Conference Proceedings – Speaker Transcript

Habitat features of open forests and woodlands in relation to disturbance by fire

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Link to slides

Thank you – I hope I am able to put some of the key points across on behalf of Peter Croft today (Slide 1). I also have to thank Allan York for taking a lot of the thunder out of some of the things that will be discussed in this presentation. Firstly, I'd like to provide some background about why Peter was looking at this study. One of the things we were looking at is the fire frequency thresholds. They've been developed, as Allan was showing, based on plants, but not really based on anything else, really. We haven't really included fauna into that situation. The research, as we were told, is still in some ways in its infancy. It really didn't start that long ago. Most of the research that was done to develop these thresholds was basically on that lower end of the scale, that frequent fire period. So people went out and they had BACI (before-after-control-impact) designs and all sorts of things but it was really about what happens in those first 10 to 20 years of recovery after fire.

Then there was an assumption made about what might be the maximum and at that maximum, we really don't know what happens afterwards. But by putting a maximum onto that fire frequency, there gives an impression and that impression might be that things are going to collapse, things are going to get worse, if we don't burn within that threshold. What that tends to do, though, is lead us into a situation where we don't really know what value of long-unburnt areas have, what they might contain that's important. These areas are becoming increasingly threatened in the landscape. As soon as something goes over its fire threshold, there seems to be a need to go out and burn it, to bring it back to a healthy state.

We wanted to go out and have a look at some very long-unburnt sites that we can prove they have been long unburnt. Is there anything in them that we should be worried about? And should we really be going out there and causing the extinction of a pyro-sequence that's becoming rarer and rarer in the landscape?

We're going to present just a few small aspects of Peter's thesis (Slide 2). I'm still prompting him to finish a couple of papers. As you know, with fire there's a lot of political demand to go

out there and burn and reduce the fuel loads in the landscape. With climate change, we're going to get more fires coming through, and we'll probably get higher severity. But everything that we burn is habitat to something, so there's always a consequence with every management decision we make. Some of the things that Peter noticed, while walking round in the bush for many decades, were that charred logs seemed to have less fauna underneath them and the same with charred bark. So that was the basis for a couple of the experiments that he decided to set up and see what was going on. Of course, we all know logs are really important habitat on the ground for all types of fauna (Slide 3).

This is the first one that I'm going to talk about (Slide 4). That's one of Peter's experiments. He's been very clever in coming up with some designs. Logs on the ground burn and they disappear into ash, that's even when the drought index is quite low (Slide 5). Even sometimes when there's still a bit of moisture around. They can just smoulder away for a very long period of time until they completely disappear from the landscape. Some of these big logs, well, they're just such important habitat but they take a very long time to be replaced.

Peter went out and collected 240 hardwood posts, and he burnt 120 of them (Slide 6). He set them out in an experimental design with a fire that had been recently done. So, he put half of them in a recently burnt area, half of them in an area that hadn't been burnt for some time. He placed unburnt and burnt logs side by side (Slides 7-8). Every month he'd go out and flip them over and check if anything was recolonizing.

There's some of the logs (Slide 9). There's some of the critters underneath (Slide 10). Basically, the results were, as you can see there, his observations were quite correct. He was particularly looking at invertebrates, but also looked at vertebrates as well. The results showed the critters seemed to like uncharred logs (Slide 11). The vertebrates took a little bit longer to get under the logs, but anything that was charred certainly had a statistically significant less abundance. We need unburnt logs in the landscape. If you start to burn them, animals don't like them so much and it takes a very long time to start to replace unburnt logs in a landscape that's been burnt (Slide 12).

The next one was bark (Slide 13). I saw a poster out there about candling, so this might be of interest to a project like that. Lots of animals use bark. Again, Peter concentrated on the insects here, but fauna really like bark as well (Slide 14-15), for example lots of birds run up and down the bark to try and grab the insects that live amongst them. And of course, bark is fuel for fires and we like to reduce fire fuel loads (Slide 16).

Peter went out and blow-torched a whole lot of different trees with different bark types (Slide 17). There they are there (Slide 18) and he came up with a nice little design where he wrapped them with plastic and put some alcohol in there and collected all the insects that had been on those trees (Slide 19). There's a nice cockroach for you (Slide 20). What he got was a statistically significant result on all of the bark types except the errant ironbark (Slide 21). It

was still statistically significant, but it did the opposite of everything else. So, gum-bark, box-bark and stringy-barks all had much reduced insect abundance and diversity, whereas the ironbark seemed to go the other direction.

Just to go back, one of the things that came out of restoration of these burnt bark types, based on some other research that had been done in Australia as well is that, for stringy barks in particular, it might take up to 20 years before the bark returns to a state where it has the same diversity and abundance of insects as it has in an unburnt state. So if you go around burning the bark off the trees, it can be a very long time before it really gets back into a balance.

Peter had another survey (slide 22). Some of these sites were considered to be very long unburnt (Slide 23). In fact, he went back through historical records, he spoke to all the landholders on the farms and he tried to pick places where there was intergenerational knowledge, where landholders had had their parents and grandparents and so forth on the landscape, on the land, to see what the fire histories were. Plus he also tested that with characteristics in the landscape, such as the skirts on *Xanthorrhoeas* and things like that, to verify fire histories. He then went and he looked at all sorts of habitat features, the shrub cover, litter cover, litter depth, logs, log hollows, even spider webs and spider web types, and all sorts of things like that (Slide 24).

Of course, everything, all of those measures, you know, shrubs and everything, are habitat to something (Slide 25). Of course, when we do hazard reduction and all sorts of other burns, that habitat is fuel, and we want to reduce fuel loads. So, we're getting a contradiction here about what some animals need and what we are trying to do to manage our fire threat. Of course, these days, one of the things that certainly worries Peter is we're getting into areas that we never got into before for burning, by dropping incendiaries from helicopters and approaches like that (Slide 26). So it's becoming easier to get into places and burn these long-unburnt areas, as time progresses. Some nice shots of everything going in a backburn (Slide 27-28).

Some of the things that he measured included the fallen timber (Slide 29). This graph shows the time since fire and fallen timber and certainly, there's a very significant increase in the length of the logs on the ground within very long-unburnt areas. Not only were there more logs, but they were larger as well. The number of log hollows correlated with the number of logs on the ground (Slide 30), but also, because the logs were larger, they had more hollows in them as well. That was statistically significant, once you get past that 50 year period.

Lots of little critters use these hollows (Slide 31-32). This graph shows at the number of tree hollows in relation to time since fire (Slide 33) and again, statistically, this was much higher in these long-unburnt areas. We just heard a talk about hollows in trees and how burning can knock out a lot of hollow bearing trees. The important thing here too is that the larger trees are the ones that tend to fall over and they tend to have multiple hollows, and also multiple

hollows of larger sizes. So these trees may actually be more important than one tree with one hollow that you often get in regenerating forests.

The fuel load results were interesting, because of course, everyone worries about fuel load accumulation if we don't burn (Slide 34). In the areas in which Peter was looking at, which was the western side of the northern Tablelands and the north-western slopes, the fuel load was not as statistically different at 50 plus years, as it was at 0 to 7, which is when we're normally burning. In fact, it's the time in between where the fuel loads are quite high. So if we leave it long enough, those fuel loads actually go down to a point where you probably don't need to burn.

Here is a picture of a long-unburnt area (Slide 35). As a summary (Slide 36), for the communities in which Peter was working, the dashed line shows the upper fire threshold. That's when everybody says, "Oh my God, we have to burn now or it's going to degrade." For many of the features that we say we want, these tend to improve past that point of the upper threshold. So we're getting more fauna habitat at the time when we're starting to want to burn it.

Fuel loads are dropping because initially shrubs increase, but if you leave it long enough they come back to a much lower balance in the landscape, so that reduces. The litter, like the previous graph showed, tends to drop off and get closer to where it is if you're burning regularly. So, basically, if you leave it long enough, it self-perpetuates. You don't have to go in and start burning all the time to get what you want.

One of the things we need to think about is that the fire thresholds that have been put out there are now 30 years old and they were done in a time of much less knowledge. Maybe we should start to think about those upper ends of the fire thresholds and whether there is a case for protecting some very long-unburnt areas. It's the concept of death by 1000 cuts. If we do things like candling, if we do things like burn everything we have within fire thresholds then those trees are going to collapse, those logs on the ground are going to disappear. Maybe we're creating a kind of fauna desert out there if we're not very careful about what we do.

Questions from audience

Question: Pete Juniper, Northern Beaches Council. Hi, thanks for your presentation. I was impressed by the component of the study with the posts laid down on the ground. As far as an insect is concerned, what is the difference between a charred log and an uncharred log?

John: Not being an insect, I really don't know. All we know is that there's a difference and they don't like it. Maybe there's an entomologist around somewhere.