

Wildfire Types

This guide is designed to provide northeastern Minnesota property owners in wildfire-prone areas with practical tips for protecting their homes and businesses from wildfires through the use of appropriate landscaping techniques, including the use of wildfire-resistant plants. This type of landscape design to prevent wildfire damage is referred to as Firewise Landscaping.

The goal is to encourage local solutions for living more safely with wildfire threats by involving homeowners in taking individual responsibility for preparing their properties to better survive wildfires.

Two types of wildfires can threaten your property. These are surface fires and crown fires.

Surface fires move along the ground and burn dry materials lying on or immediately above it including tree limbs, grass, stumps, shrubs, leaves, pine needles and pine cones. Similar to crown fires, surface fires can throw burning embers, although not nearly as far. Surface fires can quickly surround a property and accelerate in vulnerable areas where brush is piled or where ladder fuels allow fire to reach tree canopies. They also can move quickly and cause great damage and injury when there is wind or steep terrain. After winters with little snow, spring wildfires in tall, un-compacted grasses are a common form of surface fire in northeastern Minnesota.

Crown fires burn through the canopy of forested areas either independent from surface fuels or in addition to the surface fuels. Crown fires need a lot of heat energy from the surface fire, ladder fuels, and wind to get going. Individual trees often "torch"—called passive crown fire - but typically, this type of burning cannot be sustained for long. Active and independent crown fires create the most heat, the most smoke, and typically move quite rapidly. Because active and independent crown fires require wind to get started, the potential exists for wind transport of embers over long distances, threatening homes or igniting new "spot" fires.

Understanding Wildfire Fuels & Behavior

Protection of property from wildfire, requires a basic understanding of wildfire fuels and behavior.

Wildfire Fuel Types

Ground fuels include all combustible materials found beneath the surface. Examples are deep duff, roots, and buried logs. Duff is the top surface layer of partly decayed leaves and needles that accumulates under dense stands of large brush or trees. Although slow to ignite, ground fuels can burn below the surface and be very hard to find and extinguish.

Surface fuels include all materials resting on the surface or immediately above the ground. Examples are pine needles, leaves, grass, and downed woody materials.

Ladder fuels are material near the surface that can spread fire into the crown of a tree. The most common ladder fuels in northeastern Minnesota are balsam fir and spruce trees with live or dead lower branches near the ground. Other examples include thick patches of blown-down trees or flammable shrubs.

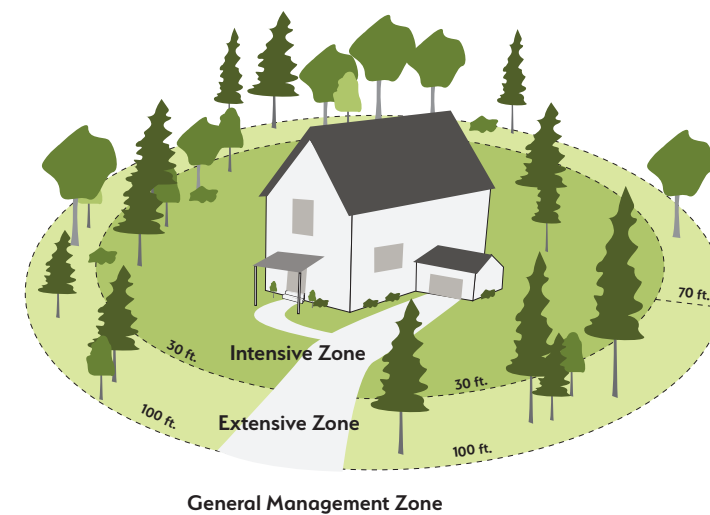
Canopy fuels include all the green and dead vegetation in the forest canopy. The elevated position increases airflow to the flame and increases wind exposure. When trees are densely spaced or when there are many understory trees or shrubs, the fuel density can be high enough to sustain a crown fire.

Wildfire Fuel Species

The flammability of individual trees and fuels varies depending on what type they are. In general, trees with evergreen needles are more flammable than broadleaved deciduous trees. This is because most needle-leaved evergreens typically (1) have leaves with lower moisture content, especially during drought, and (2) have sap containing flammable resins.

In northeastern Minnesota, the two most flammable tree species are balsam fir and black spruce (see table below). Jack pine and white spruce are also quite flammable, while white pine, red pine, and white cedar (arbor vitae) are somewhat less flammable.

Defensible Space Zones



Wildfire Fuel Ecology

The most important thing you can do is create defensible space, or a safety zone, immediately surrounding your home. Wildfire experts divide defensible space into two zones:

1. The Intensive Zone, 0-30 ft around buildings.
2. The Extensive Zone, 30-100 ft around buildings.

Most Firewise work should be concentrated in the intensive zone, with work proceeding outwards into the larger extensive zone. There are six basic steps to creating a well-managed defensible space:

1. Thin, Prune up to 10 ft (but not more than 1/3 of live crown) or remove conifer trees. Make sure crowns are at least 10 feet apart (intensive zone suggestion is at least 20 feet between crowns or 30 feet between clusters of trees)
2. Remove all understory ladder fuels (small balsam)
3. Remove and minimize surface fuels (thick pine needles, dead branches)
4. Create non-combustible borders around the base of your buildings. (3 to 5 ft from building)
5. Water and keep grass mowed short (1-2")
6. Maintain your defensible space every year

Neighbors participated in an educational Firewise Demonstration Day in Ely, MN



Tree Species	Flammability	Tree Species	Flammability
Aspen	Very Low	Eastern White Cedar	Medium
Birch	Low	Balsam Fir	Very High
Maple	Very Low	Tamarack (Larch)	Low
Poplar	Very Low	Bur Oak	Very Low
Elm	Very Low	Green Ash	Very Low
Black Spruce	Very High	Basswood	Very Low
White Spruce	High	Eastern Cottonwood	Very Low
Jack Pine	High	Peachleaf Willow	Low
White Pine	Medium	Large-tooth Aspen	Low
Red Pine	Medium		

Table 2: Wildfire-Resistant Plants

Proper landscape plant selection and placement can aid in preventing homes and buildings from igniting during a wildfire. Plants that do not burn easily are referred to as wildfire-resistant and are less likely to contribute to a fire. Wildfire-resistant plants have several helpful characteristics. For example, conifers commonly contain resins that can ignite and produce intense flames and heat whereas many deciduous plants do not contain these flammable resins. Other helpful characteristics include loosely packed foliage, lack of persistent dead foliage, no serious insect and disease problems, and trees with good separation between the ground and lower branches. Of course, any plant can burn if it is dry enough or in extreme heat conditions.

The plants below have been rated "low" or "moderate" flammability and are not invasive. Low flammability plants can be planted between 3 to 30 feet of a building, whereas "moderate" flammability plants should be planted beyond 30 feet of a building.



Common Name	Latin Name	Flammability Rating	Plant Type	Soil Moisture	Sun	Hardiness Zones
Blueberries	Vaccinium spp.	Low	Low Shrub	Dry-Med	Sun to Part	3 to 7
Currants	Ribes spp.	Low	Low Shrub	Med-Wet	Sun to Part	3 to 8
Dwarf Bush Honeysuckle	Diervilla lonicera	Low	Low Shrub	Dry-Med	Sun to Part	3 to 9
Black-Eyed Susan	Rudbeckia hirta	Low	Perennial Flower	Med	Sun	3 to 9
Blazing Star	Liatris spp.	Low	Perennial Flower	Dry-Med	Sun	4 to 9
Blue Giant Hyssop	Agastache foeniculum	Low	Perennial Flower	Dry-Med	Sun to Part	4 to 8
Blue Vervain	Verbena hastata	Low	Perennial Flower	Med-Wet	Sun	3 to 9
Butterfly-weed	Asclepias tuberosa	Low	Perennial Flower	Dry-Med	Sun	3 to 9
Cardinal Flower	Lobelia cardinalis	Low	Perennial Flower	Med-Wet	Sun to Part	2 to 9
Columbine	Aquilegia canadensis	Low	Perennial Flower	Med	Sun to Part	3 to 9
Coneflower	Echinacea spp.	Low	Perennial Flower	Dry-Med	Sun to Part	3 to 8
Culver's Root	Veronicastrum virginicum	Low	Perennial Flower	Med-Wet	Sun	3 to 8
Cup Plant	Silphium perfoliatum	Low	Perennial Flower	Med-Wet	Sun	4 to 8
Fireweed	Epilobium angustifolium	Low	Perennial Flower	Dry-Wet	Sun to Part	2 to 7
Goldenrods	Solidago spp.	Low	Perennial Flower	Dry-Wet	Sun to Shade	4 to 9
Hairy Solomon's Seal	Polygonatum pubescens	Low	Perennial Flower	Med	Part to Shade	3 to 8
Jack-in-the-Pulpit	Arisaema triphyllum	Low	Perennial Flower	Med-Wet	Part to Shade	3 to 9
Joe Pye Weed	Eutrochium maculatum	Low	Perennial Flower	Med-Wet	Sun	3 to 9
Milkweed (Common)	Asclepias syriaca	Low	Perennial Flower	Dry-Med	Sun	4 to 9
Native Violets	Viola spp.	Low	Perennial Flower	Dry-Wet	Sun to Shade	4 to 9
Nodding Trillium	Trillium cernuum	Low	Perennial Flower	Med	Part to Shade	3 to 8
Northern Bluebells	Mertensia paniculata	Low	Perennial Flower	Med	Part to Shade	3 to 9
Prairie Smoke	Geum triflorum	Low	Perennial Flower	Dry	Sun	3 to 7
Purple-stemmed Aster	Symphyotrichum puniceum	Low	Perennial Flower	Med-Wet	Sun	2 to 9
Shooting Star	Dodecatheon meadia	Low	Perennial Flower	Med	Part to Shade	4 to 8
Spreading Jacob's Ladder	Polemonium reptans	Low	Perennial Flower	Med	Sun to Part	3 to 8
Thimbleberry	Rubus parviflorus	Low	Perennial Flower	Med	Sun to Part	3 to 10
Bunchberry	Cornus canadensis	Low	Ground Cover	Dry-Wet	Part to Shade	2 to 6
Dewberry	Rubus pubescens	Low	Ground Cover	Med	Sun to Shade	3 to 8
Hostas	Hosta spp.	Low	Ground Cover	Med	Part to Shade	3 to 9
Large-Leaved Aster	Eurybia macrophylla	Low	Ground Cover	Med	Part to Shade	4 to 8
Mountain Mint	Pycnanthemum virginianum	Low	Ground Cover	Med	Sun	3 to 7
Prairie Phlox	Phlox pilosa	Low	Ground Cover	Med	Sun	4 to 9
Prairie Sage	Artemisia frigida	Low	Ground Cover	Dry	Sun	3 to 10
Sedges	Carex spp.	Moderate	Ground Cover	Dry-Wet	Sun to Shade	3 to 8
Wild Geranium	Geranium maculatum	Low	Ground Cover	Med	Sun to Part	3 to 8
Wild Ginger	Asarum canadensis	Low	Ground Cover	Med-Wet	Part to Shade	4 to 8
Wild Strawberry	Fragaria virginiana	Low	Ground Cover	Med	Sun to Part	3 to 10

Nurseries:

Many wildfire-resistant species can be found at these local nurseries.

- Blue Moose Garden Shop (Grand Marais) 218-387-9303 www.thebluemoosemn.com/lowershop.php
- Boreal Natives (Cloquet) 218-729-7001 www.prairieresto.com/
- Cherry Greenhouse (Cherry & Chisholm) 218-263-9304 www.facebook.com/Cherry-Greenhouse-81365897047/
- Dirt Lady Gardens & Greenhouse (Virginia) 218-741-0174 www.organicgoldblackdirt.com
- Lilac Hill Greenhouse (Duluth) (Formerly Engwall's Garden Center) 218-727-8964 www.lilachillgreenhouse.com
- Ely Flower and Seed (Ely) 218-365-6555 www.uwebconnect.com/elyflower/home
- Gracie's Plant Works (Ely) 218-365-0055 www.graciesgarden.wix.com/graciesplantworks
- Greenstone Nursery (Ely) 218-365-6037
- Heidi's Greenhouse (Chisholm) 218-929-0990 www.madeontherange.com/heidis-greenhouse.html
- Kunnari Greenhouse (Eveleth) 218-744-5853 www.kunnarigreenhouse.com/
- Maxwell's Woodland Nursery (Finland) 218-353-7726
- McMillian Landscape & Tree Service (Grand Marais) 218-370-0118
- Northern Landscapes (Hibbing) 218-263-9739 www.northernlandscapes.net
- Vern's Greenhouse & Nursery (Virginia) 218-749-2981 www.verns-greenhouse.com/
- U of MN Pollinator Website cues.cfans.umn.edu/old/pollinators/plants.html..
- MN DNR Pollinator Website www.dnr.state.mn.us/pollinators/index.html

FIREWISE LANDSCAPING IN NORTHEASTERN MINNESOTA

A Guide to Protecting Your Home or Business from Wildfire Threats Using Wildfire-Resistant Landscaping and Plants

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