

Tools in the Toolbox: Different methods for fuels management in Nevada



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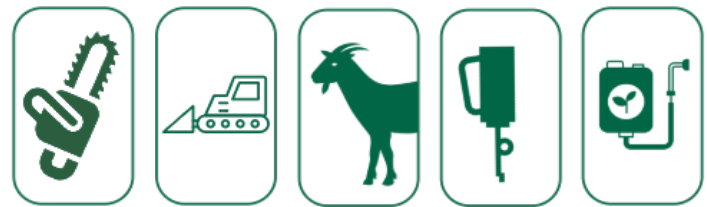
“Fuels management” involves reducing the amount of vegetation in an area to reduce the intensity and spread of potential wildfires. Understanding the different methods of fuels management is crucial for residents in high-fire-hazard areas that want to reduce their wildfire risk.

The role of community members in reducing the wildfire threat

Community members play a crucial role in reducing wildfire risk by treating the areas around their homes. Many local fire departments and districts offer resources, such as curbside chipping and green waste collection days, to assist landowners in treating their properties. However, treating a single property has only a limited effect if neighboring properties remain untreated. Strong partnerships among communities, fire agencies, stakeholders and rightsholders increase the effectiveness of wildfire mitigation efforts, laying the groundwork for more resilient, fire-adapted communities.



Community members and fire department personnel work together to reduce hazardous wildland fuels in Carson City, Nevada. (Dave Ruben)



Why do we do fuels management?

Periodic “low intensity” fire, which burns with less heat and energy, can be good for the land. However, after decades of widespread fire suppression and the forced removal of indigenous people who used intentional fire on the land, many ecosystems have become unhealthy and vulnerable to fire. Forests are becoming overcrowded and dead vegetation has built up which can be hazardous due to its potential to become fuel for wildfire.

When we talk about wildfire fuel, we don’t mean gasoline or diesel. The term fuel refers to both dead and living vegetation that can burn, as well as homes and other structures that can ignite. This is particularly important in areas where urban development meets the natural environment, known as the wildland urban interface (WUI). Wildfires are becoming increasingly destructive across many ecosystems, including forests, woodlands, and rangelands. Climate change, human-caused ignitions, the encroachment of homes into the natural environment and the volume, density and health of fuel on the landscape all contribute to this escalating problem. In this fact sheet, we will explore some different “tools in the toolbox” for managing fuel in Nevada.



Fire crews hand thin and create burn piles at Spooner Lake & Backcountry State Park. (Nevada Division of Forestry)

Tools in the toolbox

Hand thinning and pruning

When we use tools such as chainsaws and axes to remove small-diameter trees and shrubs, we call it hand thinning. Pruning refers to the removal of lower tree branches and trimming back shrubs to minimize ladder fuels, which are low-growing vegetation that promote the movement of fire from the ground to the crowns or tops of trees.

Hand thinning and pruning are great tools for someone who is working on a small scale to reduce their wildfire risk. Pruning, for example, can be done with tools that an average homeowner may already have, such as gardening shears and a simple saw.

Hand Thinning

Advantages

- » Inexpensive
- » Accessibility is higher than other fuel treatment methods (can get to harder to reach places in comparison to other fuels treatment methods)
- » Less environmental impact

Disadvantages

- » Less efficient than other methods for larger-scale projects
- » Hand thinning requires more people in comparison to other methods such as mechanical thinning

Mechanical thinning

Mechanical thinning involves using heavy machinery in various ways to cut and either remove or rearrange vegetation to reduce wildfire risk. These methods stand out for being efficient and productive, allowing crews to accomplish much more in less time compared to hand thinning. However, it's important to consider the significant initial investment required for contracting a company or purchasing and maintaining the specialized equipment required for mechanical thinning, as well the environmental impact, as heavy equipment can cause considerable soil disturbance.

Common methods of mechanical thinning include the mechanized harvesting of trees using heavy equipment such as feller bunchers to cut and remove trees or using masticators to grind woody vegetation into mulch that is deposited on site. With mechanized harvesting, large trees can be handled effectively, which is crucial for thinning dense forests. There's also a potential financial benefit since the harvested trees can sometimes be sold to lumber mills to help offset costs. Mastication can be used as an alternative treatment when removal of vegetation is not feasible, there are concerns about disturbing soils, or prescribed fire is not an option. There are advantages and disadvantages to each method outlined below.



A feller buncher harvests trees. (Adobe stock)

Mechanized Harvesting

Advantages

- » Allows for precise control over tree spacing
- » Avoids negative impacts on air quality, since vegetation is removed rather than burned
- » Potential for revenue from the sale of harvested trees

Disadvantages

- » Limited by steep terrain and weather conditions
- » Potential environmental impact from heavy machinery, particularly soil disturbance
- » May not fully replicate natural wildfire effects on ecosystems and could potentially increase surface fuels



A tree masticator mulches forest vegetation. (Vadzim/Adobe stock)

Mastication

Advantages

- » Leaving masticated material on site can help soil retain nutrients
- » Suitable for areas where burning is not possible due to air quality concerns or other restrictions
- » Useful in areas with limited road access or steep slopes where other equipment cannot be used

Disadvantages

- » May not fully replicate natural wildfire effects on ecosystems
- » Could potentially increase surface fuels and create fire hazard

Targeted grazing

Targeted grazing is an approach where animals are used to graze on land, consuming vegetation to reduce fuel in an area. Grazing is most effective in areas with small diameter vegetation such as grasses, shrubs and low tree branches, which makes this approach great for breaking up dense areas of vegetation that can increase wildfire spread, as for well as eliminating ladder fuels that promote the movement of fire from the ground to the canopy of trees.

Targeted grazing involves careful planning, considering factors such as how many animals are needed, how long they should graze, which plant species to target, and which animals are right for the job. By harnessing the natural behaviors of animals such as goats, sheep or cows, targeted grazing can offer a cost-effective alternative to other management methods.



Sheep graze on land near a neighborhood in south Reno. (Humboldt-Toiyabe National Forest)

Targeted Grazing

Advantages

- » Help control invasive plant species, reducing the need for chemical herbicides
- » Can be more economical compared to other management methods such as herbicide treatments or prescribed burning
- » Targeting invasive plants, allows native vegetation to thrive, enhancing ecological diversity
- » Can help improve soil health by trampling plant material, adding nutrients and reducing erosion

Disadvantages

- » Can be time-consuming and require careful planning regarding timing, intensity and duration of grazing
- » Animals need water, shelter and proper management to prevent environmental damage or harm to the animals themselves
- » May not be feasible or effective in all landscapes, depending on factors such as terrain, vegetation and the availability of grazing animals
- » Achieving desired results may require multiple grazing sessions over several years, necessitating ongoing commitment and resources

Prescribed burning

Fire plays a vital role in our environment. Historically, fire has been a tool for keeping ecosystems diverse and resilient to catastrophic wildfire. Many ecosystems experienced frequent low-intensity fires that consumed low-growing vegetation and dead vegetation on forest floors, promoting tree growth by reducing competition for water and recycling nutrients like nitrogen back into the soil. For millennia, Indigenous people have used fire for a variety of purposes, including cooking, clearing land to promote certain crops and enhance game hunting, facilitating travel, and other important cultural and ecological reasons. Decades of suppressing natural fire and the displacement of Indigenous communities have had detrimental effects on the environment. Prescribed burning is applied to mimic these natural disturbances, fostering the creation of more ecologically diverse and fire-resilient landscapes.

Prescribed Burning

Advantages

- » Reduces the risk of more dangerous fires
- » Increases water availability for remaining plants
- » Reduces tree competition, aiding in drought resistance
- » Improves plant diversity and wildlife habitat
- » Controls invasive species and pests
- » Is cost-effective compared to mechanized treatments

Disadvantages

- » Temporarily reduces air quality
- » Poses risks to people, property and animals
- » Can lead to increased cheatgrass invasion
- » Poses risk of escaped fires

Common methods of prescribed burning include **pile burning** and **broadcast burning**, each suited to specific vegetation types and management goals, with unique advantages and disadvantages.



A landowner burns piles on private land in Nevada. (Wendy Hanson-Mazet)

Pile burning involves burning piles of medium to large woody vegetation, which landowners can do by following safe practices and adhering to local laws. This may require obtaining a permit and burning only on specific days. This method is highly effective for disposing of larger debris, but doesn't address smaller fine fuels and litter that accumulate on the ground and can carry a fire if ignited. Pile burning also localizes fuel treatment in one spot rather than letting fire creep across a larger area. This can be useful when targeting specific areas around a property but may negatively impact soil directly beneath the pile.

Broadcast burning involves applying fire across a larger, designated area to reduce fine fuels such as grasses and shrubs that accumulate and increase fire risk. It also provides essential ecological benefits, such as improving soil health and promoting the regeneration of native vegetation, which cannot be achieved through pile burning alone. This method requires significant training to conduct safely and is subject to a much greater degree of oversight from officials and the public. In Nevada, prescribed fire is regulated by NRS 527.122-128, and broadcast burns on private and state lands must follow a written burn plan and be conducted by a qualified burn boss, making it difficult for most landowners and even some fire departments to carry out.

A wildland firefighter ignites vegetation with a driptorch during a broadcast burn. (Bureau of Land Management - Nevada)



Herbicides

Herbicides are chemical treatments that are used to control vegetation growth. They're mainly used to control invasive species that grow fast and need retreatment often, such as cheatgrass. Used safely, they can help reduce the buildup of smaller fuels that dry out quickly and can easily ignite and help fires spread. As with many fuel management methods, this is most effective when used in combination with other techniques.

This depicts an area before and after an herbicide and hand-thinning fuel treatment in Jupiter, Florida. (Bureau of Land Management)



Herbicides

Advantages

- » Can be a cost-effective solution compared to manual or mechanical weed control methods, especially for large-scale applications
- » Can be highly effective at targeting specific weed species and can provide efficient control in the right conditions

Disadvantages

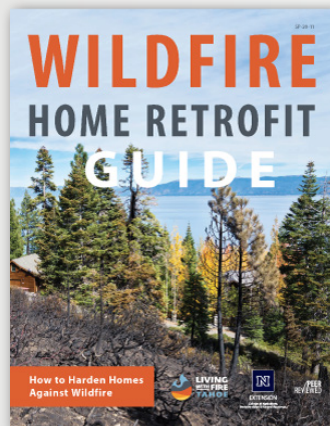
- » Need to be applied during specific windows of time to effectively target the growth stage of the weed species, and failure to do so can result in reduced effectiveness
- » Improper use of herbicides can lead to environmental harm, such as the leaching of chemicals into groundwater or runoff into nearby water bodies. Careful application and adherence to safety guidelines are essential to minimize these risks and ensure environmental protection

In conclusion

In conclusion, the methods above are all tools that land managers, fire departments and districts, residents, and communities can use to manage vegetation and reduce the buildup of hazardous wildland fuels near communities. Each tool offers advantages and disadvantages in reducing wildfire risk. By understanding and implementing these methods appropriately, communities can make significant progress in reducing the wildfire threat in their area.

Managing vegetation is only part of reducing the wildfire threat

Managing vegetation, both on the landscape and by creating defensible space around the home, is only part of reducing the wildfire threat to communities. The most effective way to reduce the threat of wildfire is the "coupled approach," which considers the home's construction materials and the surrounding vegetation. To learn about home hardening, or how to retrofit your home with ignition-resistant materials, scan the code to the right to read the *Wildfire Home Retrofit Guide*.



Scan to view the *Wildfire Home Retrofit Guide*.

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