

## Conference Proceedings – Speaker Transcript

### The State Mine Fire, October 2013 - Patterns of vegetation recovery

**Roger Lembit**

Gingra Ecological Surveys

[Link to slides](#)

My work in the area that I'm going to cover today goes back to the early 1980's and links to recent events when on the 16th of October 2013, while I was working out in the field, the Defence department decided to conduct a little burning 'experiment'. I was out on a fire road about ten kilometres to the east of the ignition point and was advised that I needed to get out, and on the way out I stopped to take a photo (slide 2). The photo was taken a couple of hours after what is now known as the State Mine fire started. This image was about the time that the unexploded ordinance was starting to catch on fire and explode as part of it. The next image (slide 3) shows the ultimate extent of the fire. The weather conditions the next day (17th) were quite amazing, with very strong winds, 60 to 100 kilometre an hour winds. Within 24 hours there had been a 30 kilometre run of fire in the middle of October, which to my knowledge has very rarely or never happened in the Blue Mountains like that in October. The fire history of this area, just before I started working in the area in the summer of 1979/80 there was a similar fire at some stage during the summer. I haven't yet managed to find an actual date for when that fire started. Then subsequently in December 1997 there was another fire. The fire interval at that stage was 18 years, and then between December '97 and October 2013, 16 years.

The type of habitats that occur in the area I'm studying include Newnes Plateau Shrub Swamp which are listed as an engendered ecological community. There are other interesting habitats surrounding sandstone formations known as pagodas. There's lots of bare rocky areas and heath which grows in soils that are very shallow. They're the habitats where my monitoring sites are. Some of sites that have been monitored to produce the data for today's presentation are swamp sites that were established in 1991. They've been running for 24 years now and other sites were established in 2004. So we had nine years of pre-fire data as well as post-fire data.

In terms of the swamp habitats they're very exposed once a fire happens and an important factor in recovery is the extent to which there's rainfall afterwards. After this October 2013 fire there was about 100 to 150 millimetres in November. But it was steady rain, it wasn't intense rain, unlike after the December '97 fire when there was an intense rainfall event in January not long after the fire. There was a lot of movement of the swamp sediments after that fire but not this one.

In the field with the monitoring sites I've got, after the fire, I've undertaken an assessment of the fire intensity based on characteristics related to the degree of impact on the shrub and ground layers. (slide 5) So I have four categories; unburnt sites, one of which was just outside a back burn area. Sites with moderate impact, they tend to be pagoda sites where the fire doesn't pass through the landscape as thoroughly as in other spots. The species richness curves for those different fire intensities are there.

So the unburnt sites are relatively stable in terms of species richness from spring 2012 which is the baseline I've used for this graph (slide 6). The sites with the highest fire intensity were the sites with the most rapid reduction in species diversity, but recovering now to pre-fire levels even within 18 months after fire. These slides show the recovery. This image is 15 days after the fire (slide 7), *Xanthorrhoea* is starting to regenerate, that's the part of Goochs Crater which is a sphagnum bog and that shows the impact of the fire on that landscape. This is 12 months after the fire in heath country (slide 8). This shows the extent of recovery, mainly re-sprouting species.

What I've also done with the data is try to put finer categories on the fire responses of the different species (slide 9). These are the categories I've derived. We've got decliners, but we've also got these species like *Gahnia filifolia* which have increased in cover/abundance since the fire. We've also got these species like *Actinotus forsythii*, the Pink Flannel Flower which has appeared. It wasn't in any of the sites in the nine years prior to the fire but its present now.

To sum up there are different impacts of fire intensity and there's a different pattern of species response based on the fire intensity. The recovery, particularly in the swamps, is related to post-fire weather conditions. The next image (slide 10) is of Goochs Crater 12 months after the fire. That was the area of sphagnum bog that had been burnt significantly. There's a range of species responses and drawing out those species responses could be important in understanding patterns if you're undertaking intervention in these sorts of habitats. Thank you.

#### Questions from audience

**Q** – Roger, was there any peat burning or sphagnum bog burning that resulted in bed lowering in these swamps?

**RL** - There is localised patches of burning. So yes, in one swamp I'm monitoring the peat was burnt to the mineral soil. There's sandy soil, so about 45 centimetres of peat was completely consumed. That particular swamp the peat has probably been around since the last ice age. So you're talking 10000 to 15 000 years. One of the swamps has had paleontological study cores taken and it goes back beyond the last ice age to 60 000 years of sediments. I haven't been into that particular spot since the fire, so I'm not sure how it was, but it was close to Goochs Crater. You saw at Goochs Crater with the photos that there was a bit of variation in the impact, so hopefully that other one, the 60 000 year old sediments have survived.

**Q** – I was just wondering about the intensities. You gave four different levels of intensity. When we do that in woodland we generally arbitrarily say that a certain scorch height will be a certain intensity, but I was wondering how you establish those in this case.

**RL** - All the sites pretty well don't have any trees so the extent to which the shrubs have been consumed is part of that. One of the photos showed just sticks of shrubs that were so high (30-60 cm), whereas the original shrub might have been that high (1-1.2 m). The extent to which those were consumed, whether there's dead leaves on some of the shrubs or not. Some of them, the fire trickled rather than burnt really hot in the ones that were moderate. The same with ground layer. It's a bit to do with the patchiness of the fire. So if there are patches of ground layer plants that they were still green after the fire, that was a different category to where one of the photos showed just a completely bare understorey, just an ash layer in the understorey.