

Optimisation of prescribed burning regimes for fuel reduction, carbon, water and vegetation

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bushfire&natural
HAZARDSCRC



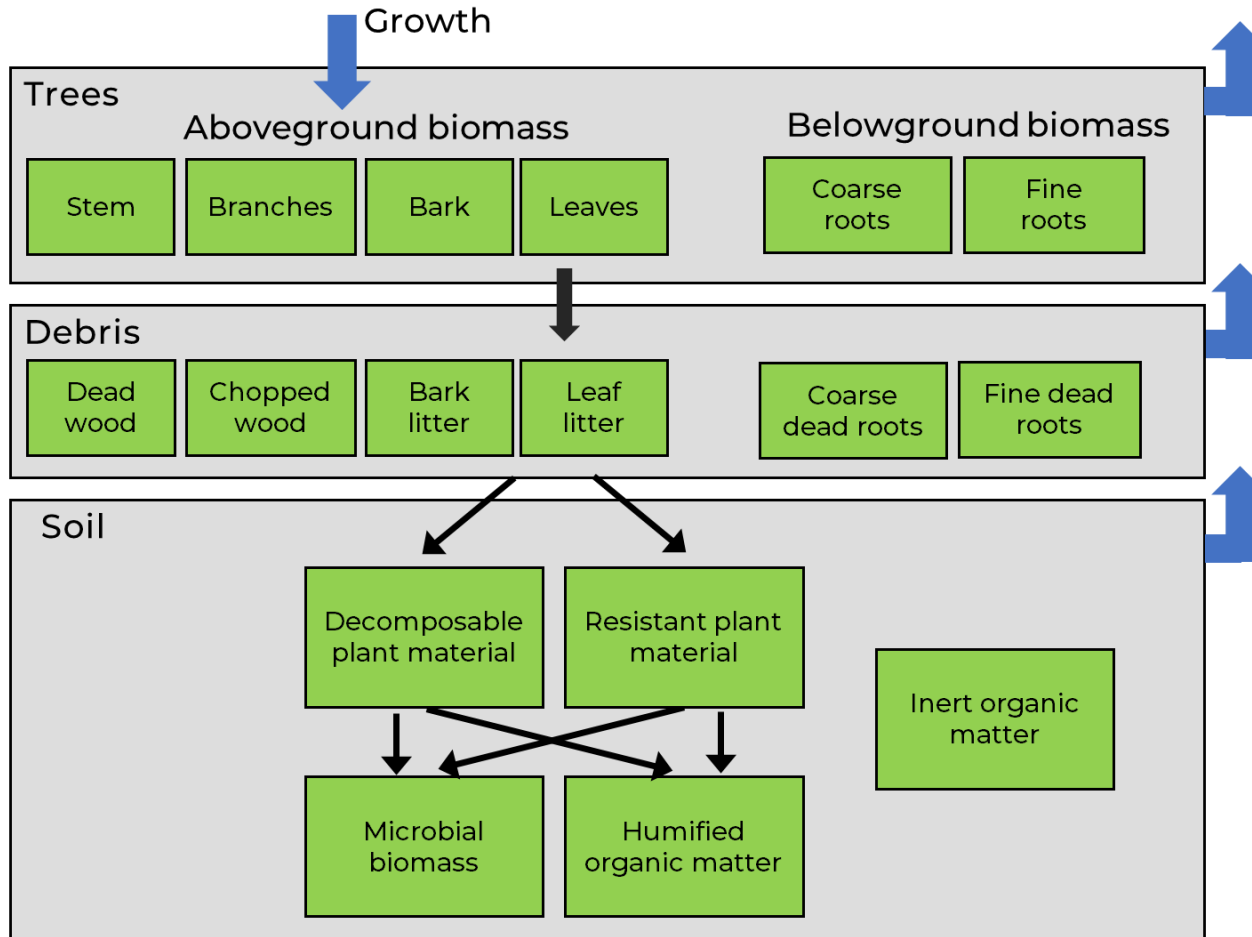
Australian Government
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Optimisation – can we have it all?

- Primary goal of prescribed burning is to minimise risk of bushfire affecting life and property
- Secondary goals are to minimise the risks associated with:
 - Water yield and quality (including erosion)
 - Carbon sequestration capacity
 - Plant and animal diversity
- **Our initial aim was collection and examination of empirical data**
 - WAVES model
- **Our current aim is to test the efficacy of other process-based models**

Full Carbon Accounting Model (FullCAM)



Tracking greenhouse gas emissions and changes in stocks of carbon associated with land use and management

Richards (2001) The FullCAM carbon accounting model: development, calibration and implementation for the National Carbon Accounting System. Technical Report 28, CSIRO

TestTYF.plo

[About](#) | [Configuration](#) | [Timing](#) | [Data Builder](#) | [Site](#) | [Trees](#) | [Soil](#) | [Initial Conditions](#) | [Events](#)

[Output Windows](#) | [Explorer](#) | [Log](#)

Select a Species

Acacia Forest and Woodlands

2 species, 1 i Only list s

Properties of the Species

Name: Acacia Forest and Woodlands

Standard Information for the Species

Plot Ready to simulate Trees page ready

Tree Species : Growth Properties - Acacia Forest and Woodlands

Properties of the Allocations, Increments, and Other Species Time Series

Type of tree age to use in tables that are expressed in years since the plants sprouted, and also in the tree yield formula

Average age of the trees in the forest

Allocations and increments are in terms of Yields

Allocations

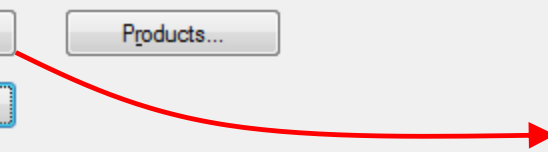
Increments

Parameters for the Tree Yield Formula

10 Tree age of maximum growth (G) [yr]

1 Non-endemic species multiplier of the site maximum aboveground biomass (r)

OK



Carbon emission from prescribed burning

| Site | Burn area (ha) | Carbon emitted | | Proportion of emissions from PB compared to bushfire (%) |
|-----------------|----------------|-----------------------|----------------|--|
| | | Prescribed burn (t C) | Bushfire (t C) | |
| Joadja | 46 | 314 | 6,600 | 5 |
| Helicopter Spur | 634 | 1,857 | 79,619 | 2 |
| Left Arm | 2669 | 11,761 | 263,868 | 4 |

- Testing model sensitivity to variability of inputs
 - Size and nature of carbon pools
 - Vegetation regrowth/fuel accumulation

Carbon emission from prescribed burning

- Scenario testing: partial combustion of near surface fuels (bark and litter)

| Site | Carbon emitted (t) | | | |
|-----------------|--------------------|-------|--------|--------|
| | 25% | 50% | 75% | 100% |
| Joadja | 148 | 216 | 284 | 352 |
| Helicopter Spur | 995 | 1,352 | 1,711 | 2,069 |
| Left Arm | 5,031 | 7,801 | 10,572 | 13,343 |

Next steps:

- Introducing this tool to land management agencies
- Testing the predictive capacity for emissions from prescribed burning



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Questions from a Fire Planner

Blue Mountains Branch 2019 Prescribed Burning Program

| Location | Number of autumn burns | Total burn size (ha) |
|-------------------|------------------------|----------------------|
| Kanangra | 5 | 9734 |
| Upper Mountains | 5 | 5148 |
| Mudgee | 6 | 11,865 |
| Wollemi-Yengo | 7 | 14,044 |
| Hawkesbury-Nattai | 10 | 12,044 |
| Total | 33 | 52,835 |

- Q1. What is the likely effect of the prescribed burning program on carbon within each burn block over the short- to medium-term?
- Q2. What if we didn't burn? How would the carbon content change over time if the burn blocks were left in their unburned state?
- Q3. By leaving the blocks unburned we also run the risk that they might be burned by a high intensity wildfire. What would be the likely effect of a wildfire on carbon?

Optimisation of fuel reduction burning regimes

For more information and discussion:
Breakout session 1:30 – 2:15 pm
Room 301

