

Protection of Rangeland and Pastures From Wildfire

C. Wayne Hanselka
Associate Department Head; Professor and Extension
Program Leader for Rangeland Ecology and Management
Corpus Christi, Texas

Grazinglands are subject to wildfire because of an abundance of fine fuel (grass), frequent dry conditions, and proximity to an ignition source - usually a road or highway. Due to the risk of wildfire, rangelands and pastures must be protected from accidental fires and/or those that are intentionally set. On-site preparations to protect grazinglands from fire include arrangements for removal of livestock and protection for feeders, pens, highlines, fences, oil and gas structures, wells, windmills, stored hay, barns, houses and cabins.

Firebreaks are a necessary and useful tool in this regard. By their very name, "firebreaks" or "fire guards", are designed to keep fire in or out of a pasture; and, most people assume that fire control is their only purpose. They will stop most fires, protect the pasture, and reduce losses, however, they do offer other benefits. Firebreaks can also be used for access by equipment to a prescribed fire; furnish access to inaccessible parts of the property; provide additional forage for livestock and/or wildlife; allow access for logging operations; allow for easier "working" of livestock; and offer recreational benefits such as hiking, horseback riding or bike trails. So, firebreaks should be constructed to meet the needs of the individual landowner and any additional benefits to be met while offering fire protection to rangelands and pastures.

There is a variety of firebreaks and methodologies, so the best practice to use will be determined by characteristics unique to the specific ranch under consideration. Often a combination of methods is most appropriate because of variability in vegetation type, topography and soil. Mowing as the **only** firebreak preparation is discouraged because of safety concerns.

PERMANENT FIREBREAKS

Cleared firebreaks are bare soil lines prepared by mechanical methods that, while they do need to be maintained, tend to be long-lived. These firebreaks must extend to bare ground or mineral soil, with no bridge of continuous dead fuel, so fire cannot creep across the fireline into or outside the pasture. Cleared firebreaks can create erosion problems so care should be

exercised on erodible soils, slopes, etc. They can be used on uplands, wet areas and sub-irrigated sites and can be prepared when the ground is dry or frozen. Since most fires occur during the winter or spring, or under drought conditions, firebreaks should be prepared well in advance of anticipated fire risk and under appropriate environmental conditions

Cleared Firebreaks may include any of the following:

- Disked firebreaks - These are best made by mowing, then disking twice, often in opposite directions (Fig. 1). Residual grass should not form a continuous fuel bridge over the fire guard.
- Plowed firebreaks - These are used with mowing if grass fuels are tall and/or heavy. The line is then scraped or bladed (not excavated) with a blade (dozer, maintainer, etc) (Fig. 2). Piles of soil containing fine fuels such as grass should not be left near the fireline.
- Pasture roads - These work well as firebreaks but it may be necessary to mow down the center of the non-paved road and mow and/or disk along the edge of the road to reduce tall fuels and widen the firebreak. County roads, paved or unpaved, work well as firebreaks but tall fuels in the drainage ditches must be considered as potential ignition points.
- Natural firebreaks - These include rivers, creeks, ponds, lakes, and cultivated fields.



Fig. 1 Disced Fire Guard



Fig. 2 Bladed Fire Guards

Dead trees and brush create a problem along cleared firebreaks. If dozing is required, trees and brush piles should be pushed well inside of the pasture (more than 100 foot), and it is often best to scatter the trees instead of piling them. If this isn't possible, brush should be piled next to the fireline and a line dozed around it. The brush pile can then be burned under low risk conditions.

TEMPORARY FIREBREAKS

There are several kinds of "temporary" fire guards. Mowed fire guards use heavy mowers, shredders, etc., to remove tall fuel along the perimeter of a pasture. The remaining short fuel stubble will still burn but not with the intensity and rapid rate of spread that taller, heavier fuel loads will achieve. Heavy accumulations of mowed grasses may need to be raked and removed. The spread of fire along mowed firebreaks can be difficult to contain so mowed firebreaks should be used in situations where bare-soil firebreaks are not feasible.

Burned firebreaks, or blacklines, are developed by burning out the fire guards under secure, safe conditions. In most cases, burned firebreaks are preferred over mowing since, once fire fuels are removed it cannot be reburned and/or any fire that reaches the blackline will, consequently, go out. Both mowed and burned guards are effective IF properly prepared. They must be wide enough to prevent the fire from crossing the guard and limit the possibility of burning embers and other material from leaving or entering the area.

Blacklines are usually created by clearing two strips, either mechanically, with chemicals or as wetlines (water), an appropriate distance apart (Fig. 3). The breaks are then burned by using a less intense, low risk fire (i.e. higher relative humidity, lower air temperatures and lower wind speeds). Caution should be used when burning volatile fuels such as eastern redcedar or sagebrush, since these species contain phenolics or other chemicals that flash when exposed to fire. Leaf litter should be raked or blown from firebreaks in forested areas. Pine needles are of special concern because fire can creep across firebreaks with only small amounts of pine leaf litter present.



Fig. 3 Blackline

Other "temporary" fireguards involve using wetlines (water) to wet down adjacent fuel while the blackline is being established. Chemical fire guards use a super phosphate to coat the fuel thus raising ignition temperatures of the treated fuel. A blackline can then be established along the chemical line.

GREEN FIREBREAKS

Landowners who want the benefits of winter grazing for livestock or food plots for wildlife as well as wildfire protection could use a "green" firebreak. These are usually disked lines, fertilized and seeded with cool season plants that stay green during the winter months when many fires generally occur. This creates food for livestock and wildlife and establishes a barrier against slow-moving wildfires. Green firebreaks should be disked, fertilized and re-seeded annually. Cool season perennial grasses should be avoided since they will contain dead material and allow fire to cross the firebreak.

SIZE

Firebreaks should be an appropriate type and width for the amount and type of fuels present as well as the size of the pasture to be protected. Necessary widths vary according to vegetation height, in that burning vegetation should not be able to fall across the bare area. A rule of thumb is that the width of the fireguard should be at least three times the height of the adjacent vegetation (Fig. 4). Firebreaks in forested areas, without prairie openings, can be as little as eight feet wide but usually need to be much wider.

To reduce flame length and fire intensity next to the firebreak, more than one type of firebreak (i.e. mowed and disked) should be used (Fig. 5). The mowed area should be on both sides of the disked area. Firebreaks need to be wide enough on all sides of the pasture so that wind direction is not a problem. The minimum blackline is usually 100 feet for low volatile grass fuels and 500 feet for windrowed brush or volatile fuels such as junipers (cedars).

COSTS

Usually the greatest direct cost of prescribed burning or fire prevention is preparing a firebreak around the perimeter each pasture. Often firebreak preparation such as dozing is a one time annual cost and can be maintained indefinitely with mowing or discing. If the firebreak is planted with a cool season grass, then maintenance costs will be reduced short-term although there will be the initial costs of seeding and mowing until the stand is established. Allowing plants to grow on the fire guard will shorten its life and increase long-term maintenance costs. Existing barriers, such as roads, sometimes can be used to reduce costs.



Fig. 4. This Fire Guard Is Too Narrow

Fig. 5. Mowed and Disced Fire Guard