



STANDING
TALL

FORESTRY



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LETTER from the State Forester

The Lifecycle of a Managed Forest



Whenever I stand under one of Minnesota's massive white pines, I can't help but feel insignificant. After all, that tree has been around longer than I have—and will probably be around long after, too. Despite their mighty bearing, though, trees are not immortal. Everything on earth has a lifecycle. And in the case of Minnesota's forests, the health of that lifecycle depends on good forest management.

Here in the Division of Forestry, we manage the lifecycle of 5 million acres of Minnesota's forested land. From seed to harvest to reforestation, we care for the state's forested lands to ensure they remain strong and healthy for the next generation. It's a big job—one we take very seriously.

Our forests not only offer beauty and wildlife habitat, they provide us with a bounty of recreational opportunities, environmental benefits, and renewable forest products. When you're hunting or hiking in a forest, you probably don't think about the thousands of jobs that forest supports. Or the millions of gallons of water it filters. Or the billions of pounds of carbon it sequesters. But a healthy forest provides us with all of that and much more.

That's our focus here in the Division of Forestry: keeping Minnesota's forests healthy.

We carefully manage each phase of the forest lifecycle to ensure the healthiest possible outcome. Our love of Minnesota's forests and our unwavering commitment to their continued vitality guide us as we work to make them strong and resilient for our children's grandchildren. We're on a good path: Minnesota has nearly a million more acres of forested land today than we did 40 years ago.

Standing Tall explains how we do this. From cultivating and growing trees, to sustainable management and harvesting, to planning and protecting forests, we want you to understand every step of the forest's lifecycle and the Division of Forestry's involvement in it. While our public, private, and tribal partners are important to our success, *Standing Tall* highlights the work of the DNR to keep Minnesota's forests healthy.

Although that white pine may make me feel a bit inconsequential in the grand scheme of the world, I'm happy it will be around long after I'm gone. It means all of us have done our job. And that makes me very proud indeed.

Our love of Minnesota's forests and our unwavering commitment to their continued vitality guide us as we work to make them strong and resilient for our children's grandchildren.

Forrest Boe
Minnesota State Forester

DNR Forestry

A HISTORIC LEGACY

Forestry is the oldest division within the Minnesota Department of Natural Resources. In fact, we existed a generation before the organization that became the DNR got its start! Our roots formed in the large wildfires of the late 1800s and early 1900s.

After a massive fire swept through the town of Hinckley in 1894, killing 418 people, the Minnesota State Legislature created the office of the Chief Fire Warden. General C. C. Andrews, a former Civil War general and longtime forestry pioneer, accepted the position and began organizing a statewide system to suppress wildfires.

Yet as logging activity moved through northern Minnesota, large fires continued to burn throughout the early 1900s, including the 20,000-acre Chisholm fire in 1908 and the 300,000-acre Baudette-Spooner fire in 1910. As a result, the legislature created the Minnesota Forest Service in 1911 with three key goals in mind: preserving our forests, managing reforestation, and preventing and suppressing wildfires. William T. Cox became Minnesota's first state forester.

In 1918, the Cloquet-Moose Lake fire destroyed 38 communities and killed 453 people—to this day, it is considered the worst natural disaster in Minnesota history. This prompted the legislature to pass burning permit laws, which regulated when and how people could have open fires. These laws, updated over the years, remain in effect today. We oversee the management of burning permits and alert the public when conditions make it unsafe to burn.

In 1931, the legislature created the Minnesota Department of Conservation. At that time, the Minnesota Forest Service officially became the Division of Forestry and remained that way when the Department of Conservation changed its name to the Department of Natural Resources in 1971.

Today, the Division of Forestry oversees the entire lifecycle of Minnesota's forests, from seed cultivation, to management and recreation, to protection (including fire protection), to harvest and reforestation.

All of us in the Division of Forestry take seriously our job to protect and preserve Minnesota's forests, so that all Minnesotans can enjoy and benefit from our 5 million acres of DNR-managed forests for generations to come.



HISTORY

Where It All Begins

DNR'S STATE FOREST NURSERY

You could say Minnesota's forests are born at the State Forest Nursery in north-central Minnesota.

That's because the nursery grows 4 million to 6 million bareroot seedlings each year for planting in public and private forests. We use roughly half of these trees to reforest state lands; landowners purchase 1.5 million for reforestation on private lands; and counties, tribal governments, and other public agencies purchase the rest.

The Nursery cultivates these native trees in collaboration with the public. Each year, the Nursery invites people from around the state to collect seeds and cones on their private property or in State Forests. The Nursery then buys those seeds and cones for use in growing new trees. When the seedlings are ready to be sold, the Nursery makes every effort to return them to the same part of the state from which the seeds were collected. This collaborative effort promotes genetic diversity and also ensures the trees will grow where they are planted.

We expect that demand for the Nursery's tree seedlings will increase in the coming years to assist Minnesota's forests in adapting to climate change and to store additional carbon. We also know that tree loss from fires, blowdowns, and invasive insects will call for more trees to be planted. So, the Nursery is working with our Silviculture (tree cultivation) Program to actively identify new tree species that will be suitable for Minnesota's changing forest habitat, while also constantly reviewing seed collection zones to increase genetic diversity and improve tree survival in the changing times ahead.

TO LEARN MORE about the State Forest Nursery—including how to order trees for your land—log on to mndnr.gov/nursery



GROW

FUTURE FORESTS FUND

The Future Forests Fund gives Minnesotans the opportunity to partner with the DNR to keep state forests healthy for future generations. Although a majority of the funding to reforest comes from State Forest timber sales and state bonding, the Future Forests Fund allows people and corporations to donate money to increase the number of trees planted and cared for on DNR-managed land.

DNR foresters carefully select areas where Future Forests Fund gifts are used, focusing on land where the need is greatest or where the donor has requested. In addition to supporting replanting efforts after a harvest, donations to the Future Forests Fund help replace trees lost to disease, fire, storms, insects, and other elements.

Contributions to the Future Forests Fund made it possible to plant 100,000 red, white, and jack pine seedlings in the St. Croix State Forest after a windstorm destroyed trees there. Donations also allowed the DNR to restore marginal cropland to a native mixed-hardwood forest in the Richard J. Dorer Memorial Hardwood Forest.

We plant millions of seedlings on state lands each year. Then we nurture, protect, and ensure those trees are wisely used. Through the Future Forests Fund, the public can have a more personal stake in planting trees in their forests.

The Future Forests Fund has helped us engage with the community and individuals and fulfill our mission of maintaining Minnesota's wilderness areas so that everyone has a place to go adventure.

Tom Sega
President, Duluth Pack
Future Forests Fund Donor



TREE IMPROVEMENT PROGRAM

Our Tree Improvement Program began in the 1950s to breed trees that would enhance and protect Minnesota's forests. Today, we continue that tradition by establishing and maintaining seed orchards of trees that are selectively bred to enhance their productivity, seed production, pest resistance, and ability to cope with a changing climate.

This process takes time and attention—such care is essential to ensure trees succeed in our current and anticipated future climate conditions. The payoff, however, is great: As a result of the Tree Improvement Program, our selectively bred white spruce now is approximately 12 percent taller, and has up to 30 percent greater volume, than white spruce found in the wild. Meanwhile, an improved white pine orchard will provide seeds to grow trees resistant to white pine blister rust.

Our membership in the Minnesota Tree Improvement Cooperative, run by the University of Minnesota, expands our pursuit to improve Minnesota's trees through collaboration with counties and other public partners who oversee the health and growth of forests statewide.

BRINGING DREAMS to LIFE

Private Forest Management Program

If you have woods on your property, we can help you get what you want out of them.

Through the Private Forest Management Program, we assist family woodland owners in creating wildlife habitat, increasing natural beauty, improving trails, enhancing environmental benefits like clean air and water, and harvesting timber.

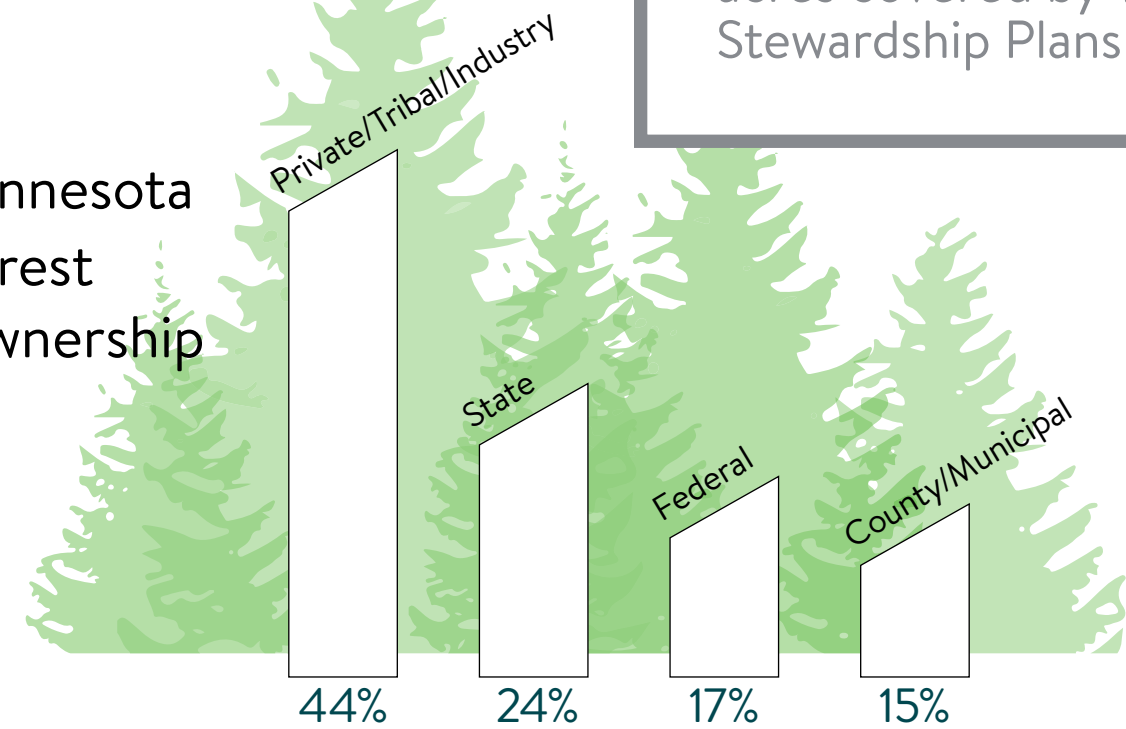
We do this by working with woodland owners to identify what kind of trees they have on their land, how to care for them, and how to plan for future forests. We also connect landowners with cost-share and incentive programs to complete woodland projects or receive tax benefits. We write and oversee Woodland Stewardship Plans that provide technical advice to woodland owners on how to manage their woods based on their needs and goals, or we assist landowners in finding consulting foresters to help them do this.

Minnesota has one of the highest rates of forest stewardship engagement in the country—and we intend to keep it that way. Our long-term goal is to have 2.5 million acres, or roughly half of all privately owned forest lands, covered by Woodland Stewardship Plans. Sound stewardship is good for woodland owners, and it's critical for Minnesota's forests.

80,000
family woodland owners
with 20+ acres

1.85 million
acres covered by Woodland
Stewardship Plans

Minnesota
Forest
Ownership



NURTURE



Trees **IN TOWN**

Community Forestry

Trees and forests add beauty and value to communities. They also reduce heating, cooling, and storm water management costs; clean our air and water; and enhance wellbeing.

We help communities and homeowners plan, plant, and care for trees and urban forests so that they remain strong and healthy.

We do this by working with cities to incorporate the latest tree-care knowledge into their urban forest management approach—something that’s especially important as changing climate and invading pests such as emerald ash borer threaten the trees that grace our yards, parks, and boulevards.

Our forest health specialists also train Tree Inspectors to assist Minnesota communities in caring for their

trees. We now have some 850 DNR-certified tree inspectors working for local governments and businesses to scout for insects and diseases, and advise on tree health and tree care, in more than 225 Minnesota communities.

We also run Minnesota’s Tree City USA program, which recognizes when a community has taken steps to ensure the future health

of its urban forest. More than 100 Minnesota communities have received the Tree City USA designation, and the number grows every year.

Community forests improve the lives of Minnesotans in so many ways. We’re here to help make sure they continue to do that for generations to come.

TEACHING Trees

Minnesota's School Forests

The School Forest Law of 1949 created a rare gem in Minnesota education: living laboratories where children could learn core academic subjects. Today, math, science, and social studies come to life for more than 50,000 kids in some 140 School Forests throughout the state. Through the School Forest Program, schools partner with us to establish and maintain nearby natural places as outdoor classrooms. We provide forest management and land assistance, trainings to improve teacher confidence outdoors, and a host of hands-on lesson and teaching materials. Schools commit to regular outdoor activities on sites that range from just a quarter acre to more than 300 acres. Teachers report that students who engage with a School Forest have improved test scores and content knowledge, decreased behavior issues, and a strong sense of connection with nature. Minnesota's School Forest Program highlights our long-term commitment to sustain Minnesota forests and create knowledgeable citizens.

Project Learning Tree

Developed by educators in 1976, Project Learning Tree (PLT) uses forests as a "window to the world" in which trees, land, air, water, and wildlife help students excel in reading, writing, math, science, and social studies. The program includes 15 activity guides, for preschool through high school, correlated to state and national academic standards. By training classroom and outdoor educators in this environmental education program, we empower them to share forestry with thousands of students annually. Teachers tell us they enjoy using PLT, and their enthusiasm helps us forge a vital link between Minnesota's increasingly urban population and our forests.

Arbor Month

Every May, our Arbor Month Program encourages all Minnesotans to plant and care for trees. We do this through events, videos, social media, and special publications. Making forest stewardship accessible on a personal level through Arbor Month activities creates a powerful connection between people and the trees and forests that grace their lives.



Let them once get in touch with nature and a habit is formed which will be a source of delight through life.

Charlotte Mason
20th Century classical educator

Nature's YEAR-ROUND PLAYGROUND

Minnesota's 59 state forests offer a wealth of outdoor recreation opportunities. From fishing and hunting, to snowshoeing and snowmobiling, to hiking and horseback riding, they not only benefit all of us who live here, but also the thousands of out-of-state visitors who flock here to enjoy them.

Visitors so highly prize our state forests and the recreation they offer that balancing everyone's interests can be a challenge. That's why we work with other DNR divisions to manage state forest recreational activities and develop trail

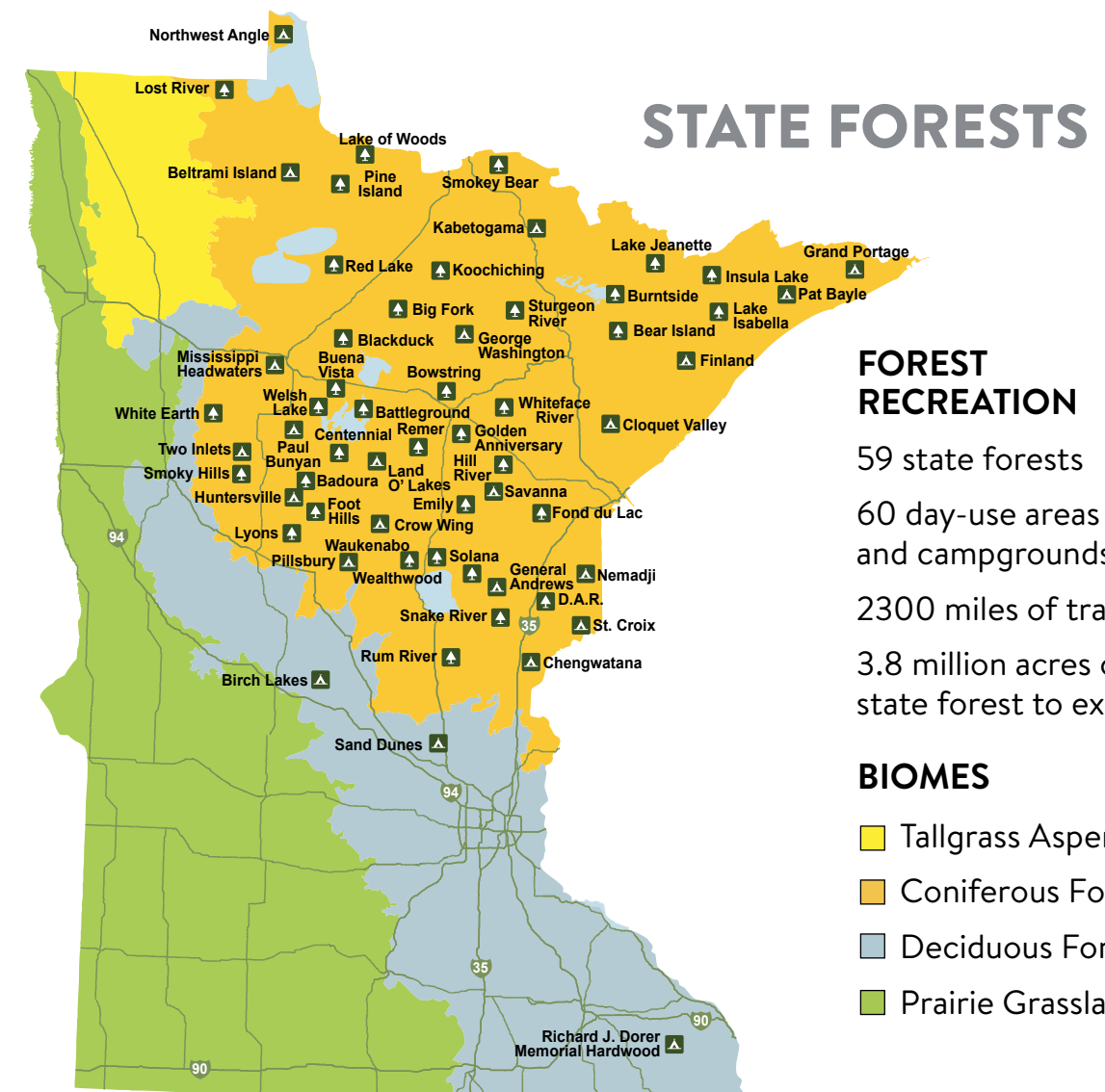
systems that have something for everyone: off-road vehicle users, horseback riders, skiers, snowmobilers, hikers, and bicyclists alike.

The 60 campgrounds and day-use areas tucked into State Forests provide picnickers, campers, hunters, and others beautiful places to relax or stay while playing in the great outdoors.

Visitors also may camp outside of formal campground areas (known as "dispersed" camping) at no charge, as long as they follow state forest rules and leave no trace.



ENJOY



Keeping Track of **MINNESOTA'S TREES**

Our primary job in the Division of Forestry is to manage State Forests for the benefit of all Minnesotans. The first step in doing that is making sure we know exactly what we have in our forests so that we can take care of them responsibly and effectively.

To do this, we collect data in multiple ways to provide accurate, up-to-date information on the composition and condition of trees and other plants in the 5 million acres of forests we manage. We then use that information to decide where, when, and how to plant, thin, harvest, or preserve trees to meet forest management goals.

We use two main on-the-ground forest inventory approaches: the National Forest Inventory and Analysis (FIA) and Minnesota's Cooperative Stand Assessment (CSA). The federal FIA program tracks the species, size, and health of trees, as well as forest ownership, wood production, and utilization rates. CSA, meanwhile, collects data on tree species, size, health, and density in more than 200,000 state-managed forest areas—that's nearly 5 billion trees. We use FIA and CSA data to map, monitor, and evaluate vegetation. We also use the data for large-scale forest management, assessment, and modeling to understand how changes in the forest affect Minnesota's natural resources.

Wondering what kind of DNR-managed trees are in your neck of the woods? Check out our forest inventory viewer to use an interactive map at mndnr.gov/maps/forestview

A forest manager wearing a red cap, sunglasses, and a high-visibility orange vest is standing in a forest, looking up at a large tree trunk. The word "MANAGE" is overlaid in large white letters at the bottom of the image.

MANAGE

30%

amount of Minnesota wood fiber that comes from DNR-managed lands



Harvesting BOUNTIFUL BENEFITS

We Minnesotans love our trees. So it's natural to ask: why would we ever cut them down?

Harvesting is an important part of a managed forest's lifecycle. It mimics natural disturbances, but in a workable, less disruptive way. Harvesting also is the No. 1 tool we have to ensure Minnesota's forests have a wide range of tree ages and conditions to support diverse wildlife habitat, keep watersheds healthy, and provide recreational opportunities.

Minnesotans also love wood products. This is a good thing, because wood from well-managed, certified forests is an environmentally friendly raw material. Not only is it 100% renewable—we always reforest after harvest—it has the added benefit of sequestering carbon. This means wood products remove greenhouse gases from the air and store them to reduce the effects of climate change.

Harvesting trees supports Minnesota's valuable forest products industry, which brings jobs and income to communities statewide. In fact, the forest products industry is the fifth-largest manufacturing sector in Minnesota: It employs more than 64,000 people and has a \$17.8 billion impact each year. It is the backbone of northern Minnesota, and has been since our state's earliest days. Remember: Paul Bunyan is a lumberjack!

Finally, managed forests have a much lower risk for wildfire and forest pests than unmanaged forests. Thinning trees protects against wildfire by reducing the fuel wildfires need to burn. Harvesting also cuts down on forest pests by creating more young, healthy, diverse stands of trees that are more resilient to insects or disease. These same young, healthy forests are great for wildlife too.

Caring for Minnesota's WORKING FORESTS

Our DNR-managed forest lands are working forests. This means we harvest trees periodically according to a plan. Revenue earned from these harvests support a variety of state activities, from forest management to pre-K-12 education.

These harvests not only help diversify forest ecosystems and support wildlife, they also provide a consistent, steady stream of wood to Minnesota's forest products industry. If you use paper, wood, or any other product from trees, you can thank a Minnesota forest for making that possible. Harvesting allows Minnesota's forests to "earn their keep"—and reduces pressure to convert forests to other revenue-generating uses.

We carefully consider ecological, economic, and social factors when creating forest management plans. And when we offer timber for sale, we specify which sizes and species of trees may be harvested. Foresters then supervise the harvests to ensure we meet forest management objectives—including forest health, habitat, recreation, clean air and water—and ensure that the forest will grow back through natural regeneration, planting, or seeding.



HIGH-TECH TOOLS

We use cutting-edge technology to make sure we know exactly what's in the forests we manage. Remote sensing technology such as LiDAR, aerial photos, and satellite imagery, combined with robust computer technology, make our inventory data current, useful, and highly desirable. In fact, Minnesota is known for our extensive forest mapping and monitoring, as well as our habitat modeling based on satellite imagery. This remote assessment allows us to frequently and economically update our forest inventory and complement the work of foresters in the field.

LIDAR: SHINING SOME LIGHT ON MINNESOTA'S TREES

LiDAR—an acronym for light detection and ranging—uses ultraviolet, visible, or near-infrared laser light pulses to make digital 3-D images of objects. A plane equipped with LiDAR equipment flies over a forest, sending out millions of pulses of light per second. This creates a 3-D "point cloud" of information about the forest. A computer program then interprets that information to generate high-resolution maps depicting the different kinds of trees in the forest.

MANAGING

Responsibly and Sustainably

We are proud to be among the first and largest public land managers in the U.S. to have land certified as “well managed” by the Forest Stewardship Council and the Sustainable Forest Initiative. Currently, all 5 million acres of DNR-managed lands are dual-certified.

Certification means we meet or exceed rigorous criteria designed to ensure our forests are reasonably managed to provide environmental, social, and economic benefits. To maintain our certification, we undergo annual independent audits that challenge us to constantly improve our forest management techniques.

Certification provides unique market access to support and sustain Minnesota’s healthy and diverse forest industries. These industries produce things like lumber, siding, flooring, office paper, magazines, windows, furniture, and cabinets. You can feel good about purchasing and using products that come from DNR-managed forests, because you know the land has been carefully maintained for sustainability.

8 million
acres of public and
private certified forests



FUNDING

Minnesota Schools

School Trust Lands have a specific purpose: to provide a continual source of funding for Minnesota’s public schools. They date back to 1858, when Minnesota became a state and the federal government granted a portion of every township “for the use of schools.”

The DNR serves as the trustee for Minnesota’s School Trust Lands, and we work diligently to manage them by promoting activities that both generate revenue and protect the natural resources Minnesotans value and enjoy. This means we handle collection and accounting of revenues, schedule timber harvest activities, verify all forest products removed from School Trust Lands, reforest after a harvest, and oversee protection of the land.

Today, income from the 2.5 million acres of School Trust Lands contributes \$1 million to \$2 million each year to Minnesota’s Permanent School Fund—which, in turn, helps fund every public school in the state. If you’d like to know how much your local school district receives from School Trust Lands and the Permanent School Fund, log on to the interactive Permanent School Fund Distribution map at mn.gov/school-trust-lands/revenue

\$17.6 billion
in economic impact



64,000
jobs

Supporting **HEALTHY MARKETS**

Minnesota's forests provide a host of things we all use or benefit from every day. From paper, to school supplies and cosmetics, to construction materials, Minnesota's forest products wind up in homes and businesses throughout the country—and the world.

Because income from harvests can help pay for managing forests—and also persuade landowners to retain forests as forests, rather than selling woodlands for other uses—it's critical that we ensure Minnesota has healthy markets for our forest products.

To that end, our Utilization and Marketing Program works to strengthen traditional markets, identify emerging markets, and support developing new products and outlets. We do this by collecting data, providing analysis, and tracking change in the forest products industry. Our work helps natural resource professionals, lawmakers, forest products companies, communities, and the public make wise decisions about how to sustainably use Minnesota's forests. It also identifies opportunities for improved forest resource management and sustainable economic development.

We play a major role in anticipating and filling the need for new markets as society and product needs change. We work with grant programs and partners that support traditional wood utilization projects, expand wood energy markets, and promote the use of wood as a renewable resource. We also provide data, business services, and economic development assistance to public, private, and educational organizations as they explore new, efficient, and sustainable ways to use wood.



BIOMASS: CONVERTING WASTE TO ENERGY

Pressure to find local, renewable alternatives to petroleum-based fuels and chemicals provides Minnesota a great opportunity to be at the forefront of biomass production.

Biomass is a renewable source of energy from plants—in our case, trees. Biomass from wood and wood-processing wastes can be burned to heat buildings, produce industrial process heat for manufacturing, and generate electricity. Biomass also can be converted into biogas or liquid biofuels.

One way we're helping to boost Minnesota's forest-based biomass industry is by identifying the best ways to use wood biomass in Minnesota—for example, using wood heat in areas that don't have access to natural gas, and also in agricultural industries like poultry production that consume large amounts of propane.

We also provide data and information to wood energy development groups who are positioning Minnesota as a global leader in the bioeconomy, and support the Minnesota Department of Agriculture's bioincentive program, which encourages commercial-scale production of advanced biofuels and biomass thermal energy.

Keeping Us Safe from **WILDFIRES**

The Minnesota Legislature created the Minnesota Forest Service back in 1911 chiefly to prevent and fight forest fires. Today, this remains a core part of our mission: protecting life, property, and natural resources from fire on more than 45 million acres of public and private land.

Prevention

We Minnesotans love our cabins and secluded homes. But building in remote or rural areas means living within the danger zone for wildfires. That's why we adopted the national Firewise Program. Through Firewise, we work with partner agencies, municipalities, organizations, and homeowners to identify, plan for, and reduce wildfire risk. Additionally, we empower and support local groups to prepare Community Wildfire Protection Plans, reduce the amount of burnable materials around homes and in communities, and evaluate subdivisions and individual homes to help homeowners reduce their wildfire risk. More than 300 Minnesota communities identified as at risk for wildfire now operate under a Community Wildfire Protection Plan—a success we credit to the strong partnerships we've built.

We also reduce the risk of wildfire by requiring a permit to burn anything larger than a campfire. Homeowners who want to burn yard debris must register their burn with us, then call to verify conditions before burning. Our burning restriction program has reduced wildfires by 30 percent in the past decade.

And, of course, we work with Smokey Bear to spread the prevention message throughout Minnesota. We oversee the Smokey Bear program, ensuring he makes appearances throughout the year at schools, parades, and the State Fair to remind everyone, "Only you can prevent wildfires!"

PROTECT

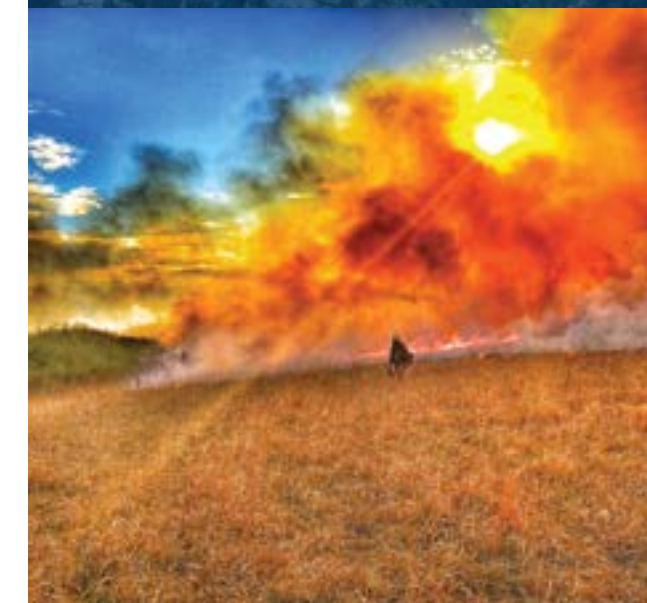


Suppression

Despite our best prevention efforts, Minnesota still experiences more than a thousand wildfires every year, most of which are caused by debris burning, equipment, and arson.

Quick, aggressive, local response works best to keep these fires small. But if local resources become overwhelmed, MNICS coordinates firefighting across jurisdictions and geographic areas for a rapid, organized response. Depending on the time of year and severity of the fire, a thousand firefighters are prepared to step out of their day-to-day activities and jump into action. Using planes, helicopters, all-terrain vehicles, and backpacks full of water, they work to attack and control large fires that exceed the capacity of local firefighters. Our goal is to respond to wildfires within 20 minutes and keep them contained to 10 or fewer acres.

When firefighting resources are not needed in Minnesota, we make our crews available to help fight fires or perform related duties elsewhere through the National Interagency Coordination Center and the Great Lakes Forest Fire Compact, which includes Canada. In 2018, 1,036 Minnesota firefighters (321 from the DNR) deployed to 27 states, Puerto Rico, and Canada to fight fires and assist with other hazardous situations. In turn, firefighters from other states and Canada lend a hand when we need help here in Minnesota.



USING FIRE TO CARE FOR OUR LAND

Fire isn't always bad. Prescribed burns, often called "controlled burns," are intentionally lit to manage prairie and other habitats, regenerate trees, control insects and diseases, improve wildlife habitat, and reduce the risk of wildfire. Prescribed burns are an important resource management tool, but they can spell trouble if done incorrectly or during inappropriate conditions. We help keep prescribed burns safe and effective by training land managers, assessing weather forecasts, and monitoring and sharing current and predicted conditions.

Preparation

Minnesota has two distinct wildfire seasons: spring and fall. But really, wildfires can happen anytime there's no snow on the ground. As a result, we're prepared to respond to wildfires anywhere in the state during the snow-free seasons.

Our preparation consists of three key elements—equipment, people, and partnerships—coordinated by the Minnesota Incident Command System (MNICS).

Located at the Minnesota Interagency Fire Center (MIFC) in Grand Rapids, MNICS brings together the U.S. Forest Service, Bureau of Indian Affairs, Minnesota DNR, U.S. Fish and Wildlife Service, National Park Service, and Minnesota Department of Public Safety into a single, coordinated force prepared to fight wildfires at a moment's notice.

The Northeast Interagency Incident Support Cache supplies our firefighting forces with a wide range of equipment, including pumps, hoses, backpack water sprayers, protective clothing, and tools. Supplies can be shipped anywhere in the state within a few hours. The cache also supports 20 northeastern states with wildfire equipment.

Partnership agreements between federal, state, local, and tribal governments make this work possible and allow us to quickly respond to fires in any jurisdiction. Fast, aggressive response is our best chance of stopping an emerging wildfire before it has a chance to destroy property or threaten lives.



Preserving **FORESTS:**

Forest Legacy Program and Forests for the Future

As Minnesota's property values rise, private woodland owners and forest product companies may be tempted to sell their forest land for other uses. To maintain and conserve Minnesota's forests, we administer both the Forest Legacy and Forests for the Future programs. These programs have three goals: to prevent the conversion of forest land to non-forest uses; to stop large forest blocks from being split up; and to preserve the many benefits forests provide all of us.

The federal Forest Legacy Program provides matching funds to the Division of Forestry so that we can purchase land or conservation easements. Minnesota's Forests for the Future program gives landowners a way to sell conservation easements on their lands. A conservation easement restricts development and protects ecological, historic,

or scenic resources. It compensates woodland owners for keeping their forests as forests. This, in turn, protects Minnesota's fish and wildlife habitat, provides recreation and wood products, and ensures clean drinking water.

Forest landowners have embraced these programs. As a result, \$93 million from public and private sources have been used to protect 365,000 acres of forests since 2000—nearly 99% of which are open to the public for hunting, fishing, and other recreational uses.

Our aim is to purchase conservation easements on 530,000 acres of Minnesota forest land by 2034. With continued support from our public and private partners, we believe this is an achievable goal that will benefit all Minnesotans.



Using Science to **PROTECT OUR FORESTS**

Ecological Classification System

We use science in managing and protecting Minnesota's forests. Our Ecological Classification System (ECS) offers field tools and training to help both public and private land managers make decisions about growing, maintaining, and harvesting our forests.

Built on almost three decades of investigating, quantifying, and learning about our forest ecosystems, ECS gives wildlife managers, foresters, and others a shared language they can use to work together to keep forests healthy and strong. ECS uses native plant community field guides, tree selection tables, soil protection guidelines, maps, and other tools that describe forest ecosystems and how to manage them. These tools allow us to identify a wide range of land management strategies and possible outcomes so that we can choose options that best protect the integrity of the forest as a healthy ecosystem.

ECS helps us figure out, among other things, which trees are the best fit for the larger plant community. It also provides guidance about which tree species grow best in particular ecosystems. This information will prove particularly important as Minnesota's climate changes. ECS assists us in predicting the impact of climate change and determining which trees likely will do better in Minnesota's warmer and wetter climate. This helps us boost forest resilience to climate change and keep Minnesota's forests healthy and productive.





EMERALD ASH BORER

Emerald ash borer is enemy No. 1 when it comes to Minnesota's 1.2 billion ash trees. This non-native invasive insect, first found in Minnesota in 2009, kills every ash tree it infests. Since ash makes up 7 percent of our forests and 15 percent of our urban trees, we are on high alert. We train and support Forest Pest First Detectors to respond when residents report EAB. To minimize damage, we support the Minnesota Department of Agriculture as it quarantines wood and provides education and outreach to infested communities. We also allow only DNR-approved firewood on DNR lands, because EAB can travel in wood.

Managing FOREST HAZARDS

Despite their vastness and apparent strength, forests face daunting foes. Invasive plants and insects, diseases, and adverse weather all can reduce a forest's health. They can harm the ecosystem, timber production, recreation, and other "goods from the woods." Our Forest Health Program is the first line of defense against these challenges.

Speed and accuracy matter when it comes to protecting our forests. We have to stay ahead of native and invasive insects, plants, and diseases in order to prevent significant forest losses. Our Forest Health and Terrestrial Invasive Species programs survey millions of acres of forest land, quickly share results, determine the best management options, and provide timely recommendations to other public, tribal, and private land managers—all to keep our forests healthy and strong.

Preventing the introduction and spread of invasive species, and controlling infestations when they do occur, is vital. We train foresters, land managers, Forest Pest First Detectors, and others to identify and report pests. This extensive frontline effort to gather knowledge of new infestations and pest movement allows immediate response to threats and helps keep outbreaks and impacts to a minimum.



INVASIVE BURDOCK



INVASIVE GARLIC MUSTARD

PLAY. CLEAN. GO.

The biggest threats to Minnesota's forests are so small we often don't see them. But invasive species such as oak wilt disease and oriental bittersweet can bring down a forest. Our innovative PlayCleanGo campaign educates Minnesotans about these and other invasive threats, and encourages people to stop the spread by removing hitchhiking egg masses, seeds, and larvae that might be lurking in firewood or embedded in mud on boots or gear. All of us in the Division of Forestry practice what we preach: we "WorkCleanGo"—and we require our contractors to do the same.

Planning **FUTURE FORESTS**

With lifespans extending many decades or centuries, trees by nature require a long-term management perspective. That's why our Forest Planning Program looks at the really big picture: millions of acres of forest lands spanning the next 50 to 100 years.

To do this, we set goals using 10-year forest management plans. These plans spell out how DNR-managed forests should look, what they should provide—for example, wildlife habitat, rare species protection, and timber production—and how to make that happen. These short-term plans guide our on-the-ground activities to ensure we stay on track over the long term.

We develop our forest resource management plans with input from partners, the public, and the DNR divisions of Fish and Wildlife and Ecological and Water Resources. The plans are based on ecological rather than administrative boundaries, which allows us to monitor the forest over time, even when administrative boundaries change. Information about current forest

conditions, as well as computer modeling to ensure harvesting never exceeds growth, helps us to address changing forest conditions, threats, and demands.

To encourage good forest stewardship across all ownerships, we maintain the Minnesota Forest Action Plan. This plan describes the most important issues facing Minnesota forests and how to address them. We all benefit from understanding the big picture of all Minnesota forests, not just DNR-managed lands. The Minnesota Forest Action Plan provides a detailed description of Minnesota forests and outlines strategies for managing them now and into the future.

As we plan our activities to promote healthy future forests, we use scientific information to ensure good habitat distribution, provide recreational opportunities, and use wood resources—all while conserving areas with unique or sensitive forest resources.

The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value.

Theodore Roosevelt



PLAN



Standing Tall **INTO THE FUTURE**

As stewards of Minnesota's 5 million acres of state forest lands, we keep one eye firmly on the future when managing their lifecycle.

This means we work with partners in Minnesota and throughout the country to develop strategies that will help our forests adapt to changes that could threaten them, such as climate change.

We do this by making harvest and reforestation decisions that result in a mix of tree species, ages, and sizes in our forests. We also promote growing strong, resilient trees by thinning young tree stands, removing invasive plants, and protecting seedlings from browsing animals such as deer and rabbits. When harvesting occurs on DNR-managed forests, we make sure to protect forest soils from erosion so that young trees are more likely to survive and grow quickly. Additionally, our State Forest Nursery and Silviculture programs collaborate with forestry researchers and ecologists to grow tree seedlings that are more likely to do better in our warming climate.

Together, these management strategies will help create and maintain healthy forests that not only can respond to change, but also play an important role in the climate change response. Healthy forests capture and store carbon dioxide—a greenhouse gas that's warming the planet—in trees and soil.

We will continue to work with our federal and state partners—including soil and water conservation districts, county land departments, environmental groups, nonprofits, and industry—to promote responsible forest management practices that prepare our forests for the future.

Minnesota's forests enrich us all. They provide us with clean water and air, places to play and find peace, products we use everyday, and so much more. That's why all of us in the Division of Forestry, and the DNR as a whole, embrace our role of managing the lifecycle of Minnesota's Forests. We want them to stand tall for many generations to come.



In a forest of a hundred thousand trees, no two leaves are alike. And no two journeys along the same path are alike.

Paulo Coelho
Portuguese novelist



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