



Fire-Resistant Landscaping Considerations for Montana's Wildland Urban Interface (WUI)

By Dominique Woodham, MSU Extension Natural Resources
With input from: Kaleena Miller, MSU Extension Madison-Jefferson
Counties; Ali Ulwelling, Ashley Juran, Crystal Beckman and Ian Harris all
of the MT Department of Natural Resources and Conservation.

Wildfire is, has been, and always will be a part of Montana's wild landscapes. As a result, many plants developed fire-resilient adaptations, creating the foundation for fire adapted ecosystems. With human expansion into the Wildland Urban Interface (WUI), the potential increases for impacts of wildland fire on communities and individuals. Learning about fire-resistant landscapes is an important component in reducing wildfire risk.

Need for Fire-Resistant Landscaping

Montana is often referred to as “the Last Best Place.” Many people enjoy living, recreating and visiting here. Communities are often located in or near undeveloped wildlands (forests, grasslands, etc), and in the past decades have expanded further into more remote and rugged terrain, increasing the presence of humans across wild landscapes. This area where human development meets with wildland vegetation fuels is referred to as the Wildland Urban Interface (WUI).

While closeness to the natural world is what people are seeking, they may be unprepared for some results of that closeness. Wildfire activity across the state for the past 20 years has shown a steady increase in average number of wildfires, as well as an increase in average annual acres burned.¹ Increasingly common extreme-fire seasons are predicted for the future, with wildfire activity expected to increase across much of North America.² It is important to increase awareness for people living in the WUI about increasing wildfire potential and exposure to wildfire risk.

Fire-resistant landscaping is recommended in the WUI to improve structure survivability (ability to remain intact without fire suppression response), as well as defensibility by firefighters. Research has shown wildfire spread into and within the WUI is through three predominant pathways: radiant exposure of flammable materials, direct flame contact exposure, and aerial fire embers/brands igniting flammable materials.³ Thoughtful wildfire risk reduction landscaping practices, annual maintenance and the use of fire-resistant

home construction materials can greatly reduce wildfire risk within neighborhoods and communities in the WUI.

Fire-Resistant Landscaping Planning and Recommendations

Fire behavior is a result of the interaction of three variables: weather, terrain and fuels (flammable materials like vegetation). High temperatures, high wind speeds and low humidity allow wildfires to spread more quickly across a landscape in the event of a fire ignition. When these factors are coupled with complex topography such as steep terrain, canyons or valleys, heated exposures, as well as a continuous dry fuel source; wildfires can be expected to spread more rapidly.

Humans are unable to control the weather and the terrain; however, we can alter or remove flammable fuels like trees, brush or grasses, etc. The selection of fire-resistant plants, as well as the location and arrangement of any vegetation and other flammable materials around a home can highly alter fire activity and spread. With regular maintenance and attention, the following fire-resistant landscaping suggestions can help reduce wildfire risk.

Selection and location of Fire-Resistant Plants

Any plant will burn under the right conditions. The ability of a plant to withstand heat and not ignite depends upon fire behavior and intensity, along with certain plant characteristics such as moisture content, size, and the presence of flammable compounds within the bark and leaves. Even if a plant is identified as fire-resistant due to its natural characteristics, where plants are located, how they are arranged, and their ability to retain moisture should be taken into account. Location and arrangement of landscape vegetation should take priority over whether plants are fire resistant or not. To learn more about specific Fire-Resistant Plants for Montana Landscapes, refer to MSU Extension MontGuide MT200101AG (<https://store.msuextension.org/publications/YardandGarden/MT200101AG.pdf>), Revised 12/19.



A great example of fire resistant landscaping. Large and small rocks are used for aesthetics and to break up fuel continuity along with the stone pathway. Aspen trees are spaced apart and away from the low growing and green shrubs and the structure. BY DOMINIQUE WOODHAM

Spacing and Arrangement of Landscaping

When discussing home landscapes in this guide, the focus is on the maintained area next to a home and that extends out 100 feet from the home. This area is typically referred to as the Home Ignition Zone (HIZ) by fire managers and educators and was developed by USDA Forest Service scientist Jack Cohen.⁴ This area is critical when seeking to reduce a home's wildfire risk and increase the likelihood of surviving a wildfire, or being defensible by firefighters. Utilizing fire-resistant building materials, altering landscape arrangements and increasing space between flammable materials are all important actions to consider to moderate fire behavior and intensity.

Flammable materials next to a home can directly ignite structures through direct flame contact, as well as through radiant and convective heat transfer. Non-flammable material can fill the area next to a home for aesthetics, i.e. rocks, large stones. If keeping this area clear of vegetation or other flammable materials is not an option, consider the following:

- Are plants fire-resistant species or low growing, watered and sufficiently spaced?
- Do nearby structures have fire-resistant material (siding such as metal or rock, tempered windows, covered vents, etc)?

From a wildfire risk reduction perspective, deciduous trees and shrubs (such as aspen) are often preferred over coniferous vegetation (such as juniper or fir) in landscaping due to their higher moisture content, chemical composition and structure. Unless they are abnormally dry or stressed,

they are generally more fire resistant. Coniferous trees can remain if the distance between individual tree crowns, groups of trees, or between trees and other flammable materials are adequate. The distance between trees and structures of concern should be increased if they are situated on a steep slope. Fire moves rapidly uphill, heating all flammable materials ahead/upslope of flames through both radiant and convective heating, increasing the likelihood of ignition and the potential rate of fire spread.

Ladder fuels (low-hanging branches, shrubs or small trees growing directly below the tree overstory) should be eliminated or managed so they do not provide a way for fires to crawl up into the tree canopy. Low-hanging branches of individual trees should be pruned up one-third of the tree height to reduce the likelihood of a ground or surface fire climbing into a tree canopy and becoming a crown fire. Ground and surface fires are more manageable by fire management resources than crown fires.

Dry grass is also a potential fuel for wildfires and can support rapid fire spread. A greater amount of grass (height and volume) fuels greater potential flame length, flame height and resulting heat intensity—making a fire harder to control. Maintain grass so it is short and moist to reduce its probability of ignition and potential fire spread. Walkways or paths can be effective for breaking up flammable fuel continuity, and altering potential fire spread as well.

Maintenance

Wildfire risk reduction efforts through fire-resistant landscaping should be considered an ongoing process which can always be improved upon through regular attention and

maintenance. May is recognized as Wildfire Awareness Month in Montana, and the National Fire Protection Association recognizes the first Saturday in May as Wildfire Community Preparedness Day across the United States. These events can serve as good reminders to landowners to revisit their wildfire risk and perform maintenance activities annually. Maintenance activities include, but are not limited to:

- Assess the health and quality of vegetation growing within the HIZ.
- Remove dead or stressed vegetation which typically has greater ignition potential.
- Remove collections of decaying or dry materials such as fallen leaves and pine needles that have accumulated in yards, gutters, roofing or decking, etc.
- Remove or manage any new vegetative growth (seedlings, regrowth on trees, etc.) through cutting or pruning.

Additional Considerations

The location of other flammable or volatile materials is also critical in reducing wildfire risk within the home ignition zone. For example, do not store firewood near a home or on the deck. Brush piles from landscape maintenance should be isolated, away from overhanging branches and away from other potentially flammable or hazardous materials.

In addition to addressing live and growing vegetation, do not allow dry, flammable materials such as tree leaves and needles to accumulate on roofs, in gutters, or under decks. Such accumulations create a receptive fuel bed for fire embers to ignite, potentially resulting in fire spread and structure ignition.

Mulching is a popular and recommended method amongst gardeners and landscapers to capture moisture and diminish weedy competition in landscaping. However, embers from a wildfire can ignite mulch, potentially endangering a home and property. If mulch is used, it should be kept moist, or consider replacing it with rocks as a preventative measure.

It is not uncommon for people to store their own gasoline or diesel for equipment and landscaping tools. Storage should be fire proof, away from the home and visibly labeled as “hazardous” or “flammable.”

Fire-Resistant Landscaping for Adaptive Resilience

It is important to note that even with wildfire risk reduction measures such as fire-resistant landscaping, annual maintenance and the use of fire-resistant home construction materials, a property does not become “fire proof” or fully protected from being damaged or lost to wildfire. With



Which side of the cabin illustrates fire resistant landscaping? Fire-resistant landscaping can be attained through pruning, thinning and maintenance of naturally growing vegetation. The right side of the cabin illustrates fire-resistant landscaping as a result of vegetation maintenance. BY DOMINIQUE WOODHAM

wildfire being a part of Montana’s history, present and future, it is in the best interest of individuals and communities to continue steps toward becoming more resilient to risks associated with wildfire. Those that strive toward desired future conditions that influence fire behavior and improve community fire preparedness and response through planning and management are practicing adaptive resilience.² Examples of adaptive resilience in action include but are not limited to; community wildfire preparedness education events, developing or becoming familiar with an existing Community Wildfire Protection Plan, and actively managing vegetation on private property and adjacent shared areas to reduce wildfire risk to individuals and communities.

For assistance with assessing and addressing the potential wildfire risk of a home and property, contact your local MSU Extension office. They can help to start developing a wildfire risk reduction plan for a property and recommend other valuable resources and partners. Ongoing efforts help to build fire-adapted communities that are more resilient to wildfire and will help to maintain Montana’s status as, “the Last Best Place.”

References

1. Northern Rockies Coordination Center Year-To-Date & Historical Incident Data (updated annually). https://gacc.nifc.gov/nrcc/predictive/intelligence/ytd_historical/ytd_historical.htm

2. McWethy, D.B., Schoennagel, T., Higuera, P.E. et al. *Rethinking resilience to wildfire*. *Nature Sustainability* 2, 797–804 (2019). <https://doi.org/10.1038/s41893-019-0353-8>
3. The Fire Protection Research Foundation, 2015. <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Emergency-responders/RFPPathwaysForBuildingFireSpreadWUI.ashx?la=en>
4. National Fire Protection Association. <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire>

Additional Resources

The National Fire Protection Association (NFPA) <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire>
<https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Wildfire-safety-tips>

Headwaters Economics <https://headwaterseconomics.org/wildfire/homes-risk/building-costs-codes/>

Fire Safe Montana <https://firesafemt.org/home-and-landowners>

Fire Adapted Communities <https://fireadapted.org/>



MT202104AG, NEW 1/21
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