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A Publication for the Northern Rocky Mountains Landscaping for Wildfire Prevention

Protecting Homes on the Wildland/Urban Interface

Idaho Forest, Wildlife and Range Experiment Station Moscow, Idaho

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Jniversity of Idaho

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Landscaping for Wildfire Prevention

Yvonne Carree, Chris Schnepf, and W. Michael Colt

Towns and cities are spreading as more and more people move to the surrounding countryside. If you live on forest or rangeland property, or are considering building there, you are part of the growing wildland/urban interface - where the urban environment meets the wild.

Idaho is part of a large area of the United States with fire-based ecosystems. Fire has been a natural part of our ecological history and will continue to be so. Wildfire can be very destructive, destroying homes and property and placing firefighters at risk. Residents of the forested and rangeland areas of Idaho should view wildfire the same way residents of the Midwest view tornados -- a common natural phenomenon that can devastate property and life -- and prepare accordingly. This publication is designed to help you implement measures to increase the chances of saving your home, property, and maybe your life, from wildfire.

Firehistory, ecology, and behavior

Historically, both lightning- and humanignited fires occurred over large land areas almost every year. For at least 10,000 years, Native Americans supplemented lightning-caused fire by setting fires to encourage shrubs and grasses to grow in the understory to attract game, and to deprive attacking enemies of cover. In the latter half of the 19th century, as Native American populations where moved on to reservations, these burning practices ceased.

Early in the 20th century, federal and state agencies began suppressing wildfire. Suppressing wildfire was a political response to catastrophic events such as the 1910 burns in Idaho and surrounding states and an effort to protect timber values. This effort became increasingly effective through the 1940's and 1950's, as planes, heli-

copters, and other modern equipment and technologies were added to the war on fire. From 1946 to 1979, wildfires in the West were held at low acreages through both wet and dry weather cycles - reflecting an era when human capacity out-paced environmental effects.

Starting in 1979, however, wildfire acres began to grow, in spite of increasingly sophisticated firefighting techniques. In 1994, this led the National Commission on Wildfire Disasters to conclude that it is no longer possible to hold wildfires in check by improving the sophistication and capacity of firefighting technology. The paradox of wildfire control is that every success in suppressing fire has resulted in growing fuel supplies.

Two types of wildfires are important to homeowners:

Surface fires burn surface litter and plants, shrubs, and small trees. This type of fire kills many seedlings, but usually causes minimal damage to mature trees and shrubs. Surface fires can be extremely damaging in young stands of spruce, fir, and hemlock, which have low fire resistance. Historically, many forest and range lands now occupied by interface homes had ground fires every 5-15 years.

Crown fires move through the canopy of a stand, burning from tree crown to tree crown. They usually occur in dense stands, during periods of high wind, and/or in areas with hilly terrain. Crown fires also occur in large stands of sagebrush, and regardless of the fuel type, can have extremely high flame lengths which often start spot fires far ahead of the fire front. Crown fires are the most destructive wildfires, killing mature trees and shrubs, and can move over large areas in short periods of time. Surface fires often become crown fires in stands with a high percentage of spruce, fir,

and hemlock. These species' crowns often reach the forest floor and act as a ladder for flames to move into the forest canopy. Historically, crown fires occurred less frequently than surface fires because frequent surface fires prevented small fuels from accumulating, making it harder for flames to reach the crown layer.

In the relatively dry, and often cold climate of the northern Rockies, large woody debris decomposes slowly. After years of fire suppression, fuels accumulate, tree density increases, less fire-resistant, shade tolerant species such as true firs increase, and the rate of organic decomposition declines further. This, in turn, creates conditions for larger, more intense, and potentially more destructive fires. Crown fires are more likely since fire size and intensity increase with the amounts of duff, litter, and woody debris "fuels" accumulated.

Although we have learned to use management techniques such as timber harvesting and prescribed burns to mimic fire's role in an ecosystem, political and social difficulties often limit these activities in wildland/urban interface areas.

Wildfire Protection and Defense

hile wildfire plays a very important role in forest and rangeland ecology, it can be devastating if homes, possessions, and even lives are lost. For the past 50 years, Smokey Bear has been saying "Remember, only you can prevent forest fires." But perhaps he should be saying "Not even you can prevent all forest fires." Preparation is the best way to protect your property against destruction by wildfire. To begin defending your property from wildfire, complete the home fire risk exercise on page 10.

Landscaping

The most effective way to increase the protection of your home from wildfire is by creating defensible spaces. *Defensible space* involves creating concentric zones around structures, with increasing fire resistance provided in zones closest to structures. Plants in each zone perform a distinct function. The transition area between zones creates a break to slow advancing flames. A minimum distance of 100-150 feet around your home needs this type of comprehensive landscaping. See Figure 1 for a description of

Figure 1. Defensible zones.



Zone 1: Moist and trim.

In zone 1, low-growing plants which resist catching fire and provide little fuel are used. Turf, perennials, groundcovers, and annuals form a greenbelt that is regularly watered and maintained to eliminate dry plant litter. This zone may contain individual shrubs and trees located at least 10 feet from the house.

Zone 2: Low and sparse.

In zone 2, slow growing, drought-tolerant shrubs and groundcovers are used to keep fire near ground level. Native vegetation can be retained here if it is low growing, does not accumulate dry, flammable material, and is irrigated.

Zone 3: High and clean.

In zone 3, native trees or shrubs are thinned and dry debris on the ground is removed. This zone requires removing overgrowth and pruning trees every three to five years. Specimen trees can be planted at the edge of this zone, if well cared for.

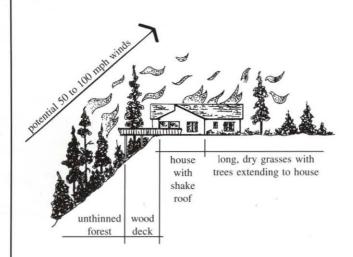
Zone 4: Natural area.

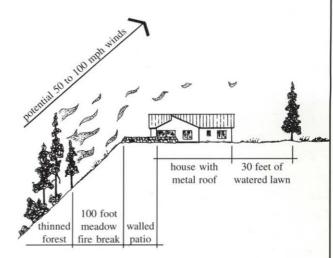
Zone 4 is composed of native plants that are selectively thinned. If possible, highly flammable vegetation is removed and replaced with less fireprone species.

Figure 1 revised from "Fire Risk Ratings for Homes" Wildfire Hits Home, Fire Control Division, Washington State Department of Natural Resources, Lacey, WA.



Figure 2. Sloped Sites.





House without defensible space

- House at crest of hill at risk.
- Overhanging wood deck is a big danger.
- Shrubs below deck and tree through deck add to fire danger.
- Shake roof burns easily.

House with defensible space

- House set back from crest is sheltered.
- Stone walls deflect fire.
- Fire proof roof protects house from embers.
- Small watered lawn prevents ground fires.
- Enclosed eaves reduce fire risk.
- Greatest clearing downhill from house.

each zone. Steep slopes or windswept exposures need greater defense distances (see Figure 2).

Before any discussion of reducing fire hazard through the selection of proper plant materials, this point should be made clear – all plants will burn if there is enough heat and other conditions are right. The term "fire resistive" is used when referring to plants that are less flammable than others.

The condition of a plant is as (or more) important as the species. Depending on a plants' growth form and access to water, the same species may be fire-resistive in one environment and combustible in another. Summer irrigation may make the difference between an extremely flammable plant and one which will not burn readily. Some species, such as cheatgrass, can actually serve as a fuse and start flash-fires when overheated.

Plants that ignite readily and burn intensely, known as *pyrophytes* or "fire-prone" plants, typically share certain characteristics. They:

- are water-stressed.
- usually accumulate fine, twiggy, dry, or dead material.
- have leaves and wood containing volatile waxes, fats, terpenes, or oils.
- are typically aromatic (crushed leaves have strong odors).
- have gummy, resinous sap with a strong odor.
- are usually blade-leaf or needle-leaf evergreens.
- · have stiff, leathery, small, or fine lacy leaves.
- may have pubescent (hair covered) leaves.
- may have loose or papery bark.
- are plants that flame (not smolder) when preheated and ignited with a match.

"Fire-resistive" plants share the following characteristics. They:

- · have a high moisture content in their leaves.
- are drought-tolerant.
- have little or no seasonal accumulation of dead vegetation.
- · have a low volume of total vegetation.
- · have non-resinous woody material.
- · have an open, loose branching habit.
- · are slow growing.

For a list of selected fire-resistive plant materials refer to the Appendix, pages 11-13.

Landscape Maintenance

In maintaining defensible space, you must actively reduce potential fuel accumulation by regular pruning, mowing, raking, and removal. The less accumulated plant debris, the slower a fire will spread.

To modify existing vegetation to reduce wildfire hazard:

- Clean the debris from your roof and yard several times a year.
- Remove grassy fuels for 30 feet around all dwellings.
- Remove highly flammable brush from around each home for a distance of not less than 100 feet.
- Apply all known cultural practices (irrigation, fertilization, etc.) that improve health and vigor of trees/shrubs around homesites.
- Do not plant shrubs at the base of structures.
 Where planted, they should be kept well-watered and pruned.
- Keep tree branches at least 15 feet away from chimneys and stove pipes, which should be covered by screens. Tree branches should also be kept at least 15 feet from utility lines and roofs.
- Store firewood 30 to 100 feet from any structure and create a defensible space around the pile.
- Remove dead shrubs and trees.
- Thin shrubs growing 100 feet and further from

- each house into individual plants.
- Eliminate "ladder fuel" configurations in vegetation (*ladder fuel* refers to the growth of a plant community structured like the rungs of a ladder leaves, grasses, small shrubs, large shrubs, and trees). Removing these "rungs" decreases the development of destructive crown fires.
- Reduce the probability of surface fire climbing into tree crowns by pruning the base of the crown 6 to 15 feet from the ground.
- Reduce lateral movement of fire between crowns by cutting branches that span between crowns to 10 feet, or more, apart.
- · Prune all dead branches.
- When possible, keep the surrounding landscape healthy by thinning, controlling insect and disease problems, and reducing fuel accumulations.

Firefighting agencies

Fighting wildland fires is very different from fighting fires in timbered or range areas interspersed with homes. In most wildland/urban interface areas of Idaho there are at least one of four types of fire protection agencies:

City fire departments are funded by taxpayers who live inside city limits. They have no obligation to provide fire protection outside their jurisdiction, and some may even be prohibited from doing so.

Rural fire districts are usually areas close to cities where there is sufficient improved property and an adequate tax base to provide funding. Rural fire districts protect year around and are equipped to fight structure fires. The response time can be slower than with city fire departments. Neighboring landowners often join together and form a rural volunteer fire protection district. If you live in a rural area and do not have a rural fire protection district, you may find it difficult to get insurance. To start one in your area, contact a local rural development agency (e.g., a Resource Conservation and Development Council).

State forestry departments are wildland fire protection agencies. These agencies are neither responsible for, nor equipped to, fight structural fires. Their primary function is to prevent and extinguish wildland fires. State forestry departments are typically geared up for action during the summer fire season and provide less protection during the rest of the year. Response time is also slower, sometimes taking up to a half hour.

Federal land agencies, such as the USDA Forest Service and the USDI Bureau of Land Management, are also spending more time fighting interface fires. Cooperation with city and rural fire departments is increasing, with common communication and organizational structures being adopted and interagency teams suppressing wildland/urban interface fires.

Roads, access, and signs

Vehicles from firefighting agencies must have adequate access to your property.

Otherwise, they may skip your property to protect homes that are more easily accessed and defensible.

Your property should be clearly marked with a nonflammable sign with numbers and letters at least 4 inches high on a contrasting background.

You should have two ways to access your property in the event that one route is threatened. Roads should be wide enough for two-way traffic, and vegetation should be cleared 10 feet from along roadsides and driveways. If a two-way road is not possible, turnouts should be constructed.

Fire equipment has difficulty negotiating excessively steep (greater than 12%) or sharp roads. Bridges should be strong enough to support fire equipment and the water they carry (at least 34,000 pounds) and be identified as being so. If access to your site leads to a cul-desac, an adequate turnaround radius is needed. A minimum of 50 feet is suggested.

Emergency water supplies

Do you have enough water to fight a fire? If not, consider developing an emergency water supply, such as an additional well, a pond, cistern, swimming pool, or tank. You should have 25,000 gallons of water available for emergency backup. Make sure water supplies are clearly marked and accessible to fire trucks. Firefighters usually need at least 16 feet to access a water source. If you depend on a well for your water supply, get a backup, gas-powered generator to provide power to the pump in the event of losing electrical service.

Building materials

If you have not built yet, try to place structures on flat ground. Fires burn up hill more rapidly than down or across a flat. Avoid draws, as they can serve as a chimney, creating more intense fires that spread rapidly with uphill drafts.

Use fire resistant materials to build or to replace flammable materials. Tile or fiberglass roofing materials and brick or stucco walls are the most fire resistant. Untreated or poorly treated wood shake shingles are the least fire resistant. Line the undersides of decks and porches with a nonflammable material. Double pane windows and protective shutters or fire-resistant window treatments (blinds, drapes) will help insulate the inside of your house from the heat of a fire, lessening the chance of the interior becoming overheated and igniting. Make sure your chimneys are screened and have covers constructed for any openings in the attic and basement.

If possible, have power lines buried to protect them from fire and prevent the ignition of vegetation. If burying lines is not possible, contact your power company to make sure trees and branches are trimmed 10 to 15 feet away from lines.

Fire safe inside

The inside of your home should also be firesafe.

- Know your fire protection district; post their number by all telephones.
- Install smoke detectors and replace the batteries twice a year. A good time to do this is when you change the clocks in the spring and fall.
- An indoor sprinkler system is a very effective fire protection device.
- Locate several fire extinguishers throughout the house and garage. Have them serviced yearly to make sure they are fully charged. Know how they work, as some are formulated differently for electrical, wood, or other types of fires. The basement, kitchen, laundry area, and near wood stoves and fireplaces are good locations.
- If you have a wood stove or fireplace, maintain it. Clean the chimney before cold weather sets in, and again as needed throughout the cold months as creosote builds up. The free use of a chimney brush is often available from your local fire department.
- Establish an escape plan and practice fire drills with your family.
- Place all of your important documents and valuables in a fire-safe box and keep it in an accessible location.
- If you have neighbors, pre-plan an emergency community fire procedure and an alert system.
- Prepare a fire kit. Include three days food and water, a shovel, rake, hoe, bucket, sprinkler, hose, a ladder long enough to reach the roof, and protective clothing such as goggles, gloves, a long-sleeved shirt, pants, and boots.

When a wildfire threatens

In the event of a wildfire, call 911 or your fire protection district. Consider the steps necessary in the event of an evacuation. Put your valuables and pets in the car, park in the direction you will escape, and leave the key in the ignition. If there

is time, you can take the following steps to increase your fire protection.

- Close the house and disconnect electric garage door openers.
- · Cover attic and basement vents.
- · Fill all available containers with water.
- Place a ladder to the roof opposite the approaching fire and put a sprinkler on the roof.
- Get the emergency generator ready to run the pump in the well.
- Shut off the gas supply.
- Turn on all indoor and outdoor lights to make your house easier for firefighters to find in the dark.
- Take down flammable window treatments; close nonflammable window treatments such as metal blinds.
- Arrange temporary housing at the home of a friend or relative who is outside the threatened area.

After a fire

Check for and mop up any hot-spots in your yard and on the roof. Burned areas should be monitored for 12 hours to make sure the fire is out and danger is past.

Conclusion

Lenjoyable, but not without danger. In western forest environments, wildfire should be anticipated and planned for, not unexpected and dismissed. Some counties may have ordinances addressing defensible spaces and water storage which may vary from the information presented in this publication. Check with your local planing and zoning department for further information on local ordinances. Taking precautions to protect your property will increase your chances of escaping serious damage and death from wildfire.

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Your Home Fire Risk Rating

Use the exercise below to determine your home fire risk rating. Use the numbers in the right column that correspond to your situation to complete your risk rating.

Fuel Hazard Rating

Fuel type	Rating
Small, light fuels (grass, weeds, shrubs)	1
Medium size fuels (brush, large shrubs, small trees)	2
Heavy, large fuels (woodland, timber, heavy brush)	2 3
Class Harris Detter	
Slope Hazard Rating	D -di-
Slope Mild along (0.5%)	Rating
Mild slopes (0-5%)	1
Moderate slopes (6-20%)	2
Steep slopes (21-40%)	3
Extreme slopes (41% and greater)	4
Structure Hazard Rating	
Design Characteristics	Rating
Classified roof and noncombustible siding materials	1
Classified roof and combustible siding materials	3
Unclassified roof and noncombustible siding materials	7
Unclassified roof and combustible siding materials	10
Additional Factor Rating	
Additional Factors	Rating
Rough topography that contains several steep canyons	+2
Areas having history of higher than average fire occurrence	+3
Areas exposed to severe fire weather and strong winds	+4
Areas with existing fuel modification or usable fire breaks	-3
Areas with local facilities (water systems, fire districts, dozers)	-3
Calculating the Risk	
Fuel hazard $\underline{}$ x slope hazard $\underline{}$ = $\underline{}$	
structural hazard +	
additional factors + or	
Total hazard points =	
Extreme = 26+ points	
High = 16 to 25 points	
Moderate = 6 to 15 points	
Low = 6 or less points	

This exercise is taken from the Home Hazard Rating form used by the Idaho Department of Lands.

Fire-Resistive Plant Material for the Northern Rocky Mountains

Much discussion went into the inclusion of the following plant material list. THERE ARE NO FIRE **RESISTANT PLANT MATERIALS.** Landscape maintenance is far more important in landscaping for fire prevention than the selection of fire-resistive versus pyrophytic plant materials. This list is not all-inclusive. For example, there are over 100 genera of herbaceous perennials, many that would fit the criteria for fire-resistiveness that are not listed here. When planning your landscape, use the characteristics of fire-resistive and pyrophytic plants along with site characteristics such as slope, aspect, hardiness zone, and amount of precipitation to choose plant materials suitable for your site.

Groundcovers

Succulents:

Botanical Name

Delosperma nubigenum Echeveria spp. Sedum spp.

Non-succulents:

Botanical Name

Achillea tomentosa Ajuga reptans Arctostaphylos uva-ursi Armeria maritima Cerastium tomentosa Cotoneaster dammeri Euonymus fortunei 'Coloratus' Potentilla tabernaemontanii (verna) spring cinquefoil Senecio cineraria Thymus praecox arcticus Verbenia bipinnatifida

Common Name

hardiest ice plant hens & chicks stone crops

Common Name

wooly yarrow carpet bugle kinnikinnick sea pink; thrift snow in summer bearberry cotoneaster winter creeper dusty miller mother of thyme verbenia







Vines

Botanical Name

Campsis radicans Parthenocissus quinquefolia Vitis spp. Wisteria spp.

Common Name

trumpet vine Virginia creeper grapes wisteria

Perennials

Botanical Name

Achillea spp. Allium schoenoprasum Bergenia spp. Brodiaea spp. Carex spp. Coreopsis spp. Erysimum linifolium Eschscholzia spp. Fragaria spp. Geranium spp. Hemerocallis hybrids Heuchera spp. Iris spp. Kniphofia uvaria Lupinus spp. Oenothera spp. Penstemon spp.

Common Name

yarrow chives bergenia lilies sedges coreopsis wall flower California poppy wild strawberries geranium daylillies coral bells iris red hot poker lupine evening primrose beard tongue goldenrod lamb's ear



Hemerocallis hybrid

Shrubs

Botanical Name

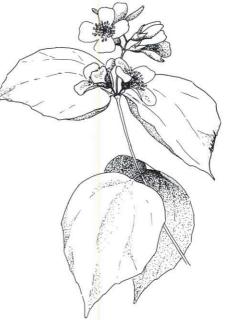
Amelanchier spp. Atriplex canescens Buddleia davidi Caryopteris x clandonensis Cornus sericea Cotoneaster spp. Liqustrum spp. Mahonia spp. Pachistima canbyi Philadelphus spp. Prunus spp. Rhamnus fragula Rhododendron spp. Ribes spp. Sheperdia argentea Symphoricarpos albus Viburnum trilobum Yucca spp.

Common Name

Solidago spp.

Strachys byzantina

serviceberry four wing saltbush butterfly bush blue-mist spirea red osier dogwood cotoneaster privet creeping grape holly dwarf mountain lover mock orange; syringa cherry buckthorn azaleas; rhododendrons currant silver buffaloberry snowberry cranberry bush yucca



Philadelphus lewisii



Trees

Conifers:

Botanical Name

Calocedrus decurrens Thuja plicata

Common Name

incense cedar western red cedar

Deciduous:

Botanical Name

Acer spp. Aesculus spp. Alnus spp. Catalpa speciosa Cornus florida Fagus spp. Fraxinus spp. Gleditsia tricanthos Populus spp.

Robinia pseudoacacia

Salix spp.

Quercus spp.

Common Name

maple

horsechestnuts & buckeyes

alder

northern catalpa

flowering dogwood

beech ash

honeylocust

aspen & cottonwood

oak

black locust

willow



Quercus macrocarpa

This list has been revised from the original Fire Resistant Plant Materials for the Rocky Mountains. Gary Moen, Advanced Instructor of Horticulture, Larry Selland College of Applied Technology, Horticulture Department, Boise State University.

A Checklist of Preventative Measures for Wildland Fires

Landscaping ☐ defensible spaces/firebreaks around property and structures □ prune trees up 6-15 feet ☐ keep lawn and plant materials well watered and trimmed ☐ trim branches away from chimneys and utility lines ☐ store firewood away from structures and surround with a defensible space clean debris from roof and yard frequently Roads and signs ☐ emergency escape route accessible for fire equipment property clearly marked with nonflammable signs with clear letters at least 4 inches high Emergency water supplies clearly marked and accessible emergency generator Building materials nonflammable materials, especially on roof, decks ☐ double pane windows or nonflammable window treatments □ screens on chimneys covers for attic and basement openings Fire safe inside ☐ know fire protection agencies; post numbers by phones ☐ smoke detectors, sprinkler system, fire extinguishers ☐ chimney/stovepipe maintenance ☐ escape plan documents and valuables □ community emergency fire procedures and alert system ☐ fire tools and emergency supplies

Steps for Evacuation When a Wildfire Threatens ☐ Wear protective clothing. ☐ Close up the house and disconnect electric garage door openers. ☐ Cover attic and basement vents. ☐ Fill all available containers with water. ☐ Put up a ladder to the roof opposite the approaching fire and put a sprinkler on the roof. ☐ Get the emergency generator ready to run the pump in the well. ☐ Shut off the gas supply. ☐ Turn on all indoor and outdoor lights to make your house easier for firefighters to find in the dark. ☐ Take down flammable window treatments; close nonflammable window treatments such as metal blinds. In the Event of Being Caught in a Fire: Crawl low. ☐ Touch doors before opening; if they are hot, use another escape route. ☐ Put a towel or rug at the bottom of the door to prevent smoke from entering the room. ☐ Don't panic, and stay together. ☐ If you catch fire - remember STOP, DROP, and ROLL.

References

The following references were used in the development of this publication and also provide useful information on protecting your home from wildfire:

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