



# Sustainable firewood supply in the Murray-Darling Basin

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**Australian Government**

Final Report November 2004

Commissioned by the  
Australian Government Department  
of Environment and Heritage

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**Citation:**

Freudenberger D, Cawsey, EM, Stol, J & West, PW (2004). Sustainable firewood supply in the Murray-Darling Basin. CSIRO: Canberra.

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## Executive Summary

CSIRO Sustainable Ecosystems was engaged by the Commonwealth Department of Environment and Heritage (then Environment Australia) to:

- Develop regional exploitation criteria for sustainable harvesting of firewood from woodland and forest communities in the Murray-Darling Basin, based on three scenarios for future harvesting of firewood.
- Identify the location and sustainable yield of firewood from those woodland and forest communities in the Murray-Darling Basin that meet the exploitation criteria of each scenario.
- Analyse the possible ecological impacts of the harvesting scenarios, particularly the green-wood scenario.

This research project is one outcome of the *National Approach to Firewood Collection and Use* (ANZECC 2001; <http://www.deh.gov.au/land/publications/firewood-ris/index.html>).

In consultation with a broad range of stakeholders, three harvesting scenarios were developed and analysed for their capacity to meet the current demand for firewood of 2.25 million tonnes per year from the Murray-Darling Basin:

### **Scenario 1. *Dead-wood*; Continued reliance on firewood harvested from standing and fallen dead timber from native forests on privately held land.**

We estimated that the maximum sustainable yield of dead timber from the 12.3 million hectares of private forests in the Murray-Darling Basin is 10 million tonnes per year, about four times greater than current demand. Our modelling suggested that only 3 million hectares of private forests would be required to meet existing demand through the exclusive harvesting of dead timber (coarse woody debris). However, a reliance on dead timber for firewood would continue to deplete levels of coarse woody debris to an average of 3 tonnes per hectare, far less than the average 20 tonnes per hectare that would remain were there no firewood harvesting of dead timber. We estimated that 1.5 billion tonnes of coarse woody debris has already been lost in the Murray-Darling Basin through clearing. This has greatly reduced habitat availability for the wide range of species reliant on such habitat, and has impaired ecosystem processes and landscape function.

Our modelling suggests that there is plenty of scope to manage the intensity of harvest from coarse woody debris. If firewood harvesting of dead timber is to continue, then highly cleared areas of the Murray Darling Basin should be excluded from further harvesting. We suggest that harvesting should only occur in those regions with an extensive forest cover.

### **Scenario 2. *Green-wood*; Firewood harvests of live trees thinned from existing stands of native forests and woodlands on privately held land**

We estimated that there are 9.8 million hectares of private forest in the Murray-Darling Basin suitable for harvesting of live thinnings for firewood from managed forests, providing a sustainable maximum yield of 2.3 million tonnes per year. The results from our field surveys indicated that an exclusive harvest of live trees, if properly managed, would eventually create mixed age stands and allow for substantial accumulation of coarse woody debris (15-20 tonnes per hectare). This accumulation should have significant benefits for biodiversity conservation and maintenance of landscape function. Survey results also indicated that thinning can open forest canopies and stimulate the establishment of a greater density and diversity of shrubs, grasses, forbs and orchids.

### **Scenario 3. *Plantations*; Firewood harvests from plantations of native hardwoods on privately held, presently unforested land.**

We estimated that, if the most productive sites along the eastern and southern boundaries of the Murray-Darling Basin were used for plantations, a total of just over 0.2 million hectares of plantations, grown on 10 year rotations, would be required to meet the current demands for firewood from the Basin. If planting was restricted to the less productive areas of the Murray-Darling Basin and on soils at high risk of salinisation from agriculture, a total of about 0.6 million hectares of plantations, grown on a 20 year rotation, would be required. If plantings were restricted to such sites, then 29,000 ha would have to be established annually for 20 years to achieve the final estate size required to wholly meet current firewood demand. There is limited prospect for growing commercially viable plantations solely for firewood unless growers receive additional income streams from other timber products or from environmental services such as biodiversity habitat, salinity mitigation and/or carbon sequestration.

This project explored alternatives to the current reliance on standing dead and fallen timber as a source of firewood. A reliance on dead timber for firewood will continue to threaten biodiversity, particularly in forest stands closest to markets and within highly cleared landscapes. There is a need to further explore and implement firewood sources other than dead timber. Our modelling and field surveys showed that other sources of firewood include the thinning of live trees from well managed native forests and as one of many products and services that can be provided by an expansion of hardwood plantations within the Murray-Darling Basin.