Visual Fuel Load Guide
for the Pilbara Region

GOVERNMENT OF
WESTERN AUSTRALIA

Bush Fire and Environmental Protection Branch

FESA
Fire & Emergency Services
Authority of Western Australia

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Contents

Introduction

Many factors influence fire behaviour but none is more significant than fuel. The availability, size, arrangement, moisture content and type of flammable material available all contribute to what can be considered to be fuel. An appreciation of the range of variables affecting fuels assists with a prediction of the likelihood of fire and fire behaviour under certain conditions. This enables better management of risks and assessment of the best fire suppression options.

As a fuel load increases the potential run (fire spread) and heat output (fire intensity) increases, thus increasing the risk to life, property, the environment and firefighter safety as well as diminishing control options.

Purpose of this Booklet

This booklet is intended as a reference guide to enable fire managers, pastoralists and other stakeholders to visually assess fuel loads and provide an estimate of the potential fire risk. This booklet will also assist fuel load managers to prepare a fire prescription, understand risks on a given area and suggest suitable fuel load management for vegetation type.

The Pilbara Region

The Pilbara region (see Figure 1) as defined by the Interim Biogeographical Regionalisation for Australia (IBRA) covers an area of 178,300 km^2 and consists of four biogeographical sub regions:

- Chichester
- Fortescue
- Hamersley, and
- Roebourne.

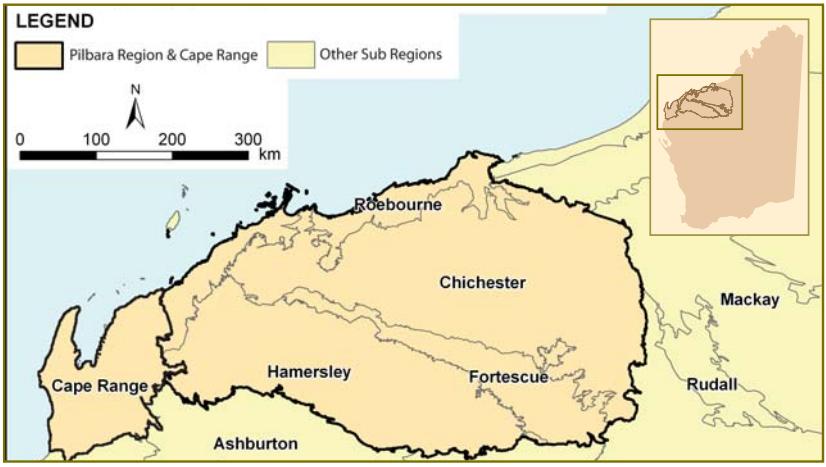
For the purpose of this booklet, Cape Range is also included as part of the Pilbara region. Biogeographical regions are determined by similarity of rainfall, soil types and vegetation, factors which have a direct impact on available fuel load and fire behaviour.

The Pilbara region includes a diversity of environments, from coastal sand plain to inland ranges and desert, and encompasses a wide variety of endemic species,

including several species of Acacia (Wattle), all of which have a different effect on fire behaviour. Much of the Pilbara region is also covered in Hummock Grasslands (Spinifex) which creates a fuel that is available for most of the year. Annual rainfall zones vary from 200 – 300 mm in the desert areas to 600 mm over the inland ranges (BOM, 2009 <http://www.bom.gov.au>).

With a semi-arid environment, high temperatures and low, irregular rainfall the Pilbara region is susceptible to fire.

Figure 1. Pilbara Region and Cape Range as defined by the Interim Biogeographical Regionalisation for Australia (IBRA).



Methods of fuel sampling

The method used in this guide to calculate fuel loads is based on a 1 m^2 representative fuel load sample. A one metre square is placed over an area of vegetation that is representative of the vegetation within the sample area. All vegetation from within the sample quadrat less than 10 mm in diameter is removed and oven dried to determine the dry weight of the sample. The dried weight of the vegetation is then calculated to tonnes per hectare (t/ha). The one metre white square in the photos (shown overleaf) are the areas taken as characteristic samples of vegetation at the location identified.

Fuel load calculation

Dried weight (grams per $metre^2$) / 100 = fuel load (t/ha)

How to use this Guide

This guide is intended to assist the user in visually determining fuel loads. This is a non-destructive means of assessment, in that vegetation does not need to be removed in order to gain an estimation of the fuel load for a particular area. By visually assessing the vegetation with reference to this guide an estimation of the fuel load can be made.

0–5 tonnes per hectare

1 t/ha Fortescue—Tussock grass interspersed with herbaceous plants and hummock.

1.4 t/ha Roebourne East—Short tussock grassland.

1.6 t/ha Fortescue—Hummock grassland and herbaceous plants.

2.2 t/ha Chichester—Grasslands up to 600 mm in height.

2.3 t/ha Chichester—*Acacia* spp. over grasslands up to 900mm in height.

2.8 t/ha Chichester—*Acacia* spp. over grasses and herbaceous plants.

3 t/ha Cape Range—Hummock grasslands with sparse *Acacia* shrub.

3.4 t/ha Fortescue—*Acacia* spp. shrubland.

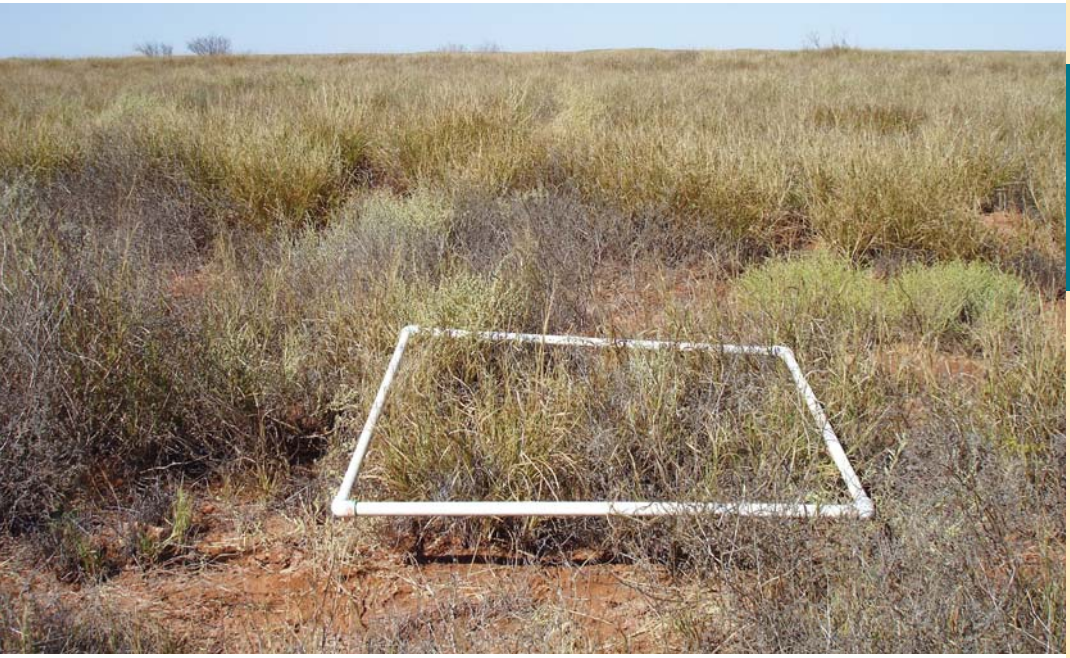
4.6 t/ha Hamersley—*Acacia* spp. over tussock grassland.

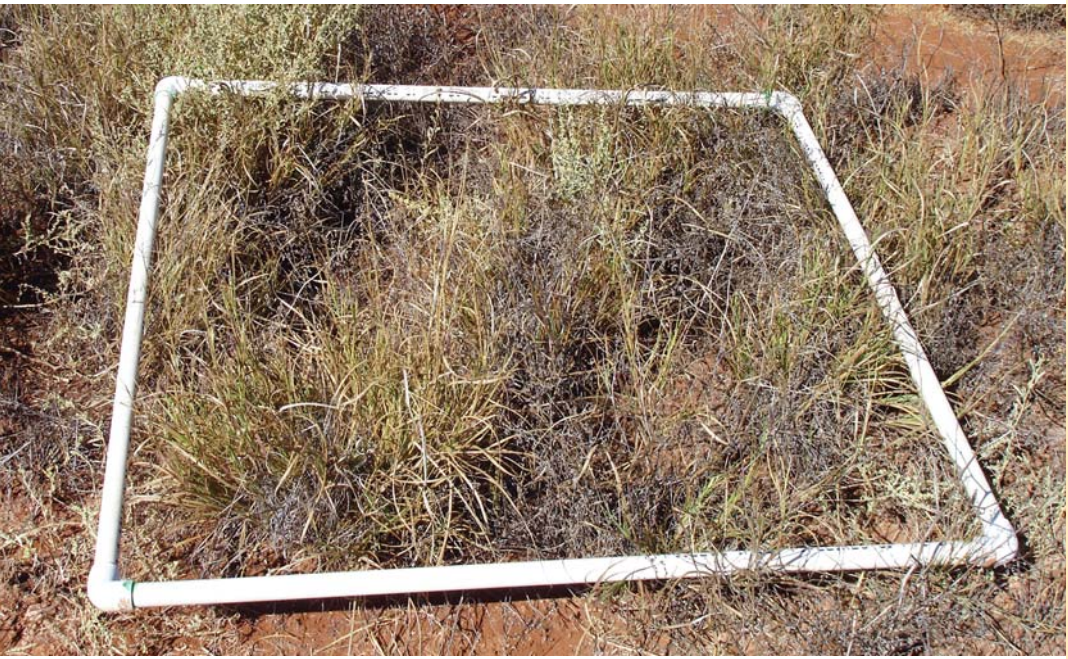
4.8 t/ha Chichester—Kapok bush over hummock and grasses.

5–10 tonnes per hectare

5.2 t/ha Roebourne—*Acacia* spp. over hummock and tussock grasses.

5.5 t/ha Cape Range—Hummock and tussock grassland.



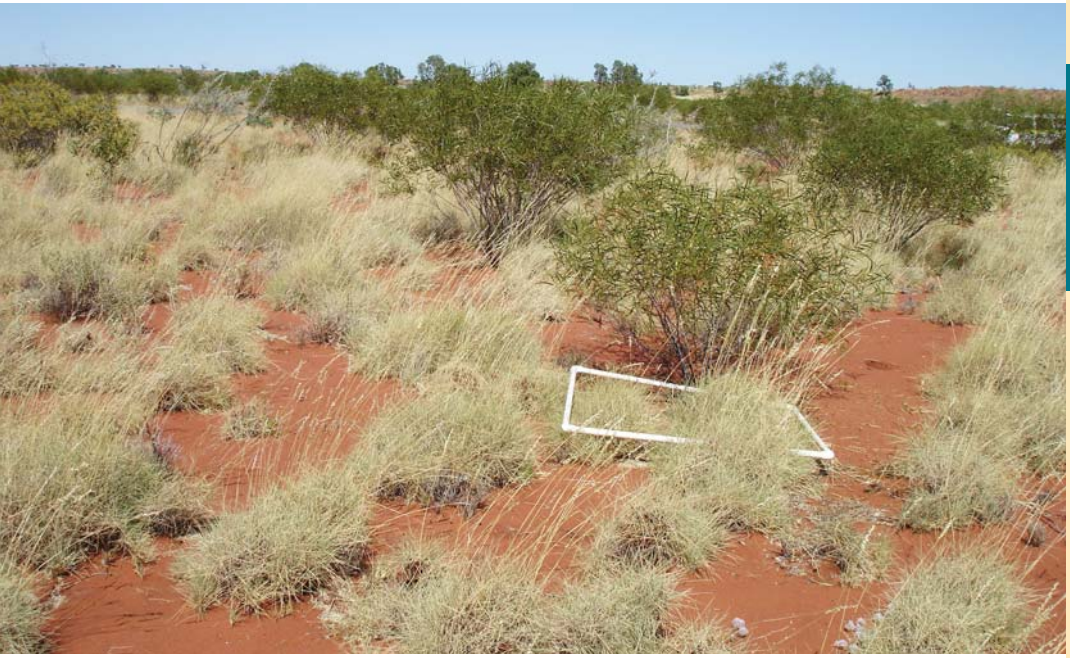


5.8 t/ha Cape Range—*Acacia* spp. over hummock grasses.

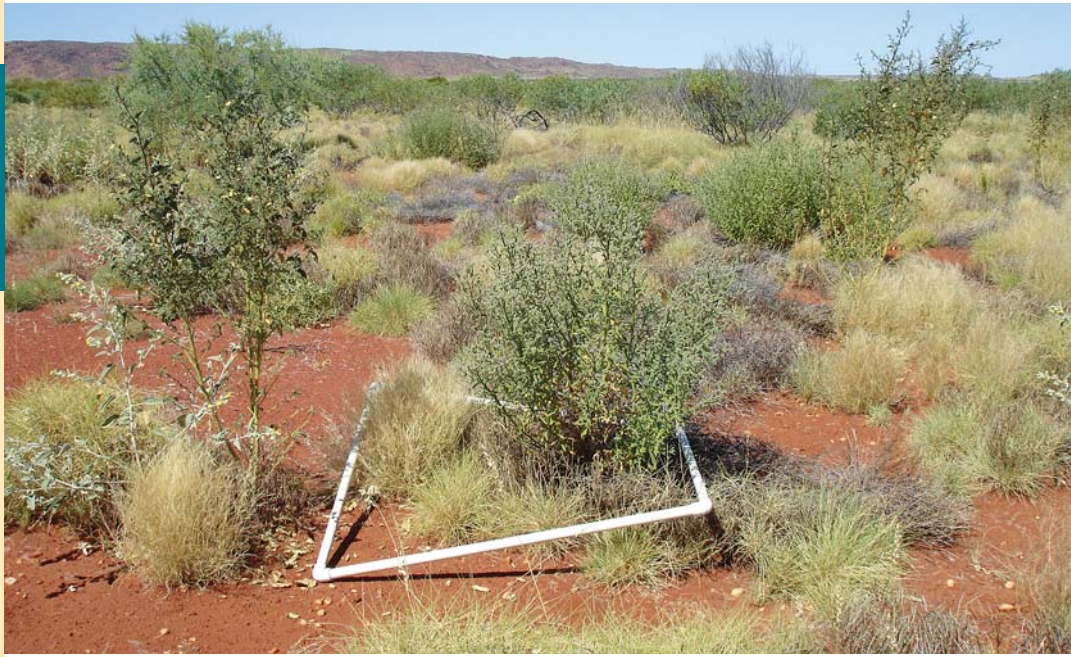
6.6 t/ha Roebourne—*Acacia* spp. over grasses.

7 t/ha Roebourne—*Acacia* spp. over grasses up to 1200 mm in height.

7.9 t/ha Cape Range—*Acacia* spp. over hummock and tussock grassland.



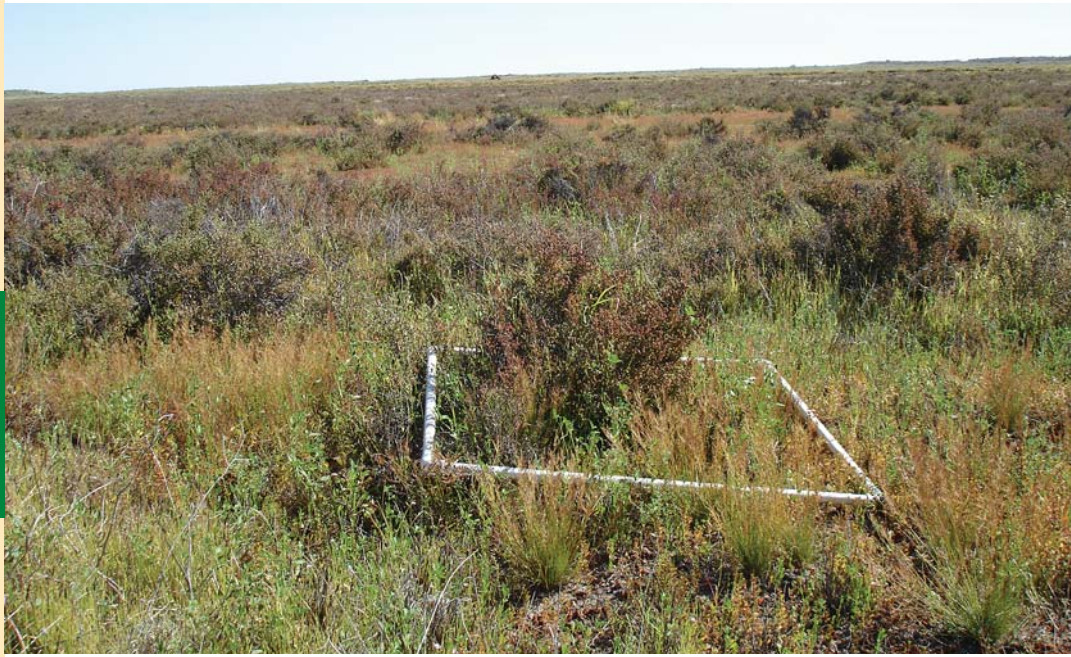
8 t/ha Hamersley—*Acacia* spp. over hummock grassland.



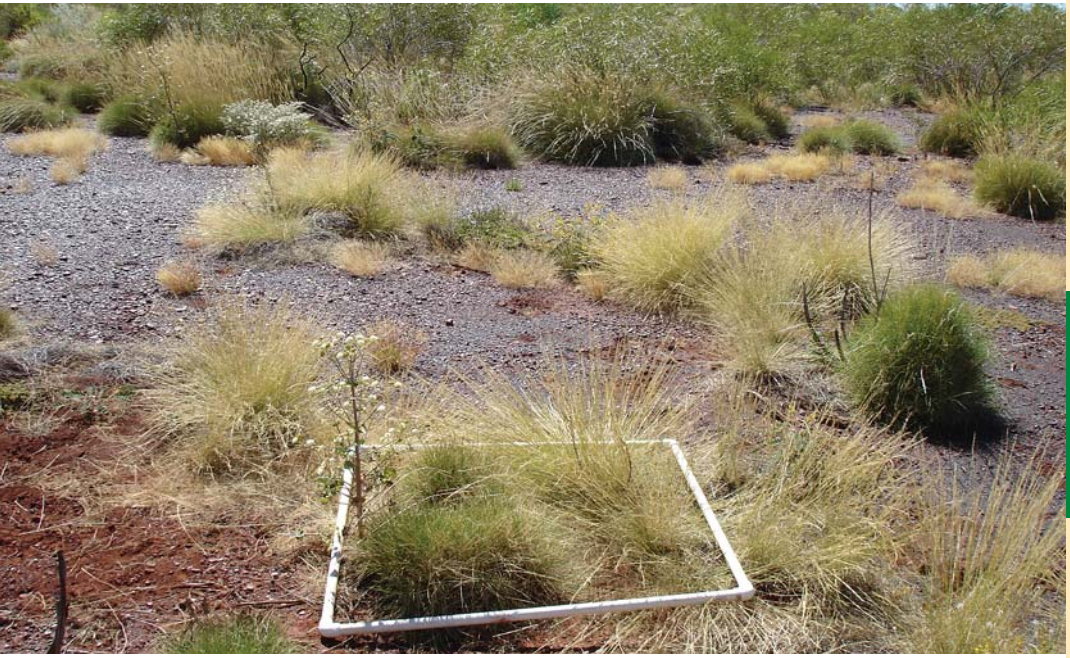
10–15 tonnes per hectare

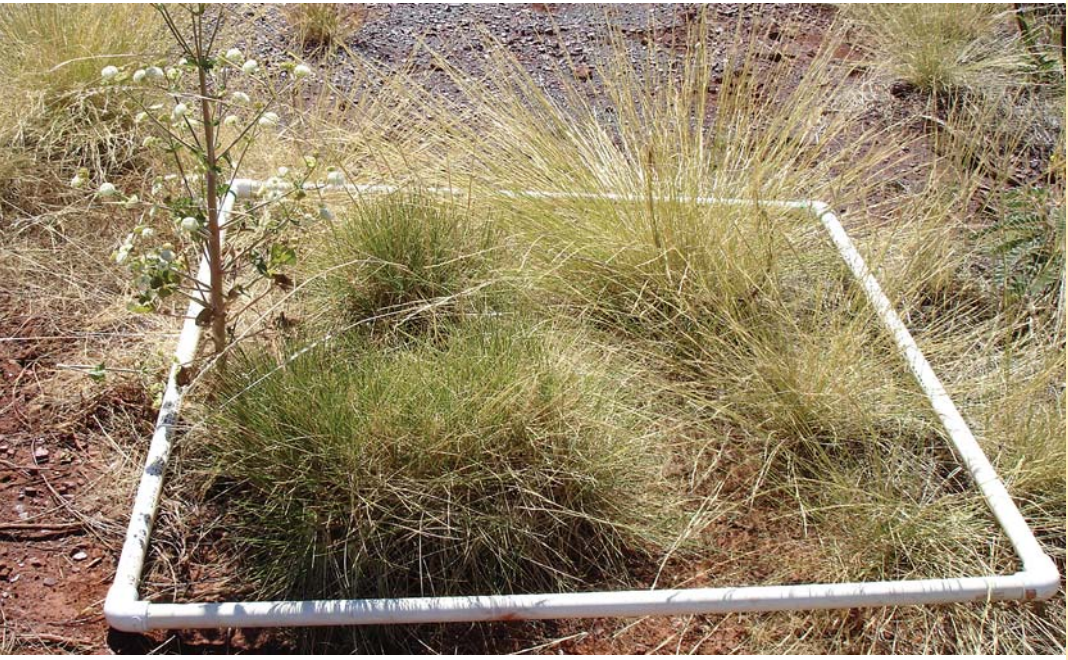
10.2 t/ha Chichester—Hummock grasslands with *Acacia* spp.

10.4 t/ha Cape Range—Small shrubs over grasses and herbaceous plants.

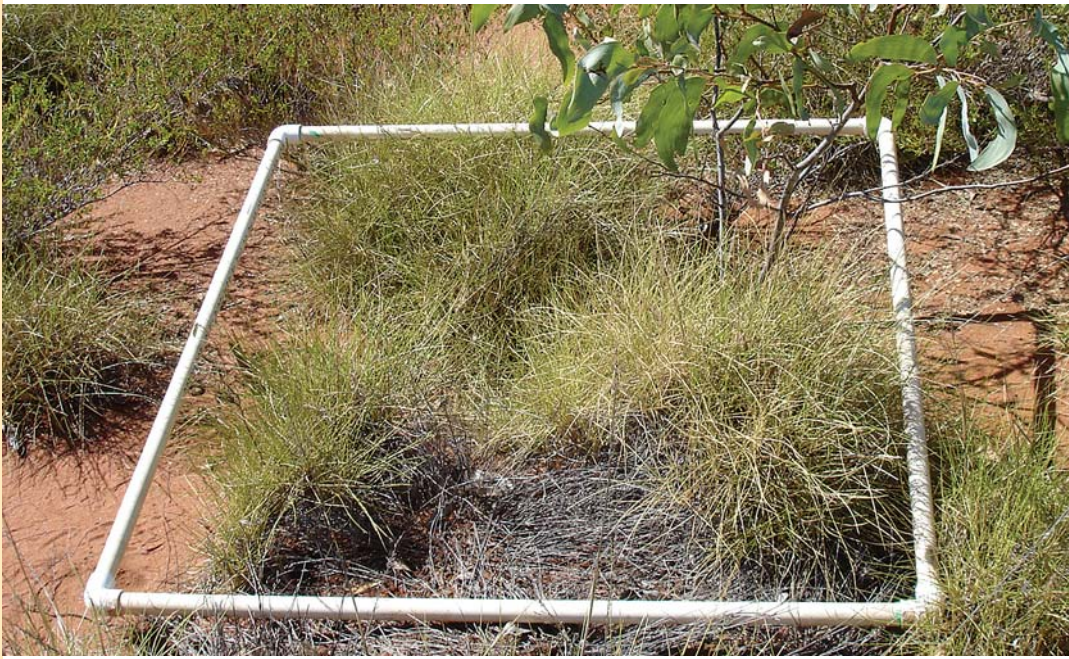


10.6 t/ha Hamersley— *Acacia* spp. over hummock and tussock grasses.

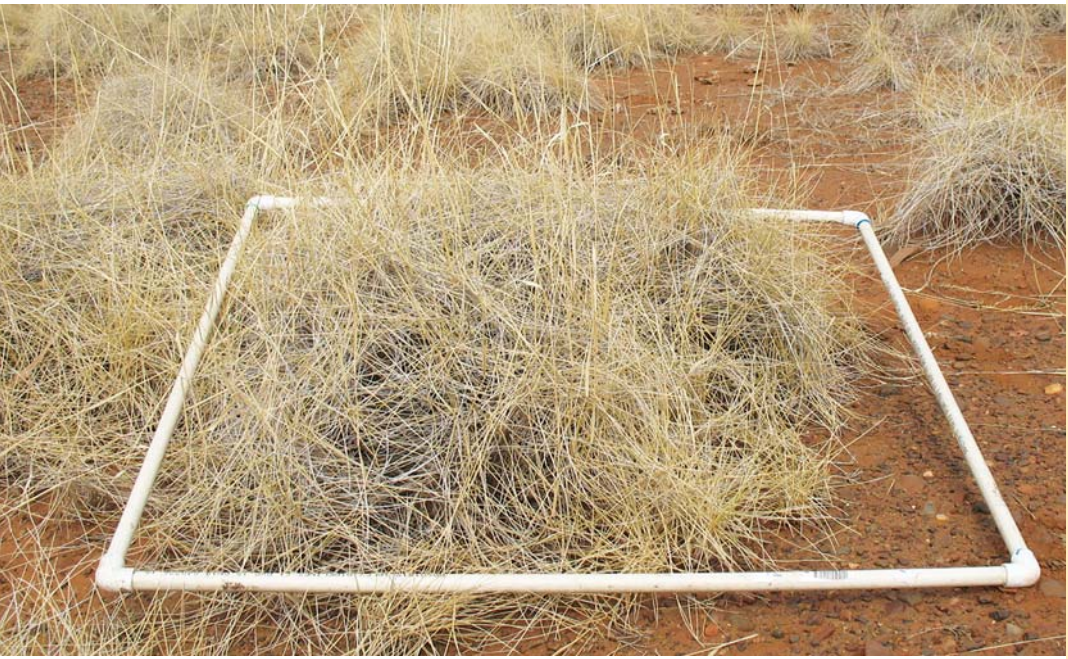




11.9 t/ha Roebourne West — *Acacia* and *Eucalyptus* spp. over hummock grassland.



14.1 t/ha Roebourne—Tussock grassland.



15+ tonnes per hectare

16.1 t/ha Chichester—*Acacia* shrubland with hummock grasses.

Notes

Glossary

Biogeography	Geographic patterns of species (plant and animal) distribution and the processes that combine in a location to produce areas of natural occurrence.
Fuel load	The dry weight of fine fuel (<10 mm in diameter) per unit area—commonly expressed as tonnes per hectare.
Hummock grass	Commonly referred to as Spinifex; identified as such because they grow together in large rounded 'hummocks' which can grow several metres across and often form central dead or decaying patches. Hummock grasses are generally *Triodia* spp. and are found in arid regions of Australia.
IBRA	Interim Biogeographic Regionalisation for Australia—the species distribution and patterning across Australia often characterised by the local conditions.
Spp.	Plant species.
Tussock grass	Also known as bunch grasses as they grow in clumps of tufts rather than forming a sod or mat.