few were set by Indians for various reasons. As more settlers arrived, fires from landclearing became common. By the end of the century when logging was at its peak there were at least eight years between 1870 and 1900 when huge forest fires raged uncontrolled across hundreds of thousands of acres. Losses were terrible. No fire was ever again as bad as the Peshtigo fire of 1871 which took more than 700 lives.

The devastation finally prompted fire control regulations. Just after the turn of the century, towns which were responsible for all rural fire control began appointing fire wardens to enforce the rules. But severe conflagrations in 1908 and 1910 proved that townships alone were not equipped to do the job. In 1911 state and federal rangers and fire wardens were appointed and a coordinated fire prevention program was launched.

Long term dedication of money and resources since then has resulted in today's well-developed, comprehensive forest fire protection program. Sophisticated equipment is kept ready by regular inspection and maintenance. Training programs ensure that the staff are kept up-to-date on equipment and fire fighting techniques. Comprehensive plans for responding to fires assign responsibility to state, federal, county and town fire fighting units. Handbooks and manuals explain in detail how to handle prevention and suppression.

These programs have been highly successful. The number of fires and the acreage burned has been stable for the past 20 years. In most years since 1950 the fire prevention program has met its goal of holding fires to one-tenth of one percent of the total acreage protected.

But over 2,000 fires still rage through 17,000 or more acres of Wisconsin forest in an average year. Ninety-eight percent are caused by people. Successful fire control relies on continuing prevention and vigilance. There are still many problems.

Railroads, a major cause of fires since the logging boom days, today cause less than a third of all forest fires. The problem is shrinking as rail traffic declines and enforcement increases. Main shortcomings of the railroads were failure to clear combustible brush and grass from the right-of-way and faulty train equipment.

One in five fires is started by debris burning. The increasing numbers of people living permanently and seasonally in rural homes are the main cause.

Arson fires are likely to be set in places that are difficult for fire fighters to get to and on days when fire danger is highest. Because they are intentional criminal acts they are very difficult to deal with.

Zoning which allows buildings in fire-prone forested areas is dangerous. Homes and businesses bring debris burning, fireplaces, furnaces and other equipment or activities which are major fire sources.

Increases in conifer acreage, dedication of areas to wilderness where debris accumulates and access is poor, and even fire protection itself, all contribute to the increasing volume of potentially dangerous fuels in the forest.

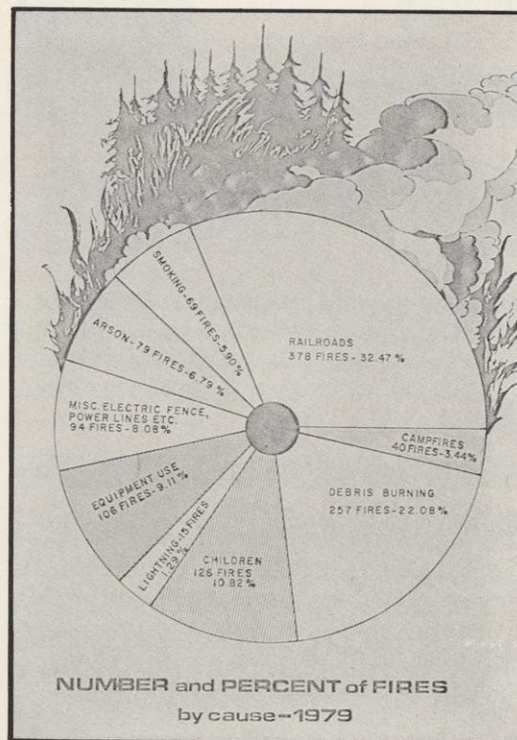
Some parts of the state file inadequate or improper reports about the cause of fires and the extent of damage. This hinders analysis and makes the statewide fire management program less effective than it might be.

To address these problems the plan recommends:

1. *A special survey system to determine actual losses from fire, insects, disease and other causes.*
2. *Development of a fuel management program.*
3. *Increased fire management by DNR and local fire departments in coniferous, fire-prone areas.*
4. *Improved fire prevention and enforcement to reduce fires caused by railroads and debris burning.*
5. *Emphasis on fire management in areas which have both highest risk and highest timber value.*

6. **Strong enforcement of arson laws.**

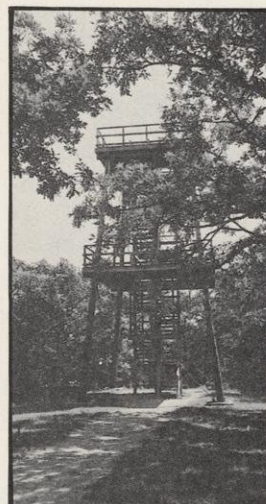
7. **Town and county land use zoning and enforcement in fire-prone areas.**



Rural homes in forests are at higher risk from fire. They also divert fire fighting efforts away from forests. Better land use zoning and enforcement are needed in fire prone areas.
DNR photo

Illustration by Mariana Leider

Ironically, fire prevention helps contribute to the increasing volume of dangerous fuels in the forests.
UW Extension-Forestry photo



Forest fires destroy timber and wildlife but can also be a management tool for both.
Photo by Dennis Chapman



DNR Photo

It was most rewarding to share in the preparation of this plan which addresses public and industry needs and expectations for our forest resource and speaks to each of us about what we can and must do if we are to meet these expectations.

WILBUR L. LESLIE
Executive Secretary
Wisconsin County
Forests Association



Fire breaks and backfires are time tested fire fighting techniques.
DNR photo

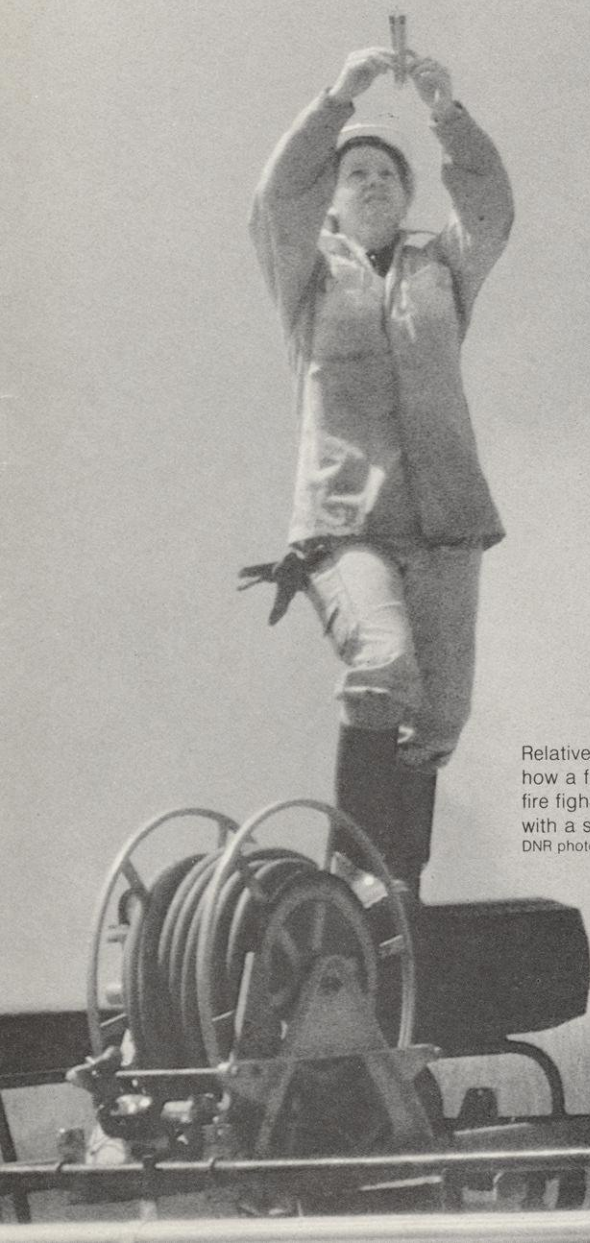


Fire fighters keep up-to-date on methods and equipment with training programs. This modern spray truck is a big help in fighting forest fires.
DNR photo



Railroads are a major cause of fires.
DNR photo

Relative humidity affects how a fire will burn. This fire fighter gets a reading with a sling psychrometer.
DNR photo



Insects and disease

While the devastating effect of forest fires is pretty obvious, the true extent of disease loss is not. However, we now know that more than 40% of growing stock mortality is caused by disease and insects, far more than is caused by fire. Destruction of seedlings and saplings, and lost or reduced growth in other size trees is uncalculated, but probably extensive. Dutch elm disease and spruce budworm illustrate recent threats and the gypsy moth is of current concern.

As investments in forests increase, control of risk factors becomes more important. Four areas are at particularly high risk:

- Softwood reforestation can be jeopardized by a variety of insects, and diseases. Large unbroken blocks of trees of the same species and similar age class, like conifer plantations, are the most susceptible.
- Biomass plantings are also single species and even-aged. While problems are currently limited because few acres are now used for this purpose, hybrid aspen and cottonwood are susceptible to rusts, borers and leaf beetles.
- In harvest and management of hardwoods, damage from machinery allows insect and disease infestation.
- Expansion of state tree nurseries to meet demand for seedlings will inevitably increase incidence of damping-off fungi and other destructive pest problems. Most can be controlled.

Three types of controls for insects and disease are useful. Direct controls like insecticides and fungicides are the most controversial but fortunately are not the most common. They are costly, do nothing to change conditions that led to established infestation, and may have to be repeated unless conditions change. Indirect controls manipulate the forest composition, increase tree vigor and remove disease prone materials from the forest. Harvesting trees when they are mature and before they begin to decline in vigor helps keep disease out. New techniques for reducing logging damage and more complete timber salvage are other examples of these indirect controls. Biological controls already exist in nature. Predators, viruses and bacteria can be effective over the long term but are too slow-acting for epidemic conditions.

The plan recommends a program of integrated pest management to cut insect and disease losses in half.

Integrated pest management is a relatively new concept of growing a crop while managing its several pests in a cost effective and environmentally safe manner. Depending on conditions, different types of controls are applied in an integrated manner to reduce protection costs and pest damage. This requires detailed knowledge of controls, timing and techniques for economical application and the ability to predict when infestations are gaining momentum. At UW-Madison foresters

are developing ways to use remote sensing technology to detect stress — particularly insect damage — in forest vegetation.

Research is also needed to develop integrated pest management guidelines for the various forest types. Requiring pest management plans as part of overall property management will also help, but guidelines are needed here too.

The plan also says work is needed to develop insect and disease resistant tree stock for conifer plantations.

DNR's three seed orchards with trees of superior genetic quality will be able to meet nursery needs in about 20 years. While the transition to resistant stock will be a slow one, it is essential for the health of future plantations.

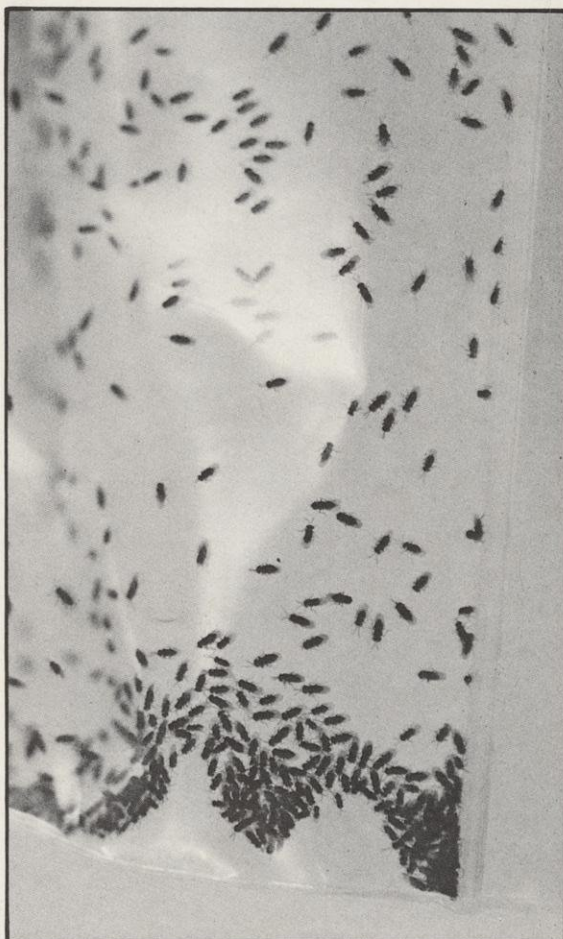
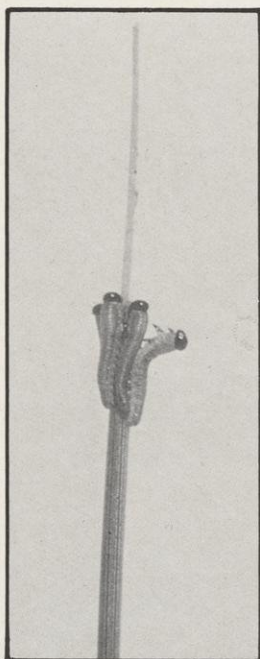
Since it will not be possible to cut timber mortality in half by 2030 without chemical pesticides the plan recommends their use when applied according to state and federal guidelines. They have an appropriate place in integrated pest management when used carefully and are the best resort in epidemic infestations.

Dense plantings and high volume of seedlings in nurseries can be an open invitation to insects and disease. Adequate pest control here is critical to avoid unacceptably high losses.

Insects, disease and fire easily destroy more than 25-million cubic feet of growing stock annually in Wisconsin. Unlike losses to weather, these can be mitigated and it only makes sense to do so in view of the gigantic investment involved.

Far Right Photo: Releasing natural predators like these flies (ooencyrtus) which prey on gypsy moth eggs, is sometimes an effective way to control forest pests. DNR photo by Dave Hall

Lower Photo: These sawfly larvae (sertifor) are eating away the green on a pine needle, leaving only a skeleton. DNR photo by Dave Hall





Tussock moths attack pine.
UW-Extension-Forestry photo



Top left and middle: Animals like beaver and cattle damage and kill productive forest trees.

Beaver photo UW-Extension Forestry
Cattle photo Dennis Chapman



Winter burn retards growth of evergreen needles.
UW-Extension Forestry photo



▼ The gypsy moth is a recent invader causing problems in southeast Wisconsin.
Photo by Don Renlund

- Weather causes more forest damage than any other factor.
- Insects and disease cause almost half of all tree mortality.

Winds kill some trees and damage others, leaving them open to insects and disease.

Photo by Dean Tvedt ▼



▶ Pesticide and herbicide application can be beneficial to forests, but research is needed to validate safety and develop guidelines for safe and effective use.

▶ Tent caterpillars strip trees of foliage, making them weak and susceptible to disease.
Photo by Dave Hall



Information and education

It's only natural. Everybody loves trees, especially city people. They plant them everywhere, in yards and along city streets. They watch them grow and cherish summer's green canopy, the colors of fall and stark patterns of winter. They prune and fertilize and hire tree surgeons and cringe when the power company trims around the wires. Most people, including a lot of woodlot owners, want trees to last forever and never be cut down. It's only natural.

But applied to forests this attitude is a disaster. Loved to death is no exaggeration! Forests need to be managed or the trees die of insects, disease and weather and a pretty woods turns into a gray maze of rotted trunks. People need to know this happens because they live in wooden houses with wooden furniture and use all that paper and like to hike and camp and ski and hunt in the woods.

Because there's a lot of misinformation around, people are apprehensive about harvest, thinning, clearcuts, reforestation, chemical treatment and other forest management activities. This necessary work often doesn't get done, either out of uncertainty, apathy or on purpose.

One worried farmer who harvested his woodlot said, "I felt I was destroying it." — Not an uncommon notion.

These attitudes mean less timber production and not enough management — a situation The Strategic Plan wants to reverse. By the year 2030 it envisions timber production on 90% of the forest land in private ownership. To achieve this, the plan advocates a coordinated double-barreled information and education approach aimed at both the general public and the landowner, to be conducted by all Wisconsin forestry interests. The idea is to increase understanding of how forest management relates to timber, wildlife, recreation and aesthetics.

Photo courtesy of Consolidated Papers, Inc.



People need to know how forest management affects not only the economy, but also wildlife, fuelwood, jobs, and the environment.



UW-Extension-Forestry photo



"Our lumber association is dedicated to promoting good forest management on public and private forest lands, and was the leader in development of forest productivity studies for Wisconsin."

Thomas P. Brogan
Northern Hardwood and Pine Manufacturers Association

Among efforts the plan endorses are:

- *A joint information, education and public involvement program by Michigan, Minnesota, Wisconsin and the US Forest Service.*
- *Training of woodworkers in logging and related skills.*
- *Stepped up use of school forests to teach children forest values.*
- *A change in the law to strengthen requirements for teaching conservation in public schools.*
- *A program aimed specifically at the private nonindustrial forest owner that focuses on increased timber production and other values like wildlife and recreation.*
- *Better marketing information to include procedures on how to cut and sell timber.*
- *Encouragement of membership in organizations like the Wisconsin Woodland Owners Association and others devoted to improving forest management.*
- *Assignment of the lead role for forestry information and education to UW-Extension which has been providing these services to private landowners ever since 1924. This will require beefed-up staffing.*
- *An urban forestry program for city dwellers to demonstrate the values of a managed forest to society and the economy.*
- *Increased information and education activity by DNR personnel.*

The plan notes that 3½-million acres of forest will not be cut by owners who now hold title to it, mostly because they lack knowledge about biological and economic benefits of good management. With the trend today toward more and



Photo by Herb Lange,
Rt. 1, Hazel Green, 53811

more owners and smaller and smaller woodlot sizes (now 54 acres on average...) this "no cut" attitude is likely to persist and become more acute without a vigorous well designed information and education program. The data show that it's worth doing. Nearly all of Wisconsin's current wood needs and those projected to the year 2030 can be met by merely eliminating "no cut" attitudes and applying good forestry practices. Planners have sketched a star next to information and education. They say it's one of the most important recommendations — that the plan is a big "GO" with it, but may be "NO GO" at all without it.

This poster was entered in a State Fair contest last summer by Joanne Dufek, 4th grader at Hillcrest Heights school in Green Bay. Education about the value of forests should start early.



Forest inventory & computer modeling

Plans and decisions are only as good as the information on which they are based. A current and accurate data base for the forest helps industry plan for expansion and wood procurement. Land management plans rely on it, and it helps public officials make budget and policy decisions. Because forests change constantly, a data base must be revised at least every 10 years. Modern computer technology should help make this easier and more economical. The Strategic Plan for Wisconsin's Forests is based on a computer update of the 1968 Wisconsin forest resource survey. A new survey was completed in 1983 and publication is scheduled for 1984.

Statewide surveys help with long range planning, but they are not particularly useful for on-the-ground management. Two other techniques are used for this: continuous forest inventory and forest reconnaissance. Inventories give accurate data on area, volume, growth and removals, but do not describe the location of timber types. Forest reconnaissance, used on national, state and

county forests gives good data on area, timber types, harvest dates and treatment needs, but does not provide accurate information on volume growth, mortality and removals. Reconnaissance also gives general information about recreation, wildlife and access.

The 1981-83 statewide survey used aerial photography to locate forest land and classify it by timber type, stand size and density. The photographs were used to randomly select field plots where total biomass, stand size and density were measured. Field technicians collected information on growth, removals, mortality and ownership characteristics.

Computer technology will help keep 1983 survey data up to date and will help check sophistication of computer programs by comparing field data with projections made from the 1968 survey.

The Soil Conservation Service's detailed statewide soil survey is more than half finished. Information on soil types helps foresters determine which soils produce the best tree growth and what species to plant on specific sites.

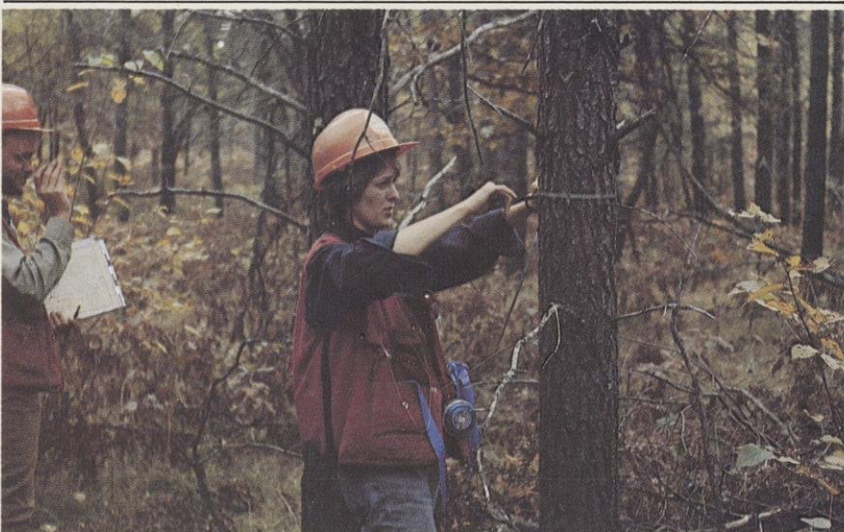
As forest land management intensifies, accurate, current information will play a critical role in reducing investment risks. The Strategic Plan recommends development of a centralized system for forest data storage and retrieval and a uniform system for monitoring and reporting changes in the forest resource base.

Resource information is collected and stored by individual landowners. It will only be useful to research, planning and education if it is located in one place where it can be retrieved and analyzed. The information's usefulness diminishes rapidly because trees grow and die, land uses change, fire and storms destroy tracts of trees, and dozens of other changes occur. Surveys can be corrected by applying averages and making calculations, but these computer corrections can stray from reality if they are not compared to information from the field. A uniform resource change reporting system can keep the data base accurate.

Computer models help forests keep track of trees. But forests change and electronic data has to be checked by on-the-ground measurements.

Top: Surveys lay out a 50-foot radius.

Bottom: All trees within the circle are measured.



It was a real privilege to work with a group so well qualified and dedicated to a job that really needed to be done.

GEORGE W. ALLEY
Forester
Soil Conservation Service



Minerals

Relatively recent copper and zinc discoveries in Rusk, Forest and Oneida Counties, and uranium exploration in other areas have raised concern. Foresters fear losing timber production to mining, mining waste disposal, transportation corridors and other associated developments. Environmentalists and other groups fear land and water pollution and health hazards. Landowners fear escalating property taxes from land speculation.

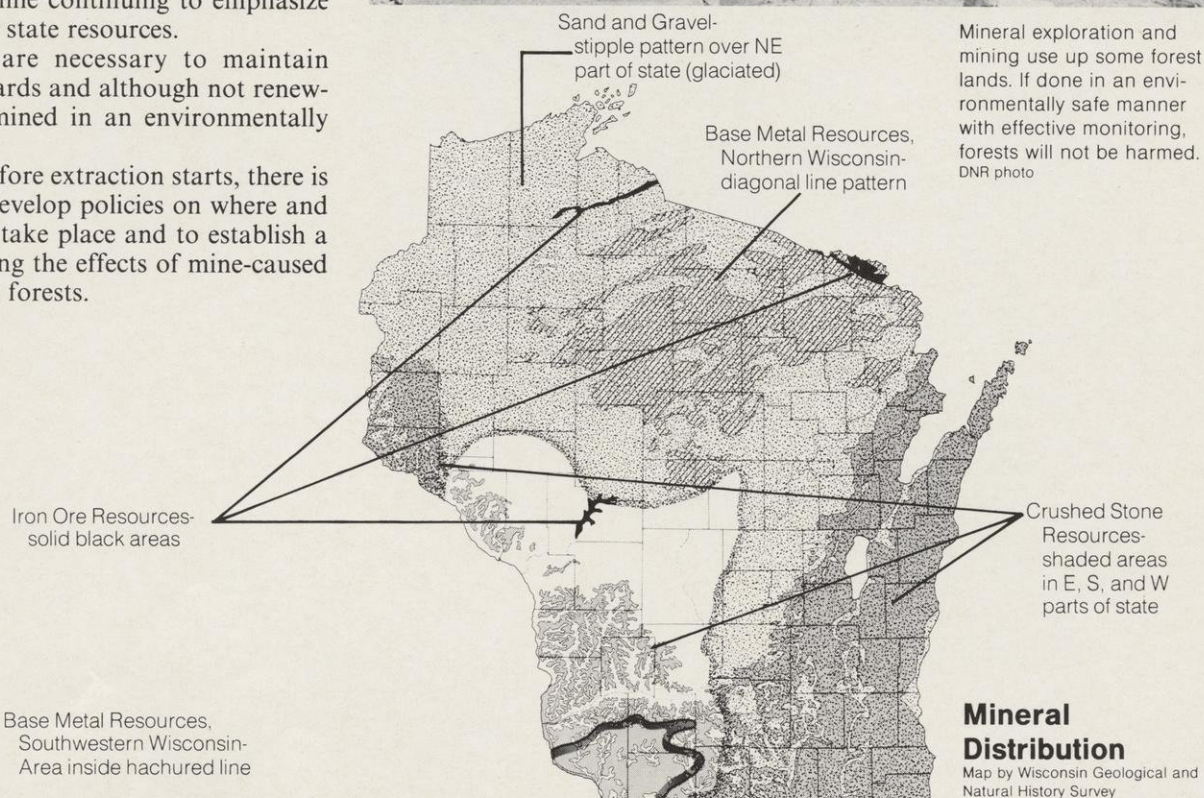
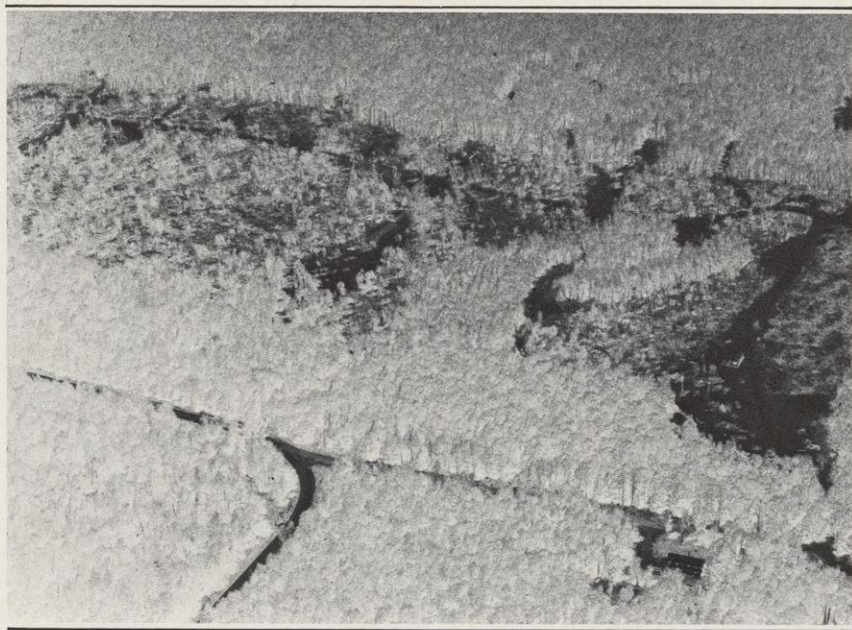
Because no mines have been opened in the near-decade since the last mineral deposit was found, property values have returned to normal. In the interim, state agencies have developed mining codes to address environmental and health concerns. And timber interests have concluded that even though metallic minerals will probably be mined in the near future, they pose little threat to timber production. In fact, metallic mining might help wood-using industries by shoring up unprofitable railroad branch lines with new freight revenues. Mining for other resources — sand, gravel, stone, clay and peat — takes place on commercial forest land on a very small scale.

In general the public has developed the attitude that mineral mining is a legitimate use of the land but one that must be regulated to minimize its influence on other land uses, protect other resources from contamination and ensure human health and safety. The Strategic Plan for Forests says:

All ownership, agencies and interest groups should plan and coordinate mineral exploration and development while continuing to emphasize protection for other state resources.

Some minerals are necessary to maintain present living standards and although not renewable, they can be mined in an environmentally safe manner.

In the interim, before extraction starts, there is an opportunity to develop policies on where and how mining should take place and to establish a system for monitoring the effects of mine-caused land-use changes on forests.



Waste disposal

The vast tracks of forest land in northern Wisconsin are tempting targets for waste disposal. As undeveloped land becomes scarce, pressures to use our commercial forests for other purposes will become heavier. Recent designation of 16 counties as potential sites for radioactive waste disposal is merely one instance of this problem. The Department of Energy has selected this area because of bedrock characteristics, because it is remote from population centers, and because large blocks of publicly-owned land are available. The forests are also being considered for other forms of waste disposal.

The Strategic Plan concludes that municipal and industrial solid waste disposal will not be a problem for timber production because transportation from distant population centers is too costly. Municipal sewage and wastewater may even be a beneficial fertilizer for plantations. Forest disposal, whether for radioactive or non-hazardous materials will actually disturb recreation users and wildlife much more than timber production. The plan recommends:

1. A study of the potential effects of hazardous and non-hazardous waste disposal and the identification of sites that will be least detrimental to the resource and its users.
2. Rules that will assure proper site location, minimize negative effects, protect ground and surface water, assure proper reclamation, and protect the economic and social values of the forest.



Upper photo: Backwoods landfills sometimes look bad but serve a purpose. With proper site selection to protect ground and surface waters and good management they can eventually be returned to their natural state.

Lower photo: Dump sites like this are inappropriate in a forest.

Transportation



Three-quarters of all Wisconsin's wood fiber moves by truck.
DNR photo

Wood is a heavy, bulky commodity that must usually be moved long distances. A hundred years ago timber was skidded out of the woods on the snow then floated down streams and rivers to sawmills. Even as recently as the early 1970's pulpwood was still floated across Lake Superior from Canada inside booms pulled by tugboats. These days, however, most of Wisconsin's wood fiber is carried by trucks, the rest by rail.

Without well-developed and maintained transportation systems both in and out of the forests, it would be impossible to market timber and pulpwood. Hauling prices must be reasonably economical if the projected growth in consumption of wood and paper products is to occur.

Railroads

Rail transport for wood fiber is economical when volume shipped is high or distances are great. Most wood hauled by rail in Wisconsin comes from outside the state. Local rail branchlines in northern Wisconsin timber producing areas are currently unprofitable because freight volume is too low, and volume is low because trucking is generally cheaper and more

convenient. With too few people consuming other goods to justify rail shipment, operators are seeking to abandon many of the remaining branchlines.

Government subsidies might help keep branchlines operating. Volume might be increased by modifying the way northwoods railroads collect wood. If mainlines were preserved and could be served by four key branchlines running roughly north/south, and wood collection terminals were spaced at appropriate intervals, shipping could be consolidated for better efficiency. Such a reorganization requires railroads to make a strong financial and moral commitment to good service. Private groups or logging coalitions would have to develop collection terminals and make a commitment to use the railroads. A state or federal subsidy might also be needed to ensure continuing service.

For the present, branchline abandonment seems inevitable. A possible plug for the leaking railroad dike is government operation or at the least preservation of the rights-of-way for future transportation systems. The Strategic Plan recommends evaluating public ownership of abandoned branchlines to serve the state's wood-producing areas.

Highways

Three-quarters of all wood fiber moves over highways by truck. It is the least expensive way to haul for distances up to 150 miles. Trucks are convenient because Wisconsin has a well-developed system of more than 105,000 miles of good road. But, equipment, maintenance and fuel costs have grown enormously in the last 10 years. For example, gasoline and diesel fuel prices increased nearly 70% between 1975 and 1980. Significantly greater fuel cost increases in the future may make highways a less attractive way to move wood to mills and manufacturing plants. Most likely, however, demand for truck service will increase about 2½ times in the next 50 years as rail service declines and pulpwood consumption doubles. Consumers will continue to pay for transportation in the price of the goods they buy.

Highway transport could be made more efficient if ways could be found to allow wood hauling during the spring thaw. Truck weights are traditionally restricted then to avoid damaging the roads. Cooperative truck hauling programs and movement of less green timber (which is heavier) might also help.

Forest Roads

The first link in the timber transportation chain is the forest road system. Lack of a well-developed system in state and county forests limits harvest, reforestation and timber improvement measures. It also restricts recreation and wildlife management access. The US Forest Service has an excellent forest road program which is a good model to follow. A thorough state and county forest road plan is needed including policies for operation and maintenance, a classification system and funding for development and maintenance. This plan should include a cost/benefit analysis which sets investment priorities. It should identify the best timber management opportunities, protect special plant and animal communities, consider outdoor recreation potential, define wildlife management opportunities, and protect soil and water.

Upper photo: Railroads are most economical for long hauls of timber. Not enough wood or other freight is shipped on northern Wisconsin branch lines to keep railroads in business.
UW-Extension-Forestry photo

Lower photo: During spring breakup expensive equipment like this sits idle because wood hauling is prohibited.
UW-Extension-Forestry photo

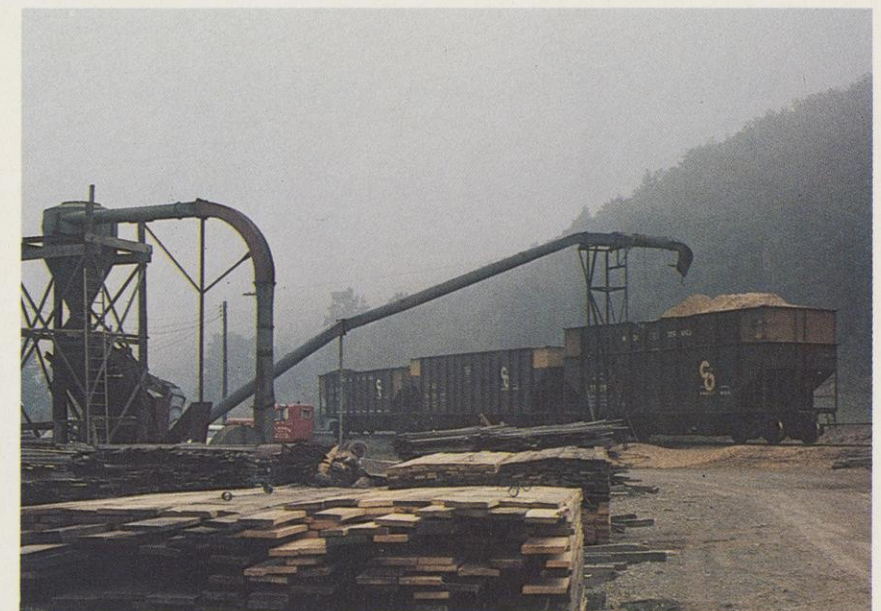
Moving logs in the early days was risky and difficult.
UW-Extension-Forestry photo



"Industries that use timber will be in a much better position to plan and expand production as a result of the Strategic Plan."

MARK MUELLER
Executive Director
Northwest Regional
Planning Commission

Center photo: Wisconsin's good road system helps make trucking timber economical. But access roads in state and county forests need developing.
DNR photo



The Wisconsin paper industry must import 80% of its softwood requirements.
Photo courtesy of Consolidated Papers, Inc.



Wisconsin

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The forests of Wisconsin, like the legendary phoenix bird, have arisen from the smoke and ashes of a devastated pine empire to become once again a priceless natural resource.

Today, the 14½-million acres which cover 42% of the state's land area are of significant importance to our economy. Forests are the basis for much of Wisconsin's timber industry, recreation, and wildlife. They contribute to clean water and air and are the backbone of the tourism industry.

Wisconsin is the leading paper producing state in the nation and is second in high quality veneer production. We rank high in hardwood lumber, Christmas tree, fuelwood and even maple syrup production. Wisconsin forests now produce the equivalent of 3.8-million cords per year. If this wood were all cut eight feet long and piled four feet high, it would form a pile 2,879 miles long—from New York to Chicago, Denver, Los Angeles and San Francisco.

One out of every 10 persons employed in this state is directly dependent on forests. Their wages are measured in billions of dollars.

This Strategic Plan charts the future direction of forest land management in Wisconsin for the next 45 years. The primary emphasis is on the supply and demand of timber and related values such as recreation and wildlife. The plan will be updated periodically.

As stewards of the land, each of us has an obligation to care for our forests, to protect and enhance their values for future generations and to manage them for the greatest total social benefit. The Strategic Plan will help us do this.

Milton E. Reinke
Chief State Forester