

# FORESTRY

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## Sustaining Minnesota's Forest Resources

A CITIZENS' GUIDE

1997

Division of Forestry  
Minnesota Department of Natural Resources



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# FORESTRY

## *Our Mission*

To work with public and private entities to promote the conservation, protection, and enjoyment of Minnesota's forest resources through sustainable management, wildfire and pest protection, and technical forestry assistance.

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## *From the Director*

**W**e Minnesotans take great pride in the wealth of natural resources that grace our state. Sun-sparkled lakes, wetlands teeming with life, broad expanses of grassland and towering trees ... all stand witness to the importance of natural systems as a source of irreplaceable richness in our lives.

For 85 years, the DNR Division of Forestry has been a proud partner in ensuring the well-being of these valued and valuable systems. Initially, our focus was on forests as a source of raw materials for a growing state and nation. But in recent years it has become clear that the forest is part of a broader picture, the integrity of which is key to our survival and that of future generations. Today we see our job as applying forestry principles and practices in partnership with all Minnesotans to nurture the sustained coexistence of a healthy environment, a healthy economy, and healthy communities.

As this report illustrates, the activities included under this broad mandate are as far-ranging as the resource itself. In southwestern Minnesota, DNR foresters work with community leaders to plan and plant new trees in the wake of a devastating tornado. Near the Canadian border, a technician snowshoes through a black spruce stand, gathering data to ensure that future harvests maintain the long-term viability of the resource. On broad open fields between the Twin Cities and Duluth, laborers spend hot hours in the sun at state forest nurseries, tending seedlings that will one day shelter our children and grandchildren.

Though the specific activities carried out by division employees are diverse, they have many common threads. One is commitment to the health and vitality of the resource now and for future generations. Another is partnership, working with public and private interests to accomplish far more than any of us could alone. There is empowerment, enabling those affected by decisions to take a central role in shaping them. And yet another is reliance on creativity, innovative technology, and an entrepreneurial spirit to form solutions that work in today's fast-changing world.

Minnesota's forests have long symbolized what's right with our state—a strong work ethic, a commitment to the future, a constant striving for cooperation and balance. We in DNR Forestry are dedicated to ensuring these forests' ongoing health and productivity. We welcome your comments as we continue our efforts to serve all Minnesotans, today and for generations to come.



Gerald A. Rose, Director  
Division of Forestry





# FORESTRY

## Overview

### *Who We Are, What We Do*

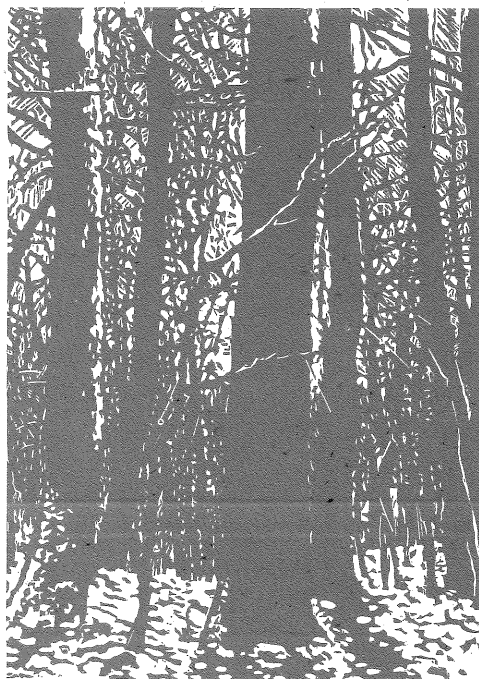
**T**he Minnesota DNR Division of Forestry touches the life of every Minnesotan. If you care about the natural environment, you appreciate our efforts to ensure that the forest ecosystem remains healthy as it serves the multiple demands of the people of the state.

If yours is among the 190,000 Minnesota jobs generated directly and indirectly by forest products and related industries—or if you simply use paper or other wood products—DNR Forestry serves you by helping maintain and even increase the state's long-term timber supply.

If you enjoy outdoor recreation, you benefit from the forests, roads, trails, water accesses, and campsites we manage.

If you are responsible for trees, whether a forest or a struggling sapling in your front lawn, you can count on the advice and expertise of DNR foresters as you make decisions on how to best care for your own “neck of the woods.”

DNR Forestry is committed to managing Minnesota's forests in a way that allows them to both produce and thrive so that our generation and generations to come may benefit from the many tangible and intangible gifts they have to share with us. Statewide, 350-plus DNR Forestry employees work daily, nightly, evenings, and weekends to support the multiple use, protection, and enjoyment of our state's valued and valuable forest resources.



## A Proud Past

For more than 85 years, DNR Forestry has been working to keep Minnesota's forest lands a healthy, thriving part of our lives, our environment, and our economy. But it hasn't always been that way. When what we know today as Minnesota was first settled by European immigrants, woodlands were seen as things to be used up, not sustainably managed. Millions of acres of trees were permanently cleared away in the name of creating farmland. Entire forests' worth of logs were floated downstream to build the cities of the growing nation.

It wasn't until the turn of the century that settlers began to recognize that the “endless supply” wasn't really endless, and that forest resources needed to be managed rather than simply used. Rampant wildfires spurred the 1911 state legislature to establish a position of state forester, and rangers were hired to protect forests throughout the northern part of the state. Gradually, the function of the state's forestry professionals grew to include not just fighting fires, but forest management, private forestry assistance, and more. By the time the division celebrated its 75th anniversary in 1986, more than 400 employees were working around the state to ensure the health and productivity of Minnesota's forests.

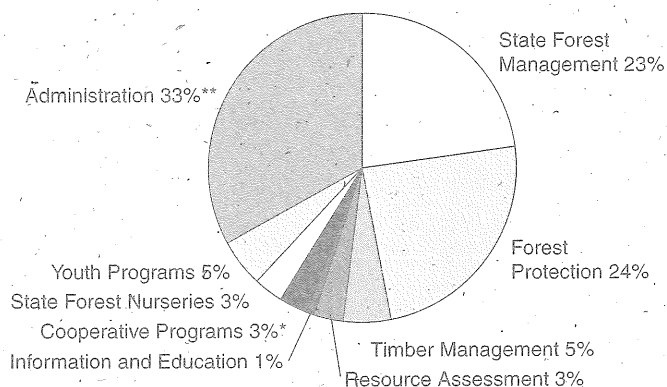
In 1989, a new era began for forest management in Minnesota when citizens, concerned about the growing demand for timber, asked the state's Environmental Quality Board to assess the potential environmental impacts of various levels of future harvest. The resulting Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota (GEIS), approved in 1994, provides an important framework for the long-term sustainable management of the state's forests. It also underscores Minnesota's commitment to supporting multiple uses of the forest while sustaining it for future generations. The recommendations of the GEIS were embodied in the Minnesota Sustainable Forest Resources Act of 1995, one of the state's most significant forestry laws.

## Current Challenges

In recent years, Minnesotans have increasingly recognized that forests are far more than "unimproved land" or wood waiting to be harvested. They are the source of many things we value—forest products, yes, but also beauty, outdoor recreation, wildlife habitat, and more. As public perceptions have shifted, so too have the responsibilities of DNR Forestry. Where once our focus was largely on traditional forestry, our work today is clearly oriented toward managing the 4.5 million acres of state-owned forest and related land in a way that allows it to provide multiple goods and services on a sustainable basis. And that's not all. We also:

- Help Minnesotans understand and appreciate forests
- Prevent and fight wildfires on 45 million acres of land
- Help private forest owners become stewards of their lands
- Promote responsible use of forest products
- Serve as a major source of wood fiber for one of the state's largest manufacturing industries
- Keep tabs on Minnesota's total forest resources
- Sell timber and coordinate reforestation
- Offer conservation programs for youth
- Produce millions of tree seedlings each year
- Work with towns and cities to establish, expand, and protect community forests
- Teach youth and adults about the natural world.

**How Division General Fund Dollars Were Spent During Fiscal Year 1996 (July 1, 1995 through June 30, 1996)**

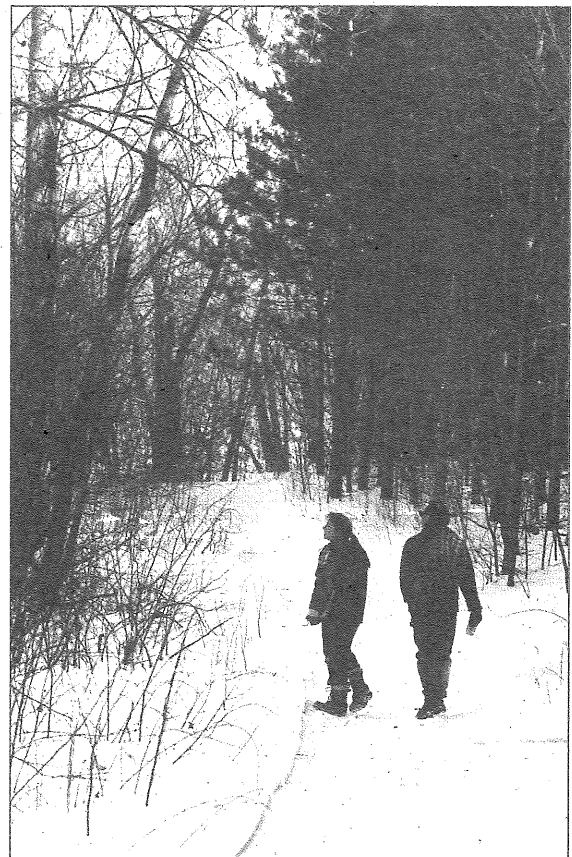
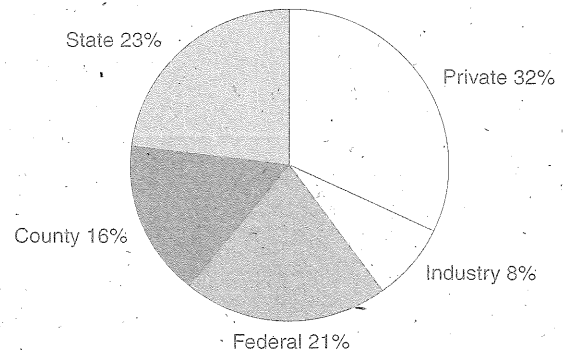


\* includes urban and community forestry

\*\* includes planning activities; salaries; facility, fleet, and equipment expenses; authorized leave and time off

The state of Minnesota owns only a fraction of the state's forest lands. However, DNR Forestry employees are responsible for promoting the quality and sustainability of all 16.7 million acres of forest within the state.

**Who Owns Minnesota's 16.7 Million Acres of Forested Land?**



A DNR forester helps a private landowner develop a forest stewardship plan for his land.

# FORESTRY

## DNR Forestry Region and Area Offices

### REGION 1 BEMIDJI

(218) 755-2891

111 Bemidji Area  
(218) 755-2890

116 Bagley Area  
(218) 694-2146

117 Blackduck Area  
(218) 835-6684

121 Warroad Area  
(218) 386-1304

123 Wannaska Area  
(218) 425-7793

131 Baudette Area  
(218) 634-2172

161 Park Rapids Area  
(218) 732-3309

162 Alexandria Area  
(320) 762-7812

163 Detroit Lakes Area  
(218) 847-1596

### REGION 2 GRAND RAPIDS

(218) 327-4418

221 Deer River Area  
(218) 246-8343

222 Effie Area  
(218) 743-3694

234 Hibbing Area  
(218) 262-6760

241 Orr Area  
(218) 757-3274

245 Tower Area  
(218) 753-4500

251 Cloquet Area  
(218) 879-0880

253 Two Harbors Area  
(218) 834-6602

255 Grand Marais Area  
(218) 387-1075

261 Littlefork Area  
(218) 278-6651

### REGION 3 BRAINERD

(218) 828-2616

311 Brainerd Area  
(218) 828-2565

312 Little Falls Area  
(320) 632-6674

321 Backus Area  
(218) 947-3232

323 Pequot Lakes Area  
(218) 568-4566

331 Hill City Area  
(218) 697-2476

334 Aitkin Area  
(218) 927-4040

342 Moose Lake Area  
(218) 485-5400

344 Hinckley Area  
(320) 384-6146

351 Cambridge Area  
(612) 689-7100

353 St. Cloud Area  
(320) 255-4276

### REGION 5 ROCHESTER

(507) 285-7428

442 Mankato Area  
(507) 389-6713

443 New Ulm Area  
(507) 359-6057

444 Willmar Area  
(320) 231-5164

531 Lewiston Area  
(507) 523-2183

532 Caledonia Area  
(507) 724-5264

533 Preston Area  
(507) 765-2740

534 Lake City Area  
(612) 345-3216

541 Rochester Area  
(507) 285-7428

545 Faribault Area  
(507) 332-3247

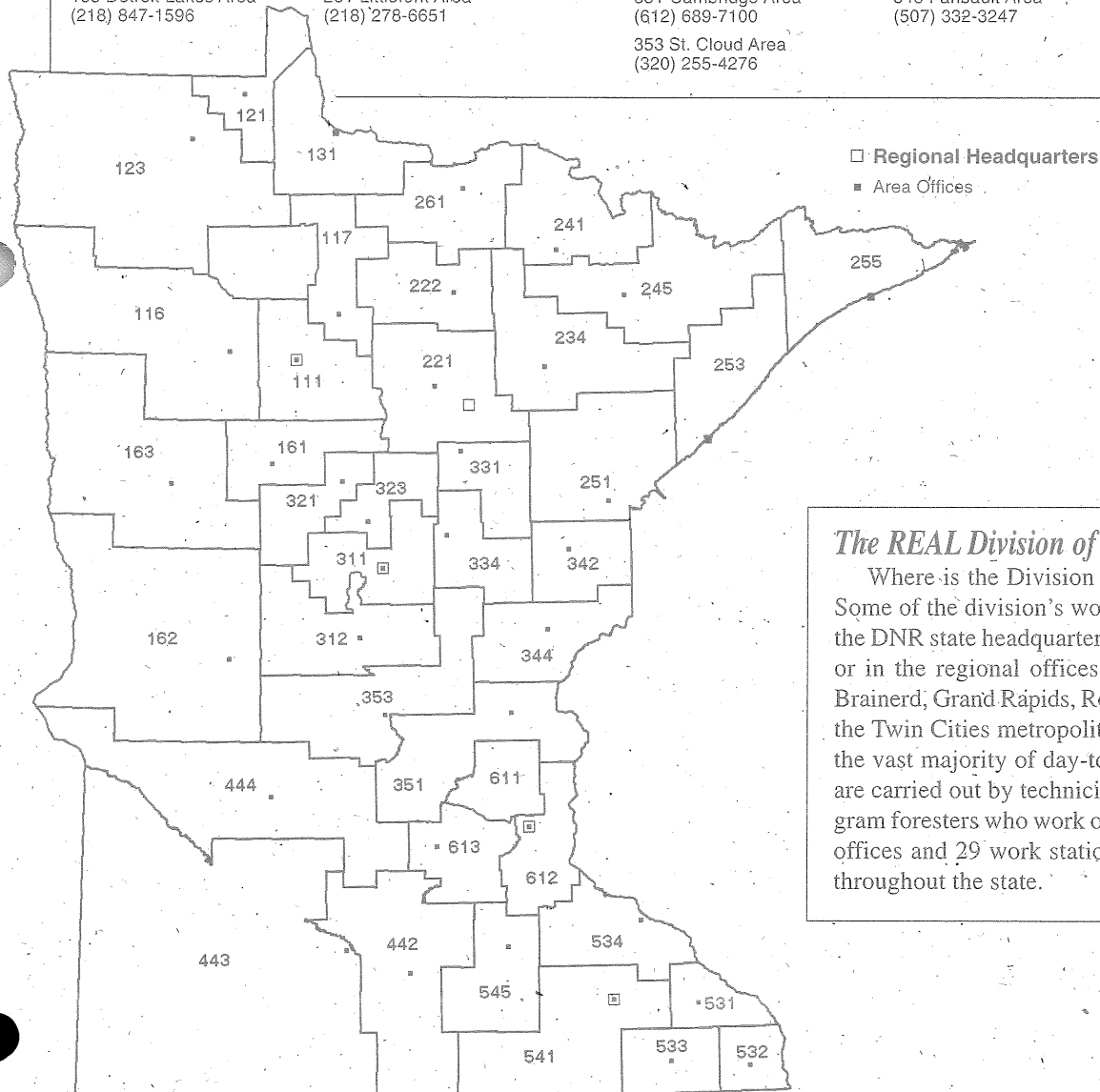
### REGION 6 METRO

(612) 772-7925

611 North Metro Area  
(612) 772-7925

612 East Metro Area  
(612) 772-7925

613 West Metro Area  
(612) 832-6175



### *The REAL Division of Forestry*

Where is the Division of Forestry? Some of the division's work is done at the DNR state headquarters in St. Paul, or in the regional offices in Bemidji, Brainerd, Grand Rapids, Rochester, and the Twin Cities metropolitan area. But the vast majority of day-to-day efforts are carried out by technicians and program foresters who work out of 40 area offices and 29 work stations scattered throughout the state.



## A Sustainable Future

DNR Forestry faces a future that is both encouraging and challenging. We're invigorated by the increased attention forests are receiving as a source not just of wood products but of other benefits as well.

The GEIS and its legislative follow-up, the Minnesota Sustainable Forest Resources Act of 1995, provide a road map that shows us how we can balance the many and

growing demands while preserving the integrity and sustainability of the state's forest resources.

But the road ahead is far from easy. The complexities of managing to conserve biodiversity across multiple ownerships only increase the challenge. In the years ahead, urban sprawl and related pressures from a growing population will reduce the forest's ability to provide wood products and wildlife habitat. Forest fragmentation is making many tracts uninhabitable for some species.

Even as we are being called upon to address emerging challenges such as this, we also are seeing budgets tighten. As a result, we expect to continually streamline what we do and work more than ever in partnership with other public and private groups.

Growing partnerships fit equally well with the DNR's emphasis on ecosystem-based management, known as EBM. This philosophy advocates sustaining forests and other natural systems through cooperation and collaboration to balance the needs of humans with those of other ecosystem components. We're enthusiastic about the fresh ideas and opportunities this approach is bringing as we make it more central to all we do.

As we enter a new millennium, trees and forests are increasingly important to the lives of Minnesotans. They are a valued source of renewable materials to meet the daily needs of a growing world. They offer refreshment through outdoor recreation and beauty. They are central to a healthy future in which living systems are respected for their innate value as well as for what they can do for us.

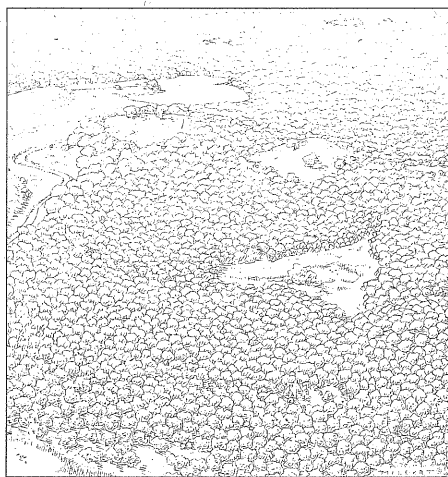
Minnesota's forests were an important part of our state's rich past. Ensuring that they will be an equally vital part of our future is what DNR Forestry is all about.

## A Multiple-Use Resource

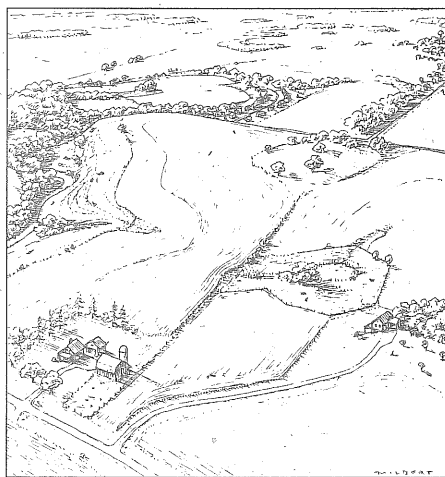
Minnesota's trees and forests provide many benefits...

- forest products
- jobs
- recreation
- beauty
- wildlife habitat
- healthy environment (clean water, clean air)

*Pre-1850s Big Woods Ecosystem*



*Present Day Big Woods Ecosystem*



*The Future of Big Woods Ecosystem*



A fragmented forest is uninhabitable for some wildlife species. Ecosystem-based management strives to handle multiple-owned areas through partnerships and public outreach.

For more information on DNR Division of Forestry programs and services, contact the St. Paul central office at (612) 296-4491 or your regional DNR office:

- Bemidji ..... (218) 755-2891
- Grand Rapids ..... (218) 327-4418
- Brainerd ..... (218) 828-2616
- Rochester ..... (507) 285-7428
- Twin Cities ..... (612) 772-7925

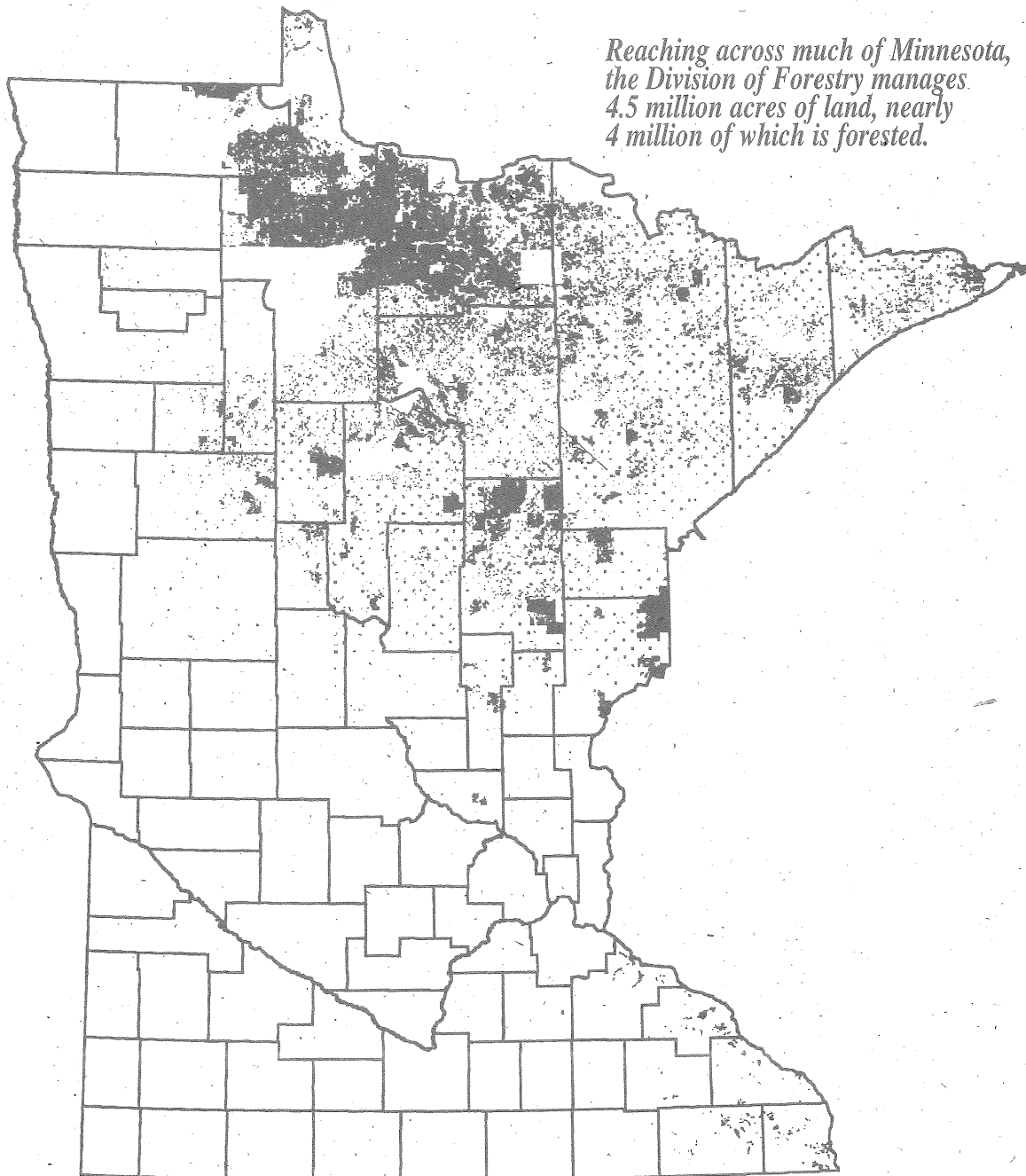
From Managing Landscapes in the Big Woods Ecosystem. Used with permission.

# FORESTRY

## State Forest Management

### *Maintaining Our Forests*

**M**illions of acres of land—including those situated within 57 state forests—are publicly owned by the people of Minnesota. Balancing the many demands we place on such lands today while keeping them healthy for tomorrow is one of DNR Forestry's biggest jobs.



*Reaching across much of Minnesota, the Division of Forestry manages 4.5 million acres of land, nearly 4 million of which is forested.*

## Many Forests, Many Responsibilities

Minnesota's state forests are rich and diverse. Some are largely aspen and pine. Others are scattered hardwood forests interspersed with fertile farmland and rustic villages. State forests may stretch from one county to the next or be tiny parcels of land freckling the landscape.

As diverse as the forests themselves are the products and services they offer. Minnesota's forest lands produce timber and other crops. They provide open spaces for hunting and birding, skiing and snowmobiling, camping and canoeing. They help protect surface waters by preventing erosion. They are home to countless animals and plants. Most importantly, they are an integral part of larger natural systems that sustain and vitalize our environment, economy, and communities.

Managing this diverse resource is not one job, but many. Responsibilities of state forest managers include:

- **Maintaining state forest campsites and other outdoor recreational facilities.** DNR Forestry maintains 46 campgrounds, 44 day-use areas, 1,200 miles of trails, 142 water accesses, and 17 canoe and boating route campsites. These facilities provide access to state forest land and help prevent forest fires by concentrating use at sites with fire rings.
- **Keeping forests thriving and healthy.** Land managers plan harvests and tree-planting projects to help keep the forest healthy and productive. We are committed to reforesting an amount of land equal to land harvested each year. We also im-

prove areas that were inadequately reforested in the past or are poorly stocked for other reasons.

- **Maintaining forest roads.** We maintain more than 2,000 miles of forest roads that provide public access to nearly 4 million acres of state forest land. More than 95 percent of the miles driven on these roads is for general travel and outdoor recreation. They are an integral part of the everyday transportation network in northern Minnesota and support two of the state's largest industries, forest products and tourism.
- **Managing habitat for fish and wildlife production.** We work with DNR Fish and Wildlife staff and others to maintain or improve the forests' ability to support hunting, fishing, and a rich diversity of plant and nongame animal species. Specific activities include building trails, managing shrub and grass habitat, carrying out prescribed burns, ensuring that activities on state forests have minimal impact on water quality, and protecting and restoring habitat in scientific and natural areas.
- **Identifying and protecting values in addition to timber and outdoor recreation.** DNR Forestry is committed to conserving biological diversity—the variety and variability of living things and the populations, communities, and ecosystems in which they occur. We are working with an archaeologist to identify and protect areas within state forests that have exceptional cultural or historic value. We are using a set of guidelines known as best management practices (BMPs) to protect water, soil, and aesthetic values while carrying out forest management activities.

Public forest management is both a science and an art. It must balance many different needs and values. It also must anticipate the needs and values of the future far in advance, for the trees we'll need a half-century from now won't be there unless we take care of the ones we have today and plant more for tomorrow.

### Practices That Protect

Clean water, healthy soil, and beauty are among the most valuable contributions Minnesota's forests make to the well-being of our environment, economy, and society. To help preserve these traits during and after tree harvest, DNR Forestry has developed in cooperation with the forestry community a series of guidelines known as best management practices, or BMPs.

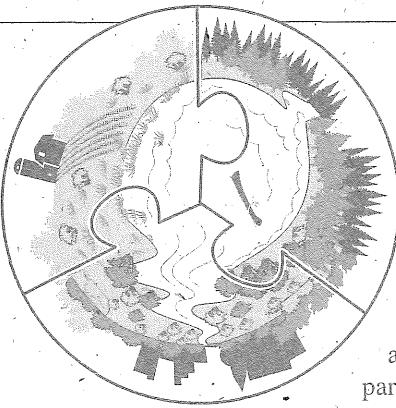
BMPs encourage the use of harvesting techniques and other practices that minimize impacts to water, soil, wetlands, and aesthetics. They are required for harvests and other management activities on state-owned lands and are recommended for use on other forest ownerships.

By following voluntary BMPs, forest managers, loggers, and landowners are helping to protect the many benefits forests provide while minimizing the need for government regulation.

# BMPs



# FORESTRY



## *EBM Meets MN*

Historically, state forest management has been based on stands—chunks of forest land in which the vegetation is relatively similar throughout. Today, that approach is being tempered by a DNR-wide commitment to an increasingly accepted approach known as ecosystem-based management, or EBM.

EBM means looking at resources from a big-picture perspective that takes into account not just a single area or component, but also the links with other living and nonliving things in and around the area. It means working with other private and public partners to meet mutual goals. It means balancing needs of economy, community, and environment.

For DNR Forestry managers, EBM means literally looking beyond the trees to see the forest. It means looking beyond the forest to see the needs of the people and other creatures that depend on it and each other for continued well-being. It means acknowledging the fact that we all need to work together in order to produce a future that is bright for all of us.

## **Changing With the Times**

As we gaze into the crystal ball, we see a number of changes that affect how we manage today's forests. A prominent one is the growing demand for wood and wood products. Managers are busier than ever planning wise harvests and renewing harvested sites for future use.

We also see a growing demand for outdoor recreation. The number of people using state forest campsites is on the rise. The kinds of recreation are changing, too. There is an increase in conflicting recreational uses as more people want to use outdoor sites for horseback riding, motorcycling, all-terrain vehicles, and so on. Minnesotans want better access to the forest, whether through additional roads or creation of paved, self-guided nature trails such as the one recently built in Wabasha County to increase access for persons with disabilities. Because of limited funding, we expect to meet the increased recreational demand largely by helping people plan their own outdoor recreation, rather than building more formal facilities. We also are eyeing other creative ways of providing services on a limited budget, including an "Adopt a Campground" program and various volunteer programs.

The future is also being shaped by a growing interest in preserving cultural and aesthetic values and in protecting the forest's ability to sustain water resources and biodiversity. We will continue to consider multiple uses and values in our management decisions. We will manage some forests on an extended rotation basis to increase their ability to provide these values. We will also protect old, relatively undisturbed stands that represent outstanding examples of native forests from long ago as an important heritage from the past.

At the same time that demands are changing, the tools forest managers have to work with also are changing. Information technology has created mind-boggling upgrades in our ability to get information we need to make decisions and carry them out. Changes in logging technology are making it increasingly possible to harvest trees in ways that reduce impacts on forest aesthetics, soils, productivity, and biological diversity. New tools such as field data recorders and advanced computer programs are helping us gain a fuller understanding of forest resources in order to better plan how to get where we want to go.

As important as these new trends and technologies are to our future, we are very aware of the need to keep state forest management firmly rooted in the heritage of the past. Our forebears had the wisdom and foresight to set aside lands to be managed by the state for the good of its people. We take this responsibility very seriously, recognizing that we hold in our hands a gift of inestimable value to be used now but also to be passed along to our children and to their children after them.

## **A Chance to Invest in Tomorrow**

**Wish you could do something concrete to help perpetuate Minnesota's Forests? You can! DNR Forestry's Future Forests Fund offers individuals and businesses a tax-deductible opportunity to support tree planting on state land. For more information call DNR Forests at (612) 296-4491 or toll-free, (800) 766-6000.**

## *Something for Everyone*

Talk about multiple uses ... at Sand Dunes State Forest, just northwest of the Twin Cities in Sherburne County, they're pretty much doing it all. In winter it's snowmobiling, snowshoeing, and cross-country skiing. In summer, folks come to camp, pick berries, picnic, fish, ride horseback, hike, and swim. ("On a hot day you can't wedge yourself on the beach," says DNR program forester James Tischler, who is largely responsible for managing recreation on the site.) Year-round, the forest supports hunters, target shooters, birders, loggers—even, says Tischler, one woman who trains her sled dogs by having them haul around the frame of an old Volkswagen. And smack in the middle of it all is a scientific and natural area, set aside to protect the endangered Uncas skipper butterfly and rare sand dunes habitat.

With its many diverse functions, the 6,000-acre Sand Dunes is the essence of what's right with state forests: they give every Minnesotan a chance

to experience nature in his or her own way, whatever that might be. But as use skyrockets (Sherburne is the fastest-growing county in the state), it also illustrates the challenge that comes with trying to be all things to all people. Families looking for peace and quiet end up camped next to a truckload of guys who've come to unwind after a hard work week. Skiers find winter's frosty silence interrupted with the whine of snowmobiles. Hunters eye trees marked for harvest and wonder whether there'll be any game worth coming for next year.

Today, these pressures are giving the Sand Dunes a chance to model one way in which such conflicts can be defused if people focus on solutions rather than problems. The multiple-use boom in recent years has transformed one of the area's most popular pastimes, target and trap shooting, into a public health hazard. The knee-jerk reaction might have been to outlaw such activities altogether. Instead, interested parties approached the state legislature and came away with money for a shooting range, enabling target practice and berry-picking to safely coexist.

"It's an attempt, rather than to react and say no, to provide an alternative," Tischler says.

Creative compromises like this, he believes, will become increasingly important at Sand Dunes as the area develops further. "On this number of acres it's not physically possible to allow everybody to do what they want," he says. "But I don't want to see the multiple uses disappear. Intensive recreational management is going to have to be the future for this operation."



**James Tischler**

For more information on state forest management programs and services, contact Barry Morse at (612) 296-4482 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925

# FORESTRY

## Fire and Forest Health

### *Protecting Our Forests*

**F**ire, disease, and insects were all part of the forest ecosystem long before European settlers showed up on the scene. But when we began using resources from the forests, the natural balance between growth and destruction shifted. We changed the mix of plant and animal species and brought in new, havoc-wreaking pests against which native species had little resistance. And we introduced an economic need to limit fire damage to forests and to the homes, businesses, and lives we built in and around them.

In the early years, with horrendous disasters such as the Hinckley Fire fresh in our memories, our goal was to unequivocally protect forests from fire and pests. As the science of resource management progressed, it became evident that some destruction is part of a balanced ecosystem. Today, our more measured response calls for limiting damage from fire and pests in a way that makes sense from both economic and ecological standpoints.

### **Controlling Fire**

History is peppered with stories of great tragedies caused by uncontrolled forest fires. Even our recent past is replete with examples of fires that would have destroyed entire communities if they were not controlled. As one of the primary wild-land firefighting entities in the state, DNR Forestry helps protect not only 45 million acres of land, but also human lives and property, from fire.

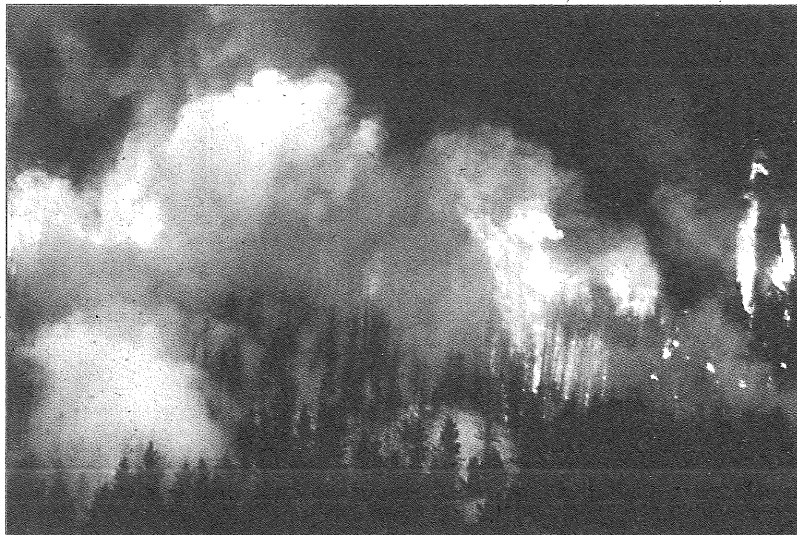
Fire control begins with preventing fires in the first place. We do this by educating people, controlling open burning, and enforcing fire-prevention laws. These efforts do much to reduce fires started by careless debris-burning.

In order to respond quickly to fires, we maintain a solid

core of professionals ready to go when a fire starts. We are heavily involved in "presuppression efforts"—training firefighters, monitoring fire-related weather conditions, coordinating with other agencies, and developing plans for handling various situations. In recent years we've emphasized building bridges with other public agencies so we can help each other in emergencies. Just as Minnesota firefighters may fight fires in Ontario or Michigan, we have an international pool of experts to call upon should our needs exceed our capacity.

Each year we fight an average of 1,600 fires, which together burn some 65,000 to 75,000 acres of land. When a fire breaks out, DNR Forestry firefighters work with local fire departments and others to minimize damage and threat to human life. Using specialized land vehicles and aircraft, well-trained crews and well-placed strategies, we work to limit the blaze and protect life and property. The effort is led by an incident commander, often a program forester or technician with special training in managing firefighting crews.

Resource protection workers also carry out controlled burning as a forest management tool and for firefighting practice. Some 20,000 to 30,000 acres of land are deliberately burned each year to mimic the ecosystem-renewing benefits of natural fires while continuing to protect human life and property.



DNR Forestry helps protect not only 45 million acres of land, but also human lives and property, from fire.



## Forest Health

Take a small step back in time, to the 1970s or so. At that time, tree-infesting insects and diseases were considered just plain trouble. Our job, as we saw it then, was to eliminate them wherever and whenever we could.

Things have changed. We now know that damage to trees by other living things is not all bad. Many organisms we call pests are part of a balanced ecosystem. They often provide food and create shelter for other forest residents.

But that doesn't mean they ought to proceed unchecked. Some insects are invaders and work against, rather than toward, the natural balance. And sometimes pest damage interferes with timber production, aesthetics, and other values we derive from trees and forests. Our job is to balance the natural place of pests in the forest environment with other needs.

Working both on publicly owned land and with private landowners, we survey forests for pest problems. We identify risks faced by individual stands. We also develop management guidelines for various pest situations, and advise others how to identify and respond to insect and disease problems.

Over the past several years, we have seen many changes in philosophy and technique. Where once our goal was healthy trees, today it is healthy forests. Where once we concentrated on problems as they arose, today we try to anticipate and prevent them by managing the composition, vigor, and configuration of forests. Where biological controls were once a novelty, today they make up the bulk of our pest-fighting arsenal.

DNR foresters spend time examining and tracking the health of forests.

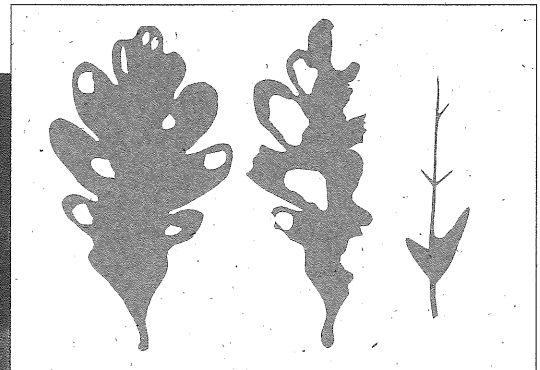


## Shifting Needs, Shifting Abilities

Both needs and capabilities are evolving in resource protection. The amount of land vulnerable to wildfire and pests is increasing because of cropland reduction and wildlife habitat development programs. The need to protect homes and property is growing as rural populations expand and the rural-urban interface blurs. These trends are likely to increase demand for our services.

As demand grows, so does our ability to meet it through advanced technology and new partnerships. Today, a computer program that simulates fire behavior helps us determine the best tactics for fighting a fire. Improved weather forecasting allows us to better predict conditions likely to produce fires. Aircraft enhance the efficiency of our response. Computer linkages and a common computer language make coordinating among agencies faster and better than ever.

In the realm of forest health, we are bracing for invaders such as the gypsy moth that are making their way across the country. We also are alert to the need to consider the impact of global climate change on forests. On the bright side, ongoing research holds promise for increasingly specific pest control that could one day let us, for example, selectively destroy the larvae of a particular pest without harming other insect species.



The gypsy moth devours oak tree foliage quickly.

## *One to Talk About*

To hear Jim Tarbell tell it, the urge to fight fires could well be a hereditary trait. Son of a Cotton, Minnesota, district ranger, Tarbell says he was captivated from his earliest days by what he calls "the thrill of being able to put out a fire, to make a difference for the resource."

"By the time I was old enough to walk that was always my yearn, to put out fires," he says. That desire became a career in 1961, when Tarbell joined the DNR. Today, he is not only area forester, but also a member of one of three Minnesota Incident Command System overhead teams that combat wildfires throughout the state.

Among the toughest and most rewarding experiences Tarbell's had in that position occurred in 1995, when he served as incident commander for a 16-day wildfire that burned 14,000 acres of land on the Minnesota-Canada border.

Known in the record books today as Sag Corridor-Thunder Bay 136, the fire was started by a careless camper on a remote island in the Boundary Waters Canoe Area Wilderness in the Gunflint District of the Superior National Forest. Fanned by 50-mile-per-hour winds and fueled by a mixture of conifers with fir killed by spruce budworm, it spread rapidly through the dry terrain. Within a day, suppression efforts had begun—a job that eventually would involve 592 firefighters from 21 states and six

provinces and cost U.S. and Canadian taxpayers more than \$3 million.

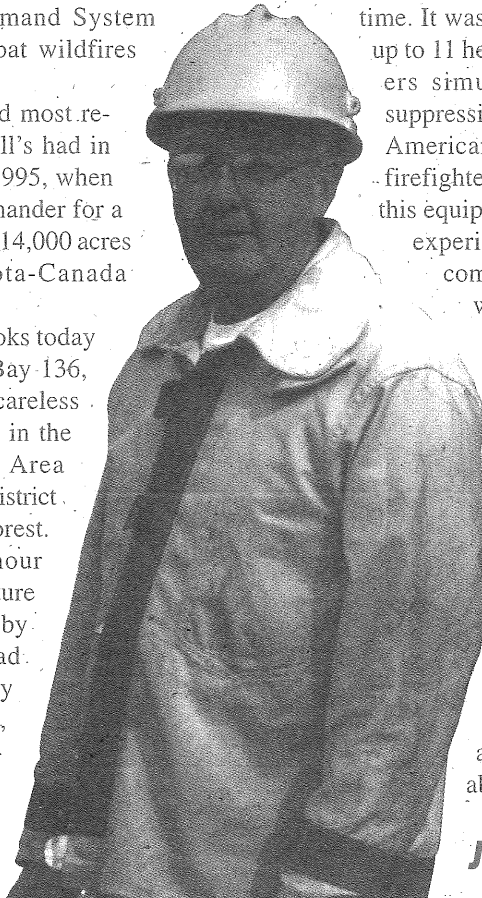
As the head of the suppression effort, Tarbell was responsible for everything from coordinating international efforts to providing leadership for the Overhead Team so that suppression objectives were met and firefighters were safe and well-fed. Because of the isolated nature of the fire, the team had to call in a spectrum of special equipment and techniques, including a large helicopter that could haul 10 tons (2,600 gallons) of water at a time. It was a spectacular air show with

up to 11 helicopters and seven air tankers simultaneously available for suppression work. These aircraft, both American and Canadian, supported firefighters on the ground. "Without this equipment or the well-trained and experienced firefighters, the outcome of this suppression effort would not have been so successful," says Tarbell.

When it was all over, Tarbell was pleased with the outcome.

Thanks to quick, strategic action by the initial attack and extended attack personnel, not a single life—not even a single structure—was lost. "I was elated," he says. "It was a unique, complex situation. It's probably one we're going to talk about for a long time."

**Jim Tarbell**



## DNR & IPM

The trend in human health care today is to do things that will keep us healthy rather than waiting until we get sick. That same idea is being applied to trees through an approach to forest health known as integrated pest management, or IPM.

The practice of choice today for controlling tree insects and diseases, IPM is a blend of biological, chemical, mechanical, and other techniques. Its goal: to create and maintain a healthy forest in a way that is both environmentally and economically sound.

With IPM, pest control permeates forest management. We plant insect- and disease-resistant trees. We watch a growing forest and remove or treat problem spots promptly. We thin and carry out other management practices with the goal of maintaining a healthy forest. Regeneration plans consider previous pest problems as well as which mix of species will be the healthiest on the site.

IPM isn't easy. It means tailoring activities to individual stands rather than treating all of Minnesota like one big forest. It means thinking ahead. It means preventing problems as well as curing them. But just as health maintenance keeps health care costs down and people healthy, IPM is proving to be just what the doctor ordered for maximizing forest health while minimizing expense and chemical intervention.

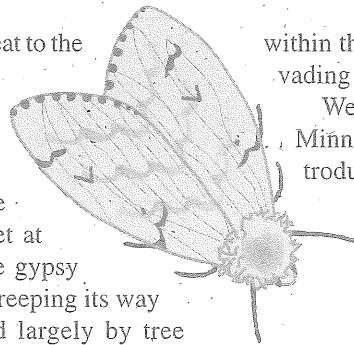
## Unwelcome Guest

If you have moved to Minnesota from an infested area and suspect the gypsy moth might have hitchhiked along with you, or if you would like to know more about this pest and its control, contact your regional DNR office (see box on right) or your community forester.

The most serious threat to the health of Minnesota's forests today is the gypsy moth, an insect introduced to the eastern United States in the 1800s. Although not yet at an infestation level, the gypsy moth has slowly been creeping its way into Minnesota, spread largely by tree nursery stock, recreational vehicles, and household items coming into the state.

The voracious caterpillar feeds on more than 200 species of plants, but it prefers oak and aspen. Once established, it can defoliate entire stands, weakening and destroying trees.

What are we doing to slow the spread and minimize damage? For the short term, we are alerting Minnesotans to the problem and watching forests carefully so we can eliminate new infestations before they spread. For the long term, we are working on increasing the health and vigor of our forests and changing the mix of trees



within them to reduce their appeal to the invading insect.

We cannot keep the gypsy moth out of Minnesota forever. But by slowing its introduction, we can buy the time needed to adjust the forest ecosystem to withstand this exotic pest.

For more information on fire and pest management programs and services, contact Olin Phillips at (612) 296-5971 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Timber Sales

### *Harvesting the Interest From Timber Investments*

**T**hink the only thing forests do for schools is supply the paper needed for those interminable spelling and math tests? If so, think again. Timber sales from land managed by DNR Forestry contribute the dollars needed to operate a variety of public services, including schools.

Timber harvesting also allows foresters to shape the forest toward management goals—for example, striking the balance between young and older forest needed to encourage a variety of wildlife species. Managing harvests while maintaining the long-term health and productivity of state lands is the job of DNR Forestry timber sales program staff.

## Selling Timber

In Minnesota, independent loggers do most timber harvesting. The owner of the land to be harvested—whether it's the state or a farmer with a woodlot—sells the right to harvest a certain amount of trees in a certain way through a legal tool called a timber sale contract.

Selling timber is much more complicated than tacking a "wood for sale" sign to a tree. Trees grow and die, so the amount of timber on a site changes constantly. Also, the value of the timber varies depending on how much there is, how easy it is to get to, the species of trees, and how far it is from market.

The job of administering timber sales on state lands is carried out by DNR foresters. First, the amount of timber that can be sustainably harvested on state lands each year is determined. Next, sites that should be harvested are selected. Then the amount of timber on a sale site is estimated and offered for sale at public auction. Timber sales staff handle the specifics, working to get the best return for the taxpayer. They supervise the harvest to ensure protection of environmental and aesthetic values. They also "scale" the timber sold—measure the quantities removed from the site.

## *Why Harvest Timber From State Lands?*

The most obvious reason is to produce income for public programs. But timber harvest is also an important part of the stewardship of actively growing forests. Wisely planned harvest helps forests thrive while maintaining and even enhancing features such as space for outdoor recreation and some types of wildlife habitat. Timber harvest is also an important source of economic activity.

Perhaps the most down-to-earth reason for harvesting timber on state land, however, is the one you are holding in your hands. Wood products such as the paper on which this report is printed permeate our everyday lives. And wood products produced from state-owned timber are among the most environmentally sound products you can buy. Why? First, wood, unlike many other raw materials, is a renewable resource. Second, because of various laws and the need for public accountability, wood products made from state-managed trees carry with them the guarantee that the loggers who harvested the wood did their work in a way that protects forests for the future. Third, wood products are more energy friendly to manufacture than many products made from other raw materials.

## Keeping Pace With the Times

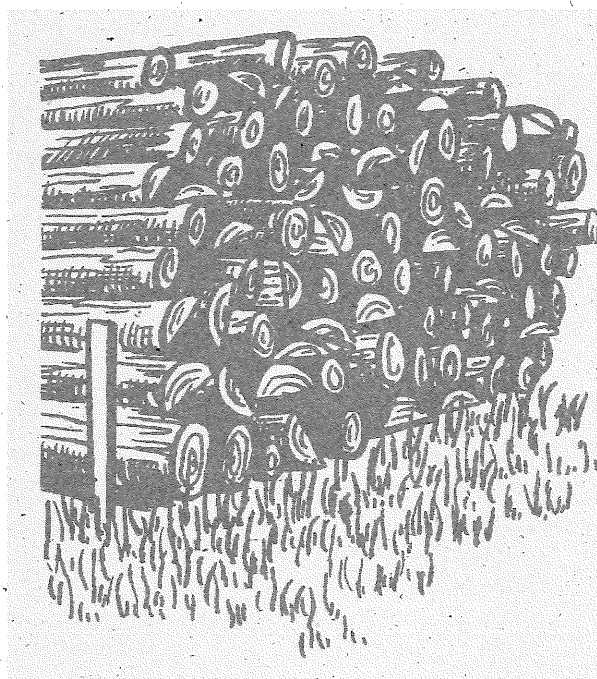
Timber sales have changed much over the years. In the days of the logging camps, the DNR was only allowed to offer one auction sale per year in each county with a maximum value of \$15,000, and the sales often were large enough to keep a camp full of lumberjacks busy for several years. Informal sales, begun in 1925 to give individual settlers a chance to earn a little extra income, had a \$50 cap and were limited to dead timber.

Currently the DNR is allowed by law to sell timber in four ways. Timber in volume of up to 6,000 cords may be sold through oral or sealed bids in a *regular auction sale*. There is no limit on the number of sales per county or number of regular auction contracts a single person or company may hold. *Intermediate auction sales* cover smaller amounts, up to 3,000 cords of timber; an individual may hold up to six at one time. *Informal sales*, which do not require public bidding, can be made on timber in volume of 500 cords and are usually used for small lots or salvage situations. Finally, the program also offers *special fuelwood permits* that allow harvest of 12 cords or less.

## An Eye to the Future

Today, the timber sales program faces both changing needs and changing capabilities. In step with DNR Forestry's commitment to sustainable, multi-use management, the program is paying increased attention to protecting soil, water, wildlife, aesthetics, and other forest components. It is also working to keep benefits to taxpayers as high as possible by improving administrative efficiency and adopting state-of-the-art methods for jobs such as appraising and scaling timber. Computers make the program's work more accurate and efficient than ever.

Much of the focus for future improvement is on marketing, coordinating with other agencies and with the forest products industry, encouraging new harvesting technologies, and applying research to increase forest productivity.



## What's a Cord?

If you've ever shopped for fireplace wood, you know one of the seller's first questions is, "How many cords do you need?" So, what's a cord? Legally, it's a standard measure of a stack of wood that is 8 feet long, 4 feet wide, and 4 feet high. The volume of a standard cord is 128 cubic feet. Don't be confused when you buy. Cut and split wood is often sold in "cords" smaller than a legal cord.

## *All in a Day's Work*

The cold and snow can get to you sometimes, it's true. So can the blackflies. And then there's the bears .... But when it comes right down to it, DNR forestry technician Jody Liedholm wouldn't trade his job for any other.

An 18-year veteran of the Littlefork area office's timber sales crew, Liedholm spends much of his work day in the woods, appraising timber for sale, or checking up on harvesting in progress. Some days it's a matter of taking a pleasant hike in a sunlit forest with a notebook and other assorted tools of the trade. Other times it involves bone-chilling treks by machine and snowshoe across long miles of isolated land. It always involves a solid dose of good training, intuition, common sense, and a commitment to ensuring that the forest is managed wisely.

"There's so much to learn in this job," Liedholm says. "It takes a good many years to really see the whole big picture out in the woods."

In the two decades he's been cruising timber, Liedholm has seen a few changes. Perhaps the most significant is the increasing emphasis on multiple uses. Liedholm stays in close contact with DNR wildlife specialists to keep up to speed on habitat protection needs. When he's actually marking up a sale, he'll often specify that certain parts of stands or even individual trees be left behind to maintain the area's aesthetic or habitat value. And he makes sure that when the loggers are in the woods, they take the proper precautions to avoid damaging soils and water.

How does he balance the many considerations? By tapping his own bank of experience and those

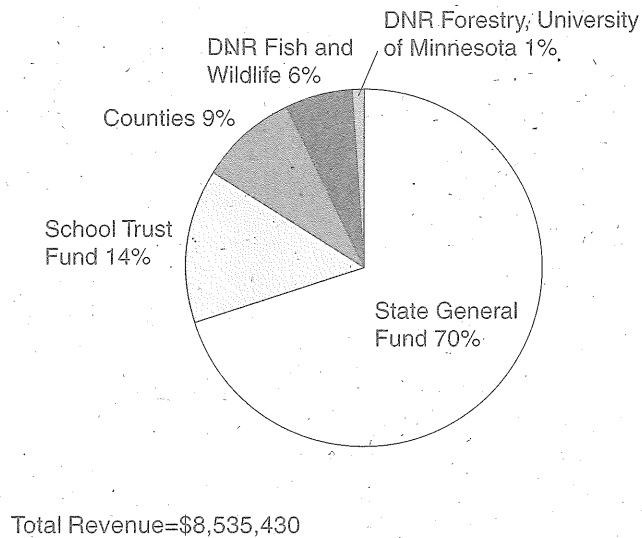


**Jody Liedholm**

of others—and by keeping in mind that the decisions he makes in the field have long-term impacts he and others will have to live with.

"There's an art to it, being able to look at the big picture," he says. "Whatever we do, that's an impact that's going to last for many, many years."

**Distribution of Timber Revenues**  
July 1, 1995–June 30, 1996



For more information on timber sales programs and services, contact Bill Berndt at (612) 296-4498 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Resource Assessment

### *Sketching the Picture*

**I**f you want to take good care of something, you have to know what it is and what its needs are. Imagine trying to do so for a “something” that covers nearly 17 million acres and changes every day! That’s the job of DNR Forestry’s resource assessment staff.

Since 1936, we have been collecting and sharing information about the size and nature of Minnesota’s forests. Originally our tools were on-the-ground surveys. Then photos taken from the sky expanded our information gathering. Today satellite imagery and computer models are also used. The result is a clear portrait of Minnesota’s forests, both public and private, that resource managers can use to develop programs and policies that promote continued forest health and productivity.

## Walking the Woods

With a few holidays excepted, every day of the year finds a DNR forester tromping somewhere through the woods, identifying and measuring trees. Because trees grow, die, and regenerate, resource assessment is a never-ending task.

It’s also a statistically based one. There’s no way we can measure every one of the state’s estimated 10 billion trees. Instead, we set up sample plots and measure randomly chosen groups of trees within those areas. We then apply the information to create a picture of the overall forest.



A forester draws a core sample from a tree to better examine its health and growth pattern.



Aerial photographs help managers assess forest land.

## Remote Sensing

Hands-on, feet-in-the-mud assessment gets at the details of forest stands. But we also need a look at the big picture. We get that via remote sensing—gathering information using aircraft and satellites.

Most remote sensing in Minnesota is done by aerial photographers on contract with the DNR. The photos they produce are used for everything from identifying harvest sites to fighting fires. And managers requiring a *really* big picture can turn to satellite imagery, data collected from space that can be combined with the other resource assessment tools to bring the broad picture into even better focus.

## A Model Program

Over the past several decades, forest assessment has been revolutionized by computer modeling. Complex models developed through scientific research let us feed what we know about forests and how they change into a computer and produce a picture of what a stand we haven’t measured looks like, or what a stand we have measured will look like a year or even decades from now.

Models require a degree of caution, because the information we get out is only as accurate as the assumptions we feed in. But as we learn more and more about the complex interactions within a forest, they are providing an increasingly important part of the picture we paint of Minnesota’s forest resources.

## Putting It Together

On-the-ground surveys, remote sensing, and computer models are the tools of forest assessment. But how and when do we use them?

The answer is a veritable alphabet soup of programs, some federal, some state, some cooperative, that use survey techniques to build a better understanding of our state's forests so we can benefit from them while protecting the values they offer for future generations.

Forest Inventory and Analysis, or FIA, is the granddaddy of them all. A cooperative program with the U.S. Department of Agriculture (USDA) Forest Service, it continues a survey process that began in the 1930s. Every 10 years on a rotating basis, FIA inventories 12,500 permanent forest plots throughout the state.

In recent years, improvements in technology and the need for more up-to-date information than the usual FIA cycle provides has driven the development of a new way of measuring these permanent plots known as the Annual Forest Inventory System, or AFIS. Now in the development and pilot application stage, AFIS combines remote sensing, actual measurements of a relatively small number of tree stands, and computer models to provide an annual update of forest conditions.

Cooperative Stand Assessment, or CSA, is the division's own system for gathering information on 5 million acres of DNR-administered land. First completed in 1985, the program photographs stands from the air. Those that appear to have changed substantially since the last photo get a ground survey. Stands subject to change are assessed periodically and after harvest or other major changes. We then use the information to do anything from plan where and how much to harvest to develop major policies.

Today the division is working to incorporate CSA within a new system known as the Forest Inventory Module (FIM). This system takes full advantage of today's powerful computer linkages to gather information on stands around the state that is more current and accurate than ever. Forest managers use this information to decide what kind of management a

particular site ought to receive.

Though tree growth certainly is a key part of what we're looking at, it's not the only thing on our minds. In the early 1990s, as we increasingly recognized the need to nurture the forest as well as the trees, we began to develop a tool for categorizing lands not only by tree type, but also according to the other living systems they sustain. The result, known as the Ecological Classification System, or ECS, gives land managers a clearer picture of the ecological interactions of an area. Thus, for example, a forester interested in managing a specific forest type—say, sugar maple—under old-growth guidelines might begin by consulting the state's ECS map to identify areas with the greatest potential to develop older maple forests. The ECS is also valuable for more traditional timber management as it provides information about the best sites for growing timber.

Along similar lines, a cooperative program with the National Biological Service known as GAP—for Gap Analysis Program—aims to identify holes in the overall picture of plant and animal species diversity. GAP consolidates information on various aspects of forests—ownership, species habitat, vegetation, and so on. The synthesis of the many aspects is then used to identify the kinds of lands that are needed by various communities of plants and animals but are absent or in short supply. This information, in turn, can guide us in focusing conservation efforts in a way that maximizes biodiversity.

We also use our assessment skills to help keep forests healthy. In cooperation with the federal Forest Health Monitoring (FHM) Program, we annually assess the health of specific plots around the state. Our goal here is to identify and trace the cause of health problems within the forest ecosystem so they can be resolved by forest managers.

### The ABCs of Resource Assessment:

AFIS	Annual Forest Inventory System
CSA	Cooperative Stand Assessment
ECS	Ecological Classification System
FHM	Forest Health Monitoring
FIA	Forest Inventory and Analysis
FIM	Forest Inventory Module
GAP	Gap Analysis Program
GIS	Geographic Information System

# FORESTRY

## *Get the GIST*

Imagine you're a resource manager near the tiny town of Marcell, Minnesota, and you'd like to find out all there is to know about the forest land surrounding one of the area's many lakes. A generation ago, you'd be pulling maps out of drawers, stretching them across your table, laying one over the other, fighting the creases and curls, perhaps even calling around to other offices to track down elusive variables such as soil type and wildlife population.

Today, thanks to computers, that task has become strikingly more efficient and accurate. A type of software known as a geographic information system, or GIS, allows resource managers to look at, and make decisions based on, a variety of traits of land areas at the same time.

GIS is used commercially for things like deciding where to site a new fast food restaurant. In natural resource work, it's an indispensable tool for analyzing lands based on specific criteria. For example, a manager might use GIS to select all land in an area that is forested and at least 100 feet from a waterway. He or she can then use that information to make resource-related decisions faster and more accurately than ever before.

## *Remote Relevance*

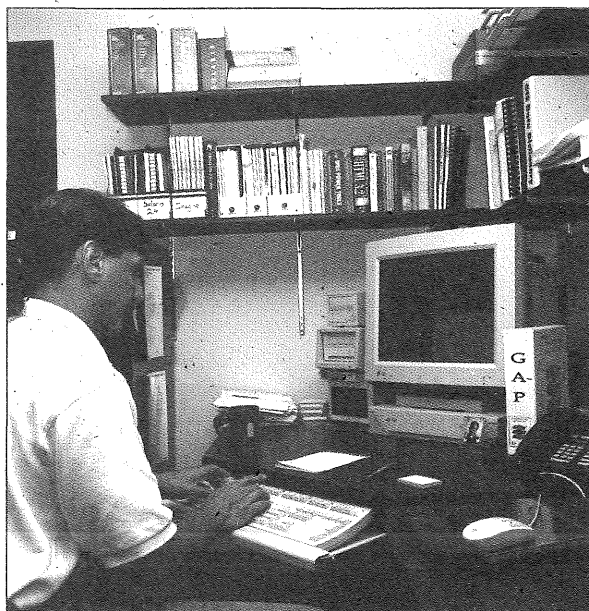
How can data collected from 423 miles out in space help protect biological diversity here in Minnesota?

Ken Boss can speak to that. A research analyst with DNR Forestry's resource assessment office in Grand Rapids, Boss spends much of his workday in front of a computer screen, analyzing digitized images of Minnesota beamed down by LANDSAT, a remote sensing satellite that spends its workday taking portraits of the land beneath it. Using patchy information from ground surveys and special pattern-recognition software, Boss works his way through the images, deducing from known information the cover type of areas that appear in the satellite image but that haven't been visited on the ground.

The process is painstaking. "I work in one large block at a time, then further subdivide the image on an ecological classification system basis," Boss explains. He's been at it for a year now; by the end of the three-year project, he hopes to have produced a detailed description of the vegetative cover type of every inch of the state.

Such information is valuable for a number of reasons. But Boss is particularly interested in applying it to a national effort to protect biodiversity known as the Gap Analysis Program, or GAP. GAP gathers and consolidates a variety of kinds

of information on land status—everything from ownership to soil type—in order to identify and focus management efforts on habitat types that currently are inadequately represented. By contributing a key layer to the overall effort, Boss's work will one day provide valuable clues to where and how species conservation efforts should be targeted in the state.



**Ken Boss**

## Changing Times

Like many other public programs, resource assessment is anticipating working in the future under increasingly austere budgets. This means continuing to increase our efficiency and shifting emphasis from on-the-ground work to remote sensing and GIS.

Fortunately, technology is giving us a boost in both regards. For example, rather than recording data in notebooks and later transferring them to computer files, foresters can now take minicomputers known as field data recorders right out to the trees. By keying in numbers as they collect them and transferring them electronically to the big computer back at the office, they can reduce the effort required to transform raw measurements into useful input for management decisions.

For more information on resource assessment programs and services, contact Dave Heinzen at (218) 327-4449 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Information and Education

### *Spreading the Word*

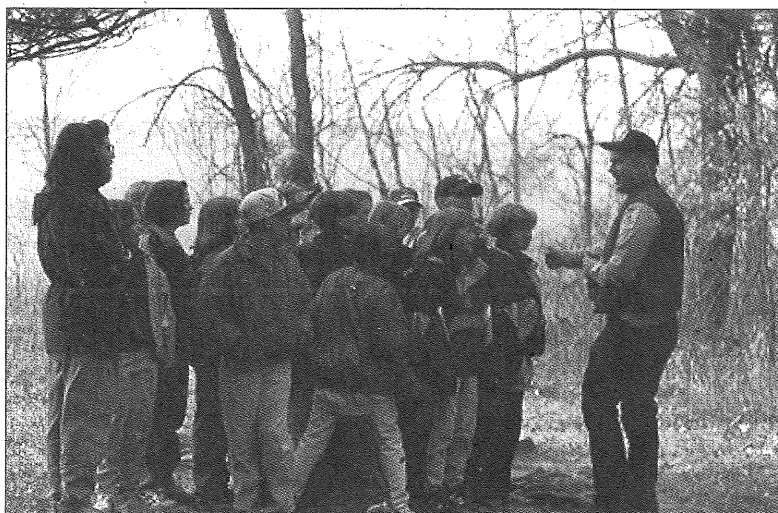
**D**NR Forestry professionals know and care about Minnesota's trees and forests. But we also recognize that we can do nothing unless our ultimate employers, the people of the state, also understand and care. That's why an important part of our job is to inform Minnesotans, not only about the work of the division, but also about the importance of wisely managing forests and other natural resources.

We take a "life-long learning" approach to education. For the youngest we offer Project Learning Tree, a national program that uses forestry as a starting point to teach environmental principles to students from preschool through high school. Since 1978, PLT has been used by more than 3,500 teachers and thousands of students in Minnesota.

We also link DNR Forestry and school forests, plots of land set aside for educational purposes. More than 80 school forest sites across the state encourage teachers and students to incorporate hands-on environmental education into everything from art to zoology.

For adults, our efforts focus first on keeping communication open between DNR Forestry and our partners, our clients, and the general public. We help people understand the division's role in sustaining Minnesota's forests and their ability to meet economic, ecological, and social needs. We also listen and respond, because we recognize that we have much to learn from those we serve.

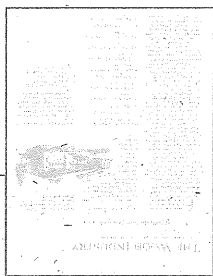
Minnesotans of all ages benefit from resources we provide in response to their interest in the state's forests. We team with environmental educators in the DNR, in schools, and elsewhere, enriching each other's efforts. We collaborate on community activities that nurture appreciation for natural resources. We link with other groups and agencies to help all of our resources stretch further toward our common goal of educating Minnesotans about our environment. Arbor Day/Arbor Month is one example of how we have helped turn ideas into action by finding and building upon common ground.



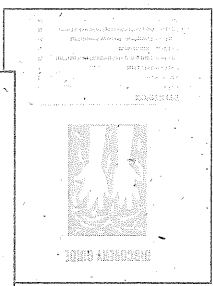
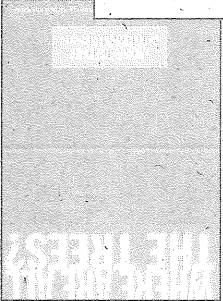
DNR foresters work with school groups to foster an awareness of trees and the natural world.

**News and Views**  
Who decides how Minnesota's forests are managed? How can I nurture a preschooler's sense of wonder about the world? What do I do about those little green worms on my tree? These are just a few of the many questions that find answers in one or more of the many publications produced by DNR Forestry. Targeted at a variety of audiences, these publications contain a wealth of information on trees and other environmental topics. A sampler:

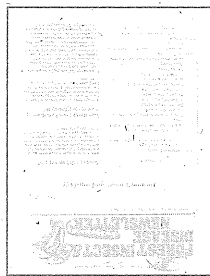
- **The Forest Story** - series of fact sheets describing everything from tree biology to forestry careers.



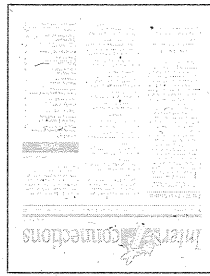
- **Where are all the Trees? A Minnesota Primer and Discovery Guide** - introduction to Minnesota's trees and forests, accompanied by a curriculum for use with elementary and secondary students.



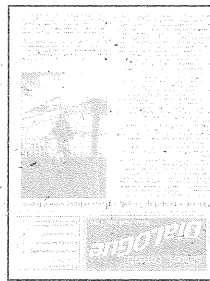
- **Forest Insect and Disease Newsletter** - published six times a year for private woodland owners and others interested in timely updates on tree health problems.



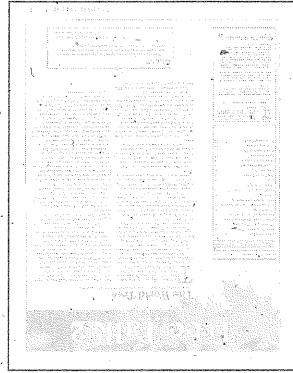
- **Interconnections** - semiannual newsletter for environmental educators containing feature stories, program hints, lists of resources, and more.



- **Dialogue** - newsletter for participants in the school forest program.



- **Tree Talk** - tabloid describing various aspects of forest management and biology for general audiences.



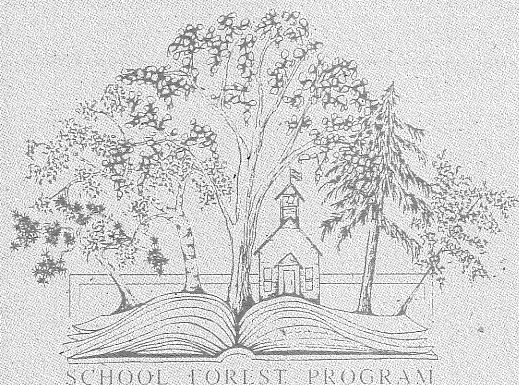
Many brochures on specific topics related to forestry and the environment are also available. For information on obtaining any of these newsletters or other publications, contact Meg Hanisch at (612) 296-5958 or your regional DNR office.

## Issues of the Day

Balancing resource use and protection is a challenging task. Equally challenging in today's diverse society is helping people recognize the appropriateness of such a balance. For every person who believes that cutting trees is defacing the forest, there is another who sees it as the source of income that puts food on the family's table, or of important products to keep our economy strong. There are those who believe forests should be managed for hunting, and others who think forest recreation means motorless sports. A big part of our job is to help people recognize that forests offer many goods and services, and that these do not have to be mutually exclusive.

This job will become more and more challenging as the pressure on forests increases from all directions. At the same time that demand for wood products is on the rise, so is interest in outdoor recreation and environmental protection.

As we continue to work with our many audiences, we remain committed, first of all, to helping people see forests as unique and valuable in their own right. We will continue to help people understand that well-managed harvesting contributes to, rather than detracts from, environmental quality. We will continue to provide Minnesotans the information they need to become advocates for wise and responsible management of trees and forests.



Does your school have a forested area you'd like to see used for educational purposes? If so, write to the School Forest Program, 500 Lafayette Road, St. Paul, MN 55155-4044.

## Challenges and Opportunities

Two-way computer links with classrooms ... videos and CD-ROMs as teaching tools ... workshops and conferences in which participants interact easily, though sitting in meeting rooms miles apart ... these are among the communication frontiers our crystal ball reveals today. They promise exciting opportunities for better linking our educational efforts with the public we serve. Many also offer improved capability for gathering feedback that can be used to make division programs better than ever.

But the future holds new challenges, too. The same changes that will improve our communications also will increase the overall information load people encounter in their day-to-day lives. As a result, we need to find innovative ways to get the message through without overwhelming. We also need to become even better at collaborating with other environmental educators and communicators to avoid redundancy, stretch our budgets, and give our messages maximum impact.

Changing demographics make our task more challenging, too. As our population ages, we will need to do more to inform and educate adults about their natural environment and their role in maintaining it for future generations. This will be especially important as the way we manage forests changes due to increases in scientific knowledge and shifts in what Minnesotans ask of the forest. Lessons adults learned as children—that all forest fires are bad, for instance—may no longer apply. Yet a clear understanding of the importance and complexity of modern resource management is critical if we are to achieve long-term sustainability of forest ecosystems.

### School Forests

Where's the best place to learn about trees? In a forest, of course! Students throughout Minnesota can gain hands-on knowledge of the forest and other aspects of the environment through school forests.

The mechanism for establishing school forests—plots of forested land designated for use by schools for educational purposes—was set by the state legislature in 1949. Today, school forests include some 6,000 acres of forest land in more than 80 sites around the state. Through the statewide School Forest Program, DNR Forestry educators work with other public and private groups to help teachers get the most educational value from school forest sites.

## *Bringing Trees to Life*

The kids in Dave Johnson's outdoor classroom roll on the ground laughing their heads off—and Johnson wouldn't have it any other way.

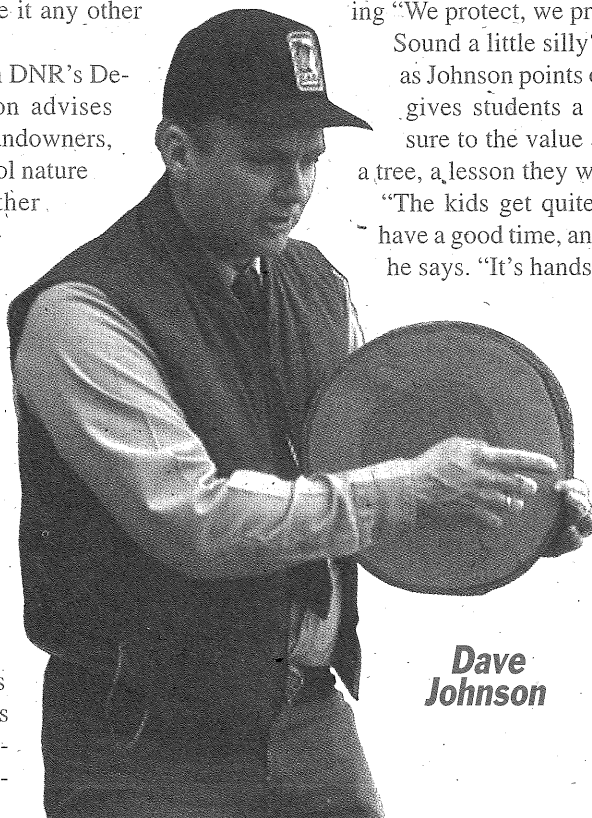
A program forester with DNR's Detroit Lakes office, Johnson advises community foresters and landowners, helps raise money for school nature areas, and does many other tasks related to his jack-of-all-trades profession. But among the highlights of his work is teaching young people to understand and appreciate trees.

Which is where the giggle-fest comes in. Each year, Johnson and colleagues hold a conservation tour for fifth graders in their area. As part of that experience, Johnson likes to have his group act out the work of the various parts of the tree. Under his guidance, he soon has everyone playing a role, from lat-

eral-root students lying on the ground saying, "slurp, slurp" to outer-bark students chanting "We protect, we protect."

Sound a little silly? Maybe it is. But, as Johnson points out, the experience gives students a memorable exposure to the value and complexity of a tree, a lesson they won't soon forget.

"The kids get quite excited and they have a good time, and they remember," he says. "It's hands-on-teaching."



**Dave  
Johnson**

For more information on information and education programs and services, contact Meg Hanisch at (612) 296-5958 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Cooperative Programs *Sharing Expertise*

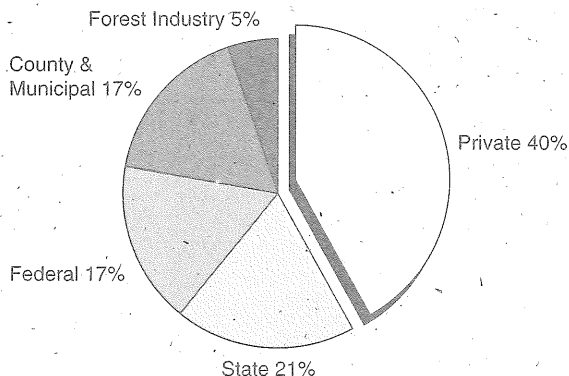
**D**NR Forestry has an obvious role in caring for lands owned by the state. But our interest in promoting healthy forests and a healthy forest products industry extends further. In addition to managing state lands, we also work with the U.S. Department of Agriculture (USDA) Forest Service and numerous other partners to help private and commercial landowners and members of the forest products industry manage and wisely use forest resources. Under the general category of cooperative programs, we provide assistance in private forest management; environmental protection, including soil protection; and forest products utilization and marketing.

### Private Land Forest Stewardship

Forty percent of Minnesota's timberland is owned, not by the government or by members of wood products industry, but by small, nonindustrial private forest landowners—your neighbor, the farmer who grows your food, the retired couple up at the lake. Most have little knowledge of how to manage forests. Yet they own some of the most valuable and productive land in the state.

### *The Fate of Four of Every 10 Trees on Minnesota's Timberland is in the Hands of Private Landowners*

**Minnesota Timberland Ownership  
(14.8 million acres)**



As part of our interest in keeping Minnesota's forests diverse, healthy, and able to meet multiple economic and other goals, we educate and provide technical assistance to these landowners (nearly

140,000 of them across the state!). Through workshops and one-on-one consultation, we help them understand the value of wise planning and translate their dreams into sound, sustainable management plans.

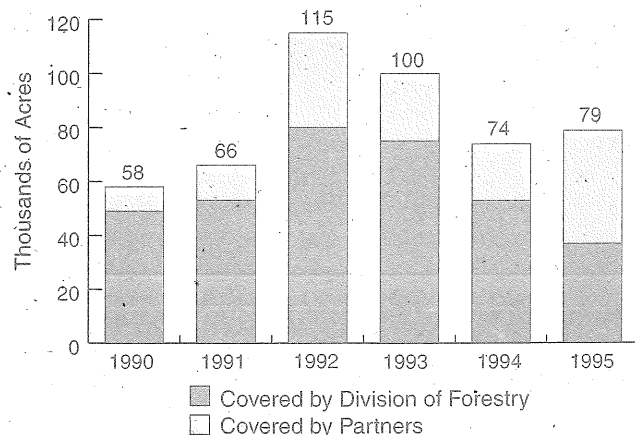
We cannot do this alone, however. In recent years, as we have tried to expand the number of landowners assisted, we have broadened the effort to include support from other sectors, including nonprofit groups, consulting foresters, industrial foresters, biologists, and soil and water conservation districts.

When we or our partners work with nonindustrial private forest landowners, we first help them identify their goals—generating income, protecting biodiversity, providing space for outdoor recreation, and so on. We go over the other functions their land fulfills, including meeting the needs of society and maintaining a healthy ecosystem. Once goals are clear, we help develop management plans tailored to landowners' individual interests. And recognizing that the best-laid plan is useless if it simply gathers dust on a shelf, we provide both advice and hands-on technical assistance to help turn the plan into reality.

Over the years, a number of government programs have enhanced our ability to assist private landowners. The federal Conservation Reserve Program encouraged landowners to shift some lands from farm production to other uses, including forest, generating new interest in stewardship plans. Other programs, such as the Agricultural Conservation Program and the Stewardship Incentives Program, have provided financial help to landowners seeking to manage their forests wisely.

**Forest stewardship plans covering 492,000 acres have been prepared for Minnesota landowners by the Division of Forestry and its partners.**

**Minnesota Acreage Covered by Forest Stewardship Plans**



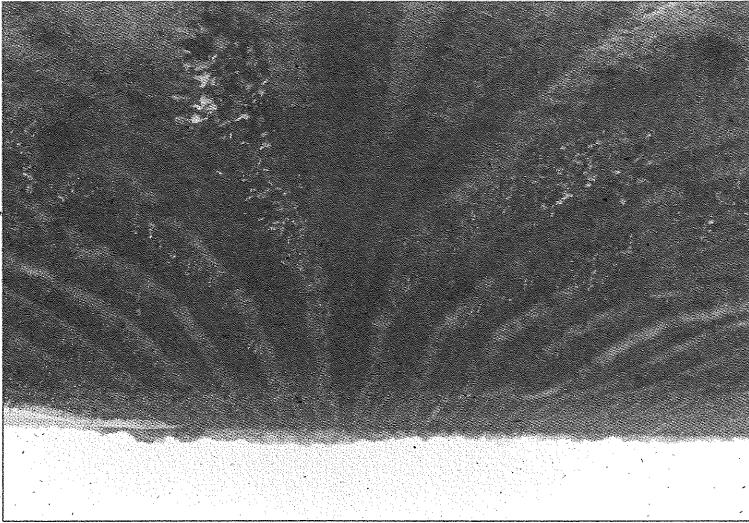
In addition to advising individual landowners, we also help county and city governments manage the 2.5 million acres of timberland they own. Timber sales are an important source of income for a number of northern Minnesota counties. When requested, we help with administration, inventories, and interpreting aerial photos, ensuring that these counties have access to the information and expertise they need to manage for multiple use and sustainable yields of various forest resources.

### Public Partners

On many Minnesota farms, the role of trees is to offer shelter from wind or extra cash from timber sales. Today, however, DNR Forestry is a partner in a short rotation woody crops (SRWC) program that is helping to make trees a farm crop in their own right. The SRWC program began in the 1980s as a cooperative effort with other state and federal agencies to determine whether trees could be successfully grown as a row crop for use as fuel. Using hybrid poplar on test plots near Alexandria and in northwestern Minnesota, researchers have demonstrated a system that produces harvestable wood in as little as seven to 10 years.

The next step, commercial application, is well underway. Some farmers whose land was used for the experimental plots plan to continue the operations on their own. Short rotation woody crops are a part of the plan for an effort by Minnesota Rural Partners, with assistance from DNR Forestry and other public and private partners, to restore woodlands along the Minnesota River. And a private firm recently bought 30,000 acres of land in central Minnesota on which it will adapt the system to produce the raw material for its paper mill.

In some areas, trees are planted as a short rotation woody crop.



Down on the Farm

Comments from  
Forest  
Stewardship  
Program  
participants:  
"This is the way  
government should  
work. Thanks for a  
positive experience."  
"I'm excited about  
implementing the plan  
and seeing the results  
over the years to  
come."  
"I feel that this is a  
great program. I am  
very pleased!"



## *Helping Acorns Do Their Job*

Red oak is one of Minnesota's most valuable trees. It's also among the hardest to regenerate once it's been cut. And it's mostly found on private land.

Sound like a recipe for "Oak-B-Gone"? It looked that way, too, up until a decade or so ago.

"Red oak needs a lot of light to regenerate," says Valiree Green, a division program forester working out of Caledonia, in the heart of south-eastern Minnesota's hardwood country. "For years, people picked over their woodlands," harvesting the best trees and leaving behind scrawny ones that shaded the site. "Oak doesn't regenerate well in that. We've not helped it along as we should," she says.

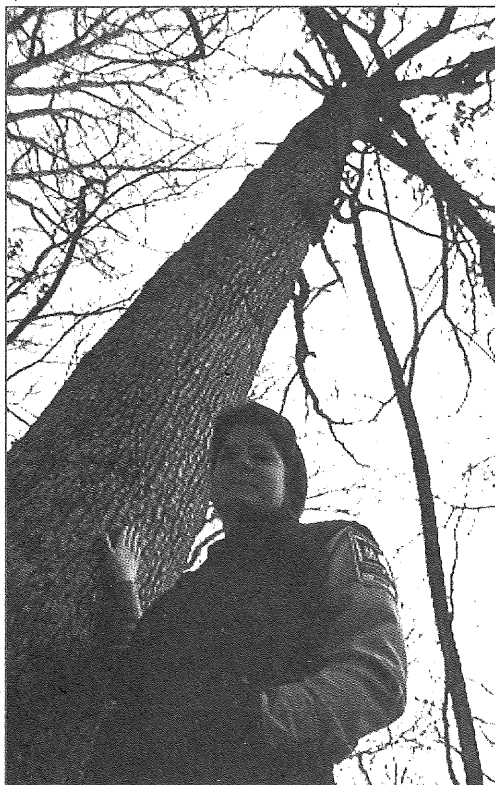
Recognizing a problem in the making, DNR Forestry began targeting hardwood forest owners for education and assistance through the division's private forest management (PFM) program. Green is one of several PFM foresters who work the area today, holding workshops and helping landowners develop and carry

out plans for sustainably managing their oak forests.

According to Green, landowners are still harvesting plenty of the species, which is under high demand for use in flooring, furniture, and construction lumber. But they're also learning—and practicing—specific management techniques to help ensure that new oak trees replace those that are harvested.

To Green, it's clear that the lack of sound management in the past was not so much a matter of lack of concern as it was lack of awareness of how to do things right. Even though the long-term payoffs for regenerating this slow-growing species are something today's landowners will likely never see, the interest among the area's landowners in doing what's right for the forest is heartwarmingly high. She advises easily 200 landowners a year, and that's just the tip of the iceberg.

"I can't possibly get to everybody," she says. "If I advertised for business, there would need to be three or four of me in the county and we'd all be busy."



**Valiree Green**

For more information on cooperative programs and services, contact Bruce ZumBahlen at (612) 296-4499 or your regional DNR office:

Bemidji.....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd.....	(218) 828-2616
Rochester.....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Urban and Community Forestry

### *Enriching Human Environments*

**T**rees benefit everyone. Even in towns and cities they have an important role in improving our environment, sheltering us from hot summer sun and harsh winter winds, providing wildlife habitat, and increasing property values. That's why DNR Forestry's work extends beyond vast expanses of forest land to include trees that green our homes and workplaces.

Urban and community forestry involves planning, planting, and caring for trees in neighborhoods, parks, business places, and other populated areas. In Minnesota, it's a cooperative effort by many public and private partners. DNR Forestry participates by sharing technical expertise and by promoting tree planting, care, and appreciation.

### **Strengthening Community Forests**

Who plans, plants, and cares for the trees in Minnesota's communities? For the most part, it's residents, local government employees, organization members, and business people. An important part of our job is to train these people so that the trees they plant remain strong and healthy. We also teach them how to protect existing trees from assaults such as disease and construction damage.

In addition to providing formal training, DNR foresters work one-on-one with community representatives on everything from demonstrating proper tree planting to designing tree ordinances and advising zoning committees. If a community is creating parkland, starting a tree-planting initiative, or simply rallying support for greenery, we can help by bringing the experience of other communities and our technical expertise to bear on the situation.

Building awareness of the value of trees and good tree management is a third area in which we help communities. One way we do this is through participation in Minnesota's Arbor Month Partnership, a coalition of public and private partners who help develop school activities and community events to encourage Minnesotans to better appreciate trees and forests.

We also encourage communities to participate in the Tree City USA program headed by the National Arbor Day Foundation, a private nonprofit group. Tree City USA recognizes cities and towns that fund community forestry, pass ordinances supporting trees, have a local citizen-based tree board, and hold annu-

al Arbor Day celebrations. As the Minnesota contact for this effort, we help communities meet the requirements for Tree City USA designation.

We also serve as the main contact for several programs that give cities, towns, and nonprofit organizations the financial boost they need to make trees a priority. Minnesota ReLeaf, a program funded by the Minnesota legislature as approved by the Legislative Commission on Minnesota Resources, provides educational materials, technical assistance, and funding to help communities conserve energy by planting trees. We also administer a federal program that provides grants for developing educational materials, inventorying trees, or doing other activities (other than tree planting) in support of community forestry.



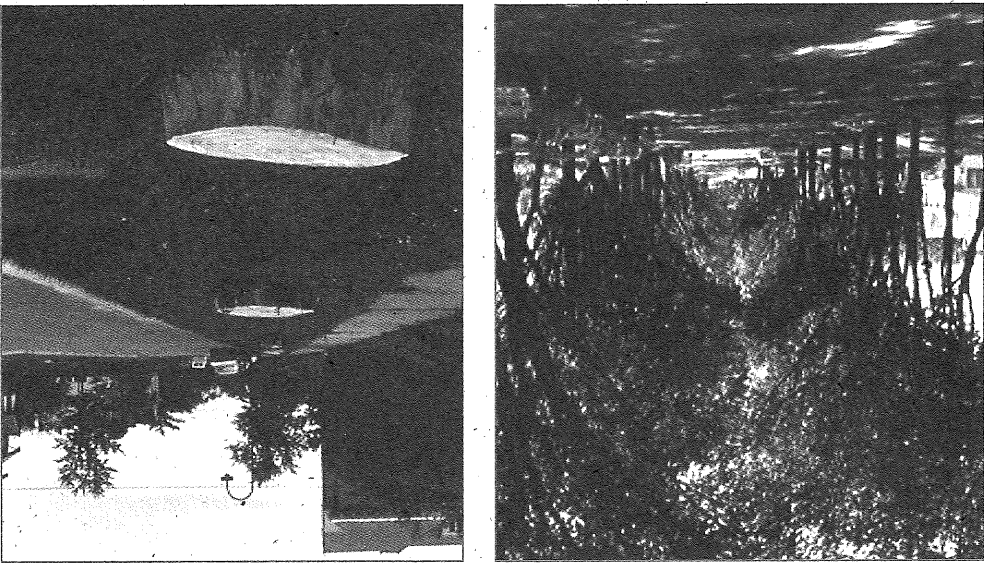
DNR foresters work with city employees to promote the planting and care of community trees.

After the Elms

Three decades ago, the streets of countless Minnesota communities were shaded by arches of stately elms, the fruits of city planners who envisioned just this rich, uniform elegance when they planted block upon block of American elm. Not factored into their vision, unfortunately, was the arrival of Dutch elm disease. Within a matter of years, streets were stripped bare of the regal trees. Communities were devastated. How should they cope? And how could they prevent a tragedy like this from happening again?

It's questions like these that spawned the DNR's urban forestry program. Community foresters became key players in responding to Dutch elm disease. Though we couldn't conquer it, we were able to slow its spread and help communities plan and plant replacement species. On a longer horizon, that crisis had the positive impact of helping Minnesotans recognize the value of urban trees, and of involving professionals in planting and nurturing them.

Dutch elm disease stripped many Minnesota communities of their stately elm trees.



From Dutch Elm Disease Management Guide, USDA Forest Service. Used with permission.

# FORESTRY

## On the Grow

Community forestry programs have made great advances since they began in the 1970s. However, there is still much room for progress. Nearly half of the potential tree sites along city streets in Minnesota remain unplanted. Some 3.6 million trees could yet be added to enrich communities. We need to work to diversify the mix of tree species to reduce the likelihood of disease epidemics like the one that cleaned many communities of their regal elms in the 1970s.

As towns and cities expand, our role in protecting trees will, too. We will continue to encourage communities to protect forested areas threatened by development. Our message is that natural areas add economic value and intangible wealth, and any development will be richer for the forests it protects.

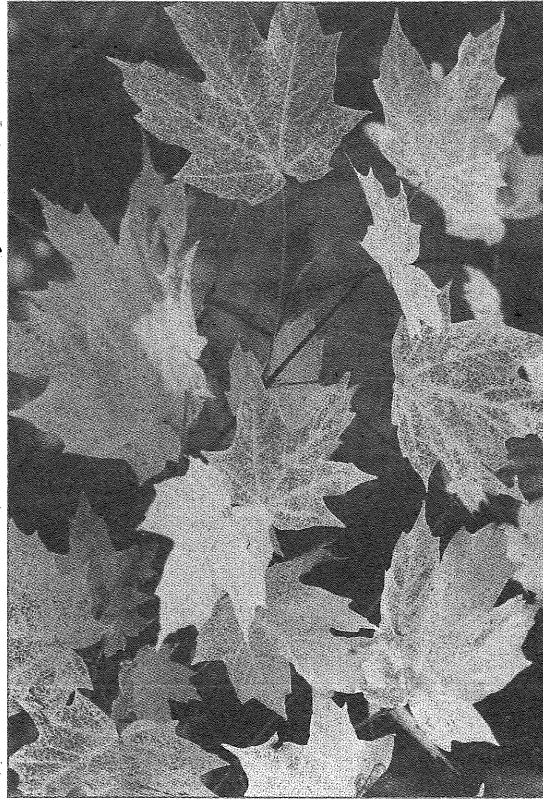
Another major goal for us is to minimize construction damage to trees. One way to do so is by teaching people how trees are hurt or killed in the process of building a home, and how simple and inexpensive practices can greatly increase the odds that the trees will be around to provide shade and beauty in the years ahead. Another is through encouraging communities to pass ordinances that make tree protection part of any construction activity.

Our future efforts also focus on protecting existing relationships between communities and trees.

Over the years, storm damage to urban trees in Minnesota has underscored the need to make careful plans for addressing tree loss due to natural disasters. Major tree pests (most notably oak wilt and gypsy moth) and practices such as tree-topping are threatening many trees in urban areas. We will continue to work to minimize the damage these cause in our cities and towns.

We also will continue to help cities address safety problems related to the aging of trees. Many trees planted in the early part of this century are at a stage where they are likely to lose limbs or become unstable because of size or age-related health problems. Thus, it is becoming increasingly important for us to help communities develop policies and practices to minimize human injury, property damage, and inconvenience caused by trees that have become hazardous, and to carry out ongoing tree care programs.

The need for community forestry clearly is "on the grow" throughout Minnesota. So is the dedication of people who appreciate the great natural beauty our state has to offer, not only in the distant North Woods, but also on our streets and in our parks. As needs change, we will continue to ensure that our homes, businesses, and places of outdoor recreation are enriched with the beauty and environmental quality that are the gifts of living trees.



## *In the Aftermath of a Storm*

In the big, open stretches of prairie that characterize southwestern Minnesota, trees are far from abundant. So when a tornado tore through the tiny town of Lake Wilson in June 1992, the widespread loss of shade trees planted a half century back by foresightful forbears was devastating. After taking care of emergency needs—clearing out streets so emergency vehicles could get through, caring for those who lost their homes and businesses, putting roofs back into place—townspeople saw that they had some serious work to do if they were to regain the shelter and beauty the trees had provided.



**Jerry Jensen**

The task at hand was costly and challenging. Fortunately, DNR forestry staff were ready to help, not only with advice, but also with tree-planting funds available through the Minnesota ReLeaf community forest program.

The effort was led by community members with assistance from Jerry Jensen, a regional staff forester out of the DNR's Rochester office. The Minnesota Extension Service, the Lions Club, local churches, 4-H clubs, and the Murray Soil and Water Conservation District, with DNR help, developed a plan for planting. The team identified which trees to save, how to heal and save them, and the best way to replace those that were lost.

New trees were chosen based on their ability to grow and thrive on specific sites, their ability to contribute to energy conservation by providing shade

and protection from wind, and the desire to have an appropriate mix of species. Trees were located so that they sheltered homes from sun and wind, and a shelterbelt was added on the fringes of the

town. Citizens were taught proper planting and care. All told, Minnesota ReLeaf contributed 725 trees from 17 species and cultivars; townwide, some 1,100 trees were planted.

"We planted large numbers of trees," Jensen says. "There were tons of volunteers."

Today, nearly a half-decade later, the efforts are beginning to bear fruit. Young,

healthy trees are stretching tall to take their predecessors' places in shading homes and streets in the rebuilt community.

Jensen credits much of the success of the project to the heart-and-soul commitment of local citizens to restoring their town's tree populations. But he also points out that without the help of forestry professionals, much of their heroic effort might have been wasted. Even with the best of intentions, the odds that the average homeowner would plant the right mix of trees on the right sites using proper techniques and follow-up care are slim. And the availability of trees through Minnesota ReLeaf made a big difference, too. If it hadn't been for the DNR's help, Jensen says, "they would still be trying to find trees to put in there."

One positive outcome of the disaster that hit the Lake Wilson area is the publication of a guide for choosing and planting trees in southwestern Minnesota, which Jensen has worked on in collaboration with the Minnesota Extension Service.

For information on obtaining a copy of this publication, contact your local extension office. Ask for item number FO-6575-S. Check out the one for southeastern Minnesota, too, item number FO-6574-S.

For more information on community forestry programs and services, contact Peggy Sand at (612) 772-7562 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925



# FORESTRY

## Nursery and Tree Improvement

### *Trees for Our Future*

**T**he demand for new trees is never-ending. Each year millions of mature trees are harvested or die from fire, insects, disease, or other causes. Each year Minnesotans plant new trees for wildlife habitat, to create shelterbelts and windbreaks, to control erosion, for use as Christmas trees, to reforest areas still bare from the land-clearing axes and plows of pioneers.

DNR Forestry helps ensure that new trees are available to provide healthy, sustainable forests for future generations. This involves not only growing tree seedlings, but also carrying out research and development so that the most desirable genetic traits of each species are perpetuated.

#### *But Don't We Have Enough Trees Already?*

That's a bit like asking whether you ought to stop breathing now that you've inhaled. Sure, many of the lands we harvest can grow new trees without the use of seedlings. But seedlings play a big role in ensuring the right mix and quality of trees. They also are in demand by landowners who wish to create wildlife habitat, add shelterbelts and windbreaks, control erosion, grow Christmas trees, and reforest previously cleared areas.

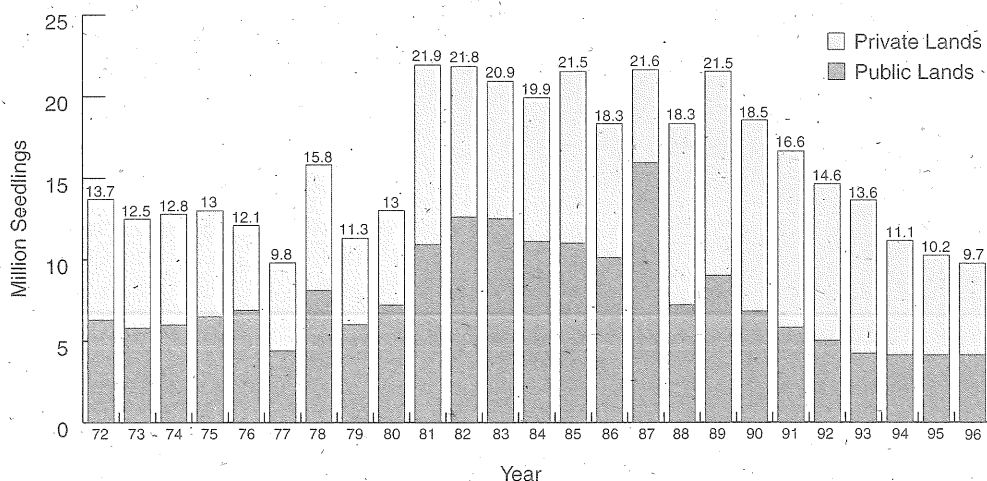
#### Growing New Trees

DNR Forestry's nurseries were established by the state legislature in 1931. Since then, we have grown and distributed hundreds of millions of plantings around the state. If you drive along any main highway in Minnesota, chances are you will be passing towering trees that literally had their roots in one of our two state nurseries.

Located on a total of 560 acres of land near Willow River and Akeley, the nurseries began as a source of trees for reforesting public land after harvest. As conservation programs evolved to encourage tree planting on private land, we began selling seedlings to landowners. Today we sell trees to DNR land management units, county land departments, federal land management agencies, municipalities, commercial forest interests, schools, organizations, and individuals. With the exception of nonprofit groups such as scouting organizations, our private sector sales are limited to lots of 500 or more.

The number of trees produced and sold by state nurseries has varied dramatically over the years. In our busiest year, 1961, we shipped 39.1 million seedlings. Since then the numbers have declined, largely because of practices that increased seedling survival, a shift toward reforesting with natural regeneration and aerial seeding, development of different and sometimes better technologies for producing planting stock other than bareroot seedlings, and a decline in federal cost-sharing programs for planting on private lands.

Seedlings Shipped From State Forest Nurseries, 1972-1996





## Trees with a Reputation

So you want to plant your back 40. Do you suppose any old seedlings will do? Don't bet on it. If you want something to show for your efforts, use plants with a known history. The ideal seedlings for use in Minnesota are grown from seeds collected from Minnesota trees, so that you know they have what it takes to make it in our climate. They also should have a history that maximizes the likelihood that they are free of disease.

DNR Forestry nurseries take special care to make sure our seedlings have a "reputation"—that is, can be traced to a local, disease-free source. Known as seed source control, this practice helps ensure that the seedlings we sell will thrive in their new homes.

## Mighty Oaks From Tiny Acorns Grow...

And mighty pines from tiny pine cone seeds, too, at the two DNR nurseries, the General Andrews State Forest Nursery at Willow River, and the Badoura State Forest Nursery near Akeley. All told, the nurseries produce 22 species of trees and shrubs, most native to Minnesota. The Top Ten grown for 1995 shipping:



1. White Spruce



2. Norway (Red) Pine



3. Jack Pine



4. White Pine



5. Black Spruce



6. Red Oak



7. Green Ash



8. Bur Oak

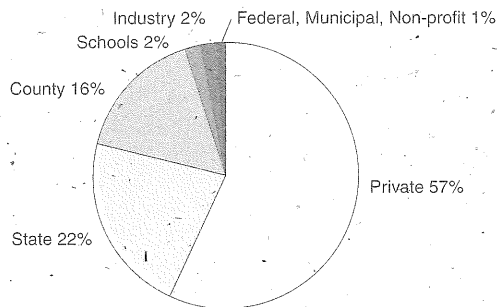


9. Black Walnut

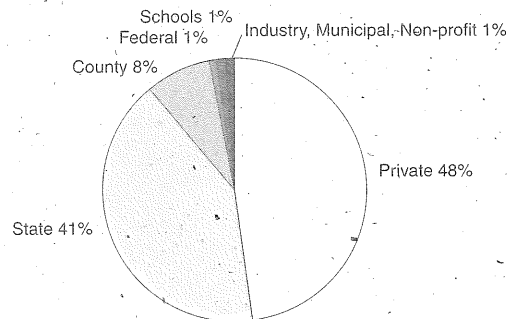


10. Balsam Fir

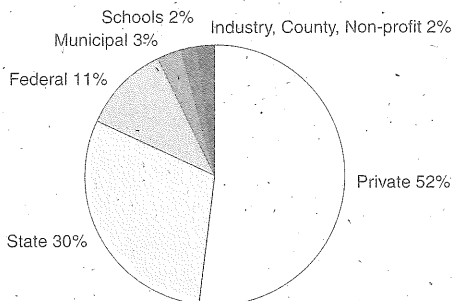
Norway Pine Seedling Distribution by Ownership, 1996



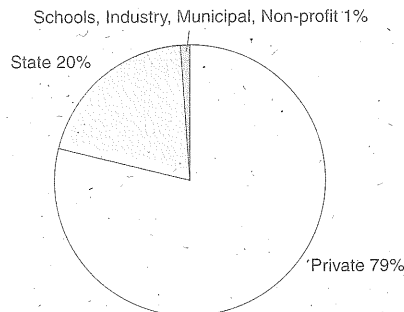
White Pine Seedling Distribution by Ownership, 1996



Red Oak Seedling Distribution by Ownership, 1996



Black Walnut Seedling Distribution by Ownership, 1996



# FORESTRY

## Quality Counts

As the premier provider of tree seedlings in the state, we have a big influence on the kinds and quality of the trees planted to shade, shelter, and comfort future generations of Minnesotans.

We take several approaches to ensuring that tomorrow's forests are healthy, vigorous, and productive. First, we promote the use of native Minnesota tree species. Second, we use seeds from healthy, strong stock. Third, we use selective breeding and advanced genetic techniques to improve the quality of Minnesota's future forests.

## Redefining Our Role

The role of DNR Forestry nurseries has evolved over the years. Our original mandate was to provide trees for reforestation harvested public lands. In the 1940s we began selling seedlings to private landowners. As time went by, we increased production to meet the needs of landowners participating in government programs subsidizing the cost of tree planting. By the early 1980s, seedlings sales were high enough that income from the program supported not only the cost of the seedlings, but our tree improvement research as well.

Over the last decade, however, circumstances changed dramatically. Demand for seedlings for planting on public lands dropped. Government cost-sharing programs encouraging planting on private lands declined. So, consequently, did our sales—from 21.9 million in 1981 to fewer than 10 million in 1996. As we began exploring ways to expand our market to make up for this loss, it became increasingly obvious that we needed to more clearly define our role relative to that of commercial nurseries.

In 1995, representatives of DNR Forestry, private nurseries, and other groups met to assess our appropriate niches within the overall picture of tree seedling development and sales in Minnesota. We agreed that it is important to continue to encourage tree planting, particularly in light of the decline in federal cost-share money. One way we'll do that is to help develop a tree sale program targeted at landowners with less than 20 acres. We agreed, too, that DNR Forestry should continue to promote the use of native species and high-quality seeds and seedlings and to carry out research and development in the area of genetic improvement. However, we also agreed that it's most appropriate for commercial nurseries to supply nonnative trees and meet many of the seedling needs of private landowners.

This shift in seedling sales responsibilities to the private sector poses some challenges for us. It means that fewer dollars are available to support genetic improvement and related work. As a result, we are exploring other means to fund these important programs.

Over the next several years we will continue to scrutinize our role and shift our activities as necessary so that seedling production and improvement continues to thrive in Minnesota. We will increase our effort to develop native tree species to be used in place of nonnative or invasive species. We will continue to encourage Minnesotans to plant trees. We will more clearly define our niche with respect to the private nursery industry. Through it all, we will keep in clear sight our common goal: to ensure that the resources are available to maintain healthy forests for Minnesota for generations upon generations to come.



The two DNR forest nurseries produce 22 species of trees and shrubs.

### *Trees for Sale!*

Wish things were a shade shadier around your ranch? Start those dreams on their way to reality! For information on obtaining trees for reforestation, windbreaks and shelterbelts, wildlife habitat, and erosion control, contact your local DNR office or:

- Tree Sales, General Andrews Nursery  
Box 95  
Willow River, MN 55795  
(218) 372-3183
- Tree Sales, Badoura Nursery  
Route 2, Box 210  
Akeley, MN 56433  
(218) 652-2385

## *Growing Minnesota's Future*

Joyce Tietz is growing Minnesota's future.

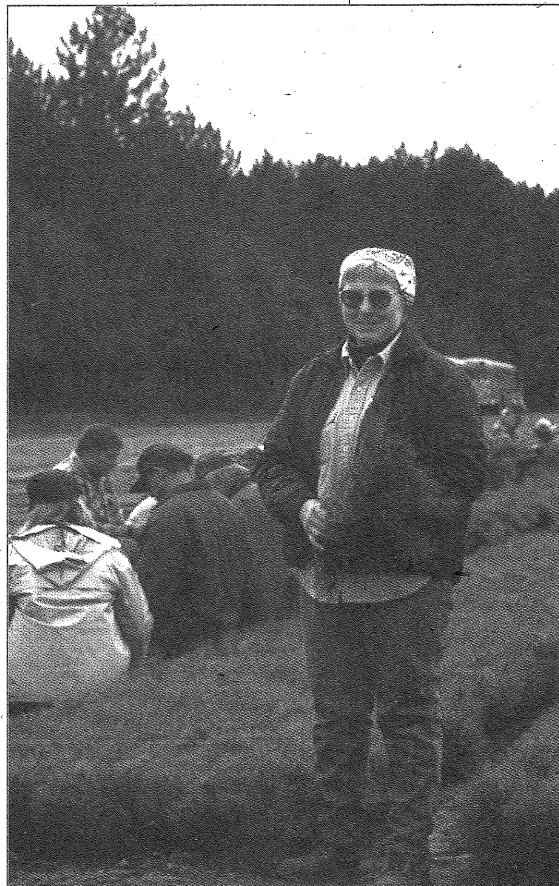
One of four seasonal laborers with General Andrews Nursery at Willow River, Tietz has tended tens of millions of tree seedlings during her 25-year career. From laborious hand-weeding to crating and shipping the final product, she has been involved in virtually every aspect of turning one year's crop of pine cones, acorns, and other tree seeds into the shade, scenery, paper, and wood of tomorrow.

Tietz's job follows the reassuring rhythm of planting and harvesting that characterizes much of rural life. In early spring she spends six weeks or so in the shipping office, sending boxes of trees off to their new homes around Minnesota. When that job's done, she shifts into transplanting, pulling seedlings from the ground, sorting them, and then replanting them for another two years of nursery growth. Next comes a summer filled with fertilizing, weeding, irrigating, cultivating, and pruning on the 125 acres of seedbeds that make up General Andrews' tree-growing land. Fall brings preparing the soil, planting, harvesting, packing trees for early spring shipment, and putting up fence to protect seedlings from deer. ("They just love those little cedar," Tietz says.) And when she's not busy with the trees, she may be painting buildings or mowing the grounds.

"You're doing something different all the time. It's never boring," she says.

Although Tietz's favorite part of the work itself is driving tractor—an exacting task that offers only inches of leeway between rows of seedlings—the most rewarding aspect of the job is probably the chance to see the fruits of her labor literally lining the highways and byways of Minnesota.

"When I ship out trees, I ship them out by county," she says. "Now when I drive down the freeway, I see those county signs. I'll watch the fields, and if I see little trees, I think, 'Maybe I helped grow those.'"



**Joyce Tietz**

For more information on nursery programs and services, contact Mike Carroll at (218) 652-2385, Spencer Stone at (218) 372-3182, or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925

# FORESTRY

## Youth Programs

### *Training Tomorrow's Leaders*

**E**ach year young Minnesotans of all backgrounds are given a chance to develop conservation interests and skills by combining employment, service, and learning in one of three programs administered by the division—the Minnesota Conservation Corps (MCC) Summer Youth Program, the MCC Young Adult Corps, and the Youth in Natural Resources Program.

Modeled after Depression-era CCC programs, the programs offer a remarkable return on investment of taxpayer dollars. They provide valuable job experience. They give youth a chance to learn about careers in resource management. They provide the work force for enhancing facilities and services for the DNR, the USDA Forest Service, the National Park Service, county governments, and others. It's been estimated that Minnesota receives \$1.25 or more in benefits for every dollar invested in the programs.

### **Summer Camp With a Twist**

The Minnesota Conservation Corps (MCC) Summer Youth Program, an eight-week residential work program, gives youth ages 15–18 a chance to learn and earn while carrying out natural resources and conservation projects around the state. It traces its roots to 1974, when the DNR was assigned to administer a new federal program, the Youth Conservation Corps (YCC). When YCC was eliminated in 1981, Minnesota was one of only a handful of states to continue the concept with state funds.

In today's program, 60 to 80 youth spend a summer building and maintaining trails, surveying wildlife, and performing other conservation-related work for minimum wage. They also learn about the environment, develop job search and leadership skills, and enjoy camping, canoeing, exploring, and other recreation. Although the bulk of the work is related to conservation or natural resources, youth occasionally are involved in social service projects such as Habitat for Humanity construction. As part of its commitment to diversity, the corps typically includes a dozen or more deaf or hard-of-hearing youth, and American Sign Language is included as one of the skills taught.

### **Experience for Young Adults**

The MCC Young Adult Corps, a nonresidential service and learning experience for persons ages 18–25, began in 1978. Today the program hires the equivalent of about 100 full-time employees each year for six to 12 months of service. Among their activities, corps members build bridges, shelters, trails, and campgrounds; improve wildlife habitat; plant and maintain forests; help stock fish; and help with fire suppression and other emergency work. They receive a stipend and training in career development, natural resource management, and environmental awareness.

A new facet was added to the program in 1995 when MCC became affiliated with AmeriCorps, a federal program providing community service through CCC-like teams of young adults ages 18–25. Because of this designation, we were able to add much-appreciated “carrots” of health and child care coverage and a post-service education award to the MCC young adult program.



A member of the MCC Young Adult Corps clears a trail.

**It's been estimated that the state receives \$1.25 or more in benefits for every dollar invested in youth programs.**



## Diversifying Natural Resources

The Youth in Natural Resources Program (YINR) was initiated in 1989 to give youth of color ages 16-19 the opportunity to explore careers in natural resources. The program began as a work-crew system, with up to a dozen crews of five or six youth spending eight weeks learning and working around the state. Projects included netting and counting fish, building picnic tables, cleaning up river banks, and building trails.

Today the crew system is still used in northern Minnesota. However, in 1994 the Twin Cities area program began teaming youth individually with resource professionals. Participants spend a week exploring natural resources careers, six weeks working on special projects, and a final week wrapping up the program and learning about educational options. Some three dozen youth are involved in YINR each year.

## Outlook

DNR Forestry's youth programs are widely recognized as a well-placed investment in the future of Minnesota's resources, both natural and human. However, they are not immune to funding cuts. Over the years they have hidden the roller coaster of loss of federal money, threats of elimination from the state budget, and inability of budgets to keep up with inflation.

To help buffer the program from budget uncertainties and lay the foundation for further growth, we are working to diversify our "customer base"—the people and programs we serve. Within the DNR, that might mean providing additional labor (beyond what our limited budget already can offer) on a contract basis. Outside the DNR, it may entail contracting with federal agencies, nonprofit groups, and others.

This diversification will make us less vulnerable to funding shifts. It also may give future teams more chances to work in community development as well as in traditional natural resources projects.

Specific program changes in the years ahead will depend to a large part on funding. What will not change is our ongoing commitment to giving Minnesota's young people a chance to build their lives while serving others. It is this kind of service, we believe, that lays the groundwork for a brighter future, both for those who participate in our programs and for the many others who benefit from their dedication and hard work.

## Seeing Stars

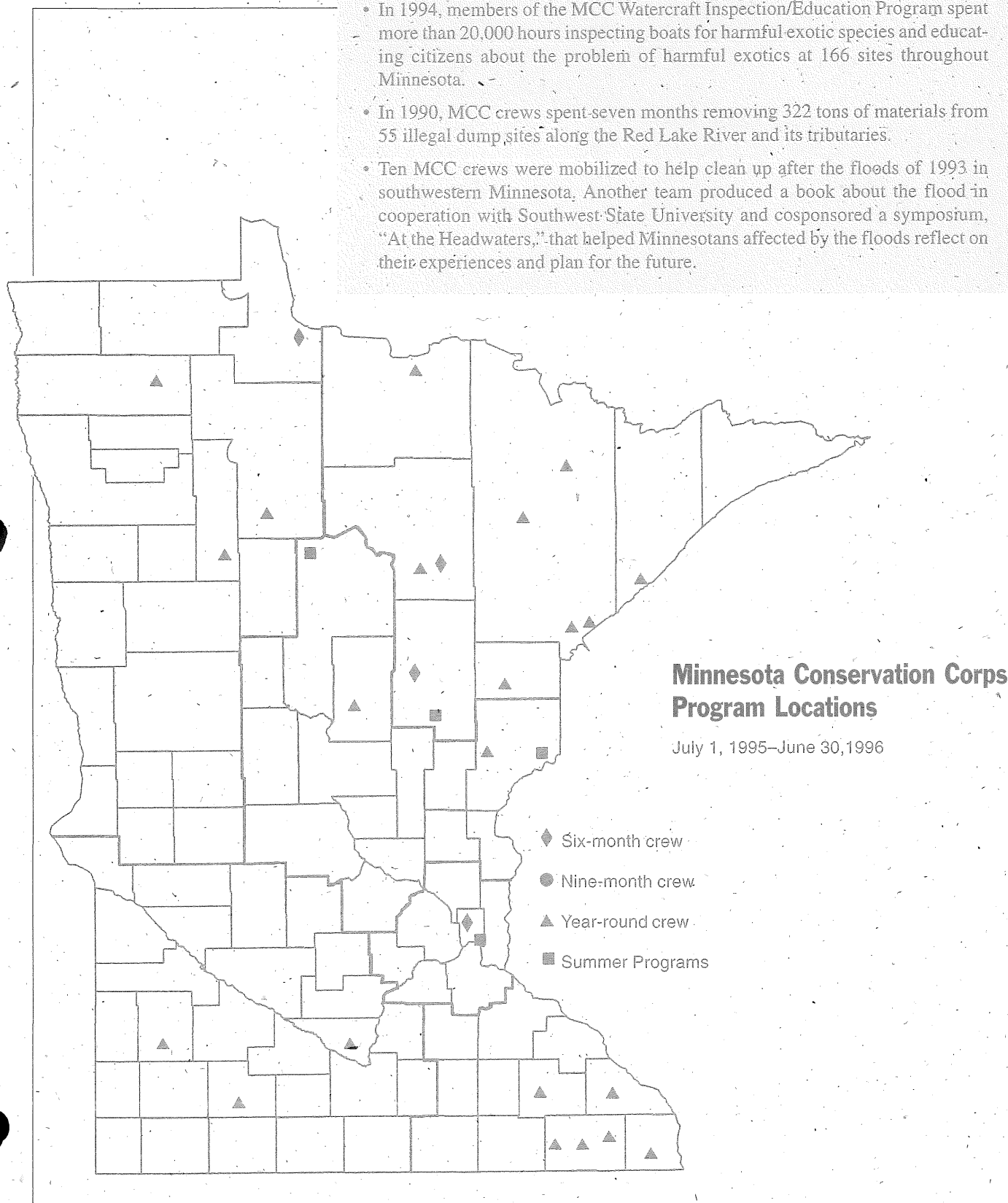
The value and quality of youth programs have been repeatedly recognized by awards. In 1992, MCC's component for hearing-impaired youth received special recognition from the National Association of Service and Conservation Corps. In 1994, the MCC summer youth program was named a Star Program by Governor Arne Carlson. In 1992, YINR received Minnesota's Department of Employee Relations Star of the North Polaris Award for excellence in human resource management and was honored as an exemplary federal-state partnership by Minnesota, an organization representing federal and state agencies. A flood recovery project organized by MCC and Southwest State University was named a Star Program in 1995.





## *What do MCC participants do? Here's a sampler:*

- In 1994, members of the MCC Watercraft Inspection/Education Program spent more than 20,000 hours inspecting boats for harmful exotic species and educating citizens about the problem of harmful exotics at 166 sites throughout Minnesota.
- In 1990, MCC crews spent seven months removing 322 tons of materials from 55 illegal dump sites along the Red Lake River and its tributaries.
- Ten MCC crews were mobilized to help clean up after the floods of 1993 in southwestern Minnesota. Another team produced a book about the flood in cooperation with Southwest State University and cosponsored a symposium, "At the Headwaters," that helped Minnesotans affected by the floods reflect on their experiences and plan for the future.



## *A Foot in the Door*

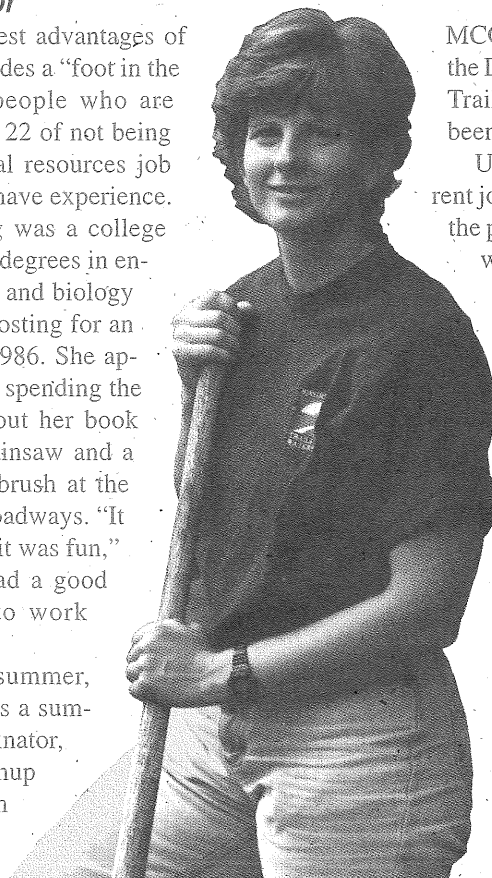
One of the biggest advantages of MCC is that it provides a "foot in the door" for young people who are caught in the Catch 22 of not being able to get a natural resources job because they don't have experience.

Leslie Udenberg was a college student working on degrees in environmental studies and biology when she saw the posting for an MCC job back in 1986. She applied, and ended up spending the summer rounding out her book learning with a chainsaw and a sandvik, attacking brush at the sides of trails and roadways. "It was hard work, but it was fun," she recalls. "We had a good group of people to work with."

The following summer, Udenberg worked as a summer program coordinator, then as a river cleanup coordinator, still with

MCC. In June 1988, she was hired by the DNR to manage the Root River State Trail in southeastern Minnesota. She's been doing it ever since.

Udenberg directly attributes her current job to the MCC work. "I got to know the people I'm now working with. It always helps to get to know the organization and to get hands-on experience," she says.



**Leslie Udenberg**

For more information on MCC/youth programs and services, contact Larry Fonnest at (612) 296-6195 or your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925

# FORESTRY

## *Special Emphasis Projects*

**W**hat good is a forest? The answer to that question varies, not only from person to person, but from decade to decade. A generation ago, the response might have favored forests as a source of wood and game habitat. Today, it increasingly includes such things as sustaining biological diversity, providing beauty and historical treasures, and protecting the environment.

Because our interactions with, and expectations of, forests change with the times, we periodically initiate special efforts to refine, even redefine, the way we do things. These "special emphasis projects" involve substantial public input and often extend beyond traditional program boundaries. Three such projects today are follow-up activities to the Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota (GEIS), application of Extended Rotation Forestry (ERF), and use of Best Management Practices (BMPs) and Forest Practice Guidelines.

### **GEIS: A Long-Term Look**

Forests are many-splendored things. They provide raw materials that enrich virtually every corner of our lives. They are home and sustenance to a remarkable variety of living things. They help protect the quality of air and water. Their presence restores the soul in ways the finest human invention could never match.

But forests also are finite. So when demand for wood began to soar in the late 1980s, Minnesotans quickly recognized the need to balance our desire to meet that demand with our commitment to maintain forests' ability to provide other tangible and intangible benefits.

The result was the commissioning of a Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota, known as GEIS, by the state's Environmental Quality Board. The report took a comprehensive look at what we need to do so that our state's forests can continue to meet the many demands placed upon them. After a half-decade of research and discussion and several months of synthesis by a committee representing a variety of interest groups, the process produced a list of specific recommendations, many of which became law in the form of the Minnesota Sustainable Forest Resources Act of 1995 (MSFRA).

Today we are following up on the recommendations of the GEIS in several ways.

One is by providing professional support to the Minnesota Forest Resources Council, a 13-member group created by the MSFRA to achieve sustainable, balanced use and protection of the state's forest resources. Made up of representatives from government, tourism and forest products businesses, academia, environmental groups, labor, private landowner groups, and more, the council is working to ensure that Minnesota's forests meet current needs while retaining their integrity as natural systems and their ability to meet needs of future generations.

We also are involved as a member of the Forest Resources Partnership, an independent coalition of land managers, loggers, and forest landowners formed in early 1995. The partnership, encouraged but not mandated by the MSFRA, is applying the vision created by the GEIS and its follow-up to day-to-day forest management activities around the state.

### *The Bottom Line*

The most direct impact of the GEIS process on the future of Minnesota's forests is through the 1995 Minnesota Sustainable Forest Resources Act. Taking its cues from the GEIS and subsequent discussions, this law:

- Authorizes creation of a Forest Resources Council to coordinate implementation of the act and provide broad-based involvement in forest policy development
- Encourages landowners, managers, and loggers to work together on implementing sound forestry practices through creation of a Forest Resources Partnership
- Requires the development and use of voluntary timber harvesting and forest management guidelines to protect forest ecosystems on all ownerships
- Requires the development of landscape-based forest planning processes
- Encourages coordinated forestry research and calls for creation of an interagency information cooperative
- Requires the development of improved resource, compliance, and effectiveness monitoring
- Supports logger and forester continuing education and certification programs
- Encourages forest management assistance for private landowners.

## ERF: Managing for More Than Trees

If the goal for a forest is to produce the most and

best timber possible, there are classic procedures that describe just how to manage it—how to thin the trees, what to do about pests, when to harvest. But as good as they are at making wood, these procedures are not necessarily the best for achieving ends such as protecting species diversity and maintaining aesthetic value. Because our emphasis today is on multiple-use management, we are reconfiguring traditional harvest-ing prescriptions to accommodate these other goals.

One change this has brought about is a commitment to letting some trees grow older than they would under a timber-oriented harvesting schedule, a practice known as extended rotation forestry (ERF). For maximum wood production, trees are typically harvested between 40 and 100 years of age, depending on species and growing conditions. In recent years we've found that in order to best nurture diverse ecosystems with a variety of plant and animal species, we need to provide a range of ages of trees, from saplings to towering giants to old, broken-down relics that offer shelter and food within their rotting limbs. ERF allows us to accommodate a portion of the trees grow to one and one-half or more times the age at which we normally would harvest them.

The process of determining how many trees should be allowed to age and for how long has been a challenging one. Because trees have economic value for timber, there is pressure to not leave more usable wood standing in the forest than is needed to meet species diversity and related goals. On the flip side, the value of diversity and the huge lead time needed to produce old trees suggest that we ought to be cautious when it comes to maintaining some older forest needed to support healthy populations of some species. Even here, however, ecologists warn us not to go overboard or we'll adversely affect other species that depend on young growth. After all, they point out, even before European settlers showed up on the scene Minnesota's forests had more young trees than old, thanks to natural losses due to forces such as fire, wind, and insect and disease infestations. The solution we've arrived at to protect both timber production and habitat is a three-pronged approach. First, we've defined for each tree species an age after which it is considered to be in extended

rotation. Second, we've determined what proportion of that species ought to be in extended rotation in order to meet both timber and habitat goals. Third, we're looking at the bigger picture—the broad distribution of various ecosystem types—to determine the appropriate quantity and distribution of ERF sites. The result, rather than a blanket prescription, is more of a patchwork quilt of decisions about how many trees should be in extended rotation and how long they should be allowed to grow. In northeastern Minnesota, for example, the overall goal is to keep 20 percent to 30 percent of forest lands in older forest cover, including extended rotation. But some stands may be tightly managed for production, while others are allowed to grow to more than twice the conventional age at harvest. By being flexible with individual stands but upholding the overall program goal, we can provide the variety of tree ages needed for optimal species diversity while still retaining the forest's ability to contribute sustainably to the raw material needs and economic well-being of our communities and our world.



Trees of all ages—saplings to older giants—are needed for diverse ecosystems with a variety of plant and animal species.

# FORESTRY

## BMPs: Reducing the Impacts

A century ago, timber harvesting focused on getting the trees out of the forest and into the market. Later, people began to recognize that what seemed like an infinite resource really wasn't, and reforestation became an important part of timber harvesting.

In recent years, yet another angle has been added due to growing recognition that forests provide many benefits besides trees. Today, responsible harvesting includes not only regenerating forests but also protecting environmental quality and beauty.

To help loggers protect the environment and aesthetics, DNR Forestry has worked with other agencies and government units, members of industry, and special interest groups to create a series of recommendations known as "best management practices," or BMPs. The first BMPs, developed and published in response to the Clean Water Act of 1987, guide loggers' efforts to protect lakes and streams from damage. They have since been extended to protect wetlands.

BMPs are a remarkable example of how collaboration can be used to resolve a complex environmental issue. Through constructive dialogue, a willingness of the interested parties to address the issue, and effective education, the forestry community has demonstrated that the environment can be managed and protected without the need for extensive regulation. Use of the guidelines is voluntary. DNR Forestry's role is limited to developing recommendations based on field experience, then encouraging their use through contract provisions, education, and technical assistance. And the approach has worked. BMPs have become standard operating practice for loggers throughout the state.

More recently, in a noteworthy show of initiative and collaboration, the tourism and forest products industries worked with the DNR to develop visual quality BMPs. The idea here is to have counties classify their roads according to the degree to which visual quality is important. Timber operations are then modified on roads highly valued for their scenic quality in order to retain that quality. Like water quality BMPs, visual quality BMPs are voluntary. But they give forest managers and landowners valuable guidelines as they strive to protect the many values offered by the forest.



A field audit team member rates a small oil spill on a forest management site.

## Forest Practice Guidelines: Protecting Renewable Resources

The highly successful BMP program is serving as the mold for development under the leadership of the Minnesota Forest Resources Council of additional forest practice guidelines to protect riparian zones, forest soil productivity, forest wildlife habitat, and historical and cultural resources. As with the water quality and wetland BMPs, these guidelines involve collaboration among representatives from state, federal, and county agencies and government units; academia; forest industry; resort and recreation interests; private landowner groups; and conservation and environmental organizations. When complete, the guidelines will be voluntary and will be promoted and implemented through education, technical assistance, and other means.



## Measuring Success

Most folks who head to the Brainerd Lakes region during their summer vacations do so to soak up the sun, catch a few fish, enjoy the resort life.

Vince Smith, a middle school science teacher with the Anoka-Hennepin Independent School District, does it to check out logging roads and erosion control systems on newly harvested forest stands.

For the past several years, Smith has been a volunteer with one of four teams that assess tree harvesters' compliance with water quality BMPs around the state. He does it, he says, because it gives him a chance to see what's going on outside the Twin Cities in terms of environmental protection. It also offers some valuable perspectives he can share with students on the relationship between logging and caring for the environment.

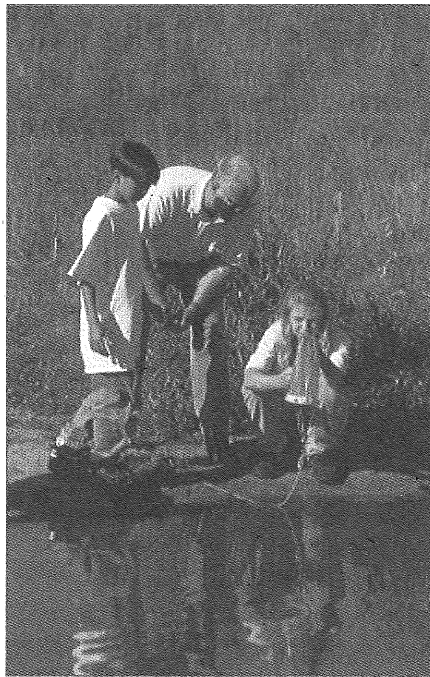
"A lot of my students hunt and fish, and their views of going into an area (to harvest) are many times quite critical," he says. "But all the loggers are doing is harvesting a renewable resource." By passing that message—reinforced with personal experience—along in the classroom, he hopes to help students understand that environmental protection and natural resource use need not be mutually exclusive.

After several seasons on the monitoring team, Smith says he's sold on the unique

approach of the BMP program, which encourages but does not require loggers to use practices that protect water quality. "Even in schools, working with kids, you want to give them a chance. This is surely better than a mandate or regulation," he says.

Does the voluntary approach work? The numbers Smith and other auditors around the state have come up with suggest that it does.

In three years of evaluating timber operations at 261 sites around Minnesota, teams found that 84 percent of practices they observed complied with BMP recommendations. Not only that, but more than three-quarters of the departures from recommended practice were minor, with little likelihood they would harm water resources.



**Vince Smith**

For more information on the GEIS, Sustainable Forest Resources Act, Minnesota Forest Resources Council, or ERF, contact Dave Zumeta at (612) 297-2143. For more information on water quality BMPs, contact Rick Dahlman at (612) 296-6502 or Mike Phillips at (612) 297-4924; on aesthetic BMPs, contact Al Jones at (218) 327-4449.

General information on forest practice guidelines is available from Mike Phillips, DNR Forestry, at (612) 297-4924. For information on riparian zone management guidelines, contact Charlie Blinn, University of Minnesota College of Natural Resources, at (612) 624-3788. For information on forest soil productivity guidelines, contact Dick Rossman, DNR Forestry, at (218) 755-2891. For information on site-level forest wildlife habitat guidelines, contact Tim Webb, DNR Wildlife, at (218) 755-3958. For information on historical and cultural resources guidelines, contact Al Jones, DNR Forestry, at (218) 327-4449.

Or, contact your regional DNR office:

Bemidji .....	(218) 755-2891
Grand Rapids .....	(218) 327-4418
Brainerd .....	(218) 828-2616
Rochester .....	(507) 285-7428
Twin Cities .....	(612) 772-7925

# FORESTRY

## Administration

### *Behind the Scenes*

**H**ear the word “forestry,” and you’re not likely to conjure up images of spreadsheets, budgets, computers, and position descriptions. But all are an important part of the behind-the-scenes administrative efforts that keep the division going strong.

### **The Buck Stops Here**

Though DNR Forestry is decentralizing many functions, the numerous threads that form a web of forest-related activity throughout Minnesota eventually converge in a bank of offices on the fifth floor of DNR state headquarters in St. Paul. Here administrative staff enable and oversee the activities of the division’s 350-plus employees. They handle the money matters for the division. They manage personnel issues. They also are in charge of the “big picture” when it comes to the purchase, use, and care of the field and office equipment we use around the state in the business of managing forests.

### **Doing It All**

Forestry employees take care of trees, right? Yes, we do. But we do an incredible variety of other things, too. On any given day, DNR Forestry employees around the state may be not only handing out burning permits and measuring trees, but also counting gypsy moth larvae, repairing truck engines, working from helicopters, writing grant proposals, fixing computer glitches, greeting campers, surveying endangered wildflowers, and more.

### **Improving Our Service**

By far the most valuable component of DNR Forestry is people. Perhaps it’s something about the nature of natural resources work, but you would be hard put to find a more dedicated, hard-working set of employees in any organization, anywhere. Walk into a region office, bump into a program forester in the field, phone the local DNR to check up on burning regulations, and you’ll see it for yourself. DNR Forestry employees care about Minnesota’s natural resources, and that concern gives them a sense of enduring commitment that is hard to beat.

In DNR Forestry administration, we support our employees with a progressive development program. We hire the best people to meet each need. We work to nurture their success within their careers. Four percent of the division’s time and dollars is committed to advancing employees’ knowledge and skills.

Employees and supervisors work together to create a training plan each year. Though there’s no typical plan, an individual’s program might include workshops such as land line corner relocation, conflict resolution, genetic implications of silvicultural systems, and awareness of heritage resources. Topics vary from year to year depending on employees’ needs. Most training is offered within the DNR, but it also may include conferences and classes outside the agency.

In addition to nurturing the development of current employees, we also encourage promising young people—in particular, those in traditionally underrepresented groups—to consider natural resource careers. Just as foresters manage for the next generation of trees, current employees cultivate future “new growth” through classroom talks, internships, volunteer opportunities, and informal advising.



DNR Forestry encourages young people to consider natural resource careers.

## The Big Picture

Planning is another important function of central administration. With more than 4 million people to serve, a staff spread throughout the state, and a 17-million-acre job site, the division could easily become lost in the details of daily demands. Planners have the important task of helping us all to maintain a clear view of the long-term, big-picture goals that drive our individual efforts.

DNR Forestry planning responsibilities cover myriad tasks related to managing our state's forest resources. These include DNR Forestry strategic and annual work planning, environmental review, coordinating with other agencies, and developing and maintaining policies. DNR Forestry's planning efforts also are a key part of the long-term sustainable forest management effort begun with the Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota (GEIS) and currently reflected in the 1995 Sustainable Forest Resources Act.

So that DNR Forestry functions mesh cleanly and productively with other natural resource management efforts, regional forest resource management planning is coordinated by staff who work for the entire DNR rather than just for our division. These people, located in regional offices, work with our region staff and staff from other DNR divisions (e.g., Fish and Wildlife, Parks, Trails and Waterways), helping to ensure that plans appropriately reflect opportunities and limitations characteristic of various parts of the state, rather than of some hypothetical "generic Minnesota."

In short, planning helps ensure that the day-to-day work of DNR Forestry remains true to our overarching mission of promoting the conservation, protection, and enjoyment of Minnesota's forest resources.

## The Computer Corps

Ever wonder how you made it without computers? So do we.

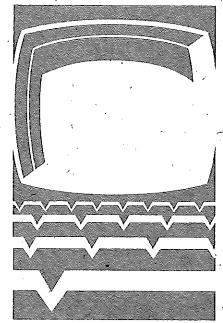
In the past 25 years, computers have revolutionized much of our work. They manage huge files of forest inventory data. They link regions. They speed document reviews. In short, they have transformed our traditional jobs and added new capabilities that previous generations could only have dreamed about.

Of course, all this capability is not self-sustaining. It must be designed, developed, maintained, and continually updated. That's the job of our Forestry Information Systems (FIS) staff.

FIS staff evaluate division needs for information systems. They keep a finger on the fast-paced pulse of the computer industry so we can meet those needs in the best way possible. They train users and help them as they incorporate the system into their work. Because information systems capabilities are evolving so rapidly, these responsibilities are constant.

A huge and valuable change within our information systems over the past decade has been improving the coordination among offices and functions. One part of this has been to centralize hardware and software decisions—the equivalent of making sure division employees around the state all speak and write the same language. Another has been meshing our management information systems—the portion of our computer world that deals with the general office tasks of writing reports, tracking personnel and equipment, and so on—with geographic information systems, the computer capability that allows us to organize and manipulate information on a multitude of characteristics of the land we work, from the location of endangered species to characteristics of underlying soils. By coordinating and merging functions, we have increased our efficiency and paved the way for an increasingly seamless information link among our many offices and efforts.

At the same time we're coordinating things statewide, we're also decentralizing information expertise. Our goal is to have information systems experts in every region so that needs can be addressed and problems resolved on the spot, on time, wherever they arise.



For more information on administrative programs and services, contact Dennis Ingvaldson at (612) 296-4495 or your regional DNR office:

Bemidji ..... (218) 755-2891  
 Grand Rapids ..... (218) 327-4418  
 Brainerd ..... (218) 828-2616  
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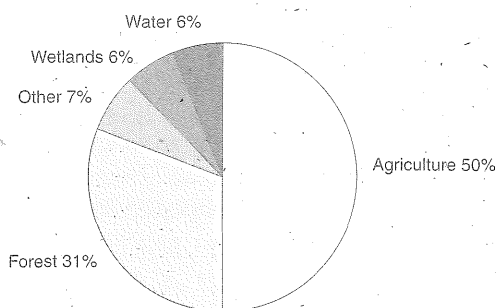
# FORESTRY

## Questions and Answers

### How large is Minnesota's land base? How is the land used?

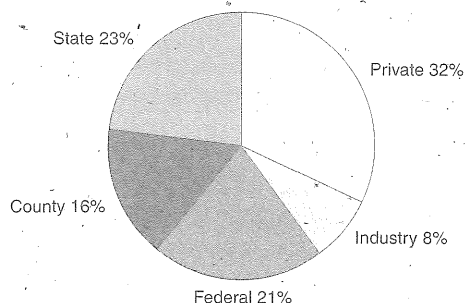
Minnesota comprises 54 million acres (84,068 square miles) of land. Land use can be broken down as follows:

Agriculture - 27 million acres  
 Other (urban development, etc.) - 3.78 million acres  
 Wetlands - 3.24 million acres  
 Water - 3.24 million acres  
 Forest - 16.74 million acres



### Who owns Minnesota's 16.7 million acres of forested land?

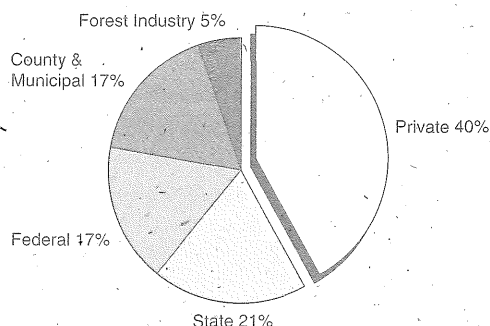
Privately owned - 5.34 million acres  
 Industry owned - 1.34 million acres  
 Federally owned - 3.51 million acres  
 County owned - 2.67 million acres  
 State owned - 3.84 million acres



### Who owns Minnesota's timberlands?

Minnesota has 14.8 million acres of timberlands—lands that are considered useful for growing and harvesting trees. Most (approx-

mately 40 percent) of Minnesota's timberlands are in the hands of private citizens.



### Is any land in Minnesota reserved from timber harvesting?

Yes. More than 1 million acres of Minnesota's publicly owned forest lands are protected from timber harvesting. You know many of these acres as the Boundary Waters Canoe Area Wilderness; or BWCAW; Voyageurs National Park; state parks; scientific and natural areas; and county parks. This land is protected from harvesting through statute or administrative regulation or designation.

### Is forest land on the decline in Minnesota?

Forest lands occupy about 16.7 million acres in Minnesota, nearly one-third of the state. This is about half the area of forest prior to European settlement. The loss is due to agriculture and urbanization. Recent projections suggest that the forest area in northern Minnesota will continue to decline, largely due to development for other uses. However, the forest area in the southern part of the state is increasing due to reversion from marginal agricultural lands. Overall, the forest area in Minnesota is expected to increase slightly from now until 2040.

### Why can't we stop harvesting timber?

There is a widespread misperception that wood use is declining in the United States. The fact is, our per capita consumption of wood has risen more than 31 percent in the last 20 years. Today, wood is one of the nation's most important raw materials. The weight of wood we use every year exceeds the combined weight of all metals, plastics, and cements.

If demand for wood products remains high and the United States harvests fewer trees, we'll only export our problem—we'll get the wood products all right, but probably from tropical rain forests in developing countries. Is it really okay to continue to use forest products at the rate we do, resist harvesting our own trees, and instead use timber from "somewhere else?"

Timber harvest also is an important part of the stewardship of actively growing forests. Wisely planned harvest helps keep forests thriving by encouraging new growth and removing trees vulnerable to pests; while preserving and even enhancing things like recreation and wildlife habitat.

## **Who cuts timber on state-owned land?**

In Minnesota, independent loggers do most timber harvesting. The owner of the land to be harvested—whether it's the state of Minnesota or a private individual—sells the right to harvest a certain amount of trees in a certain way through a legal tool called a timber sale contract.

In keeping with our commitment to sustainable, multi-use management, DNR foresters make sure that loggers protect soil, water, wildlife, aesthetics, and other forest benefits when they harvest timber on state land. In partnership with other agencies and organizations, we promote logger education programs so timber is harvested with minimal impacts and disturbance on all lands, no matter the ownership.

## **What is clear-cutting? Why is clear-cutting allowed? When is clear-cutting not used?**

Clear-cutting is the removal of all trees (except those reserved for special purposes such as wildlife habitat) from a specific area. Clear-cutting helps tree species (jack pine, aspen, paper birch, tamarack, and some oaks) that require full sunlight to regenerate and grow. Aspen, for example, will put out new shoots from roots if the tree is cut down, but only if full sunlight heats the root system. Paper birch and oak regenerate from stump sprouts under the same conditions. Clear-cutting also allows many species of ground vegetation to grow, providing food for wildlife.

Clear-cutting is not used with tree species such as maple and basswood because they regenerate best under the canopy of older trees. When the

older trees start to die, the canopy opens up to let sunlight in, allowing the young trees to grow more rapidly. Selective tree logging, which removes only a few trees from an area, is usually desirable when working with these species.

Clear-cutting is also not recommended on steep slopes, near open water, or on fragile soils because it can cause severe erosion and loss of productivity in these areas.

## **Is state land reforested after harvest?**

Yes. According to the guidelines set forth in the Forest Management Act of 1982, the DNR is to reforest acreage equal to that harvested each year. We do so by seeding 4,000 to 5,000 acres per year, planting 4,000 to 5,000 acres of seedlings per year, and encouraging natural regeneration on 20,000 acres per year.

## **Why do we need to inventory trees?**

To be able to take good care of the forest resource, DNR foresters need to know where it is, what it is composed of, and what its needs are. Inventories give foresters an idea of what tree species are growing where, how big the trees are, and what other things are growing with the trees. Using all this information, foresters decide how the land should be managed to maximize its benefits, whether it be for wildlife habitat, timber production, soil and water quality, recreation, aesthetics, or a combination. Inventories also help foresters identify and trace the cause of health problems so they can be resolved by forest managers.

## **Why do foresters pay so much attention to trees and so little attention to other parts of the habitat?**

They don't, anymore. In recent years we have come to recognize that managing Minnesota's forest resource is not one job, but many. Responsibilities of state forest managers now include maintaining state forest campsites and other recreational facilities; planning harvests and tree-planting projects; maintaining forest roads; managing habitat for fish and wildlife production; fighting wildfires; and protecting biological diversity.

Today, DNR foresters are working with an archaeologist to identify the thousands of culturally sensitive areas within state forests. They are



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helping to preserve water and soil quality, wetlands, and aesthetics by incorporating guidelines known as best management practices into forest management activities. They are also allowing some forests to grow beyond their optimum harvest age for the sake of the plants and animals that live there.

## **Why is all the attention now focused on ecosystem-based management?**

An ecosystem approach considers the whole system, not just the parts, and brings people together to work for the health of the land and the communities it supports. This approach is the best insurance for sustaining opportunities for current and future generations.

Everything that we do is in some way related to our community, our environment, and our economy. Over the years we've sometimes tried to further one or another of these while ignoring the others, and have found that it just doesn't work. Community, environment, and economy are really parts of the same system. Healthy communities and economies depend on healthy environments. Ecosystems include all living organisms (people, animals, plants), their physical surroundings (soil, water, air), and the natural cycles that sustain them. Ecosystems are resilient, but they have limits; if pushed too far, they can no longer provide expected benefits and services. Economic production ultimately depends upon a healthy natural resource base. Similarly, effective environmental protection depends on a sound economy. Ecosystem-based management recognizes and builds upon these connections, and shows us what we must do if we wish to sustain all three areas.

## **Who can help me manage my forest land?**

A woodland stewardship plan is the key to managing your land for personal benefit while protecting soil, water, wildlife, trees, and other plants. Together you and a natural resource manager prepare this plan. You'll specify your goals and assess the time and money available. The natural resource manager then evaluates your woodland resources and proposes ways to meet your goals.

Begin your plan by contacting your local DNR, Soil and Water Conservation District, or Minnesota Extension Service office, or work

with a forest industry forester or private forestry consultant.

## **When is Earth Day? Arbor Day? What do they celebrate?**

Earth Day is April 22. It is a day that encourages people to look at their lifestyles and adopt activities that help improve the environment—recycling; using fewer pesticides and chemicals; picking up trash, and changing transportation to reduce automobile pollution and fuel consumption.

Arbor Day in Minnesota is always the last Friday in April. Minnesota also celebrates May as Arbor Month. This celebration encourages people to plant and care for trees.

## **How can I learn more about Minnesota's forests?**

DNR Forestry has a lot of environmental learning experiences to offer. Project Learning Tree helps kindergartners through 12th graders learn about trees and the world around them—air, water, soil, wildlife, and people. The School Forest Program helps schools form outdoor classrooms where students of all ages can learn about the environment by touching, feeling, learning, and seeing natural features.

We also offer newsletters, brochures, publications, and reports that describe the resource and discuss trends and issues. Some of these are available by calling or visiting your local DNR Forestry office; others are available only if you participate in scheduled workshops. DNR Forestry also works with many other organizations, so if we don't have the information you need, we can put you in touch with those who do. To get started on your learning experience, contact DNR Forestry at (612) 296-4491.

## **Can I order tree seedlings from the DNR?**

Yes, if the seedlings will be planted for conservation purposes. By law, seedlings from DNR nurseries must only be used for reforestation, establishing windbreaks and shelterbelts, erosion control, soil and water conservation, or permanent food and cover for wildlife. Orders are taken from the middle of August until supplies are exhausted. The minimum order is 500 trees and seedlings are sold at cost. Contact your local DNR Forestry office or call (800) 766-6000 for more information.

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**Q How do I find out how to care for my yard tree or identify what's wrong with it?**

**A** Contact your local community forester or tree inspector. If you don't have one, contact your local DNR Forestry office.

**Q When do I need a burning permit?**

**A** You need a permit to have an outdoor fire whenever the ground does not have complete snow cover. This permit includes any outside burning except for recreational campfires and cooking fires. Obtain a burning permit at your local DNR Forestry or Fire Warden office. It's also a good idea to check with local officials to see if there are special burning regulations in your area.

**Q Where can I buy firewood?**

**A** If you want to cut your own, permits are available from your local DNR Forestry office. These permits let you cut specified amounts of wood in specified areas on state land. If you would like to buy firewood already split and dried, consult classified ads in your newspaper.

**Q Do I have to use designated campgrounds in state forests? Can't I camp anywhere in the woods?**

**A** DNR Forestry asks all overnight campers to help protect state forests by only using designated campsites. Designated campsites have fire rings that contain flames and litter containers that prompt campers to dispose of garbage properly.

**Q Can I pick up all the dead wood I see on state land?**

**A** If you're building a fire when you're camping in a state forest, you may certainly use wood that has been collected and stacked for that purpose in the campground or gather wood from the vicinity. If you want to take wood out of state land boundaries, you must have a permit from the local DNR Forestry office.

**Q Can I remove trees or other plants from state forests?**

**A** Trees may not be cut for Christmas trees and no plant may be dug up and removed. In some areas, certain trees may be cut for fuelwood, but you must obtain a permit at the local DNR Forestry office. Similarly, you must obtain a special-use permit from the local DNR Forestry office to harvest boughs for holiday decorations. You may pick up pine cones from the ground to take home and harvest fruits and mushrooms.

**Q Can I hunt grouse, deer, and other game in state forests?**

**A** Yes, during the appropriate season and with the correct license. You may obtain maps of state forests at your local DNR Forestry office. State forests do contain private holdings within their boundaries, many of which are signed "no hunting." The maps identify these areas and help you to plan your hunt around them.

**Q Can I build a permanent deer stand in a state forest?**

**A** Permanent deer stands are discouraged on state land. If you build a temporary stand, you may not cut trees to use as building materials or to create firing lanes.

**Q What else can I do in state forests?**

**A** Lots! Where indicated by markers or signs, you may hike, bike, snowmobile, or horseback ride (for big rides with a large number of horses, you do need a special-use permit from the local DNR Forestry office). You may go birdwatching or pick berries and mushrooms. There are also designated areas in some state forests where you are allowed to ride all-terrain-vehicles (ATVs) and off-road motorcycles. Contact your local DNR Forestry office to find out where these areas are and to find out other ways to enjoy the forest.

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## Information in Brief

**D**NR Forestry works to promote the conservation, protection, and enjoyment of Minnesota's forest resources. Here is some information "in brief" to tell you about the division—what we do, how we do it, and just how far we've come in ensuring the well-being of our forests.

- We manage 4.5 million acres of land, approximately 4 million of which is forest land.
- We have:

Five **region** offices - Bemidji, Brainerd, Grand Rapids, Rochester, Twin Cities.

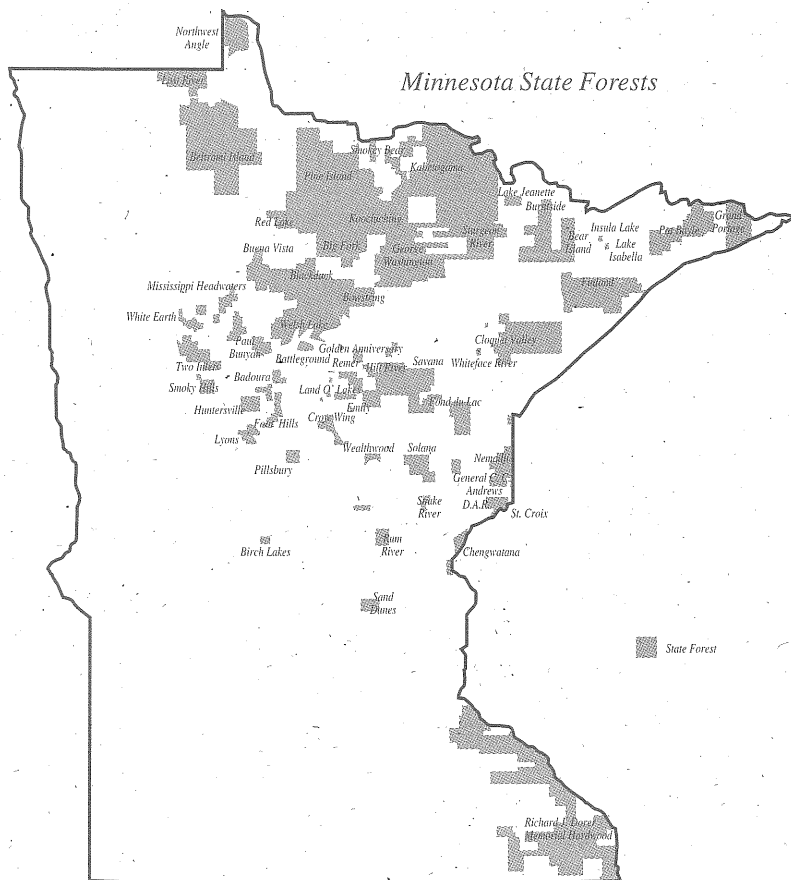
Forty **area** offices - Aitkin, Alexandria, Backus, Bagley, Baudette, Bemidji, Blackduck, Brainerd, Caledonia, Cambridge, Cloquet, Deer River, Detroit Lakes, East Metro, Effie, Faribault, Grand Marais, Hibbing, Hill City, Hinckley, Lake City, Lewiston, Little Falls, Littlefork, Mankato, Moose Lake, New Ulm, North Metro, Orr, Park Rapids, Pequot Lakes, Preston, Rochester, St. Cloud, Tower, Two Harbors, Wadena, Warroad, West Metro, Willmar.

Twenty-nine **work stations** - Big Falls, Birchdale, Cass Lake, Cook, Cotton, Duluth, Eaglehead, Eveleth, Finland, Floodwood, Grand Rapids, Grygla, Guthrie, Hoveland, International Falls, Kabetogama, Kelliher, Long Prairie, McGrath, Mora, Nimrod, Northome, Onamia, Roy Lake, Sandy Lake, Side Lake, Washburn Lake, Williams, Zimmerman.

- We have 350-plus employees. Seasonal workers hired to complete tree shipping in the spring and to help with wildfire suppression and summer field work put the "plus" in this number at certain times of the year.
- We have operated on an average yearly budget of \$36,600,000 since 1990.
- We oversee Minnesota's 57 state forests that contain 46 campgrounds (with nearly 1,000 campsites), 44 day-use areas, 1,200 miles of trails, 142 water accesses, and 17 canoe and boating route campsites.

These state forests are: Badoura, Battleground, Bear Island, Beltrami Island, Big Fork, Birch Lakes, Blackduck, Bowstring, Buena Vista, Burnside, Chengwatana, Cloquet Valley, Crow Wing,

D. A. R. (Daughters of the American Revolution), Emily, Finland, Fond du Lac, Foot Hills, General C. C. Andrews, George Washington, Golden Anniversary, Grand Portage, Hill River, Huntersville, Insula Lake, Kabetogama, Koochiching, Lake Isabella, Lake Jeannette, Lake of the Woods, Land O' Lakes, Lost River, Lyons, Mississippi Headwaters, Nemadji, Northwest Angle, Pat Bayle, Paul Bunyan, Pillsbury, Pine Island, Red Lake, Remer, Richard J. Dorer Memorial Hardwood, Rum River, St. Croix, Sand Dunes, Savanna, Smokey Bear, Smoky Hills, Snake River, Solana, Sturgeon River, Two Inlets, Wealthwood, Welsh Lake, White Earth, Whiteface River.



\*Lake of the Woods State Forest is still being digitized

- We maintain more than 2,000 miles of forest roads that provide access to nearly 4 million acres of state forest land. More than 95 percent of the miles driven on these roads is for general travel and outdoor recreation.

- We have in the past five years reforested 150,000 acres of state land by planting, seeding, and natural regeneration. By law (Forest Management Act of 1982), we are committed to reforesting an amount of land equal to land harvested each year.
- We coordinate a network of 2,400 volunteer fire wardens issuing more than 70,000 burning permits each year.
- We prevent and fight wildfires on 45 million acres of land.
- We fight an average of 1,600 fires each year that together burn some 65,000 to 75,000 acres of land.
- We assist other resource protection units in prescribed or controlled burning of 20,000 to 30,000 acres of land each year to mimic the ecosystem-renewing benefits of natural fires.
- We annually survey 14 million acres of forest land for forest pests.
- We have in the past five years sold 3.2 million cords of wood valued at nearly \$43 million, with resulting value added to the state and local economies estimated at more than \$790 million.
- We have in the past five years provided aerial photography of over 35 million acres of forest land for use in forest management and forest survey.
- We have sponsored the nationally recognized environmental education program Project Learning Tree since 1978. It is now being used by more than 3,500 teachers and thousands of students in Minnesota.
- We oversee school forests that include some 6,000 acres of forest land in more than 80 sites around the state. These outdoor classrooms encourage teachers and students to incorporate hands-on environmental education into everything from art to zoology.
- We have in the past five years assisted more than 5,000 landowners with improving their woodlands, developing professional stewardship plans for over 300,000 acres of private forest lands.
- We have annually provided 1,700 assists to communities in the management of their urban forests.
- We are one of the largest producers of forest tree and shrub seedlings in the northeastern United States. We run two state nurseries—General Andrews at Willow River and Badoura near Akeley—that cover a total of 560 acres of land. Since 1990 the nurseries have produced, procured, and distributed over 90 million tree seedlings for planting on private and public land in Minnesota.

Their busiest year was 1961, when 39.1 million seedlings were shipped. They produce 22 species of trees and shrubs, most native to Minnesota.

- We administer the Minnesota Conservation Corps program; whose participants in the past year have planted nearly 90,000 trees, constructed 29 campsites and picnic areas, assisted in prescribed burning 7,455 acres, contributed nearly 3,000 hours to cleaning up blowdown trees, built 16 bridges and 14 trail shelters, constructed and erected over 2,000 nesting structures, collected nearly 7,000 pounds of prairie seed, and inspected nearly 43,000 watercraft for exotic aquatic species such as Eurasian watermilfoil.

## Some steps in time

**1894** - The rapid disappearance of the forests by the ax and fire attract little attention until the great Hinckley Forest Fire of September 1 takes the lives of 418 human beings.

**1895** - The legislature appoints the state auditor as forest commissioner. He appoints General C. C. Andrews, long a pioneer in the fight for forestry, as Minnesota's first chief fire warden. In his first annual report, General Andrews shows an area of 11,890,000 acres of forest land in the state.

**1899** - The first forestry board is created by the legislature to manage lands granted to the state for forestry purposes by the federal government or any private person.

**1900** - Minnesota's first forest reserve is established when a thousand acres of cutover pine lands in Cass County donated to the state by Governor John S. Pillsbury become the Pillsbury State Forest.

**1908** - On September 4, a forest fire sweeps over the mining village of Chisholm, encouraging the legislature to authorize the appointment in 1909 of a corps of forest rangers.

**1910** - On October 9, about six weeks after the handful of forest rangers are laid off due to lack of funds, many small fires are fanned by the wind into a holocaust and before the day ends, the cities of Baudette and Spooner are in ashes and 42 people are dead.

**1911** - Following the tragedy of the Baudette-Spooner Forest Fire, the legislature enacts laws that mark the beginning of the Minnesota Forest Service. All responsibility except the management of state timber is transferred from the state auditor and placed

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under a forestry board. William T. Cox is appointed as Minnesota's first state forester and he organizes a state forest protection system with district rangers.

**1914** - A constitutional amendment is passed designating trust fund land as state forests.

**1917** - The Minnesota legislature sets up 350,000 acres of state lands in northern St. Louis, Lake, and Cook counties as state forests. The first extensive tree planting is undertaken when wild stock is dug up in the woods and planted on various types of land.

**1918** - On October 12, a forest fire wipes out the town of Cloquet, most of Moose Lake, and more than a dozen smaller villages, resulting in property damage in excess of \$28 million and 438 human beings killed. The burning permit law is passed, better regulating when and where fires can be started.

**1924** - The enactment of the federal Clarke-McNary Act provides the state with increased funds for fire prevention work.

**1925** - The first Conservation Commission is created and the first Department of Conservation set up. The state forester becomes the commissioner of forestry and fire prevention. Forestry laws are reorganized and codified. The forest area of the state is defined as any county having 1,000 acres or more of timber or unbroken prairie land or of cutover land not cleared of combustible material.

**1931** - Reorganization of the Department of Conservation takes place. The new department functions under a commission appointed by the governor and is empowered to employ a Commissioner of Conservation for a six-year period. The administration of state forests and the sale of state timber on state forest lands are put under the control of the department's Division of Forestry. All state parks are also put under the Division of Forestry.

The legislature authorizes the production of tree planting stock, limited to native conifers for planting on state-owned lands. The Badoura Nursery near Akeley, having started several years before, soon has seedlings available for planting.

**1933** - The legislature passes a law providing that all income from acquired lands within state forests is to be credited to the general revenue fund of the state, and that 50 percent of the gross receipts from such lands is to go to the counties in which the lands are situated.

The Civilian Conservation Corps (CCC) camps are

established and thousands of young men are available for work in fire protection, firefighting, forest management, and nursery work. An additional 13 state forests are set up by the legislature upon which CCC work can be done.

**1935** - A separate State Parks Division is set up. Willful burning is changed from a misdemeanor to third degree arson. Cities are authorized to obtain lakeshore lands for municipal forests. Peat lands are withdrawn from sale. Thirteen new state forests are established. The Director of Forestry is empowered to acquire tower and ranger station sites, to close roads and trails through forest areas when fire conditions warrant, and to clear up fire hazards along roadsides.

**1936** - The first statewide forest inventory is completed in cooperation with the USDA Forest Service.

**1937** - Reorganization of the Conservation Department takes place again. The Conservation Commission is abolished and replaced by a commissioner appointed by the governor.

**1939** - The General C. C. Andrews state forest nursery, named for Minnesota's first chief fire warden, is started near Willow River.

**1943** - The state forest laws are codified and 29 state forests are reestablished under one act. Minnesota's first minimum cutting regulations law is enacted, defining the size of trees to be cut and providing for the leaving of seed trees.

**1944** - Keep Minnesota Green is organized in Minnesota, providing for forest fire prevention education and the Tree Farm program. By 1958 over 1,000 tree farms are established and over 600,000 acres of private forest land are placed under management.

**1946** - Private forest management assistance begins with the employment of two trained foresters with \$8,000 provided by forest industries. The following year a legislative act provides for private forest management service to owners of not more than 1,000 acres, and the work continues.

**1947** - The Division of Forestry is authorized to produce stock of all species for use on privately owned lands. Production of trees is immediately accelerated.

**1953** - The Norway pine is designated as the official Minnesota state tree by the legislature.

The Division of Forestry is empowered to furnish tree planting stock free of charge for use on auxiliary



forests owned by social, educational, or charitable organizations.

**1955** - An inventory of the timber on the 4,750,484 acres of state land owned or administered by the Department of Conservation is completed and published. It is the first such inventory in the history of the state.

**1956** - Reorganization of the Division of Forestry is completed. The functions of the division are divided into two sections, state land management and cooperative forestry. The following year the field is reorganized into four regions, 18 administrative areas, and 74 ranger districts.

**1957** - The legislature designates the first Friday in May as Arbor Day in Minnesota.

The Minnesota Tree Growth Tax Law is passed, permitting privately owned forest lands to be taxed on the basis of the annual increase in value.

**1959** - By order of the Commissioner of Conservation, 830,116 acres of state land are reserved from sale and set aside as state forests to be added to existing state forests.

**1963** - The legislature establishes and reestablishes 54 state forests.

The Minnesota Outdoor Recreation Resources Act is passed, encouraging the development of numerous recreation facilities within the state.

**1965** - Arbor Day, which has been observed on the first Friday in May since 1957, is changed to the last Friday in April.

**1967** - The Department of Conservation is reorganized by the legislature. The Division of Forestry becomes the Division of Lands and Forestry. State land leases, sales, and land records are now part of the division.

**1971** - The name of the Department of Conservation is changed to the Department of Natural Resources.

**1972** - The Department of Natural Resources is reorganized and the Division of Lands and Forestry is separated into the Division of Forestry and the Bureau of Lands.

**1982** - The legislature passes the Forest Management Act, whereby the Division of Forestry is committed to reforesting an amount of state land equal to state land harvested each year.

**1989** - A new era begins for forest management in Minnesota when citizens, concerned about the growing demand for timber, ask the state's Environmental Quality Board to assess the potential environmental impacts of various levels of future harvest through a generic environmental impact statement, or GEIS.

**1990** - Water Quality BMPs (best management practices) are developed and published in response to the Clean Water Act of 1987 to guide loggers' efforts to protect lakes and streams from timber harvesting damage.

The legislature establishes Lake of the Woods State Forest, bringing the number of state forests to 57.

**1991** - The ECS, ecological classification system, is developed as a tool for categorizing lands not only by tree type, but also according to the other living systems they sustain.

**1994** - The GEIS is approved by the Environmental Quality Board, providing an important framework for the long-term sustainable management of the state's forests.

Visual quality BMPs to help modify timber operations on roads highly valued for their scenic quality are published as a result of a cooperative effort among the Department of Natural Resources and the tourism and forest products industries.

The Division of Forestry is reorganized into five regions, 40 areas, and 29 work stations.

**1995** - The legislature passes the Minnesota Sustainable Forest Resources Act, encompassing many of the recommendations of the GEIS. The law authorizes the creation of a Forest Resources Council to coordinate implementation of the act and provide broad-based involvement in forest policy development, and encourages the creation of a Forest Resources Partnership in which landowners, managers, and loggers work together on implementing sound forestry practices.

Water Quality BMPs are extended to protect wetlands in response to the Wetland Conservation Act. Expanded BMP guidelines covering water quality and wetlands are published.

**1996** - The Minnesota Forest Resources Council established under the Minnesota Sustainable Forest Resources Act of 1995 is developing forest practice guidelines to protect riparian zones, forest soil productivity, forest wildlife habitat, and historical and cultural resources.

