

## Conference Proceedings – Speaker Transcript

### **The interaction between fire and weeds in native vegetation across NSW: A review by the Hotspots fire project**

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[Link to Slides](#)

#### **Mark Graham**

We would like to pay our respects to the Gadigal clan of the Eora Nation, the elders past and present, and also pay our respect to all of the Aboriginal nations in which we work around New South Wales, which is a considerable number. The Hotspots Fire Project is co-delivered by the NSW Rural Fire Service (RFS) and the Nature Conservation Council of NSW (NCC), with support and advice given by eight additional project partners.

Two years ago we commenced the process of reviewing fire and weeds in the native vegetation of New South Wales (Slide 2) due to considerable interest from landholders and natural resource practitioners and managers in recent years. We are nearing the end of this fairly major task and are very close to public release of the review. The review builds on the framework of the Hotspots Fire and Vegetation literature reviews prepared for eastern NSW

We have delivered Hotspots programs across the entire east of New South Wales over the last 12 years (Slide 3). The goal is sustainable fire management through well-informed and well-prepared communities which complement the roles of land managers and fire agencies and that a shared approach to fire management is critical to any form of planning.

We have covered landscapes as varied as the semiarid areas in the Lachlan Valley right through to the very wet subtropical landscapes in the Tweed Valley, and right down to the southern corner, some subalpine and high elevation landscapes mixed in amongst it. We have got a big spread of landscapes in which we work. The common theme in each of those landscapes is that there are environmental weeds present and there are concerns about those weeds and there is a universal need across all tenures to recognise the severity of the problem and to look at ways to best manage environmental weeds.

We worked across all of the former catchment management authorities in the east of the state (Slide 4). We don't work in the western zone because of the climatic limitations upon fire.

Basically, from Dubbo through Bourke and then down to southern New South Wales, we work east of that. Prior to Kevin's and my employment, Penny Watson had prepared a lot of the literature reviews on fire and biodiversity in each of the catchment management authority regions. We have essentially covered the state with a foundation of knowledge on fire and biodiversity, from which we do a literature review, a fairly comprehensive scientific process, and we translate that into materials for landholders (Slide 5). We translate the science into materials that are accessible by a lay audience, designed to give guidance and information for owners of rural properties with bushland to assist them in better managing the risks of fire and to maintain biodiversity on the properties they own.

This is very close to a finished report (Slide 6). We hope that within the coming months it will be available on the [Hotspots website](#), with our other materials. It is also being translated into a landholder booklet. To give a rough outline of the report (Slide 7), we undertook a review of all available relevant literature, including doing keywords searches, as well as looking through grey literature sources, seeking expert opinion and case studies about the interactions of fire and weeds within native vegetation. We looked at the economic and social costs and the biodiversity impacts. We looked at the literature on weeds and disturbance, which of course can tend to propagate weeds. We looked at the general principles of fire ecology and the principles of ecological restoration. As we work within the Keith New South Wales vegetation frameworks, we looked at all of the vegetation formations in New South Wales that were relevant within the east of the state, and explored the interactions of fire and weeds across the broad environmental gradients that existed across those formations.

For the final stage of the review, we identified key weed species that had arisen through our workshops around the state, where we became aware of particularly problematic or ecologically harmful weed species or particularly common species and a number of weeds of national significance. We collated the state of knowledge of those weeds and looked at a number of key factors in their management. A point that we noted quite early on is, whilst for a lot of our native species, particularly those centred on the Sydney Basin, we have good data available for their vital attributes and their functional traits. However, that same level of knowledge didn't exist for weeds. We were challenged by that somewhat - the state of knowledge of individual native plants was a lot better than for a number of the weeds that we'd reviewed.

It's a relatively hefty document: that is the table of contents (Slide 8-9).

### **Kevin Taylor**

The (Slide 10) weeds we reviewed are: African olive, African lovegrass, bitou bush, blackberry, boneseed, camphor laurel, Chilean needle-grass, Coolatai grass, lantana, large & small-leaved privet, phalaris, South African pigeon grass, Scotch broom and serrated tussock. We tried to get a range throughout our area, from north to south. It is currently undergoing a targeted peer review by government agencies including Department of Primary Industries and OEH National Parks weed management staff (Slide 11) and we hope it will be ready within two months.

I'll present some of the key findings (Slide 12) and the management options for a couple of species. Bitou bush and boneseed are two weeds with quite a lot of information. There is a strong body of published evidence that demonstrates that implementing sequences of treatments that include fire and herbicide application will result in the best management and restoration outcomes for bitou bush.

It looks like fire has a role to play with their management. In all these instances, you've got to have resources to undertake follow-up, and knowing their attributes, like the longevity of the seeds, you have got to be vigilant for 10 years. You might have a site completely free of bitou or boneseed and 7 years later a fire comes through, which triggers all that seed. You have got to think about that and build into your management plans to have the funds to undertake follow-up in case of a wildfire or, in some cases, you could use another fire to trigger mass germination and then hit it before it has a chance to seed to deplete the seed bank in the long-term. Having the capacity to adaptively respond to unplanned wildfire events can, in many instances, also assist in achieving good restoration outcomes

Here is an example (Slide 13) of a burn 7 months ago, and you can just see the bitou at the bottom coming through and asparagus and quite a few other weeds. It is a really crucial time to hit that now. If you didn't build that into your plan with the burn, you will have a lot of the weed problem back again and the fuel load will go up very quickly. The other photo shows where bitou has been treated in quite a big area. As far as I know there is no consideration of fire as this has now increased the fire risk and it is an area where there are a lot of illegal campfires around the beach at night, and in summer there's a good chance a nor-eastern can come up and set that alight. However, this also presents a very good opportunity to introduce prescribed fire and open it up and stimulate the wattle and banksia to regrow, and also flush out the next wave of seeds.

Lantana is another weed we looked at (Slide 14), especially in the north coast, with Bell Miner Associated Dieback. The problem there is that often the sites become too moist, or it is a moist wet sclerophyll community, and it is very difficult to get fire in. In some of those instances, the best approach is to treat lantana early, let it die back, then get fire in. In other areas such as grassy woodlands settings, regular fire will be within interval and it will keep lantana from becoming established. With a splatter-gun, you can treat quite large areas in a very quick time (Slide 15). The bottom photo shows lantana treated 6 to 12 months before a planned burn, with money built in to do the treatment first, and then come in and complete the burn later. Because mistflower and crofton weed appeared where the Lantana had been killed, that was treated and then the burn was put in and then follow-up has been undertaken every year since the burn in 2013.

Some of the other species like Coolatai grass and Scotch broom (Slide 16) are very difficult to treat. Once fire comes in, they tend to out-compete everything else, you need to have many years of follow-up planned to control them. In addition, if wildfire comes through, you need to be ready to treat it before it seeds.

The review (Slide 17) will be complementary to our other literature reviews and form a basis for our delivery of Hotspots workshops and can be used as a resource for anyone to [access online](#). Hopefully some of these reviews will become part of the [Fire and Restoration hub](#) and they will be a living document that people can provide feedback on. As we get more information and hear of other's experiences, we can keep adding to the information and build up the knowledge about those species. The final slide (Slide 18) is just something to think about. Thank you.

### Questions from audience

**Question:** Chris Dickman, Sydney University. Following Bronwyn's talk and the attraction of foxes to burnt areas, often when you're looking at fox droppings they'll contain blackberry seeds, bitou bush. I'm just wondering if fire that might be used to reduce those weeds could be actually be attracting foxes that act as vectors for the seeds of those problem plants.

**Mark Graham:** Absolutely and in the review, the interactions of foxes and a number of native bird species with bitou bush were explored. Looking at management strategies and fire regimes which remove as many seed sources from the landscape and then subsequently deplete the soil seed bank are approaches where there's been great success in removing bitou bush across an awful lot of the coastline. There have been incredible successes on-park and off-park along the coastline. Of all the weeds of national significance, it's probably the species that, through the review, we found had the greatest of success. There's been significant reductions in the space of 10 to 15 or so years in bitou, and significant improvements in a lot of coastal ecosystems through these integrated management strategies, integrating fire and weed management but there may well be related opportunities for creating some traps for foxes, given their preference for Bitou. When it is in fruit, bitou is a large part of the diet of coastal littoral foxes.

**Question:** Was there much in the literature about flammability? I know for example with lantana, there's often mixed reports, some people claim that it's more flammable but I look at it as possibly being less flammable. Was there much in the literature about that?

**Mark Graham:** In certain instances, yes. With lantana, there was a little bit of global literature on this. There were some reviews into the flammability from India, for example. Of course, lantana is a globally significant weed. On the east coast of Australia, it's one of the greatest and most problematic of weeds. The point we make about management of it with fire is that it can very much be a double-edged sword, and it really does depend entirely upon site conditions and preceding climatic conditions as to its flammability. In so many of these landscapes where it's lower in the landscape, it's very damp and very humid for the majority of time, and it really is just in those few prevailing drought times, very limited windows of time, when burning it will become possible.

One question is whether or not private landholders or public land managers are willing or brave enough to be using fire at those times as there can be significant additional risks in putting fire into the landscape at those times. What emerged was that there are good prospects for having a go when safe and confident and adaptively learning and responding. Certainly in the Toonumbar area that we covered, there's been a lot of quite successful work there. Bell Miner Associated Dieback is such an emerging problem; we do need to put a huge focus upon its management, because some of our most biodiverse forests are being catastrophically impacted by it and lantana is a key component of the process of Bell Miner Associated Dieback. We really are hoping to put a lot of effort into attempting to actively manage that process with a view to improving the health of forests.