



## Jamison Creek restoration project

**Led by:** Janet Rannard, Penrith City Council

**When:** Wednesday March 12 1:00-3:00

**Where:** Leonay Oval, Leonay Parade, Leonay (100m from Russell Street, Emu Plains exit from M4, entrance next to Emu Plains Golf Club)

**What:** Jamison Creek flows from the Blue Mountains City Council escarpment through the suburbs of Leonay and Emu Plains through Leonay Reserve, Hollier Reserve and Huntington Reserve to the Nepean River. A Plan of Management has been prepared for the lower Reserves along the Creek. The riparian corridor contains remnant Cumberland Plain Woodland and Sydney Coastal River-flat forest. There have been three successful grants in the past three years. Two in the upper catchment and there is currently an Environmental Trust grant for three years for the lower reserve, called Huntington Reserve. There has also been a Green Corps team working in the reserve between June and December 2007. This event intends to show how degraded the sites were, what work has been completed to date and what work still needs to be completed. The sites are a very short distance from the M4 intersection with Russell Street at Emu Plains.

**Cost:** free

**Bring:** closed shoes, hat, water, raincoat, jumper

**RSVP:** Janet Rannard, 02 4732 8088, 0407926386, jrannard@penrithcity.nsw.gov.au

## Wolli Creek Regional Park

**Led by:** Paul Ibbetson, DECC This is a joint event with the Wolli Creek Preservation Society, the Department of Environment and Climate Change and AABR

**When:** Wednesday April 23 1:00-3:00

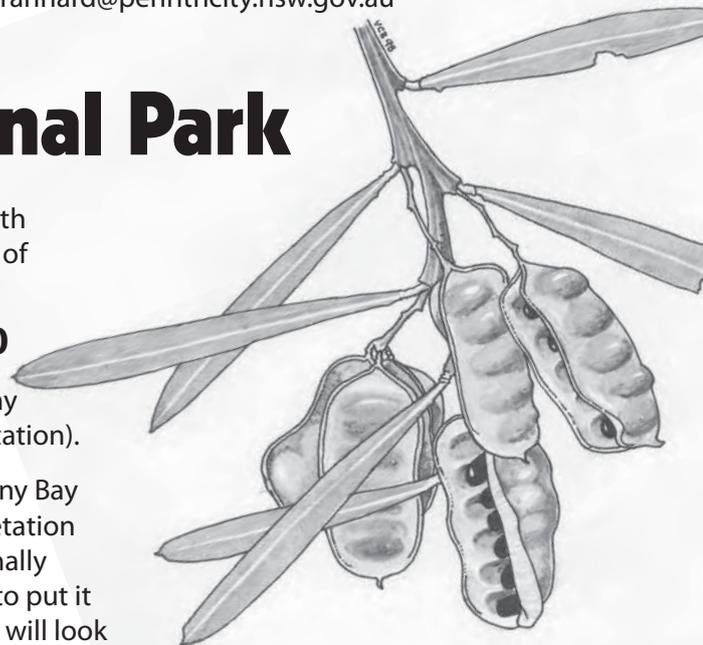
**Where:** Meet Corner of Hartill-Law Avenue and Bray Avenue, Earlwood. (a short walk from Bardwell Park station).

**What:** Wolli Creek flows from Beverley Hills to Botany Bay through heavily urbanised areas. Some remnant vegetation remains along parts of the lower section and is regionally significant as a wildlife corridor. It has survived plans to put it under a freeway and decades of neglect. The site visit will look at some of the many issues facing the Park including weed invasion, stormwater and landscaping and look at what has been achieved in bringing back the bush.

**Cost:** free

**Bring:** closed shoes, hat, water, raincoat, jumper

**RSVP:** Paul Ibbetson, 02 9337 7023, 0438 274 749, ibb56@yahoo.com.au



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# President's Perspective

Hi Folks

Another busy year in bush regeneration and if things in your part of the world are growing as quickly at the moment as where I am, then it's only getting busier for you as the year draws to a close! The wet weather has been a welcome respite from years of dry, but of course it also serves to remind people of just how fast weeds can grow in a good season. The good thing around here though is that the mid year rain helped with putting on a bumper flower season around late winter and spring, then one of the best crops of seed I've seen in years from many of the local shrubs and grasses. Hope you have similar good reports too.

Earlier this year Ryde TAFE hosted a meeting of bush regeneration contractors to discuss any issues with the training they provide and how it meets the needs of the industry. It was a lively meeting with a lot of great comments and ideas, and as might be expected it led to talk about issues affecting the industry generally. One of the biggest that was raised, and has certainly been often highlighted in the past, is the high turnover of trained staff and the difficulties faced in keeping experienced and trained bush regenerators working on the ground. This has many ramifications for both contractors and land managers in maintaining quality of on ground works given the complexities of plant id and vegetation dynamics when working across various vegetation communities in an enormous variety of situations.

The AABR schedule of rates has certainly done a great deal to helping improve pay and conditions in recent years, but is still not enough. At a time when there's more money being spent on bush regeneration than at any time in history we are still hard up trying to develop a workforce skilled and experienced enough to meet the demands. To address this we need as many people as possible to contribute over the next few years. In the new year a short survey will be circulated as widely through the industry as possible to get everyone's thoughts on where the bush regeneration industry is at and where it is headed. Look at the AABR website and follow the link to the list of 30 issues identified previously for some more information on what we are looking to try and address, and keep your ear to the ground for further developments on this next year.

While you're looking at the website check out all the new stuff! AABR has recently released a report with WWF giving a snapshot of the work bush regenerators do, particularly with respect to garden escapes (see page 3). I did a presentation of this report at the recent weeds conference in Wollongong in September, and you can now download the entire report from the website. The website is regularly updated with upcoming events, new documents and heaps of bush regeneration jobs, so check it out!

Anyway, that's all from me from the time being. I'd like to wish you all a safe and merry festive season, and may all your Christmas bushes be free from privet.

Regards  
Matt

## Welcome to new members

Melissa Farrell  
Grant Phillips  
Don Cameron  
Sarah Jane Dempster  
Nick Gistitin  
Peter Ardill  
Marcus Burgess  
Tom Clarke  
Melissa Farrell  
Ruth Joan Lampe  
Kimberley Moule  
Russell Moule  
Lana O'Sullivan  
Grant Phillips

## New exhibition "Impact, a changing land"

A new exhibition at the State Library of NSW has displays about bush regeneration in Sydney, including the Bradley sisters and Kellys Bush.

It is on until late February 2008.

## Ecological Management & Restoration (EMR) seeking short notes.

Have you a small project (or part of a bigger one) that would make a good short note for EMR? Please send any ideas or submissions to the editor, Tein McDonald. The editor can provide feedback on early drafts regarding their suitability for EMR and a peer review will be carried out once a final version of a note has been submitted. Topic categories are:

1. Rainforest
2. Grassland / grassy understorey
3. Wetland
4. Other communities
5. Fauna & habitat
6. Coastal
7. Marine
8. Riparian and stream ecology

9. Ethics & philosophy
10. Planning, monitoring & assessment
11. Policy and legislation
12. Landscape pattern & design
13. Integrating ecosystems & production
14. Cultural & socio-economic issues / solutions
15. Restoration & management theory
16. Techniques & methodology
17. Threatened species
18. Genetic issues
19. Indigenous land & water management
20. Weeds & feral animal control
21. Landscape arts & aesthetics
22. Education & communication
23. Community involvement
24. Organisations

Tein McDonald, Editor EMR  
02 6682 2885 teinm@ozemail.com.au

# Press release for garden escapes report

## Regenerators and volunteers battling an ecological bulldozer

The Australian Association of Bush Regenerators NSW (AABR) today, with the support of WWF Australia, launched an alarming report that highlights the battle bush regenerators are fighting against a flood of escaped garden plants that are smothering remaining natural areas in eastern Australia.

The report indicates the sheer volume of the bush regeneration workforce on Australia's east coast – an estimated total labour effort of over half a million hours was put into bush regeneration work in 2005 in selected areas of NSW, southern Queensland and northern Victoria. The workforce in the study areas amounted to around 6,700 people – 90 per cent of whom were volunteers. The cost of this work was estimated (including volunteer labour) at \$18 million in 2005 alone. "This large volunteer-dependent workforce is fighting an overwhelming battle against a flood of invasive garden plants that are literally driving NSW's native species to extinction" says WWF's Invasive Species Policy Officer, Nicola Thomson.

The bush regenerators surveyed through the study identified 171 escaped garden plants that have invaded remnant bush areas. The report documents the on-going emergence of new invasive plants as well as established problem species spreading into new areas.

"One of the more disturbing findings of the report is that many of the garden plant species that are confirmed as ravaging NSW's native bushland are not declared under the State's Noxious Weeds Act 1993. Hence the vast majority of these plants can still be promoted and sold as garden plants in NSW," said Jane Gye, an AABR spokesperson.

Last year the CRC for Australian Weed Management released its own report into the impacts of weeds on Australia's biodiversity, which found that invasive plants were the biggest threat to the survival of native species after land clearing.

WWF-Australia has nominated the garden plant invasion pathway for declaration as a Key Threatening Process under the NSW Threatened Species Conservation Act 1995.

"There are thousands of garden plants waiting to jump the back fence and become the next generation of agricultural and environmental weeds. We have a major opportunity to get a suite of plants out of trade before they add to this overwhelming and devastating environmental problem," WWF-Australia's Invasive Species Policy Officer, Nicola Thomson said.

AABR and WWF-Australia are urging the NSW Government to better support the bush regeneration workforce to protect NSW biodiversity.

"The weed problem is likely to worsen unless more resources can be put into natural area restoration. The Government cannot continue to rely so heavily

on volunteer bush regenerators to carry the can for them on this major environmental issue", AABR spokesperson Jane Gye said.

### For more information:

Jane Gye, Australian Association of Bush Regenerators, 0415 647 409

Nicola Thomson, WWF-Australia, 0406 384 288

Notes to editors:

- Weeds identified by AABR as emerging problems in the study areas included; Sheena's Gold (*Duranta erecta*), Seaside Daisy (*Erigeron karvinskianus*), Orange Jessamine (*Murraya paniculata*), Bluebell creeper (*Sollya heterophylla*) – all of which are popular garden plants that are available for sale in Australian plant nurseries.
- Concerned members of the public that want to voice their concern to the NSW Minister for Primary Industries (MacDonald) and the NSW Minister for Climate Change, Environment and Water (Koperberg) can do so using a sample letter that can be downloaded from the AABR site: [www.aabr.org.au/](http://www.aabr.org.au/)
- Consumers are urged to use WWF's list of invasive garden plants as a guide when they shop for plants. The list can be downloaded from the WWF site at: [wwf.org.au/publications/ListInvasivePlants/](http://wwf.org.au/publications/ListInvasivePlants/)
- A copy of the report can be downloaded from the AABR website : <http://www.aabr.org.au/>

### About AABR

AABR was established in 1986 out of concern for the continuing survival and integrity of bushland and its dependent fauna in or near bushland areas. The Association's aim is to foster and encourage sound ecological practices of bushland management by qualified people, and to promote the study and practice of Bush Regeneration/Natural Area Restoration

### About WWF

WWF-Australia is part of the WWF International Network, the world's largest and most experienced independent conservation organisation. It has close to five million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. This is achieved by working on the ground with local communities, and in partnership with government and industry, using the best possible science to advocate change and effective conservation policy.

# AABR workshop: why collect seed?

*On November 10 2007, Ross Rapmund led a workshop on seed collecting at Hornsby Shire Council Community Nursery in Sydneys North, where he is manager.*

*Ross prepared this discussion paper for the workshop. The group observed how seed management is applied at the nursery, then visited adjoining Pennant Hills Park to consider some of the practicalities of seed collecting.*

Generally speaking we are undertaking seed collection to reintroduce local species to a site that has "lost" them through detrimental disturbance factors, and where that site now has limited ability to naturally regenerate these species.

There are many questions to consider before contemplating revegetation.

How do we know what to reintroduce? We can easily use a nearby healthy patch of bushland as a reference zone to get the correct species mix, but will they be suitable to use in the disturbed low resilience area that needs restoration.

- Do we put fire dependant sandstone species in a deep narrow urban sandstone gully that is unlikely to get burnt again to perpetuate these reintroduced species? Will we just keep planting them every time they reach the end of their lifespan, since fire is absent to trigger the germination of their subsequent seed production, as are the more favourable post fire growing conditions they need - like an ash bed, reduced overhead canopy etc.
- Do we plant just plant short lived pioneer species that thrive on disturbance, and walk away without thinking of longer term plant species that live for potentially centuries?
- Do we plant species of a more mesic or non-fire dependant ecology where once it was a dry open sclerophyll plant community, if fire can no longer be a part of a bushland reserve?
- What if the species we want to plant because they are local and indigenous to a particular area will no longer grow there because the conditions have changed dramatically with respect to soil, water run-off or nutrient loading (abiotic factors). Or changes in biotic factors such as reduced/absent mycorrhizal activity.

As a bushland restoration practitioner you may like to reintroduce a species that is seemingly absent from a site through revegetation. It is also important to remember that this species may reappear through other vectors/factors-

- Fauna could reintroduce the species to the site through attachment to fur of an animal; birds could fly in and deposit seed through regurgitation or excretion. Ants being massive predators of seed are subsequently also huge dispersers of seeds.

- Wind dispersal
- Water dispersal
- Time
- Patience
- The correct disturbance factor maybe hindering germination of the "lost" species. The species may be present on site but is hidden within the soil seed bank awaiting correct conditions to germinate.

## Site Assessment

Although in a perfect world restoration projects would run longer than the standard twelve month financial year, this is usually not the case. So how do you factor in seed collection and the supply/instalment of "local" genetic stock? Alternatively long term Bushcare sites or Landcare sites may have the benefit of dedicated volunteer labour and ongoing government funding for successive years.

In either scenario supply of local plants still relies heavily on planning; planning ahead well in advance usually.

Before plant reintroduction can be considered. The following points need to be addressed-

- This is best achieved through having a sound understanding of the site.
- An assessment of the current and likely resilience of the site is crucial
- And, factoring in the reintroduction of local plant material through the overall strategy for the site, whether this is a through a detailed Plan of Management action statement, contract brief in a tender document or simpler site strategy plan as is used for most Bushcare sites.

Put simply, a clear reference point for all involved in the restoration project to bring awareness that local seed will be required to meet the aim or goals of the restoration plan.

A plant order form can be a useful document once this stage is reached.

## Planning Seed Collection

Once it is determined that seed collection and future supply of local plant material is required for a site, the next step is to decide on the most suitable species mix; is it on site, nearby or elsewhere within the local region?

Once this is determined, who will undertake the seed collection?

- Sub contract to a specialised nursery that includes undertaking seed collection?
- A restoration company that includes seed collection in their services?
- Or, is the seed already collected and available through an existing local seed store facility?
- Or do the people on site involved in the restoration project have the necessary skills?

Seed and its subsequent availability and abundance are an extremely dynamic component of the natural

world. What may be common one year may then be infrequently available for several seasons e.g. *Angophora* spp. Successional shift in plant communities post disturbance can see "common" species disappear until disturbance factors that created their niche return e.g. fire and the legume family (peas and wattles). Other factors can include seed predators which can consume nearly all the seasons seed production for a population of plants, e.g. local spider flower *Grevilleas*, (this can also occur post collection of the seed if not correctly managed).

As previously mentioned seed is an extremely variable product. An understanding of local plant biology and ecology can be extremely useful since generalisations are far and few between when it comes to dealing with individual species and their seed. To highlight this example at a genus level *Acacia parramattensis* and *A. longifolia* are local species, but they have quite different life cycles. *A. parramattensis* flowers in early summer but seed is not ripe for another 52 weeks. *A. longifolia* however, flowers in July (mid winter) and has ripe seed available within 16 weeks of flowering.

One generalisation about seed production is that all plants fall into one of either two categories-

- 1 Plants that produce seed regularly and hold that seed on the parent plant all year, often including previous season's production. Examples include *Banksias*, *Eucalypts* and *Allocasuarinas*. Therefore collection can occur all year. They are generally hard woody fruits.
- 2 Or, plants that shed their seed as soon as it is ripe, many of these species rely on their seed being stored in the soil seed bank, for example *Acacias* and *Grevilleas*. These plants often have a small window of time in a season that successful seed collection can be undertaken.

For a local species is to be successfully reintroduced to a site, and awareness of the timeframe its seed is likely to be available in the field is crucial.

Often human error can be attributed to poor seed collection, simple errors can include-

- Incorrect assessment of "ripeness"
- Missing seed because it dropped yesterday
- Poor understanding of when seed is likely to be ready
- Poor collection techniques may render seed unusable
- Incorrect cleaning of seed, storage or recognising dormancy periods.
- Not knowing how much seed volume to collect for production requirements. Many species have large numbers of seed per individual fruit; others may have only one seed per fruit.

Add to these complexities the influences of the natural environment on seed availability, including but not restricted to:

- Changed pollinators in an urban area - are they gone, out competed or pollination just doesn't occur, e.g. Mountain Devils, *Lambertia formosa*?
- Climate, will the now recognised event of climate change disrupt seed availability/seasonality?
- Microclimates, aspect or amount of shade/sun can affect time of seed availability at a micro scale.

- Weather patterns- repeated hot weather can rapidly speed up seed release in species that shed their seed, whilst repeated days of wet weather during flowering may prohibit adequate pollination of flowers by insects/fauna.
- Cooler weather will obviously delay seed availability, pushing it later into the season.
- Fire. A huge topic within its self. This has the ability to totally transform a plant community and its subsequent species make up at any given point in time. Often fire triggers flowering in some species such as *Angophora hispida* and *Lomatia silaifolia*. The regrowth post fire for these plants is the only opportunity for a plant to flower and set seed. Mass seed producing pioneer plants are also common in the first 3-5 years post fire disturbance.
- Position in the landscape in relation to altitude, species at higher elevations will have seed available at a later date compared to the same species growing at sea level.

## The Five Golden Rules of Seed Collection

(taken directly from Florabank)

- 1 Wherever possible target large populations to ensure capture of a genetically diverse sample
- 2 Separate source plants to minimise relatedness of mother plants
- 3 Collect similar quantities of seed from mother plants so the sample is not biased toward any one mother plant
- 4 Only collect from plants that have produced seed from synchronous flowering events and,
- 5 Document your collections securely.

## Assessment of Ripe Seed

Assessment in the field for ripeness of seed usually entails visual cues, these can include:

- Colour change, i.e. green legume pods turning darker in colour (before splitting however!)
- Texture change, this can go one of two ways; either soft or green to a harder woodiness such as *Hakea sericea*. Or, in the case of a berry producing plant, hard green fruit to soft coloured fruit.
- Ease of removal, usually the peduncle (stem section attached to the fruit) becomes brittle and fruit is easily shed, think of picking a ripe plum or citrus.
- Presence of fauna. Birds and other creatures maybe feasting on fruit that is ripe, generally since sugar contents of the fruit are at a peak or a colour change has occurred to indicate fruit is ripe.
- Harvesting green fruit. Some species can be collected whilst still appearing in an immature stage or "green" stage. This takes practice and experience in recognition but examples include *Microlaena stipoides* easily dislodged from the seedhead while still green, *Grevillea* spp. once fruit are full size on the cusp of colour change since seed is rapidly expelled soon after (within

hours). *Syzigium smithii* (syn. *Acmena smithii*) is a further example that can be harvested at a green stage provided fruit has reached full size.

## Seed Storage

If coordinating a seed bank it may be important to collect more substantial volumes of seed from those species that produce well in erratic years, such as *Angophora* spp. This can allow for plant production in subsequent years when fresh seed is unavailable; provided of course that it can survive in artificial storage facilities.

Further to this point an understanding of seed dormancy and stored seed longevity is important. Species that crop well some years and then don't for several seasons (as mentioned above) may also be a species that has a short seed viability timeframe. An example of this is Coachwood, *Ceratopetalum apetalum* this plant can be stored as a germinated seedling and have resources for growth starved from it to keep it in a dormant seedling stage (similar to privet seedlings under a canopy of mature privet). Individuals are potted on when required and respond well once given more favourable conditions.

For more "conventional" species seed storage is a practical method in order to readily have on hand local propagules for future use. Conditions that lead to best practice for seed storage include the following-

- Thoroughly cleaned as much as possible down to pure seed.
- Low as possible moisture content (MC), i.e. dry (best state is between 8 and 15% MC)
- Airtight container/ vessel for storage.
- Lightproof container/vessel for storage
- Even temperature for duration of storage; ideally refrigeration as it is low humidity and a constant 4 degrees Celsius approximately.
- Away from pests/predators
- Detailed labelling.

It is paramount to have good record keeping associated with stored seed for future needs and cross referencing details referring to individual seed lots. This should include but is not limited to-

- Identifying the seed lot with a batch number for cross referencing to other data bases.
- Initial cleaned seed weight,
- Collection date,
- Location of collection,
- Number of parent plants collected from,
- Dates of cleaning and sealing container,

- Names of collector(s),
- Specific site details if applicable i.e. collected from endangered ecological community, soil type, length of time since fire.

Further details such as viability tests on seed lots to ascertain germination rates and volumes needed for future sowing; and amounts sown to date from individual seed lots can be assigned to a computer database. This system also is invaluable for report production.

## Licensing

In order for some level of procedure and governance to accompany seed collection from public land; seed collection is usually (hopefully) carried out with the consent and knowledge of the land owner. Generally written permission must be obtained for seed collection from all public land.

Collection from National Parks land managed by the Department of Environment and Conservation involves the application for a scientific license where permission will only be granted for a demonstrated end use of the seed.

## Further Resources

### Flora Bank

Is very informative; probably the foremost site for seed information. This site has a large number of very specific guidelines (10 in total) for all facets of dealing with seed and revegetation. [www.florabank.org.au/](http://www.florabank.org.au/)

### Sydney CMA

[www.sydney.cma.nsw.gov.au/index.php?option=com\\_content&task=view&id=26&Itemid=47](http://www.sydney.cma.nsw.gov.au/index.php?option=com_content&task=view&id=26&Itemid=47)

### Greenweb Sydney

[forum.greeningaustralia.org.au/viewforum.php?f=7&sid=3e23cbf5ec44413baebb6d6c62d92cf4](http://forum.greeningaustralia.org.au/viewforum.php?f=7&sid=3e23cbf5ec44413baebb6d6c62d92cf4)

### Sydney Royal Botanic Gardens

[www.rbgsyd.nsw.gov.au/conservation\\_research/Conservation\\_and\\_Seedbank/nsw\\_seedbank/seedquest\\_nsw](http://www.rbgsyd.nsw.gov.au/conservation_research/Conservation_and_Seedbank/nsw_seedbank/seedquest_nsw)

### Bush Regeneration Online Forum

[www.envirotalk.com.au:80/forum/index.php?](http://www.envirotalk.com.au:80/forum/index.php?)

### Greening Australia

has various seed related fact sheets on their website too. [www.greeningaustralia.org.au/GA/NSW/](http://www.greeningaustralia.org.au/GA/NSW/) or [www.greeningaustralia.org.au/](http://www.greeningaustralia.org.au/)

## Contribute to the ANPC Conference: Our declining flora - tackling the threats

The conference will be held at Mulgoa in April (See back page for more details) and the organisers are aiming for a balance of science and practice.

Do you have an idea for a paper or poster and want to check if it is suitable? Bob Makinson from ANPC would be happy to hear from you. Call 0408 116 448.

Abstracts with contributors details are required by February 15 2008.

# AABR field day: vegetation classification survey

**Wednesday the 19th of September was a gorgeous day for a walk around Field of Mars Reserve to discover and observe the vegetation communities of Ryde.**

**We all met outside the entrance and Gith Strid-Nwulaekwe, Environmental Monitoring Officer from Ryde Council, orientated us to the layout of the reserve with 2 excellent maps of the area.**

**After the entire group had gathered we moved to the survey site where Chris Melrose discussed her project and prepared us for an interesting afternoon enjoying the plant community.**

## Summary points of Chris's discussion

The aim of the projects in 2006 & 2007 is to assess the Flora and Fauna biodiversity within Ryde Council. Vegetation lists (including weeds) were completed for all reserves and quadrats were erected in areas of high biodiversity. There have been 16 quadrats erected in the last two years. In 5 years the survey will be reassessed to observe if there is an increase or decrease in biodiversity.

The vegetation classification model used for the survey was developed by Mark Tozer and is currently used by the Department of Environment and Climate Change in NSW. This model provides a quantitative description of biodiversity, which can then be compared to future surveys. Throughout NSW the NPWS has set up 500 quadrates to assess the vegetation. The NPWS has already gathered Ryde Council data on this project and added it to its data base.

Firstly, quadrats are erected measuring 400m<sup>2</sup> (20m X 20m). Then an assessment of the vegetation cover is made using the Braun-Blanquet scale used by Tozer, which was developed by (Poore 1955). Each plant is counted within the quadrat to measure the foliage cover.

- 1 = rare, few individuals present, cover < 5%
- 2 = uncommon & cover < 5%
- 3 = common & cover < 5%
- 4 = very abundant & cover < 5% or between 5-20% cover
- 5 = 20% - 50% cover
- 6 = 50% - 75% cover
- 7 = 75 - 100% cover

within the quadrat the percentages are as follows:

- 1m x 20m = 5%,
- 4m x 20m = 20%,
- 10m x 20m = 50%,
- 15m x 20m = 75%

Weeds were also listed in the quadrats. The setting up of a quadrat requires two people and takes around half a day to complete (including the Braun Blanquet).

Survey equipment consisted of 30m tape, iron stakes, biodegradable tape and information sign.

Chris pointed out that for the information to be statically valid random samples needed to be implemented and in this project random sampling was not used. Areas instead were selected to best represent the plant communities because most bushland reserves are so small.

There are three Endangered Ecological Communities in the Field of Mars: Estuarine Complex, and the two communities visited on this trip; the Shale/Sandstone (high sandstone) Transition Forest and Turpentine-Ironbark Margin Forest. The group was able to observe the endangered *Pimelia curviflora* var *curviflora* in flower and *Epacris purpurascens* var *purpurascens*, which had just finished flowering.

Trees observed at the two sites were:

- *Eucalyptus haemastoma* x, *E.racemesa*, Scribbly gums
- *Syncarpia glomulifera* spp. *glomulifera*, Turpentine
- *Eucalyptus resinifera*, Red mahogany

The survey showed areas lacking in diversity. There was always low diversity in shrub or ground cover, which was caused by various problems such as proximity to an edge, mulching, stormwater or lack of fire.

## Community involvement

In 2005 a local botanist Paul Kubiak published "Native Plants of the Ryde District" with a very comprehensive plant list and comments on rare and uncommon plants. This document was a useful base from which to work as well as lists kept by volunteers and bush regeneration contractors.

All quadrats are mapped by using a GPS and Council has incorporated the vegetation community mapping into the council GIS.

The rest of the afternoon was spent walking through Field of Mars Reserve observing the plant communities and its unique plant species. Many different orchids were in flower and it was a great treat to observe the diversity of the reserve. A highlight of everyone was the endangered *Pimelia curviflora* var *curviflora*.

## Conclusion

The day was a valuable experience with lots of information to help our understanding of plant community classification. Surveys for Flora and Fauna reports are essential and Chris presented a detailed description of the process involved in gathering Flora data. Her use of the Braun-Blanquet cover scale and classification model developed by Mark Tozer when doing the survey gave quantitative data that could be reevaluated in the future.

**Wendy Kinsella and Chris Melrose**

# Biodiversity research

Extracts from the newsletter of the NSW Biodiversity Research Network

## Successful Translocation of the Bridled Nail-Tailed Wallaby

The Bridled Nail-Tailed Wallaby (*Onychogalea fraenata*) once ranged over eastern Australia from Victoria to North Queensland but, as European settlement progressed, its numbers dropped dramatically due in part to hunting in the early 1900s. For almost 40 years, it was thought to be extinct until a fencing contractor discovered a remnant population on a property in central Qld. In 1996, a group of animals were introduced into Idalia National Park, in central-western Qld and about five years after the re-introduction the number of animals was estimated at about 1000. This has decreased to 200 recently due to drought and predation by wild dogs; however, this is still considered a healthy population. Read the entire Catalyst story at: [www.abc.net.au/catalyst/stories/s2056529.htm](http://www.abc.net.au/catalyst/stories/s2056529.htm)

## Using Fire to Fight the Giant Rush in Wetlands

Extremely dry conditions in the Murray River Catchment have provided the opportunity for Forests NSW to treat areas of the Moira Lake and Reed Beds Wetlands with fire in order to reduce the coverage of Giant Rush (*Juncus ingens*). The reed is native but has become locally invasive according to the regional ecologist/hydrologist of Forest NSW, Gary Miller. Burning is one of a range of tools used to increase plant diversity and increased the foraging habitat for waterbird species in the wetlands. For more information, read the story at [www.dpi.nsw.gov.au/aboutus/news/bush-telegraph-magazine/spring-2007/wetlands](http://www.dpi.nsw.gov.au/aboutus/news/bush-telegraph-magazine/spring-2007/wetlands)

## Farmers Return Water and Life to Rocky Mouth Creek

Drainage at Rocky Mouth Creek over the past 150 years dried out the soils, leading to the release of sulphuric acid and the death of many fish. The creek is located in the Richmond River subcatchment, near Woodburn in north-eastern NSW. Local farmers installed water control structures in early August to water the acid sulphate soils. The wetlands appear to be reviving, with the arrival of broilgas, nesting black swans, frogs, fish and water couch. For more information contact project manager Simon Walsh at [simon.walsh@dpi.nsw.gov.au](mailto:simon.walsh@dpi.nsw.gov.au).

## Adding Wood Increases Stream Biodiversity

Victorian research has found adding wood to streams in cleared agricultural areas increases the richness of most functional feeding groups in the stream. Researchers introduced wood in eight streams in intensively grazed regions and measured the effect on aquatic macroinvertebrate communities. Of all sampled habitats, wood supported the greatest density of families and was colonised by all functional feeding groups. Read the abstract 'Does adding wood to agricultural streams enhance biodiversity? An experimental approach by Lester et al in Marine & Freshwater Research at [www.publish.csiro.au/nid/126/paper/MF06198.htm](http://www.publish.csiro.au/nid/126/paper/MF06198.htm).

## Weed Potential of Biofuels

The Invasive Species Council has recently released a report assessing the weed threat posed by biofuels in Australia. The report makes several recommendations and states that Government and industry should work together to ensure that emerging biofuel industries operate sustainably and do not worsen Australia's weed problems. To read the full report, go to: [www.invasives.org.au/issues/biofuels.html](http://www.invasives.org.au/issues/biofuels.html)

## Weed Warriors

This is a national program aimed at encouraging students to join with land managers and community groups to implement a biological control program for a regional priority weed. Schools, community groups and land management agencies map weed infestation, breed biological control agents in classrooms and monitor the impact and spread of the biological agent. The program is being co-ordinated by state government agencies in NT, Qld, NSW, Vic and SA. [www.weedwarriors.net.au/index.html](http://www.weedwarriors.net.au/index.html)

## Salt to Kill Water Weed

The NSW Department of Primary Industries will begin salting Wallagoot Lake, between Tathra and Merimbula in the south-east of NSW, in an effort to eradicate the invasive aquatic weed *Caulerpa taxifolia*. The outbreak is small and it is hoped that the use of salt will be able to kill it within a few days and prevent it spreading further. For the full media release see: [www.dpi.nsw.gov.au/aboutus/news/recent-news/fishing-and-aquaculture/caulerpa-wallagoot-lake](http://www.dpi.nsw.gov.au/aboutus/news/recent-news/fishing-and-aquaculture/caulerpa-wallagoot-lake)

## Good News for Native Fish in the Murray-Darling

Despite the prolonged drought and historic low levels of water in the Murray-Darling Basin, native fish populations are rising and the battle against the European carp is gathering pace. Read more in the latest MDBC native fish strategy report at [www.mdbc.gov.au/subs/fish-info/NFS\\_Annual\\_implementation\\_report2005-06/index.htm](http://www.mdbc.gov.au/subs/fish-info/NFS_Annual_implementation_report2005-06/index.htm)

## No Waterbirds at the Macquarie Marshes

Richard Kingsford from the University of NSW has been surveying waterbirds at the Macquarie Marshes for 22 years but this year they did not find a single bird. "This will be the lowest count ever of waterbirds in 25 years," he says. In the 1980s, they averaged 20,000 birds from more than 20 species. In the 1990s, this dropped to 5000 from 13 species and since 2000 they have averaged 600 from 9 species. Kingsford says too much water is being taken from the system for dams and irrigation and reform is too slow compared with the pace of deterioration. This is the seventh year there will be no breeding event in the Macquarie Marshes. For the full media release, read the news at: [www.theaustralian.news.com.au/story/0,25197,22663693-5006784,00.html](http://www.theaustralian.news.com.au/story/0,25197,22663693-5006784,00.html)

# Controlling anredera

*From the 'envioweeds list server.'*

**To answer some queries about controlling Anredera, Tim Scanlon shared some of his experiences in NSW north coast subtropical situations**

## 1. Effectiveness of treatment eg percentage of tubers killed

100% glyphosate scrape and paint seems to kill mainly the above ground part of the plant, so that there is regrowth from tubers.

Scrape and paint with Vigilant® (picloram) seems to kill close to but not quite 100% Follow up is certainly required (as with all control techniques)

## 2. Variations in techniques, timing, herbicides, strengths

Most of our control has been tried when the vine is actively growing ie Dec to May

## 3. Time till death and how long the treated vine should be left undisturbed.

We try not to disturb for at least a month.

Using Glyphosate result in its dying within a week or two but with Vigilant® seems to take quite a bit longer - maybe 5 weeks

## 4. The effectiveness of the method in multi-vine situations where it is difficult to find and paint all vines

Scrape and paint is extremely time consuming.

Wild tobacco seems to be a great support for it, enabling it to get higher into other trees. Veils are created between them.

Of course balloon vine creates even bigger veils. Moth vine is one of the worst too – it grows very thick with a large biomass and fruits high in the tree. In the Upper Bellinger the project I was involved in concentrated on riparian zones but moth vine is throughout the landscape being wind dispersed.

Lantana, wild tobacco and ground-based madeira vine can make it EXTREMELY time consuming to control these weeds. The hardest part is the initial knock down. Follow up needs to occur very soon after (say initial control Dec/Jan, follow up March at very latest in subtropics) whilst it's still on the ground otherwise access is again difficult.

Vigilant® is much easier just because you aren't dealing with paint brushes, application bottles etc. You just need a knife (in your belt) and a bottle in your hand (oh, of herbicide that is!)

We discussed whether we should have controlled all vines or left moth vine in Upper Bellinger but I feel you have to control them all, they are all capable of devastation.

*Editor's note: under the NSW Threatened Species Conservation Act 1995, Invasion and establishment of exotic vines and scramblers is listed as a key threatening process in Schedule 3 of the Act.*

Cats claw creeper (the worst of them all) seems a little more straight forward / not quite as time consuming. With the Upper Clarence, Blaxlands Creek and Kangaroo Creek Catchment Management Authority projects in the Clarence catchment, cut and paint with glyphosate (1:1.5) has been working well, follow up for ground infestations and seedlings is important, with 1:100 glyphosate also effective.

## 5. Comparison of method with spraying or manual techniques.

With Bellingen Urban Landcare (BULC) we have found manual techniques just too time consuming. For the areas I deal with, with NPWS work it just hasn't been an option either. BULC has had success with pulling it down and bagging and I used that effectively on Lord Howe Island but it's time consuming, involves a lot of people / coordination and if you miss one, away it goes again (so need increased follow up). It's hard to pull it down when you have other trees/shrubs/plants around as they "spray" around a bit as they hit branches etc. Then there's the branches themselves if you're pulling the vines down

## 6. Physiological information on Anredera (eg normal tuber life)

Hard to know there's so many and they're being produced and dropped all the time.

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# Mistletoe in our remnant woodlands: friend or foe?

**David Watson helps us understand why mistletoe is like red wine or chocolate. Why is there so much mistletoe around these days, and what can we do to get rid of it?**

As an ecologist working on mistletoe for the past ten years, I am asked this question routinely. Together with a group of research students and other collaborators, I have studied the interactions between mistletoe and animals, and the answers to these questions are becoming clearer.

Firstly, let's address the issue of mistletoe numbers. Historic data are few and far between, but it's fairly well established that mistletoe has become far more abundant over the past century. Interestingly, this pattern seems to be restricted to eastern Australia—in the wheat-belt of Western Australia the reverse has occurred, with mistletoe now absent from many areas.

To understand why they have become more abundant, we need to know more about the plants themselves and the processes that ordinarily keep them in check. Mistletoes are one of the few groups of native plants that rely on birds for both pollination and seed dispersal. Their seeds lack a protective coat and need to be deposited in a well-lit area in order to establish, using photosynthesis to fuel initial growth and penetration of the host's bark. As parasites, mistletoes rely on their hosts for all of their water and nutrient needs. By concentrating minerals in their tissues, they can divert water from their host. As such, mistletoe leaves represent a rich nutritional resource for leaf-eating animals, with a wide range of marsupials (especially possums and gliders) and leaf-eating insects (especially butterflies and lerp) preferentially feeding on mistletoes.



*Drooping mistletoe Amyema pendula: a common parasite of eucalypts. Photo: DM Watson.*

When we consider the changes made to Australia's forests and woodlands since settlement, many of these interactions have been modified. Most of the woodlands have been cleared, and the amount of 'edge' habitat has increased greatly. The large hollow-bearing trees required by possums and gliders are less abundant, and the nectar-bearing shrubs that support butterflies have been overgrazed. So, the average tree is now less shaded and less frequently visited by herbivores, greatly increasing the likelihood of mistletoe establishment and growth. Unlike many native plants, mistletoe has no defences against fire, and the

occasional fire through an area removes most of them without killing the trees. In many regions, the frequency and intensity of bush fires has decreased.

Combining these interactions, it's clear that we have inadvertently made many agricultural landscapes ideal for mistletoe growth, removing many of the factors that ordinarily prevent them establishing, growing and spreading.

Interestingly, these increased numbers of mistletoe aren't necessarily problematic. Indeed, my group has been finding a whole range of benefits associated with mistletoes in remnant woodlands. Sites with more mistletoe consistently support a higher number of woodland birds.

This is partly due to the popularity of mistletoe as a food

source, and partly due to the use of mistletoe as a nest site. We are examining this in detail in a large-scale removal experiment near Albury. Called RIFLE (Resources in Fragmented Landscapes Experiment), this study involves long-term monitoring of 40 grassy box woodland remnants on private land in the upper Billabong Creek catchment. We have removed all mistletoes from 20 of the remnants, and are keeping track of the birds, mammals, reptiles and selected insects living in the woodlands over the next fifteen years. Dramatic differences are already clear between the removal and the control sites, with many woodland-

dependent birds now wholly restricted to those sites with mistletoe. While due partly to the fruit, nectar and nesting sites afforded by mistletoe, leaf-litter is also involved, and it is this component that may have the most pervasive effects on the overall habitat. Wendy March recently completed her PhD research which entailed the first study ever conducted on mistletoe litter, and the findings were remarkable.

Unlike most plants, mistletoes do not try to conserve nutrients or water—if they need more, they simply take it from their hosts. So, when they drop their leaves, they don't withdraw any nutrients or water, they simply drop them as is. This attribute, coupled with the high concentration of various minerals in mistletoe tissue, makes mistletoe litter surprisingly rich. Of fifteen elements examined, mistletoe litter contained significantly higher concentrations of eleven elements. So, pound for pound, mistletoe litter is a far higher quality litter than regular gum leaves. But mistletoes have another trick up their sleeves. Unlike eucalypts that grow reinforced, chemically protected leaves that they retain for many years, mistletoes grow flimsy semi-succulent leaves that they replace frequently. In leaf-litter trials carried out near Albury, mistletoe leaves were shed six times more frequently than the leaves of their eucalypt hosts. The combined effect of these differences is striking: areas beneath mistletoes have more litter, higher-quality litter, and more reliable litter-fall throughout the year. This leads to pronounced changes in the availability of every element examined in the soil, leading to a broad range of responses in understory plants. Ongoing research will explore these effects in more detail, and look at changes in germination rate, water retention and the diversity of soil-based microbial communities.

Yet, just like chocolate and red wine, you can have too much of a good thing! Trees can become infected with such high numbers of mistletoe that they can no longer support themselves, leading to reduced growth rates

and, in extreme cases, premature death. Rather than being the cause of tree mortality, however, mistletoe is quite often a symptom: an indicator of a broader imbalance. High infection levels are often associated with paddock trees or trees on the edges of woodland patches. These trees are often subjected to higher light levels, lower visitation by possums and gliders, infrequent fires and high nutrient levels (from run-off and domestic stock resting in the shade). While mistletoes can be pruned off, this is expensive, time-consuming and rarely practical. While it might be worthwhile for particular trees of high-conservation or historic value, mistletoes typically return to their original densities within a year or two, since the underlying drivers remain unchanged. By restricting stock access, replanting understory shrubs, installing a few nest boxes and having the occasional controlled burn, mistletoe numbers will return to a more manageable level and the overall community will benefit as well.

In sum, mistletoes are a poorly known group of native plants that have a disproportionate influence over our native woodlands and forests. By altering the extent and disturbance regimes in these woodlands, we have unwittingly removed many of the factors that once kept them in check. While often seen as weeds or destructive invaders, these native plants actually play critical roles in these habitats. By providing food and shelter for native animals, and shedding high-quality litter, they act as keystone resources, boosting diversities of native animals and enhancing the biodiversity values of our remaining woodlands and forests.

**David M Watson is an Associate Professor in Ecology at Charles Sturt University.**

**This article first appeared in edition 9 of *Bush Matters*, the newsletter for the DECC Conservation Partners Program**



*Flowers of Amyema cambagei, needle leaf or sheoak mistletoe that closely resembles its Casuarina hosts. Photo : DM Watson.*



*Flowers of Amyema preissii, wire leaf mistletoe commonly seen growing on acacias. Photo: DM Watson.*

# Events and Conferences

Date	Title / Details	Venue	Organiser	Contact
Wednesday March 12 1:00-3:00	Walk and Talk <b>Jamison Creek restoration project</b>	Emu Plains, NSW	AABR	Janet Rannard, Penrith City Council 02 4732 8088 0407926386, jrannard@penrithcity.nsw.gov.au.
April 21-24	Australian Network for Plant Conservation Inc (ANPC) 7th National Conference - <b>Our declining flora - tackling the threats.</b> Threatening processes include human factors like land-clearing, fire mismanagement, and poor planning, geophysical ones like climate change, and biological ones like invasive weeds, animals and pathogens. They interact and operate at the smallest of local scales up to landscape level. Tackling threatening processes is essential, whether for local patch preservation, threatened species management or whole-landscape protection. It requires pooling the best available science and practical experience. This conference will bring together scientists, conservation managers and on-ground practitioners to demonstrate and discuss techniques for managing threats, share experience and identify knowledge gaps. Papers, workshops and field trips will present the latest science and case studies from Australia and New Zealand.	Mulgoa NSW	ANPC, Mount Annan Botanic Garden	ANPC GPO Box 1777 Canberra ACT 2601, Australia Ph: 02 6250 9509 Fax: 02 6250 9528 anpc@anpc.asn.au www.anpc.asn.au
Wednesday April 23 1:00-3:00	Walk and Talk <b>Wolli Creek Regional Park</b>	Earlwood, Sydney	Wolli Creek Preservation Society, DECC and AABR	RSVP: Paul Ibbetson, DECC 02 9337 7023 0438 274 749 ibb56@yahoo.com.au
May 18-22	16th Australian Weeds Conference <b>Weed Management in 2008 - Hot Topics in the Tropics.</b>	Cairns Convention Centre QLD		16awc@eventcorp.com.au

**Seasons greetings to our readers !**  
wishing you all a year of rewarding and successful regenerating  
in 2008

from the AABR team

# AABR

was established in 1986 out of concern for the continuing survival and integrity of bushland and its dependent fauna in or near bushland areas, and seeks new members and friends for promoting good work practices in natural areas. The Association's aim is to foster and encourage sound ecological practices of bushland management by qualified people, and to promote the study and practice of Bush Regeneration.

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