

Symposium Field Trip

# *Practical methods for bolstering the grassy woodlands*

Notes prepared by Dr Peter Mitchell, Biolinks Alliance

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## **Summary**

*The afternoon of the symposium was spent looking at two sites where various methods were being tried to bolster the quality of grasslands in degraded sites. At the Euroa Arboretum, Cath Olive and her team are continuing the work of several decades to convert a formerly grazed paddock and more recently a VicRoads work site into a diverse and healthy grassy woodland ecosystem. Three aspects of this work were discussed during the day: the production of seeds needed for climate-ready revegetation, the use of scalping and re-seeding to return degraded areas to native grassland, and the use of fire, and particularly Indigenous burning, to manage the land.*

*The second visit was to "Wetlandia" at Miepoll, where Justus and Janet Hagen are using natural regeneration and direct seeding to restore habitat complexity and ultimately to increase the diversity of fauna using the land. In summing up, Paul Foreman raised the question: "How do we scale up the work from small areas to the large areas we need for conservation?" The work at Wetlandia and other examples were discussed.*

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## Site 1: Euroa Arboretum

At the Euroa Arboretum, Cath Olive and her team are continuing the work of several decades to convert a formerly grazed paddock and more recently a VicRoads work site into a diverse and healthy grassy woodland ecosystem. The site is in a shrubby outwash community with a sandy substrate coming off the granites of the Strathbogie Ranges – so is different from the riverine plains further west. It has a deep reservoir dug for road building.

Initially the site was dominated by Phalaris, Paspalum, Sweet Vernal Grass and other introduced species. The challenge has been to get the native ground cover back.



Cath Olive and Justus Hagen at the Arboretum

## Production of seed for climate-ready revegetation

*Presented by Jim Begley, Goulburn Broken CMA*

Euroa Arboretum and the Goulburn Broken Indigenous Seedbank at Dookie, with the Goulburn Broken CMA, are developing ways to produce larger quantities of seed from a wider diversity of species for revegetation work. In the past, most seed collecting was done along roadsides. Only small amounts (if any) were collected for many species, and from the same few plants every year. In addition, the prevailing wisdom was to collect indigenous seed – seed from plants only in the local area.

In the early 2000s, Sally Mann began to develop a seed production area at the Arboretum. For the targeted rare species, seed was collected from the last remnant populations. The technique involved the use of mats to collect large amounts of seed dropped by the plants in the seed production area, something that could not be achieved in wild populations.

Also, the idea of restricting collections to local populations had changed, thanks to studies of plant genetics by people including [Dr Linda Broadhurst](#). Linda has helped guide subsequent projects to draw from a wide diversity of populations and create opportunities for more cross-pollination. Linda showed that seed production areas such as those at the Arboretum had much better genetic diversity than wild populations. But even this is limited by the bottlenecks affecting the genetic diversity of many wild populations.

One example of this work is the Silver Banksia Project. One widely distributed across the landscape, the species is limited to a few very small remnants scattered across the region.

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Seed has been collected from these remnants and plants grown at the Arboretum. Mixed-provenance plantations have been established in many places across the Goulburn Broken Catchment to establish populations with wide genetic diversity.

The team have classed species as:

*A list:* species that are easy to obtain seed and use in direct seeding

*B list:* species that are hard to collect from, hard to obtain sufficient volumes of seed for revegetation, and don't do well using direct seeding (where treated seed is planted directly into the site and large areas can be more easily revegetated).

*C List:* too difficult to grow. Cherry Ballart is one example, although recent studies showed seeds in emu faeces do germinate).

Seed production is expensive – including the initial cost of seed collection. The Federal Government's Biodiversity Fund provided \$1 million for the work. The GB Seedbank continues to collect and distribute seed, under the management of Goulburn Valley Energy. And the Euroa Arboretum continues to run its seed production areas, with a lot of volunteer helpers. But the seed remains a major cost in revegetation seed work.

## Scalping and reseeded

*Presented by Cath Olive, Manager of the Euroa Arboretum.*

Cath described trials at the Euroa Arboretum using scalping of the soil to remove weeds seeds and nutrients followed by seeding to re-establish native grassland communities. She demonstrated the results of scalping trials done in 2016 and 2018.

Part of the site was very boggy grassland, so wetlands were created in 2012 with shallow scrapes that created ephemeral ponds that dry out in summer. Removal of topsoil in the ponds successfully eliminated the weeds.



Fig 1: Boggy grassland with topsoil mounds on right



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Elsewhere, spraying over several years failed to really control grassy weeds. Cath consulted with grassland experts Paul Gibson-Roy and Lisa Rasmussen. Soil tests were carried out. Phosphorus and Nitrogen levels were tested at 5, 10 and 20cm depths. Olsen P was around 10.

They also tested for weed seeds and found these dropped out below 10cm. So scalping was tried over a 1.2ha area in March 2016, removing soils down to 10cm. 60kg of seed was then applied from the seed production area in the Arboretum and from wild plants along roadsides, together with grass seed from the Dookie Seedbank. Seeding had a mixed success – lilies did not come through. But other species not in the mix did come through, including the rare Euroa Guinea Flower, which grew in abundance in the scalped area, and a variety of peas. These species must have been in the deeper soil layers and germinated after the scalping. A second area was scalped in 2018, and a lot of daisies came up.



Fig 2: Scraped grassland in Spring 2017 showing Hoary Sunray and other daisies growing between the grass tussocks

The main message from these trials is the lack of weeds after treatment. The seed bank in the soil had been successfully removed by the scalping and almost no maintenance has been needed – perhaps once or twice per year and maybe 5L of poison over 1.2 ha. Tree seedlings are removed when sighted. The only species we have had to follow up on is *Paspalum* with spot spraying and this is almost unnecessary now.

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It is now Year 4 since the first site was scalped and sown, and its the first time Cath has thought about some little patch burns to reduce grass biomass and open tussock spaces.

The edge interface of the scrape is an area of particular interest. If there is effective weed control, will seed naturally spread? What they have seen to date indicates this is not happening particularly well, with little germination outside of the scrape, despite the good weed control.

Weeds in this zone were Onion Grass, Sweet Vernal Grass and Annual Veldt Grass. Cath tried spraying Onion Grass 6 weeks and 8 weeks after emergence. Interestingly, Sweet Vernal Grass was knocked out by the 6 week but not the 8 week spraying. Annual Veldt Grass under trees was removed where scalping could be achieved; ground closer to the tree and its root system were not scalped and the weed has persisted in those areas.



Fig 3: Interface between the scraped area (on right) and area treated for weeds on left.

Cool burns have also been tried with mixed success. Cool burns were very successful after the autumn break when the Veldt Grass had germinated and while the sites were still dry. Fire seems to be the best way to control Annual Veldt Grass – significantly better than spraying or hand weeding (which is just a big effort).



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Cath plans to trial some soil disturbance in patches to attempt some natural regeneration near the interface with the scalped areas.

Cost of the project was around \$50,000 per hectare, with seed as the biggest cost.

## The use of fire using Indigenous burning practices

*Presented by Shane Monk, Taungurung man, and Phil Hawkey, Country Fire Authority.*



Shane Monk (left) and Phil Hawkey demonstrating the use of fire at the Arboretum.

Cool burning is very opportunistic it should be carried out when the country says it's ready. The ingredients needed for manageable and effective cool patch burning are:

1. **Fuel:** Flame height is generally twice the height of the fine dead fuel. Phalaris and Cocksfoot can have a lot of tall fuel and hence flames that make fire difficult to control. But it can be flattened to the ground. In comparison, native grasses like Kangaroo Grass remain green even after long dry periods, making fire much easier to control. Slashing along the edge of a fire also makes it easier to control.
2. **Fuel moisture** in the fine dead fuel needs to be between 10 and 20%. Instruments are available to measure fuel moisture (based on air temperature and relative humidity - see [here](#) for more information). An alternative is the "crackle factor", and this requires experience in reading the bush.
3. **Weather** – the temperature, humidity and wind speed – is important to consider before burning. Fire needs a bit of wind but not so much that the fire becomes uncontrollable. Wind is measured using the Beaufort Scale (see [here](#) for descriptions of the appearance of wind speeds).

## *Test burns:* if you are uncertain about burning

1. Use a 44 gallon drum without top or bottom, and with some holes punctured in the sides, to test the fuels. Place the drum upright over a representative sample of vegetation. Throw in a lighted match. If the flames come out the top of the drum, it is probably not safe to burn. This provides some idea of how much heat is put out by the burning grass and how easy it would be to extinguish with water.
2. To then assess the effect of the wind, spray water around a circle of dead fuel. Cool burns produce white smoke (cleansing smoke). If the smoke is dark and dirty, it is too hot.

## *Other considerations*

- Fire Danger Ratings: only do cool burns outside the Fire Danger Period and when the FDI is cool to moderate (in the green part of the chart in your local area).
- Resources: CFA require a minimum of two people for a 200ha fire plus equipment to control the fire.
- Contact the Country Fire Authority to [register your fire](#), so they know it is a controlled fire and not something they need to attend to.

## *Doing the burn:*

Cool burns are done as backing fires. Heading fires travel at the speed of the wind and in the same direction. Flanking fires travel at about half that speed, and backing fires are slow and most manageable. Sparks can carry fire forward beyond the front of the fire; a backing fire means sparks fall safely towards control lines and burnt ground.

Fig 4: Demonstration of back burning at the Burge Family Reserve in Gobur, with Shane Monk (in the burnt area) and Phil Hawkey (behind). Wheel tracks with short green grass were sufficient for a fire break. Even grass wet with a watering can may be enough.



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## *Indigenous burns*

Shane described how the Taungurung people and other Indigenous groups are getting their knowledge back so they can better manage the land. They are learning by doing – and exchanging ideas. At the same time, they are learning how to avoid impacts on the plants used for food and medicine and on the animals. They are fully booked at present to do these burns and there is a demand for more Indigenous burning.

The groups are monitoring their results and will be recording their experiences. Ultimately, they hope to open the practice up to the public, to a point where landholders will have the knowledge and confidence to manage their own land.

One issue raised in the workshop was about burning in forested areas where there are often massive fuel loads and current DELWP burns can be too large, hot and destructive (thanks in part to the demand for fuel reduction burns every year). The Dja Dja Wurrung are working with DELWP who have the equipment needed to control fires in this environment.

The workshop ended with the saying:

*If you burn country you change it, if you don't burn you change it.*



## Site 2: “Wetlandia” at Miepoll

*Hosted and presented by Janet and Justus Hagen. Janet is facilitator of the Hughes Creek Catchment Collaborative and the Strathbogie Ranges Catchment Management Network. For more information and images of the property in different seasons, go to the Powerpoint: Wetlandia 2011 – 2019: a landscape restoration project.*



The 130 ha property was purchased by Janet and Justus in 2011, and 30 ha of Crown frontage to Seven Creeks was added under a Conservation Licence. The property was grazed for a long time. The previous owner had a low number of sheep and did not use fertilisers. However, he laser-levelled about half the property in 2009 and tried cropping for two years; the crops were lost during two big wet years. One adjoining property has 50ha of covenanted land along the creek, but most other neighbours are cropping.

Janet and Justus first visited a few years earlier to do direct seeding along the laneway, and learnt about the rich diversity of these flat and “featureless” plains. When they purchased the property, their aim was to restore the habitat complexity, using natural regeneration and direct seeding, and ultimately increase the diversity of fauna using the land. One key aim was to retain large areas of open grassland. The property (outlined in blue) is now protected with a Trust for Nature covenant.



Fig 5: “Wetlandia”, Miepoll.  
Property outlined in blue.

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Although EVC maps show Plains Woodland with an area of older Red Gums mapped as Plains Grassy Wetland, the site is much more complex – and interesting:

**Box Grassy Woodland** in the southern corner: existing woodland with native grasses and a few logs, but no understorey. The site was successfully enhanced by direct seeding of understorey, but three attempts to plant Buloke tubestock have been unsuccessful. Plantings near trees were mostly unsuccessful. Herbicides were not used during revegetation to avoid killing existing native species, although generally it is difficult to establish shrubs against the competition from grasses.

**Gilgai country** through the centre of the property: 57ha area with cracking-clays that expand and contract to create a gilgai terrain with crab-holes and humps. This terrain is the site of Seasonal Herbaceous Wetlands. [Seasonal Herbaceous Wetlands](#) are listed as critically endangered under the federal Environmental Protection and Biodiversity Conservation Act (EPBC Act). This dry paddock transforms after rain into a rich diversity of Drum Sticks, Blue Devils, Broughton Peas and many other species. Damien Cook, from Rakali Regional Consulting and an expert in SHWs, is monitoring the wetlands. One management issue is the Saffron Thistle (a Regionally Controlled Weed under the CaLP Act) that grows on the humps; it needs spraying when everything else is in flower. Doug Robinson said that Saffron Thistles are a common problem across the wetland areas of the plains. They are a pioneer species in these seasonally disturbed sites, but are killed in flooded areas.

**Plains woodland** across the northern part of the property. Without grazing, Red Gum regrowth is massive. The aim is to have a more open, patchy grassy woodland and more diversity of trees (including Grey Box). Cassinia regrowth is a good start in this area. Two areas totalling one hectare were scalped and planted with Drumsticks and Blue Devil; the Drumsticks grew very well. A small test burn was also tried but this encouraged the thistles.



Fig 6: Box Grassy Woodland



Fig 7: Plains Woodland



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**Red Gum Swamp:** this area in the centre of the property has some old Red Gums and many large but younger gums that post-date the building of drains along the laneways. Local flooding happens about every five years. Floods in the Seven Creeks do not affect the wetlands.



Fig 8: Red Gum Swamp in dry and wet times.

**Seven Creeks riparian area:** leased Crown land on the eastern edge of the property contains many billabongs. Damian Michael has put out tin and tiles to monitor reptiles and amphibians.

**Monitoring:** A key part of their work has been to establish monitoring points to record the changes from paddock to woodland. And Birgita Hansen from Federation University has set up 10 transects to monitor the changes in bird populations as the habitat on the property is transformed. She monitors 4 times each year and now has 7 years of data.

**General management:** Weed control has been a major focus. Janet and Justus have sprayed to get rid of Phalaris and other weeds. They have slashed to make it easier to control introduced grasses and thistles, and tried burning; burning was not successful the season they tried it. About 200 kangaroos use the site but don't do too much damage. Janet and Justus are working out how many kangaroos the property can sustainably support.



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## Scaling up: summaries of the afternoon

*Discussions were led by Paul Foreman and Dr Doug Robinson. Paul is an ecologist based in Castlemaine and Chair of Biolinks Alliance. Doug has a conservation property near Violet Town and is the Conservation Science Coordinator with Trust for Nature (see [here](#)).*

Paul raised the question:

***How do we scale up the work from small areas to the large areas we need for conservation?***

He said that, in the 1990's, there were few grassland reserves on the Northern Plains. Since then, private landholders, conservation trusts and the State Government have turned this around. From a few hundred hectares we now have thousands of hectares of protected grasslands managed for conservation. With this groundswell, there is now enough land to turn species around. One example is the successful growth in populations of Plains Wanderers through the Riverina. (Doug noted that Paul has been a leader in this scaling up of protected areas in northern Victoria.)

Janet and Justus have been trying to scale up, using current best practice. But it is getting harder to do – and time may show that it doesn't work. Many other landholders are doing similar work on the same scale (including Doug Robinson and Sally Mann on their land near Violet Town). It all takes a lot of time. And money. Private land management can attract some funding.

Doug spoke about his experience in scaling up of conservation from individual sites to landscapes. Doug worked on Grey-crowned Babblers across the Longwood Plains west of the Hume Freeway. He began work in the 1990's fencing and revegetating areas of 1-2 ha at a time. Then came Biodiversity Action Planning across the Plains. They identified the habitat they wanted to conserve and restore, focussing on priority species. For example, Grey-crowned Babblers need habitat adjacent to their existing habitat. With Susan Sleigh facilitating the work, around 100ha were protected and restored each year for many years. The work continues, scaling up site by site and paddock by paddock.

Doug's experience and wisdom gained from this work were presented in a talk on "The Babbler Project - linking people and land" at the 2017 "Linking the Landscape" Biolinks Alliance Symposium (see [here](#)).