HOTSPOTS FIRE PROJECT

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Fuel Fact Sheet 1

Understanding Fuel

...and why we need to manage it

Australia's climate is becoming warmer and drier with the occurrence of very high to extreme fire risk days predicted to increase across NSW. Understanding how fuel accumulates over time is essential to managing bush fire risk to life, property and natural ecosystems.

What is fuel?

Bush fire fuel consists of all living and dead vegetation. However, it is fine fuels less than 6mm in diameter, consisting of leaves, sticks, twigs, bark and grass, that are most likely to be consumed by a fire.

The presence and arrangement of fine fuel significantly affects flame height and the speed at which a fire moves. Heavier logs and stumps tend to burn after the fire front has passed and take longer to extinguish.

Fuel occurs in layers from the forest floor (surface and near surface fuels), through the mid storey (elevated and bark fuels) to the canopy. The quantity and arrangement of fuel in each layer can be assessed visually using the Overall Fuel Hazard Guide (Hines *et al.,* 2010).

Why not remove all the fuel?

Bush fire fuel consists of living and dead vegetation, which has ecological, social and economic value. It is not practical or desirable to simply remove it completely.

Near and surface fine fuel have ecological values (for foraging and habitat) or perform ecosystem services including water filtration and storage, erosion control and carbon storage. Elevated material also provides a substantial area of food and habitat for fauna and other plants. Bark not only provides habitat but also protects the trees from predation and insulates epicormic growth buds from radiant heat and direct flame contact.

Forest products such as shelter, timber, leaf extracts and honey are just a few economic benefits that would be lost if all the fuel was removed.

How does fuel accumulate?

After a fire, the available fuel is dramatically reduced but starts to accumulate again as vegetation regrows in the post-fire environment.

The type of vegetation present, seasons and local climate all influence the rate, type and amount of fuel that accumulates.

At sites with higher rainfall and fertility, fuel accumulates quicker and can sometimes reach pre-fire levels within a decade, while at some low fertility dry sclerophyll sites it may take much longer.

The rate of decay of leaf litter plays a big role in the surface fine fuel loads and can vary widely over time and location. In some situations, after a low intensity burn there may be enough fuel to carry a fire within two to three years though its intensity is likely to be lower. Minimum fire threshold guidelines (Kenny *et al*., 2003) should be used when planning prescribed burns to minimise impacts on biodiversity.

Generally, fuel accumulates steadily after a fire and then reaches an upper limit where the rate of decay equals the input of new material.

(See Figure 1).

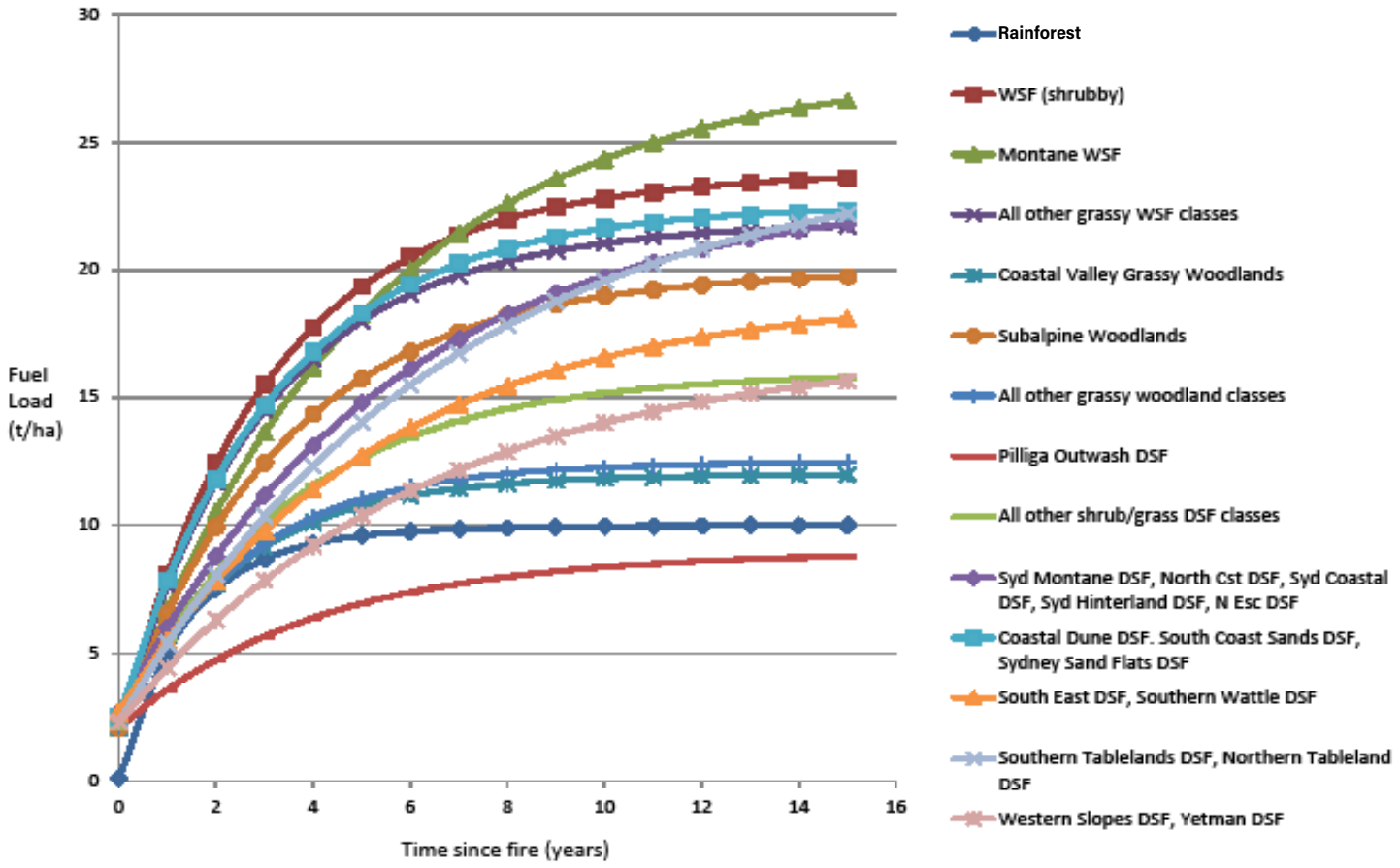

Figure 1: Trajectory quasi-steady state fuel load estimates with time since fire of litter, near surface and elevated fuel load in NSW forests and woodlands based on studies by Watson (2012). *NB this does not include bark or canopy values. Fuel accumulation curves are not yet available for all vegetation formations in NSW. The values for initial fuel present may be higher or lower than the curves suggest following specific fires at a given site. WSF = Wet Sclerophyll Forest, DSF = Dry Sclerophyll Forest.*

REFERENCES:

Kenny, B. J., Sutherland, E. K., Tasker, E. M. and Bradstock, R. A. (2003) *Guidelines for Ecologically Sustainable Fire Management.* NSW National Parks and Wildlife Service.

Watson, P.J. (2012) *Fuel load dynamics in NSW vegetation. Part 1: forests and grassy woodlands.* Report to the NSW Rural Fire Service. (Centre for Environmental Risk Management of Bushfires, University of Wollongong: Wollongong, NSW, Australia).

Hines, F., Tolhurst, K.G., Wilson, A.G., (2010) *Overall fuel hazard guide 4th edition*. Department of Sustainability and Environment, Victoria.

PICTURE CREDITS:

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