



Photograph credit Rick Davies

# Buffel Grass

## Management Guide for Central Australia

**This guide provides advice on how to manage buffel grass as strategically, cost effectively and efficiently as possible, in pastoral and non-pastoral situations.**

### Background

Buffel grass (*Cenchrus ciliaris*) is a deep rooted, perennial grass native to Africa, through to the Middle East and India. At least 30 cultivars were trialled in Central Australia in the 1960s and eight or more had been introduced on pastoral properties by the 1970s. Cultivars vary in size, appearance, seasonal response and palatability to livestock, and are hard to distinguish. Key identifying features can include:

- dense tussocks to 1 m high;
- leaves to 30 cm long and to 1.3 cm wide;
- bluish-green leaves which are hairy, flat or folded and with pointed tips;
- a ring of short hairs at the base of leaf blades;
- seeds enclosed in a cluster of bristles, which gives them a 'fluffy' appearance;
- seed heads in a dense, hairy, cylindrical spike up to 15 cm long and 2 cm wide;
- seed heads with a purple appearance which fades to white as they age; and
- a 'zig-zag' shaped, rough textured axis which becomes visible once the seeds drop.

### Habitat and distribution

Buffel grass is well adapted to drought and can grow in a diverse range of soil types, with sandy fertile soils being preferred by dominant varieties in Central Australia. The grass generally favours drainage areas and alluvial flats, as these areas are higher in moisture and nutrients, but it has also established on plains, rocky terrain and hill slopes. Hybridisation amongst cultivars is believed to have enabled further adaptation allowing cultivars to spread well beyond areas where they were originally planted and into environments once thought unsuited to their survival.

Often transport and infrastructure corridors, and other areas of disturbance are opportunistically colonised because wind, water, animals and vehicle movement aid seed dispersal. Initial establishment also occurs under trees, where wind-blown seed falls through the canopy onto shaded and moist soils where nutrients are favourable. Continued rainfall will enable buffel grass to gradually spread from these areas.



Buffel grass has been extensively planted in Central Australia for pasture improvement, soil stabilisation and dust suppression. However, unmanaged buffel grass can reduce native plant diversity and alter vegetation structure by changing fire regimes.

### **Advantages of buffel grass**

Buffel grass is well regarded by many Central Australian cattle producers because of its palatability, ability to produce significant amounts of forage and its tolerance to drought and grazing. However, palatability varies between cultivars and the soil quality they are growing in. Since buffel grass is perennial, it responds rapidly to rain, except in cold and frosty periods. Green buffel grass is relatively nutritious with about 14% crude protein, declining as it matures and cures to about 3%. Good stands of buffel grass can make reasonable quality hay.

The extensive root system of buffel grass enables it to bind soil particles, reducing erosion and suppressing dust. In addition, the tussock base and leaves help to impede overland flow of water and the erosive impact of raindrops. These benefits are evident in both Alice Springs and in surrounding Indigenous communities where there has been widespread buffel grass plantings over many years to reduce erosion and rehabilitate damaged land.

### **Disadvantages of buffel grass**

Buffel grass can create a fire hazard for infrastructure, animals and people. As it dries off between periods of growth, a high volume of dry plant matter can accumulate, which can fuel intense fires. Resilience to fire enables buffel grass to survive and quickly produce new growth after burning, providing fuel for more fires. Many native plant species, including trees, are unable to cope with the increased fire intensity and frequency. As a result the overstorey in woodlands can be severely damaged, leading to reduced topfeed (ie: trees and shrubs).

Buffel grass is particularly threatening to riparian systems and high conservation value aquatic ecosystems. In the absence of fire, buffel grass can inhibit the abundance of native ground layer plants, impacting on biodiversity conservation and potentially on diversity of livestock diets.

Large and dense populations of buffel grass may impede overland flow of water in streambeds, increasing the extent of local flooding.

### **Declaration status**

Buffel grass is not a declared weed under the Weeds Management Act 2001. Current efforts focus on raising awareness of buffel grass, its advantages and disadvantages, encouraging landholders to manage it appropriately and preventing inadvertent spread. Buffel grass is a contentious species because it is prized by many pastoralists but is also recognized as being highly invasive and having significant impacts on biodiversity values in central Australia.



*Woodlands severely damaged by buffel grass fire*

## Step 1 Assess your situation

### Draw a map of your land

Ensure you identify:

- the density and distribution of buffel grass (declared weeds should also be considered);
- the location of buffel free areas;
- natural variations within your land, including slope, waterways and areas subject to flooding;
- any infrastructure, including fence lines, driveways, yards etc; and
- locations where you intend to actively manage buffel grass.

Your map will help to prioritise areas for management, determine a work program and identify a budget.

## Step 2 Develop your plan

The broad goals for managing buffel grass must be clear prior to determining a management program. Examples of goals may include: to maintain and conserve biodiversity; to provide diversity in livestock diet; and/or to reduce fire risk. Once your goals are clear, you can consider the most appropriate objectives, strategies and tools for achieving them.

Most management objectives aim to reduce negative impacts of buffel grass. However, it is acknowledged that pastoral land managers may wish to increase dominance of desirable buffel grass cultivars.

### Determine

**Where:** Priority management areas are.

**What:** Are the most appropriate management method/s for each location.

**When:** The works should be undertaken (likely to be in response to rain).

**Who:** Will conduct the surveys, management and monitoring (self, family, contractor, staff).

Your plan may seek to achieve the following objectives:

#### Spread prevention

- **Hygiene**

Buffel grass seed can be spread by people, animals, vehicles, machinery and equipment. A seed spread prevention program should aim to avoid moving seed into or through areas where it is not wanted, recognising that wind and water are important agents of transfer that are much harder to control.

- **Prevention/minimisation of further seed production**

Seed production can be suppressed using chemical control and slashing and, in some situations, grazing.

- **Buffer zones**

Suppression or removal of existing tussocks and prevention of seedling establishment within buffer zones by chemical, mechanical or physical means may assist in reducing spread into buffel-free areas. Where buffel grass is already dense in a proposed buffer zone, grazing may also be useful.

#### Eradication of isolated plants and outbreaks

Eradication may be feasible for isolated occurrences of buffel grass.

#### Active containment of major occurrences

Major occurrences may be contained through an integrated control program. It may be beneficial to identify and map all buffel grass populations on your target area using a GPS. This information can then be used to monitor outcomes over time.

Limited suppression in a pasture may be achieved through strategically timed grazing.

## Step 3 Implement your plan

### Timing of control

Effective management of buffel grass relies on undertaking management activities at appropriate times during growth and reproductive cycles. Germination, growth and reproduction in Central Australia correlate strongly with highly variable rainfall events which can occur at any time of the year. If sufficient rain falls, germination, growth and reproduction can occur in any month except July when lower temperatures and frost may lead to curing. Recent developments taking advantage of residual herbicides such as flupropanate do not rely on plants being actively growing providing the opportunity to treat buffel grass all year round even while plants are in the dormant stage during extended dry periods which is the norm in Central Australia.

Early intervention is the key if you aim to eradicate buffel grass or limit its extent. Buffel grass is competitive as an established plant, but only weakly competitive as a seedling. The potential for successful management is greater if buffel grass is controlled during the early stages of establishment.

### Control methods

#### Spread prevention

Spread prevention is the most successful and cost effective way of managing unwanted plants. Always prioritise eradication of isolated plants/populations, working back towards major occurrences. Alternatively work outward from buffel-free areas, disturbing soil as little as possible.

Because buffel grass is so well established in Central Australian landscapes, it can be very difficult to avoid spread and establishment, particularly in developed and well trafficked areas. A high level of vigilance will be needed to maintain buffel-free areas.

#### Physical control

Manual and/or mechanical methods can control buffel grass in small, isolated patches, but this can be labour intensive. Slashing or mowing may increase rates of buffel grass growth, but cutting prior to chemical control of regrowth can reduce costs and increase effectiveness.

#### Chemical control

There are several chemical control options currently available for the control of buffel grass. The two key chemical options for control are flupropanate and glyphosate which can be used separately or in conjunction depending on the density and growth stage of plants. Glyphosate is only effective for the control of buffel grass when plants are actively growing to ensure the chemical is readily absorbed through actively growing leaf tissue, the major disadvantage of glyphosate is that it does not control residual seedbanks in the soil. Flupropanate is a slow acting residual herbicide which is absorbed through the plant root system and has the added advantage that it can be applied when plants have hayed off and are not actively growing and provides control of residual seedbanks as well as the parent plants. Trials using flupropanate in Central Australia are ongoing and producing positive results.

#### Fire management\*

Buffel grass is extremely fire tolerant. Controlled burns as soon as possible after curing may reduce potentially dangerous high fuel loads, but this strategy can be risky and should only be undertaken with advice from fire authorities (see previous page\*).

Burning may also be used to get rid of rank growth prior to applying herbicide to regenerating tussocks, but soil moisture must be sufficient to enable regrowth, and wind and temperature should be low. This integrated approach to management will reduce herbicide requirements and provide better kill rates.

Fire is not a recommended tool on its own for reducing or eliminating buffel grass.

\*Any management incorporating burning must be in accordance with the *Fire and Emergency Act* and *Bushfires Act*. Please contact your local fire station for permits to burn if you live within a Northern Territory Fire and Rescue Service Emergency Response Area (NTFRS ERA). If you live outside a NTFRS ERA, contact your local Volunteer Fire Brigade Captain or local area Fire Warden through Bushfires NT on (08) 8952 3066 (Alice Springs).

## Grazing land management

Buffel grass is capable of producing a high yield of palatable forage and it is also relatively stable and resilient to grazing.

The Territory Government recommends that buffel grass be grazed at a utilisation rate of no greater than 20% or at a stocking rate of approximately 3-6 AE\* (Animal Equivalents) per km<sup>2</sup>, but this depends on rainfall, soil type and land condition (NB: \* 1AE = 450 kg steer or dry cow).

Utilisation at this rate will:

- reduce the standing bulk to below 1200 kg/ha, reducing the risk of wildfire;
- prevent the build up of rank material and maintain inter-tussock spacing for native plant establishment; and
- minimise the impact of grazing on the native plants in the pasture.

## Step 4 Monitor and review

Monitoring will help to determine the effectiveness of management methods, enabling improvements to future management. Consider keeping a diary of management strategies adopted and work undertaken.

### Monitor for new outbreaks

Identify regrowth or new seedlings early, so follow up can be undertaken quickly.

You should regularly check:

- areas disturbed by fire, flood, heavy grazing or earth works;
- areas previously supporting buffel grass; and
- areas near existing populations (seed sources).

### Document costs and resources used

Keep a record of which management methods were used and when, and their effectiveness. Implementing inappropriate management actions or the right actions at the wrong time can reduce success and increase cost.

### Establish photo points

Photos taken from the same point, at the same time each year will enable comparisons to be made. Photos will show changes in buffel grass populations and other vegetation, but keep in mind that responses to rainfall (or lack of it) may be more apparent than changes resulting from management.

### Review your plan

Assess whether your plan achieved your requirements. Make amendments or modify as necessary to improve your management activities next year.



## Resources

### **Grazing Land Management – Central Australian Version: Workshop notes**

Meat & Livestock Australia have developed this resource to assist graziers.

(Chilcott, C.R., Rodney, J.P., Kennedy, A.J. & Bastin, G.N. 2005).

### **The following resources can be obtained from the Weed Management Branch:**

#### **NT Weed Management Handbook**

Provides information on herbicide safety, integrated weed control and control techniques.

#### **Weed Planning Guide for Properties**

Provides information on how to develop a weed management map and a property weed plan.

#### **Weed Monitoring Template**

Details how to monitor, evaluate, report and improve on your existing property weed plan over time.

## Weed Management Branch

Phone: 08 8999 4567

Email: [weedinfo@nt.gov.au](mailto:weedinfo@nt.gov.au)

Web: [www.nt.gov.au/weeds](http://www.nt.gov.au/weeds)

## Bushfires NT

Phone: 08 8952 3066

Web: [www.nt.gov.au/bushfires](http://www.nt.gov.au/bushfires)

## Livestock Industries Development

Department of Primary Industries and Resources

Phone: 08 8951 8111

Web: [www.nt.gov.au/dpir](http://www.nt.gov.au/dpir)

*Buffel grass is well regarded by many Central Australian cattle producers*

