

## Conference Proceedings – Speaker Transcript

### **Collaborative monitoring of two culturally important species before and after fire at Wattleridge Indigenous Protected Area: preliminary results for the echidna and threatened black grevillea**

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[Link to Slides](#)

#### **Lesley Patterson**

I'd like to acknowledge the traditional owners, past, present and future. Our talk today is on Kukra and Winba. Kukra in Banbai language is echidna and Winba means fire.

I'll give you a brief history on Wattleridge (Slide 2). We were dispersed with no land and feeling sickly, everyone from the children to the elders. Then we got Wattleridge back in 1998 and it was purchased by the Indigenous Land Corporation on behalf of the Banbai Traditional Owners.

Wattleridge sits 40 kilometres north east of Guyra (Slide 3). It is 650 hectares, 80% of which is natural bushland with many rare and endangered species. Wattleridge was declared the first Indigenous Protected Area in New South Wales in June 2001 and is the 13<sup>th</sup> in Australia.

Our organisation is all Aboriginal people, making it Aboriginal owned and operated. I'm one of the Elders. We have ten full-time staff positions and five part-time. Our staff roles vary from administration to rangers.

Our country is self-sustaining and for future generations. It is where our children learn cultural values, such as bush tucker and traditional practices (Slide 4), and understand what healthy country means. Our country is a meeting place for family and community gatherings, where knowledge is shared and what we see, our generations will see in the future. Healthy country, healthy people, healthy waterways make our country self-sustaining.

#### **Michelle McKemey**

I'm Michelle, I'm doing my PhD and I'd like to acknowledge my supervisors, Nick Reid, John Hunter, Oliver Costello, Emily Ens, and Mal Ridges. I also want to acknowledge the Firesticks project, which has supported Lesley and I to be here today.

I'd also like to acknowledge support from the Rural Fire Service Association who recently gave me a sponsorship so that I could continue to do my PhD which is turning into quite a long term project, and a number of other organisations that have also given us support.

As Lesley said, we're talking about Wattleridge and it was the first IPA declared in New South Wales. It's halfway between Sydney and Brisbane, right up the top of the Great Dividing Range, near a lovely little town called Guyra. It's about 1,300 metres above sea level, so high altitude, granite soils, forest and woodlands.

### **Lesley Patterson**

Wattleridge is home to 15 threatened fauna species, and four threatened plant species. These include declining woodland birds, the scarlet robin, forest owls, powerful owl, glossy black cockatoo, spotted tail quoll, koala, and the New England tree frog. Four threatened ecological communities such as the Snow Gum and New England Peppermint communities.

Wattleridge has several sites of cultural significance including an ancient rock art site, scar trees, and axe-grinding grooves on granite boulders. Wattleridge is long unburnt country which means fire management was identified early as a priority.

Fire management at Wattleridge (Slide 5): we've been learning a right way and a wrong way of burning. We joined Firesticks in 2013, and with our reintroduction of cultural burning we're using low intensity fire and we are managing country to protect assets, working with the Aboriginal communities on their country.

### **Michelle McKemey**

My PhD research project has both an ecological and a cultural component (Slide 6). The ecological component looks at before-after-control-impact experimental design, comparing the low intensity Aboriginal style burning at Wattleridge, with moderate intensity large scale frequent burning at a nearby national park, Warra National Park. I've been collecting data on changes to ground cover, shrubs, trees, logs, fuel hazard and targeted species, and also undertaken qualitative social and cultural surveys such as participatory research and semi-structured interviews.

Today our talk is going to focus on the collaborative research component of our PhD project (Slide 7). The key research questions that we're asking here are (Slide 8): how do Aboriginal rangers and scientists work together to monitor important plants and animals, in order to produce meaningful results that can inform adaptive management? And what are the ecological impacts of Aboriginal cultural burning compared with the National Parks led hazard reduction burning on the echidna and black grevillea?

You might ask: why is collaborative monitoring important (Slide 9)? Over 20% of Australia is held in Aboriginal ownership and that is growing. IPAs of Australia represent a total area ten times the size of Tasmania. They make up nearly 50% of the National Reserve System, and there's some

really good examples throughout Australia of Aboriginal groups and scientists working together to provide meaningful results. For example, one of my supervisors, Emily Ens, works in Arnhem Land, and they've set up water buffalo monitoring where they've fenced off important culturally significant billabongs and then the rangers have gone out and monitored the changes in the fenced and unfenced areas to see what impacts that has had. She has also been working with the Yugul Mangi Indigenous rangers around Ngukurr to document Indigenous knowledge and to develop an Indigenous dictionary of flora and fauna for future generations.

We're asking 'how do we use similar practices to that here in New South Wales?' I talked to the members of Banbai and said "What's really important to you? What would you like to know about when fire comes in?" and they chose the echidna, as one of their target species.

### **Lesley Patterson**

The echidna is our totem (Slide 10), it's on all our clothes, on our cars, on everything, and before I got into this we used to eat Kukra with damper when we were kids. We wanted to know what it does before and after burns. With Michelle's help we're closing the gap on what we know about the Kukra.

### **Michelle McKemey**

Here is a little bit of background and ecological information about the Kukra. They've got a home range of about 50 hectares and they generally don't change their home range when a fire's been through their country. They eat ants, termites, and in the New England they eat scarab beetle larvae, which is quite important because scarab beetles can cause dieback in rural trees. Probably the most important limiting factor in the environment for them is shelter. They need fallen and dead trees, or large trees that they can burrow under the roots and also provide cover, so that they can rest and hide from predators. It has been found that predation by foxes on the echidna increases fivefold after fire, and that foxes are actually shown to target echidnas after fire. So these are all reasons why we wanted to know how echidnas were being affected in our part of the world.

### **Lesley Patterson**

The reason we chose the black grevillea (Slide 11), is that it only grows in the Backwater area and in the Warra National Park that adjoins Wattleridge. It flowers from November until February. We wanted to know how the black grevillea came back after fire. With Michelle's help we've looked at some burn plots, and compared them with the unburnt plots. In one plot we had three mature plants and after the fire we ended up with about 300 or more. Of the three mature plants one got burnt, but only half of it got burnt, and we found with the fire it comes back really strong.

### **Michelle McKemey**

This work is pretty important because Wattleridge is a stronghold for this threatened species. Banbai feel responsible for the future of this black grevillea which is one of the reasons we chose to monitor it.

I'll quickly run through the methods (Slide 12). It's a before-after-control-impact experimental design where we have both control plots being unburnt control plots, and burnt impact plots. That's Warra National Park so there was a large burn of about 450 hectares there. Down here

that's Wattleridge, and there was a very small burn of about two hectares, and I've got 30 plots set up through both of those study sites that we sampled both before and after fire. The way we measured the echidna use was counting the type and the area of the diggings, and with the grevillea we counted the height and the width of the grevilleas within these plots.

These are only preliminary results as I haven't done any statistical analysis yet, but I think some of the preliminary results are fairly obvious. For the grevillea (Slide 13), all of these green plots are unburnt, so those two are the impact and control pre-fire, and that's the impact and control post-fire, so that's the number of seedlings. As you can see there's a dramatic increase in grevillea seedlings after the fire, like Lesley described. A lot of the mature shrubs got killed, so after the fire there were less mature shrubs. Also the mature shrubs limited their reproduction after the fire (Slide 14).

The logs (Slide 15), the lighter green bars are the Wattleridge fire, and the darker green bars are Warra. You can see that the fire at Wattleridge didn't have much impact on the logs after the fire. The length of logs at Warra did decrease after the fire. At Wattleridge the amount of charring on the logs doubled, and at Warra it quadrupled after the fire. So there was quite a lot of charring, and Peter Croft has shown that a lot of vertebrates and invertebrates avoid charred logs after fire, except for ants.

Warra was the hot burn and Wattleridge was the cool burn. With the cover at Wattleridge (Slide 16), the cool burn, bare ground increased after the fire. The area of leaf litter also increased but the amount of vegetation in the plots decreased.

You can see the same at Warra, the bare ground increased, leaf litter increased, vegetation decreased. However, the depths of litter decreased quite substantially at Warra whereas the depth of litter didn't decrease as much at Wattleridge.

With the echidna (Slide 17), we found that the count of echidna signs increased a lot at Warra National Park, and increased a little at Wattleridge, but the size index decreased at both, so the size of the foraging activity decreased a little bit at Wattleridge, and a lot at Warra.

Some of our key results (Slide 18): there was a dramatic increase in seedlings; there was a decrease in mature shrubs and reproduction of the grevilleas; the length and number of logs decreased more at Warra National Park than at Wattleridge; the charring increased at both sites, but more at Warra; there was a decrease in vegetation and an increase in bare ground; and there was an increase in the count of echidna signs but a decrease, particularly at Warra of the size index. There was some variability in the results and as I say we haven't statistically analysed them yet so we don't know yet if they're statistically significant. There are some inconsistencies which is the nature of collaborative monitoring so we need to continue to test this.

To answer our research questions (Slide 19), the question about the ecological impacts of the indigenous style fire versus the hazard reduction fire. We found that the black grevillea did have a mass germination event after the fire which created a multi-age grevillea population. However, if there's too frequent fire it will probably exhaust the seedbank and very large shrubs have a substantial reproductive output whereas the younger plants once they reach reproductive age still

might not have a very significant reproductive output. We're going to go back and monitor the grevillea again next year.

With the echidnas, we found there wasn't much change at Wattleridge, whereas at Warra we found that they seemed to be exploring the burnt areas, so there's more activity in the burnt areas, but less sustained activity which suggests that they might be taking surface ants, because ants do tend to like charred areas, but not undertaking extensive foraging.

The conclusion in response to research question one: collaborative monitoring is working. The Aboriginal rangers are able to go out and do this by themselves now. They might need a bit of help with the analysis, but we've got the plots set up so if they want to keep monitoring that's something that they are capable of doing.

The cultural burning seems to have less impact ecologically than the moderate intensity, hazard reduction burning. Cultural burning is an important practice in the revitalisation of Aboriginal culture, reconnecting people with an ancient cultural practice and it empowers Aboriginal communities to successfully manage their land.

As part of our collaborative work together we've developed this fire and seasons calendar (Slide 21). We've identified biocultural indicators which tell us when the seasons are changing and whether it's a good or a bad time to burn. One of those biocultural indicators is during winter the echidnas form breeding trains and that lets us know that it's cool time, which is a good time to put in a low intensity fire. As Lesley said, the grevillea flowers during summer, which is a hot time and it's wildfire time and not a very good time to burn, so we've also used the grevillea as one of our biocultural indicators.

### **Questions from audience**

**Question:** Are you doing any ant counts or having a closer look at ant availability or diversity or suitability or any of that sort of thing?

**Michelle:** It's all anecdotal at the moment. When we went and did the immediate post-fire surveys there were ants everywhere, all over the really charred ground, and there's a bit of scientific literature about ant behaviour after fire, but we're not actually counting the ants.

**Question:** I was so impressed with the management of this land on the recent field day, it was lovely to see this beautiful country being cared for and the enthusiasm of the rangers who were learning the practices. Do you have any news on the future funding for IPAs?

**Michelle:** The Australian government has announced another 5 years of funding for IPAs from 2018 onwards