

Management With Fire

Burning regime

The importance of fire for veld management

Of all management options open to the game ranch manager, fire probably offers the most direct means of managing the veld (Tainton 1999). In the savanna areas of Africa, the fire is recognised as having an important ecological role in the development and maintenance of productive and stable savanna communities. Burning in savanna is not only to decrease bush encroachment, but also to bring the browse down to a level that can be used by wildlife (Trollope and Tainton 1996). Fire caused by lightning is common in these areas. There are three types of fire, ground, surface and crown burns. The differentiation is based on the level where the vegetation burns (Tainton 1999):

- Ground fire – this fire burns beneath the surface of the soil in the thick layers of organic materials and plant debris.
- Surface fire – a fire that occurs in the herbaceous layer.
- Crown fire – a fire that includes all levels of vegetation strata, but mainly the leaf canopy of trees and shrubs.

Different vegetation reacts differently to fire and grazing. In veld management burning is done for many reasons (Van Rooyen 2002):

- To remove old, unacceptable or dead plant material accumulated from previous seasons. This favours the growing of desired grass species and reduces undesired ones. If the old material is not removed, it has a smothering effect on the desired grass species and the veld becomes deteriorated.
- To prevent or reduce bush encroachment by unacceptable woody or herbaceous invasive plants. Bush encroachment reduces the productivity of the grass layer, when it takes over.
- To create fire breaks in order to protect the grazing.
- Partial burns to stimulate rotational grazing.
- Controlling of parasites such as ticks.

Burning is unacceptable if it is to be used to stimulate new grass growth out of season. Fires should not take place in the summer, autumn or winter (Van Rooyen 2002). Unless browsers are introduced after a burn, the use of a fire to prevent bush encroachment is not effective. Trees and shrubs become reduced in height after the burn, but large trees are little affected. After a burn the leaves and young twig growth are made available to mixed feeders and browsers such as duiker and eland. The burning of veld tends to make the bushveld 'open' due to the burning of the lower branches and shrubs. This forced rotational grazing and browsing through burning ensures that preferential food types in the veld will not be eliminated but rather promoted by a correctly implemented management plan which includes a burning program.

Frequency of burning

If savanna is under-utilised for too long period, the veld deteriorates. The frequency of burning depends on the production rate of the grass, which is directly related to rainfall, and the degree and proportion to which the veld is utilised (Van Rooyen 2002). On unutilised high-rainfall sour veld the frequency may vary from annually to every 3 or 4 years on mixed veld, to even longer or not at all on sweet veld. The frequency of burning in savanna is determined by the veld condition, the rate of shrub growth out of reach of browsers, occurrence of bush encroachment and the rate at which unutilised grass material accumulate (Tainton 1999).

Intensity of burning

The intensity of a fire is influenced by the following factors: fuel load, fuel moisture, air humidity, temperature, wind speed, the lack of effective fire breaks is one of the most important reasons for fires getting out of control. The type of fire that is required to remove old, accumulated material is a less intense (cool) downwind fire (head fire). Although a head fire is apparently less intense at ground level than a fire backfire which burns against the wind. The temperature between 1 and 3 m above ground level is higher in head fires than in backfires. The burning should be started along a firebreak as a short backfire. To secure safety a firebreak is burned. The fire is started on the upwind side, so that this head fire burns the greater proportion of the area.

Time of burning

Veld burning in savanna should only be performed for the removal of old, unacceptable plant material (Van Rooyen 2002). The time of burning should be decided on in such a way that the veld is able to reform a leaf cover as quickly as possible. If the veld is burned before the first spring rains, it remains bare and is thus more susceptible to soil erosion by water and wind. The recommendations for veld burning are therefore, not earlier than 6 weeks before the expected first spring rain and no later than 2 weeks after the first spring rain (Bothma 2004). If the veld has not been burnt before the first spring rains, due to signs of growth, it is done within 24 hours after the first spring rains of 15 mm or more. Fires that are applied early in the summer, when the grass is growing actively, have a disastrous effect on the productivity, basal cover and species composition of the grassland. The damaging effect of the fire is determined by the physiological condition of the grass plants at the time of the burn rather than the burning season (Van Rooyen 2002).

Firebreaks

Firebreak roads should be wide enough, at least 8 m wide to prevent accidental fires to cross them. Burning should never be attempted without adequate firebreaks. A change in wind direction can be disastrous and the application of a backfire to contain a run-away fire almost impossible to attain. There are basically two types of firebreaks, namely clean cultivated firebreaks and burnt firebreaks (Van Rooyen 2002). Clean cultivated firebreaks are the most effective and comprise the removal of all ground vegetation. This can be accomplished either manually or mechanically. Burnt firebreaks are where a strip of vegetation is burnt around the larger area intended to be burnt. The most common method is to burn a strip of grass with the

aid of fire-fighting equipment. A safer method is to cut two strips with a mower early in the winter. This leaves an uncut strip in the centre, which is then burnt as soon as the grass is dry enough. This method is, however, limited to areas with gentle topography. A similar method is to spray two strips of grassveld with a foliar herbicide during autumn and to burn the strips when the grass becomes dry. The unsprayed portion between the sprayed strips is then burned during winter when the grass is dry and dormant (Van Rooyen 2002).

Management of veld after fire

The interaction of burning and grazing after a fire probably has a greater effect on the vegetation structure and composition and the grass production of the next season than any other aspect of veld burning. After a fire sour veld should not be grazed before the grass sward has re-grown to a height of at least 150 mm. When it is necessary to burn sweet veld, it should not be grazed until the full bloom stage has been reached. With wild herbivores this is problematic because animals such as blue wildebeest, Burchell's zebra, blesbok and impala will all move to the burnt area immediately following the fire. The reason for this is the new growth that has an increased protein and mineral content after a fire. On a wildlife ranch the burnt area should be large enough and be stocked at a conservative stocking rate to minimize the potential harm to the veld. Licks may also be removed from recently burnt areas and watering points closed until the veld has recovered sufficiently (Van Rooyen 2002). The area that was accidentally burnt last year is recovering very well (Figure 19), most of the animals on Highlands Wilderness are grazing on the area, this confirms the studies done by Trollope and Booysen (1996) that postburn plants are often preferred by plants. Animals grazing on burned areas have been found to gain weight more rapidly than those on unburned areas. The burnt areas tend to have higher animal densities (Tainton and Booysen 1996).

Recommendations for Highlands Wilderness

On Highlands Wilderness 5 burning blocks (Figure 22) and with burning sequence (Table 16) are proposed. It is proposed that about one third of the ranch be burned each year but burned areas should not be adjacent to each other at least be provided with adequate firebreaks. The total burned area should also be large enough to prevent overgrazing of the burned patches. It is important that the necessary infrastructure, equipment and labour be available to handle fire. The houses on Highlands Wilderness need to be protected from veld fires especially during dry season when most of the grass relatively dry by making fire breaks around them. The firebreak need be wide enough to contain the flames during the application of the backfire. When the head fire is applied, its flames are blown away from the firebreak into the areas to be burned. It is proposed that a firebreak of 4 to 8 m wide be maintain around the property boundary. However, a graded road as firebreak is not possible in all areas. It is recommended that the current firebreak roads be graded and most vegetation is removed. Where areas cannot be graded, it is recommended that burning methods be used to create an effective firebreak.



Highlands WILDERNESS

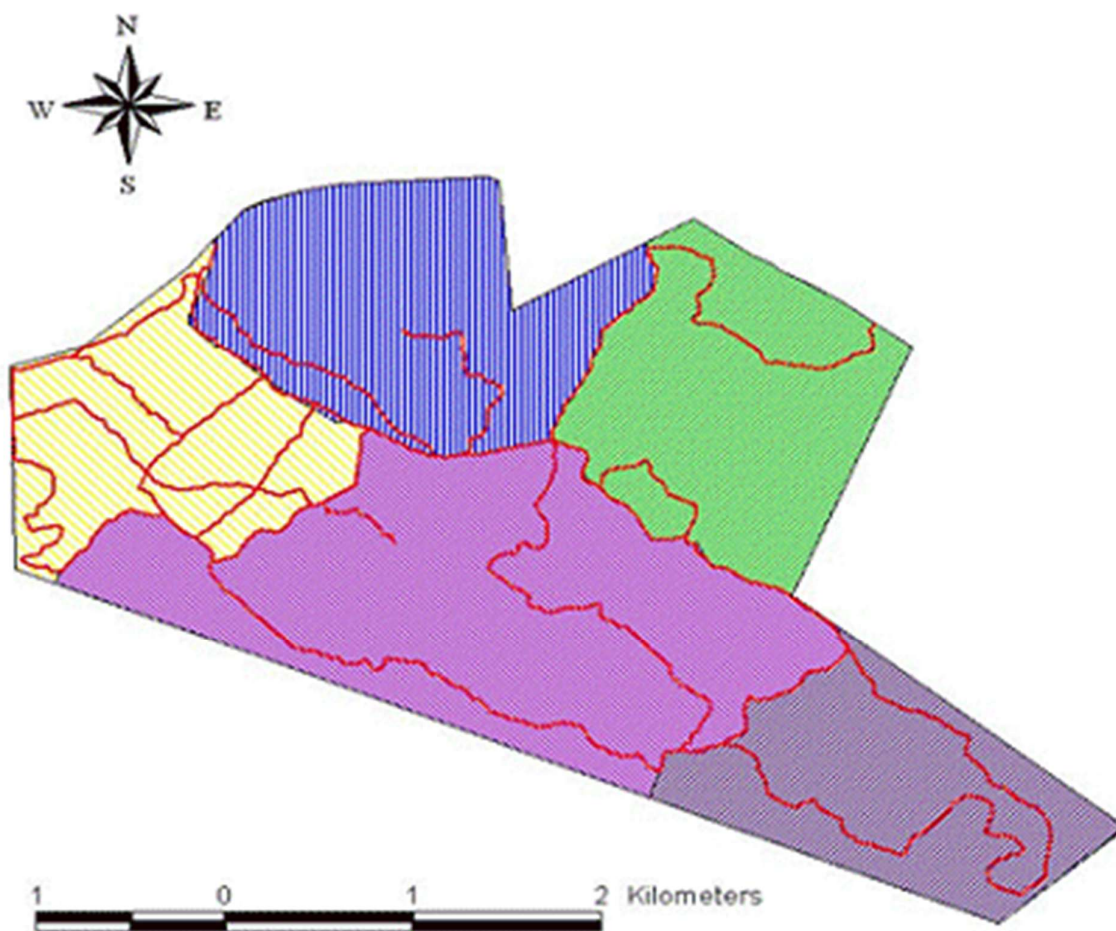


Table 16: Recommended burning blocks sequence on Highlands Wilderness

Burning blocks	Years
1	2007
2	2008
3	2009
4	2010
5	2011



All trees must be removed from this area and be maintained and accepted as sacrificial in protecting the property from the devastating effects of a runaway fire. The current road infrastructure can be used as internal firebreaks if most of the vegetation is removed or the grass stratum kept very short. On Highlands Wilderness the network of wide, cleared roads would serve as ideal firebreaks, the roads along the fence line on other parts of the ranch are not cleared, for instance on the mountains, this will cause accidental fires to escape and cause damage on the neighbouring properties. An accurate weather forecast (especially wind direction) is recommended before prescribed burn. The type of fire, which is therefore required, is a low intensity fire. A low intensity fire is achieved by burning when the following environmental conditions are present in the area to burn: the air temperature should be below 20 °C, the relative humidity above 50 percent and the soil moist. This means that burning must preferably take place during the morning before 11h00. The fuel load must also be at least 2000 kg/ha but not more than 4000 kg/ha for the fire to be carried but still safe. Fuel loads for each management unit must be determined annually before implementing a burn. Wind speed should not be more than 20 km/h. All areas that are burned should be recorded annually on a map of the ranch, together with a note of the date and the reasons why the fire occurred.
