Ezemvelo KZN Wildlife

Guidelines for the *in situ* Management of Ecosystems in KwaZulu-Natal, according to Biodiversity Conservation Principles

KZN BIODIVERSITY STEWARDSHIP
a programme championed by Ezemvelo KZN Wildlife

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NOTE: The section below has been extracted from the above-mentioned document:

8.4.2 Burning

The positive and negative effects of burning wetlands

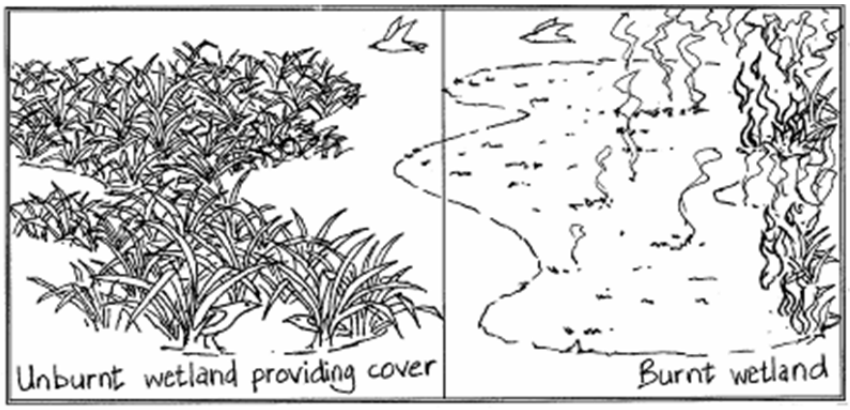
- Burning of herbaceous wetlands using a correct burning plan has several potential positive effects, including: assisting in alien plant control; increasing plant productivity by removing old dead material; improving the habitat value for wetland dependent species and improving grazing value. However, burning incorrectly may have several negative effects.
- The young of wetland-dependent species are particularly vulnerable to the direct effects of heat and asphyxiation.
- Most species are summer breeders and are therefore little affected by winter/early spring burns.
- Some species, notably the wattled crane, are, however, winter breeders. In South Africa, fire is one of the most important causes of wattled crane egg failure and chick mortality.
- Fire may also negatively affect autumn/early winter breeding species such as the grass owl. Furthermore, fire may contribute to increased levels of erosion, especially where it occurs every year and attracts high concentrations of grazing animals. Thus, it is important that the guidelines in the following section are followed.
- Many wetlands in afforested areas are burnt annually in early winter because of the fire risk that wetlands pose to the trees.
- Early winter burns generally have greater impacts on the hydrological and ecological benefits of wetlands than late winter/early spring burns. Absence of loose surface and standing plant litter (removed by the early winter fire) for the entire winter is likely to result in a significant increase in the evaporative loss of water from wetlands and reduces the cover for wetland-dependent fauna.
- Late summer/winter breeding species, notably the threatened grass owl, the African marsh harrier and the marsh owl may be severely affected by early winter fires. An absence of cover during the winter is also likely to be to the disadvantage of other wetland dependent fauna. The high frequency of burning (i.e. annual) further adds to the impact, particularly when it occurs extensively, leaving little un-burnt areas remaining as cover for wetland dependent fauna.
- Fire may play a very important role in maintaining the diversity of wetlands, particularly in areas supporting a mix of forested and herbaceous wetlands, such as on the coastal areas of KwaZulu-Natal, which comprises a mosaic of coastal grassland (the herbaceous component) and forest patches (the woody component).
- Wetlands occur as both herbaceous and woody types within this mosaic. Fire plays a critical role in maintaining the herbaceous component of these ecosystems. Where fire is excluded, the herbaceous areas will tend to be transformed through succession into forest. This will result in a loss of herbaceous habitat and the many different species these areas support, including critically endangered species such as *Kniphofia leucocephala*. Ultimately, the overall diversity of the landscape would be considerably reduced.
- The impact of each individual fire will, of course, depend in part on the type of wetland and its state at the time of the burn. Especially important are wetlands with peat soils,

particularly when the wetness of these areas has been diminished (e.g. through afforestation of the wetland's catchment). Under these conditions, the wetland becomes very susceptible to sub-surface fires, and the destruction of the peat. An attempt is made to account for these conditions in the recommendations given below.

Planning burns

1. The burning of the wetland needs to be integrated into the burning plan for the overall property.
2. Identify areas requiring special treatment, including:
    a. Peat wetlands requiring particular caution to prevent ground fires, especially in years with low rainfall
    b. Areas (e.g. swamp forest) which require total protection from fire.
    c. Areas identified for biodiversity conservation purposes to be maintained as herbaceous, but which are being actively invaded by woody plants, and which need to be frequently burnt to control this invasion.
3. With the exception of special treatment areas, as a general rule, for high rainfall regions (>900 mm p. a.) an area of wetland should be burnt every 2 to 3 years, while for low rainfall regions it should be every 4 to 5 years. However, always consider the specific circumstances at the site. For example, if the wetland is actively grazed by livestock then standing litter will accumulate less readily than an un-grazed wetland, perhaps requiring less frequent burning.
4. Burning should be undertaken on a rotational basis. If possible, divide the wetland into two burning blocks and alternately burn each half, leaving the other half unburnt to provide refuges for wetland-dependent animals from which they can recolonise the burnt area/s (Figure 8.3). If this is impractical, the entire wetland may be burnt every second year (in the case of a high rainfall area) provided there are other wetlands nearby (preferably within 1 km) left unburnt for the year in which the wetland is burnt. Effective fire breaks are often difficult to achieve in wetlands, as fires may easily burn across the break through the loose surface litter, or even below it in the upper organic matter-rich soil layers if they are dry.

Figure 8.3: An un-burnt area of wetland is situated close to an area of burnt wetland, allowing secretive birds such as flufftails to easily move across for the cover that they require.



1. Note the location of any breeding areas of late summer/autumn and winter breeding birds, which have special requirement (see Boxes 4 and 5)
2. Identify wetlands falling within firebreaks that need to be burnt annually for fire protection purposes (this occurs widely in tree plantation areas) and re-examine the designation of these areas to see if some of these could be re-classified as biennially burnt portions without compromising the fire protection of the plantations. Annual burning is only acceptable where absolutely necessary. This is considered critically important for those peatland systems in a plantation forestry setting, due to the desiccation of substrate allowing the fire to burn the organic matter in the soil. If the wetland's catchment is dominated by trees, especially mature stands of trees, the risk of desiccation and burning of peatland areas is increased significantly. Wide wetland areas and wetland areas adjacent to grassland can potentially be burnt biennially using strip burning (see Kotze, 2004 for more detail on strip burning).

When planning the burning system and setting management objectives it is important to have a broad landscape view. In the case of properties with plantation forests, think in terms of optimizing the total area of wetland rotationally rested from fire within the property. It is difficult to prescribe acceptable levels, as these will be strongly affected by the extent to which a particular estate has been planted to trees and the risks of arson and runaway fires, which serve to restrict the extent to which open areas can be left un-burnt in a particular year.

Remember that the situation both within the estate and in neighbouring lands is dynamic. For example, the hazard from arson fires may change over time. Therefore the fire plan is likely to require a periodic review.

Implementing burns

The following generally applicable recommendations are made, aimed at reducing the extent, intensity and damage caused by fire.

- Aim to promote a cool and patchy burn by burning when the relative humidity is high and the air temperature is low, preferably after rain. Such fires, result in more vegetation cover remaining for wildlife. However, if the purpose is to control invading woody plants, then an intense burn would be required.
- Head fires (burning with the wind) are generally preferable to back fires (burning against the wind) in the case of both cool burns and hotter burns to control woody plants. Temperatures at ground level tend to be higher in back fires and consequently the impact on the growing points of plants is greater. Although the fire front advances less rapidly in a back fire, direction is more difficult to predict. Also, because the fire front advances more rapidly with head than with back fires, particularly if the wind speed is high, the fire has less time to spread laterally. Thus, head fires can be used more effectively for burning only portions of the wetland without the use of fire breaks. However, this method of burning portions of a wetland is dependent on many factors outside the manager's control, such as wind direction changes, and cannot be relied upon for consistent block burning.
- If conditions are unfavourable for burning (e.g. if the soil is very dry and susceptible to sub-surface fires, which is particularly important for peatland areas) delay burning until the following year.
- Give preference to burning areas with abundant dead (moribund) stem and leaf material that is obviously limiting new growth.
- Protect areas known to be important bird breeding areas (e.g. reed marsh areas used by herons or sedge marsh areas used by ducks) but even these may need to be burnt every fourth or fifth year to stimulate new plant growth.

Box 4: Burning recommendations to account for the grass owl (*Tyto capensis*), marsh owl (*Asio capensis*) and African marsh harrier (*Circus ranivorus*)

In areas in which these species breed, burn rotationally through block burning and check before burning by having 'beaters' 10 m apart walking through the area and then closely examining all localities where these birds are flushed (Johnson, *Pers comm*., 1999. KwaZulu-Natal Nature Conservation Services). Leave areas unburnt where chicks have still not fledged, or, if possible, delay burning for that year.

Box 5: Burning recommendations to account for the wattled crane (Bugeranus carunculatus)

The wattled crane is a winter to early spring breeder. Thus, if this species is breeding in the wetland then:

- Consider delaying burning until the chick can fly and therefore escape the fire

- If burning cannot be delayed then the following measures could be carried out under the supervision of a representative of the Southern African Crane Working Group
  - If a nest with eggs is present temporarily remove the eggs and place in a small incubator (an insulated box warmed with hot water bottles can be used but do not place the eggs directly on the hot water bottles).
  - If burning cannot be delayed long enough, then attempt to catch the chick, perform a patchy burn and then release the chick after the burn. Alternatively, if the chick cannot be caught (which will probably be the case, observe where the chick is at the time of the burn and burn strategically, sometimes having to burn a break around where the chick is hiding.

- In all cases it is vitally important that a patchy burn is performed so as to leave sufficiently tall vegetation areas for the chick to hide from predators.

For information about cranes and burning, contact the Southern African Crane Working Group (Tel: +27 (0) 11 486 1102; Email: crane@ewt.org.za).