



Spreading like

WILDFIRE

Planning fire prevention
as communities grow
into wildlands.



Fighting FIRES

Special challenges heat up where wildfires and urban life meet.

Jolene Ackerman

Fire, whether started by humans or by lightning, is necessary and inevitable. It helps maintain the beauty and health of our forests even though it seems destructive. Each year in Wisconsin, thousands of acres burn, destroying dozens of structures and threatening hundreds more. Excluding fire from wildlands is not possible.

Today, however, a unique wildfire danger is growing where homes and other structures are built in areas of highly flammable vegetation, creating a condition called the wildland-urban interface (WUI). The WUI can be a lone house in the middle of a forest, a subdivision on the edge of a pine plantation, or even homes surrounded by grassland. Adding buildings to areas that historically burn interrupts the natural cycle of wildfires and creates a situation where homes and businesses potentially become just another piece of burnable fuel during a wildfire. Increasingly, people are moving into wildland areas without adapting to the dangers around them.

Fire officials are greatly concerned when the structures themselves are made of flammable materials and built in remote areas where roads and driveways are narrow or sandy, making it impossible for emergency vehicles to reach them.

Unfortunately, even though housing in the wildland-urban interface is increasing, the number of available firefighters and equipment is not increasing at the same rate.

We can start preparing for wildfire by working together. As homeowners, we can partner with others in our community as well as local fire departments to develop a safety plan in the wildland-urban interface. By planning how home sites are designed, built and maintained in wildland areas, we can work together toward becoming “firewise.” Becoming firewise is a process, not an endpoint. That process includes paying attention to the features on your property and in your community that may start or spread a wildfire.



ROBERT QUEEN

The goal is to prepare homes and businesses to survive wildfire without the intervention of the fire department, allowing firefighters to concentrate on controlling the fire without having to make stands to save individual homes.

Jolene Ackerman is Wisconsin DNR's wildland-urban interface coordinator.

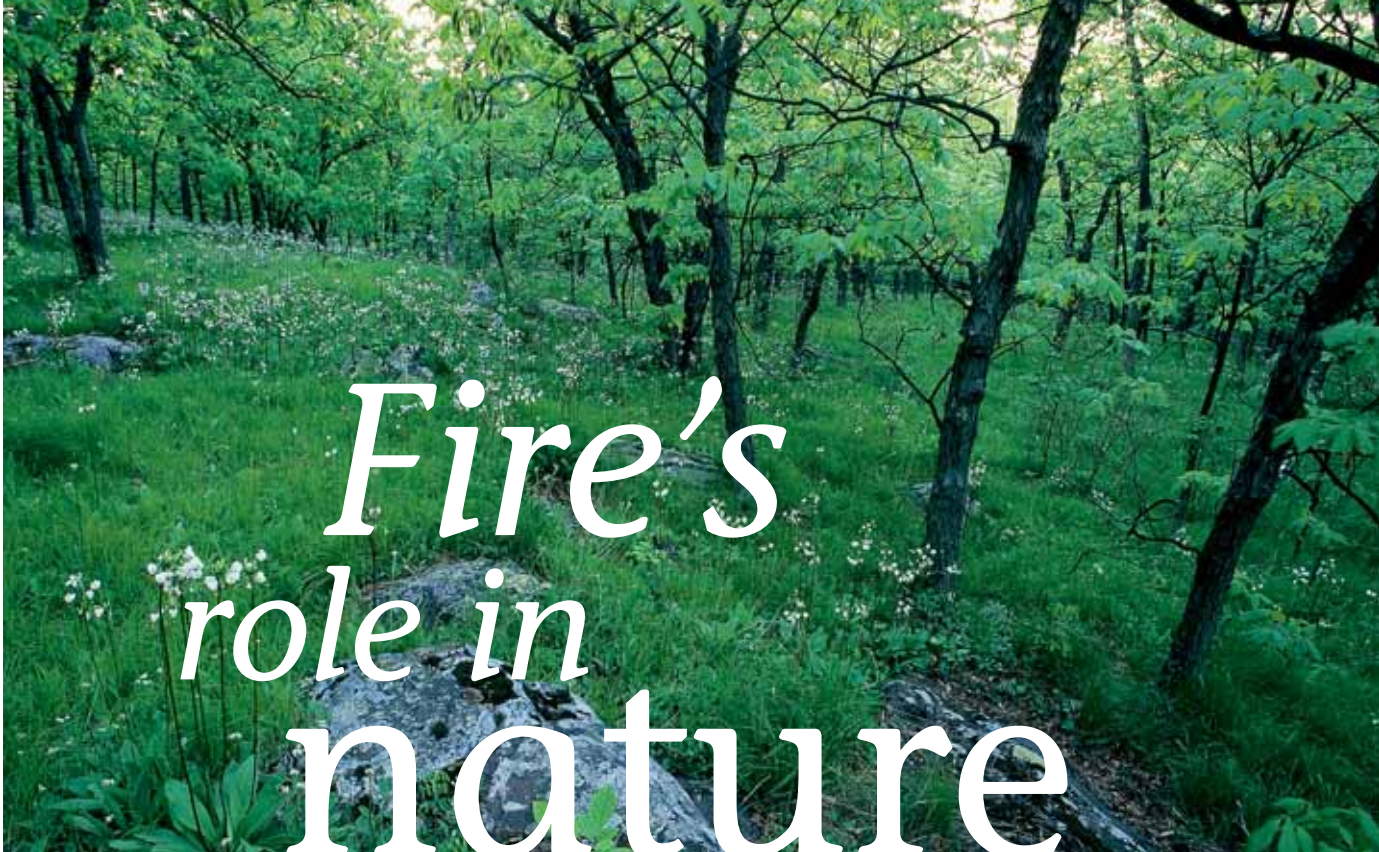


JOLENE ACKERMAN



CHRIS KLAHN

TOP: Fire training is an important tool in suppressing fires in the wildland-urban area. During an actual fire these firefighters will be outfitted in full gear. MIDDLE: The Crystal Lake Fire in 2003 melts the vinyl siding on this house. BOTTOM: A fire crowns in trees and throws embers across the highway.



GERALD H. EMMERICH, JR.

Fire's role in nature

Shaping Wisconsin's landscape.

Nancy Braker

Much of life on Earth has evolved with fire. Like storms and floods, fire is a powerful force that can give life or smother it. Fire has shaped many of the ecosystems we know today, in Wisconsin and worldwide.

Wisconsin's natural plant communities at the time of settlement were a mix of grasslands, oak savannas and oak forests in the south and southwest, and conifer-hardwood forests and pine savannas (or barrens) in the north. These ecosystems evolved over thousands of years under many influences. One of the most important was fire. Fire returns nutrients to the soil, exposes soil so that seeds may germinate, releases seeds from cones or hard seed covers, removes the thatch layer that shades small-statured species and plays many other ecological roles.

While lightning strikes started many fires, many more acres in North America were burned intentionally by Native Americans. Fire was used to clear the land for agriculture, improve forage for game species, direct game migration and clear brush to ease travel or prevent hostile forces from approaching.

In *The Vegetation of Wisconsin*, John Curtis writes: "In the early years of

settlement, the most important vegetational effects were caused by the elimination of fire." European settlers limited the extent of wildfires with their plowed fields, dirt roads and forest clearings, causing major changes in the frequency and extent of free running fire that changed the natural community.

In prairie and savanna regions of the state, land described as treeless by early settlers quickly became covered with brush and forests as major settlements were established. Changes in fire-dependent plant communities were rapid after about 1850. Prairies, pine barrens and oak savannas disappeared as the forest canopy closed. Many formerly common plants and animals are now uncommon, and quite a few are listed as threatened or endangered.

Even with conservation efforts, only a small percentage of vegetation representing the original natural state remains and is largely maintained by fire such as prescribed burns.

Natural resources managers work to mimic the fire that plant communities experienced naturally. Since most significant natural fires burned when the vegetation was dry in the spring and fall, this is when managed fires usually

are set. Using natural fire breaks such as rivers or lakes, or manmade breaks such as roads, mowed paths or plowed fire lines, land managers generally only burn a small portion of a protected area at one time in order to avoid damage to animal populations.

While state and federal agencies conduct most management fires, private organizations such as The Nature Conservancy, The Prairie Enthusiasts and many nature centers have prescribed burn programs as well.

For more information:

- The Nature Conservancy's Fire Initiative: <http://nature.org/initiatives/fire/>
- National Park Service Fire Management Program Center: www.nps.gov/fire/
- "Bibliography of Fire Effects and Related Literature Applicable to the Ecosystems and Species of Wisconsin," Technical Bulletin No. 187, Wisconsin DNR
- "Fire In America: A Cultural History of Wildland and Rural Fire" by Stephen Pyne

Nancy Braker works for The Nature Conservancy out of its Baraboo office and is fire manager for the Conservancy's Wisconsin chapter.



Partnerships

A powerful fire fighting tool.

Natasha Kassulke

Chris Klahn, DNR cooperative fire specialist, was a forest ranger for 15 years and now works with 870 fire departments in Wisconsin planning for fighting fires. He also serves as the assistant fire chief in Montello.

“A vast majority of Wisconsin fire departments are volunteer,” Klahn says. “Members often have other jobs, and make time to fight fires in their communities, train and help with rescues after car accidents.”

Rural fire departments are our first line of protection, Klahn says. Yet,



TOP: Many fire department members, wildlife managers, students and citizens are trained in fire suppression methods each year.

BOTTOM: Emergency fire wardens have been volunteering since 1895.

staffing and equipment aren't growing at the pace that can keep up with the needs of communities spreading into the wildland-urban interface.

To meet these challenges, com-

munities can apply for grants. The Volunteer Fire Assistance (VFA) grant program is open to county fire associations and consists of a 50 percent cost share grant using federal funding.

The Forest Fire Protection (FFP) grant program is open to Wisconsin fire departments with wildfire suppression agreements with DNR. The program also provides a 50 percent

cost share using state and federal funds.

“Fire suppression efforts statewide include training, community planning and zoning,” Klahn says. “This

DEAN TVEDT

includes writing mandatory driveway widths into zoning laws and including fire protection in subdivision planning.”

The Spooner fire district, along with DNR, is asking homeowners to play a larger role in fire protection. The district consists of the City of Spooner and 11 townships. The 322-square-mile fire protection area is covered by a 35-person volunteer fire department.

“It’s a large area and keeps us active,” says Spooner Fire Chief Darren Vik.

Highly flammable pine is common in the area. Many homes are being built in clusters surrounded by pine plantations and at the woods’ edge. Vik’s concern is that his department won’t have the vehicles or manpower necessary to make a stand against fires that threaten multiple homes. Some areas also have limited access and steep terrain.

Vik credits Ed Forrester, DNR area forestry supervisor in Barron County, and Bob Focht, Spooner fire ranger, with suggesting a door-to-door inspection program to get homeowners proactively working to minimize fire risks around their homes.

During his door-to-door visits, Vik explains that the property is located in an area that historically was subjected to periodic forest fires. The last catastrophic forest fire in the area occurred in 1980 and destroyed over 150 buildings. Since then, the number of structures built in the St. Croix River drainage basin has doubled. In that same period, the number of fire departments has remained the same and the number of DNR fire units available in the area has decreased.

Whether Vik finds people at home or not, he leaves them information on proper leaf burning, burn barrel requirements, emergency vehicle access and more.

Among the most common changes homeowners make after his inspections are widening driveways and creating turnaround spaces for fire fighting vehicle access. Other changes include pruning trees to a height of six to 10 feet above the ground, adding stone landscaping to create a defensible space, moving firewood piles away

from homes and removing conifer bushes from around the home. Evergreen trees are generally much more flammable than deciduous trees and are not recommended within 30 feet of structures.

During the inspections, Vik also uses GPS (Global Positioning System) to locate the main building on the property as well as map driveway dimensions in the event of a fire. Under smoky conditions, these maps can be used to locate structures and driveways.

“This is a wonderful program,” Vik says. “It’s been very well accepted by homeowners who are not only protecting their homes but beautifying them in the process.”

Marquette County has included fire prevention information in its comprehensive land use plan, and Crystal Lake recently became Wisconsin’s first recognized “Firewise Community” for its efforts to plan for the fire season. In April 2003, the northern Marquette County community was threatened by a fire started near the Lake of the Woods Campground. Because of the fire’s intensity, 17 fire departments and DNR worked together to save many threatened structures. The fire was finally contained after 572 acres burned. The cause was a large brush fire that had not been fully extinguished.

After the fire, the community worked with the Neshkoro Fire Department and local DNR to widen access roads and thin vegetation. A chipping day was held to dispose of removed trees. The community’s efforts paid off. They received lower insurance rates on their collectively owned wildland.

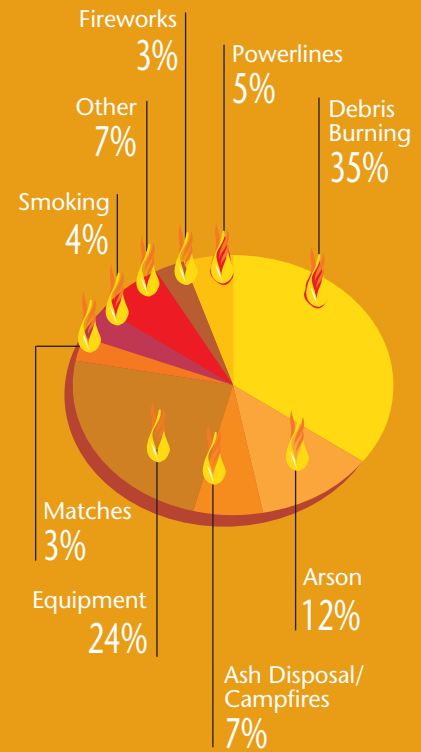
Decisions on where to invest time, energy and funding are increasingly based on data and partnerships.

A research team from the College of Agricultural and Life Sciences at the University of Wisconsin — Madison has partnered with the U.S. Department of Agriculture Forest Service to analyze and combine census and vegetation data to create a map that defines at-risk communities in the wildland-urban interface. Wildland-urban interface maps are available online at: www.silvis.forest.wisc.edu.

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

WILDFIRE

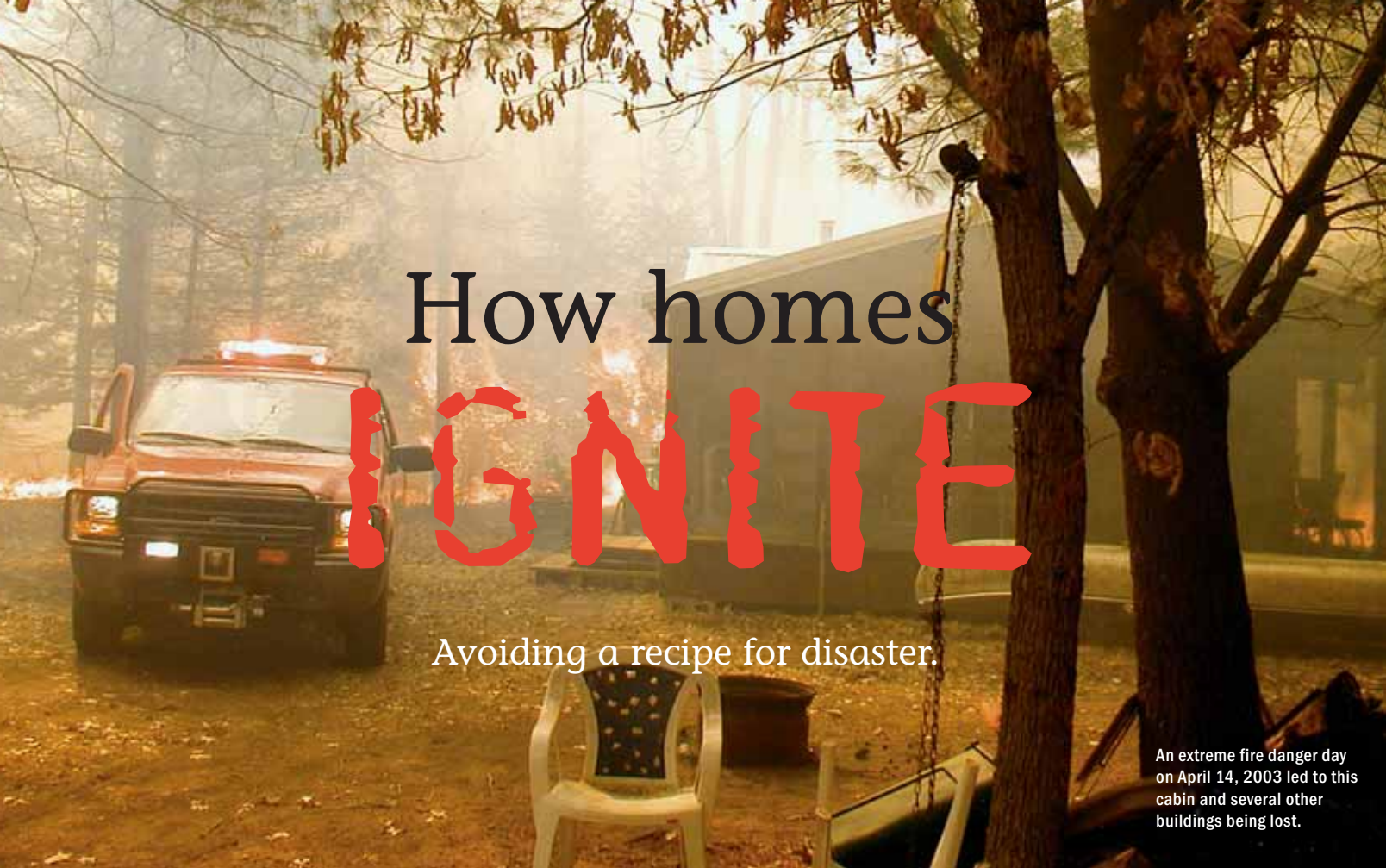
causes



About 1,500 fires annually burn over 5,000 acres on lands protected by the Wisconsin Department of Natural Resources. Over 90 percent of these fires are human-caused.

In the spring, a lack of rain and high winds can add up to especially bad fire weather. Burning debris piles may be left unattended and embers can re-ignite a large fire. ATV riders and other off-road motorists also should be aware that grass and leaves can collect around the muffler and fall off causing a fire. If you build a campfire, clear all grass and leaves from around the area. When you put the fire out, pour water on the ashes and make a slurry to ensure that the fire is out.

WISCONSIN DNR



How homes

IGNITE

Avoiding a recipe for disaster.

An extreme fire danger day on April 14, 2003 led to this cabin and several other buildings being lost.

Jolene Ackerman and John Hintz

Fire needs heat, fuel and oxygen to burn. If even one of these factors is removed from the equation, the fire is snuffed out. Fuels, weather, topography and human behavior influence the likelihood of a fire starting, as well as its speed, direction, intensity, and the ability to control and extinguish the wildfire. Weather cannot be changed. Topography generally

remains the same. But fuels and human behavior can be altered. Thus, the greatest opportunity to reduce a wildfire threat to your home lies in actively managing wildland vegetation and changing your habits.

Fuels

Fire quickly moves through light fuels

like grass, fallen leaves, pine needles and mulch. Fire lingers and burns more intensely in heavier fuels like wood decks and fences, firewood stacks and lawn furniture. Very heavy fuels like trees and buildings can burn for long periods and spread fire by producing radiant heat and flying embers.

Fuels are arranged horizontally and vertically. Ground fuels consist of

TIMELINE

Wisconsin's heated history.

1634

Jean Nicolet explores Wisconsin. Fur traders and missionaries follow.



1820

The first European settlements are built in southwest Wisconsin, following the discovery of lead. Much of the timber is cut and burned to make room for agriculture.

1850

Railroad construction begins. The first railroad into northern Wisconsin, the Wisconsin Central, is built in 1870.

1854

A single wildfire runs from Amery to Iron River, a distance of 140 miles.

1871

Peshtigo fire: The deadliest fire in the nation's history. Between 1,200 and 1,500 lives are lost and more than 1.5 million acres burn.

1887

Marshfield burns to the ground.

1891

Comstock fire in Barron County destroys 64,000 acres, the entire village of Barronett and also burns structures in Shell Lake.

1894

On July 27, the Phillips fire burns over 100,000 acres in Price County, destroying 400 homes and much of the downtown area. Thirteen people die trying to escape by swimming across the lake.

1900

The "Golden Age" of lumbering reaches its peak in Wisconsin. Fueled by slash left from the intensive logging of the era, large catastrophic fires are common.

combustible materials lying beneath the surface including deep duff, roots, rotten buried logs and other organic matter. Fires in ground fuels are usually called “peat fires.”

Surface fuels consist of materials lying on or immediately above the ground including pine needles, leaves, grass, downed logs, stumps, tree limbs and low shrubs.

Aerial fuels include green and dead materials in the upper forest canopy: tree branches, crowns, snags, moss and taller shrubs. “Crown fires” burn these aerial fuels. Fires in conifer stands and pine plantations tend to be very intense and difficult to control.

How these fuels are connected around a home can determine the chances of a structure surviving. Unmowed grass, unraked leaves and dead branches are a continuous fuel supply right up to a home’s siding. Breaking the chain of continuous fuels up to and around a home can serve as a fuel break, slowing a fire and bringing it to the ground where firefighters have a better chance to stop it.

Weather

Temperature, relative humidity and wind speed are three significant weather factors affecting wildfire behavior. Higher temperatures preheat fuels by driving off moisture, which allows fuels to burn faster. Lower relative humidity and a lack of precipitation lowers fuel moisture; dry fuels

burn more easily than fuels with higher moisture content.

Wind is the most important weather factor since it dries fuel and increases the supply of oxygen. Wind has the greatest influence on the rate and direction of fire spread. In Wisconsin, wind direction almost always changes in a clockwise rotation, and winds tend to be the strongest in mid-afternoon.

Wisconsin’s wildfire weather is most severe during spring, between the time after the last snowmelt and before the vegetation “greens up.” Spring rains and new green growth lessen the likelihood that wildfires will start and spread. The chances increase again during late summer and fall when the vegetation begins to dry out. The combination of hot weather, high wind speed and dry vegetation creates

prime conditions for wildfires.

Topography

Topography plays a big role in how a fire will behave. Steep slopes spread fire rapidly. Minimizing fuels downhill from a home can make a difference when a wildfire threatens. Fire travels faster uphill, and afternoon winds travel upslope as hot air rises, pushing fire even faster. Homes built on a hilltop need larger areas of defensible space, particularly on the downhill side. Aspect, or the direction a slope faces, also is a factor. North facing slopes tend to be more shaded and moister with heavier fuels such as trees. South facing slopes tend to be sunnier and drier, with more light fuels such as grasses.

Human behavior

When people live in fireprone environments, their behavior becomes an important factor in predicting the loss of life and property. Narrow or sandy roads and driveways, limited access, lack of firewise landscaping, inadequate water supplies and poorly planned subdivisions increase risk to people living with the threat of wildfire. Wildfire risk also increases when people burn trash or light warming campfires.



Juniper is highly flammable and should not be planted near homes located in areas at risk of fire.

Jolene Ackerman is the DNR’s wildland-urban interface coordinator. John Hintz is the forestry staff specialist in the Wisconsin Rapids area.

1905

Forest fire control begins, marked by appointing 249 town fire wardens around the state. While they have authority to hire firefighters, they have no equipment.

1911

First forest rangers hired. The forest protection headquarters is established at Trout Lake. From this point through the late 1920s, organized protection spreads across the state as ranger stations and lookout towers are constructed.

1914

National Fire Prevention Day inaugurated.

1915

Jack Vilas pilots as the first forest fire patrol. The flight is made from Trout Lake. For the first time in Wisconsin’s history, it is possible to detect fires from the air.

1925

Spring fires burn out of control until late May when rains extinguish them. Rangers, equipped only with hand tools, are virtually helpless. Later that year, a new burning permit law is enacted, which requires citizens to obtain a written permit before setting any fires in a protection district when the ground is not snow-covered.

1930-34

In the dust bowl era, severe droughts ravage the state. During this time about 2,950 fires burn 336,000 acres annually in Wisconsin.

1930

One fire burns 120,000 acres of marshland. Demand for more adequate forest protection builds.

Continued on page 8

Is your home firewise?

Protect your property from wildfires.

Matt Duvall and Jolene Ackerman

Your home was your castle in medieval times. High stone walls, massive drawbridges and deep moats protected you against competing monarchies and roving bandits.

Today, homes built in the wildland could take a tip or two from their medieval predecessors. Using non-flammable building materials and

landscaping plants, and providing ample access for emergency vehicles will improve the chances that your modern palace will survive a wildfire.

Many parts of a home are vulnerable to wildfire. The roof is the most exposed portion of a home exterior and is the most at risk from flying embers. Roofs near any wildland area should be constructed of noncombustible materials,



Making your home “firewise” includes having an adequate driveway for fire trucks to be able to turn around and (inset) stone and water are excellent fire breaks.

PHOTOS BY ROBERT QUEEN

TIMELINE *Continued*

1933
The Civilian Conservation Corps (CCC) provides increased firefighting and completes essential improvements in fire protection efforts by building standard lookout towers, fire lanes and bridges.

1935
The tractor plow is established as standard fire suppression equipment. Dramatically fewer large wildfires occur.

1936
Chartered aircraft is used for detecting and reconnaissance on fires.

1939
Use of radios expands to aircraft, firefighters on the ground and lookout towers.

1948
Aldo Leopold, author of *A Sand County Almanac* dies while fighting a grass fire between Portage and Baraboo on April 28.



University of Wisconsin-Madison Archives



1951
Smokey Bear makes first public appearance in Wisconsin (Hurley).

1959
On May 1, a running crown fire in Burnett County burns 17,560 acres, causing \$201,889 damage.

1960s
Throughout the 1960s, an average of 1,880 fires burn 8,700 acres each year. Railroads are the leading cause of fire.

and all roofs and gutters should be kept clean of pine needles, leaves or other burnable material.

Unfortunately, homes are often made of materials that melt or ignite when exposed to heat or flames. Consider using fire-resistant siding and logs, masonry or stucco. Vinyl siding and soffits, when exposed to heat from a wildfire, will melt and fall away from structures, leaving a passageway for



Keeping firewood close to your home is an unsafe practice. It increases the risk of fire spreading into the home.

ROBERT QUEEN

embers to ignite insulation or enter the attic. Airborne embers also can enter attics through open eaves or vents. For these reasons, it is especially important to keep flammable objects like shrubs and firewood stacks away from buildings and keep eaves and vents covered with a tight mesh screen.

Anything attached to your home, such as a deck, fence or garage can also carry fire into your home. Decks should be enclosed to keep debris from collecting underneath. Keep flammable vegetation and debris away from the base of your deck, fence and garage. These are the same places where flying embers will collect should a fire occur in your neighborhood.

Windows can transmit radiant heat and break under heat stress. Tempered or double-paned glass windows will protect a home better than single-paned windows during a wildfire. Most importantly, keep flammable objects away from windows.

Clean and inspect your chimney at least once a year and use a chimney cap with a spark arrestor. Keep a garden hose that is long enough to reach any area of

your home and any other structures on your property. Develop a water supply. Water can be supplied from nearby creeks, rivers, lakes, ponds and even swimming pools.

Nearly every home has some tools that can be used in the event of a wildfire. People living in fireprone areas should have some fire protection tools on hand. Shovels and rakes can be used to create a firebreak around your home. And, of course, fire extinguishers should always be on hand.

In the fire protection world, 30 feet around the home is known as “defensible space.” In this space, all trees should be pruned and kept widely spaced. Evergreen trees and shrubs should be kept to a minimum. Remove

dead, dying and diseased plants or plant parts. Maintain a vegetation-free zone three feet wide around all structures. Create “island” gardens that are separated by nonflammable features such as lawns or stones. Choose plants with fire-resistant qualities. Succulent plants, deciduous trees and shrubs, and plants with thick leaves are better suited to a fireprone environment.

Wood chips and straw are ideal places for embers to land, smolder and ignite. Use these mulches sparingly and never alongside the house.

In order for firefighters to protect your home, they must be able to reach and exit your property safely. Post the house address along the road at the driveway entrance as well as on the home.

Build and maintain your driveway so it is wide enough and straight enough for a fire engine to navigate. A good rule of thumb is a 12-foot wide driveway with 14 feet of overhead clearance. Longer driveways and those with curves should be closer to 20 feet wide.

Your castle is only as strong as its weakest point. Invest in a home sprinkler system. Take the time to assess your property and make the necessary changes. With a comfortable fleece vest as your armor and chainsaw as your sword, go forth and defend your castle.

Matt Duvall is UW-Extension’s Central Wisconsin basin educator for wildland resources. Jolene Ackerman is DNR’s wildland-urban interface coordinator.

Jim Gobel is a DNR forestry technician in Spooner.

1977

The entire state suffers a second year of severe drought. Nearly 49,000 acres burn in 1977. Over 170 structures are destroyed or damaged. Areas worst hit are Jackson, Washburn, Douglas and Wood counties. Notable fires include:

- Saratoga fire in Wisconsin Rapids, 6,159 acres and 90 buildings
- Brockway fire, Black River Falls, 17,590 acres
- Five-mile fire, Washburn and Douglas counties, 13,375 acres and 83 buildings

1980

Over two days in April, the Ekdall Church fire in Burnett County and the Oak Lake fire in Washburn County burn over 16,000 acres and destroy more than 200 buildings.

1988

The entire state suffers a second year of drought. Notable fires include:

- Deer Print fire, Douglas County, burns 817 acres.
- Lyndon Station fire, Juneau County, burns 911 acres and three buildings.

1990s

Throughout the 1990s, an average of 1,600 fires burn 3,400 acres each year. Debris burning is the leading cause of forest fires.

1995

State begins a trial program with a local agriculture pilot, Jim Stutesman, to use single engine air tankers for in-state fires.

2003

The Crystal Lake fire in Marquette and Waushara counties burns 572 acres. Several buildings are destroyed and nearly 200 are threatened.

Tools of the trade

From planes to Pulaskis.

Ron Zalewski

Just as the forest fire hazard varies across the state, so does the equipment used to suppress those fires. Some of the equipment has not dramatically changed over the past century. The reliable backcan pump is still commonly used to suppress many smaller fires.

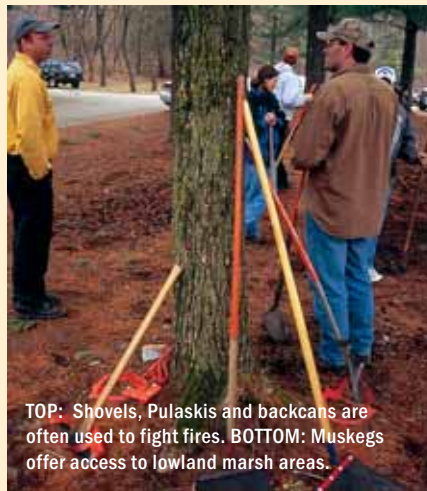
These backcans can be either galvanized metal or newer soft models that are more comfortable to wear. Both types hold about five gallons of water and, when used in a team approach with three or more individuals attacking a fire, can successfully extinguish smaller, lower intensity fires burning less than a couple of acres. These backcans also are used extensively during mop-up procedures, where hotspots are completely extinguished after initially containing and controlling a fire. Often used in conjunction with hand tools such as a shovel or Pulaski (combination of axhead for cutting

and mattock for digging) these backcans can help ensure that the fire is completely out.

Additional equipment, however, may be needed to fight more intense wildfires. Initial attack DNR Type 7X trucks or fire department brush trucks often provide first response to forest fire

reports and can be used effectively where access is available. These four-wheel-drive trucks carry 150 to 200 gallons of water and are equipped with mobile radios, emergency lights and sirens, hand tools (shovels, Pulaskis, chainsaws) and other safety equipment. These engines provide quick response to many fires, helping to keep them small and minimizing destruction. DNR Type 7X engines typically are equipped with foam units for applying a foam-water mixture that provides greater protection than water alone.

The Department of Natural Resources uses larger Type 4 engines on more challenging fires. These trucks are outfitted with emergency lights and sirens, carry about 850 gallons of water, and house small and large diameter hoses, hand tools, backcans and safety equipment. They often have foam capability. Not only can these trucks deliver water to a fire, they are



TOP: Shovels, Pulaskis and backcans are often used to fight fires. BOTTOM: Muskegs offer access to lowland marsh areas.

ROBERT QUEEN



able to pump water from lakes, streams and even swimming pools. These engines are often used to suppress wildfires and protect structures. Larger fire department engines vary considerably, but also are commonly used on wildfires along with tanker-type engines to suppress fires and protect structures.

These engines also pull tractor plows to control more challenging fires. When combined with a tractor plow unit and trailer, they are referred to as “heavy units.” Tractor plow units carry 150 gallons of water primarily used for operator protection. The six-way blade on the front can be used to construct drivable roads around larger fires, separate burning materials from unburned material, push over burning trees and create firelines or fire breaks. The plow in back of the tractor may cut a six-foot-wide mineral soil fireline or fire break.

Fire breaks are effective ways to control small intensely burning fires or larger fires. Inside the fire break, a small fire (drip torch) is used to burn out fuels between the fireline constructed by the tractor plow furrows in an attempt to stop the spread of an advancing fire. Tractor plow units are especially effective



DNR FILE PHOTO

Planes play an important role in detecting and suppressing fires.

in upland areas but can also operate in some wetter areas that pose equipment access problems. These tractor plow units are the backbone of fire suppression activities in Wisconsin.

The Wisconsin Department of Natural Resources also has equipment specifically designed to operate in lowland marsh conditions. ATVs, Muskeg Units and Bombardier units oftentimes can provide the necessary access. These tracked units typically are equipped with water tanks and can suppress fires either by running over the edge of a less intense fire with their tracks and smashing vegetation into wetter fuels or water, or by spraying water on the fire edge. Some of these wet ground units are equipped with a front blade to assist fire suppression. Once the fire is contained and controlled these units help with mop-up actions and provide transportation and water into areas that are not accessible by typical equipment.

Plane patrols

Planes are important tools in detecting and suppressing fires. Oftentimes, smoke spotted by these planes, or air patrols, are outdoor burning operations. Since burning is normally only allowed toward evening hours, these aircraft patrols are an extremely effective fire prevention tool, alerting forestry personnel on the ground about illegal burning.

Fire towers also are used to detect fires and reports from fire towers are checked by air patrols. Once a wildfire is spotted, aircraft pinpoint the wildfire

location and assist by directing ground forces into the wildfire and providing valuable information on fire size, intensity and spread.

During periods of high fire danger, the Department of Natural Resources contracts aerial suppression planes or helicopters to help control fire.

These planes, called SEATs (single engine air tankers), are usually based in the most hazardous areas of central, northwestern or northeastern Wisconsin. These aircraft can deliver up to 600 gallons of foam or retardant to a fire scene in a short time, hopefully arriving while fires are small. They work with resources on the ground to prevent fires from becoming larger and more destructive. Helicopters have the same mission. They typically drop water with a collapsible bucket that hangs from the bottom of the ship and holds just over 100 gallons of water or a water/foam mixture. Larger air tankers that carry up to 2,000 gallons also are available from neighboring states to aggressively attack more intense fires.

Fire prevention

Even before a fire starts, computer programs can predict fire danger and fire behavior. Small hand-held instruments gather weather information at the scene, helping fire managers make better decisions on how to safely suppress these fires. Other computer programs help firefighters make attack plans and rally resources to suppress larger fires.

Ron Zalewski has been a DNR forester and ranger for 20 years.



JOLENE ACKERMAN



Hazards,
alternatives
and safe
practices.

Open burn

Catherine Regan and Lindsay Haas

The safest time to burn is when the ground is completely snow covered.

Burning debris is the number one cause of fires in Wisconsin and poses health concerns for you and your neighbors.

Outdoor burning in Wisconsin is regulated and you will need a permit in most areas of the state. In most fires caused by debris burning, the responsible party was not following restrictions listed on the burning permit.

Permits typically restrict burning to evening hours when there is less likelihood that a debris fire will escape control.

Usually illegal

Smoke from burning garbage stinks, can trigger asthma attacks and contains toxic compounds.

Open burning of household solid wastes also is illegal with limited

exceptions. For example, it is illegal to burn all plastic materials, kitchen wastes, dirty or wet paper wastes, treated or painted wood, furniture and demolition material — or any other material that creates a nuisance. The exceptions include (if not prohibited by local ordinance) lawn and garden debris, small quantities of clean, untreated, unpainted wood and clean paper waste that is not recyclable.

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Outdoor fires for cooking or warming up are usually okay and do not require special approvals.

Alternatives

There are many alternatives to open burning for waste disposal.

- **Reduce:** Buy in bulk to reduce over-all packaging.
- **Reuse:** Reuse household items and give toys, clothes and furniture that you no longer want or need to

someone who can use them.

- **Recycle:** It's the law in Wisconsin to recycle plastic, glass, metal, newspaper and cardboard. Take your recyclables to the recycling center closest to your house if there is no roadside recycling pick-up.

- **Compost:** Composting is a great way to dispose of yard waste and kitchen scraps while getting something in return — nutrient-rich soil for your garden, trees and bushes. Brush piles left in a wooded area also can provide wildlife habitat.

When a burn pile escapes

If, after considering environmentally sound alternatives to burning, you still decide to burn, check to see if a burning permit is required.

The safest time to burn is when the ground is snow-covered and late in the day when the wind has died down.

Before igniting the fire, clear away overhanging branches and remove surrounding vegetation or flammable material at least 10 feet around your fire. Make sure to have firefighting tools, such as a watering hose and a shovel handy, and never leave your fire unattended.

Be certain your fire is out by dousing it with water and stirring the ashes. The two most common reasons burn barrels cause wildfires are the lack of a lid and a barrel that is in such poor condition that burning materials fall out.

Burning permit required?

Use the Wisconsin map to determine where and when you may burn.

- **In an intensive area:** Permits are required when burning any time the ground is not snow-covered. Contact your local DNR Office or Emergency Fire Warden.
- **In an extensive area:** Permits are required any time the ground is not snow-covered during January through May. Contact your local DNR Office or Emergency Fire Warden.
- **In a cooperative area or inside the**



ROBERT QUEEN

Piling leaves and branches in a fire pit does not make it a campfire. A burning permit may still be required.

limits of incorporated villages or cities: These areas are primarily protected by local and county officials. Communities can create ordinances and additional permit requirements. Contact your local fire department or local officials to obtain burning regulation information.

Obtain a permit, if required. Check the permit for date and time restrictions. Avoid burning on windy days.

Never leave your fire unattended. **You are responsible for all costs to suppress a wildfire caused by your negligence.**

Catherine Regan is a DNR wildfire prevention specialist and Lindsay Haas is a DNR natural resources educator.

Forest fire protection



WISCONSIN DNR



Sparks in the

Fighting nighttime fires poses unique challenges.

Ron Zalewski

April 12, 1998 began early in central Wisconsin for DNR forestry personnel and local volunteer fire departments. Strong southerly winds, low humidity and warm temperatures combined with dead vegetation on the ground — typical spring conditions — resulting in extreme forest fire danger across the area.

DNR forestry personnel and volunteer fire departments were paged early that morning to the first forest fire call at the start of what turned out to be a very busy day in the Grand Rapids DNR dispatch area. That first fire was started by careless outdoor burning, but was quickly extinguished, burning less than one acre.

That wasn't the case with other forest fires that started later that day. Careless

outdoor burning, unextinguished debris piles or campfires, railroad activities and downed power lines ignited another 24 forest fires that burned 94 acres that day.

While night fires happen, they usually are less challenging to control than daytime fires because relative humidity tends to be higher and temperatures lower, resulting in less volatile fire behavior.

On this day, the daytime humidity remained low and winds gusted to nearly 30 miles per hour creating challenging nighttime fire conditions.

A Town of Rome police officer on patrol reported a forest fire at 1:33 a.m. The Town of Rome Fire Department responded. Minutes from the fire station, they discovered a fire burning several acres, with many of the trees torching

(completely consuming all needles on the tree).

The fire department called the Department of Natural Resources for help. Several heavy ground units responded and a single engine air tanker dropped a water and retardant mix. DNR sent heavy units including 800-gallon fire engines towing John Deere 450 tractor plows. These plows control fires by creating fire breaks (plow furrows) along the edge of a fire with hopes the fire will stop spreading when it reaches the break.

Firefighters worked to flank the fire, keeping it as narrow as possible, until fuel type or weather changed in their favor and they created a fire break that surrounded the fire or used existing barriers to contain it.



dark

WISCONSIN RAPIDS DAILY TRIBUNE/GANNETT WISCONSIN FILE PHOTO

No cause was found for this Wood County night fire on April 12, 1998.

The fire's glow was visible as soon as DNR units pulled out of the station in Grand Rapids. Even before arriving at the scene, assistance was requested from the DNR station in Babcock and from Whiting where firefighters were returning from fighting another fire.

DNR initial attack units and heavy units responded from Friendship, Necedah and Wisconsin Dells along with fire department trucks and personnel from Grand Rapids, Nekoosa and Big Flats. Rome Police Department staff and the Adams and Wood county sheriffs' departments and Wood County Emergency Management provided traffic control and evacuated more than 75 residences.

As the fire roared, fuel types changed from young 10- to 15-foot red

pine that completely torched to 45-foot red pine that burned mainly as a hot surface fire, consuming brush, grass and needle litter on the forest floor. The relative humidity continued to rise and winds decreased allowing firefighters to surround the fire with fire breaks to keep it from spreading. The fire breaks were then leveled into a drivable trail, allowing four-wheel-drive engines to patrol and extinguish hot spots with water.

Fire seriously threatened six buildings but there were no structural losses or significant human injuries. In the end, 30 DNR personnel, 14 DNR engines, eight DNR tractor plow units, 60 fire department members, 16 fire department engines, a 20-person University of Wisconsin-Stevens Point

hand crew, numerous law enforcement personnel, county emergency management personnel and one DNR aircraft battled the fire.

The fire was controlled at 5:28 a.m. on April 13, after jumping two town roads and burning 158 acres of planted pine on industrial owned property. Light rain later that morning helped firefighters "mop-up" (extinguish all hotspots on the fire). Timber value damaged by the fire exceeded \$65,000 while the cost of suppressing the fire totaled over \$10,300.

No definite cause was found, though an intensive investigation was completed.

Ron Zalewski is a DNR forester and ranger in Antigo.

From clues to court cases

Fire investigations dissect fire behavior and burn patterns.

Jolene Ackerman and Rick Bucklew

All forest fires are investigated, regardless of the fire size or the amount of property damage. At the scene, a wildfire investigator looks for clues that indicate where the fire started: “point of origin.” To find that point and cause of a fire, the investigator must know wildfire burn patterns, fire indicators and fire behavior.

Seasoned investigators use science and art to determine what started the blaze. Sometimes the cause is easily pegged — a prescribed burn that got out of control or a burn barrel. But often the evidence at the point of origin is not found intact, making the investigator’s job more difficult. First responders to the scene must protect the area believed to be near the point of origin. Both the public and firefighters are kept out of this area to minimize the chance that evidence will be destroyed or washed away.

Every fire is investigated and documented as if it were going to be a court case. The fire investigators keep detailed records of observations such as license numbers of vehicles leaving the scene, tire tracks, fire behavior, and persons or aircraft in the area. An investigator’s

records can include written descriptions, pictures and even sketches.

Wildland fires often have common features. They usually start in light fuel such as dry grass or leaves and typically the ignition is small. Physical indicators point to the direction the fire has burned. For example, the way soot marks rocks, tree trunks and other dense or non-flammable items will show an experienced fire investigator the fire’s path. Other indicators can be the way light fuels are left unburned or the way burn patterns are left on small shrubs and twigs. Combining all of the indicators points out key information to a trained investigator.

Wildfire investigators and fire control personnel are always on the lookout for potential serial arsonists. If not caught, these fire setters can get bolder with time and move from wildland fires to empty buildings and even to occupied structures. Consequently, a thorough investigation needs to be conducted on even the smallest grass fire as it may have been set by a budding arsonist.

Jolene Ackerman is DNR’s wildland-urban interface coordinator. Rick Bucklew is DNR’s forestry law enforcement specialist.



Fire scars indicate which direction the fire came from.

JOLENE ACKERMAN



FOR MORE INFORMATION:

WDNR Forest Fire Program

www.dnr.state.wi.us/org/land/forestry/fire

Firewise

www.firewise.org

USDA Forest Service

www.fs.fed.us

National Association of State Foresters

www.stateforesters.org

National Fire Plan

www.fireplan.gov

Joint Fire Science Program

<http://jfsp.nifc.gov/>

National Interagency Fire Center

www.nifc.gov/

National Fire Protection Association

www.nfpa.org

Federal Emergency Management Agency

www.fema.gov

Produced by: Wisconsin Department of Natural Resources, Division of Forestry, Fire Management Section.

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PUB-FR-309-2005

April 2005

Design by: Waldbillig & Besteman, Inc.

Funding: The work upon which this publication is based was funded in whole or in part through a grant awarded by the Northeastern Area State and Private Forestry, USDA Forest Service.

This publication is available in an alternative format.

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Cover photos clockwise from top: JOLENE ACKERMAN, J-MAR PHOTO WERKS, CHRIS KLAHN, J-MAR PHOTO WERKS

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