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What Grows Back After The Fire?

Ed Smith, Natural Resource Management Specialist

Jay Davison, Plant and Soil Specialist

An increasing number of Nevadan's are gaining first hand experience with one of the important influences of rangeland vegetation...wildfire. In the aftermath of wildfire, many homeowners are alarmed by the sudden change in appearance of the wildland vegetation surrounding their homes. The brushlands that once dominated the landscape have been converted to charred skeletons of shrubs and the black residue of burned leaves, twigs, stems, and bark. At this time, a frequently asked question is "Will it grow back?" This fact sheet describes the response of some common northern Nevada rangeland plants to wildfire.

A HISTORICAL PERSPECTIVE

Fire has helped shape Nevada's vegetation for thousands of years. It affects the kinds of plants growing in an area, their abundance, size, health, and age. Prior to European settlement, big sagebrush dominated rangelands (i.e., the most common type of vegetation in Nevada) burned on intervals of 20-70 years. Because of the relatively frequent reoccurrence of fire, shrubs were less abundant and grass more common than today. It is generally believed that the livestock grazing practices of the late 1800's reduced the presence of grass. This, coupled with effective fire suppression activities, decreased the occurrence of fire. In the absence of fire, shrubs became more abundant. In the early 1900's cheatgrass, an annual grass native to central Asia, became well established in much of the big sagebrush vegetation type of Nevada.

Because cheatgrass is very flammable, today's fires are more frequent, occur earlier in the year, and when shrubs are involved, more intense than the pre-settlement fires.

PLANT RESPONSE TO FIRE

Plants vary in their response to fire. Fire readily kills some plants, rejuvenates others, and some may even require fire to exist. The manner in which plants are affected by fire is largely determined by their biological characteristics and fire behavior. Some of the biological characteristics include:

- **Sprouting:** Some plants have the ability to sprout when the above ground portion has been burned. Depending upon the plant species, sprouting can occur from roots, rhizomes, base of the trunk, branches, below ground root crown, and grass crowns.

- **Seed Adaptation:** Some seeds require heat in order to germinate, are tolerant of higher temperatures, or possess some other adaptation, which improves survivability.

- **Growth Stage:** For some plants, the stage of growth determines the degree of damage from fire. Most perennial grasses, for example, are more susceptible to fire damage when actively growing than when dormant.

- **Stature:** Often plants of smaller stature survive fire because they contain less fuel. Small grasses with many stems, for example, may burn at lower temperatures than larger leafier grasses and therefore may be more likely to survive a fire. Also,

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temperatures during a wildfire are usually less at ground surface that is conducive to the survival of small plants. Fire behavior characteristics that effect plant response include:

- **Temperature:** Wildfires vary considerably in terms of temperature. Wildfires that generate high temperatures are more damaging to plants than cooler fires. A combination of factors (e.g., wind speed, moisture and chemical content of fuels, amount of fuels, and other factors) determine fire temperature.

- **Duration of Heat Exposure:** Brief exposures to high fire temperature are less damaging to plants than extended exposure.

WHAT TO EXPECT AFTER THE FIRE

As mentioned above, plant response after a fire is extremely varied and is based upon a number of things. There are, however, some typical responses. Table 1 describes some general plant responses to a wildfire occurring in the big sagebrush vegetation type. A homeowner can make a rough estimate of plant survival following wildfire by considering the factors described below. An assessment of plant survival may be useful when deciding whether to reseed burned property or to allow it to revegetate naturally.

Bunch grasses (i.e., perennial grasses that grow in clumps) can be dug up and the area just above the roots examined. If there is some green living tissue present, survival is likely. If it crumbles easily and is uniformly black or brown, the plant is probably dead.

Sagebrush is usually killed by fire, but may re-establish in future years by seed. Most shrubs that are capable of sprouting (Plant Response) generally survive burning.

Bitterbrush, however, may or may not resprout or reseed after burning depending upon several factors. Bitterbrush typically resprouts best when soils are cool and moist during the fire, the plants are not old or younger than five years, competition from other plants is limited, winter snow provides protection for recently burned plants, and/or the current years seed was produced and dropped prior to burning (i.e., usually mid-July).

For natural reseeding of bitterbrush to occur, there needs to be a large seed supply, rodent activity, and a long, moist spring following the fire.

Forbs (i.e., non woody plants which are not grasses) that burned when they were actively growing are less likely to survive than those which burned after they had completed growth. In addition, forbs which reproduce only by seed are typically more damaged than those which can

spread vegetatively (e.g., via underground rootstalks). Most sites will produce an abundance of forbs following fire, but they may be of different species than existed prior to the fire.

Although many plants will survive and reinitiate growth soon after the fire, their ability to thrive and reseed in subsequent years will be greatly affected by the presence of cheatgrass and other invasive weeds. Unfortunately, these weedy plants are capable of preventing desirable range plants from re-establishing in the lower elevations (i.e., below 6,000 ft.) of the big sagebrush zone. Furthermore, their presence also increases the likelihood that a wildfire will reoccur in the near future and earlier in the growing season, a very sensitive period for many of our rangeland plants. To control these flammable weedy plants, many land management agencies plant crested wheatgrass. While crested wheatgrass is usually effective in this regard, it too can preclude the re-establishment of some desirable native plants.

CONCLUSION

After burning, the big sagebrush dominated rangelands which surround many northern Nevada communities will not remain unvegetated for long. The type and abundance of plants which regrow and re-establish after the fire is dependent upon a variety factors. It is unlikely, however, that the plant community will return to its preburn condition in the near future, if at all. The presence of cheatgrass has changed plant succession after fire and will likely increase the likelihood that fires will reoccur. In these situations, reseeding with adapted and less flammable species may be desirable. For further information and technical assistance concerning rehabilitation of burned lands, contact your local Cooperative Extension representative and/or USDA Natural Resource Conservation Service.

Table 1. Response of some common northern Nevada range plants to wildfire.

Plant Name	Response to Fire	Comments
Big sagebrush	Killed	Readily killed even by low intensity wildfire and short exposure to heat. Usually reestablishes from seed in subsequent years.
Bitterbrush	Varied	May resprout after fire depending upon growth form, age, soil moisture, and/or season of burn. May be killed by fire and re-establish from seed or may be eradicated from the site.
Green ephedra Green rabbitbrush Desert peach Horsebrush	Survives	Readily resprout after fire. Horsebrush and green rabbitbrush may become more common during years following fire. In some cases, resprouting shrubs may appear more “healthy” than prior to the fire.
Squirreltail Crested Wheatgrass Sandberg’s bluegrass Indian ricegrass Thurber’s needlegrass Needle and thread	Varied	In general, bunchgrasses ¹ are more sensitive to fire when green than when dried and yellow. Squirreltail, crested wheatgrass, Sandberg’s bluegrass, and Indian ricegrass are typically more tolerant of fire than the needlegrasses. Oftentimes production is reduced the first year after fire, but may increase in subsequent years.
Western wheatgrass Intermediate wheatgrass	Survives	In general, rhizomatous grasses ² survive burning and increase in subsequent years.
Cheatgrass	Survives	Since it is an annual ³ , cheatgrass has typically concluded it’s life cycle prior to the fire season. Although it may be reduced during the first year after fire, abundance in subsequent years usually meets or exceeds prefire conditions.
Tailcup Lupine Arrowleaf balsamroot Mule’s ear Longleaf phlox Fleabane	Varied	Forbs ⁴ generally survive late summer and fall burns because they are often dry and disintegrated by this time. They may also increase in number during subsequent years. Typically, those forbs which can spread by rootstalks fare better than those which do not.

¹Bunchgrass: Perennial grasses which grow in a clumpy form.

²Rhizomatous grass: Perennial grasses which can spread via underground roots.

³Annual grass: A grass which completes its life cycle during one season and perpetuates itself from seed.

⁴Forbs: A non woody plan which is not a grass.