Kimberley Grasslands Field Curing Guide

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KIMBERLEY REGIONAL
FIRE MANAGEMENT PROJECT

FIRE AND EMERGENCY SERVICES
AUTHORITY (FESA)

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KIMBERLEY REGIONAL
FIRE MANAGEMENT
PROJECT

FESA

Department of Agriculture

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Introduction

The Kimberley Grassland Field Curing Guide has been prepared to assist land managers and fire authorities in the Kimberley region of Western Australia to more accurately estimate and communicate fuel characteristics, which is important for practical decision-making in strategic fire management and wildfire control.

This fuel guide has been produced as part of the Kimberley Regional Fire Management Project, funded by the Natural Heritage Trust. This is a community directed project, tasked with demonstrating and communicating innovative approaches to fire management in the Kimberley. A management committee that represents all the main land user groups within the region oversees the project.

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REFERENCES

Johnson, A. (2002), North Australia Grassland Fuel Guide, Tropical Savannas CRC.

Cheney, P. & Sullivan, A. (1997), Grassfires: fuel, weather and fire behaviour, CSIRO Publishing, Collingwood, Australia.

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Curing – the Basics

Curing is a measure of grass 'greenness' and is defined as the percentage of grass material that is dead in the sward.

Grass curing is dependent on seasonal conditions such as rainfall distribution and temperature. As grass dries off over the dry season (May-October in northern Australia) the curing percentage increases.

Curing is also dependent on plant species and land type. Annual species will dry out and die off earlier in the dry season than the above ground parts of perennial grasses.

FUEL MOISTURE CONTENT

As grasses cure, moisture content decreases. However, fuel moisture content is strongly influenced by humidity and temperature. A fully cured clump of grass will not easily ignite if there has been heavy dew and moisture content is high. For further information see Cheney and Sullivan (1997).

FMC: Fuel moisture content (FMC) is expressed here as a percentage of the wet weight of the plant material:

$$FMC = \frac{\text{Wet weight - Dry weight}}{\text{Wet weight}} \times 100$$

GRASS CURING AND FIRE BEHAVIOUR

The greenness and moisture content of grasses affects ignition potential, fire intensity and rate of fire spread. Fuel moisture acts as a heat sink and thus influences fire behaviour by increasing the specific heat required for fuel to combust. As fuel moisture content decreases, potential ignitability and fire intensity increase.

The following guidelines are provided but it should be noted that fire behaviour is strongly influenced by weather and cover:

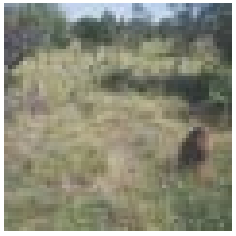
- Fires will spread effectively in grasses cured more than 50%.
- Fuels cured less than 50% are not likely to carry a continuous flame front, or intense fire.
- Fuels cured less than 20% will be extremely difficult to ignite.

This grassland fuel guide shows curing photographs representative of 4 commonly found vegetation communities in the West Kimberley.

SITE DESCRIPTION

Black Soil Plain

Located on Kimberley Downs Station about 90km east of Derby on the Gibb River Road. Soils are cracking black clays; the main grass species found on this site are *Dichanthium fecundum* (Bundle Bundle), *Chrysopogon fallax* (Ribbon Grass), *Iseilema vaginiflorum* (Red Flinders Grass), *Aristida latifolia* (Feathertop Wiregrass).



Mixed Woodland

Located on Kimberley Downs Station about 70km east of Derby on the Gibb River Road. Soils are brown clay loam: the main grass species are *Chrysopogon fallax* (Ribbon Grass), *Triodia bitextura* (Curly Spinifex), *Eriachne obtusa* (Northern Wandarrie Grass). Dominant trees and shrubs are *Corymbia cadophora*, *Premna aculeata*, *Bauhinia cunninghamii*, *Dichrostachys spicata, Hakea arborescens, Flueggea virosa,* and *Terminalia oblongata.*

Pindan Sorghum

Located on Meda Station about 40km east of Derby on the Gibb River Road. Soils are red pindan and site is dominated by *Sorghum stipoideum* (Annual Native Sorghum) and *Chrysopogon fallax* (Ribbon Grass), with an upper story of *Acacia tumida* (Pindan Wattle) and *Bauhinia cunninghamii.*

Pindan Ribbon Grass

Located on the Pt Torment track about 10km east of Derby. Soils are red pindan and site is dominated by *Chrysopogon fallax* (Ribbon Grass) with some *Sorghum stipoideum* (Annual Native Sorghum). The upper story is *Acacia tumida* (Pindan Wattle). Many of the wattles had been killed by a recent hot fire.

BLACK SOIL PLAIN 0% CURED

Grasses actively growing
>80% Fuel Moisture Content

BLACK SOIL PLAIN 0-10% CURED

Grasses actively growing
60% Fuel Moisture Content

BLACK SOIL PLAIN 10-20% CURED

Seed heads maturing
50% Fuel Moisture Content

BLACK SOIL PLAIN 20-40% CURED

Seed heads maturing
40% Fuel Moisture Content

BLACK SOIL PLAIN 40-50% CURED

Seed heads dropping, stalks starting to dry
30% Fuel Moisture Content

BLACK SOIL PLAIN 50-60% CURED

Annuals approaching full maturity, perennials still green
20% Fuel Moisture Content

BLACK SOIL PLAIN 60-80% CURED

Annuals approaching full maturity, perennials still green
20% Fuel Moisture Content

BLACK SOIL PLAIN 80-100% CURED

Annuals dried off, perennials still green
10% Fuel Moisture Content

MIXED WOODLAND 0-10% CURED

Grasses actively growing
60% Fuel Moisture Content

MIXED WOODLAND 10-20% CURED

Seed heads developing
50% Fuel Moisture Content

MIXED WOODLAND 20-40% CURED

Seed heads maturing
40% Fuel Moisture Content

MIXED WOODLAND 40-50% CURED

Seed heads dropping
30% Fuel Moisture Content

MIXED WOODLAND 50-60% CURED

Annuals approaching full maturity, perennials still green
20% Fuel Moisture Content

MIXED WOODLAND 80-100% CURED

Annuals dried off, perennials still green
10% Fuel Moisture Content

PINDAN SORGHUM 10% CURED

Grasses actively growing
70% Fuel Moisture Content

PINDAN SORGHUM 10-20% CURED

Grasses actively growing, seeds heads forming
60% Fuel Moisture Content

PINDAN SORGHUM 10-20% CURED

Seed heads developing
50% Fuel Moisture Content

PINDAN SORGHUM 20-30% CURED

Seed heads maturing
45% Fuel Moisture Content

PINDAN SORGHUM 40-50% CURED

Seed dropping
30% Fuel Moisture Content

PINDAN SORGHUM 60-80% CURED

Annuals approaching full maturity, perennials still green
20% Fuel Moisture Content

PINDAN SORGHUM 80-100% CURED

Annuals dried off, perennials still green
10% Fuel Moisture Content

PINDAN RIBBON GRASS 0% CURED

Grasses actively growing
90% Fuel Moisture Content

PINDAN RIBBON GRASS 0-10% CURED

Grasses actively growing
70% Fuel Moisture Content

PINDAN RIBBON GRASS 10-20% CURED

Seed heads developing
50% Fuel Moisture Content

PINDAN RIBBON GRASS 20-40% CURED

Seed heads maturing
40% Fuel Moisture Content

PINDAN RIBBON GRASS 40-50% CURED

Seeds dropping
30% Fuel Moisture Content

PINDAN RIBBON GRASS 50-60% CURED

Annuals approaching full maturity, perennials still green
20% Fuel Moisture Content

PINDAN RIBBON GRASS 60-80% CURED

Annuals dried off, perennials still green
10% Fuel Moisture Content

APPENDIX A - GRAPHS OF CURING ESTIMATES AND FUEL MOISTURE CONTENTS

Figure 1. Visual estimates of curing rates for the four sites from February to July 2002.

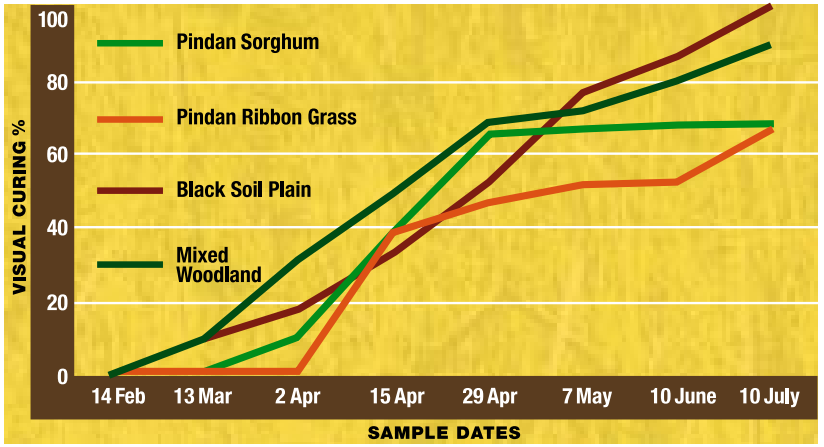


Figure 2. Fuel moisture content for each of the four sites from February to July 2002.