



Part 2

WETLAND BURNING AND GRAZING

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Introduction

A. BURNING OF WETLANDS

Controlled burning of wetlands plays an important role in modifying the wildlife habitat zones enhancing the stock grazing potential preventing unwanted fires and assisting in controlling invasive plants.

Some fresh water wetlands, in particular those from the winter rainfall regions or very low rainfall areas may be left unburnt for long periods (or not burnt at all) providing they are safe from unplanned fire and that their unburnt condition does not impair any required wetland functions.

When planning the burning of wetlands the critical issues are determining the desired frequency of burning and the correct wetland and climatic conditions under which to burn.

First there is a need to understand why the particular wetland is burnt - see "Which wetlands to burn and graze" and "Wetland Burning Decision Key and Guidelines".



B. GRAZING OF WETLANDS

In suitable wetlands the grazing and trampling of wetland plants (by cattle in particular) is a particularly important disturbance factor that encourages biological diversity. The critical issues are which wetlands to graze and when and for how long to allow stock grazing to continue before resting the area.

Ideally a percentage of any given wetland should be excluded from stock grazing each year to allow for habitat recovery free from disturbance. However it is not always practical to control stock within wetlands and so the entire wetland should then be rested periodically.

The purpose of this grazing guide is to recommend conservative domestic stock grazing practices which hopefully simulate previous wildlife grazing regimes as closely as possible whilst not negatively impacting

other wetland functions to any significant degree: see "Which wetlands to burn and graze" and then "Wetland grazing guidelines".



Which wetlands to burn and graze

The wetland settings "on site" need not be in the sequence as illustrated. Whilst stream source, estuarine and marine wetlands remain fixed at their respective upper and lower positions of a catchment; basin, plains and streambank wetlands span a wide range of landscape settings within the catchment gradient.

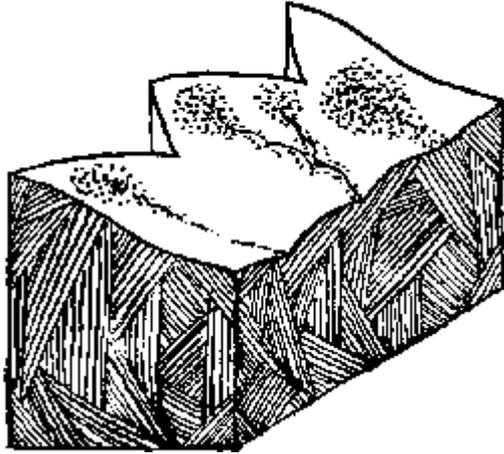
Stream Source

GRAZING RECOMMENDATIONS

Avoid grazing stream source wetlands on steep slope settings as they are prone to erosion from trampling and over-grazing. Domestic stock are naturally attracted to these "green and wet" oases in dry landscapes and it is sometimes necessary to fence off or herd animals away from these sites.

BURNING RECOMMENDATIONS

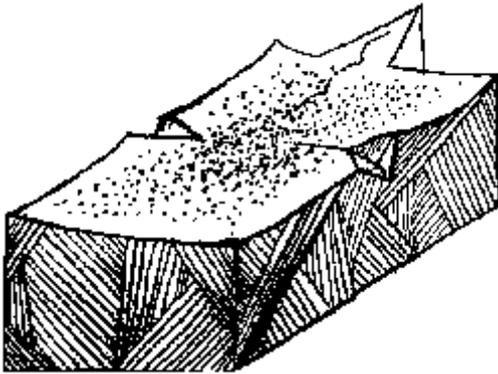
Stream source wetlands with an herbaceous cover are often subjected to local veld or firebreak burning because of their position in



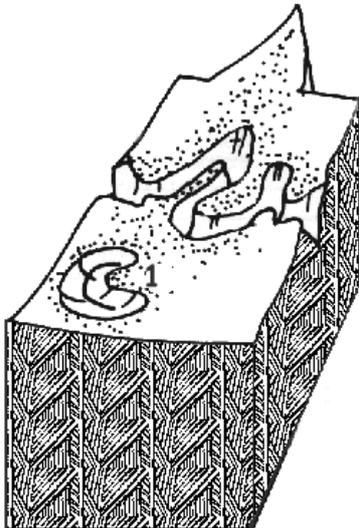
Setting

the landscape. They are prone to sub-surface fires as their small size, steep gradients, and shallow soils allow them to drain and dry out frequently. Extreme care needs to be taken in selecting correct burning conditions as the recovery of the post burn vegetation at these sites appears to be very slow, particularly when patches of soil have burnt down to bedrock; see "Wetland burning decision key and guidelines".

Plains Setting (Unchanneled)



Plains Setting (Channeled)



GRAZING RECOMMENDATIONS

Plains wetlands with an herbaceous cover can offer good stock grazing potential - but the suitable grazing capacities of the various vegetative cover types in their respective bioclimatic regions need to be determined; see "Wetland grazing guidelines". Whilst these settings have gentle gradients with corresponding lower potential for erosion than wetlands on steeper settings, domestic stock should be excluded from very wet areas, channels, drains and head cuts (or potential head cut areas such as flow concentration zones) within the wetland site via fencing or stock herding. Protect swamp forest ecotones (forest edge) from stock trampling damage.

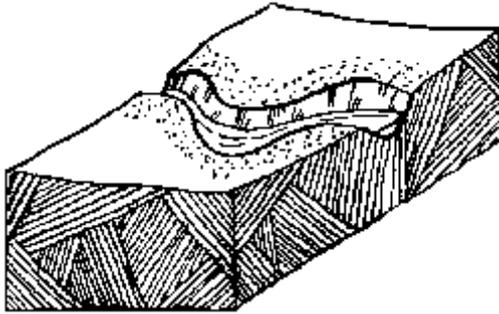
BURNING RECOMMENDATIONS

Plains wetlands have gentle gradients and tend to be relatively large in size with correspondingly higher potential for hydrological functions such as water storage, flood attenuation and water cleansing. Burning methods on plains wetlands with an herbaceous cover should allow for rapid plant regrowth so as to enhance the functions whilst inhibiting evaporative loss and retaining unburned wildlife refuge patches; see "Wetland burning decision key and guidelines". Protect woody (swamp forest) wetlands from fire damage by back burning from the forest edge- even against the wind - to meet the advancing fire so as to reduce the heat intensity and disturbance to the ecotone.

Streambank Setting

GRAZING RECOMMENDATIONS

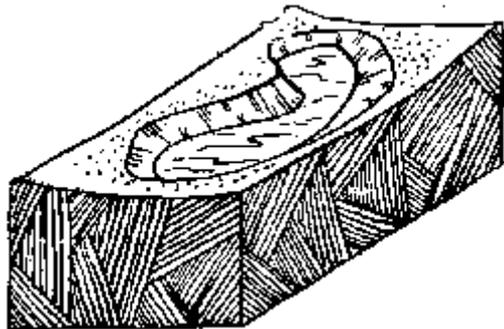
Streambanks and stream channels should be protected from stock grazing and trampling damage. Where necessary supply alternative stock watering points and restrict stock to hardened or protected stream crossings (see Wetland Fix part 3).



BURNING RECOMMENDATIONS

Burning the herbaceous cover on streambanks can assist in maintaining plant vigour thus enhancing their ability of combating scour and improving bank stability (see "Wetland burning decision key and guidelines"). Streambanks with, or progressing towards a woody cover need to be protected from fire. Use a burnt firebreak or where management roads are required locate them as fire cut-off roads to separate the riparian zone from the surrounding croplands or veld.

Basin Setting



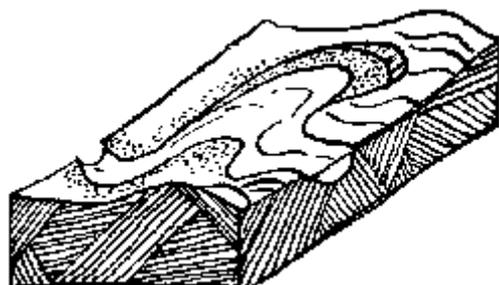
GRAZING RECOMMENDATIONS

Historically many natural basin wetlands were utilised and possibly even formed by large animals. As such, stock grazing is acceptable providing suitable grazing capacities of the various vegetative cover types in their respective bio-climatic regions are determined (see "Wetland grazing guidelines"). Stock should be excluded from erodable banks, slopes and dam walls via fencing or herding.

BURNING RECOMMENDATIONS

Apply cool patch burns on the fringes of basin wetlands that have an herbaceous cover so as to maintain refuge areas for wildlife (see "Wetland burning decision key and guidelines"). Protect basin wetlands with surrounding woody vegetation from fire.

Estuarine Setting



GRAZING RECOMMENDATIONS

Grassland areas of estuarine floodplains may be utilised for stock grazing provided suitable grazing capacities within the various bio-climatic regions are determined (see "Wetland grazing guidelines"). Stock grazing should be excluded from banks or channels via fencing or herding.

BURNING RECOMMENDATIONS

Estuarine vegetation is usually required to withstand the rigours of periodic tidal inundations and occasional extreme flooding impacts from up-river and as such should generally be left intact and protected from fire. In situations where manipulation or improvement of plant vigour by use of fire is proposed, consult the local regional conservation agency.

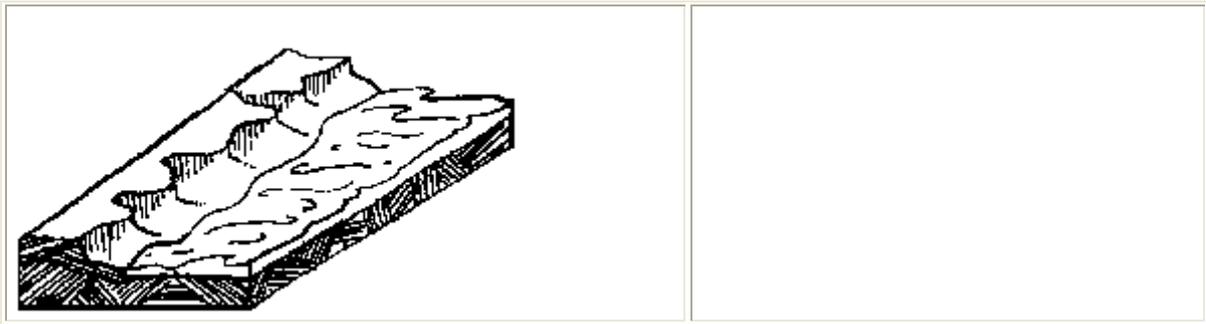
Marine Setting

GRAZING RECOMMENDATIONS

Stock grazing is not applicable.

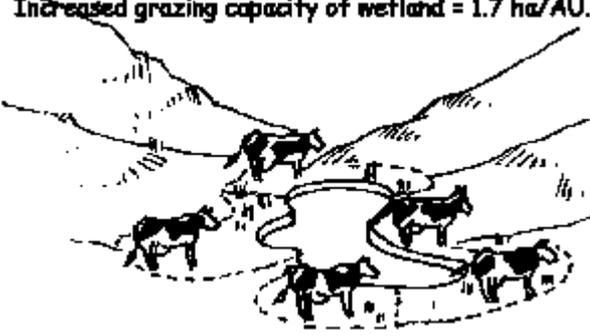
BURNING RECOMMENDATIONS

Burning is not applicable.



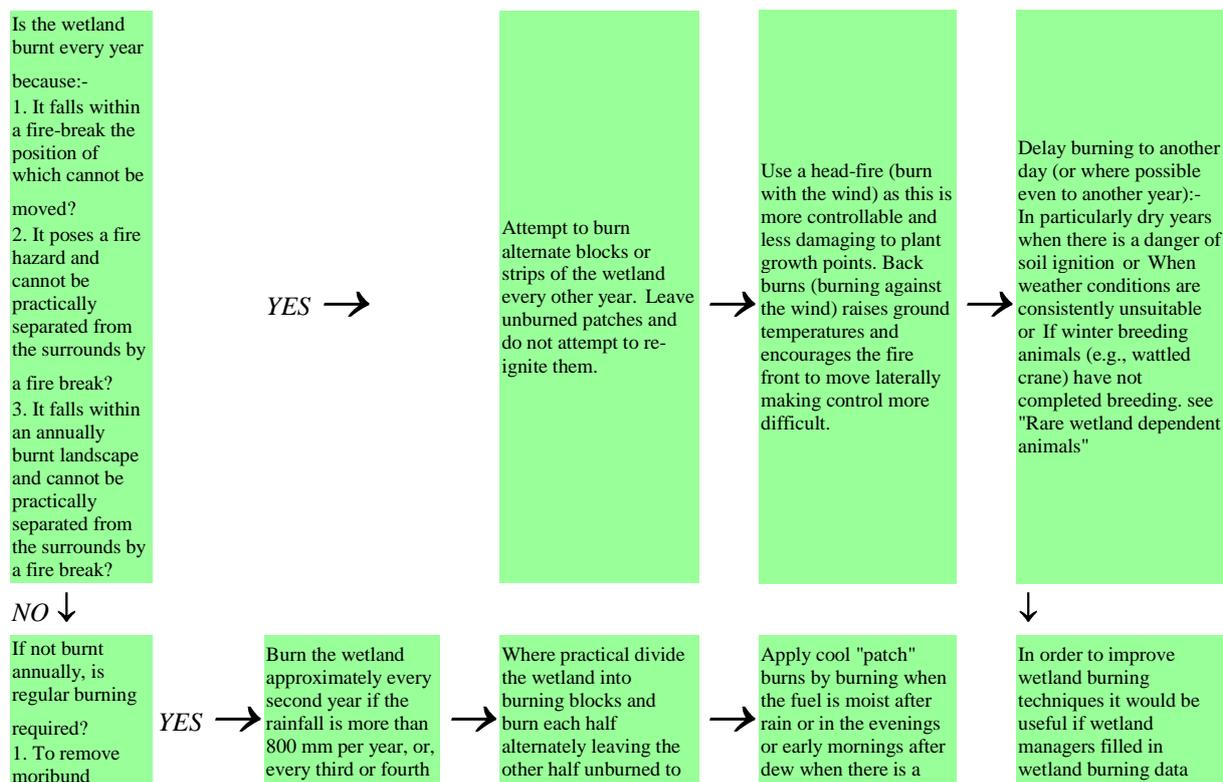
Wetland grazing guidelines

1	<p>Area of wet grassland / meadow zone within the wetland =ha</p> <p>The wetland's stocking rate is based on its proportion of wet grassland and wet meadow within the system. Stock often select these zones against marsh zones which are excluded from the wetlands overall grazing capacity calculation.</p> <p><i>Example:</i> Calculate the area of the wet grassland / meadow zone within the wetland Area of wet grassland/meadow = 50 ha.</p>	<p style="text-align: center;">Area of wet grassland meadow = 50 ha.</p>
2	<p>Grazing capacity of bio-climatic region (.....) = ha/A</p> <p>The grazing capacities of the various bio-climatic regions of Kwa-Zulu Natal have been determined and this data or the equivalent for the other regions of South Africa is available from the regional agricultural extension offices.</p> <p><i>Example:</i> Determine the grazing capacity for say bio-climatic region (8): i.e., how many hectares of grazing are required for one animal unit Grazing capacity for bio-climatic region (8) = 2,5 ha/AU.</p>	<p style="text-align: center;">Bio-climatic region (8) = 2.5 ha/AU.</p>

<p>3</p>	<p>Increased grazing capacity of the wet grassland/meadow within bio- climatic region (....) = ha/AU. ÷ 1.5 = ha/AU</p> <p>The grazing capacity of wet grassland /meadow zones of wetlands are conservatively estimated to be 1.5 times higher on average than that of the surrounding veld. (Kotze 1993)</p> <p><i>Example:</i> Calculate the increased grazing capacity of the wetlands wet grassland / meadow zone within bio-climatic region (8)</p> <p>Increased grazing capacity of wet grassland / meadow = $2.5 \div 1.5 = 1.7$ ha/AU.</p>	<p>Increased grazing capacity of wetland = 1.7 ha/AU.</p> 
<p>4</p>	<p>Adjusted grazing capacity of the wetland from the assessment of veld condition = ha/AU. ÷ 1.00 (good veld condition) or ÷ 0.85 (fair veld condition)or ÷ 0,70 (poor veld condition) = ha/AU.Therefore: Stocking rate of the wetland</p> <p>= (Area of wet grassland / meadow ha. (from 1)) ÷ (Adjusted G. cap of wetland. ha/AU. (from 4))</p> <p>= ha / ha/AU.</p> <p>= Animal units</p> <p>The grazing capacity of the wetland should be further altered to suit the prevailing condition of the wet grassland /meadow zone.</p> <p>Request a veld condition assessment from the local Agricultural extension office and adjust the grazing capacity as follows:</p> <p>Good wetland condition: grazing capacity ÷ 1.00</p> <p>Fair wetland condition: grazing capacity ÷ 0.85</p> <p>Poor wetland condition: grazing capacity ÷ 0.70</p> <p><i>Example:</i> Assuming a fair veld condition</p> <p>Adjusted grazing capacity of wetland = $1.7 \div 0.85 = 2.00$ ha/AU</p> <p>Therefore : Stocking rate of wetland =</p>	<p>Adjusted grazing capacity of wetland from veld assessment = 2.00 ha/AU.</p> 

	<p>50 ha ÷ 2.00 ha/AU = 25 AU. Adjusted grazing capacity of wetland from veld assessment = 2.00 ha/A</p>	
<p>5</p>	<ul style="list-style-type: none"> Where regular monitoring of grazing is possible:- apply a flexible rotational system where the grass sward is allowed to be grazed down to a threshold level of 8 cm and/or when the most favourable plants have been grazed down to 4 cm high. Where regular monitoring of grazing is not possible :- apply a fixed rotational grazing system of 14 days in, and 28 days out of the wetland. <p>Grazed the entire wetland and allow a full 12 month rest period every 4 years.* Grazed 3/4 of the wetland - excluding 1/4 from stock on an annual rotational basis.* All grazing must be discontinued when signs of overgrazing are evident - until conditions have improved. All grazing must be discontinued when soils are waterlogged - until conditions have improved. * A patchy burn which leaves approximately 1/4 of the vegetation unburned encourages stock to graze on the remaining post burnt areas.</p>	

Wetland burning decision key and guidelines



vegetation thus promoting the wetlands plant vigour?
 2. To control alien or woody plant invasion?
 3. To enhance the wetlands grazing potential?
 4. To enhance the wetlands wildlife habitat?
 5. To prevent untimely fires?
 6. Simply because the wetland occurs in a regularly burnt landscape?

year if the rainfall is less than 800 mm per year.

provide wildlife refuges. *or* Where this is not practical, attempt to rotate burning with other wetlands in close proximity.

high relative humidity and low air temperature *and* Burn at the onset of the growing season so as to ensure rapid plant regrowth.

forms(see pg. 10) for extension staff to study and learn from.

NO ↓

Should the wetland not fit any of the above categories can it still be beneficially and safely burnt?

YES →

Burn infrequently at approximately five year intervals, or, in Cape Fynbos regions, burn at up to 30 year intervals.

→ | | | |

NO ↓

The wetland can remain unburned because:-
 1. It is usually permanently wet
 2. It is dangerous to burn
 3. It is sensitive to fire damage
 4. It occurs in a very dry region
 5. It is being encouraged towards a woody plant cover

YES →

Do not burn the wetland at all.

→

Prevent crop or timber encroachment onto the wetland. Control alien plant invasion Allow controlled harvesting of wetland plant materials

Rare wetland dependent animals

The following is a selection of rare or threatened wetland dependent animals that require consideration when burning or grazing wetlands. This list does not preclude other animals (or plants) from due consideration, but rather attempts to highlight those animals that are already classified as rare or threatened due to wetland habitat

loss or unsuitable wetland management practices.

Late winter / early spring burning in the summer rainfall region is least likely to impact on breeding animals as the majority of winter breeders have completed breeding and the summer breeders have yet to begin. Burning after rain ensures a patchy / partial burn with rapid plant regrowth. It should be noted that the recovery rate of animals re-colonising burnt areas may be strongly dependant on the existence of these unburned refuges.

AMPHIBIANS - Frogs are vulnerable to hot or slow fires such as back-burns which burn against the wind thus raising ground temperatures. Burning practices must consider adults and tadpoles and their prey.

<p>Micro frog <i>Microbatrachella capensis</i></p>		<p>The micro-frog is endemic to the Western Cape and lives in vleis and shallow pans in the fynbos and dune veld on the Cape flats. It appears that the frogs habitat requirements are highly specialised</p>
<p>Cape caco <i>Cacosternum capense</i></p>		<p>The Cape caco is described as occurring from the Cape flats to Malmesbury, living in inundated grasslands and depressions amongst dunes and in the Fynbos - also in Renosterveld on cultivated lands on poorly drained clays and loams. The Cape caco emerges from underground in winter to breed in shallow pools.</p>
<p>Cape chirping frog <i>Art roleptella lightfooti</i></p>		<p>The Cape chirping frog is restricted to the South Western Cape and occurs in wet mossy areas alongside streams, in kloofs and on hillside seepages where it can be vulnerable to burning.</p>
<p>Poyntens rough skinned frog <i>Poyntonia paludicola</i></p>		<p>A recently described species found in mountain or hillside seeps from Jonkershoek to Betty's Bay. Little is known about this frog and as such it should be regarded as vulnerable to interference until proved otherwise.</p>
<p>Arum lily frog <i>Hyperolius horstocki</i></p>		<p>The arum lily frog occurs in the Southern and Western Cape. Males call from elevated positions on reeds, sedges and shrubs near pools, pans and vleis. A favourite haunt is within the arum lily flower where the frog becomes white in colour.</p>

<p>Long toed tree frog <i>Leptopelis xenodactylus</i></p>		<p>The long-toed tree frog is endemic to Natal and lives in grassy wetlands and marshes. It is a burrower that only emerges in the rainy season apparently to breed. It appears that eggs are laid in shallow water and froglets stay in the grass for a while before dispersing. Drainage of wetlands & commercial afforestation are further threats.</p>
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MAMMALS- It seems that provided small mammals have adequate unburnt refuges from which they may re-colonise burnt areas, the frequent (every second to third year) burning of wetlands is unlikely to have a long term detrimental effect on small mammal populations in the summer rainfall region.

<p>Water rat <i>Dasymus incomtus</i></p>		<p>The water rat inhabits reedbeds and wet grasslands and is listed as rare in the former Red Data Book. Little is known about the water rat and it appears that they occur in small numbers and are apparently losing their hold in Southern Africa due to some extent to the draining and desiccation of wetlands.</p>
<p>Serval cat <i>Felis serval</i></p>		<p>Servals are rare cats and whilst they range over large areas of up to 30 square km's they tend to concentrate their activity to wetland areas where their preferred prey, the vlei rat are most abundant. Thus, destruction and poor management of wetlands negatively affects serval.</p>

BIRDS- Protect sites that are known to be important breeding areas by rotational burning, delaying burning if chicks are still unable to fly or even temporarily removing eggs from the nest. Where possible apply cool patchy burns so as to allow for bird refuge sites.

<p>Wattled crane <i>Grus carunculata</i></p>		<p>Wattled cranes are often winter or early spring breeders and spring burns of sedge marsh wetlands may threaten chicks or eggs. These can be saved by being more flexible with regard to the timing of the burn, or protecting the breeding site from fire, or to temporarily remove the eggs or the chick.</p>
<p>Grass owl <i>Tyto capensis</i></p>		<p>The grass owl is a late summer to early winter breeder in long grass close to water. It is therefore threatened by early winter burns (carried out due to local fire risk) and by stock at or in close proximity to the nest. Attempt to locate and then to protect nesting sites from fire and stock.</p>

White-winged flufftail
Sarothrura ayresi



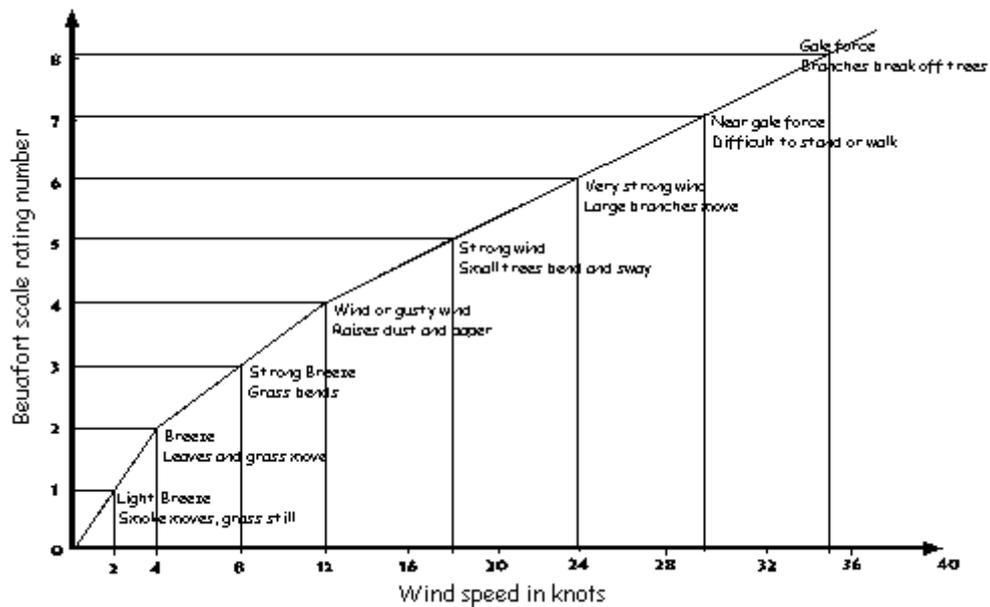
The white-winged flufftail is considered to be one of Africa's rarest and most threatened birds. It inhabits reed/sedge marsh, but very little is known about the bird due to its rare status and the difficulty in observing it. If it does breed in S.A., it possibly does so in summer and should be relatively safe under a regime of cool patch burns at 2 to 3 ear intervals in earl spring.

Wetland burning form

Wetland name:	_____	Date of Burn:	_____
Wetland Area:	_____	Block Number:_____	Date of Last Burn: _____
Cause of Fire:	Fire Break •	Schedule •	Runaway •
	Head Burn •	Back Burn •	Intense Burn •
Wind Speed:	(Beaufort wind scale) _____	Lightning •	Arson •
Temperature:	_____	Low Intensity •	Patchy Burn •
Conditions:	Wet / Damp •	Relative Humidity % _____	very Patchy •
Vegetation:	Green •	Moderate •	Dry •
Sensitive Features		Slightly green •	Dry •
		<u>Plants</u>	<u>Amphibians</u>
			<u>Birds</u>
			<u>Mammals</u>
			<u>Other</u>

Precautions take:

Results of fire:



Glossary of terms

- Alien)** Plants or animals introduced from one locality to another, where they had not occurred before.
- Animal unit** An animal unit is defined as an animal with a mass of 450 kg.
- Biological diversity** The number of species (plant or animal) and the number of individuals of these species.
- Bio-climatic (group)** Phillips (1977) classified the extremely varied natural resources of Natal into 11 bio-climatic regions based primarily on climatic parameters. These groups provide convenient natural resource classes in terms of which management guidelines can be formulated.
- Channel** The bed in which a stream of water runs.
- Desiccation** The drying out of a wetland.
- Endemic** Confined or belonging to a given area or region, e.g., an island or country; not introduced or naturalised.
- Functions (of wetland)** Wetland functions refer to the many physical, chemical and biological processes that take place in wetlands.
- Habitat** The place or environment in which specific organisms live.
- Herbaceous** Herbaceous plants are those seed plants that do not develop permanent woody tissue and die down at the end of the growing season.
- Hydrology** The study of water, particularly the factors affecting its movement on land.
- Rare** Red data species; all those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.
- Riparian** Occurring on the banks of streams and rivers.
- Stocking** The number of animal units (AUs) per unit of land for a specified period of time; it may be

rate expressed in terms of number of land units per AU.

**Woody
(cover)** Covered with shrubs or trees.

Further reading

Agricultural land use impacts on wetland functional values: Kotze,D.C., and Breen,C.M., 1994. WRC Report No 501/3/94, Water Research Commission, Pretoria.

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